

# ANNUAL REPORT 1

## HCIA Disease-Specific Evaluation

NOVEMBER 25, 2014

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## Executive Summary

In July 2012, the Center for Medicare & Medicaid Innovation (CMMI or Innovation Center) announced the first round of 108 Health Care Innovation Awards (HCIA). The HCIA program supports the testing of new care-delivery approaches, including those that leverage technical applications, workforce training, deployment of new delivery models, and ongoing improvement informed by rapid-cycle feedback.

The focus of this evaluation report is the subset of 18 HCIA awardees that are targeting patient populations with specific diseases or diagnostic profiles. These awardees operate in 28 states and territories. Because of their disease profiles and the complexity of their care needs and social situations, these patient populations face particular risk of receiving fragmented, inadequate, and inconsistent care. The HCIA disease-specific awards focus on seven conditions issued priority status because of their costs, prevalence, seriousness, and potential impact of improved treatment; they are Alzheimer's disease and dementia; cancer; cardiovascular disease (CVD) and stroke; chronic pain; diabetes; end-stage renal disease (ESRD); and pediatric asthma.

This report contains initial findings from year one of a four-year evaluation project. Findings stem from qualitative information gathered from all 18 awardees through site visits and review of awardee documentation. We also present limited quantitative findings for two awardees, with more extensive analysis of both qualitative and quantitative data for all awardees planned for next year.

The Executive Summary includes (1) a brief overview of data and activities leading to the findings presented in this report and (2) preliminary findings in three areas—program components, implementation experience, and program effectiveness. Because our data and analyses are still incomplete, key messages will likely evolve as we learn more about the awardees in subsequent years.

### Data and Methods

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This evaluation uses a mixed-methods approach, including collection of qualitative and survey data and quantitative analysis of claims data and self-monitoring data, where available. In year one, we reviewed program documents, collected qualitative information, retrieved Medicare claims data, and conducted preliminary analyses.

For our qualitative data collection, we conducted 36 telephone interviews with program leaders and created 18 conceptual models of program components. We also conducted 17 site visits to 24 sites, including 15 focus groups and more than 100 structured interviews. In this report, we systematically reviewed and summarized the qualitative information; we also plan to address research questions more thoroughly in year two with more detailed analysis of these data as well as new qualitative data.

We also made progress on claims data analysis. We established 23 data-sharing agreements and received 13 files with beneficiary information. Our quantitative evaluation assesses the relationship between awardee programs and measures of health, quality of care, and health care costs and utilization using two approaches. First, we link identifying information for program participants to their Medicare and/or Medicaid claims depending on the population the awardee serves. Second, we will compare costs and

utilization measures between participants in the program and—where available—an external comparison group. These external comparison groups will be derived from matched patients enrolled in Medicare, Medicaid or CHIP, and enable comparison between HCIA programs and usual care. We were able to retrieve claims data and create analytic files for several awardees.

In this report, we include claims-based quantitative analyses for two awardees—Trustees of Indiana University (hereafter called “Indiana”) and Innovative Oncology Business Solutions (IOBS). For IOBS and Indiana’s ambulatory care interventions, we conducted a post-intervention longitudinal analysis to observe differences in outcomes over the course of the intervention and to make inferences about the intervention’s impact on trends over time. In both instances, we faced serious challenges selecting viable comparison groups efficiently based on claims. Specific concepts, such as presence of depression or a “newly” diagnosed cancer episode, are difficult to identify through claims. We are working on addressing these challenges and including comparison groups for these awardees in subsequent reports.

In future annual reports, we will include post-acute care (PAC) interventions, where we will conduct a difference-in-differences analysis comparing the average outcomes between an awardee’s patients and a comparison group in the pre- and post-intervention implementation periods, enabling us to draw causal inferences.

If awardees provide identifying information on participants and Medicaid claims data become available, we expect quantitative analysis for all 18 awardees in the disease-specific portfolio will be available in year two of the evaluation.

## Program Components

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To characterize program components for all 18 awardees, our team reviewed key program documents, conducted telephone interviews with program staff, and conducted site visits. Site visits included key informant interviews, observation of program implementation, and patient or caregiver focus groups. Our initial review of program components suggests:

- ***Most of the disease-specific awardees engage in a set of activities that fall under the broad theme of care coordination.***<sup>1</sup> Care coordination refers to interventions and activities that focus on filling gaps in clinical care and directly supporting patients outside of traditional care processes. These activities include: continuous care management; enhanced communication and coordination between providers and patients; and facilitating linkages to resources outside the health care system. Additional qualitative data collection and analysis will allow us to assess the individual activities that fall within each of these domains and determine how they are divided among staff.
- ***Most of the disease-specific awardees engage in a set of activities that fall under the broad theme of education.*** Education happens at both the participant and community levels. Several awardee interventions include an education component focusing on self-management tailored to the participant. Others provide a more general education about issues related to the participant’s condition. Even awardees that do not have an explicit education component routinely use the

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<sup>1</sup> Seventeen of 18 awardees have a care coordination element to their intervention.

paradigm of education, engagement, and activation in interactions with participants. Five awardees conduct outreach and education activities targeted to the broader population rather than, or in addition to, individual participants enrolled in their intervention.

The following exhibit summarizes program components and the distribution of awardees in each category. Awardees perform a constellation of activities for their Innovation Award, and each of the 18 programs includes several components reflected below. For an awardee-level summary of specific program components, please reference Exhibit 1.1 and Appendix B.

Program Components
<b>Care Coordination</b>
<b>Clinical care management/disease management:</b> Developing and managing a patient’s plan of medical care, including assessing patient needs, developing and managing care plans, and monitoring continuously (16 awardees)
<b>Communication/service coordination:</b> Facilitating and enhancing communication and coordination between health care providers in different settings (16 awardees)
<b>Addressing needs beyond the health care system:</b> Identifying and coordinating services related to health, wellness, and care goals outside the health care system, including financial resources, education, support groups, social service programs, and transportation (13 awardees)
<b>Education</b>
<b>Patient education/engagement:</b> Information, training, or coaching provided to participants or their informal caregivers to promote participants’ understanding of and ability to carry out self-care tasks, including support for navigating their care transitions, self-efficacy, and behavior change (17 awardees)
<b>Community education/outreach:</b> Activities targeted to the broader population rather than, or in addition to, individual intervention participants to help both individuals and the community understand the prevalence and prevention strategies for certain conditions (5 awardees)
<b>Telehealth</b>
<b>Virtual specialty consultations:</b> The use of telemedicine to conduct consultations and provide remote diagnostics with specialists for participants (4 awardees)
<b>Home telemonitoring and teleconsultations:</b> The use of electronic devices located in participants’ homes to transmit their self-monitoring readings to a provider and/or to virtually contact nurses via video-chat software (2 awardees)

### Implementation Experience

Qualitative data collected to date have provided initial insight into awardees’ experiences with implementation.

- ***A majority of awardees devoted much of the first year of their awards to getting their projects up and running.*** Awardees expanding existing programs managed more rapid implementation than those starting completely new interventions. Using provider information systems to support interventions posed particular challenges. Many awardees found that electronic systems were not designed to meet program needs. Awardees experienced unanticipated delays in building new systems or making changes to existing systems. It helped to have a member of the program staff in a dedicated role as a

liaison between the program and IT teams—to translate technical needs to the IT departments or vendors and to monitor progress on a daily basis.

- ***New staff roles for HCIA interventions often focus on spending more time with individual patients to fill gaps in addressing unique patient needs.*** Overall, discussions with program and frontline staff showed that staff involved in care coordination must have flexibility, adaptability, and a willingness to learn. This applies both to clinical staff functioning in a care manager or care coordinator role and to non-clinically trained or lay staff. For clinical care coordinators or managers, a strong clinical background appears to be important as well. For patient navigators and community health workers, discussants cited interpersonal skills, the ability to empathize, and a connection to the community or personal experience with the disease as critical. Anecdotally, individuals in these new roles reported high satisfaction with their jobs, especially noting the time they are able to work closely with participants and the relationships formed. However, discussants also noted concerns regarding burnout in several cases. Burnout typically stemmed from the expectations and demands of program participants, unclear boundaries around specific activities, and insufficient support for the program.
- ***More than half of the disease-specific awardees have already met or exceeded their overall participant enrollment targets.*** Programs falling short of recruitment targets noted delays in hiring staff and engaging partners to recruit participants, issues with training and retaining staff charged with recruitment, and restrictive eligibility criteria that may have unnecessarily limited the potential pool of participants.
- ***Differences in staffing, resources, and community partners play a critical role in implementation for awardees with multiple intervention sites.*** The ability to adapt a program to a site’s specific circumstances has helped facilitate implementation and may provide lessons for replicability and scalability. We will continue to assess the integral components of awardee interventions and fidelity across different sites.

## Program Effectiveness

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While there is limited quantitative data available at this point in time, we were able to retrieve Medicare claims information for two awardees. As noted above, this report includes post-intervention longitudinal analyses for Indiana and IOBS.

- ***Preliminary results were unable to detect statistically significant changes in resource utilization and cost, in part due to small sample size and limited number of post-intervention periods.*** Across all the interventions, estimates of resource use and costs were available only through the end of 2013, yielding no more than five quarters of post-intervention data. Awardees were often still in the early stages of implementing their programs at this point and had enrolled relatively few participants, resulting in small sample sizes for analysis (ranging from 300 to 1,000 participants).

From the limited data available, we did observe some preliminary trends. Both Indiana and IOBS experienced statistically significant reductions in emergency department visits, with one awardee (IOBS) also seeing significant reductions in inpatient hospitalizations and total cost of care. In some cases, these findings may be due to the natural progression of the disease rather than intervention effects. It is important to note that in both of these instances we have not yet employed a comparison group and cannot, therefore, attribute reductions in utilization and cost to the interventions. We are working to frame

these results and subsequent results in terms most useful for program and policy officials, such as application of Bayesian principles. Future analyses will include additional quarters of post-intervention data as well as larger sample sizes, claims, and comparison groups, all of which will increase our ability to draw inferences on the effectiveness of the awardee programs.

Finally, our team also gathered some preliminary information on awardees' approaches to sustaining programs beyond HCIA funding. HCIA interventions fund services not typically reimbursed under current payment systems. Many awardees are attempting to demonstrate the value of their programs and are talking with insurers about opportunities for sustaining the programs. While several awardees noted that they have institutional support for sustaining their HCIA interventions in some capacity, it is still too early to know exactly what will continue once the awards end.

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In year two, we plan to expand our quantitative analysis to include all awardees, conduct an additional round of site visits and focus groups, and use awardee program data to supplement claims-based analytic models. To help plan our qualitative analysis and activities, we will meet with CMMI early in year two to prioritize research questions, new data collection, and analytic activities. Our work will include greater attention to the effectiveness of different workforce models, intervention sustainability, and factors driving program effectiveness.

## Introduction

In July 2012, the Innovation Center announced the first round of 108 HCIA Program awardees. In this round, Centers for Medicare & Medicaid Services (CMS) funded close to \$900 million in three-year cooperative agreements to health care provider organizations and other stakeholders. Under the three-year cooperative agreement (which runs until July 2015), the HCIA Program supports the testing of new care delivery approaches, including those that leverage technology, workforce training, rapid deployment of new models, and ongoing improvement informed by rapid-cycle feedback.<sup>2</sup> These projects fund interventions meant to lower expenditures and improve health and quality of care for those with special health care needs. The Innovation Center organized the 108 first-round awardees into several portfolios, including the “disease-specific” portfolio described below.

### Disease-Specific Innovation Awards

The focus of this evaluation is the subset of 18 awardees operating in 28 states and territories that target patient populations with specific diseases or diagnostic profiles. These participants have specific chronic conditions, are medically fragile, and live in the community. Their treatment may involve multidisciplinary care teams across various care settings for long durations. Because of their disease profiles, the complexity of their care needs, and their social situations, these participants face the particular risk of receiving fragmented, inadequate, and inconsistent care. Therefore, care coordination, disease management, and continuity of care play a particularly important role for these individuals.

The HCIA disease-specific awards focus on seven conditions issued priority status because of their costs, prevalence, seriousness, and potential impact of improved treatment: Alzheimer’s disease and dementia; cancer; cardiovascular disease (CVD) and stroke; chronic pain; diabetes; end stage renal disease (ESRD); and pediatric asthma. Each awardee project aims to improve clinical processes, intermediate clinical outcomes, and provide the participant quality of life while reducing use of acute health care as well as costs for the target condition. Exhibit 1.1 below summarizes basic information related to all 18 awardees.

**Exhibit 1.1:** Introduction to HCIA Disease-Specific Awardees

Awardee	Target Population	Project Focus	Primary Payer
Alfred I. duPont Hospital for Children NCC-W of the Nemours Foundation (Nemours)	Children with asthma	Family-centered medical home model complemented by community outreach and education	Medicaid/CHIP
Christiana Care Health Services, Inc. (Christiana)	Acute-care post-myocardial infarction and revascularization patients	Coordination of care transitions and longitudinal care management	Medicare

<sup>2</sup> Chin M, Covinsky K, McDermott M, Thomas E. Building a research career in general internal medicine from the perspective of young investigators. *J Gen Intern Med.* 1998; 13: 117-122.

Awardee	Target Population	Project Focus	Primary Payer
Duke University (Duke)	High- and moderate-risk patients with diabetes as well as targeted county residents	Chronic disease management, self-management support, and community-wide patient education and health resources	Medicare/Medicaid
FirstVitals Health and Wellness, Inc. (FirstVitals)	Diabetic patients with diabetic peripheral neuropathy and patients with diabetes who show signs of other microvascular disease	Chronic disease management	Medicaid
Health Resources in Action, Inc. (HRIA)	Children with poorly controlled asthma	Asthma care management	Medicaid/CHIP
Innovative Oncology Business Solutions, Inc. (IOBS)	Newly diagnosed or relapsed patients with seven selected cancers	Patient-centered medical home model for comprehensive outpatient oncology care	Medicare
Joslin Diabetes Center, Inc. (Joslin)	Patients with diabetes or at high risk for diabetes and their friends/family	Community-based series of health and lifestyle group education sessions that aim to improve key diabetes-related biomarkers and re-engage participants with the health care system	Medicare/Medicaid
Le Bonheur Community Health and Well-Being (Le Bonheur)	Children and young adults with high-risk asthma	Asthma care management	Medicaid/CHIP
Mountain Area Health Education Center, Inc. (MAHEC)	Patients with chronic pain who are on opioid medications	Chronic-pain care management program, community collaborative-based prevention intervention, and provider education	Medicaid
Ochsner Clinic Foundation (Ochsner)	Acute-care patients with ischemic or hemorrhagic strokes or transient ischemic attacks requiring subsequent long-term post-stroke care	Telemedicine-enabled inpatient care coordination and monitoring, and one-year post-discharge post-stroke monitoring and education through home visits	Medicare
Regents of the University of California, Los Angeles (UCLA)	Patients with dementia	Care coordination and management, caregiver education and support	Medicare
The George Washington University (GWU)	Patients with incident or prevalent ESRD on peritoneal dialysis	Telemonitoring, teleconsultations, and monthly educational videos	Medicare
The Rector and Visitors of the University of Virginia (UVA)	Patients with advanced cancer, metastatic cancer, or locally advanced/recurrent loco-regional cancer needing palliative care	Proactive symptom monitoring, team-based coordination and palliative care support, and adverse symptom reduction through advances in radiation therapy	Medicare
The Trustees of the University of Pennsylvania (UPenn)	Advanced cancer patients with palliative care needs who are ineligible for hospice but are eligible for home care	Home-based comprehensive palliative oncology services integrated with home-care services	Medicaid/Medicare
Trustees of Indiana University (Indiana)	Elderly patients with dementia or depression	Care management through home visits	Medicare

Awardee	Target Population	Project Focus	Primary Payer
University of Alabama at Birmingham (UAB)	Elderly patients with cancer (active, advanced, or in remission)	Technology- and navigator-enabled care coordination and management	Medicare
Upper San Juan Health Service District (Upper San Juan)	Residents of Upper San Juan Health District (USJHD) at risk for cardiovascular disease and patients presenting with acute cardiac and stroke events	Cardiovascular early-detection screenings, wellness programs, telemedicine, paramedicine, care coordination, and patient navigation	Medicaid/Medicare
Vanderbilt University Medical Center (Vanderbilt)	Patients with congestive heart failure, chronic obstructive pulmonary disease, acute myocardial infarction, pneumonia, hypertension, or diabetes	Inpatient transition clinical care coordination and outpatient chronic-care management	Medicare

The projects in the disease-specific award group are diverse in terms of geographic location, populations served, project size, and intervention approaches. The size and geography of the populations that each awardee serves vary widely, with awardees serving from 300 to 140,000 patients and operating in up to seven states. In addition, the program interventions target patients with different sources of insurance coverage, such as Medicaid (15 awardees), Medicare (14 awardees), and CHIP (three awardees). Four awardees specifically target individuals enrolled in both Medicare and Medicaid, and five specify that private insurance may be a payment source. One program targets both low-income Medicaid beneficiaries and uninsured persons. Many projects focus on managing patient care across several settings using multidisciplinary care teams. Targeted care settings include primary care, outpatient care, inpatient hospital care, home health care, emergency rooms, community health centers, community-based mental health centers, skilled nursing facilities, and rehabilitation hospitals. The evaluation of the interventions will, therefore, take into account the unique qualities of each setting and any implicit variables that are present.

### Evaluation Goals

In this evaluation, we will assess whether each of the awardees has achieved better quality of care for individuals, better health for populations, and lower costs among Medicare, Medicaid, and CHIP beneficiaries. We will also identify how program elements such as organizational structure, geographic location, and workforce characteristics influence awardee outcomes. Our evaluation design incorporates measures and analyses tailored to the circumstances, populations, and interventions for each awardee. Finally, we will continue to work with the Innovation Center and meta-evaluation contractor to further align our methods with other HCIA evaluations.

Specific goals of the evaluation include:

- determine implementation effectiveness—that is, how well the awardees establish and operate their interventions;
- determine program effectiveness in terms of health outcomes, cost, quality of care (including patient safety), and cross-cutting and subgroup impacts;

- assess the effectiveness of training programs and the deployment, satisfaction, and performance of health care professionals and direct service workers in novel or redesigned roles;
- examine the impact on priority populations in terms of outcomes and cost; and
- identify contextual performance-affecting factors, both endogenous for the awardee and exogenous or environmental.

Our design will continue to deliver ongoing feedback to awardees to help them improve their interventions. It will also produce a summative assessment of program implementation and impact across the portfolio. As the independent evaluator, we will use data from each of the awardee intervention groups, parallel data from comparison groups, and qualitative methods to assess the overall effects and impacts of these 18 projects.

### Data Sources and Methods

This evaluation uses a mixed-methods approach, including collection of qualitative and survey data and quantitative analysis of claims data and self-monitoring data where available. This section provides an overview of the data sources and analytic methods used during year one of the project. We will first examine the qualitative data sources and then follow with an outline of our quantitative analysis of those awardees with sufficient data available for this report.

#### Qualitative Data Sources

The first year has focused on data collection, allowing us to draw on a range of qualitative data sources for this evaluation. The qualitative component allows us to characterize the intervention and the effectiveness of its implementation, as well as giving us the opportunity to examine the organizational and workforce factors that affect the program. We can also use the qualitative data to inform hypotheses of the underlying analysis of survey and administrative data. We can also examine and describe the intervention’s context and the mechanisms that underlie its impact—or lack of impact—on metrics of interest. Coding and analysis of qualitative data will begin in the second year of the evaluation.

**Exhibit 1.2:** Summary of Qualitative Data Sources and Timeline

Data Source	Description	Timeline
<b>Program documents</b>	Review of awardee documents, including HCIA Quarterly Performance Reports, HCIA Narrative Progress Reports, and Project Officer Reports	Ongoing
<b>Telephone interviews</b>	Semi-structured baseline telephone interviews with key informants, primarily core program staff from each awardee	December 2013–February 2014
<b>Site Visits Interviews</b>	Eight to ten interviews conducted during the annual visit to at least one of the awardee’s geographic sites per year. Interviewees include participants of key stakeholder groups involved in awardee interventions, including but not limited to, lead awardee staff; providers/practitioners, including newly trained staff; informatics team; evaluation/monitoring team; workforce training team; and partner organizations	Round 1: April–October 2014 Round 2: February–June 2015

Data Source	Description	Timeline
<b>Site Visits</b> Direct observation	Observation of program implementation in cases where appropriate and feasible—for example, in cases where it would be possible to observe clinic or office practices, education programs, or IT systems—or convening of program planners or administrators	Round 1: April–October 2014 Round 2: February–June 2015
<b>Site Visits</b> Patient/ caregiver focus groups or telephone interviews	One or two patient/caregiver focus groups were conducted per awardee site during each visit. We are conducting discussions with individual participants in person or by telephone at other sites in place of focus groups when focus groups are not feasible.	Round 1: April–October 2014 Round 2: February–June 2015

### Program Documents

We are reviewing documents available from each of the 18 HCIA awardees on an ongoing basis. These documents include:

- quarterly performance reports;
- quarterly report dashboards;
- operational plan milestone trackers;
- a self-monitoring plan;
- narrative progress reports; and
- project officer reports.

In the initial phase of the evaluation, we developed a profile of each awardee. The profiles contain data reported by all awardees related to HCIA-funded activities, such as data on direct and indirect participants, encounters, types of services offered, staffing, training, financial information, and awardees’ self-monitoring measures. The profiles also include information from narrative progress reports that provide updates each quarter on project activities, accomplishments, and challenges during the implementation process. We update the awardee profiles with data from the most recent awardee quarterly report to ensure that we use up-to-date information to inform the protocols developed for each site visit. Site visit information is also used to inform awardee profiles.

### Baseline Interviews

During the initial evaluability assessment, our team conducted baseline small-group interviews with key informants from each of the 18 HCIA disease-specific awardees. Interviews included a group of three to five program leaders from the awardee’s organization, primarily those who are most involved in the design, implementation, and monitoring of the HCIA awardee projects; for example, this may include each awardee group’s Medical Director, Project Manager, Program Director, and Chief Medical Information Officer. Interviews with each group lasted between 60 and 90 minutes. All baseline interviews took place during the first six months of the evaluation base year.

### Site Visits

Our evaluation team will ultimately conduct a total of two rounds of site visits per awardee in the disease-specific portfolio. The first round of site visits ran from April to September of 2014. The purpose of these

visits was to better understand awardees’ planning and implementation processes and progress. Exhibit 1.3 provides an overview of the timeline for the first round of site visits.

**Exhibit 1.3: First-Round Site Visit Schedule**

Visit Date	Site Name	Visit Date	Site Name
April 9	Innovative Oncology Business Solutions*	June 19–20	Joslin Diabetes Center (NM site)
April 21–22, Sept. 11	Christiana Care Health Services	June 24–25	FirstVitals Health and Wellness
May 7–8	UCLA	June 25–26	University of Alabama at Birmingham
May 12	Joslin Diabetes Center (DC site)	June 26–27, Sept. 17–18	Nemours Foundation
May 15–16	Duke University (Durham and Cabarrus Counties)*	July 1–2	University of Pennsylvania*
May 27	Joslin Diabetes Center (PA site)	July 7–9	Vanderbilt University Medical Center
May 27–28	Le Bonheur Community Health and Well Being	July 28–30	George Washington University*
May 29	Duke University (Quitman County)*	July 23–25	Indiana University
May 29–30	University of Virginia*	Aug. 5–6	Ochsner Clinic Foundation
June 8–9	Mountain Area Health Education Center	Oct. 6–8	Health Resources in Action
June 16–17	Upper San Juan Health Service District		

\*We conducted discussions with individual participants in person or by telephone at these sites in place of focus groups.

The second round of site visits, to be conducted during winter/spring of 2015, will document the evolution of the interventions with a focus on sustainability and scalability. These visits will also serve as an opportunity to discuss any questions raised by the secondary data analysis.<sup>3</sup>

**Interviews**

During each site visit, we conduct eight to 10 individual and small-group semi-structured key informant interviews, each lasting between 30 and 90 minutes. At each site, we speak with representatives from the following informant groups, as relevant to the intervention:

- core program team (e.g., principal investigator, project director, project manager);
- frontline staff (e.g., care managers, care coordinators, community health workers, triage nurses);
- clinical care providers not directly involved in the intervention;
- workforce training team and managers;
- program evaluation staff;
- information technology staff; and
- partner organizations (e.g., medium and small clinics, community-based organizations).

<sup>3</sup> As a number of awardees have multiple intervention sites that may be geographically dispersed, we may also use this second round to visit additional sites than was feasible during the first round of site visits. For example, Innovation Oncology Business Solutions (IOBS) works with seven cancer centers throughout the United States. During the first round of site visits, our visit was limited to the New Mexico Cancer Center, where IOBS is based. The University of Alabama at Birmingham works with 10 sites throughout the southeastern United States; during our initial site visit, we only visited Birmingham, Alabama.

We derived more specific topics from the evaluation domains and subdomains that the meta-evaluation contractor developed as well as from document reviews and baseline interviews. While the structure of the protocol ensures that we ask parallel questions across sites, each protocol reflects the specific intervention characteristics, population, and context of each awardee so that we focus on different objectives and hypotheses (e.g., workforce issues, team and organizational characteristics) at different sites.

For each respondent type, we have developed tailored discussion protocols so that both the topic and the tone of the questions are appropriate for the respondent’s role in the intervention. Topics addressed with specific stakeholder groups are provided in Exhibit 1.4.

**Exhibit 1.4: Interview Themes**

Stakeholder Group	Discussion Topics
<b>Program leadership</b>	<ul style="list-style-type: none"> <li>■ The ways in which the care model builds on previous interventions</li> <li>■ The organizational characteristics or events that have shaped and challenged the implementation; how the intervention team adapts to challenges in order to foster success</li> <li>■ The perceived impact to date of the program on the target population</li> <li>■ Lessons learned from the program’s workforce model</li> <li>■ Lessons learned about coordinating with partners</li> <li>■ Adoption of systems to monitor and evaluate progress and the ways in which program leadership has used such information to modify or adjust the intervention accordingly; plans for sustaining and spreading the intervention</li> </ul>
<b>Frontline staff</b>	<ul style="list-style-type: none"> <li>■ Prior experience with similar programs</li> <li>■ Role within the intervention</li> <li>■ Experience with training</li> <li>■ Organizational support</li> <li>■ Perceived impact on participants</li> <li>■ Job satisfaction</li> <li>■ Challenges</li> <li>■ Lessons learned</li> </ul>
<b>Care team supervisors and training staff</b>	<ul style="list-style-type: none"> <li>■ Recruitment and hiring of staff</li> <li>■ Ideal qualifications, background, and characteristics of frontline staff</li> <li>■ Format and content of trainings provided</li> <li>■ Perceptions of and data on job satisfaction, turnover, and burnout among frontline staff</li> <li>■ Impact of intervention on program participants</li> <li>■ Key accomplishments, challenges, and lessons learned</li> </ul>
<b>Clinical providers</b>	<ul style="list-style-type: none"> <li>■ How the program has changed their workflow</li> <li>■ Experiences working with an interdisciplinary team, when relevant</li> <li>■ Perceptions of the program’s impact on patient outcomes</li> </ul>

## Direct Observation

When possible, site visits include observation of intervention-related meetings, care delivery, care coordination and management activities, education sessions, home visits, and other intervention components.<sup>4</sup> During these observations, we record the physical setting, roles of those present, the content of the intervention or activity, interactions between participants, tools used, potential impact of evaluator presence on the situation, and any additional descriptions and reflections related to evaluation research questions.

## Focus Groups

Site visits include focus groups with participants or caregivers (e.g., for innovations addressing dementia, childhood asthma) when possible. Key topics of discussion include:

- satisfaction with care;
- knowledge of the disease;
- confidence and ability to manage their own health/that of their dependent (patient activation);
- sense of empowerment;
- burden on caregiver or family;
- relationship with provider(s);
- care coordination;
- access to care; and
- daily functioning and quality of life.

In some cases, focus groups were not feasible due to the health status of the innovation participants (e.g., individuals homebound with diabetes or end-stage renal disease) or the timing of the site visit. In such cases, we conducted in-person discussions with program participants where they received care or followed the site visit with a personal telephone interview. Exhibit 1.3 above indicates the cases in which we conducted discussions with participants in place of a focus group.

## Quantitative Methods

Our quantitative evaluation assesses the relationship between awardee programs and measures of health, quality of care, and health care costs and utilization using two approaches.

First, we link identifying information for program participants to their Medicare and/or Medicaid claims, depending on the population served by the awardee. This allows us to compare health, costs, and quality of care before and after enrollment in the program (pre-post design). Awardees provide us with information to identify the Medicare and Medicaid/CHIP beneficiaries served by their program (called a finder file). At the time of this first annual report, we successfully retrieved Medicare data from two

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<sup>4</sup> Eleven visits included observation of in-person interactions with participants. In several cases, observation of participant interaction was not possible because of awardee-specific concerns around protected health information (PHI). In cases where the intervention is primarily by telephone, site visits did include limited observation of care coordinator/manager response and workflow. Staff provided demonstrations of software tools in cases where we were not able to observe interactions with participants.

awardees for the analysis presented here. Future reports will include data from additional awardees and will include both Medicaid and Medicare data.

Second, we compare health outcomes, costs, utilization, and quality of care between participants in the program and an external comparison group derived from patients enrolled in Medicare, Medicaid, or CHIP. These external comparison groups enable comparison between HCIA interventions and usual care.

As noted above, our analyses look at three kinds of outcomes or dependent variables: measures of health; costs and resource use; and quality. For this first report, we focus on four core measures<sup>5</sup>: all-cause hospitalizations,<sup>6</sup> ambulatory care sensitive (ACS) hospitalizations, emergency department (ED) visits, and cost, where appropriate. Exhibit 1.5 provides an inventory of the core measures we were able to analyze in the report for each awardee. The annual reports over time will expand their focus to include additional research questions related to program effectiveness and will consider return on investment.

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<sup>5</sup> CMMI identified the four core measures to provide a consistent set of measures for comparing across all 108 HCIA awardees. For more details on the specification for each of these measures, please refer to Appendix A.

<sup>6</sup> For awardees that use hospitalization as an eligibility requirement, we do not report on all-cause hospitalization in this report.

**Exhibit 1.5:** Core Measures for Awardees Included in Annual Report

Awardee	Target Population	Setting	Core Measures Reported, First Annual Report
<b>IOBS</b>	Newly diagnosed or relapsed patients with seven selected cancers	Community	<ul style="list-style-type: none"> <li>■ All-cause inpatient hospitalizations per quarter per 1,000 eligible beneficiaries</li> <li>■ All-cause ACS hospitalizations per quarter per 1,000 eligible beneficiaries</li> <li>■ All-cause ED visits per quarter per 1,000 eligible beneficiaries</li> <li>■ Total Medicare costs per quarter per eligible beneficiary</li> </ul>
<b>Indiana</b>	Elderly patients with dementia or depression	Community	<ul style="list-style-type: none"> <li>■ All-cause inpatient hospitalizations per quarter per 1,000 eligible beneficiaries</li> <li>■ All-cause ACS hospitalizations per quarter per 1,000 eligible beneficiaries</li> <li>■ All-cause ED visits per quarter per 1,000 eligible beneficiaries</li> <li>■ Total Medicare cost per quarter per eligible beneficiary</li> </ul>

Quantitative data analysis will focus on the impact of the awardee’s intervention, as well as comparing awardees’ patients with suitable comparison-group patients when possible. The methodological approach we used to answer the research questions varied by the setting and nature of the intervention. The remainder of this section outlines the methodological approaches used in this report.

We identified two broad groups of interventions for this report—post-acute interventions and ambulatory care programs. Post-acute care interventions focus on improving patient outcomes during or immediately after a discrete event, such as hospitalization. These qualifying events are readily identifiable from claims and allow for easy identification of program participants and potential comparison populations.

Ambulatory care interventions seek to identify and care for participants in the outpatient setting and, thus, are more difficult to localize to a provider or identify from claims records. In this report, we focus on ambulatory care interventions only but provide the planned methodology for post-acute interventions.

### **Post-Acute Interventions**

In this section, we present the proposed methodology for post-acute care interventions.<sup>7</sup> Participants are enrolled in these intervention programs when they are admitted to (or discharged from) an inpatient hospital. Although the interventions focus on different conditions and use different approaches, they all have a common goal of improving health, increasing quality of care, and decreasing cost in the post-acute care period. Each episode of care provides an opportunity to intervene to improve outcomes. Therefore, the patient-episode is the unit of analysis for these awardees. Since patients must be admitted to a participating inpatient facility to be eligible for the intervention, we are able to easily identify an internal comparison group from those patients admitted to (or discharged from) the awardee facilities prior to the start of the HCIA Program (pre-intervention period). Similarly, an external comparison group will be comprised of admissions to (or discharges from) non-participating facilities, using propensity score-matching methods,<sup>8</sup> during both the pre- and post-intervention periods.

We will create the external comparison group for the post-acute intervention awardee from a pool of peer providers that matched the awardees on a set of pre-intervention provider-level variables like such as patient volume, demographics, and case-mix. We will identify beneficiary episodes with an index hospitalization admitting diagnosis that matched one of the diagnoses used by the awardee (see Exhibit TA.1 for list of diagnosis codes). To select appropriate control episodes for each beneficiary episode, we used a combination of direct and propensity-based matching. For more detailed information on methodology, please refer to Appendix A.

Combining the data for the awardee facility and comparison facilities pre- and post-intervention, we will construct a serial cross-section study, meaning we collect all episodes during each period (e.g., pre/post-intervention period, or quarter) and compared episodes in one period (e.g., pre-intervention period) to those episodes occurring in another period (e.g., post-intervention period). A key assumption of this design is that the patient-participant episodes during any given period are similar to patient-participant episodes in another period, which allows for comparisons to be made between time periods.

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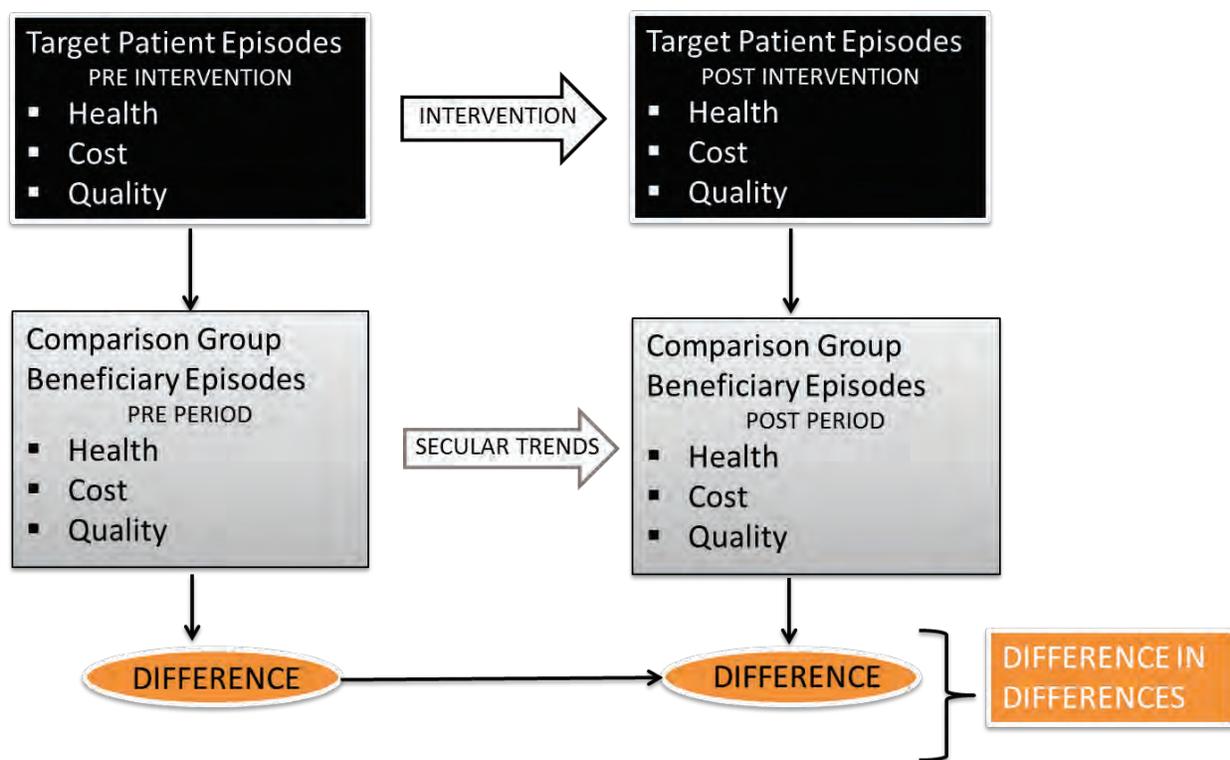
<sup>7</sup> Results for post-acute awardees are not included in this report.

<sup>8</sup> The methodology for propensity score matching has not been finalized at the time of this report.

We will use DID methods to compare average outcomes between the awardee program and a comparison group in the pre- and post- intervention periods. The DID is the difference in average outcome between the awardee treatment group and a comparison group before implementation of the pre- intervention implementation minus the difference in average outcome between the awardee treatment group and a comparison group after implementation of the post- intervention implementation. This construction allows us to study the impact of the awardees’ program compared to similar provider organizations, by estimating an average treatment effect for the program while limiting the influence of selection bias (using the same groups pre- and post-intervention implementation) and secular trends (analyzing the comparison and treatment groups during the same calendar time period).

The comparison group provides an estimate of what the outcomes would be if participants had not participated taken part in the intervention. We provide the overall impact estimates for the CMMI core measures: hospital readmissions, ED visits, and total cost of care. See Exhibit 1.6 for a visual depiction of the difference-in-differences design that will be presented in future reports.

**Exhibit 1.6:** Difference-In-Differences Evaluation Design



## Ambulatory Care Programs

Unlike the post-acute interventions, the ambulatory care awardee programs do not identify their participants based on acute events, such as a hospitalization. In general, these programs focus on improving health, increasing quality of care, and decreasing cost for patients with chronic conditions living in the community. Program participants are often a convenience sample of patients presenting to the awardee program site during the intervention period. The awardees with ambulatory care programs included in this report are Indiana University and Innovative Oncology Business Solutions (IOBS).

This awardee program design presents challenges for a claims-based evaluation at the provider level. Patients are attributed to the awardee program *ex-ante* in the post-intervention period by virtue of their enrollment in the program. But attribution of patients to the awardee in the pre-intervention period should be performed *ex-post*, using claims-based attribution rules. Hence we choose to conduct the analyses for ambulatory care awardees at the participant level, following participants longitudinally (across time periods) before and after their enrollment in the program.

Identifying an appropriate comparison group of beneficiaries for ambulatory care/community-based awardees is also a challenge. Creating an appropriate comparison group requires a proper understanding of the awardee's treatment population and how demographic characteristics, clinical characteristics, and health service utilization patterns associated with the treatment population can be captured in claims data. In this report, we focus only on the treatment population for ambulatory care awardees. Through our analysis of program participants, we will learn more about the characteristics of participants enrolled in the awardee program, which can be applied to the selection of a claims-based comparison group for future reports.

We have used a longitudinal cohort design to evaluate the intervention over time at the awardee site. The focus of our results is on the trends in hospital admissions, ED visits, and total cost of care for awardee program participants over time. To do this analysis, we used a regression modeling strategy called generalized estimating equation (GEE) models with the appropriate functional form for the dependent variable, estimating the difference based on duration of enrollment in the program for all program participants and for sub-populations of program participants. The specification for the fully adjusted GEE model is:

$$Y_{ij} = \beta_0 + \beta_1 \text{Quarter}_{ij} + \beta_2 \text{Patient}_i + \varepsilon_i$$

Here  $Y_i$  is the outcome variable for the  $i^{\text{th}}$  beneficiary episode seen by during the  $j^{\text{th}}$  quarter; *Quarter* is a set of indicator variables for the number of quarters since enrollment in the intervention; and; *Patient* is a vector of patient demographic clinical variables, qualifying condition, and the awardee implementation site where the patient was seen. Although the overall effect of enrollment time is the primary parameters of interest for this analysis, we also looked at effects over time by qualifying condition and awardee implementation site.

We will examine whether intervention impacts on outcome measures differ by beneficiary sub-populations (i.e., by disease and/or condition), site (for awardees with more than one site), and intervention sub-components. By comparing sub-populations within an awardee program, we are able to better understand variability in outcomes across the entire program. This understanding will also help inform our comparison group selection. Once this analysis is complete, we will add an external comparison population for these awardees in future reports, which will enable us to make inferences about the performance of the awardees relative to usual care. Exhibit 1.7 below outlines the components of each of the two broad intervention groups and the different analytical approaches.

**Exhibit 1.7: Methodological Overview by Awardee Intervention Type**

	Post-Acute Interventions	Ambulatory Care Interventions
<b>Intervention Overview</b>	Participant selection event based, focused on transition from inpatient to post-acute settings for patients with the targeted conditions	Participant selection from the community, often a convenience sample of patients with the targeted condition seen in an outpatient clinic
<b>Design</b>	Serial cross-section—comparing treatment provider to other providers pre- and post-intervention period	Longitudinal cohort—comparing treatment cohort at two (or more) points in time <sup>9</sup>
<b>Analytic Method</b>	Difference-in-difference	Longitudinal data analysis
<b>Unit of Analysis</b>	Patient-episode	Patient
<b>Internal Comparison (pre-period)</b>	Patient-episodes at awardee facilities prior to start of intervention	None <sup>5</sup>
<b>External Comparison</b>	Patient-episodes from similar facilities	None <sup>5</sup>

### Overview of Findings

This report reflects our work over the first 11 months of the project, September 2013, through August 2014. In this time, we have reviewed awardee documentation, conducted three sets of initial phone interviews with all awardees, conducted site visits with 17 awardees, established data-sharing agreements with 16 awardees, received data from 10 awardees, and obtained Medicare claims data from CMS. This report summarizes what we have learned thus far from all of these data sources.

First, we provide preliminary cross-awardee findings based on initial interviews with awardees, review of awardee quarterly reports, and early site visits. We then provide a chapter for each awardee, which summarizes what we have learned through initial site visits, review of awardee reports, and initial phone interviews as well as through the analysis of quantitative data for select awardees (Indiana, and IOBS). For awardees with site visits completed before May 16, 2014 (Christiana, Duke, IOBS and UCLA), we present an awardee-level report of our initial findings. Finally, in Appendix A, we provide details of our quantitative research methods, including data sources, measure specifications, and analytic models.

Although we present initial findings in this report, we are still in the early stages of our evaluation. The data collected from our first site visits have not yet been coded or fully analyzed, and our quantitative

<sup>9</sup> Analyses for ambulatory care interventions in future reports will include both pre-intervention period data and external comparison groups.

data-analysis results are limited to the early stages of awardee program implementation. We will present subsequent awardee studies in future quarterly and annual reports, when adequate time is available for reviewing and coding transcripts and when more claims data are available.

## Cross-Awardee Findings

In this section we describe our early observations regarding HCIA disease-specific interventions as implemented by awardees. We have drawn these descriptions primarily from qualitative data gathered from one-hour awardee interviews, awardee documents, site-visit interviews and observations, as well as a limited amount of quantitative data. We focus our discussion of cross-awardee findings on a basic description of awardee implementation activities, including early understanding of factors affecting progress. We present more detailed information specific to each awardee in the awardee-specific chapters. The narrative below reflects our understanding of awardee activities to date. Our descriptions of awardee activities and implementation effectiveness will expand and evolve as we gain a deeper appreciation of these interventions in upcoming phases of our evaluation.

The information is organized into five areas of discussion:

- program components: using awardee documents and site-visit data, we categorize the key components of awardee interventions;
- implementation experience: using awardee documents and site-visit data, we describe findings on the awardees' experiences with implementation;
- program effectiveness: using Medicare claims data, we report on findings for Indiana and IOBS;
- workforce: using site-visit data, we describe cross-awardee patterns in training and new roles; and
- context: using site-visit data, we discuss the role of endogenous and exogenous contextual factors that may play a role in implementation and outcomes.

### Program Components

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Disease-specific awardees aim to improve processes, outcomes, and quality of life while reducing the cost of care and avoidable use of health care services for participants with targeted conditions. Below we describe innovation components by providing examples, identifying trends, and highlighting differences across awardees.<sup>10</sup> We discuss intervention components in three non-mutually exclusive areas: (1) care coordination, (2) health education, and (3) adoption and use of telehealth to improve quality of care and access. We summarize each area in Exhibit 2.1.

Care coordination is, by far, the largest and most complex of these areas. Subthemes are clinical care management, communication and service coordination, and addressing needs beyond the health care system. Health education interventions include both patient education and community outreach. Finally, telehealth interventions include home telemedicine and virtual specialty consultations.

A central aspect of implementation is the awardees' efforts to establish a cross-disciplinary workforce needed to conduct their interventions. The following section describes the intervention components as well as the corresponding workforce support.

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<sup>10</sup> In Appendix B, we provide a matrix of basic program characteristics across awardees.

**Exhibit 2.1:** Key Components of Awardee Innovations

Innovation Components	Innovation Examples
<b>Care Coordination</b>	
<p><b>Clinical care management/disease management:</b> Developing and managing a patient’s plan of medical care, including assessing patient needs, developing and managing care plans, and continuous monitoring (16 awardees)</p>	<ul style="list-style-type: none"> <li>■ UPenn – Nurse practitioners, registered nurses, and social workers work with participants and families to clarify and document goals for care and initiate advanced care planning.</li> <li>■ Christiana – Care managers develop individualized care-management plans for participants before discharge.</li> </ul>
<p><b>Communication and service coordination:</b> Facilitating and enhancing communication and coordination between health care providers in different settings (15 awardees)</p>	<ul style="list-style-type: none"> <li>■ UVA – The Supportive Care Tumor Board—comprised of an inter-professional team of providers—reviews medical records and summaries of cases on a weekly basis.</li> <li>■ UPenn – CLAIM nurse practitioners have developed relationships with oncologists and are able to communicate with them about issues identified during home visits.</li> </ul>
<p><b>Addressing needs beyond the health care system:</b> Identifying and coordinating services outside the health care system that contribute to health, wellness, and care goals, such as financial resources, support groups, social service programs, and transportation (13 awardees)</p>	<ul style="list-style-type: none"> <li>■ Duke – Social workers are responsible for providing high-risk participants with social support, education, and informal counseling as well as assisting participants with applications for financial resources.</li> <li>■ Indiana – Care-coordination assistants address participants’ and caregivers’ social needs, such as transportation and meals assistance.</li> </ul>
<b>Education</b>	
<p><b>Patient education and engagement:</b> Information, training, or coaching provided to participants or their informal caregivers to promote patient understanding of and ability to carry out self-care tasks, including support for navigating care transitions, self-efficacy, and behavior change (16 awardees)</p>	<ul style="list-style-type: none"> <li>■ Vanderbilt – Transition care coordinators combine Vanderbilt tools and individualized informational packets to improve a patient’s self-management of chronic diseases.</li> <li>■ Ochsner – A key component of Stroke Mobile involves family-based health education, which is intended to address preventable stroke risk factors among family members.</li> </ul>
<p><b>Community education and outreach:</b> Activities targeted to the broader population rather than, or in addition to, individual intervention participants to help both individuals and the community understand the prevalence and prevention strategies for certain conditions (5 awardees)</p>	<ul style="list-style-type: none"> <li>■ Upper San Juan – A wellness coordinator conducts a 12-week community wellness program that addresses a variety of health-related issues.</li> <li>■ MAHEC – Community coalitions through Project Lazarus use community meetings to educate individuals in the community about the harms of misuse and abuse of painkillers.</li> </ul>
<b>Telehealth</b>	
<p><b>Virtual specialty consultations:</b> The use of telemedicine to conduct consultations and remote diagnostics with specialists for patients (4 awardees)</p>	<ul style="list-style-type: none"> <li>■ Upper San Juan – The acute stroke care telemedicine program allows specialized physicians to provide lifesaving exams and emergency treatments to stroke patients in rural settings.</li> <li>■ Ochsner – Vascular neurologists and other specialists provide telemedicine consults for Stroke Central/Mobile Staff, program participants, and rural hospitals.</li> </ul>
<p><b>Home telemonitoring and teleconsultations:</b> The use of electronic devices located in participants’ homes to transmit their self-monitoring readings to a provider and/or virtually contact nurses via video chat software (2 awardees)</p>	<ul style="list-style-type: none"> <li>■ GWU – Peritoneal dialysis patients receive blood pressure cuffs and scales that transmit information to nurses on a daily basis.</li> <li>■ First Vitals – Participants use blood glucose and blood pressure meters, internet-connected tablets and proprietary home-based imaging and sensing devices to track key clinical information.</li> </ul>

## Care Coordination

The majority of the disease-specific awardees seemingly use terms such as “care management,” “care coordination,” “patient navigation,” “disease management,” and others interchangeably. We therefore looked for common definitions to help categorize interventions based on specific parameters. Because we did not find consensus or validated definitions of clinical care management and service coordination satisfying all cases, we use a broad definition applied to the term “care coordination”:

*“The deliberate organization of patient care activities between two or more participants (including the patient) involved in a patient’s care to facilitate the appropriate delivery of health care services. Organizing care involves the marshaling of personnel and other resources needed to carry out all required patient care activities and is often managed by the exchange of information among participants responsible for different aspects of care.”<sup>11</sup>*

Sixteen of the 18 awardee interventions focus on care coordination, per the above definition. All use care teams to help with communication and coordination. In most cases, the individuals implementing the innovation work outside of the clinical team primarily responsible for treating the participant. Most awardees use a mix of clinical and lay health workers (staff who do not have formal clinical education or credentials for care coordination); however, three awardees rely exclusively on staff with clinical credentials.<sup>12</sup> In the sections below, we provide preliminary observations on the various staff roles that support awardees’ activities. As we move forward with our analyses, we will explore the effectiveness of the various staffing models.

As common definitions may play an important role in the spread and sustainability of interventions, we anticipate further addressing the topic of nomenclature in future reports. Common definitions would also help define which intervention elements may be able to vary by site versus those that are inherent to the intervention’s integrity. Because establishing a nomenclature and definitions may represent a challenge across HCIA portfolios, we will work with the Innovation Center and the meta-evaluator on this activity if appropriate. In the paragraphs below, we elaborate on the sub-themes included under care coordination.

**Clinical care management.** Clinical care management or disease management activities focus on continuous monitoring of participants between visits to their physicians. This includes developing and managing a participant’s medical care plan and identifying and addressing issues as they arise—for example, changes in clinical status or changes to medications. Staff with clinical training—including registered nurses (RNs), nurse practitioners (NPs), and pharmacists—are responsible for these tasks. Disease-specific awardees are primarily targeting these services to participants enrolled in an intervention through an ambulatory care provider rather than those enrolled after discharge from acute care. Examples of specific components are included in Exhibit 2.2.

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<sup>11</sup> McDonald K, Sundaram V, Bravata D, Lewis R, Lin N, Kraft S, McKinnon M, Paguntalan H, Owens D. Care Coordination. Vol 7 of: Shojania KG, McDonald KM, Wachter RM, Owens DK, editors. *Closing the Quality Gap: A Critical Analysis of Quality Improvement Strategies*. Technical Review 9 (Prepared by the Stanford University-UCSF Evidence-based Practice Center under contract 290-02-0017). AHRQ Publication No. 04(07)-0051-7. Rockville, MD: Agency for Healthcare Research and Quality; June 2007

<sup>12</sup> The three awardees are GWU, IOBS, and MAHEC.

**Exhibit 2.2:** Components of Clinical Care Management

Specific Components	Innovation Examples
<p><b>Assessing patient needs.</b> A majority of awardees report assessing participants’ needs for care and care coordination as a baseline and then monitoring needs on an ongoing basis. This may include assessing physical, emotional, and psychological health; functional status; current health and health history; self-management knowledge and behaviors; current treatment recommendations, including prescribed medications; and the need for support services.<sup>13</sup></p>	<ul style="list-style-type: none"> <li>■ In UPenn’s CLAIM program, the nurse practitioner, registered nurses, and social workers work with the participant and family to clarify and document goals for care and initiate advance care planning.</li> <li>■ Indiana and Ochsner use assessment tools to collect data about participants’ needs during home visits to gauge the participants’ progress and to further tailor care.</li> </ul>
<p><b>Developing a care plan.</b> A critical component of care management is the development of a care plan based on identified participant needs. Often the participant (and in some cases their caregiver) works with awardee staff. The staff will outline the participant’s current and longstanding needs and goals for care and help to identify coordination gaps.<sup>14</sup> Care plans may address both medical needs—such as the identification of treatment protocols and the review of medications—as well as social needs—including the needs of caregivers and referrals to community resources. The care plans may also include strategies for self-management and plans for linking participants to needed behavioral or mental health services.</p>	<ul style="list-style-type: none"> <li>■ In adherence to a recommendation from the National Heart, Lung, and Blood Institute Asthma Expert Panel, HRiA, La Bonheur, and Nemours are using asthma action plans that provide clear instructions for participants and their caregivers on how to manage the condition.<sup>15</sup></li> <li>■ In Christiana’s intervention, before a hospital discharges a participant, care managers develop an individualized care management plan using the program’s care management software. Managers then hold an initial visit with each participant to share information on follow-up contact. In most cases, care plans are living documents, subject to ongoing review and revision.</li> </ul>
<p><b>Facilitating care transitions.</b> Three awardees focus explicitly on facilitating participant transitions following hospital discharge. This includes transitions from one setting to another and everything from addressing a participant’s immediate care needs to supporting long-term self-management.<sup>16</sup></p>	<ul style="list-style-type: none"> <li>■ Vanderbilt and Christiana both focus on facilitating transitions for participants with cardiovascular disease who are discharged from the hospital, while Ochsner facilitates transitions for participants following a stroke. As part of Christiana’s intervention, care managers visit participants, and pharmacists work on medication reconciliation even before the participant leaves the hospital. A care manager then follows up with participants by phone between 24 and 72 hours post-discharge, depending on their risk profile. Care managers check in again in 30, 60, or 90 days, depending on assessed need. Ochsner manages care across settings for stroke patients—from inpatient, to rehabilitation facilities, to home. Ochsner staff members chart the progress of participants discharged into rehabilitation facilities and assess whether participants need additional interventional care.</li> </ul>

<sup>13</sup> Chapter 3. *Care Coordination Measurement Framework: Care Coordination Measures Atlas*. Rockville, MD: Agency for Healthcare Research and Quality; January 2011. <http://www.ahrq.gov/professionals/prevention-chronic-care/improve/coordination/atlas2014/chapter3.html>

<sup>14</sup> Ibid.

<sup>15</sup> National Asthma Education and Prevention Program. Expert Panel 3: Guidelines for the Diagnosis and Management of Asthma. National Heart, Lung, and Blood Institute; 2007. <http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf>

<sup>16</sup> Chapter 3. *Care Coordination Measurement Framework: Care Coordination Measures Atlas*. Rockville, MD: Agency for Healthcare Research and Quality; January 2011. <http://www.ahrq.gov/professionals/systems/long-term-care/resources/coordination/atlas/chapter3.html>.

Specific Components	Innovation Examples
<p><b>Offering enhanced access to care delivery.</b> Just over half of awardees provide participants with an alternative source to the emergency room for urgent care, such as 24/7 telephone assistance or extended clinic hours.</p>	<ul style="list-style-type: none"> <li>■ At UCLA, dementia care managers are available during business hours to answer questions about behavioral or medical problems, community-based resources, or other concerns. A physician is on call outside normal business hours for caregivers and participants.</li> <li>■ The Le Bonheur program includes a 24/7 assistance phone line intended to help avoid hospital admissions and reduce lengths of stay.</li> <li>■ Enhanced access is also a key component of the IOBS intervention. Its COME HOME clinics provide extended weekday hours as well as weekend hours on Saturday and Sunday for participants to “come home” to their practice rather than going to the emergency room.</li> </ul>

**Communication and service coordination.** HCIA interventions are introducing new lines of communication between members of participants’ care teams and between participants and their providers. This ranges from formal channels (e.g., inter-professional teams meeting to review participants and their plans of care) to informal discussions (e.g., between clinical staff who visit participants in their homes and at the office of primary care physicians). This enhanced communication provides additional opportunities to address participants’ ongoing needs. To facilitate communication between patients and providers, some awardee interventions include staff to serve as an intermediary between the participant and their providers, primary care physicians, pharmacists, and specialists.

Service coordination may include scheduling follow-up appointments with physicians post-discharge, setting up appointments with behavioral health providers, helping participants find providers and insurance options, and helping participants physically locate where they need to go for care. Clinical care coordinators, managers, or lay health workers—for example, care coordinator assistants and patient navigators—may be responsible for this type of coordination. Awardees use communication and service coordination in different contexts as tools to help achieve program goals (see Exhibit 2.3).

**Exhibit 2.3:** Components of Communication and Service Coordination

Communication and Service Coordination	
Specific Components	Innovation Examples
<p><b>Communication between members of the care team.</b> Fifteen of the disease-specific HCIA interventions include enhanced communication across providers responsible for patient care. This includes providers engaging with each other through in-person discussions and/or by telephone, email, and letters. It also includes structured transfer of clinical information such as medical history, medication lists, diagnoses, and test results.<sup>17</sup></p>	<ul style="list-style-type: none"> <li>■ UVA – The Supportive Care Tumor Board (SCTB) supports participants with advanced cancer as part of UVA’s CARE Track program. In SCTB meetings, providers—including chaplains, social workers, pain specialists, palliative care physicians, and oncologists—work together to establish a care plan for complex cases.</li> <li>■ UPenn – CLAIM nurses talks to oncologists about needs they identified while in participants’ homes.</li> </ul>
<p><b>Communication between patients and providers.</b> Some awardee interventions include staff to serve as intermediaries between participants and their physicians. These workers spend time with participants and learn about their questions or barriers to adhering to medical recommendations and then bring these questions back to the medical team.</p>	<ul style="list-style-type: none"> <li>■ Indiana – Care coordinator assistants (CCAs)—non-clinicians with some health care background — become a participant’s point of contact with the health system. CCAs learn valuable information about participants during home visits. Often they are able to gain a participant’s trust and learn more than a physician could during an office visit, such as finding out information about a participant’s adherence to a treatment regimen or questions the participant may have. The CCAs then take this information back to the care team.</li> </ul>
<p><b>Assistance with scheduling appointments.</b> For some awardees, a new workforce provides assistance with scheduling appointments with providers for participants and caregivers.</p>	<ul style="list-style-type: none"> <li>■ Indiana – CCAs are responsible for scheduling care coordinators’ visits with participants and caregivers.</li> </ul>

**Addressing needs beyond the health care system.** For 13 awardees, care coordination extends to identifying and coordinating services related to health, wellness, and care goals outside of the traditional health care delivery system (see Exhibit 2.4).<sup>18</sup> This may include facilitating enrollment in public benefits (e.g., Medicaid, food stamps), educational resources, support groups, or social service programs (e.g., Meals on Wheels). This role may be filled by a social worker or by a lay health worker, such as a community health worker (CHW). In some cases, however, the clinical care manager is the only one handling these issues. At Nemours, Le Bonheur, HRiA, and Duke, CHWs help connect participants and their families to resources in the community. CHWs use the information collected about participants to connect them to social services and also to inform the clinical care team of the participant’s non-medical needs. This gives clinicians a broader understanding of the circumstances that may facilitate or impede specific treatment and management strategies for participants.

<sup>17</sup> McDonald K, Schultz E, Albin L, Pineda N, Lohhart J, Sundaram V, Smith-Spangler C, Brustrom J, Malcolm E. *Care Coordination Atlas Version 3* (Prepared by Stanford University under subcontract to Battelle on Contract No. 290-04-0020). AHRQ Publication No. 11-0023-EF. Rockville, MD: Agency for Healthcare Research and Quality; November 2010.

<sup>18</sup>Chapter 3. *Care Coordination Measurement Framework: Care Coordination Measures Atlas*. Rockville, MD: Agency for Healthcare Research and Quality; January 2011. <http://www.ahrq.gov/professionals/systems/long-term-care/resources/coordination/atlas/chapter3.html>.

**Exhibit 2.4:** Addressing Needs beyond the Health Care System

Specific Components	Innovation Examples
<p><b>Addressing needs beyond the health care system.</b> Identifying and coordinating services that contribute to health, wellness, and care goals outside the health care system, including financial resources, schools, support groups, social service programs, and transportation.</p>	<ul style="list-style-type: none"> <li>■ Duke – Social workers are responsible for providing high-risk participants with social support, education, and informal counseling and also assisting participants with applications for financial resources.</li> <li>■ Indiana – CCAs address participants’ and caregivers’ social needs, such as transportation and meals assistance.</li> </ul>

**Education**

The second key component of awardee innovations is education, which happens at both the patient and community levels. Two groups emerge under the education function: (1) patient education and engagement; and (2) community education and outreach. In this section, we describe both pieces and the workforce that support these innovation components.

**Patient education and engagement.** Thirteen of the awardee interventions include a patient education component. We distinguish between patient education activities aimed at large groups of patients and available to a whole community from targeted education provided to facilitate care management. The Agency for Healthcare Research & Quality (AHRQ) defines the latter type of patient education as:

*“...information, training, or coaching provided to patients or their informal caregivers to promote patient understanding of and ability to carry out self-care tasks, including support for navigating their care transitions, self-efficacy, and behavior change.”<sup>19</sup>*

Several awardee interventions include an education component focusing on self-management tailored to the patient. Others provide a more general education about specific issues related to the patient’s condition. Awardees may provide education at the individual or small-group level (as opposed to education in the context of community-wide outreach). Even awardees that do not have an explicit education component routinely use the paradigm of education, engagement, and activation in interactions with patients. Clinical care coordinators/managers or lay health workers may provide this tailored education; examples include:

- **Disease-specific education.** Le Bonheur’s program provides asthma education to children with asthma, their families, and community members. Asthma care coordinators provide asthma education to participants during their initial clinic visit following program enrollment. The asthma care coordinators can also conduct home-based education for participants that do not have a clinic visit scheduled in the two weeks immediately following enrollment. In addition, the program delivers education through “group experiences” by facilitating group activities and discussions for multiple participants and their families.

<sup>19</sup> Chapter 3. *Care Coordination Measurement Framework: Care Coordination Measures Atlas*. Rockville, MD: Agency for Healthcare Research and Quality; January 2011. <http://www.ahrq.gov/professionals/systems/long-term-care/resources/coordination/atlas/chapter3.html>.

- **Support groups.** MAHEC, which focuses on chronic pain, trains its sites to include a self-management chronic pain support group as part of a medical group visit. An NP or physician assistant (PA) leads these groups. They discuss safety issues and benefits and drawbacks of their prescribed pain medications as well as alternatives to medication. Complementary practice providers co-teach groups to provide patients with information on the benefits of healthy lifestyles, including nutrition and hygiene, and other therapies such as acupuncture.<sup>20</sup>
- **Technology education.** The FirstVitals intervention for patients with diabetes includes education specific to using the wireless glucometer they receive as part of the intervention. Awardee staff shows patients how to use the glucometer to measure their glucose. This provides a gateway into teaching patients to monitor their results using software on a tablet device. The tablet serves as the primary communication tool between patients and coordinators and also provides additional educational materials for patients.

**Community education and outreach.** Five awardees conduct outreach and education activities targeted to the broader population rather than—or in addition to—enrolled individual patients. The focus of the outreach and education vary by community and disease/condition and include community-wide education meetings and caregiver education classes (e.g., caring for a family member with dementia).

Several awardees developed community education meetings focused on diabetes, heart health, asthma, or chronic pain. These meetings help individuals, as well as the community, to understand the prevalence of certain conditions and methods for preventing and treating these conditions. Upper San Juan, for example, conducts a worksite wellness program and has increased outreach efforts targeting individuals not connected to health care. Wellness coordinators conduct cardiovascular early detection screening and a 12-week community wellness program with participants recruited from health fairs, schools, and local businesses. Nemours, meanwhile, educates its community partners on the best strategies for understanding and mitigating environmental asthma triggers.

Awardees that have a community-engagement component to their intervention include staff members who work primarily in the community, rather than in a health care setting. This staff primarily educates the community on prevention and early detection strategies. However, they may also assist in recruitment and development of partnerships.

- **Community liaisons.** At Nemours community liaisons work with community-based organizations to identify ways to improve the environment where children live, learn, and play. Community liaisons provide outreach and education

**Increasing Drug Awareness through Community Meetings: MAHEC**

MAHEC uses community meetings to educate individuals in the region about the harms of addiction to painkillers resulting from attempts to treat chronic pain. One MAHEC respondent, speaking to the approaches MAHEC took to reduce the harmful effects of chronic pain, remarked that it was important to start “... *engaging the community ... and changing the way that they are addressing opioids and chronic pain issues so that we can reduce the drug overdose rates.*”

Through their partnership with Project Lazarus, MAHEC identified coalition leaders and key stakeholders for each county. They worked with this group to distribute a community toolkit, which provides resources on holding community events and coalition work. This toolkit includes public awareness posters, fliers, and billboards that community coalitions may replicate as desired.

<sup>20</sup> Medicare does not cover acupuncture. In some states Medicaid covers acupuncture treatment for substance abuse.

to schools, urban housing departments, community centers, places of worship, and other community outlets on environmental triggers of asthma. They work with community partners to form strategic plans to reform or enforce local and state policies to support an asthma-friendly environment.

- **County coordinator.** MAHEC is using county coordinators to help implement the Project Lazarus community-based initiative to educate community organizations, including schools, churches, and first responders about preventing opioid overdose deaths.

## Telehealth

The final component of awardee innovations is telehealth. Four awardees incorporate telemedicine specialty consultations, while two others incorporate telemonitoring based in patient homes. According to the American Telemedicine Association,

*“Telemedicine is the use of medical information exchanged from one site to another via electronic communications to improve a patient’s clinical health status. Telemedicine includes a growing variety of applications and services using two-way video, email, smart phones, wireless tools, and other forms of telecommunications technology.”*<sup>21</sup>

Awardees may use telemedicine to address the needs of individual patients—such as interventions where providers can monitor patient information through remote transmission. Others may use it more broadly to help a community or region in a rural area access specialty care. The majority of awardee telemedicine innovations directly connect providers to patients or data derived from patients. We summarize many such cases below.

- **Home telemonitoring and teleconsultations.** GWU and FirstVitals use devices located in participants’ homes to transmit their self-monitoring readings to a provider. These interventions allow providers to monitor their participant’s condition and support his or her self-management from a distance while identifying situations that require a clinic visit. For example, FirstVitals uses a telehealth diabetes monitoring program focused on glycemic control to prevent complications for participants at risk for diabetic peripheral neuropathy. Care coordinators train participants to use blood glucose and blood pressure meters, internet-connected tablets, and proprietary home-based imaging and sensing devices that track key clinical information in real time. In many cases, home visits focus on providing participants with health information and encouraging in-person visits to the clinic. Future analysis will focus on the relevance of devices for target communities.
- **Virtual specialty consultations.** Two awardees are using telemedicine for virtual specialty consultation. Ochsner vascular neurologists and other specialists provide telemedicine consults for Stroke Central/Mobile staff and program patients seen in hospitals throughout Louisiana. Upper San Juan uses telemedicine-enabled consultations and remote diagnostics with neurologists and cardiologists for patients at risk for stroke. The acute stroke care telemedicine program, which predates HCIA, allows emergency room physicians at the local Critical Access Hospital to consult with neurologists at a Level 1 Trauma Center and Joint Commission-certified Advanced

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<sup>21</sup> What is Telemedicine? American Telemedicine Association; 2012. <http://www.americantelemed.org/about-telemedicine/what-is-telemedicine#.UxIMofldWS0>

Comprehensive Stroke Center to help diagnose stroke and assess the need for thrombolytic treatment. One of the goals is to eliminate the cost of helicopter transport. At the time of our site visit, Upper San Juan staff indicated that multiple helicopter rides had been saved by this intervention, resulting in substantial cost savings. With its Innovation Award, Upper San Juan has also expanded its use of telemedicine to cardiology. The original plan was to implement a ST-elevation myocardial infarction (STEMI) system of management for all appropriate patients with the goal of timely face-to-face cardiologist consultations in acute ER presentations. However, the awardee has concerns about the time lost coming to the Critical Access Hospital for a diagnosis and then having to transport to the closest catheterization lab. Upper San Juan therefore shifted the focus of its cardiology telemedicine program to the clinic for follow-up care rather than using it with emergent consultations.

## Implementation Experience

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Below we describe some common challenges, facilitators, and lessons learned. These findings are preliminary observations based on early site visits. A comprehensive analysis of site-visit data is needed to draw more summative conclusions.

Awardees devoted much of the first year—and in some cases longer—to getting up and running, particularly in cases where the awardee developed the intervention from the ground up. In a number of cases, awardees needed a year (or more) to develop or adapt IT systems and to hire sufficient staff for their interventions. Even once up and running, awardees have continued to refine their programs during the implementation period in response to program data or feedback from program staff. Awardees implementing programs at multiple sites faced the challenge of determining how to manage organizational complexities that did not allow interventions to be exactly replicated across sites. This section describes four ways in which implementation was slower or more difficult than expected and how awardees have adapted their programs to address challenges:

- implementation across multiple sites;
- participant enrollment;
- technology implementation and adoption; and
- sustainability.

### Implementation across Multiple Sites

Twelve awardees implement their intervention in multiple sites. To address differences in staffing, resources, and community partners, these awardees have developed a core model for their intervention but allow individual sites to adapt the program to their abilities and needs. For example:

- IOBS developed the COME HOME model to provide comprehensive outpatient oncology care. However, individual practices can adapt the program to fit the needs of their practice—by offering extended hours in the morning or staying open late, for example, or by making alterations to the triage pathways if they do not have the necessary imaging equipment or laboratory services on site.
- Joslin Diabetes Center adopted a similar approach to facilitating implementation in different communities. Their core model of community-based group diabetes education and testing includes an introductory session, two to three content sessions, and a follow-up session at three months.

- The Duke Southeastern Diabetes Initiative (SEDI) uses a combination of workers: clinical staff to run the clinical, high-risk intervention and community staff for the moderate- and low-risk interventions. Each site has a SEDI program manager that coordinates the activities of the teams. Because of the regional variations in demographics of the patients, available health care resources, and public health models, sites all had different staffing needs. Duke therefore allows sites to tailor their staffing model, resulting in different sizes and compositions of the teams across sites.

Although allowing for staffing flexibility can create challenges—such as collecting and standardizing data across sites—the ability to adapt a program to a site’s specific circumstances has helped facilitate implementation and may provide lessons for replicability. We will explore this issue further in future site visits.

### Participant Enrollment

Several awardees have already met or exceeded their overall participant enrollment targets. At least five awardees, however, noted that they found recruiting participants to be more difficult than originally anticipated. UCLA staff discussed delays in recruitment caused by delays in hiring needed staff. The UPenn team discussed challenges with meeting anticipated levels for both staffing and participant recruitment; they felt this resulted from unrealistic original expectations. Upper San Juan noted difficulty in recruiting patients to participate in its wellness program. Staff attributed these challenges primarily to the time commitment needed from participants (including monthly meetings), indicating that it is “asking a lot of people who are already spread pretty thin.” Upper San Juan staff discussed positive reactions from those individuals taking part in the wellness program, which may help increase enrollment as the program expands. FirstVitals described challenges retaining and training staff charged with recruitment. Additionally, it was noted that fewer patients met qualifying criteria than originally estimated, leading to a change in the method of identifying potential participants.

### Technology Implementation and Adoption

Most HCIA disease-specific programs rely on health IT systems to manage patient care and identify high-risk patients in need of more intense care. We noted several challenges with the implementation and adoption of new technologies as well as modification of existing tools. Many intervention components rely on IT infrastructure, and awardees found that full implementation requires significant time and resources, which in most cases was unanticipated. Awardees learned the following lessons:

- ***Systems were not designed to meet program-specific needs.*** Staff commented on the countless changes necessary to allow them to use electronic health record (EHR) systems for intervention-specific needs—for example, identifying eligible patients and managing care for large patient populations. Using a complex survey methodology as part of its intervention, UVA found it difficult to implement an EHR system that could interact with those robust data needs. Other awardees expressed frustration in cases where EHR tools complicated, rather than simplified, collection of data necessary to manage the award:

*“...difficult to navigate and difficult [to use] in terms of collecting data, not just on the medical side and on the clinical side, but also for the purposes of this grant.”*

- ***Having a staff member serve as a liaison between the program and the IT teams facilitates IT system development and modification.*** Some awardees noted the need for someone who is able to bridge the divide by (1) speaking the languages of both the clinical and IT staff and (2) understanding the daily workflow of the program staff and how existing and potential functionalities of the IT system can support that workflow as well as the data collection, analysis, and reporting needs. It is also important to maintain constant communication in order to stay on schedule. While some awardees identified this staffing need at the outset, others did not until they experienced significant delays with IT development. At Christiana, for example, the program team identified early on the need for an IT manager who knew both clinical and IT “speak” and was able to fill this role within the first year of the award. The IT manager played a critical role in understanding the care-management needs, translating them into use cases for the IT developers, and—in turn—training the care managers on new features that support their expressed needs.
- ***Using different information systems to exchange and track information across intervention sites presented a challenge.*** At UAB, the information systems identify and track patients at different sites through hospital census reports. Some sites do not have EHRs, so it has been difficult to identify and keep track of patients through their paper records. Additionally, some sites, including some of the large academic health systems, have antiquated systems that do not lend themselves well to sending near real-time information to UAB. This has translated into some difficulties keeping track of patients, particularly those going to the Emergency Department (ED) since hospitals have not been able to produce census reports as quickly as necessary. This was an unanticipated challenge that the UAB program leadership has been working to address with each site. At Duke, providers’ access to patients’ medical records vary across staff and sites. Providers participating in the intervention may have access to enter patient data into the EHR system at one site, while other sites require the intervention team to record data in a separate electronic system. At one particular site, the social workers and CHWs chart in one system, whereas the nurse practitioner charts in another system that the community team cannot access. The team is in the process of figuring out how to give primary care providers a better picture of their patients’ participation in the intervention.
- ***Technology adoption—by both providers and participants—took more time than anticipated.*** New technology necessitates a learning curve that may be larger for some than others. FirstVitals noted the importance of allocating sufficient time and resources to support participants as they get used to interacting with the tablet and wireless medical devices. In addition, participants experienced unexpected carrier outages and technical issues with these devices. The integrated care coordinators had to spend more time than expected providing technical assistance. FirstVitals also found a steep “project understanding and technology learning curve” for care coordinators, a problem exacerbated by high turnover at the community health centers where the intervention is taking place.
- ***Other delays.*** At MAHEC, the EHR systems at most of the sites are not yet set up to efficiently provide information needed for self-monitoring activities. MAHEC staff members are still manually pulling these data. The innovation team has to work with each practice to set up the EHR system, and the process has been more difficult and time consuming than anticipated.

## Sustainability

Because many of the HCIA interventions are funding services that are not reimbursable under current payment systems, many awardees are attempting to demonstrate the value of their programs and are

beginning to discuss sustaining the programs with insurers. While several awardees noted that they have institutional support for sustaining their HCIA interventions in some capacity, it is still too early to know exactly what will continue once the award ends.

Several awardees noted that their HCIA programs are likely not sustainable under Medicare Fee-for-Service. For example, IOBS practices have to cover the cost of staff available during extended hours. These individuals may not see enough patients or conduct enough tests to cover their salaries, which can present financial challenges for the practices, leading to further concerns with program sustainability. The UCLA Alzheimer's and Dementia Care (ADC) program staff reported that under a traditional Medicare payment model, this program is not sustainable. The program receives reimbursement for in-person visits (i.e., an intake visit or follow-up visit) but not for the telephone calls to patients, caregivers, community-based organizations, and primary care physicians to coordinate patient care. The reimbursable services only cover approximately 25% of the cost of each dementia care manager. In their proposals or during site visits, several awardees discussed options for bundled payment models to support programs such as those they are implementing under HCIA.

Some organizations have indicated that they plan to continue supporting the program beyond the HCIA funding. For example, Christiana is exploring options for incorporating care management as part of the system's model of care moving forward. Because they have already invested resources in developing their health IT system supporting care management, expanding the care management to other groups beyond cardiology—for example, to oncology and heart failure—will not require significant additional investment. Without universal reimbursement of diabetic peripheral neuropathy (DPN) screening and care coordination, FirstVitals must come up with creative ways to maintain a sustainable funding source. FirstVitals is looking into selling its DPN screening services to health plans by creating a patient risk profile that will show other plans how to increase their premium from the government and demonstrate improvement in foot ulcers. FirstVitals also hopes to make its services marketable to plans by showing how its early-detection screening services can help improve payers' Healthcare Effectiveness Data and Information Set scores. Another potential source of revenue is the retinal screening services that program staff began offering in one health center in spring 2014 with plans to expand to several more participating health centers. Medicare, Medicaid, and commercial insurers reimburse retinal screening services, so FirstVitals is able to bill each participant's screening to AlohaCare to fund the program and compensate the optometrist.

## Program Effectiveness

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In future reports, our cross-awardee assessment of the effectiveness of awardee programs will bring together quantitative and qualitative data to help create a complete picture of what works and what does not work across the disease-specific portfolio. We will analyze claims and other data sources on outcomes of patient health, quality of care, and cost and resource utilization for groups of awardees. We will then combine this with categorization and characterization of awardee interventions gleaned from qualitative analysis and thereby produce findings about impact across groups of awardees.

At this time, we are limited in our ability to make comparisons across awardees. Although we have begun quantitative analysis for some awardees, we have a limited amount of post-intervention implementation data and these data are only available for a small subset of awardees.<sup>22</sup> Furthermore, we are in the early stages of coding and analyzing qualitative data needed to characterize and categorize group awardees for the purposes of comparing program effectiveness measures across awardees.

In Exhibit 2.5 (below), we summarize preliminary findings for two awardees based on quantitative analysis of cost and resource utilization measures. For Indiana’s Aging Brain Care program and IOBS’s COME HOME intervention, we conducted a longitudinal analysis of post-intervention data, allowing us to observe differences in outcomes over the course of the intervention and make inferences about the intervention’s impact on trends over time. For both of these awardees, we found it challenging to efficiently select a comparison group based on claims. There is limited ability to detect patients with depression or previously captured cases of relevant cancers based on claims data alone. We are working on addressing these challenges and finding comparison groups for these awardees in subsequent reports.

The methodology employed for each awardee is described in more detail in the awardee chapters, and additional technical information is provided in Appendix A of this report. Our preliminary analyses focused on core measures of resource utilization—hospitalizations (readmissions or admissions) and ED visits—and total Medicare cost of care (see Appendix A for specifications for these measures).

Our preliminary results showed reductions in hospitalization and ED use for two awardees—Indiana and IOBS—and reductions in total cost of care for IOBS. These two awardees are implementing ambulatory-care-based interventions where participants with qualifying conditions are recruited from outpatient settings. We emphasize that our analysis of program effectiveness is preliminary, as it focuses on only the initial quarters of program implementation for a limited set of core measures and includes no comparison group for either awardee. Future analyses for all awardees will include additional quarters of post-intervention data, comparison groups, and larger sample sizes—increasing our ability to draw findings on the effectiveness of the awardee programs.

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<sup>22</sup> In addition to the claims based analysis, we will be using data that NORC or the awardee are collecting or that awardees are capturing using clinical systems to evaluate awardees’ programs. In some cases, we have similar patient reported measures across awardees, such as the patient activation measure and the care transitions measure® (CTM-3).

**Exhibit 2.5:** Summary of Cross-Awardee Findings on Program Effectiveness

Awardee	Setting	Target Population Studied	Study Design	Number of Post-Program Quarters Evaluated	Hospitalizations (Admissions or Readmissions)	ED Visits	Total Cost of Care
Indiana	Ambulatory	Older adults diagnosed with dementia or depression living in the community	Post-intervention longitudinal—no comparison	5	Decreasing Trend	Reduced **	No Trend
IOBS	Ambulatory	People living in the community with new diagnoses or relapsed cancers	Post-intervention longitudinal—no comparison	5	Reduced ***	Reduced*	Reduced***

Level of Statistical Inference: \*\*\* p<0.01; \*\* p<0.05; \* p<0.1

## Workforce Development and Deployment

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The HCIA interventions have generated many new roles and caused changes to existing roles. In most cases, new and emerging roles fall outside of traditional medical processes of care—focusing on service coordination, care management, community engagement, and patient education and activation. These aims complement each other and often overlap within programs and across staff roles. In nearly all cases, a combination of existing and newly hired personnel staff interventions fulfill these duties.

### Training

There is little consistency in awardees' approaches to training new staff. The majority of disease-specific awardees have trained clinical and non-clinical staff in systems and technology utilization as well as basic program protocols and tools. For instance, Le Bonheur trains all asthma care coordinators on using an asthma registry developed for the HCIA Program, and IOBS trains all physicians, clinical support staff, and nurses on the COME HOME model. At least 11 awardees provided training on caring for specific disease conditions to staff. Disease-specific training is most commonly designed for non-clinical staff such as CHWs, health educators, and lay navigators. Training is especially critical for non-clinical staff with limited relevant experience. About one-third of awardees provided clinical and non-clinical staff with guidance on motivational interviewing and patient activation. Other topics of trainings have included case management/patient navigation; HIPAA or IRB policies; and CPR and first aid. Shadowing and mentoring are an important component of awardee training of new staff. This includes both new staff observing more experienced staff in action or vice versa, with experienced staff providing feedback after observing a new staff member as he or she provides care.

### Hiring

Discussions in early site visits suggest that finding individuals who are the right fit for these new roles is crucial but can be challenging. Staff in care coordinator, care manager, CHW and navigator roles mostly work independently, and must be comfortable figuring out how to deal with situations as they arise, often without a supervisor to consult on the spot. Supervisors and staff in these roles cited the importance of flexibility, adaptability, and willingness to learn. This is in part because these roles were new to the organization, requiring individuals to be comfortable with continuously evolving duties and processes. Discussants also cited the importance of interpersonal skills, empathy, and a desire to make a difference in people's lives. For example, when hiring care coordinator assistants, Indiana's interviewing process involved candidates interacting with actors playing the role of patients and caregivers in scenarios that were designed to look like a typical home visit. This gave the interviewer the opportunity to observe and assess the candidates' interaction with the target population, in particular being able to assess their ability to express empathy.

Supervisors and staff identified some health care experience as important for workers managing or providing clinical care. Some found experience with the disease of focus to be useful but not necessary, as information about the disease can be taught. Several individuals in this role had a background in emergency medicine, which was cited as useful due to the triage experience it provided. For lay health worker positions such as CHWs, navigators, and lay health educators, relevant experience includes coming from the community being served, having experience with types of services offered (e.g., home

visits), and possessing some health care experience (e.g., experience as a medical assistant, working in a clinic or physician's office, or personal experience with the disease). As we move forward with the evaluation, we will further examine the critical characteristics and experience for these new roles and the role of training.

### Job Satisfaction and Workload

Initial findings suggest high rates of job satisfaction among staff in the new roles (e.g., care coordinators, community health workers). Individuals in these roles expressed that they find the work meaningful and rewarding and feel as though they are able to make a difference in people's lives. Staff who had previously worked as nurses in another setting also noted that these positions provide an opportunity to spend more time with patients than traditional nursing positions.

However, the nature of these roles may also increase the potential for staff to burn out. There were some reports of staff being overworked and approaching the point of burnout due to workloads or caseloads that are too high for the level of care the staff is providing. In addition, because these roles are, in many cases, new to the organization, job requirements have been continually evolving and expanding. The nature of these roles is very demanding and emotionally draining, particularly when positions entail developing relationships with participants over a period of time. CHWs who visit individuals and families in their homes, for example, have found it challenging to identify the appropriate boundaries. Participants may have staff cell phone numbers and call at all hours about all types of issues that arise for which they need assistance.

Several awardees provide staff support through use of chaplains, support groups, or staff meetings to allow staff to discuss their experiences. For example, UAB provides supports for patient navigators to prevent burnout. These supports include monthly conference calls between the director of nursing, the navigators, and site managers, during which the director of nursing responds to the navigation team's concerns about challenges encountered during interactions with patients, families, and medical staff. Reviews of difficult cases also promote problem-solving skills and help identify best practices between teams. Additionally, the navigators participate in a monthly debriefing call facilitated by a chaplain, where they have an opportunity to discuss their experiences amongst their peers. The navigators expressed that they provide support to one another, even covering caseloads for each other as needed.

Initial findings suggest that dividing labor and maximizing use of technology are important in allowing staff to work at the top of their licenses and handle a higher workload. For example, frontline staff reported facing issues they were unable to address due to lack of resources, knowledge, or time. At a number of sites, social workers or other staff with knowledge of local resources may be able to help address this challenge. Similarly, several awardees have an assistant to provide support to care coordinators. This may be a new role or a repurposing of an existing organizational role, such as a medical assistant or administrative assistant. These individuals can handle certain coordination functions, such as making appointments and checking in with participants on specific issues, allowing clinical staff to have more time available for clinical care management. UVA, for example, hired an administrative specialist to serve as an assistant to the care coordinator. The administrative specialist works closely with the care coordinator, providing support for recruitment, administering the patient survey and patient education, communicating with oncologists, and communicating between the hospice and hospital,

among other tasks. One awardee—Vanderbilt—has also automated some of these functions—particularly reminder calls for participants—allowing staff to use their time for other tasks. Future analyses will examine the ideal staffing structure and distribution of tasks across team members.

## Management

Another emerging finding is the importance of having the right manager in place for care coordinators and CHWs to be able to address processes that may not be working. This has been particularly critical for programs that did not have existing processes in place. Ideally the person in this role has served in a similar role to those people they are supervising. For example, Christiana found that the Care Management Hub Manager played an important role in developing protocols and working with staff to develop guidelines for care management processes. The individual who is currently in this role is able to draw on her prior experience as a care manager with an insurer as well as previous experience at Christiana, which enables her to serve as a resource for the care management team. Because she is in touch with the team on a day-to-day basis, she is able to address problems and issues as they arise.

## Contextual Factors

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We have identified several contextual factors—organizational and environmental—that presented challenges or facilitated implementation. Rather than enumerating an exhaustive list of contextual factors, we discuss a handful of factors that emerged across almost all awardees. These include one pervasive exogenous factor—socioeconomic conditions and access to resources—and two key endogenous factors—institutional support and partnerships.

### Impact of Socioeconomic Factors and Access to Resources

Many programs have found that socioeconomic factors or a lack of resources have impacted the health of their patients and limited the success of medical interventions. Staff at Vanderbilt, Indiana, and Ochsner described challenges that patients face accessing needed medications or medical equipment as well as the impact that lack of safe housing, transportation, or nutritious food can have on the health of their patients. Environmental factors are a challenge for several programs in terms of their ability to impact participant outcomes. For example, many participants in Duke’s program live in areas with limited access to healthy food. Recent cuts to Supplemental Nutrition Assistance Program (SNAP) benefits and low-income levels exacerbate this environmental barrier to lifestyle change. At Duke’s Quitman site, lack of public transportation also makes it difficult for individuals to attend health education events and reach the walk-in clinic. In addition, lack of transportation prohibits many local residents from traveling to the limited number of grocery stores in the county offering fresh produce.

Nemours staff described several exogenous barriers specific to their program’s target population that limit the impact of the intervention. CHWs noted that patients and their families contend with unstable and poor housing, blended families, financial constraints, lack of transportation, and unsafe neighborhoods. CHWs must first focus on addressing these social barriers before they can begin to work on the asthma-specific issues. CHWs must first focus on addressing these social barriers before they can begin to work on the asthma-specific issues. In many cases CHWs cannot provide solutions to all the challenges faced by the participants and their families. For example, transportation continues to pose a challenge as the

public transportation system in Delaware is often inconvenient and difficult to navigate. In addition, CHWs in Wilmington noted they often feel unsafe traveling to the homes of some participants and have reduced or eliminated home visits during times when gang violence and shootings increase.

The Le Bonheur team similarly faces challenges in mitigating some environmental asthma triggers in the homes of participants. The project does not have the resources to offer some services that would reduce or remove triggers, such as mold and mildew removal. In addition, the project team noted that Memphis housing codes do not help support healthy home environments (e.g., it is very difficult for tenants to force landlords to maintain an asthma-trigger-free environment). On a policy level, the supervisor of community collaborations within the Le Bonheur team is developing a grant with the University of Memphis School of Law in order to reform housing codes and help families work with landlords to reduce environmental triggers for asthma. The Le Bonheur team would help connect the law school to participants affected by housing issues and who could be advocates for change.

### Institutional Support

Many HCIA awardees have benefited from institutional support in the form of complementary initiatives that enhance the impact of the HCIA-funded intervention. In some cases, there have been outright contributions of resources to the HCIA Program itself. We will examine this factor when assessing return on investment (ROI) At Ochsner, for example, the HCIA-funded Stroke Central/Stroke Mobile programs are part of broader complementary changes being conducted within the health system. Ochsner implemented Stroke Central in conjunction with several other efforts that the Ochsner health system undertook to improve stroke care, such as reorganizing admitting protocols to create a stroke unit on one floor of the hospital, training ED staff and neurology floor nurses in stroke care, and conducting multidisciplinary rounds. Ochsner's goal was to meet the standards to become a Comprehensive Stroke Center certified by the Joint Commission and the American Health Association/American Stroke Association. The HCIA-funded intervention began in early 2013, and the Joint Commission recognized Ochsner Medical Center as a Comprehensive Stroke Center in May 2013.

Nemours' innovation program fits into a broader strategic aim of Nemours to develop its population health initiative. In 2004, Nemours created a division focused on population health integration. As part of the HCIA intervention, Nemours leadership felt strongly about working with community partners and shifting the focus to include prevention as well as acute care. They are now working to spread and scale the model of interdisciplinary team care to other clinics. This organizational culture shift has also facilitated the rollout of the HCIA Program.

Nemours is also pursuing patient-centered medical home NCQA certification for all its pediatric clinics. The Nemours HCIA sites leveraged these changes to support the HCIA intervention. For example, the sites already hired care coordinators and expanded clinic hours to address access issues for this patient population. There were also several enhancements made to Nemours' EHR system for NCQA certification.

In some cases, the awardee institution provides additional resources to the HCIA-funded program. For example, the program leadership at Christiana noted that strong institutional support has been critical in developing its model: applying for the Innovation Award, implementing the program on an aggressive

timeline, and ensuring project alignment with the institution’s goals. Evidence of this institutional support is the matching funds Christiana has provided for the development of the IT systems—an approximately \$6 million investment—and funding to cover salaries that are above the allowable cap. Finally, some staff at most awardee institutions provide time to the program in-kind.

## Partnerships

Many awardees discussed the positive role of internal and external partnerships. The Innovation Awards have required that awardee institutions build and strengthen partnerships both within and beyond their organizations, including partnerships with community-based organizations, health care organizations, and payers. For example, three awardees—UCLA, Indiana, and Vanderbilt—worked with physicians to help them understand how their programs were complementary to services that the physicians do not have the time or training to provide. FirstVitals also made critical use of partnerships—both existing ones as well as those forged during the implementation process. The primary objective of FirstVitals’ intervention is to prevent or minimize complications in patients with diabetes and, in turn, to lower costs of care. In designing the HCIA intervention, FirstVitals chose to target the Medicaid population in order to capitalize on the leadership staff’s existing relationship with AlohaCare, a nonprofit health plan founded by Hawaii’s community health centers. AlohaCare covers about 7,500 Medicaid recipients. FirstVitals’ relationship with AlohaCare helped facilitate the use of claims data to identify underserved, high-risk patients with type 2 diabetes. This relationship also helped FirstVitals to partner with community health centers to target such patients and enroll them in the program. While establishing relationships with an initial cohort of health centers required a large level of effort, it was easier to develop partnerships with additional health centers once FirstVitals demonstrated implementation success and strong customer service.

## Summary

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In our first year, we have begun to uncover important findings related to awardee progress. Most awardees continue to expand in order to reach enrollment targets and develop program activities based on anticipated and unanticipated constraints. Not surprisingly, we find that awardees faced barriers to implementation in their first two years. Many of these barriers stemmed from challenges implementing a consistent model of care delivery within dynamic and complex environments. The discussion in this section points to the tremendous variation in model implementation within and across awardees based on local conditions.

While most grantees identify care delivery models or education approaches defined prior to the project, implementation of these models varies based on practical constraints. In implementing the interventions, some awardees discover a different set of needs than anticipated among enrolled participants, requiring some re-thinking. In other cases, they find that implementing the model requires buy-in that is difficult to achieve from organizations outside the intervention. Awardees also report challenges working out data-sharing arrangements and recruiting participants.

Awardees have also had a range of experiences defining, training, and using staff with nontraditional roles. For the most part, awardees do not take participants out of their “usual source of care.” Instead, they work alongside that model to provide complementary and supplementary services through care

management and service coordination. These models offer the benefit of allowing more time with participants to conduct a more detailed assessment of needs, help define a care management path, and help patients follow through on that path. This additional time helps ensure that participants understand their condition as well as the provider's recommendations—invaluable, as providers often do not have the time to confirm.

Awardees took different approaches to defining the scope of care coordination. Differences in populations and intervention philosophy drive some variation in this scope, but much of the variation depends on local dynamics, including available resources and culture. We find some inconsistency between how the credentials and training of care coordination staff relate to the scope of services they provide. For example, in some cases, RNs and NPs conduct clinical assessments and support clinical care management while lay health workers help arrange different services for patients. In other cases, this service-coordination function falls to RNs and NPs themselves.

We find that characteristics of the staff responsible for coordination as well as the needs of the patients may affect how the scope of care coordination evolves. For example, in conducting assessments among enrolled participants, awardees may need unanticipated expansions in specific services. Additionally, some care coordinators may not enforce boundaries consistently and end up going above and beyond their job descriptions.

All of these findings present some challenges in terms of using qualitative data to associate specific program factors to each awardee. It is important to emphasize that this report only reflects a descriptive summary of qualitative information rather than a formal analysis. In year two, we will move forward with more systematic analysis of data we already have as well as including information from additional site visits we have yet to conduct.

While we only have limited quantitative findings at this point, our work in year one has set the stage for robust quantitative analyses in future quarters. With each quarterly report, we will provide analyses on the effectiveness of interventions for more and more awardees. The second year of the evaluation will allow us an opportunity to understand factors associated with sustainability, including how best to characterize and define evolving interventions, options for third-party reimbursement, credentialing implications and intervention costs. By this time next year, we will be in a position to use detailed qualitative and quantitative information to describe the progress and effectiveness of interventions for all 18 awardees.

Future analysis will help clarify boundaries across different types of interventions and allow us to meaningfully incorporate program factors into quantitative analysis. Ultimately, we hope by combining quantitative analysis with qualitative findings, our evaluation will identify not only what works and what does not but also the specific conditions underlying the answers to this question.

## Awardee-Specific Findings

In this section, we present an overview of each awardee—synthesizing qualitative data collected to date and incorporating quantitative results where possible.

## Christiana Care Health System

This report presents our evaluation of the Christiana Care Health System (Christiana) Bridging the Divide Program (Bridges).

We provide preliminary observations about the program based on the awardee’s application, operational plan, quarterly reports, telephone interviews with the awardee, an April 21 – 22, 2014 site visit, and initial claims analysis. Based on a review of our site visit notes, we present initial findings, which we will update after coding site visit data and fully analyzing the data collected to date. It is important to note that this report presents findings from the first year of the evaluation. We look forward to providing more definitive findings and results for future reports.

<b>Program Title</b>	<b>Bridging the Divide (Bridges)</b>
<b>Targeted Disease/Condition</b>	<b>Cardiovascular Disease</b>
<b>Total Amount Awarded</b>	\$9,999,999.00
<b>Description of Target Population</b>	Adults with ischemic heart disease admitted to Christiana hospital for revascularization or acute myocardial infarction.
<b>Description of the Awardee Organization</b>	Christiana Care Health System is a network of nonprofit, private hospitals based in Delaware with campuses in Newark and Wilmington. There are a combined 1,100 beds and more than 1,400 staff physicians.
<b>Setting of Intervention</b>	The intervention begins in Christiana Hospital in Newark, Delaware, and follows participants through their transition back to their homes throughout Delaware and surrounding states.
<b>Overview of Innovation</b>	The Bridging the Divide intervention enhances care for participants following coronary revascularization or hospitalization for acute myocardial infarction (AMI) through health IT-enabled care management. The intervention consists of two components: (1) transitional care coordination that begins at inpatient admission through transition into post-acute care, and (2) longitudinal care management in the outpatient setting providing proactive monitoring and notification of health events and IT-enabled participant self-monitoring and management.

### Introduction

Christiana’s experience in chronic disease management interventions dates back to institutional experiences as a Health Maintenance Organization (HMO) in the 1990s and early work on cardiovascular disease management.<sup>23</sup> The Christiana Care Heart Failure Disease Management program was a comprehensive program based on the Agency for Health Care Policy and Research (AHCPR) Clinical Practice Guidelines for Managing Heart Failure.<sup>24</sup> Program goals included decreasing inappropriate admissions or readmissions of patients with congestive heart failure (CHF), and improving quality of life and self-management for CHF. The program included a cardiac disease management case manager, outpatient telemonitoring by a cardiac nurse, home assessment as needed, coordination of Medicare benefits, and inpatient assessments. Christiana reported that during this intervention fewer adults were re-

<sup>23</sup> Christiana Care Health Services, Inc. Health Care Innovation Challenge. Proposal for the Center for Medicare & Medicaid Innovation Health Care Innovation Award. Application number: 1C12012001622.2012.

<sup>24</sup> Ibid

admitted for heart failure within 30 days, and the majority of participants noted an increased quality of life.<sup>25</sup>

Between 1997 and 2002, Christiana developed an asthma-management program called the Christiana Care Asthma Disease Management Program. Based on the National Heart, Lung, and Blood Institute guidelines, the program provided experienced pulmonary disease management case managers for all patients<sup>26</sup> and offered one-on-one educational sessions with a Registered Respiratory Therapist, medication education, individualized action plans, and a home environmental assessment. Similar to Bridging the Divide (hereafter called “Bridges”), the Asthma Disease Management Program stratified patients into six levels based on utilization history, present disease severity, and responses to outcome questionnaires. From their evaluation of the Asthma Disease Management program, Christiana reported positive outcomes through reduced Emergency Department utilization for adults and pediatric patients

Building from these institutional experiences and Christiana’s status as one of the leading cardiology programs in the country, the Bridges program focuses on ischemic heart disease. Program leadership saw the potential to reduce events of this common yet expensive condition by providing evidenced-based care. The Bridges program leverages existing health IT infrastructure in Delaware, including the first statewide health information exchange (HIE) organization, Delaware Health Information Network (DHIN). DHIN went live in May 2007, originally with only five physician practices participating but currently connecting more than 5,000 providers and staff across the state.

Christiana’s intervention is in response to evidence that patients in transition, receiving care in multiple locations, are particularly vulnerable to adverse events.<sup>27, 28</sup> Prior research also demonstrates that coordinated transitional care can lower readmissions and save nearly \$500 per patient over 180 days.<sup>29</sup> Additionally, HIE-facilitated longitudinal care management can reduce the average length of hospital stays and save costs.<sup>30</sup> In a discussion of largely unsuccessful attempts by commercial disease-management companies to improve care processes, one study notes that real-time data are essential to managing unpredictable chronic diseases.<sup>31</sup> This finding is echoed in other research that supports the use of real-time data in health IT-enabled care management.

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<sup>25</sup> Ibid

<sup>26</sup> Ibid

<sup>27</sup> Coleman E, Smith J, Raha D, Min S. Post hospital medication discrepancies: prevalence and contributing factors. *Archives of Internal Medicine*. 2005; 165(16): 1842-7.

<sup>28</sup> Kripalani S, LeFevre F, Phillips C, et al. Deficits in communication and information transfer between hospital-based and primary care physicians: implications for patient safety and continuity of care. *Journal of the American Medical Association*. 2007; 297(8): 831-41.

<sup>29</sup> Coleman E, Parry C, Chalmers S, Min S. The care transitions intervention: results of a randomized controlled trial. *Archives of Internal Medicine*. 2006; 166(17): 1822-8.

<sup>30</sup> Albert Tzeel V, Pemble K. The business case for payer support of a community-based health information exchange: a Humana pilot evaluating its effectiveness in cost control for plan members seeking emergency department care. *American Health and Drug Benefits*. 2011; 4(4): 207-16.

<sup>31</sup> McCall N, Cromwell J. Results of the Medicare Health Support disease-management pilot program. *New England Journal of Medicine*. 2011; 365(18): 1704-12.

## Innovation Components

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The Bridges program enhances care for patients following coronary revascularization or hospitalization for acute myocardial infarction (AMI) through health IT-enabled care management. The goal is to reduce 30-day readmissions; improve measurements of blood pressure and LDL cholesterol control; and lower costs. The intervention consists of two main components: (1) transitional care coordination that begins at inpatient admission through transition into post-acute care, and (2) longitudinal care management in the outpatient setting informed by a real-time patient data system. At the core of the Bridges program is the Care Management Hub, a care management team that consists of an internist, a Hub manager, three nurse care managers, two social workers, an inpatient care manager, a health ambassador, and a pharmacist. The care managers, social workers, and health ambassador each manage an average of 250 participants at any given time.

**Transitional care coordination.** Christiana uses predictive analytics to identify patients who meet the enrollment criteria for Bridges care management. Neuron™ (ColdLight Solutions, LLC)—a software capable of processing large amounts of data and learning to identify patterns—scans Christiana hospital system records for defined events and then generates a daily list of patients. The care management team is able to review, confirm, and enroll these patients in the program. The software assigns participants to one of three risk groups based on their risk profile and comorbidities.

The inpatient care manager performs an initial visit while the patient is still hospitalized. At this visit, the care manager introduces participants to the program and describes follow-up contact after discharge. The Hub pharmacist works with participants to reconcile medications before the care managers provide patient-centric discharge planning. The discharge plan focuses on patient self-management, presents a guide to health-coaching efforts, and enables symptom tracking.

A member of the care management team contacts each participant by phone between 24 and 72 hours post-discharge, depending on the participant's risk profile. Care managers use Aerial™ (Medecision)—a commercial care management software—which assigns participants to care plans, provides scripts for transition calls, and generates prompts for other specific tasks. The follow-up phone call focuses on reducing readmissions by reviewing medications, scheduling a follow-up appointment, and identifying other participant needs. Based on this call and the risk stratification, the care manager will assign participants to a 30-day, 60-day or 90-day follow-up period. Care managers follow up with high-risk participants at least weekly. For participants who qualify, Bridges care managers also coordinate visiting nurses and home health care. The Christiana Care Visiting Nurse Association (VNA) calls the Bridges Care Management Hub at the end of the day to discuss any visits they made to program participants.

**Longitudinal care management.** In general, on the 61<sup>st</sup> day after program enrollment, participants move from transitional care into the longitudinal care management outpatient component. The Hub care managers provide ongoing IT-enabled monitoring, help participants schedule follow-up visits with physicians, and assist with enrollment in chronic disease self-management programs.

The program's analytics system, Neuron, identifies participants who are most likely to experience readmissions, develop complications, and need a higher level of care. The system runs analytics on data from Christiana's inpatient electronic health records, the American College of Cardiology PINNACLE Registry®, and the VNA system to identify participants with elevated blood pressure, weight gain over a

specific threshold, or a readmission. This data then feeds directly into Aerial (the care management software) via tasks and notifications that provide participant details and classify severity. The care managers, using clinical judgment, adjust participant severity levels and quickly reach out to participants who need further monitoring or in-person appointments. Aerial configures tasks for the care managers, such as reminders for assessment completion, to save time and streamline workflow.

### Target Population and Program Participants

The intervention targets patients over the age of 18 with ischemic heart disease admitted to a participating hospital either for coronary revascularization (by percutaneous coronary intervention [PCI] or coronary artery bypass grafting [CABG]) or medically managed myocardial infarction.<sup>32</sup>

**Participant characteristics.** As of April 2014, Bridges has served more than 1,600 patients (60% male). Approximately half are older than age 65, while 42.3% of participants are between 26 and 64. Approximately 75% of participants are White and 12.3% are Black or African American. The most common insurance types among participants are Medicare (46.2%) and private commercial insurance (26.4%).

Demographic Information	Jan–March 2014 Patient Count	Jan–March 2014 Patient Count		Jan–March 2014 Patient Count	Jan–March 2014 Patient Count
<b>Sex</b>	<b>#</b>	<b>%</b>	<b>Age</b>	<b>#</b>	<b>%</b>
Male	729	64.5%	Elderly: >75 years	248	21.9%
Female	330	29.2%	Elderly: 65-74 years	332	29.4%
Unknown	71	6.3%	Adults: 26-64	478	42.3%
<b>Race/Ethnicity</b>	<b>#</b>	<b>%</b>	<b>Insurance Type</b>	<b>#</b>	<b>%</b>
Black/African American	139	12.3%	Medicaid	73	6.5%
Hispanic or Latino	26	2.3%	Medicare (FFS/Unspecified)	522	46.2%
Asian	26	2.4%	Dually Eligible	199	17.6%
White	852	75.4%	Private/Commercial	298	26.4%
American Indian/Alaska Native	0	0.0%	Uninsured	14	1.2%
Unknown	86	7.6%	Other	24	2.1%
Two or More Race/Ethnicity	1	0.1%	Unknown	0	0.0%

Source: HCIA 7QR Awardee Performance Report. Reflects unique count of quarterly direct program participants.

<sup>32</sup> The intervention qualifications are clear to identify since PCI and CABG are easily identifiable through billing codes. The myocardial infarction population was specified as medically managed since acute myocardial infarction (AMI) patients are not revascularized and can therefore be difficult to capture. This means that Christiana is avoiding capturing AMI patients who come in with non-cardiac events but heightened levels of troponin. Instead, the Bridges program can define their myocardial infarction patients by an elevated troponin and catheterization that is defined by at least a 50% stenosis of one lesion. Within the Bridges population, roughly 95% of the participants are enrolled with PCI/CABG. The reporting for PCI/CABG is done separately, which means that AMI is discussed infrequently in Christiana’s reporting.

## Implementation Effectiveness

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Christiana has implemented the intervention in phases in order to establish sufficient infrastructure. The operational plan was approved on September 21, 2012, after which Christiana focused on recruiting care managers and building a sustainable and personalized care management system. They began enrolling patients in the Care Management Hub on February 4, 2013.

Christiana spent much of the first year getting the Bridges program up and running. Major activities included developing a health IT system to support care management and creating care management processes and protocols. The implementation process opened up new lines of communication at both the clinical and institutional levels.

**Development of health IT systems.** The Bridges team developed the health IT component rapidly, implementing Aerial within three months and Neuron within six months. Initially, care managers manually analyzed data to identify eligible patients, although the process is now automated through Neuron. Neuron generates and delivers the list of eligible patients with relevant details (e.g., risk score, predicted readmission risks, elements that contribute to the readmission risks) to Aerial, the care management software, making it easier for care managers to identify and prioritize high-risk patients.

Before this project, Aerial primarily served the health insurance industry. Christiana's health IT team worked closely with the vendor to modify the application for provider settings across the care continuum. In addition, care managers provided feedback on system requirements and prototypes. As a result, Aerial can be used more widely among provider facilities with some additional customization. A critical role has been the liaison between the care management and health IT teams who helps to ensure the IT system continues to meet care management needs and that IT updates are well-communicated to the Hub. Through this iterative process, the Aerial interface is continually improving to align more closely with care management workflow. For example, standard protocols are now programmed directly into Aerial, such as the script for initial transition calls to ensure that the care managers address all necessary care components. The team also uses Aerial to configure customized tasks. For example, if issues around medication affordability surfaced on the first call, the care manager can set up a prompt for the care manager or pharmacist to provide education on the medication and encourage continued compliance in spite of the cost.

Christiana continues to work with the vendors to improve the systems to better support care coordination at Christiana Care. There are continued efforts to optimize various data streams, including the Delaware Health Information Network (DHIN), which offers lab and utilization data, Cerner's PowerChart (the inpatient electronic health record), the American College of Cardiology PINNACLE Registry®, and the VNA Home Health system. When these data feed into the system, Neuron aggregates it in real time and sends the appropriate information to Aerial so that care managers can identify eligible patients. Moreover, once the data streams are up and running, the system can use the data to produce alerts for the care managers regarding their participants. For example, if a participant has elevated blood pressure at the cardiology office, the ACC Registry will have this data, which will then be transmitted to the care managers. When the care manager calls the participant, she can follow up on whether the participant took the prescribed antihypertensive medication. It is critical for the systems to have access to the right data, to

apply the correct data analytics, and to have the ability to provide usable information to the care managers.

Early in the project, the Bridges team changed software vendors to a more responsive company. They originally planned to develop Neuron with a large company that is geographically distant from Christiana. However, the team determined the company was not committed to putting forth sufficient effort to develop the product. Instead, they contracted with a smaller vendor and now work directly with the vendor's CEO. This was particularly important given the intricacies and needed attention around developing the middleware layer. The Bridges team needed the CEO to work closely with them and implement software changes swiftly. The resulting software programs are more responsive to the participant and program evaluation needs because they integrate real-time data streams rather than retrospective claims data.

**Evolution of care management processes and protocols.** The awardee had a strong vision for care coordination and has improved its implementation over time. While the original staffing model anticipated a fully functioning health IT system, the care management intervention commenced before IT capabilities were fully functional. In the initial stages, the Hub team was not able to leverage the efficiencies around automation; they had to manually review patient charts through the EHR to identify eligible patients. This diverted attention from other care management activities, such as calling participants.

Initially, the approach to care management was ad-hoc, given that Christiana had not previously provided care coordination in the outpatient setting and due to turnover in Hub leadership in the first year and a half. While the dashboard was in development, the care management team was unable to create firm protocols or processes relating to the interface. Without established protocols, the care managers' daily tasks were highly variable based on personal philosophies of care. Under the leadership of the new Hub manager, Christiana is now implementing protocols and procedures. As they develop and standardize care management protocols, the roles and responsibilities of the Hub team have been iteratively refined.

After much trial-and-error, the Hub team now has clearly defined expectations, roles, and responsibilities. Each care manager has a caseload of 250 to 300 cases at any given time; this workload is adjusted for the severity and risk of the participants. The lowest-risk participants are assigned to the health ambassador, a non-clinical member of the care management team. With a clearer division of labor, the team has come to trust each other in their care management roles. For example, care managers with nursing backgrounds are assigned higher-risk participants; social workers focus on ensuring participants are receiving sufficient social support; pharmacists manage all medication reconciliation tasks, in person and over the phone; and the health ambassador takes charge of lower-risk participants. While some fluidity may remain in terms of roles and responsibilities, the team has found it beneficial to know who leads each task.

The Bridges team has also modified the definitions of risk levels. Upon enrollment, participants receive an inpatient visit by a Hub care manager who assigns them to an intervention level. This assignment determines the general roadmap for care management. The awardee originally proposed a six-level system (0 to 5). As care managers began implementation, they found the care pathways could be consolidated. Upon further discussion with the Bridges team, they collapsed the six levels to four levels (0 to 3). Now, Levels 1 and 2 participants are seen by the inpatient care manager, who introduces the

Bridges programs, identifies specific participant needs, and designates them for follow-up phone calls within 48 to 72 hours. Level 3 participants, the highest risk group, receive Level 1 and 2 services, medication reconciliation services, and follow-up phone calls within 24 hours. Care managers devise a tailored care plan after the follow-up call. Participants with a high-risk of readmission typically receive weekly calls at a minimum; lower-risk participants may receive standard 30-day, 60-day, and 90-day follow-up calls. The level assignment is adjusted based on the latest participant data.

**Addition of readmission adjudication meetings.** Midway through the first year, the team recognized a need to convene the interdisciplinary team regularly to discuss cases of enrolled participants readmitted within 30 days. When participants are readmitted, nurses are notified to meet the participants and obtain consent and complete a chart audit of key variables. The nurses also conduct a participant survey during which they ask participants about their preparedness for discharge, their experience with discharge, and reason for readmission.

On a biweekly basis, the Bridges team—including the Principal Investigator, Co-PI/Director of Program Evaluation, Hub Manager, Hub Medical Director, care managers, and the cardiologist—gathers to review four to six readmission cases. Each physician who participates in the meetings is assigned a subset of cases to review before the meeting. During these meetings, the group reviews the nurses' chart audits and results from the participant survey. They walk through each case and talk through a series of guiding questions, including whether the readmission was preventable; the reasons for readmission; an assessment of communication between providers, case management staff, and the participant; any key lessons learned, and any follow-up action items.

The Bridges team then shares the feedback with the cardiologist and care management team to improve post-discharge care. The group submits a summary of the discussion as an adjudicated readmission audit to the research supervisor. The information is then taken back to the Hub for review, and the Hub makes improvements to care management protocols accordingly. For example, the review group identified lack of coordination between the Hub and the cardiac surgery team as an issue. In response, care managers now conduct daily rounds with the cardiac surgery team. Bridges also updated the seven-day follow-up protocol so that participants see the cardiac surgeon and the cardiologist; the surgeon looks at the state of the wound, and the cardiologist checks on medication management.

**Interdepartmental communication and collaboration.** The implementation of the Bridges program has fostered collaboration between staff in departments across the health system. The health IT and clinical teams had not previously worked together and have different lenses and languages. The entire Bridges team meets twice weekly. According to program leadership, these meetings force teams to integrate and provide a platform for candid discussions. Once a month, the entire Bridges team comes together for an in-person meeting to cross-pollinate and take a step back to look at the big picture of the innovative work that is taking place. As a result of these regular meetings, issues and challenges surface in a timely manner, and the Bridges team is able to address them appropriately. Christiana works with a subcontractor to provide project management support and facilitate the implementation process.

## Program Effectiveness

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Our evaluation uses quantitative analysis to assess program effectiveness in terms of the core outcome measures used across all HCIA awardees—hospitalization rates, emergency department visit rates, 90 day readmission rates, and total cost of care—as well as supplemental measures specific to an individual awardee. We also gathered additional qualitative data on program effectiveness through the site visit, surveys, awardee telephone interviews, and review of program documents.

### Quantitative Results

Our evaluation of program effectiveness of the Bridges program will be based largely on quantitative data. We look forward to presenting results on Christiana’s impact on measures of health, quality of care, utilization, and costs in future reports.

### Qualitative Results

Our qualitative findings of program effectiveness for the Bridges intervention will be based largely on analysis of data collected during our site visit, including discussions with staff and patients and observations of the program. At the time of this report, we had not yet conducted an analysis of this data and will therefore present the results in a future report.

## Workforce Development and Deployment

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The Care Management Hub acts as a focal point for the Bridges intervention. The inter-professional care management team includes the physician, the Hub Manager, three nurse care managers, two social workers, an inpatient care manager, a health ambassador, and a pharmacist. The physician is trained as an internal medicine physician and has recently transitioned into population health for the Bridges program. In July 2014, she joined the Bridges team full-time. Her key role on the Bridges team is to answer clinical questions and liaise with clinicians from other practices. The Hub Manager is a registered nurse, with a Master of Science in Nursing and a certificate in the business of nursing as well as seven years of experience as a staff health educator at Christiana. She also worked in telephone case management through an insurance company before returning to Christiana to join the Hub.

The team members are co-located, so they can easily communicate with each other. For example, while the nurses primarily manage the high-risk participants, they can make sure that the team social worker follows up with a participant who may need social support services, or they may request that the pharmacist follows up to address specific medication questions. The health ambassador, who does not have a clinical background, works in tandem with the nurse care managers but focuses on the lowest-risk and least complicated participants. Since the Hub is a central piece of the intervention, hiring for these positions has been critical to successful implementation.

**Training.** The Christiana program trains its care management staff on health topics relevant to their work (e.g., cardiac nutrition, health literacy) and on how to use the program’s care management software. In the beginning of Bridges, care managers completed health coaching and care management modules online. They also received training from care managers and social workers at Christiana through lunch-and-learn sessions. The most recent hires participated in two days of nursing orientation and one day of Christiana new employee orientation; they also spent a month shadowing an inpatient care manager.

The broader Hub team also completes base competency training through the American Case Management Association (ACMA). The program, called Compass, is offered online and has 16 modules, including Professionalism, Resource Management, Observation, and Advocacy. This ensures every Hub staff receives the same base training. The primary care managers are required to take ACMA's Accredited Case Manager (ACM) certification exam after meeting the exam prerequisites. The pharmacist also has access to educational programs through the Christiana pharmacy department.

**Recruitment, retention, and turnover.** The Bridges team has found it challenging to recruit and retain Hub staff who were able to cope with the evolving nature of the program during the first year and a half. Managers found that flexibility, willingness to work in a dynamic environment, creative problem solving, experience in care management, and ability to engage participants via telephone were essential characteristics of a successful care manager. In addition to challenges finding individuals who were the right fit for the position, they encountered reluctance from potential employees to accept a grant-funded position, which they viewed as too temporary or unstable.

Finding the right person to lead the care management team was also a challenge. The current Hub Manager, who began in March 2014, is the fourth person to hold the position. The leadership team found that the Hub Manager role requires a unique set of skills and experience, including prior experiences in case management, flexibility, and an interest in innovation.

**Changes in roles.** In the initial design of the program, the inpatient care manager role was a floating responsibility shared among the Hub staff. Since the Hub staff are located in a building separate from the hospital and often had full workloads, they were not always able to see patients before discharge. Thus, eligible patients did not consistently receive an introduction to the Bridges program.

Bridges has since appointed a permanent, dedicated inpatient care manager. The individual in this role is able to speak with almost all patients before discharge. In fact, this inpatient care manager is able to identify and resolve some of the patients' needs before discharge. She introduces the Bridges program to patients, provides informational materials, and explains what patients can expect during the next year of participation. Her tasks also include daily rounds with the physicians and working closely with the inpatient care team. The inpatient care manager is now viewed as a critical role, serving as the face of the program.

## Context

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Below we discuss some of the contextual barriers and facilitators Christiana has encountered in the implementation of the Bridges program.

### Exogenous Factors

The discussants attribute the early success and progress of the Bridges program to strong leadership and committed staff members experienced in research, care management, and information technology. In addition, clearly defined goals enable the Bridges team to make adjustments and adaptations to the program while staying on track to achieve effective IT-enabled care management. The program also receives steady institutional support, which some team members noted is a key facilitator that enables

them to innovate, learn through trial-and-error, and make changes relatively quickly to ensure the program goals are met.

**Support and experience.** Strong institutional support and experienced staff members are critical. Starting from the planning phase, high-level leaders were involved, including the Chief Medical Information Officer, Vice President for Population Health, and the Chief Medical Information Officer/Information Technology. The project has greatly benefited from such involvement, as leadership is able to steer the project so that it is consistent with the institution’s goals. The Bridges team is thus able to build a model that increasingly approaches Christiana Care’s core mission. One can see evidence of this institutional support through the additional funds Christiana has provided for the development of the IT systems—an approximately \$6 million dollar investment—and to cover salaries above the allowable cap. Additionally, the Bridges program is supported by experienced health services researchers and project managers as well as seasoned IT and biostatistics staff.

The Bridges team learned the importance of having both “experienced leadership and truly deep institutional support.”<sup>33</sup> To an extent, the Bridges program introduces a significant change to care delivery at Christiana. It shifts the focus of care toward population health. Strong leadership and institutional support can effectively guide this process and ensure all program adjustments align with the program’s goals and, ultimately, the institutions’ vision. In turn, the implementation and maturation of the Bridges Program is well supported, and the team is empowered to be innovative.

### Endogenous Factors

**Delaware’s healthcare market.** The healthcare market in Delaware is an important facilitator. Christiana Care, with 80% of the hospital beds in the state, is a dominant provider, which positions them well to influence the state’s policies. In addition, there are relatively few insurers covering those living in the state, which leads to fewer entities with which to negotiate. There are about 900,000 people living in Delaware; about half are covered by the state through Medicaid, state employee benefits, or the Children’s Health Insurance Program. Also, many large national companies there are self-insured.

Moreover, Delaware is a small state with substantial health IT infrastructure in place, including the first statewide health information exchange entity. Provider and payer dominance reduces the barriers to obtaining access to useful health data. For instance, DHIN will be a key source of data informing the Christiana team. It includes lab and admission discharge transfer data, and its provider enrollment is approaching 100%.<sup>34</sup> Christiana is currently working to establish a channel to access data from the DHIN in order to optimize their use of Aerial and Neuron. The process of obtaining access to each data stream is both time- and resource-intensive. In addition, once the data feed is put in place, the system must be able to aggregate and analyze the data. Ultimately, the system will use this data to provide the Hub with important information, such as patient risk score, other elements that contribute to readmission risk, and predicted readmission risks.

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<sup>33</sup> Bridges leadership, Site Visit Discussion.

<sup>34</sup> About Us. Delaware Health Information Network; 2014. <http://www.dhin.org/about>.

**Sustainability.** At the institution level, Christiana Care is committed to incorporating care management as part of the model of care moving forward. In fact, the awardee had a discussion at the President’s Cabinet meeting around “the role and sustainability of the Bridges program in Christiana Care’s longer-term strategy for population health.”<sup>35</sup> Christiana Care has also shown commitment through its investments in the health IT system supporting care management. Christiana leadership plans to continue the care management component beyond the life of HCIA and views this intervention as part of a new approach to care. One member of the leadership team called this award “transformational,” noting that the introduction of this approach to care management “is really our transition to doing accountable care work.” Because Christiana has already invested resources in developing the Aerial care management system, expanding the care management to other groups beyond cardiology—for example, to oncology and heart failure—will not require significant additional investment.

## Summary

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The goal of Christiana’s Bridging the Divides program (Bridges) is to enhance care for patients following coronary revascularization or hospitalization for acute myocardial infarction (AMI) through health IT-enabled care management. The Bridges program consists of two intervention components—transitional care coordination and longitudinal care management—providing varying levels of care from admission to one-year after admission. The Care Management Hub is at the core of the Bridges program. The Hub consists of a care management team, which is made up of an internist, nurse care managers, social workers, an inpatient care manager, a health ambassador, and a pharmacist. With support of the online care management platform, the team provides a wide range of services primarily through telephone calls, including reminders for follow-up appointments, medication review, and connection to social services and home health agencies if needed.

Care management in the outpatient setting was a new endeavor for Christiana and the Bridges team. The team faced some initial staffing challenges in getting up and running. Once program leadership were able to staff all the critical positions for Bridges the team has found its stride and continues its efforts to enhance the program. Strong program leadership and institutional support have facilitated program implementation by empowering the Bridges team to be innovative, to learn through trial and error, and to make changes quickly to ensure the program goals were met. In addition, as the dominant provider in Delaware where half of the population is insured by the state and many others work for large national companies who self-insure, Christiana was well-positioned to access critical data streams to support their intervention.

There are several topics which warrant further investigation during the second year of the evaluation, including:

- The role of the pharmacist in counseling participants on medication;
- Updated information on improvements in medication adherence or reduction in medication errors associated with Bridges; and
- Implementation and uptake of the patient portal.

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<sup>35</sup> Christiana Care Health Services, Inc. (2014). Health Care Innovation Awards Seventh Quarterly Reporting Period (7QR) January, February, March 2014.

Continued research and communication with the awardee on these topics will help to better inform the evaluation of Christiana in order to determine the potential for replicability and scalability of the intervention, as well as how the program is serving its patients currently enrolled in the program.

## Duke University

This report presents our evaluation of the Duke University Southeastern Diabetes Initiative (SEDI) program.

We provide preliminary observations about the program based on a review of the awardee’s application, operational plan, quarterly reports, telephone interviews with the awardee, and data from site visits to Durham and Cabarrus Counties on May 15–16, 2014 and to Quitman County on May 29, 2014. At the time this report was written, we had not conducted participant interviews. Based on a review of the notes collected during our site visits, we present initial findings, which we will add to and revise after we code site visit data and fully analyze the data collected to date. It is important to note that our findings are tentative at this point. In this section, we will examine themes that we have identified during the first year of the evaluation. We look forward to providing more definitive findings and results for subsequent reports.

<b>Program Title</b>	<b>SEDI (Southeastern Diabetes Initiative)</b>
<b>Targeted Disease/Condition</b>	<b>Diabetes</b>
<b>Total Amount Awarded</b>	\$9,773,499.00
<b>Description of Target Population</b>	Adult (18 years of age or older) residents of four counties in the Southeastern United States. The high-risk intervention targets patients with diabetes at high risk for hospitalization or death; the moderate-risk intervention targets patients at moderate risk for hospitalization or death; and the low-risk intervention targets all county members.
<b>Description of the Awardee Organization</b>	Duke University partnered with the National Center for Geospatial Medicine at the University of Michigan; the Mississippi Institute for Public Health; Family Medical Center and Quitman County Hospital in Marks, Mississippi; Center for Rural Health at Joan C. Edwards School of Medicine, Marshall University; the Mingo County, West Virginia Diabetes Coalition and Comprehensive Health Solutions Clinic, Williamson Memorial Hospital, Family Care Center, and Health and Wellness Federally Qualified Health Center in Williamson, West Virginia; the Appalachian Regional Commission; the Durham County Department of Health in Durham, North Carolina; the Cabarrus Health Alliance in Kannapolis, North Carolina; and Carolinas Medical Center-NorthEast and Cabarrus Rowan Community Health Centers in Concord, North Carolina.
<b>Setting of the Intervention</b>	The intervention takes place in four Southeastern counties: Durham County, North Carolina; Cabarrus County, North Carolina; Quitman County, Mississippi; and Mingo County, West Virginia. Intervention activities take place in clinics, participants’ homes, and community organizations.
<b>Overview of Intervention</b>	<p>The goal of SEDI is to address the toll of type 2 diabetes on populations residing in the Southeastern region of the United States, also known as the “diabetes belt.” The intervention includes several components:</p> <ol style="list-style-type: none"> <li>(1) Spatially enabled informatics system that uses EHR data, demographic data, and environmental data (e.g., neighborhood features such as grocery stores) to segment patients and neighborhoods based on the risk of hospitalization or death facing persons living with diabetes in each of the four participating counties.</li> <li>(2) Patient-centered care management involving a multi-disciplinary team working in parallel with the treating clinician to assess and address clinical, behavioral health, social support, and nutritional needs.</li> </ol> <p>The risk algorithm groups patients into three intervention groups, each receiving a different intensity of services.</p>

## Introduction

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Several components of Duke’s Southeastern Diabetes Initiative (SEDI) program are grounded in evidence-based research. First, and central to the Duke intervention, is geospatial identification of high-risk patients, which studies have shown is successful for targeting chronic disease interventions. For example, a study conducted in the United Kingdom concluded that geospatial maps may be a useful tool for identifying areas of high diabetes risk and provide interventions.<sup>36</sup> More broadly, an overview of risk algorithms concludes that multivariable risk algorithms can play a useful role in supporting population health initiatives.<sup>37</sup> Finally, one of the SEDI principal investigators (PI) cites an “extensive and growing rapidly” literature supporting the use of geospatial maps to address population health in her 2011 commentary, “Use of Spatial Analysis to Support Environmental Health Research and Practice.”<sup>38</sup>

Once high-risk areas and patients are identified, public health officials must then deliver proven interventions to change the risk profile and improve population health. For this component, Duke built on an evidence base showing the effectiveness of diabetes care management. A meta-analysis of 76 studies concluded that chronic care management improves diabetes outcomes.<sup>39</sup> The analysis also found that programs featuring two or more chronic care model components produce the most positive outcomes.<sup>40</sup> Duke’s educational programming is partially based on the Stanford Diabetes Self-Management Program (DSMP), which has significantly improved participants’ behavior and self-efficacy. A randomized trial shows that the DSMP model has significantly reduced participants’ depression and symptoms of hypoglycemia while also improving their communication with physicians, their healthy eating, and the reading of food labels.<sup>41</sup>

The Duke-based PI has focused his SEDI work on predicting risk for individuals and subsets of people with chronic disease and then matching risk level with the intensity and mode of treatment. After attending a presentation by the SEDI co-PI from the University of Michigan National Center for Geospatial Medicine, he became intrigued by the potential to use environmental and demographic data arrayed geographically to help predict risk of hospitalization or death for those living with chronic diseases. Adding social and environmental risk factors to clinical data could improve the predictions and help target interventions that go beyond clinical treatment. The two PIs discussed the possibility of placing EHR information in a geospatial context and combining this information with other data to create health profiles of entire communities, which resulted in the foundational concept for the SEDI program.

The co-PIs then engaged the city and county of Durham, North Carolina, to gather community views on the characteristics of an effective health care system and then used the results of this exercise to develop the different components of SEDI. Duke received a grant from The Bristol-Myers Squibb Foundation

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<sup>36</sup> Mathur R, Noble D, Smith D, et al. Quantifying the risk of type 2 diabetes in East London using the QDScore: a cross-sectional analysis. *British Journal of General Practice*. October 2012; 62(603): e663-e670.

<sup>37</sup> Maneul D, Rosella L, Hennessy D, et al. Predictive risk algorithms in a population setting: an overview. *Journal of Epidemiology and Community Health*. October 2012; 66(10): 859-865.

<sup>38</sup> Miranda M, Edwards S. Use of spatial analysis to support environmental health research and practice. *North Carolina Medical Journal*. May 2011; 72(2): 132-135.

<sup>39</sup> Elissen A, Steuten L, Lemmens L, et al. Meta-analysis of the effectiveness of chronic care management for diabetes: investigating heterogeneity in outcomes. *Journal of Evaluation in Clinical Practice*. October 2013; 19(5): 753-762.

<sup>40</sup> Ibid.

<sup>41</sup> Lorig K, Ritter PL, Villa F, Armas J. Community-based peer-led diabetes self-management: a randomized trial. *Diabetes Educator*. July-August 2009; 35(4): 641-645.

gave Duke a grant to develop the SEDI concept and then HCIA funding to broadly test the SEDI concept. Under the award, the team combines EHR data with community-level health and social data to inform quality improvement activities and to implement a county-level learning health system model in four Southeastern United States counties.

### Innovation Components

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SEDI is a county-based population health initiative that uses a risk algorithm to spatially assess neighborhoods and individuals and segment residents into one of three main interventions:

- High risk: diabetes management for patients with diabetes at high risk for hospitalization or death;
- Moderate risk: diabetes self-management telephone program and community-based classes for patients at moderate risk for hospitalization or death;
- Low risk: targeted neighborhood diabetes education and health resources available to all county members.

The high-risk intervention is supported by an interdisciplinary care management team—clinical staff and case workers—at each of the four sites. The moderate- and low-risk interventions are primarily implemented by a community-based workforce (i.e. diabetes information officers and community health integrators) and supported by a Community Advisory Board (CAB) of county stakeholders at each site but receive some support from members of the care management team. The CAB meets regularly with the SEDI site program staff to review the geospatial data and discuss how they can work together to effectively target existing and new resources and programs to prevent poor diabetes outcomes in their communities. SEDI's data warehouse is used for periodic monitoring of individuals and populations in the counties of interest, including those with diagnosed and undiagnosed type 2 diabetes.

**Development and implementation of risk algorithm.** SEDI uses a risk algorithm to identify patients at highest risk for diabetes-related hospitalization or death and then attempts to enroll them in the high-risk intervention. In addition to highlighting the highest-risk individuals, the risk algorithm maps risk for diabetes-related hospitalization or death across different communities within the entire county. Because the algorithm looks at risk of hospitalization or death associated with diabetes, investigators first have to use EHR data to “phenotype” patients living with type 2 diabetes. In order to achieve the mapping objectives, the SEDI model looks at clinical data from as many providers as possible in the county, including those not directly participating in the high-risk intervention.

Using EHR data to phenotype diabetes is a time-intensive process requiring significant cleaning and validation of EHR data due to the variation in how different practices code for diabetes. Variation is often due to differences in how diagnostic entries are configured in EHR and billing systems. Conflation of the related conditions of gestational diabetes, type 1 diabetes, type 2 diabetes, and pre-diabetes can also create confusion. In addition, sometimes records have no diabetes diagnosis, but a diabetic phenotype can be detected from patterns in lab tests and results. Once patients with diabetes are identified in the EHR data, the algorithm uses clinical data to predict risk of hospitalization or death. Duke plans to continuously improve its risk algorithm by adding social and environmental data.

SEDI also uses a data-driven approach to inform implementation of moderate- and low-risk interventions. Duke marries its social and environmental data in a spatially enabled data warehouse to determine where people at highest risk for diabetes and diabetes-related hospitalization or death live. This information helps target communities for the moderate- and low-risk interventions. The moderate- and low-risk interventions call for close collaboration between the community and the team creating data maps. The data team provides the community (represented by the CAB) with maps and social and environmental information, and the community team helps the data team identify any factors outside of the data that may affect patient or neighborhood risk. As with other components of the program, site-specific factors affect how the maps are used. For example, in Durham, North Carolina, the robust CAB has worked closely with the SEDI mapping team to identify specific neighborhoods in Durham County, the largest county participating in SEDI. By contrast, in Cabarrus—the participating county most similar to Durham—the CAB shared that its policy workgroup uses the mapping to inform the work it does on food policy. The Cabarrus CAB members explained that they focus more on the general population than on identifying target populations. In Quitman, Mississippi, the smallest participating county, the entire county acts as the “neighborhood” for the purpose of these interventions. These differences suggest that the size of the county and each CAB’s vision informs the extent to which mapping influences intervention targeting.

**Participant enrollment.** Primary care providers at partnering clinics or SEDI care management team staff use the risk algorithm to identify and enroll patients eligible for high-risk intervention. Any patients who do not qualify initially are subject to a provider override so that they can be funneled into the high-risk program. Providers most commonly recommend the override in cases where they deem a patient at high risk for hospitalization or death on the basis of the patient’s social circumstances or mental health (qualities that may not be reflected in the risk algorithm). This recommendation is reviewed by a team for approval and also serves as the basis for continuous quality improvement on the risk algorithm.

The means for initiating contact with patients selected for the high-risk intervention varies by site. In Durham, the care management team reaches out to the eligible patient’s primary care provider to gain permission to contact the patient about enrollment. Cabarrus County has faced barriers in recruiting Hispanic patients and thus has added a *promotora* to increase the number of Spanish-speaking high-risk participants. Many Durham and Cabarrus intervention participants are patients at local federally qualified health centers.

SEDI care management staff also use the risk algorithm to identify and enroll patients eligible for the moderate-risk intervention. A physician or nurse practitioner can also refer patients for the moderate-risk intervention. A main component of the moderate-risk intervention is a telephone self-management program. The other principal component is Stanford’s Diabetes Self-Management Class,<sup>42</sup> which is open to anyone. In Durham, community health integrators<sup>43</sup> are working on a system to get providers to refer patients into these classes. Sites target the low-risk intervention—largely consisting of outreach and education—to specific neighborhoods and communities and, therefore, do not enroll specific individuals into these interventions.

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<sup>42</sup> Stanford’s Diabetes Self-Management Class has a rigorous evidence base and has been endorsed by the Surgeon General. US Office of the Surgeon General. <http://www.surgeongeneral.gov/library/publichealthreports/sgp124-4.pdf>

<sup>43</sup> At the Durham site, community health integrators work with neighborhood organizations to connect people to the SEDI community programming; plan and run community events; and teach classes on diabetes self-management.

**High-risk intervention—diabetes management.** Participants enrolled in the high-risk intervention receive diabetes management that includes a needs assessment, a care plan development, and a care management team. The team works to actively manage the clinical, lifestyle, and social needs of participants both in their homes and in clinical settings. To better understand health barriers that participants may not be able to communicate effectively in a clinic setting, the team also conducts home visits. The participant-specific care plan drives care management activities that may include coordination within the health care system and/or links to community resources.

The care management workforce varies by site, but typically includes a mid-level medical provider, nurse, nutrition professional, and a social service professional. Depending on the participant's needs, he or she may see between one, some, or all members of the care management team. (Depending on the site, there are between two to four providers.) This team works separately from the participants' PCPs or other medical providers but communicates with PCPs as appropriate. The care management team may use social and environmental data maps to share information about local resources with participants. They address needs that could include lack of transportation, lack of access to diabetes testing supplies, lack of access to medication, lack of insurance or being underinsured, and healthy food.

**Moderate-risk intervention—diabetes self-management.** Participants enrolled in the moderate-risk intervention receive diabetes self-management support that may include telephone reminders for self-management; referral coordination; diabetes and wellness education; and access to new health resources, including smoking-cessation counseling and farmer's market vouchers. Depending on the county, a contracted organization or a member of the care management team from the high-risk intervention will implement the telephone-based self-management support. At some sites, the moderate-risk team uses maps to identify venues and population groups to engage (e.g., churches and their congregations).

**Low-risk intervention—neighborhood education and health resources.** The low-risk intervention provides educational programming and health resources that vary by county. The offerings include information about general wellness, diabetes prevention, diabetes identification and self-management, healthy eating, and physical activity. There are also events such as farmers markets and media campaigns that advertise health messages and promote SEDI programs. Most classes are held at community centers such as libraries or public health departments. Most event registrations come from announcements in the local newspaper, although some events are also marketed on social media, radio, word of mouth, and television. The SEDI community engagement team at each site typically includes a marketing professional responsible for promoting SEDI programs and an outreach worker responsible for leading diabetes management and prevention classes. The outreach worker also works to connect people to social supports such as transportation or healthy food. The SEDI staff work with the CAB to assess existing county policy, clinical programs, community awareness/marketing, or community education and identify gaps. CAB workgroups organized around these issues provide the thought leadership necessary for making decisions about programming and neighborhood targeting. These decisions are further supported by maps of county demographics, local health-related resources, and health status provided by the Duke data team. The community workforce is closely tied to or includes employees of the partnering site's county public health department who already have strong community ties and are familiar with available and unavailable resources. As a result, a robust county public health infrastructure can enable much of the low-risk intervention programming.

## Target Population and Program Participants

As noted above, this program tests the SEDI model across diverse adult (18 years of age or older) populations in the Southeast. The four counties represented in the award include low-income rural Whites in Appalachia; rural African Americans in the Mississippi Delta; urban African Americans, Whites, and Hispanics in central North Carolina; and an urban-rural mix of African Americans, Whites, and Hispanics in southwest North Carolina.

**Participant characteristics.** The table below shows demographic information for Quarter 7 participants for from the three main interventions and includes data from all four intervention counties. There is a high proportion of unknown responses for many of the categories reported; this may be due to limitations in data collection for the low-risk intervention. Before Quarter 6, Duke did not submit program participant data.

Demographic Information	Jan–March 2014 Patient Count	Jan–March 2014 Patient Count		Jan–March 2014 Patient Count	Jan–March 2014 Patient Count
<b>Sex</b>	<b>#</b>	<b>%</b>	<b>Age</b>	<b>#</b>	<b>%</b>
Male	716	14.3%	Elderly: >75 years	96	1.9%
Female	1,251	25%	Elderly: 65–74 years	210	4.2%
Unknown	3,033	60.7%	Adults: 26–64 years	1,217	24.3%
			Young Adult: 19–25 years	38	0.8%
			Adolescent: 12–18 years	115	2.3%
			Children: 1–11 years	13	0.3%
<b>Race/Ethnicity</b>	<b>#</b>	<b>%</b>	<b>Insurance Type</b>	<b>#</b>	<b>%</b>
Black/African American	874	17.5%	Medicaid	286	5.7%
Hispanic or Latino	224	4.5%	Medicare (FFS/Unspecified)	292	5.8%
Asian	4	0.1%	Dually Eligible	23	0.5%
White	799	16%	Private/Commercial	389	7.8%
American Indian/Alaska Native	13	0.3%	Uninsured	414	8.3%
Two or More Race/Ethnicity	6	0.1%	Other	22	0.4%
Unknown	3,080	61.6%	Unknown	3,567	71.3%

Source: HCIA 7QR Awardee Performance Report. Reflects unique count of quarterly direct program participants.

To qualify for the moderate- or high-risk interventions, patients must have a type 2 diabetes diagnosis by a clinician or a glucose reading greater than or equal to 126 at fasting or greater than or equal to 200 on random sample as well as an HbA1c greater than or equal to 6.5%. As noted above, for the high-risk intervention, participants must be deemed high risk by Duke's risk algorithm or by their primary care physician. Low-risk intervention is targeted broadly at county residents in high-need areas.

## Implementation Effectiveness

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Since the SEDI kick-off meeting on July 30, 2012, Duke University has molded the SEDI model to each county's population and resources. Enrollment of participants in the care management intervention began May 3, 2013, in Durham and Mingo; June 26, 2013, in Quitman; and July 30, 2013, in Cabarrus.

The SEDI team has made remarkable progress implementing its intervention in diverse locations. Different circumstances at sites have necessitated different approaches to program implementation. Successful implementation requires flexibility while maintaining the general thrust of the SEDI model.

**Development of risk algorithm.** One area of variability is in the use of countywide EHR data to apply the risk algorithm. The capacity to use data for this purpose rests on institutional agreements to share clinical data with the SEDI team, and each site has unique issues with data sharing. Local health system politics impact data-sharing agreements and the speed of intervention implementation since participant recruitment depends largely on an EHR-informed risk algorithm and EHR-informed population health information.<sup>44</sup> The project currently uses EHR data in all four counties for geospatial mapping and then supplies that information to the teams for neighborhood identification, hot spot identification, and community resource identification.

Because providers use different EHR systems, data extraction and curation requires significant time. As of May 2014, Duke has data from nine of the ten health systems. To fully realize the model for mapping envisioned by the co-PIs, SEDI must establish data-sharing agreements and gain access to valid data from across the county. To continually improve and refine the model, the analytics team use data on participants for whom providers overrode the risk algorithm for high-risk intervention recruitment. The analytics team investigated which common patient characteristics triggered the overrides and used the findings to incorporate additional medical and social factors into the algorithm.

**Participant recruitment.** Due to Institutional Review Board (IRB) requirements and provider capacity, recruitment and enrollment practices for the high-risk intervention vary across sites. For example, in Quitman County, there is only one participating physician who directly recruits patients meeting the high-risk intervention criteria. Recruitment and enrollment takes more time in Cabarrus County, because the SEDI team uses data from participating providers to identify patients meeting enrollment criteria for the high-risk intervention. Rather than contacting eligible patients directly, the SEDI team then sends the relevant PCPs letters to share with eligible patients. The letters prompt the patient to contact SEDI's nurse or social worker if interested in participating in the diabetes program, and the nurse or social worker completes the enrollment process for interested patients. Also, the reliance on the risk algorithm score for enrollment varies across sites, with some sites overriding scores to enroll patients. Most overrides are motivated by a provider's concerns about the social fragility of the patient, including but not limited to homelessness, illiteracy, psychiatric illness, or extreme poverty.

**Integration with clinical information systems.** Providers' access to patients' medical records varies across staff and sites. Some providers invite the SEDI clinical or care management teams to enter patient

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<sup>44</sup> The analytics team noted that it has been important to have EHR and non-EHR algorithms to capture more of county patient populations.

data into the clinic's existing EHR system, while others do not. For example, in Quitman the care management team adds information to both the clinic's EHR system and the paper charts, since this is what the provider prefers. In Cabarrus, the SEDI team has permission to enter information directly into the Federal Qualified Health Center's (FQHC) eClinicalWorks EHR; however, they do not have this permission for a health system or the community free clinic. For those organizations, the clinical team creates a special "soap note" after every visit and leaves it with the provider to scan into the EHR system. In Durham, different members of the clinical team chart in different systems. Health department employees, dietitians, social workers, and CHAs chart in Patagonia, the health department's EHR system, whereas the Duke-employed nurse practitioners charts in the Duke and FQHC EHR systems that the community team cannot access. The Duke team is looking into options that would give PCPs a better picture of their patients' participation in SEDI. All sites fill out data collection forms in eCOS, an electronic data-capture system.

**Patient-centered assessment.** The initial patient-centered assessment that the care management team conducts facilitates efficient future care coordination because it allows the care management team to target their efforts around each patient's needs. This prevents unnecessary visits, scheduling efforts, and care team communication.

**Intervention delivery site.** In Cabarrus, most participants receive care from the SEDI care management team at their medical home or a local FQHC, and home visits are conducted on an as-needed basis. This model may evolve as additional providers join the SEDI in Cabarrus. In contrast, the Durham participants get primary care in a number of different locations and have more transportation challenges. As a result, it is not possible for all Durham patients to be seen by the SEDI care management team at one health center. Instead, home visits have proven to be the best way to reach patients. Although home visits in Durham allow the care management team to reach participants in a broader geographic area, they are not necessarily more convenient for providers. Scheduling visits and traveling to patients' homes are time and resource intensive.

**Scheduling and provider interactions.** The SEDI Cabarrus staff shared that scheduling can be challenging and takes an undesirably large amount of time. SEDI Durham staff reported similar challenges before partnering with Patagonia, a scheduling contractor. The shared system facilitated communication across the team on the best way to reach patients who rely on temporary communication mechanisms such as prepaid cell phones. A common scheduling system represents a vast improvement over coordination via email or in meetings. In addition, more patients than expected have needed to see the majority of clinical staff, adding to provider strain. Durham clinical staff reported that the time and effort it takes to contact patients and go to their homes is taxing. There are also disagreements between SEDI clinical staff and the patient's PCP that typically focus on medication; the SEDI clinical team has accommodated PCP preferences.

**Moderate-risk intervention—diabetes self-management.** The diabetes self-management curricula and the extent to which SEDI staff members are involved in implementing that curricula depend on the existing educational resources in the partnering county. Some sites use SEDI community health workers (CHWs) to implement the program, while others partner with a nonprofit to implement the telephone program. In addition, staffing, technical, and IRB issues have stalled the implementation of the diabetes

self-management telephone intervention, one of the primary moderate-risk intervention components. Because of these issues, as of May 2014, enrollment for the telephone intervention has not begun.

**Low-risk intervention—neighborhood education and health resources.** Duke’s efforts to engage sites’ existing community organizations before program implementation and clever, locally relevant marketing seem to have been crucial to the smooth rollout of the community and neighborhood programming. The mapping data has been most useful in helping to target the intervention in the larger counties. In Quitman, the community is so small and the existing resources are so slim that the data does not help SEDI staff target its efforts.

## Program Effectiveness

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Our evaluation of the program’s effectiveness will focus on quantitative and qualitative analysis as described below.

### Quantitative Results

Our evaluation of program effectiveness for the Duke program will be based largely on quantitative data, but when we began work on this report, we did not yet have the necessary agreements in place to receive data from Duke. Since that time, we have finalized these agreements and look forward in the future to presenting results on Duke’s impact on measures of health, quality of care, usage, and costs for the Medicaid and Medicare populations. A challenge for presenting Medicaid analysis is the availability of contemporaneous Medicaid claims for North Carolina, where the two largest of the Duke program’s implementation sites are located.<sup>45</sup>

### Qualitative Results

Our qualitative findings of program effectiveness for SEDI will be based largely on analysis of data collected from discussions with patients, and observations of the program. At the time of this report, we had not yet held interviews with patients or conducted the analysis of this data and will therefore present the results of this analysis in a future report.

## Workforce Development and Deployment

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A combination of existing providers and new hires—hires funded through the Innovation Award—are implementing the SEDI program. As noted above, although there is some variation between counties, the general SEDI model consists of a care management team—clinical staff and case workers—implementing the high-risk intervention and a community team implementing the moderate- and low-risk interventions. Some moderate- and low-risk interventions receive staffing support from members of the care management team. Each site has a SEDI program manager that coordinates the activities of both teams. Because each county varies in the number of SEDI participants, population demographics, available health care resources, and public health engagement (Durham and Cabarrus community teams partnered with the local public health agency), team composition differs across sites. The Durham site has a large

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<sup>45</sup> Recent information indicates that Medicaid data for North Carolina is now available through 2012. Without timely Medicaid data, the evaluation will rely on data that awardees are collecting and use benchmarking data for a comparison.

team with limited crossover between care management and community teams. On the other end of the spectrum, Quitman has a small team with no clear divide between the clinical and community teams. In addition, collaboration is largely linked to if the two sides of care do or do not use a shared EHR or case management system. Use of a common system facilitates exchange and coordination across all providers serving any given participant.

**Exhibit 4.1:** SEDI Staff by Site

	Durham County	Cabarrus County	Quitman County	Mingo County
<b>Clinical Care Management Team</b>				
Physician	X	X	X	X
Nurse Practitioner	X	X		X
Pharmacist			X	
Nurse		X	X	X
Registered Dietician	X	X		
Social Worker	X	X		X
Patient Navigator				X (2 LPN, 1 CNA)
<b>Cross-Team Coordination</b>				
Program Manager	X	X	X	X
Community Health Worker	X	X	X	
<b>Community Team</b>				
Community Health Integrator	X	X		
Health and Wellness Promoter				X
Diabetes Information Officer	X	X	X	X

**Program managers.** Program managers manage the daily functions of the innovation program, including the budget, project coordination, evaluation, and supervision of staff. The program manager oversees the clinical, community-based, and systems-level interventions and also coordinates activities, identifying program gaps, needs, and solutions. They also hire and supervise site staff, coordinate staff development, and design incentive plans for both partners and participants. Finally, the program manager coordinates and leads CAB meetings and acts as a liaison between the council and its partners. Program managers are required to have supervisory experience and either a master’s degree in a health or human service area and at least two years of relevant experience or a bachelor’s degree and three to five years of program implementation responsibility.

**Community health workers.** The CHWs provide education and informal counseling to participants and interface with the clinical team to coordinate care and connect participants to community and clinical resources. They are responsible for recruiting, encouraging, and retaining participants for diabetes self-management classes. Through these classes, home visits, one-on-one interactions, and group interactions, CHWs provide diabetic patients with education, informal counseling, and support to motivate participants to adopt healthy lifestyles. CHWs support all participants in the Durham County high-risk intervention. They often conduct diabetes education in the participants’ homes to make sure participants understand diabetes, important tests, and goal blood sugar ranges. CHWs also connect participants to community and

health resources such as the YMCA or dental and eye care. CHWs have a high school diploma or GED equivalent and two years of related experience. Some sites that target Hispanic participants require that the community health workers be fluent in Spanish.

**Care management team.** The care management team consists of a multi-disciplinary team tailored to each county as illustrated above in Exhibit 4.1. Below is a description of the role of different team members.

**Physicians and pharmacists.** Physicians and pharmacists supervise and provide general guidance and support to the clinical team and/or conduct diabetes education and outreach. For example, the Durham endocrinologist serves as the point of contact if there is an issue that cannot be answered by the other SEDI care management team members. The pharmacist in Quitman teaches Conversation Map® classes to patients.<sup>46</sup> Physicians are typically employed by the partnering site's health department.

**Nurse practitioners.** Nurse practitioners assess the health care needs of participants with type 2 diabetes and draft care plans in conjunction with the other clinical team members to improve glycemic control among those at high risk for diabetes-related hospitalization or death. NPs provide medical care for participants, including physical examinations and the prescription of treatments; these are given in the participant's home or a clinical setting, depending on the participant's needs. In concert with the participant's PCP, nurse practitioners also make decisions regarding the total care of participants. All referrals and most treatment changes must go through the participant's PCP. Nurse practitioners also may be responsible for educating and counseling participants in one-on-one and group sessions. These sessions can occur in either a clinic or a community setting. All nurse practitioners are licensed and certified to practice in the state in which the site is located, and SEDI specifically sought out applicants with particular knowledge of diabetes management and treatment.

**Dieticians and nutritionists.** Dieticians and nutritionists serve on the care management team providing nutrition education and expertise, and coordinating nutrition-related components of the intervention. The nutritionist assesses participant nutrition needs and readiness and competency for change and then creates an intervention plan and select intervention strategies. Finally, nutritionists implement these strategies through motivational counseling and nutrition therapy at the participant's home or in a clinic environment or both. Nutritionists also consult with referring physicians and provide expert nutrition support to the medical staff. For example, nutritionists analyze and interpret physical measures and selected lab results to inform the participant's care management plan. There are a number of training requirements for SEDI nutritionists, including a master's degree in nutrition; an MPH with a focus on nutrition and at least one year of experience as a nutritionist; or a bachelor's degree in a similar discipline plus two years of experience as a nutritionist or dietician. SEDI sought out applicants with specific knowledge of diabetes and evidence-based interventions as well as past experience preparing and disseminating educational information.

**Nurses.** In the care management team, nurses serve as the primary liaison between the care management team and the program manager and coordinates clinical interventions occurring in the clinic, home, and

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<sup>46</sup> Information on conversation map classes can be found here:  
[http://educator.journeyforcontrol.com/diabetes\\_educator/conversation\\_map/](http://educator.journeyforcontrol.com/diabetes_educator/conversation_map/)

community settings. Additionally, the nurses provide participant care, nutritional counseling, and diabetes self-management education to participants in the clinical setting. Nurses may also lead diabetes self-management classes. Nurses involved in the intervention are licensed to practice in the appropriate state and either graduated from a four-year college or university with a Bachelor's of Science in Nursing, have completed an accredited school of professional nursing program with one year of professional experience, or possess an equivalent combination of training and work experience. SEDI staff requested permission to change the licensing requirement from a registered nurse (RN) to a licensed practical nurse (LPN) because of the lack of available providers in the Quitman area.

**Social workers.** Social workers are responsible for providing participants with social support, education, and informal counseling. Screening assessments administered by the social works help identify depression, substance abuse, or victims of abuse, neglect, domestic violence, or similar conditions. The social workers also act as patient advocates and liaisons between participants and providers. They assess participants' needs and facilitate access to services to support continuity of care. Strong relationships with service providers enable social workers to connect participants with services. Social workers assist clients with applications for financial and medical resources and work with physicians, medical offices, and others to facilitate access to care. Social workers have a bachelor's or master's degree from a four-year college or university in a human service area in counseling or science including social work, sociology, psychology, or nursing and two years of experience working in human services or an equivalent combination of training and experience.

**Community teams.** Community teams may include community health integrators and diabetes information officers.

**Community health integrators.** The Durham County site use community health integrators to conduct outreach to community organizations (e.g., churches, neighborhood associations, social service organizations, and schools) to connect citizens to SEDI programs and implement diabetes self-management and diabetes prevention programming (e.g., tobacco cessation, nutrition, and exercise). They work closely with the CAB to set community outreach priorities and use existing resources to build capacity in neighborhoods to create sustainable policies and programs for the prevention of diabetes and other related chronic diseases. Community health integrators bring a variety of educational backgrounds and experience and are familiar with the communities served by SEDI in Durham County.

**Diabetes information officers.** Diabetes information officers are responsible for creating SEDI marketing materials to help connect county residents to the SEDI programs available and promote healthy living. Diabetes information officers have created newspaper, radio, billboard, and television ads, and some are looking into doing ads at movie theaters and through text message services. They are also responsible for effective communication of data from the SEDI datamart to the community. Outside of Durham County, most officers have not done much social media promotion because the populations they are trying to reach do not use it regularly.

**Training.** Duke does not offer mandatory training courses. However, many community and clinical staff have completed the Stanford DSMP training.<sup>47</sup>

## Context

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Below we discuss some of the contextual barriers and facilitators Duke has encountered in the implementation of the SEDI program.

### Endogenous Factors

**Sharing and working with EHR data.** As noted previously, EHR data sharing, extraction, and curation present some important challenges. Data confidentiality agreements differ across sites and health care systems. As a result, these agreements frequently reduce the quantity and quality of data available to Duke. Second, many health systems are updating their EHRs, leading to inconsistencies in the data that Duke receives. Finally, county hospitals and clinics use different EHR systems and coding standards, making data difficult to use without extensive cleaning and validation.

**Coordination with treating clinician.** While the SEDI clinical care management team did not serve as the primary treating clinician for enrolled patients, they did sometimes recommend changes to therapy. In some cases, these recommendations were not considered for some time. In other cases, the treating clinician disagreed with the SEDI care management team recommendation, which created friction for team members and frustration for patients.

**Access to patient health records.** Allowing the SEDI care management team access to patients' health records facilitates care management by providing a shared information source and communication mechanism between the care management team and the treating clinician. We saw this model—where the SEDI team had full access rights to a participant's primary care medical record—in relatively few cases. In Cabarrus County, each member of the clinical team can view the patient's primary care medical records in a read-only format. Still, the team has a uniform note system so that they can share information in a consistent way with the clinic. This partially addresses the need but takes more time than offering the care management team direct access.

### Exogenous Factors

**Participants' access to resources.** Clinical health workers noted that many participants cannot participate in exercise-related intervention components due to poor health. Furthermore, many participants live in areas with limited access to healthy food. Low income levels and recent cuts to the Supplemental Nutrition Assistance Program (SNAP) benefits exacerbate this environmental barrier to lifestyle change. Similarly, sites indicated that limited transportation resources further impede access to fresh produce, as well as participation in community programs. Many participants rely on a Medicaid van, which also serves three adjacent counties in rural Mississippi and cannot always accommodate the schedule of the participants. In describing the limited availability of the Medicaid van, one Quitman staff

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<sup>47</sup> All sites but Quitman offer the Stanford program. Information on Stanford training found here: <http://patienteducation.stanford.edu/training/index.html>. Quitman offers the Diabetes Conversation Map Class instead, described here: [http://educator.journeyforcontrol.com/diabetes\\_educator/conversation\\_map/](http://educator.journeyforcontrol.com/diabetes_educator/conversation_map/).

member noted, “they might drop somebody off at 8:00, but the van might not come back through until 3:00 in the afternoon.”

**Adapting to county culture and resources.** A number of policies facilitate the successful implementation of the SEDI program. For example, there may be substantial benefits to housing programs in public health agencies, as is the case in Durham and Cabarrus. This allows community health staff to work within a familiar public health paradigm and may facilitate access to a qualified workforce.

We also found that partnerships with local organizations through the CAB help build capacity within the community, generate trust, and access target populations. We found that CABs can help intervention staff reach different populations and take advantage of existing resources.

The CAB in Durham appreciated being involved in the program from the beginning and felt that Duke researchers were “finally learning how to do true community-based participatory research.” Working with the CAB in Durham and Cabarrus improved the intervention’s capacity to take advantage of the maps created by the SEDI team. While geospatial data can identify at-risk areas, local knowledge allowed staff to directly reach at-risk persons. Finally, working with the CAB allows intervention staff to easily maintain an extensive list of county-specific resources to share with participating patients and present this information in a way that is most accessible to participants. Still, there are variations across sites that influence the scope of the CAB. For example, while Cabarrus and Durham benefit from existing community outreach programs, very few such programs exist in Quitman. This creates challenges to SEDI efforts to disseminate information and plan community events.

**Sustainability.** As of May 2014, there is no clear source of funding to support SEDI after the Innovation Award expires. During the site visit, team members expressed their sense that they need a much longer funding horizon for an intervention of such scale to demonstrate meaningful impact and achieve sustainability. Current possibilities include:

- Partnerships with local public health agencies. Duke’s relationship with Cabarrus Health Alliance is a particularly interesting model, as the agency is an independent non-profit with local public health authority rather than a county agency. This affords them flexibility in staffing, purchasing, and development work that some public health agencies lack.
- CAB participants may be able to offer resources that can support the sustainability efforts. The clinical care management team may benefit from a similar affiliation with safety net providers such as FQHCs. If key staff remains employed by public health, FQHCs, or community-based organizations, their training through SEDI may continue to benefit their counties even after the program expires.

## Summary

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Duke’s Southeastern Diabetes Initiative (SEDI) is a population health initiative that uses an EHR and social and environmental data-informed risk algorithm to map community risk for type 2 diabetes and implement targeted interventions for people at low-, moderate-, and high-risk for hospitalization or death associated with type 2 diabetes. The program targets four diverse county populations in the Southeastern United States. The intervention for high-risk patients is supported by a care management team. The program includes general wellness, diabetes prevention, diabetes self-management, healthy eating,

farmers markets, physical activity, and media campaigns. Each participating county also has a team focused on engaging community stakeholders. The SEDI innovation program relies largely on the capacity of investigators to marry complex risk modeling and mapping techniques to community-based programs and intensive care management.

As SEDI continues with thoughtful implementation of care management and community-facing outreach efforts guided by these modeling exercises, we find substantial differences in the way it incorporate its care management and outreach model into existing health services and public health infrastructure at each site. At this time, we do not know what exactly is needed to achieve program outcomes in four very different counties. While local circumstances do require some flexibility in implementation, we may also find that some differences dilute fidelity to program integrity and make outcomes improvement less likely.

There are several topics that warrant further investigation during the second year of the evaluation, including:

- challenges Duke has faced in phenotyping;
- collecting and synthesizing EHR data, including variations in data availability and quality across the sites;
- processes for reconciling treatment recommendations between SEDI and primary care providers;
- how the data team used social data to modify the risk algorithm;
- how the mapping data has been used to target intervention activities and inform care delivery;
- the impact mapping methods have had on cost; and
- the effectiveness of the telephone self-management program.

Continued research and communication with the awardee on these and other topics will help to better inform the evaluation of Duke in order to determine the potential for replicability and scalability of the intervention, as well as how the program itself is serving its immediate patients currently in its program.

## FirstVitals Health and Wellness, Inc.

This report presents our evaluation of the FirstVitals Health and Wellness, Inc. (FirstVitals) innovation program for patients with diabetes.

We provide preliminary observations about the program based on a review of the awardee’s operational plan, addendum to operational plan, quarterly reports, telephone interviews with the awardee, and a site visit conducted June 24–25, 2014, to Honolulu and Kahuku (on the island of Oahu). While this report presents themes that we have identified during the first year of the evaluation, it is important to note that our findings are tentative at this point, as we have not completed all of our data collection, coded the site visit data, or fully analyzed the data collected to date. We look forward to providing more definitive findings and results for future reports.

<b>Program Title</b>	<b>FirstVitals</b>
<b>Targeted Disease/Condition</b>	<b>Type 2 Diabetes</b>
<b>Total Amount Awarded</b>	\$3,999,713
<b>Target patient population</b>	Patients with diabetic peripheral neuropathy and patients with diabetes who show signs of other microvascular disease
<b>Description of the awardee organization</b>	FirstVitals is a for-profit health and wellness company that provides clients (employers or individuals) with web-based tools for health management—with an aim to reduce health care costs and improve quality of life.
<b>Setting of intervention</b>	Community health centers in Hawaii (Honolulu, Waimanalo, Wailuku, Lihue, Kahuku, Kona, and Waianae)
<b>Overview of Intervention</b>	FirstVitals has partnered with AlohaCare—a nonprofit health plan founded by Hawaii’s community health centers—to serve its members with diabetes who have evidence of diabetic peripheral neuropathy (DPN) and who are patients at community health centers in Honolulu, Waimanalo, Wailuku, Lihue, Kahuku, Kona, and Waianae. FirstVitals staff oversees the program.

### Introduction

Harmful effects of diabetes include damage to the eyes, heart, blood vessels, nervous system, teeth and gums, feet and skin, or kidneys. Studies show that keeping blood glucose, blood pressure, and low-density lipoprotein cholesterol levels close to normal can help prevent or delay these problems. Neuropathies are among the most common complications of diabetes, affecting up to 50% of people with diabetes; diabetic peripheral neuropathy (DPN) is the most common of all diabetic neuropathies.<sup>48</sup> Symptoms include tingling, numbness, weakness, or pain—usually in the lower limbs, although it can also affect the hands. Up to half of patients with chronic DPN are asymptomatic, and thus patients and their providers may not be aware of it until damage is more severe. All neuropathic patients, including those who are asymptomatic, are at risk of insensitive foot injury, such as foot ulcers, which can lead to

<sup>48</sup> Boulton A. Management of Diabetic Peripheral Neuropathy. *Clinical Diabetes*. January 2005; 23(1): 9-15.

amputation if not treated properly. Achieving stable glucose control is the most important strategy to manage DPN.<sup>49</sup>

Because DPN can be asymptomatic, screening and glucose management are critical to improving patient health outcomes and reducing associated health care costs.<sup>50</sup> A DPN test that is accurate, easy-to-use, and quick to administer can increase patients' access to DPN screening and, as a result, help physicians tailor treatment plans to combat further complications. Clinical research has shown that the NeuroMetrix DPN screening device, called DPNCheck, can be an effective tool for accomplishing these goals.<sup>51</sup> Diabetic eye diseases are also common complications. For example, 40% to 45% of people with diabetes have diabetic retinopathy. Eye exams are recommended yearly because vision loss can be prevented with early detection.<sup>52</sup>

The primary objective of the FirstVitals intervention is to prevent or minimize complications in patients with diabetes and, in turn, lower costs of care. In designing the HCIA intervention, FirstVitals chose to target diabetes in the Medicaid population because they wanted to capitalize on the leadership staff's experience managing diabetes and an existing relationship with AlohaCare, a nonprofit health plan founded by Hawaii's community health centers. AlohaCare covers about 75,000 Medicaid recipients. FirstVitals focused on enrolling patients who screened positive for signs of DPN because of the high cost of related DPN complications.

FirstVitals proposed to leverage its relationship with AlohaCare to: (1) use its claims data to identify underserved, high-risk patients with type 2 diabetes; and (2) partner with community health centers to target and enroll patients in an intervention that used tablets and wireless glucometers for self-monitoring, at-home education, and communication of glucose readings with a care coordinator. The access to claims data through AlohaCare would allow FirstVitals to determine the intervention's cost-effectiveness.

## Innovation Components

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The current FirstVitals intervention model consists of participant referral, screening, and enrollment; glucometer and tablet deployment; blood glucose telemonitoring; and retinal exams. Depending on the health center, these tasks are performed by integrated care coordinators employed by FirstVitals or by clinical care coordinators employed by the health center. FirstVitals' innovation components are detailed below.

**Participant referral, screening, and enrollment.** Participants can be referred to the program by providers at the partnering health center and/or by meeting certain criteria that FirstVitals uses to screen for potential participants using AlohaCare claims. FirstVitals uses Tableau, a data visualization tool, to organize the claims data.

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<sup>49</sup> Ibid.

<sup>50</sup> Ibid.

<sup>51</sup> Lee J, Halpern E, Lovblom L, et al. Reliability and validity of a point-of-care sural nerve conduction device for identification of diabetic neuropathy. *PLoS ONE*. January 2014; 9(1).

<sup>52</sup> Facts about Diabetic Retinopathy. National Eye Institute. June 2012. <http://www.nei.nih.gov/health/diabetic/retinopathy.asp>

After a patient is identified as potentially eligible, he or she is contacted by a care coordinator to schedule an in-person screening appointment at the health center. Patients are screened using a questionnaire and the DPNCheck device and are deemed eligible if they score within a predefined risk range. Eligible patients are invited to participate and asked to return to the clinic every three months for visits with the care coordinator. Subsequent DPNCheck screenings are conducted at least every six months.

**Glucometer deployment.**<sup>53</sup> Enrolled participants receive a wireless glucometer at the screening visit or at a subsequent in-person visit from a care coordinator. A care coordinator trains the participant on the device, and the participant is instructed to measure blood sugar levels as prescribed by his or her physician for four to six weeks and then return to the clinic for a follow-up visit.

**Tablet deployment.** Participants returning for follow-up visits who are at least 75% compliant with their testing plan receive a Samsung tablet that stores and transmits their readings to the care coordinator. The tablet also allows them to communicate with their coordinator and access educational resources. Care coordinators train participants to use the tablet and inform them of various incentives for adherence to the testing plan. For example, participants who continue to adhere to their testing plan are granted access from the tablet to external websites such as email and Craigslist.

Tablet training for participants focuses on the FirstVitals application, which has five main tools: readings, video conferencing, memo, library, and refill. The readings tool stores up to 20 of the participant's blood sugar levels taken by the wireless glucometer and categorizes them as red, yellow, or green according to the results. It also includes an alarm function to remind participants to check their blood sugar level.<sup>54</sup> The video conferencing tool allows the participant and care coordinator to contact each other through a video call. The memo tool allows the participant and care coordinator to send each other a written message. The library tool includes a few documents with recipes, information about diabetes, and educational videos about diabetes. Finally, participants can use the refill tool to send a request to the care coordinator for more glucometer test strips. Depending on the community health center, training may happen one on one or in a group setting. Care coordinators inform participants that as long as they are using the tablet, coordinators will monitor their blood sugar readings. Care coordinators also advise participants to use the communication tools on the tablet or call the care coordinator's phone number if there is an issue with the technology or with their symptoms.

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<sup>53</sup> During the June 24–25, 2014, site visit, the FirstVitals team reported that the blood pressure cuff deployment will be added “soon.” A specific timeline was not provided.

<sup>54</sup> There is also a readings tool that stores patient blood pressure readings taken by a Bluetooth-enabled cuff. However, as of June 25, 2014, FirstVitals had not yet deployed the cuffs.

**Blood glucose telemonitoring.** Telemonitoring provides participants with remote diabetes management support. As long as the participant takes his or her blood sugar levels with the Bluetooth-enabled glucometer and turns on the tablet regularly, the care coordinators can monitor the readings through a portal. The portal automatically alerts care coordinators if a participant has an abnormally high or low blood sugar level so they can intervene. Depending on the circumstances, the care coordinator can then send a text message alert to the participant, video chat with him or her, or visit the patient in the home. Remote monitoring is conducted in close partnership with the patient's primary care provider, and the care coordinator applies criteria to determine whether the participant's physician should be contacted or a clinic appointment scheduled. The care coordinator can help the patient schedule an appointment with the appropriate provider, when necessary. If the patient is not compliant, the care coordinator may refer him or her to nutrition counseling or behavioral health.

**Retinal screening.** As of June 2014, FirstVitals had added retinal screening to the intervention model and had begun implementation at one of the nine participating health centers. Retinal screenings were added to fill a common gap in diabetes management. Participants often do not follow through with yearly retinal screening referrals. FirstVitals hopes to improve compliance with guidelines for retinal screening by building the retinal screening into the participant's six-month visit with the care coordinator. FirstVitals staff brings the screening equipment to clinics that need it, performs the screenings, and then sends the images to a partner optometrist for reading and facilitating the billing process. FirstVitals bills each participant's screening to AlohaCare and uses the payment as program income and to compensate the optometrist. FirstVitals also screens non-participant, uninsured patients who are at the clinic on the day of the screening. FirstVitals is working to expand the retinal screening program to the other sites.

To make use of the biometric data collected through the program, FirstVitals is developing a microvascular score card, a participant profile with DPN and retinal screening results, and other biometric data so that the physician can identify gaps in care and modify the treatment plan accordingly. The card will also encourage physicians to identify patients at high-risk and code them appropriately.

## Target Population and Program Participants

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The FirstVitals intervention targets AlohaCare members with DPN and members with diabetes who show signs of other microvascular disease. As of March 2014, FirstVitals has enrolled 214 patients in the intervention and is below its enrollment target by 170 patients.

**Participant characteristics.** The table below shows demographic information for the FirstVitals program's patients seen during Q7. Participants are largely male (64.5%) and a significant number of patients are elderly (29.4% ages 65–74 and 21.9% over the age of 75). A majority of participants are White (75.4%). The most common insurance type among patients was Medicare (46.2%), followed by private commercial insurance (26.4%).

Demographic Information	Jan–March 2014 Patient Count	Jan–March 2014 Patient Count		Jan–March 2014 Patient Count	Jan–March 2014 Patient Count
<b>Sex</b>	<b>#</b>	<b>%</b>	<b>Age</b>	<b>#</b>	<b>%</b>
Male	729	64.5%	Elderly: >75 years	248	21.9%
Female	330	29.2%	Elderly: 65–74 years	332	29.4%
Unknown	71	6.3%	Adults: 26–64	478	42.3%
<b>Race/Ethnicity</b>	<b>#</b>	<b>%</b>	<b>Insurance Type</b>	<b>#</b>	<b>%</b>
Black/African American	139	12.3%	Medicaid	73	6.5%
Hispanic or Latino	26	2.3%	Medicare (FFS/Unspecified)	522	46.2%
Asian	26	2.4%	Dually Eligible	199	17.6%
White	852	75.4%	Private/Commercial	298	26.4%
American Indian/Alaska Native	0	0.0%	Uninsured	14	1.2%
Unknown	86	7.6%	Other	24	2.1%
Two or More Race/Ethnicity	1	0.1%	Unknown	0	0.0%

Source: HCIA 7QR Awardee Performance Report. Reflects unique count of quarterly direct program participants.

**Identification method.** Initially, FirstVitals used the AlohaCare claims data to identify patients with Type 2 diabetes at partnering community health centers and put them on a list to be contacted by a care coordinator to schedule an enrollment and screening appointment at their community health center. Because this method did not include indicators for DPN risk, more AlohaCare members were screened than were eligible for the intervention, and this required considerable staff time.

To more efficiently target patients and speed up enrollment in the program, FirstVitals added microvascular complication filtering criteria (i.e., recorded history of peripheral neuropathy, diabetic neuropathy, and diabetic retinopathy) to its AlohaCare claims screening algorithm. During the June 2014 site visit, FirstVitals reported that refining the pool of participants eligible for in-person screening has decreased care coordinators’ recruiting level of effort and has increased enrollment by screening more AlohaCare members with a high likelihood of eligibility.

### Implementation Effectiveness

FirstVitals has been forming partnerships with community health centers for patient recruitment and adding innovation components throughout the HCIA Program. As a result, implementation has been an ongoing process.

Determining the best staffing model for each community health center was a challenge for the FirstVitals team. When FirstVitals and AlohaCare first approached the health centers about the intervention, they proposed that FirstVitals integrated care coordinators (ICCs) would implement all intervention activities. However, larger health centers were concerned that introducing outside staff might be confusing to patients and suggested that their own staff had the capacity to implement all or most of the components. Thus, FirstVitals deployed the Director of Care Coordination to train the care coordinators at these clinics

to implement the FirstVitals model. However, high care coordinator turnover, time-intensive enrollment and technical assistance, and low enrollment prompted FirstVitals to use its ICCs to support the administrative components of the intervention at larger health centers. ICCs assumed more recruitment, enrollment, screening, scheduling, and technical assistance responsibilities. This new staffing model has freed the clinical care coordinators (CCCs) to see more participants and focus on the monitoring activities. Assessing community health center care coordination capacity and implementing a complementary workforce has been central to FirstVitals' staffing model. Discussions with the CCCs suggest that while they feel supported by the FirstVitals' Director of Care Coordination and the ICCs, they do not have an outlet to share challenges and best practices. A few suggested that it would be helpful to meet with CCCs based at other health centers to share best practices and troubleshoot common challenges.

FirstVitals program staff also cited the newness of the remote monitoring technology as a significant challenge. Unexpected carrier outages and troubleshooting issues with the tablet and wireless medical devices have been time intensive. ICCs have had to supply a great deal of technical assistance. While the tablets have increased participants' access to online tools and information, their data use requires consistent monitoring and data-sharing adjustment because once participants have access to more websites, they can use up more costly data. The team is regularly looking for new ways to manage data use and enhance the tablet application. For example, the team provided Verizon with a list of restricted URL addresses and negotiated a shared data plan that allows FirstVitals to move high data users into groups that use less data. As far as the interface of the technology, FirstVitals has made adjustments by enlarging the font and adding an alarm tool to notify when it's time for a blood sugar check.

## Program Effectiveness

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Our evaluation of the program's effectiveness will focus on quantitative and qualitative analysis as described below.

### Quantitative Results

Our evaluation of program effectiveness of the FirstVitals program will be based largely on quantitative data. However, when we began work on this report, we did not have the necessary agreements in place to receive data from FirstVitals. Since that time, we have finalized these agreements and look forward to presenting results on FirstVitals' impact on measures of health, quality of care, utilization, and costs.

### Qualitative Results

Our qualitative findings of program effectiveness for the FirstVitals program will be based largely on analysis of data collected during our site visits, including discussions with staff and participants and observations of the program. At the time of this report, we had not yet conducted the analysis of this data and will therefore present the results of this analysis in a future report.

## Workforce Development and Deployment

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Staff implementing the FirstVitals program include a Director of Care Coordination and two types of care coordinators who execute the care coordination activities: clinical care coordinators and integrated care coordinators. Depending on the FirstVitals Director of Care Coordination's assessment of the partnering clinic's capacity, one or both of these care coordinators implement the FirstVitals intervention components.

**Clinical care coordinator.** The CCC position is an existing member of the staff at some of the larger participating health centers, such as Kalihi-Palama and Waikiki Health Center. If health centers communicate that their CCCs have the capacity to implement some or all of the intervention's components, FirstVitals uses those workers for some implementation. At some centers, the CCC only screens and enrolls participants in the FirstVitals program; at other centers, the CCC monitors participants' test results and contacts them for follow-up.

The FirstVitals staff trains new CCCs on how to perform the DPNCheck tests, how to screen participants for enrollment in the FirstVitals program, and how to use the tablet and wireless testing devices. Most care coordinators are RNs and have responsibilities outside of the FirstVitals intervention; these tasks include educating participants about diabetes and nutrition and connecting participants to health care and social resources. There has been high turnover among the CCCs at the community health centers, which has required the FirstVitals team to be flexible in training new hires and filling in through the use of ICCs when needed.

**Integrated care coordinators.** FirstVitals employs four ICCs with HCIA funding. They hired two ICCs to supplement the CCCs in clinics where CCCs were not able to implement the full program. They hired another two ICCs to implement the full program at health centers without available CCCs.

Across all program sites, ICCs are primarily responsible for the technology—that is, training participants to use the technology, and troubleshooting problems—but depending on the health center, ICCs may also screen and enroll participants and perform additional duties.

The two care coordinators assigned to community health centers with CCCs provide support as necessary. In this role, ICCs perform tasks like teaching participants how to use the glucose meter and tablet, providing technology technical assistance, performing the DPNCheck tests and retinal exams, administering evaluation surveys, and connecting participants to resources. Of these two ICCs, one has a bachelor's degree in psychology and experience working in mental health, and the other has a master's degree in education with a background in dental hygiene and education.

The other two ICCs are nurses who perform all care coordination intervention tasks for community health centers that do not have an existing care coordination staff. FirstVitals did not intend all ICC positions to be filled by a clinical professional; however, the team felt that initial rollout would go more smoothly at the sites where the ICCs have to perform all care coordination duties if the ICCs were licensed clinical professionals.

FirstVitals management reported that when hiring integrated care coordinators, they look for individuals who are open to learning. Given that their primary role is to train and support clinic staff and participants, ICCs also need strong interpersonal skills.

**Director of Care Coordination.** As the manager of the care coordinators, the Director of Care Coordination works with each community health center to determine how the intervention components should be distributed among CCCs and ICCs. In addition, the Director coordinates with the community health centers and the optometrist to schedule screening events and also works with FirstVitals' technology partners when there are issues with the tablets.

The individual in this role holds a Master of Social Work degree and has more than 30 years of experience in medical social work in Hawaii. The Director has strong ties to community health centers and extensive experience in developing case management programs and using technology to support health monitoring of participants. FirstVitals hired the Director after it received the award. Since then, the Director has hired and trained two of the four ICCs and an employee who manages supply inventory on a part-time basis. The Director also has developed partnerships with the nine participating community health centers. Program management cited the Director's relationship-building skills and experience working with community health centers as being critical to establishing partnerships with community health centers across multiple islands.

**Training.** The Director of Care Coordination or a member of the FirstVitals leadership team has conducted all of the trainings for the CCCs and ICCs in person or over the phone. NeuroMetrix, Insignia Health, and EyePACS have offered trainings for the DPNCheck device, PAM-13, and retinal screening, respectively. One ICC reported that he was trained by a fellow ICC and shadowed her and the Director of Care Coordination for one and half months before seeing his own patients. During our site visit in June, the Director of Care Coordination emphasized that the key training component is instilling in the workforce that customer service is everything when it comes to building relationships with the health centers and encouraging patient engagement. The Director shared that without a relationship with clinic staff and patients, FirstVitals will not be able to continue the program. The program leadership emphasized that in Hawaii relationships are everything. It should also be noted that when training for CCCs is offered, other interested health care professionals at the participating community health centers are invited to participate.

## Context

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In launching a new intervention from the ground up, FirstVitals has encountered several contextual barriers, including challenges in establishing partnerships with community health centers. They have also encountered challenges related to patients' limited access to resources. FirstVitals is exploring options for sustaining the current program within the current payment system.

## Endogenous Factors

**Establishing partnerships with health centers.** An early challenge for the FirstVitals team was recruiting community health centers to participate in the intervention. Soon after receiving the award, the FirstVitals leadership team—working closely with AlohaCare, which was already partnered with the community health centers—reached out to the community health center CEOs to obtain the necessary

approval to use the AlohaCare claims data to recruit patients. While establishing relationships with an initial cohort of health centers required a large level of effort, once FirstVitals demonstrated implementation success, it was easier to develop partnerships with additional health centers. Health center administrators we spoke to during the site visit described their hope that FirstVitals' targeted care coordination efforts would help them improve care quality, health outcomes, and reduce costs.

**Responding to changes in staffing needs.** When FirstVitals and AlohaCare first approached the health centers about the intervention, FirstVitals ICCs were planning to implement all intervention activities. However, the larger health centers communicated that it may be confusing to introduce new staff and suggested they already had the capacity to implement all or most of the components. In response, the Director of Care Coordination trained the care coordinators at these clinics in the FirstVitals model so they could be responsible for the intervention activities. However, high clinical care coordinator turnover and low enrollment prompted FirstVitals to use its ICCs to support the administrative components of the intervention at larger health centers.

As noted above, high turnover among care coordinator staff at the community health centers has meant that FirstVitals ICCs have had to cover these posts as well as spend more time than expected training the new hires. The turnover has also slowed enrollment because a number of the clinical care coordinators are responsible for enrollment. Our conversations with participants who had recently lost their care coordinator revealed that some possible communication gaps about who will temporarily monitor and assist participants with non-FirstVitals interventions (such as nutrition advice) until a new care coordinator is hired. Participants did seem to understand that they could contact the ICCs with technology-related questions.

## Exogenous Factors

**Patients' access to diabetes education, affordable healthy food, and transportation.** Expensive produce and limited public transportation make it challenging for patients to make positive lifestyle changes. Although diabetes education is not a focus of the FirstVitals intervention, participants emphasized the value of the health information that care coordinators directed them to on the Internet. Participants also noted the helpfulness of classes or counseling sessions offered by their health center. Participants expressed frustration that expensive produce and limited transportation options impede their ability to implement the lifestyle changes they want to make.

**Responding to limitations in service reimbursement.** Without universal reimbursement of DPN screening and care coordination, FirstVitals must come up with creative ways to maintain a sustainable funding source. The new retinal screenings will provide FirstVitals with additional income; FirstVitals is looking into expanding that service. In addition, FirstVitals is looking into selling its DPN screening services to health plans by demonstrating that the screening results will 1) allow providers to identify and accurately code high risk patients, in turn increasing the premium paid to the health plan; and 2) demonstrate improvement in foot ulcers. FirstVitals also hopes to make its services marketable to plans by showing how its early-detection screening services can help improve payers' Healthcare Effectiveness Data and Information Set (HEDIS) scores.

## Summary

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The FirstVitals intervention, in partnership with AlohaCare, uses telemonitoring to help individuals with diabetes who display signs and/or risks of peripheral neuropathy by providing them with a wireless glucometer and training them to take their blood sugar levels as prescribed by their physician. Working with partnering health centers, care coordinators monitor participants' readings remotely and contact the patient when readings are missing or abnormal. If necessary, the care coordinator helps the patient schedule an appointment with the appropriate provider.

The Director of Care Coordination manages the FirstVitals program and staff, the clinical care coordinators (CCCs) and integrated care coordinators (ICCs), and coordinates with health centers and the program's technology partners. Although CCCs are existing members of some of the larger participating health centers, they have added responsibility for implementing some or all of the FirstVitals intervention care coordination components. In addition, FirstVitals employs four ICCs under the HCIA funding, two of whom supplement the CCCs in clinics and two of whom implement the full program at health centers without CCCs.

Although recruiting community health centers to participate in the program required a greater level of effort than expected, partner health centers' feedback helped FirstVitals adapt the Innovation program to meet the needs of the centers and their patient populations. Technology issues have proven more difficult for the FirstVitals team to solve, with the ICCs and program leadership spending more time than expected working on problems related to technical issues, the tablet application, and shared data plans. Moving forward, FirstVitals is exploring two sustainability options: expanding the reimbursable retinal screening service and selling the DPN screening service to health plans. The retinal screening services are already reimbursable, and FirstVitals is working on ways to demonstrate the value of DPN screening to health plans.

There are several topics that warrant further investigation during the second year of the evaluation, including:

- progress in developing the microvascular score card tool for identifying patients at high risk for microvascular complications;
- the ideal background and level of the experience for the ICC role;
- the role of the ICC at each site;
- further investigation on the effectiveness of the tablets; and
- the training of care coordinators.

Continued research and communication with the awardee on these topics will help to better inform the evaluation of FirstVitals in order to determine the potential for replicability and scalability of the intervention, as well as how the program itself is serving its immediate patients currently in its program.

## George Washington University

This report presents our evaluation of George Washington University’s telemedicine program.

We provide preliminary observations about the program based on a review of the awardee’s application, operational plan, quarterly reports, telephone interviews with the awardee, and information collected during site visits in late July 2014, and we continue to work to code and analyze the data from that visit. While this report presents themes that we have identified during the first year of the evaluation, it is important to note that our findings are tentative and descriptive at this point. We look forward to providing more definitive findings and results, including analysis of the data collected at our site visit, for future reports.

<b>Program Title</b>	<b>George Washington University Telemedicine Study</b>
<b>Targeted Disease/Condition</b>	<b>End-Stage Renal Disease (ESRD)</b>
<b>Total Amount Awarded</b>	\$1,939,127.00
<b>Description of target population</b>	Patients 18 years and older on peritoneal dialysis at DaVita dialysis clinics across Washington, DC; Maryland; and Virginia.
<b>Description of the awardee organization</b>	George Washington University is an academic institution in Washington, DC.
<b>Setting of intervention</b>	The intervention is delivered remotely via telemedicine to patients across DC, Maryland, and Virginia.
<b>Overview of Innovation</b>	George Washington University (GWU) provides a remote telemonitoring program for patients on peritoneal dialysis (PD) through nurses from several regional DaVita clinics. The intervention trains DaVita dialysis nurses to use telemedicine to offer real-time, continuous, and interactive health monitoring to participants. This approach is expected to improve a participant’s access to care, adherence to treatment, self-management, and health outcomes. The GWU team also anticipates that the program will decrease the cost of care for PD patients with complex health needs by reducing overall hospitalization days.

### Introduction

Peritoneal dialysis (PD) is a home dialysis treatment to manage chronic kidney disease, common causes of which include diabetes and high blood pressure. The United States Renal Data System’s Annual Report states that 31,200 patients were undergoing PD treatment in 2011, which constituted 6.6% of all patients using a known form of dialysis.<sup>55</sup> Evidence suggests that PD can have several benefits for certain patients, including increased independence and mobility and a shorter time commitment when compared to home or clinical hemodialysis.<sup>56</sup> However, PD is also associated with complications that include peritonitis, a potentially life-threatening infection of the peritoneum.<sup>57</sup> Although mortality rates in the

<sup>55</sup> US Renal Data System. *USRDS 2013 Annual Data Report: Atlas of Chronic Kidney Disease and End-stage Renal Disease in the United States*. Bethesda, MD: National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases; 2013.

<sup>56</sup> Treatment methods for kidney failure: peritoneal dialysis. National Kidney and Urologic Diseases Information Clearinghouse. September 2010. <http://kidney.niddk.nih.gov/KUDiseases/pubs/peritoneal/index.aspx>

<sup>57</sup> Wechter, D.G. (2014). Peritonitis. *A.D.A.M. Medical Encyclopedia*. 2014. <http://www.nlm.nih.gov/medlineplus/ency/article/001335.htm>

ESRD population have declined in the past decade, the United States Renal Data System estimates that only 61% of PD patients who began treatment in 2006 were alive three years later.

As PD is a home treatment, patients and providers are often limited to communicating over the phone or through in-person interactions during clinic visits. In developing this intervention, the project leaders at the George Washington University (GWU) sought to incorporate telemedicine into PD care to allow providers to make consultations and review patients' vital signs between monthly clinic visits. GWU found previous studies demonstrating that telemedicine for complex PD patients can improve health outcomes and reduce the cost of care; one study showed a 38.5% decrease in total hospitalizations.<sup>58,59</sup> The team anticipates that this approach will prevent the development or exacerbation of complications, reduce unnecessary clinic visits, and—in turn—reduce costs.

### Innovation Components

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The GWU team is training nurses at select DaVita dialysis clinics to use telemedicine to offer real-time, continuous, and interactive health monitoring to PD patients enrolled in the intervention. GWU's program involves three key features: remote monitoring technology, secure video chat software, and educational video modules.

**Site recruitment and onboarding.** The program's Principal Investigator (PI) first approaches the Medical Director of a new DaVita clinic to the program to explain the intervention and request participation in the program. If the Medical Director agrees to implement the program in the clinic and successfully identifies nurses who are willing to participate, a GWU research coordinator sets up a two-hour introductory training with the nurses. This training includes an overview of study-related activities, a description of the nurses' role in the intervention, a demonstration of the capabilities of the remote monitoring system and video chat software, and a tutorial on how to collect essential study-related data. As of September 2014, ten DaVita clinics were participating in the study; two of them started in the past four months.

**Enrollment and telemedicine equipment deployment.** After the nurses at the DaVita clinic have been trained, the research coordinators begin to enroll patients at that site into the intervention. The coordinators are primarily responsible for enrolling eligible DaVita patients into the program. They consult with nurses to determine when a significant number of eligible patients will be attending the clinic. As of March 2014, the majority of participants approached for enrollment (58.2%) agreed to participate in remote monitoring and telemedicine activities, receive the educational video modules via emails, and complete quarterly surveys. Some participants (6.6%) only agreed to participate in what GWU describes as “data activities.”

During enrollment, if possible, the coordinators provide participants with the remote monitoring equipment and deliver a short, 20-minute training. They also administer a brief survey to gauge the

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<sup>58</sup> Berman S, Wada C, Minatodani D, et al. Home-based preventative telemedicine in the follow-up of patients in home peritoneal dialysis. *J Telemed Telecare*. 2007; 13: 288-92.

<sup>59</sup> Gallar P, Vigil A, Rodriguez I, et al. Two-year experience with telemedicine in the follow-up of patients in home peritoneal dialysis. *J Telemed Telecare*. 2007; 13: 288-92.

participant's technology needs and distribute laptops and webcams, if necessary. The remote monitoring equipment includes a scale, a blood pressure cuff, and a small Bluetooth-enabled portable device called a HealthPAL. The HealthPAL transmits information from the scale and the blood pressure cuff to a database in real time, allowing DaVita nurses and the GWU telemedicine center to see daily readings. If participants have a compatible glucometer, the device also transmits their blood glucose readings to the database.

**Remote monitoring.** Nurses set parameters for normal blood pressure and weight readings for each participant in the database. Readings are color coded: green indicates that a reading is within the parameters, yellow indicates that a reading is outside the parameters, and red indicates that a reading is significantly outside the bounds of these parameters. When the nurses review the database, they can choose to contact a participant if they see a pattern of red readings that they feel should be addressed. At some sites, nurses elect to be sent faxes or called daily or weekly about participants who are in the “red zone.”

To contact participants, nurses may elect to use another key feature of the intervention: a secure video-chat software called DigiGone. Nurses can use this video-chat platform to provide teleconsultations, which allows them to address health issues before the participant's next scheduled clinic appointment and to prevent unnecessary visits to the clinic. Coordinators work with participants after enrollment to ensure that they can download DigiGone onto their home computers, tablets, or Android devices.

**Educational modules.** The final component of the intervention is a series of 12 educational modules for program participants. Video topics include blood pressure, exercise, exit site care, and peritonitis, among others. Participants receive a link to an educational video each month via email.

### Target Population and Program Participants

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This project targets PD patients at several DaVita dialysis clinics across Washington, DC; Maryland; and Virginia. Program participants must be at least 18 years old and able to perform the telemedicine requirements of the intervention.

**Participant characteristics.** Participants with known demographic information identify as Black or African American (25.3%), are adults between 26 and 64 years of age (34%), and are covered by Medicare (30.4%). Participants are split evenly between men and women. The table below shows demographic information for participants who were enrolled in the project as of Quarter 7.

Demographic Information	Jan–March 2014 Patient Count	Jan–March 2014 Patient Count		Jan–March 2014 Patient Count	Jan–March 2014 Patient Count
<b>Sex</b>	<b>#</b>	<b>%</b>	<b>Age (Years)</b>	<b>#</b>	<b>%</b>
Male	40	20.6%	Elderly: >75	9	4.6%
Female	49	25.3%	Elderly: 65–74	14	7.2%
Unknown	105	54.1%	Adults: 26–64	66	34.0%
			Unknown	105	54.1%
<b>Race/Ethnicity</b>	<b>#</b>	<b>%</b>	<b>Insurance Type</b>	<b>#</b>	<b>%</b>
Black/African American	49	25.3%	Medicare (FFS/Unspecified)	59	30.4%
White	28	14.4%	Private/Commercial	12	6.2%
Asian	8	4.1%	Dually Eligible	8	4.1%
Hispanic	2	1.0%	Medicaid	2	1.0%
Two or More Race/Ethnicity	2	1.0%	Other	4	2.1%
Unknown	105	54.1%	Uninsured	4	2.1%
			Unknown	105	54.1%

Source: HCIA 7QR Awardee Performance Report. Reflects unique count of quarterly direct program participants.

### Implementation Effectiveness

GWU’s operational plan was approved October 19, 2012, and encounters with participants began in April 2013.

Our qualitative findings of implementation effectiveness for the GWU program will be based largely on analysis of data collected during our site visits. At the time of this report, we had not yet conducted the analysis of this data and will therefore present the results of this analysis in a future report.

### Program Effectiveness

Our evaluation of the program’s effectiveness will focus on quantitative and qualitative analysis as described below.

### Quantitative Results

At the time we began work on this report, we did not have the necessary agreements in place to receive data from GWU. Since that time we have finalized these agreements and look forward to presenting results on the GWU program’s impact on measures of health, quality of care, utilization, and costs for the Medicare population served.

## Qualitative Results

Our qualitative findings of program effectiveness for the GWU program will be based largely on analysis of data from patient phone interviews. At the time of this report, we had not yet conducted the patient interviews and will therefore present the results of this analysis in a future report.

## Workforce Development and Deployment

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Program management at GWU includes a PI and two co-investigators. The PI is primarily responsible for general oversight, securing buy-in from the participating DaVita clinics, and developing the curriculum for the educational modules. The co-investigators help manage the telemedicine components of the intervention and lead data collection and analysis.

At the start of the program, GWU hired one research coordinator to carry out enrollment and manage the logistical and technical aspects of the intervention. Since then, the research coordinator has been replaced twice, and GWU hired an additional coordinator to support recruitment activities. The coordinators are responsible for training nurses and participants, working with participants to download the DigiGone software, and addressing any technological issues that arise with the remote monitoring equipment.

For this intervention, the coordinator trained DaVita nurses across 10 clinics. The nurses typically complete between one and three in-person trainings with the coordinator and are also required to complete online Collaborative Institutional Training Initiative (CITI) IRB training modules in human subjects research before participating in the intervention. GWU also provides the training to interested physicians who work at participating DaVita clinics.

## Context

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Our qualitative findings of contextual factors for the GWU program will be based largely on data collected during our site visits and patient interviews. At the time of this report, we had not completed the patient phone interviews or conducted the analysis of the site visit data and will therefore present the results of this analysis in a future report.

## Summary

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GWU's program focuses on real-time, continuous remote monitoring of adult patients with ESRD who are on PD, a home-based dialysis treatment. GWU aims to lower costs of PD care by equipping participants and DaVita dialysis clinic nurses with remote vitals-monitoring technology, video chat software, and educational modules. The program is being delivered through ten DaVita clinics throughout DC, Maryland, and Virginia. Participants and nurses are trained to use the technology to enhance already-prescribed daily at-home blood pressure and weight testing; the technology enables nurses to review these vital signs in between clinic visits. More recently, GWU launched a series of educational modules for nurses in order to support the monitoring component of the intervention.

There are several topics that warrant further investigation during the second year of the evaluation, including:

- patient experiences and variation across sites;
- the use of video chats among participants;
- how many participants have viewed the educational videos; and
- GWU’s handling of variation in patients’ and nurses’ adherence to the intervention.

Continued research and communication with the awardee on these topics will help to better inform the evaluation of GWU in order to determine the potential for replicability and scalability of the intervention, as well as how the program itself is serving its immediate patients currently in its program.

## Health Resources in Action

This report presents our evaluation of Health Resources in Action (HRiA) New England Asthma Innovations Collaborative (NEAIC) program.

We provide preliminary observations about the program based on a review of the awardee’s application, operational plan and quarterly reports as well as telephone interviews with the awardee. A site visit will be conducted in the fall of 2014. While this report presents themes that we have identified during the first year of the evaluation, it is important to note that our findings are tentative and descriptive at this point, as we have not completed all of our data collection and have not yet conducted a site visit. We look forward to providing more definitive findings and results for future reports.

<b>Program Title</b>	<b>New England Asthma Innovations Collaborative (NEAIC)</b>
<b>Targeted Disease/ Condition</b>	<b>Pediatric Asthma</b>
<b>Total Amount Awarded</b>	\$4,247,747
<b>Description of target population</b>	Patients between 2–17 years of age with poorly controlled asthma.
<b>Description of the Awardee Organization</b>	Health Resources in Action is a national nonprofit 501(c)3 public health and medical research organization. One of the organization’s programs, Asthma Regional Council of New England (ARC), serves as the convener of the New England Asthma Innovation Collaborative (NEAIC), which is funded by the HCIA Program. The NEAIC partners include nine providers across four states (Massachusetts, Rhode Island, Connecticut, and Vermont), six payers, and two education/training centers.
<b>Setting of intervention</b>	Eight HRiA provider partners are delivering the intervention to participants in their homes and in clinics throughout Massachusetts, Connecticut, Rhode Island, and Vermont.
<b>Overview of Intervention</b>	HRiA’s intervention focuses on asthma care management using a workforce of community health workers and certified asthma educators to address environmental triggers, provide education, and support self-management in clinics and at home to reduce preventable pediatric-related emergency department visits and hospital admissions and reduce costs.

### Introduction

In 2011, the Task Force on Community Preventive Services released recommendations to decrease asthma morbidity for children and adolescents with asthma through “home-based, multi-trigger, multicomponent interventions with an environmental focus.”<sup>60</sup> These interventions typically involve home visits by an array of personnel (including community health workers), identification and assessment of asthma triggers in the home environment, and education about asthma and self-management—all key features of HRiA’s program.

Asthma triggers are associated with specific home environmental conditions such as dampness, mold, tobacco smoke, dust mites, and pests. The Healthy Home model was developed and implemented in

<sup>60</sup> Recommendations from the Task Force on Community Preventive Services to decrease asthma morbidity through home-based, multi-trigger, multicomponent interventions. Task Force on Community Preventive Services. *American Journal of Preventive Medicine*. 2011; 41(2S1): S1-S4.

Seattle, Washington, as a promising approach to reduce the exposure to indoor asthma triggers. The Healthy Home model involves conducting home environmental scans to assess exposures, informing participants and patients about low-cost corrective actions, offering advice and tools to reduce exposures, and advocating for improved housing. These home visits are usually conducted by a trained community health workers (CHW) with asthma experience. A randomized control trial to evaluate the Healthy Home model showed that those patients in the intervention group had significantly improved quality of life and reduced asthma-related need for urgent health services when compared to those who were not in a Healthy Home model. The same study showed that the net savings per participant were \$189 to \$721.<sup>61</sup>

The Asthma Regional Council (ARC) of New England was launched in 2000 at an Asthma Summit sponsored by Region One of the Department of Health and Human Services and Environmental Protection Agency and the U.S. Department of Housing and Urban Development. Originally, ARC focused on environmental contributors to the disease. ARC was particularly interested in the home environment, as research was increasingly showing the role of environmental triggers in the exacerbation of pediatric asthma. ARC promoted financing (or reimbursement from payers and insurers) for asthma home visiting to reimburse for environmental assessments. Over time, the home environmental intervention model evolved to include CHWs. The HCIA Program provided HRiA with the opportunity to adopt the Healthy Home model and partner with providers who were already providing asthma home visits with CHWs through grant-funded activities. Several of the New England Asthma Innovation Collaborative (NEAIC) payer partners indicated that if HRiA was able to demonstrate a return on investment or improved outcomes for asthma patients, they would be willing to finance home visits for a defined number of patients in year three of the Innovation Awards and consider reimbursement for the home-visit intervention model in the long term.

### Innovation Components

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Each of the nine HRiA provider partners is delivering the intervention through its organization. Each partner has a CHW and a clinician who is a certified asthma educator (AE-C) and who supervises the CHW. Each provider partner is delivering the intervention, collecting self-reported data from caregivers and observations from AE-Cs or CHWs, and participating in a monthly learning collaborative where it provides and participates in peer support activities. There are three models for the intervention, described below as Model 1 and Model 2a and 2b.

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<sup>61</sup> Krieger J, Takaro T, Song L, et al., The Seattle-King County Healthy Home Project: a randomized, controlled trial of a community health worker intervention to decrease exposure to indoor asthma triggers. *American Journal of Public Health*. April 2005; 95(4): 652-659.

No.	Number of Home Visits	Home Visit Model	Provider Sites
1	3-4 home visits	CHWs conduct all home visits. Clinician with the AE-C credential provides guidance to the CHW off site but does not attend any home visits.	<ul style="list-style-type: none"> <li>■ Children’s Hospital Boston (Boston, MA)</li> <li>■ Boston Medical Center (Boston, MA)</li> <li>■ Baystate Children’s Hospital (Springfield, MA)</li> </ul>
2a	3 home visits	CHW and an AE-C conduct the first home visit; the CHW independently conducts subsequent home visits.	<ul style="list-style-type: none"> <li>■ RI/Hasbro Hospital (Providence, RI)</li> <li>■ St. Joseph’s Health Services (North Providence, RI)</li> <li>■ Thundermist Health Center (Woonsocket, RI)</li> <li>■ Rutland Regional Medical Center (Rutland, VT)</li> </ul>
2b	3 home visits	CHW and an AE-C conduct the first home visit; the CHW independently conducts subsequent home visits. Additionally, participants receive asthma education in an initial clinic visit.	<ul style="list-style-type: none"> <li>■ Middlesex Hospital (Middletown, CT)</li> <li>■ Children’s Medical Group (Hamden, CT)</li> </ul>

For all three models, CHWs conduct home visits and environmental assessments, provide mitigation supplies, review an asthma action plan with the family, educate the family members, and connect them to any needed social service resources.

To support its evaluation activities—specifically around demonstrating cost savings—HRiA has requested claims and encounter data for the entire asthma population; they have contracted with the Center for Health Policy and Research to conduct the analysis of the claims and encounters data. Although there are no specific technology components being funded through HCIA, three provider sites in Massachusetts and the provider site in Rhode Island will be using the REDCap web-based tool for data collection. The other five sites in Connecticut, Rhode Island and Vermont use a Google application developed by HRiA to capture and store data for this project.

### Target Population and Program Participants

HRiA’s target population includes patients who are between 2–17 years of age, are Medicaid or CHIP beneficiaries, have a diagnosis of asthma from an authorized clinician, and have poorly controlled asthma as evidenced by at least one of the following in the 12-month period before enrollment: (1) asthma-related ER visit, (2) observation stay, (3) hospitalization, or (4) prescription for oral corticosteroid.

HRiA’s target population excludes patients who have other medical conditions that affect their breathing (e.g., poorly controlled sickle cell disease or cystic fibrosis), are already participants in an asthma intervention that interferes with the HCIA-funded intervention, or are homeless or in state custody if either of those conditions will interfere with the administration of the environmental components of the intervention.

HRiA is working with nine provider sites that enroll participants, often directly from an affiliated emergency department. Some providers also have relationships with community health centers and are able to identify eligible participants through referrals.

The cumulative total of unique direct participants in HRiA’s intervention (as of the end of the Q7 awardee reporting period) is 546, which is below the Q7 projection by 122 participants. The projected target at the end of year two (Q8) is 636 participants.

**Participant characteristics.** The table below shows demographic information for patients seen at HRiA’s provider sites during Q7. The majority of participants are children between the ages of 1-11 years (92%) and Hispanic/Latino (38.1%). Participants are largely insured through Medicaid (83.5%).

Demographic Information	Jan–March 2014 Patient Count	Jan–March 2014 Patient Count		Jan–March 2014 Patient Count	Jan–March 2014 Patient Count
<b>Sex</b>	<b>#</b>	<b>%</b>	<b>Age</b>	<b>#</b>	<b>%</b>
Male	168	60.4%	Children: 1–11 years	255	92%
Female	110	39.6%	Adolescents: 12–18 years	22	7.9%
<b>Race/Ethnicity</b>	<b>#</b>	<b>%</b>	<b>Insurance Type</b>	<b>#</b>	<b>%</b>
Black/African American	59	21.2%	Medicaid	232	83.5%
Hispanic or Latino	106	38.1%	Private/Commercial	31	11.2%
Asian	4	0.1%	Uninsured	2	0.7%
White	37	13.3%	Other	1	0.4%
Two or More Race/Ethnicity	68	24.5%	Unknown	10	3.6%
American Indian/Alaska Native	3	1.08%			
Unknown	5	1.8%			

Source: HCIA 7QR Awardee Performance Report. Reflects unique count of quarterly direct program participants.

### Implementation Effectiveness

HRiA’s operational plan was approved on December 31, 2013. After finalizing all IRB submissions, six of nine providers began enrolling patients during the first quarter of 2013.

At the time of this report, visits to HRiA sites had not yet been completed. We will be able to provide additional information on lessons learned for the program in a future report.

### Program Effectiveness

Our evaluation of the program’s effectiveness will focus on quantitative and qualitative analysis as described below.

### Quantitative Results

Our evaluation of program effectiveness of the HRiA program will be based largely on quantitative data, and we will continue to work with the HRiA team and their partners to put the necessary agreements in place to receive data to support our evaluation. Once finalized, we will use the data provided by HRiA

and their partners to assess the program’s impact on measures of health, quality of care, utilization, and costs for the Medicaid and CHIP populations served by the HRiA program.

### Qualitative Results

Our qualitative findings on program effectiveness for the HRiA program will be based largely on analysis of data collected during focus groups. At the time of this report, we had not yet conducted focus groups. We will present the results of our analysis in a future report.

### Workforce Development and Deployment

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HRiA has two key workforce roles involved in the intervention: CHWs and AE-Cs, both of whom are employed by the eight participating provider sites, not by HRiA.

**Community health workers.** CHWs have varied backgrounds and are the first point of contact for all enrolled patients and their families. CHWs conduct three to four home visits with each participant’s family according to a set protocol. During these home visits they provide asthma education (show families how to use their medications, review asthma action plans, etc.), conduct environmental assessments, deliver asthma trigger mitigation supplies, and collect other self-reported data from patients and caregivers. All CHWs are supervised by a clinician.

**Certified asthma educators.** The role of the AE-C is to act as a resource for CHWs as they conduct home visits. Five provider sites are implementing a model in which the AE-C also attends the first home visit for each enrolled participant; at that time, the AE-C provides asthma education. At some provider sites, AE-Cs also provide asthma education during clinic visits. AE-Cs have varied backgrounds, but all have passed a qualifying exam administered by the National Asthma Educator Certification Board. HRiA provided scholarships to allow staff at provider sites (including CHWs, nurses, respiratory therapists, and care coordinators) to take a certified asthma educator training course and to cover the fee of the certification exam. Many AE-Cs have a clinical background, and all of the clinical supervisors of CHWs are also AE-Cs.

### Context

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Our qualitative findings of contextual factors for the HRiA program will be based largely on data collected during our site visits. At the time of this report, we had not conducted the analysis of the site visit data and will therefore present the results of this analysis in a future report

### Summary

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HRiA’s program focuses on asthma care management and aims to lower costs of asthma care by delivering prevention-oriented care using a workforce of community health workers (CHWs) and certified asthma educators (AE-Cs). The CHWs conduct a series of home visits, during which they address environmental triggers, deliver asthma trigger mitigation supplies, and reinforce education and self-management support. Additionally, AE-Cs work with participants alongside CHWs in clinics and at home to provide asthma education. The HCIA intervention is being delivered through nine HRiA provider partners throughout Massachusetts, Connecticut, Rhode Island, and Vermont. HRiA’s target population

includes Medicaid and CHIP beneficiaries who are between 2 to 17 years of age and have a diagnosis of asthma from an authorized clinician.

There are several topics that warrant further investigation during the second year of the evaluation, including:

- how the CHW workforce infrastructure has affected program implementation between sites;
- how state-level differences and key stakeholders shape implementation;
- the use of multilingual workforces to recruit non-English speaking program participants; and
- program components necessary for replicability.

Continued research and communication with the awardee on these topics will help to better inform the evaluation of HRiA in order to determine the potential for replicability and scalability of the intervention. It will also indicate how the program itself is currently serving its immediate patients in its program.

## Trustees of Indiana University

This report presents our evaluation of the Trustees of Indiana University Aging Brain Care (ABC) Program.

We provide preliminary observations about the program based on a review of the awardee’s application, operational plan, quarterly reports, telephone interviews with the awardee, and initial claims analysis. We conducted a site visit on July 23–25, 2014, and continue to work to code and analyze the data collected on that visit. While this report presents themes that we have identified during the first year of the evaluation, it is important to note that our findings are tentative at this point, as we have not completed all of our data collection or fully analyzed the data collected from the site visit. We look forward to providing more definitive findings and results for future reports.

<b>Program Title</b>	<b>Aging Brain Care (ABC) Program</b>
<b>Targeted Disease/ Condition</b>	<b>Late-life dementia and depression</b>
<b>Total Amount Awarded</b>	\$7,836,084
<b>Description of Target Population</b>	Community-residing Medicare and Medicaid beneficiaries, aged 65 and older, who are diagnosed with dementia, depression, or both.
<b>Description of Awardee Organization</b>	Indiana University is an academic/university medical center based in Indianapolis, Indiana. The awardee is implementing the ABC Program for dementia and depression for patients at Eskenazi Health in Indianapolis and at IU Health Arnett in Lafayette, Indiana. Eskenazi Health—formerly known as Wishard Health Services—is one of the country’s five largest safety-net health systems, providing care to nearly 1 million outpatient visitors each year.
<b>Setting of Intervention</b>	Staff are based at Eskenazi Health or IU Health Arnett and make visits to patients in their homes in the surrounding areas.
<b>Overview of Interaction</b>	Indiana’s Aging Brain Care Program provides individualized and integrated care management through a multidisciplinary care team staffed by care coordinators and care coordinator assistants. The care teams assess the participant’s needs and deliver ongoing monitoring and patient education on self-management through home visits and other types of patient interaction.

### Introduction

An estimated 5.4 million people in the United States have Alzheimer’s disease. One in nine adults older than 65 has Alzheimer’s, and one-third of people over the age of 85 have the disease. The number of adults living with dementia is significantly higher, as those with Alzheimer’s only account for 60% to 80% of all dementia cases. These conditions have diverse clinical manifestations, including declining cognitive function, immobility, increased risk of falls, swallowing disorders, urinary and fecal incontinence, and behavioral disturbances. While dementia may present differently in different cases, it is similarly devastating for patients and their families.

Depression is another common condition among older adults. Between 15% to 20% of seniors in the United States have experienced depression, and as many as 7 million adults 65 and older are regularly

affected by depressive symptoms.<sup>62</sup> Two million older adults have a diagnosable depressive illness. Depression often affects people with chronic illnesses and is especially common in people with Alzheimer's and dementia.<sup>63</sup> Program staff at Indiana University conducted research indicating that clinicians often do not recognize dementia and late-life depression and thus patients do not receive adequate treatment.<sup>64</sup>

To address the gaps in recognition and treatment of dementia and depression, Indiana University staff developed a collaborative care intervention based on current treatment recommendations. The awardee chose to target older adults with both dementia and depression based on their frequent co-occurrence, suggesting that successful management of one condition requires attention to the other.<sup>65</sup> In addition, Indiana University researchers have conducted controlled clinical trials that demonstrated the efficacy of collaborative, coordinated care for the treatment of dementia, depression, and other chronic conditions among the elderly.<sup>66,67,68</sup>

In 2008, Indiana piloted the collaborative care model program for patients with dementia or depression in the memory care clinic at Eskenazi Health, calling it the Aging Brain Care (ABC) Medical Home. Eskenazi Health funded the project. Home visits were an essential component of this program. At the start of the ABC program, there was one advanced practice nurse who served as a care manager and a medical director; the program hired a social worker and a new medical director in 2011.

Indiana is using the Innovation Award to test the scalability of its ABC collaborative care model. In order to measure the efficacy of the intervention across diverse populations and geography, the awardee is implementing the intervention in both urban and rural settings. One site serves patients from several safety-net clinics associated with the university and academic health center in Indianapolis. Another site draws from IU Health Arnett in Lafayette, Indiana, which serves a rural population in a larger geographic area. Indiana believes demonstrating that the model can be implemented in a rural setting is an important milestone in successful nationwide dissemination.

## Innovation Components

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There are four key innovation components of the ABC program: (1) initial needs assessment, (2) individual care protocol, (3) ongoing monitoring, and (4) supporting activities/tools.

**Initial needs assessment.** Once a participant is enrolled in the program and contacted by a care coordinator assistant (CCA), the CCA conducts an initial home visit and performs a needs assessment

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<sup>62</sup> Aldrich, N. CDC Promotes Public Health Approach To Address Depression among Older Adults. Centers for Disease Control and Prevention. [http://www.cdc.gov/aging/pdf/cib\\_mental\\_health.pdf](http://www.cdc.gov/aging/pdf/cib_mental_health.pdf)

<sup>63</sup> Late life depression: a fact sheet. Bethesda, MD: Geriatric Mental Health Foundation. [http://www.gmhfonline.org/gmhf/consumer/factsheets/depression\\_factsheet.html](http://www.gmhfonline.org/gmhf/consumer/factsheets/depression_factsheet.html)

<sup>64</sup> Callahan C, Boustani M, Weiner M, et al. Implementing dementia care models in primary care settings: the aging brain care medical home. *Aging and Mental Health*. 2011; 15:1, 5-12.

<sup>65</sup> Ibid.

<sup>66</sup> Ibid.

<sup>67</sup> Unutzer J, Katon W, Callahan C, et al. Collaborative care management of late-life depression in the primary care setting: a randomized controlled trial. *JAMA*. December 2002; 288(22): 2836-2845.

<sup>68</sup> Callahan C, Boustani M, Unverzagt F, et al. Effectiveness of collaborative care for older adults with Alzheimer disease in primary care: a randomized controlled trial. *JAMA*. May 2006; 295(18):2148-57.

with the program participant. The needs assessment consists of the Mini-Mental State Exam, the Healthy Aging Brain Care (HAB-C) Monitor, and the Patient Health Questionnaire (PHQ-9).

**Individual care protocol.** Based on the HAB-C or PHQ-9 score, the CCA generates an individualized care protocol tailored to participants' functional, behavioral, psychological, and cognitive symptoms. The participant's primary care physician (PCP) reviews the proposed care plan, suggesting modifications as needed. The CCA implements the care plan, conducts regular visits with the participant (e.g., home visits, clinic visits, telephone calls, or a visits to the hospital or ER if necessary<sup>69</sup>), and tracks participant and caregiver adherence to the assigned protocol. Staff members also provide information to increase caregiver knowledge of dementia and recommend caregiver support groups; however, the program does not require caregivers to enroll in support groups.

**Ongoing monitoring.** The CCA monitors the participant over time, conducting needs assessments, following symptoms, and adjusting the care plan whenever necessary. For the three months after the initial assessment, the CCA sees each participant at least once a month. Thereafter, if the participant is doing well and appears stable, visits are required only once every three months. If patients' PHQ-9 or HAB-C scores worsen, CCAs may visit more frequently. In addition to medical needs, CCAs assess the participant's and caregiver's social needs, such as transportation and meals assistance. The participant may be referred to specialists (e.g., mental health practice, Aging Brain Care Center) or receive ancillary services (e.g., home modifications) when necessary. After the CCAs conduct home visits, they report key findings to team leads, the care coordinators (CC), and social workers and often ask for each person's assistance in managing the patient's conditions.

CCs, who are registered nurses, co-lead each team with social worker. The CCs coordinate care with the ABC Medical Director and the participant's PCP to facilitate medication adherence and ensure that their treatment plan is effective. The social workers assist participants with non-medical resources, such as transportation or meal services, and provide information about Medicaid coverage.

**Supporting activities/tools.** Indiana developed specialized care coordination software known as the eMR-ABC. After entering in participant data, CCAs use the system to generate individualized depression or dementia care plans. The software also tracks process of care coordination tasks delivered by CCs and monitors patient and caregiver responses to care protocols. The eMR-ABC is connected to the Indiana Network for Patient Care (INPC), which allows for tracking of utilization data from INPC member hospitals.

Software and tool use vary by the program sites. The eMR-ABC is a tool used exclusively by the ABC Team; the broader Eskenazi system, including a participant's PCP, cannot access the system and instead uses an EHR system called the G3 system. ABC staff members—RNs, social workers, and CCAs—are able to enter participant notes into the G3 system to share information about a participant with providers outside of the ABC program. IU Health Arnett staff only use the eMR-ABC to report participant data to the ABC team and uses the Epic medical system as their primary tracking and reporting mechanism.

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<sup>69</sup> There are several ways in which CCAs visits the patient in the ER. 1.) Since the Eskenazi has an integrated IT system, the medical record shows the contact information for CCAs, and doctors will notify the CCAs if a participant enters the ER room. 2.) The CCAs will receive an alert from the eMR-ABC that that a participant was admitted to the ER and/or hospitalized.

These tools support communication between members of the care team and allow the ABC team to know if a patient is receiving other services in the hospital via two mechanisms: 1) Since the Eskenazi health system has an integrated IT system, ER staff are able to obtain a CCA's contact information from a patient's medical record and call the CCA directly to report a hospitalization or an ER admission. 2) Alternatively, CCAs receive an alert from the eMR-ABC that one of the participants has been hospitalized or admitted to the ER.

## Target Population and Program Participants

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Indiana's target population is older adults with depression or dementia (or co-occurring diagnoses).

**Inclusion criteria.** Participants are Medicare or Medicaid beneficiaries aged 65 and older who live in the Arnett or Eskenazi community. Participants must have had at least one visit to any primary care practice affiliated with Eskenazi Health (i.e. one of Eskenazi's community health centers or the Healthy Aging Brain Center) or to one of Arnett's primary care providers (PCPs) since 2011. Patients and/or their family caregiver must agree to be enrolled in the ABC program.

**Identifying participants.** Patients are identified and enrolled in the program using ICD-9 codes indicating dementia or depression. Staff members attempt to verify the diagnosis in the patient's medical record; if they are unable, they will administer assessment tools in-person to determine the patient's need for the program. PCPs can refer their patients to the program.

**Exclusion criteria.** PCPs are given the option to opt their patients out of the program. Individuals who transition to an institutional setting as long-term residents (e.g., nursing home, certain types of assisted living facilities, long-term rehab) are discharged from the program. Participants who enter short-term rehabilitation settings remain enrolled in the ABC program, but program staff does not visit the patient during that time.

Indiana originally planned to enroll only 2,000 participants in the program but has succeeded in enrolling 2,647 unique participants as of the end of Q7.<sup>70</sup> A subset of these individuals has not yet had a visit with program staff. During June 2014, staff had at least one visit with 601 Eskenazi patients and 175 Arnett patients.<sup>71</sup>

**Participant characteristics.** As of Q7, Indiana's participants are largely female (76%) and split evenly between the 65–74 age group and the over 75 age group. A majority of participants are White (60%), 38% are Black, and most are patients of Eskenazi Health in Indianapolis. The following table presents information on all Indiana participants. A subpopulation analysis of Medicare FFS participants is included in the quantitative results of this chapter.

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<sup>70</sup> Quarterly Awardee Performance Report: Trustees of Indiana University, 7<sup>th</sup> Quarterly Reporting Period (January, February, March 2014)

<sup>71</sup> MM1 document submitted by the Trustees of Indiana University to the Centers for Medicare & Medicaid Services – Center for Innovations. Reporting period end date: June 30, 2014.

Demographic Information	Jan–March 2014 Patient Count	Jan–March 2014 Patient Count		Jan–March 2014 Patient Count	Jan–March 2014 Patient Count
<b>Sex</b>	<b>#</b>	<b>%</b>	<b>Age</b>	<b>#</b>	<b>%</b>
Male	300	23.8%	Elderly: >75 years	610	48.5%
Female	959	76.2%	Elderly: 65–74 years	631	50.1%
			Adults: 26–64	18	1.4%
<b>Race/Ethnicity</b>	<b>#</b>	<b>%</b>	<b>Insurance Type</b>	<b>#</b>	<b>%</b>
Black/African American	479	38.0%	Medicaid	36	2.9%
Hispanic or Latino	3	0.2%	Medicare (FFS/Unspecified)	1,142	90.7%
Asian	6	0.5%	Medicare Advantage	37	2.9%
White	752	59.7%	Dually Eligible	16	1.3%
Two or More Race/Ethnicity	18	1.4%	Private/Commercial	7	0.6%
Unknown	1	0.1%	Uninsured	16	1.3%

Source: HCIA 7QR Awardee Performance Report. Reflects unique count of quarterly direct program participants.

### Implementation Effectiveness

Indiana’s operational plan was approved on September 21, 2014, and the program launched on October 1, 2012.

Our qualitative findings of implementation effectiveness for the ABC program will be based largely on analysis of data collected during our site visit, including discussions with staff and patients/caregivers and observations of the program. At the time of this report, we had not yet conducted the analysis of this data and will therefore present the results of this analysis in a future report.

### Program Effectiveness

Our evaluation of program effectiveness of the ABC Program for dementia and depression for patients at Eskenazi Health community health centers in Indianapolis and at IU Health Arnett in Lafayette will be based on quantitative and qualitative data. This report is limited to quantitative analysis because Indiana’s site visit was conducted too late to code and analyze before this report. We plan to report qualitative results in future reports.

### Quantitative Results

Here we present preliminary results across four measures: all-cause hospitalizations, hospitalizations for ambulatory care sensitive (ACS) conditions, emergency department (ED) visits, and total cost of care. We present these results for fee-for-service (FFS) Medicare beneficiaries enrolled in Indiana’s program for one or more quarters from Quarter 4 of 2012 through Quarter 4 of 2013, for each quarter of their

enrollment. Please note that our findings are limited and should be interpreted with caution due to the lack of a comparison group.<sup>72</sup>

Indiana provided a finder file that lists program participants and their enrollment data, enabling us to pull Medicare claims for these beneficiaries and calculate measures. The finder file from Indiana included 2,231 records for patients enrolling in the ABC Program from its inception in Quarter 2 of 2010 through Quarter 1 of 2014. Of these records, we were able to match 2,129 to unique Medicare beneficiary identifiers. We first limited our analysis only to those beneficiaries enrolled in—and having their first visit with—the ABC program after the start of the Innovation Award (operationalized as Quarter 4 of 2012). Due to the lag in available claims records, we further limited our analytic sample to patients with first visit dates before Quarter 1 of 2014, leaving 1,066 patients. From our final analytic sample of 1,066, we were unable to assign a depression or dementia diagnosis to 457 patients using Chronic Condition Data Warehouse (CCW) condition definitions for depression/dementia on their claims (see Exhibit 8.1). We classified this group of beneficiaries as having a condition (depression or dementia) of unknown diagnosis and used them in our analysis to improve our analytic power.

For each of the four measures, we tried to answer two research questions:

- (1) Is there an association between length of enrollment in the ABC Program and utilization rates and costs of care?
- (2) Is there an association between utilization and costs measures with type of condition and program site?

To answer these questions, we used population average generalized estimating equations (GEEs), which account for repeated measures across beneficiaries over multiple quarters of enrollment. The model is specified as:

$$Y_{ij} = \beta_0 + \beta_1 \text{Quarter}_{ij} + \beta_2 \text{Patient}_i + \epsilon_i$$

Here  $Y_i$  is the outcome variable for the  $i^{\text{th}}$  beneficiary episode seen by during the  $j^{\text{th}}$  quarter; *Quarter* is a set of indicator variables for the number of quarters since enrollment in the intervention; and *Patient* is a vector of patient demographic clinical variables, qualifying condition, and the awardee implementation site where the patient was seen. Although the overall effect of enrollment time is the primary parameters of interest for this analysis, we also looked at effects over time by qualifying conditions and awardee implementation site.

We present the results of these models in Exhibit 8.3, where for each outcome in the tables we report adjusted average for each covariate of interest (enrollment quarter, type of condition, and program site). Before discussing the regression results, we briefly present descriptive characteristics for the patients in Indiana's ABC program (Exhibit 8.1) as well as unadjusted average cost and utilization measures (Exhibit 8.2). For more details on the methods used for this analysis, refer to Appendix A.

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<sup>72</sup> A comparison group was not included in this report, due to the difficulty of identifying depression as a diagnosis in claims data. Indiana has recently provided NORC with a file that includes diagnosis information for their program participants that will allow us to construct comparison groups for subsequent reports.

Exhibit 8.1 displays the demographic, comorbidities, prior utilization, and program enrollment characteristics of the patients in Indiana’s ABC program. For categorical variables such as age, race/ethnicity, coverage reason, condition type, program site, and enrollment time, non-uniformity (e.g., difference in percent of patients in each category) was tested using Pearson’s Chi-squared. Of the 1,066 patients enrolled for at least one quarter in Indiana’s program, more than half (57%) were enrolled continuously for four or more quarters. Additionally, 25% of patients were enrolled continuously for three quarters, 10% for two quarters, and 8% were enrolled in the program for just one quarter. As mentioned earlier, we were unable to assign 43% of the patients in the program to a particular clinical condition, depression and/or dementia, using their Medicare claims. We classified these patients as having an unknown admitting condition. Among the participant population, 21% had both depression and dementia, 28% had depression alone, and 8% had dementia alone, based on their Medicare claims on the CCW. Among the two program sites, close to 70% of patients received care from the Eskenazi site, while 30% received care from the Arnett site. Participants in the ABC program had an average Medicare spending of approximately \$2,500 per beneficiary quarter for the year before program enrollment. The average number of hospitalizations and ED visits in the year before program enrollment was 84 and 175, respectively, per 1,000 beneficiary-quarters.

**Exhibit 8.1:** Descriptive Characteristics of Indiana FFS Medicare Population (N=1,066)

Variable	Percent (N) or Mean (SD)
<b>Quarters of Enrollment**</b>	
One	8% (82)
Two	10% (109)
Three	25% (266)
Four	35% (375)
Five	22% (234)
<b>Type of Condition***</b>	
Unknown	43% (457)
Depression	28% (303)
Dementia	7% (77)
Depression and Dementia	21% (229)
<b>Program Site**</b>	
Arnett Health	31% (330)
Eskenazi Health	69% (736)
<b>Gender</b>	
<b>Female***</b>	74% (792)
<b>Age Group**</b>	
<55 years old	0.01% (1)
55–64 years old	2.6% (28)
65–74 years old	49.2% (524)
75–84 years old	34% (363)
≥85 years old	14% (150)
<b>Race/Ethnicity**</b>	

Variable	Percent (N) or Mean (SD)
Black	31.4% (335)
<b>Dual Eligibility**</b>	
Dual	45.3% (483)
Partial-Dual	3.9% (41)
<b>Coverage Reason**</b>	
Old Age	71.9% (757)
Disability	28.1% (296)
<b>Hierarchical Condition Category (HCC)</b>	
HCC Score	1.37 (1.14)
Count of HCCs	2.0 ( 2.3)
<b>Average Quarterly Utilization &amp; Cost in Year Prior to Program Enrollment</b>	
Total Medicare Cost	\$2,479 (5,723)
Hospitalizations per 1,000 patients	84 (202)
ED Visits per 1,000 patients	175 (355)
E&M Visits for Target Condition per 1,000 patients	169 (305)

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1 Statistical significance was assessed using Pearson's Chi-square for categorical variables

Exhibit 8.2 shows average unadjusted utilization rates (all-cause hospitalizations, ACS hospitalizations, and ED visits) and total cost of care during each quarter. The columns in the table indicate the number of participants enrolled in the ABC program. For example, all 1,066 participants in our sample were enrolled for at least one quarter. The “1 Quarter” column displays the average utilization rates and cost experienced by these participants during the first quarter in which they were enrolled in the Indiana program. Similarly, there were 984 patients who were enrolled for two continuous quarters, with their average utilization rates and cost for their second quarter of enrollment listed under the “2 Quarter” column. Using analysis of variance (ANOVA) methods, we tested for trends in cost and utilization over time.

We hypothesized that participants enrolled longer in the ABC program may have lower cost of care, as well as lower hospitalizations and ED visits. However, we did not observe statistically significant changes in cost and utilization measures regardless of the number of quarters that participants were enrolled in the ABC program. Moreover, there were no differences in the point estimates for cost of care, hospitalizations, or ED visits for beneficiaries before and after enrollment in the ABC program.

**Exhibit 8.2:** Average Unadjusted Outcomes for Indiana Patients, by Quarters of Enrollment

	Number of Quarters Enrolled in Intervention 1 Quarter	Number of Quarters Enrolled in Intervention 2 Quarters	Number of Quarters Enrolled in Intervention 3 Quarters	Number of Quarters Enrolled in Intervention 4 Quarters	Number of Quarters Enrolled in Intervention 5 Quarters
<b>Number of Person Quarters</b>	1,066	984	875	609	234
Total Medicare Cost per person quarters	\$2,723 (\$8,518)	\$3,327 (\$10,965)	\$3,487 (\$13,652)	\$3,547 (\$13,235)	\$2,942 (\$10,631)
Number of IP Hospitalizations per 1,000 person quarters	97 (352)	96 (354)	106 (384)	90 (314)	85 (372)
Number of ACS IP Hospitalizations per 1,000 person quarters	37 (207)	36 (211)	48 (244)	28 (184)	30 (171)
Number of ED Visits per 1,000 person quarters	285 (820)	288 (782)	219 (599)	230 (644)	256 (610)

Statistical significant differences are indicated as \*p<0.1 \*\*p<0.05, \*\*\*p<0.01

Exhibit 8.3 shows the results from population average GEE models for total cost of care and all-cause hospitalizations, ACS hospitalizations, and ED visits across number of quarters patients were enrolled in the program, condition, and program site, after adjusting for demographic factors, comorbidities, and other covariates included in the model. Number of quarters enrolled is defined as in Exhibit 8.2, and estimates in the “1 Quarter” column refer to the cost and utilization during the first quarter a participant was enrolled in the program. Results are displayed as the adjusted average outcomes and 95% confidence intervals (95% CI) for each number of quarters enrolled, condition, and program site. This section below provides a summary of these findings.

**Enrollment time.** Among the selected measures, we observe that longer time of enrollment in the ABC program was associated with a significant decrease only for ED visits. We see a significant decrease (p<0.05) in ED visits only between the first enrollment quarter (338) and the third enrollment quarter (256) but not for other program quarters. While there were no statistically meaningful decreases in the cost of care over enrollment time, the point estimates for average cost of care per beneficiary increased up to the three quarters of enrollment and decreased at fourth and fifth quarters of enrollment in Indiana’s program, after adjusting for other beneficiary covariates. We observed a similar pattern for all-cause hospitalizations per 1,000 patients and ACSC hospitalization rates, with the point estimates decreasing in the fourth and fifth quarters of enrollment after increasing over the first three quarters.

**Type of condition.** There was significant variation in all the selected measures by type of condition. We observed that beneficiaries with both depression and dementia, followed by beneficiaries with depression, had the highest cost as well as highest rate of hospitalizations, ACS hospitalizations, and ED visits, compared to beneficiaries with unknown condition (depression/dementia). Adjusting for beneficiary covariates, the average cost of care per beneficiary quarter was highest for individuals with both depression and dementia (\$7,259, p<0.01), followed by individuals with just depression (\$5,477, p<0.01), compared with individuals diagnosed with an unknown condition. The average adjusted count of all-cause hospitalizations per beneficiary quarter, per 1,000 beneficiaries, was higher for beneficiaries with both depression and dementia (173, p<0.01), followed by individuals with depression (123, p<0.05), compared with individuals with an unknown diagnosis (38). The average count of ambulatory care sensitive

hospitalizations per 1,000 beneficiaries was marginally higher for beneficiaries with both depression and dementia (75,  $p < 0.1$ ), followed by individuals diagnosed with depression (57,  $p < 0.1$ ), compared with individuals diagnosed with an unknown condition (14). The average count of ED visits per 1,000 beneficiaries was higher for beneficiaries with both depression and dementia (411,  $p < 0.01$ ), followed by individuals diagnosed with depression (355,  $p < 0.01$ ), compared with individuals diagnosed with an unknown condition (131).

**Program site.** There were no significant differences in cost and utilization rates across the two program sites, even though the Eskenazi site had slightly higher point estimates for cost of care as well as more hospitalizations, ACS hospitalizations, and ED visits compared to the Arnett site.

**Exhibit 8.3:** Model-Based Estimates of Adjusted Average Outcomes for Indiana Patients<sup>1</sup>

	Adjusted Total Cost of Care in Quarter (95% CI)	Adjusted All-Cause Hospitalizations in Quarter (95% CI)	Adjusted ACS Hospitalizations in Quarter (95% CI)	Adjusted ED Visits in Quarter (95% CI)
<b>Number of Quarters Enrolled</b>				
1 Quarter <sup>2</sup>	\$4,165 (\$3,242–\$5,087)	114 (84–143)	48 (30–67)	338 (287–389)
2 Quarters	\$4,961 (\$3,542–\$6,380)	123 (91–154)	45 (27–63)	326 (271–381)
3 Quarters	\$5,825 (\$4,086–\$7,563)	125 (88–162)	74 (47–101)	256 (208–205)**
4 Quarters	\$4,693 (\$3,171–\$6,214)	107 (73–140)	37 (16–58)	270 (207–334)
5 Quarters	\$3,746 (\$1,743–\$5,750)	99 (45–153)	40 (5–76)	387 (261–513)
<b>Condition</b>				
Unknown <sup>2</sup>	\$1,068 (\$634–\$1,502)	38 (16–60)	14 (2–27)	131 (98–163)
Depression	\$5,477 (\$4,020–\$6,934)***	123 (92–153)**	57 (38–76)*	355 (201–408)***
Dementia	\$3,408 (\$1,630–\$5,186)**	92 (44–141)	41 (6–77)	233 (150–316)**
Depression & Dementia	\$7,259 (\$5,626–\$8,891)***	173 (141–206)***	75 (54–95)*	411 (349–473)***
<b>Program Site</b>				
Arnett Health <sup>2</sup>	\$4,665 (\$3,370–\$5,961)	106 (78–135)	43 (26–59)	213 (167–258)
Eskenazi Health	\$4,882 (\$3,883–\$5,880)	121 (100–141)	55 (42–68)	347 (307–388)

<sup>1</sup>Coefficients for Total Cost of Care per Quarter Obtained from GEE model with gamma distribution and log link. Coefficients for all-cause hospitalizations, ACS hospitalizations, and ED visits per quarter obtained from GEE with negative binomial distribution. All models controlled for enrollment time, condition, program site, age, race, FFS coverage, dual eligible status, disability, ESRD status, and beneficiary cost and utilization a year prior to program enrollment (HCC score, annual cost of care, counts of hospitalizations, ED visits, and E&M visits)

<sup>2</sup>Reference category. Statistical significant differences compared to the reference category are indicated as \* $p < 0.1$  \*\* $p < 0.05$ , \*\*\* $p < 0.01$

In sum, we find that the longer length of enrollment in the Indiana’s ABC program was associated with lower ED rates of visits in the third quarter of enrollment but was not associated with lower cost of care or lessened rates of hospitalizations and ACS hospitalizations. Medicare beneficiaries with more than four quarters of enrollment in the ABC program, however, had lower point estimates for cost of care and hospitalization outcomes compared to their first quarter of enrollment. We found that among program

participants, those with both dementia and depression and those with depression alone had higher cost of care and higher rates of hospitalizations and ED visits. Going forward, we will work with Indiana to understand who the beneficiaries with unknown condition (depression/dementia) on their Medicare might be and request that Indiana provide details on the enrolling diagnoses of these beneficiaries from their program enrollment data. Finally, we did not find any differences in program outcomes across the two program sites.

Because our analytic file for the ABC program only included post-intervention data, we were not able to assess potential decreases in cost of care, hospitalizations, and ED visits between the pre-intervention period and the post-intervention period. Because we employed an intention-to-treat analysis, we were not able to take into account the effect of participant disenrollment on the outcome measures; we are aware that the amount of follow-up differed across patients and we plan to address that in future analyses. Also, we include information from only the early stages of implementation in the HCIA funding period. More follow-up time and a more thorough understanding from our qualitative data of the key factors related to participant selection and implementation are necessary before drawing any conclusions about the impact of the awardee program on end-of-life health, quality of care, and utilization and cost measures.

Over the next year, we plan to expand the scope of our evaluation, bringing data for additional time periods both before and after enrollment in the ABC program as well as data on participant disenrollment. This will allow us to see if the ABC program improves health, quality and utilization outcomes and reduces cost of care after enrollment. Even with information on the patient experiences before joining the ABC program, we may not have enough information to draw conclusions about the effectiveness of Indiana's ABC program. Therefore, future reports would also include data for a comparison group of patients who did not receive the ABC program, allowing us to test the impact of the intervention compared to usual care. Finally, future reports will include additional measures of program effectiveness relevant to understanding the impact of the Indiana's ABC program.

### Qualitative Results

Our qualitative findings of program effectiveness for the ABC program will be based largely on analysis of data collected during our site visit, including discussions with staff and patients/caregivers and observations of the program. At the time of this report, we had not yet conducted the analysis of this data and will therefore present the results of this analysis in a future report.

### Workforce Development and Deployment

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There are three clinical ABC teams, each composed of one full-time care coordinator, one social worker, and several full-time care coordinator assistants, with support from the ABC Medical Director. Two of the teams are located in Indianapolis (Eskenazi teams), and the third team is located in Lafayette (Arnett team). The Arnett team does not have a social worker but receives support from one of the two social workers based at Eskenazi.

**Registered nurses.** Because of the difficulty recruiting nurse practitioners, the awardee chose to use an RN as the care coordinator at Arnett given that Indiana University has had success with RNs playing this role in other settings. Two nurse practitioners at Eskenazi left the program in Q5 and so the management team decided to replace the positions with RNs.

**Medical Director.** The Medical Director, who is a geriatrician, oversees all ABC staff—RNs, social workers, and CCAs. He is responsible for the overall operation of the ABC program and monitors the performance of the program. He also provides medical consultation to the team when needed.

**Care coordinator assistants.** The CCAs, who have high school degrees and in some cases specialized training (several have two-year degrees and one is a trained medical assistant), provide support to the CC and social worker and ensure that caregivers and patients follow through with their treatment plans. Each CCA is responsible for approximately 150 participants and are the primary contact person for the participant. CCAs contact potential participants to enroll them in the program and conduct home visits to collect an updated status on the patient’s condition and to ensure that caregivers and patients are following through with their care plan. They assist CCs in conducting patient and caregiver biopsychosocial assessments and also deliver specific care protocols and monitor medication adherence. CCAs are responsible for scheduling patient and caregiver visits and managing the data entry into the eMR-ABC. Trainings for the CCAs include the IMPACT training, behavioral activation, depression relapse prevention, and dementia and depression education.

**Care coordinator.** The CC, who is a registered nurse, is one of the co-leaders of the team. The CC coordinates care with the ABC Medical Director and the participant’s PCP to facilitate medication adherence and ensure that the treatment plan is effective. They also deliver and assist in the development of an individualized care plan (ICP) for the participant and caregiver. Working with the CCAs, they monitor the effectiveness of each ICP. When requested by the Medical Director, they conduct the root cause analysis to determine whether hospitalizations and other events were preventable. Like CCAs, they conduct home visits to educate the caregiver and review the participant’s ICP. Upon joining the team, CCs receive IMPACT training, problem solving therapy training, care coordinator assistant training, behavioral activation, depression relapse prevention, and dementia and depression education.

**Social worker.** The social worker, who has a master’s degree in social work, co-leads the team with the CC. The social worker is the contact person for the CCA when participants need non-medical resources, such as transportation and meal services. The social worker serves as a community resource navigator for participants and caregivers. Training includes problem solving therapy training, behavioral activation, depression relapse prevention, and dementia and depression education.

**IT specialist.** The IT specialist works closely with program staff to modify the eMR-ABC to suit the needs of the program.

**Hiring process.** When hiring CCAs, Indiana developed a six station interview in which candidates had to interact with actors playing the role of patients and caregivers in scenarios that were designed to look like a typical home visit. This gave the interviewer the opportunity to observe the candidates and their skills while “interacting” with the target population.

## Context

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Our qualitative findings of contextual factors for the Indiana program will be based largely on data collected during our site visits. At the time of this report, we had not conducted the analysis of the site visit data and will therefore present the results of this analysis in a future report

## Summary

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Indiana's goal is to assist primary care physicians in achieving the recommended standard of care in the management of older patients with dementia or depression. Indiana's Aging Brain Care program provides individualized and integrated care management through a multidisciplinary care team staffed by care coordinators and care coordinator assistants. The care teams deliver ongoing monitoring and patient education on self-management through an initial assessment, development of a plan of care, and ongoing monitoring.

Preliminary quantitative analyses suggest reductions in utilization measures, including a statistically significant reduction in ED visits between the 2nd and 3rd quarter of enrollment. We did not find any change in the total cost of care over time.

There are several topics that warrant further investigation during the second year of the evaluation, including:

- workforce workload; and
- identification of social supports for program participants.

Continued research and communication with the awardee on these topics will help to better inform the evaluation of Indiana in order to determine the potential for replicability and scalability of the intervention, as well as how the program itself is serving its immediate patients currently in its program.

## Innovative Oncology Business Solutions, Inc.

This report presents our evaluation of the Innovative Oncology Business Solutions, Inc. (IOBS) Community Oncology Medical Home (COME HOME) program.

We provide preliminary observations about the program based on a review of the awardee’s application, operational plan, and quarterly reports as well as on telephone interviews with the awardee, a site visit conducted on April 9, 2014, and an initial claims analysis. Based on a review of the notes collected during our site visits, we present initial findings, which we will add to and revise after coding site visit data and fully analyzing the data collected to date. Thus, this report presents themes that we have identified during the first year of the evaluation; it is, however, important to note that our findings are tentative at this point. We look forward to providing more definitive findings and results in future reports.

<b>Program Title</b>	<b>Community Oncology Medical Home (COME HOME)</b>
<b>Targeted Disease/ Condition</b>	<b>Cancer</b>
<b>Total Amount Awarded</b>	\$19,757,338.00
<b>Description of target population</b>	Newly diagnosed or newly relapsed Medicare, Medicaid, and commercially insured patients with cancer who seek oncology care at one of the seven participating clinics.
<b>Description of awardee organization</b>	Innovative Oncology Business Solutions, Inc. (IOBS) is a for-profit corporation based in Albuquerque, New Mexico, that was created for the purpose of administering this CMMI award. The awardee represents seven community oncology practices across the United States that are implementing and testing the COME HOME model for cancer patients.
<b>Setting of intervention</b>	Seven oncology practices across the county in New Mexico, Texas, Georgia, Ohio, Florida, and Maine.
<b>Overview of innovation</b>	The COME HOME model is a patient-centered medical home model providing comprehensive outpatient oncology care through two mechanisms: <ul style="list-style-type: none"> <li>(1) treatment pathways that provide consistent disease management guidance for providers to improve treatment decision making, to educate about symptom recognition, and to assist with patients’ self-care, pain management, and caregiver support; and</li> <li>(2) triage pathways for triage nurses to identify and manage patient symptoms as they access the practice on a 24/7 basis through a triage phone line, extended night and weekend office hours, and on-call providers.</li> </ul>

### Introduction

Traditional cancer care can be fragmented and has become increasingly complex, as highlighted by a 2013 Institute of Medicine (IOM) report describing how the current care delivery system is in crisis.<sup>73</sup> The Patient-Centered Primary Care Collaborative (PCPCC) has reported that patients with cancer receiving active treatment represent less than 1% of the commercially insured population, but they account for 10% to 12% of health care expenditures. Additionally, the cost of cancer care in the U.S. has

<sup>73</sup> Delivering High-Quality Cancer Care: Charting a New Course for a System in Crisis. Institute of Medicine. September 2013. <http://www.iom.edu/Reports/2013/Delivering-High-Quality-Cancer-Care-Charting-a-New-Course-for-a-System-in-Crisis.aspx>

been rising at an unsustainable rate of 15% to 20% annually,<sup>74</sup> which speaks to the need to seek out different models of care that can be provided at lower cost while still improving the quality of care. In its report, IOM presented recommendations to improve the quality of cancer care in the United States; one recommended using a coordinated cancer care team to help deliver patient-centered care.<sup>75</sup>

IOBS's model of care is based on the concept of an oncology patient-centered medical home (PCMH). The PCMH seeks to provide comprehensive and team-based outpatient oncology care. Recent research has documented how this type of model can lead to reduced costs of care. For example, one study found that a medical home model led to improvements in patients' experiences, quality of care, and clinician burnout rates as well as reducing ER visits by 29% and hospitalizations by 6%, leading to a total savings of \$10.30 per patient per month.<sup>76</sup>

The IOBS COME HOME model builds on the model of care provided at the New Mexico Cancer Center (NMCC) for more than 10 years. Rather than providing the fragmented, hospital-based care that many cancer patients typically receive, NMCC's goal was to provide coordinated care for cancer patients in a community setting. In designing the NMCC facility and program, leadership solicited patient and staff input to cater to their needs and provide high-quality and efficient care. In 2009, an internal NMCC analysis demonstrated that NMCC was saving millions of dollars compared to hospitals.

With the Innovation Award, IOBS is working with seven practices across the country to implement the COME HOME model. In addition to the NMCC, the other practices are Austin Cancer Center (Texas), Northwest Georgia Oncology Center (Georgia), Dayton Physicians Network (Ohio), the Center for Cancer and Blood Disorders (Texas), Space Coast Cancer Center (Florida), and the Maine Center for Cancer Medicine (Maine).<sup>77</sup> While several elements of the innovation were borne out of NMCC practices, the award is also being used to expand NMCC's capacity to provide services to more patients more efficiently, effectively, and beyond regular business hours.

## Innovation Components

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The COME HOME model includes different elements of patient-centered care. The primary goals of the model are to improve health outcomes, enhance patient care, and reduce cost. According to the COME HOME website, the seven main elements are: (1) an ongoing relationship with a personal physician to provide first contact as well as continuous and comprehensive care; (2) a physician-directed team care; (3) whole-person orientation; (4) integrated/coordinated care; (5) evidence-based medicine and performance measurement to assure quality and safety; (6) enhanced access; and (7) payment to recognize the value-added of a medical home.

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<sup>74</sup> Sprandio J. Oncology patient-centered medical home and accountable cancer care. *Community Oncology*. 2010; 7(12): 565-572. [http://pop.pcpcc.net/files/oncology\\_medical\\_home.pdf](http://pop.pcpcc.net/files/oncology_medical_home.pdf)

<sup>75</sup> Delivering High-Quality Cancer Care: Charting a New Course for a System in Crisis. Institute of Medicine. September 2013. <http://www.iom.edu/Reports/2013/Delivering-High-Quality-Cancer-Care-Charting-a-New-Course-for-a-System-in-Crisis.aspx>

<sup>76</sup> Reid R, Coleman K, Johnson E, et al. The group health medical home at year two: cost savings, higher patient satisfaction, and less burnout for providers. *Health Affairs*. 2010; 29(5): 835-843. <http://content.healthaffairs.org/content/29/5/835.full>

<sup>77</sup> To date, NORC has not visited these other sites.

The main components of the COME HOME model are triage pathways, increased access to practices through extended and weekend hours, and treatment pathways providing best practices for evidence-based care. We discuss each of these components below.

**Triage pathways.** The COME HOME model includes a team of triage nurses, available by phone and in person, who follow triage pathways to determine the urgency of a participant's concern and how it can best be handled, then guide the participant through next steps for care. There are multiple triage pathways available for the diverse symptoms that a participant might experience. When a call comes in or when a participant walks into the clinic, nurses select the relevant pathways based on symptoms and ask a series of questions to identify the proper course of action. Nurses have the authority to choose pathways, schedule appointments, and order medications without needing to consult a physician beforehand.

**Same-day appointments.** Same-day appointments are also available to participants to address symptoms, such as pain or fever. At least one mid-level provider has an open schedule, ensuring a patient can see someone even if the oncologist is called away to see another participant with a more acute need. Because the model allows for same-day visits (in many cases, patients can be seen immediately or within a couple of hours), the physician does not need to consult by phone. This allows physicians to provide uninterrupted care to the participants who are there in person and enables participants to receive the care they need more quickly.

**Extended and weekend hours.** By providing extended hours for the provision of care within the clinics, the model seeks to reduce ER visits and hospitalizations. NMCC has extended hours until 8:00 pm on weekdays and is open for four hours on Saturday and Sunday so that participants can call or visit the clinic instead of the hospital. Other clinics implementing the COME HOME model determine the best extended hours to meet the needs of their population. For example, the Maine Center for Cancer Medicine has found that its participants are more likely to access the clinic early in the morning, so it has chosen to extend hours by opening early. As long as the practices adhere to the core elements of the COME HOME model, sites have the flexibility to adapt the model to best suit their environment and specific needs.

**Treatment pathways.** Although COME HOME practices treat all types of cancer, IOBS developed treatment pathways for seven cancer types it is tracking under the award (breast, lung, colon, pancreas, thyroid, melanoma, and lymphoma). These treatment pathways consist of both diagnostic and therapeutic pathways and guide the approach to care. Each evidence-based treatment pathway is developed by a team of oncologists, including at least one oncologist from each of the seven COME HOME practices, and the pathways are in accordance with the National Comprehensive Cancer Network (NCCN) guidelines.

Treatment pathways are a normal part of any oncologists' approach to care. The treatment pathways developed as part of the IOBS intervention, however, are focused on efficacy and toxicity over cost, which contrasts with payers' approach to developing treatment pathways. As a result, with the IOBS pathways, if a more expensive medication provides fewer side effects and results in fewer hospitalizations, that is factored into the pathway. Importantly, each COME HOME pathway is reviewed quarterly so that changes based on new literature, availability of drugs, or other factors can be incorporated.

There are often multiple treatment regimens within each pathway, the number of which varies by cancer type. For instance, there are 11 regimens for pancreatic cancer and 52 for breast cancer. In each practice, the treatment pathways are integrated into the electronic health records (EHRs). Through this system, physicians can view a pathway dashboard with near real-time patient information and fix deficiencies if care goes off the pathway. The treatment pathways function similarly to advanced clinical decision support system within the EHR.

**Patient education.** IOBS has developed a patient education notebook to distribute to every COME HOME patient. The notebook outlines the overall COME HOME project and process. It also provides patients with information on how and when to contact the clinic and makes it clear that the COME HOME clinic should be a patient's primary point of contact so that he or she can avoid unnecessary ER visits and hospitalizations.

**Supporting activities/tools.** As described above, the clinical diagnostic and treatment pathways are a significant part of IOBS's intervention. Once developed, these pathways are input as algorithms into each site's EHR system. Some of the sites have common EHR vendors, but not all of the sites are using the same systems. IOBS can pull data from EHRs to monitor pathway compliance and track any deficiencies. The EHR systems do the following: (1) document contacts with patients and adherence to triage protocols; (2) allow physicians to access individual patient information; and (3) allow physicians to provide clinical decision support. At the organizational level, IOBS can pull information from the EHR to track compliance to diagnostic/treatment and triage protocols. Ultimately, the EHR is not the primary intervention but rather supports the triage and diagnostic/treatment pathway components of the intervention.

### Target Population and Program Participants

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Typically, COME HOME practices treat cancer patients with any cancer type at any stage of the cancer continuum. For the purposes of the award, IOBS is specifically tracking newly diagnosed or newly relapsed Medicare, Medicaid, or commercially insured patients who seek oncology care at a participating clinic. A direct participant is any patient (regardless of cancer type) over the age of 18, who calls the triage phone line, has a medical home patient education encounter, and/or visits a participating community cancer center office during extended hours. Indirect participants include all newly diagnosed and newly recurrent cancers of the breast, colon, lung, thyroid, pancreas, lymphoma, or melanoma in patients 18 years or older.

IOBS has served more than 10,000 direct participants to date. The majority of patients tend to be female. Though a significant number of patients are over 65 years of age, nearly half are adults between the ages of 26 and 64. The most common insurance type among patients is private/commercial, followed by Medicare Advantage. The following table represents information on all IOBS participants. A subpopulation analysis of Medicare FFS is included in the quantitative results of this chapter.

Demographic Information	Jan–March 2014 Patient Count	Jan–March 2014 Patient Count		Jan–March 2014 Patient Count	Jan–March 2014 Patient Count
<b>Sex</b>	<b>#</b>	<b>%</b>	<b>Age</b>	<b>#</b>	<b>%</b>
Male	2,163	40.3%	Elderly: >75 years	756	14.1%
Female	3,198	59.7%	Elderly: 65-74 years	1,534	28.6%
			Adults: 26-64	2,417	45.1%
			Adults: 26-64 years	612	11.4%
			Young Adults: 19-25 years	42	0.8%
<b>Race/Ethnicity*</b>	<b>#</b>	<b>%</b>	<b>Insurance Type</b>	<b>#</b>	<b>%</b>
White	2,403	58%	Medicaid	240	4.5%
Black or African American	364	8.8%	Medicare (FFS/Unspecified)	1,484	27.7%
Hispanic or Latino	716	17.3%	Medicare Advantage	1,553	29.0%
Two or More Race/Ethnicity	124	3%	Dually Eligible	109	2.0%
American Indian/Alaska Native	135	3.3%	Private/Commercial	1,699	31.7%
Asian	131	3.2%	TRICARE (Armed Forces)	202	3.8%
Unknown	267	6.4%	Indian Health Service	26	0.5%
			Uninsured	28	0.5%
			Other	20	0.4%

\*Awardee reported a computer error in the process that links demographic data to program data and was unable to report on race/ethnicity in Q7. Race/ethnicity data will be corrected in Q8. The race/ethnicity breakdown for Q6 is included above.

### Implementation Effectiveness

Although many components of the COME HOME model were already in place at NMCC before the Innovation Award, NMCC went live as the first practice to implement the model under IOBS for the purposes of the award in May 2013. IOBS’s seventh and last practice went live with the COME HOME model in August 2013.

IOBS has maintained a significant degree of program/model fidelity, as implementation efforts have closely followed the Innovation’s initial plan. Throughout the implementation process, some adaptations have been tailored to the needs of the individual practice, but core functions of the model remain in place. Examples of variations include the time of day when extended hours are offered to patients (e.g., opening early rather than staying open late) or necessary alterations to the triage pathways due to differences in infrastructures at the various clinics (e.g., availability of imaging and laboratory services on site). The IOBS innovation program relies heavily on the use of EHRs; IOBS thus required practices to have EHRs in place before practices could be selected to implement the COME HOME model.

**Staff reaction.** IOBS trained the first responders and the triage nurses on the COME HOME triage system. IOBS has been proactive in training its staff and has been seeking input throughout the training process to best suit each practice’s cultures and needs. To help with training the first responders, NMCC created a mock system that mirrored the triage software (called Coming Home) so that the phone operators could practice before NMCC fully rolled out the program. Triage nurses also receive some oncology-specific training, but they are not required to have oncology backgrounds or experience. The

nature and consistency of the triage pathways allows nurses to follow prescribed guidelines for handling patients' symptoms and applying their clinical judgment to any medical situation. Triage nurses noted that having the training specialist available for questions was extremely helpful as they learned the system and that having her available for ongoing support allows them to address any questions or issues that may arise.

When IOBS first introduced the triage pathways, triage nurses expressed concern that the pathways would take away the ability for nursing judgment in the triage process. Leadership and managers emphasized that although the triage pathways prescribe specific questions that the nurses should ask patients to guide diagnosis and treatment, the triage nurses ultimately need to rely on their own judgment, training, and skills to elicit proper and sufficient information from the patient. Without receiving adequate information early in a conversation, the nurse would not be able to determine which triage pathway is applicable to a given situation.

Despite some initial challenges in retraining nurses to spend less time documenting patient symptoms and to rely on the triage pathways rather than consulting physicians, triage nurses at NMCC have become experienced with the system and now feel that it greatly helps them coordinate services and provide efficient, effective care. One triage nurse at NMCC cited several benefits of the triage pathways:

- Nurses can be more independent since they no longer have to spend time waiting for doctor approval. This also means that nurses are able to care for patients more quickly.
- The pathways prompt nurses to ask questions that they may not otherwise have thought to ask.
- The triage system makes it easy to handle patient appointments and get patients into the clinic on the same day if necessary.
- Because the triage pathways lessen the documentation burden of nurses, they can focus more on care rather than administrative tasks.

Physicians report positive experiences with the COME HOME model. These providers were employed at the COME HOME practices before the implementation of this program. The IOBS innovation aims to change the way physicians operate, and not necessarily hire new physicians specifically for the innovation. At least one physician from each practice participates in developing and regularly updating the treatment pathways. Physicians find that the triage pathways ease their workloads by reducing the frequency of questions and sign-off requests on orders from nurses and other providers. The COME HOME model has the added benefit of allowing physicians to focus more on the patient they are seeing at any given moment. One physician at NMCC noted that the triage and treatment pathways also facilitate team collaboration by providing standard guidelines ensuring that staff is following the same procedures. This physician also recalled an electricity outage in the area that prevented access to the triage system for a short time. While the system was down, the physician realized just how fundamental the system is to the efficient functioning of the practice.

**Implementation across different program sites.** Practices have implemented the COME HOME model in different ways, primarily due to resource constraints. For example, some sites—including NMCC—are implementing the model practice-wide and treating all patients according to the components determined by the COME HOME model. However, even those sites implementing the model practice-wide are only

tracking outcomes for patients with certain cancers for the purposes of this award and evaluation. Other sites are only using the COME HOME model for the patients in the target population for the award. The decision to limit patient population treated through COME HOME is largely due to funding and resource constraints. Regardless of implementation scope—practice-wide or targeted patients only—IOBS tracks and reports outcome measures only for those patients in the target population.

In many cases, implementing the COME HOME model at practices beyond NMCC has required practices to overhaul their approach to both operations and provision of care. This is because the COME HOME model aims to be an all-encompassing, efficient source of cancer care, which differs from typical modes of practice. Given the necessary culture shift and nuances of the COME HOME model, having strong physician leadership at each practice also facilitated implementation. While IOBS has not experienced any significant turnover or difficulties with staff retention to date, the change in care has led to staffing changes at some of the practices. Program leadership as well as staff representatives report that once practices move beyond the initial culture shift and witness the program benefits, more and more people are on board with the program. Hiring has been a program-wide challenge in the midst of concerns regarding sustainability. This has, in some ways, hindered effective program implementation for the COME HOME practices. For instance, some practices are somewhat reluctant to hire new staff, especially non-clinical staff, for fear of having to let them go once the HCIA funding ceases.

Beyond the culture shift that each COME HOME practice must undergo to implement the COME HOME model successfully, there are other potential challenges during implementation. Namely, there are organizational and structural aspects of the model that some practices have had establish specifically for implementation of the COME HOME model, whereas some of the practices already had those components in place. For example, NMCC has an infusion room, a lab, imaging equipment, and an on-site pharmacy and is able to provide almost all services a patient may need in one visit, minimizing the need for coordination with outside services. Similarly, Space Coast Cancer Center in Florida has imaging, while the Maine Center for Cancer Medicine has that at a facility next door to its main practice. NW Georgia Oncology Centers and some of the other COME HOME practices, meanwhile, do not have imaging on their premises.

**Technological challenges.** IOBS and the COME HOME practices have faced some additional program-wide implementation challenges. Collecting and standardizing data from different practices using separate EHR systems has been one such challenge. While they have been able to build a system to standardize and aggregate the data, work continues to integrate patient data between individual EHR systems and the triage system in a cost-efficient, manageable way for the community-based practices. IOBS's technology partner, Net.Orange, normalizes the data flowing from different EHR systems, then aggregates it in a data warehouse, and standardizes it for analysis. IOBS has used a significant portion of its award funds to pay Net.Orange to develop this common platform EHR. The innovative nature of IOBS's program is such that it could not use an "off the shelf" vendor system. IOBS and Net.Orange continue the development process working toward the goal of collecting and analyzing their practices' data as effectively and efficiently as possible.

**Patient engagement.** Patient engagement with the COME HOME model has been a program-wide challenge. IOBS found that patients are unaccustomed to contacting their practice in the evening or on the weekend. IOBS's preliminary data have shown that most of the ER visits among participants are from

individuals who never called into their COME HOME clinic, which highlights the need for increased patient education to ensure patients understand the services provided by the triage pathway. As of the site visit, IOBS noted they are planning to bring nurse educators to each COME HOME practice to enhance their patient education efforts and encourage patients to contact the clinics first when they need care.

**Replicability.** The differences in the structure and facilities of the multiple COME HOME practices present opportunities for understanding the spread and scalability of the COME HOME model. Practices that do not have certain capabilities on site, such as imaging and laboratory services, have to enlist other facilities, such as stand-alone laboratories or other health care organizations. Factors such as these must be considered when determining how broadly replicable this program will be. It will also be important to visit COME HOME practices in addition to NMCC to learn about their different implementation experiences.

Many of the previously mentioned challenges may significantly hinder program replicability. As noted, IOBS selected practices with existing EHRs, making this a precondition to replicate the COME HOME program in its current state. Additionally, strong leadership and staff flexibility as well as willingness to embrace changes in their approach to care are all elements that should be considered with respect to program replicability.

## Program Effectiveness

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Our evaluation of the program's effectiveness will focus on quantitative and qualitative analysis as described below.

### Quantitative Results

We evaluated quantitative results across four measures: all-cause hospitalizations, hospitalizations for ambulatory care sensitive conditions (ACS), emergency department (ED) visits, and total cost of care. These results are presented for fee-for-service (FFS) Medicare beneficiaries enrolled in IOBS's program for one or more quarters from Quarter 1 of 2013 through Quarter 4 of 2013. In this preliminary analysis, a comparison group is not included, in part because we were not able to identify cancer diagnosis in claims for approximately one-third of the IOBS treatment population. Please note that our findings are limited and should be interpreted with caution due to the lack of a comparison group. For future quarterly reports, we will receive finder files from IOBS that identify cancer diagnosis for their patients.

As mentioned earlier, the COME HOME program consists of two components (1) a treatment pathway that provides disease management, and (2) a triage pathway that provides 24/7 practice access to program patients, with patients using one or both program components. Seven community oncology practices across the country are implementing the IOBS COME HOME program, with the goals of reducing avoidable ED visits and hospitalizations; improving timeliness and appropriateness of care; and reducing unnecessary testing, which will ultimately reduce the overall cost of care.

For our analysis, IOBS provided a finder file that lists the program participants and their enrollment dates, enabling us to pull claims for these beneficiaries and calculate measures. The finder file from IOBS included 2,312 records for patients enrolled between Quarter 1 of 2013 and Quarter 2 of 2014. Of these records, we were able to match 1,059 to unique Medicare beneficiary identifiers. Due to the lag in

available claims records, we further limited our analytic sample to participants enrolled in the program before Quarter 1 of 2014, leaving 699 participants. From our final analytic sample of 699, we eliminated 244 more participants because we were unable to assign a cancer diagnosis using Chronic Condition Warehouse condition definitions for cancer (see Exhibit 9.1). We classified this group of 244 beneficiaries as having cancer of unknown diagnosis and used them in our analysis to improve our analytic power.<sup>78</sup>

For each of the four measures, we tried to answer two research questions:

- (1) Is there an association between length of enrollment in COME HOME and utilization rates and costs of care?
- (2) Is there an association between utilization and costs measures with type of cancer, provider site, and program component?

To answer these questions, we used population average model generalized estimating equations (GEEs), which account for repeated measures across beneficiaries over multiple quarters of enrollment. The model is specified as:

$$Y_{ij} = \beta_0 + \beta_1 \text{Quarter}_{ij} + \beta_2 \text{Patient}_i + \varepsilon_i$$

Here  $Y_i$  is the outcome variable for the  $i^{\text{th}}$  beneficiary episode seen by during the  $j^{\text{th}}$  quarter; *Quarter* is a set of indicator variables for the number of quarters since enrollment in the intervention; and *Patient* is a vector of patient demographic clinical variables, qualifying condition, and the awardee implementation site where the patient was seen. Although the overall effect of enrollment time is the primary parameters of interest for this analysis, we also looked at effects over time by qualifying condition and awardee implementation site.

The results of these models are presented in Exhibit 9.3 where, for each outcome in the tables, we report adjusted average for each covariate of interest (enrollment quarter, cancer type, provider site, and intervention component).

Before considering the regression results, it is helpful to consider the descriptive characteristics for the patients in the COME HOME program (See Exhibit 9.1) as well as unadjusted average cost and utilization measures (Exhibit 9.2). For more details on the methods used for this analysis, refer to Appendix A.

Exhibit 9.1 displays the demographic, comorbidities, prior utilization, and program enrollment characteristics of the patients in the COME HOME program. For categorical variables (age, race/ethnicity, coverage reason, cancer type, program site, enrollment time, and program component) non-uniformity (e.g., difference percent of patients in each category) was tested using Pearson's Chi-squared. Of the 699 patients enrolled for at least one quarter in IOBS's program, nearly half (48%) were enrolled for one quarter, 39% enrolled for two continuous quarters, and 13% enrolled for three or more

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<sup>78</sup> NORC has requested a finder file from IOBS with a list of cancer diagnosis for each participant. Once a file has been received, NORC will identify comparators in claims with similar cancer disease profiles.

quarters. The three patients enrolled for four continuous quarters were dropped from our regression analyses because they represented too small of a sample for statistical inference. Among the group we were able to assign cancer diagnosis using claims rules; breast cancer (19%), lung cancer (15%), lymphoma (12%), and multiple cancers<sup>79</sup> (11%) were the most common cancer categories. Although IOBS is delivering their innovation at seven sites, only five of them had sample sizes large enough to support statistical analysis, with New Mexico, Ohio, and one Texas site having the largest enrollments. Nearly all of the patients benefited from the triage pathways component of the intervention, with few using the treatment pathway at the time of our analysis.

**Exhibit 9.1:** Descriptive Characteristics of IOBS FFS Medicare Population (N=699)

Variable	Percent (N) or Mean (SD)
<b>Quarters of Enrollment**</b>	
One	48% (337)
Two	39% (270)
Three	13% (89)
Four	0.4% (3)
<b>Type of Cancer***</b>	
Unknown	35% (244)
Colorectal	7% (49)
Lung	15% (105)
Breast	19% (133)
Lymphoma	12% (83)
Other†	1% (10)
Multiple	11% (75)
<b>Program Site**</b>	
Ohio	29% (206)
Texas 1	8% (54)
New Mexico	27% (192)
Texas 2	23% (160)
Georgia	12% (87)
<b>Intervention Component**</b>	
Treatment Pathway	4% (29)
Triage Pathway	96% (670)
<b>Female***</b>	61% (423)
<b>Age Group**</b>	
<55 years old	8% (57)
55–64 years old	9% (61)
65–74 years old	45% (313)

<sup>79</sup> We defined a beneficiary as having multiple cancers if they had more than one of the seven defining cancer conditions: breast, lung, colorectal, lymphoma, melanoma, thyroid, and pancreatic cancers. We grouped thyroid and melanoma into the category of “other” cancer.

Variable	Percent (N) or Mean (SD)
75–84 years old	30% (211)
≥85 years old	8% (57)
<b>Race/Ethnicity**</b>	
Black	6% (41)
Hispanic	1% (8)
<b>Dual Eligibility**</b>	
Dual	13% (91)
Partial-Dual	1% (8)
<b>Coverage Reason**</b>	
Old Age	75% (523)
Disability	24% (170)
ESRD	0.3% (2)
<b>Hierarchical Condition Category (HCC)</b>	
HCC Score	2.4 (1.8)
Count of HCCs	3.2 (2.5)
<b>Average Quarterly Utilization &amp; Cost in Year Prior to Program Enrollment</b>	
Total Medicare Cost	\$9,379 (\$9,978)
Hospitalizations per 1,000 patients	216 (359)
ED Visits per 1,000 patients	200 (577)
E&M Visits for Target Condition per 1,000 patients	1,938 (1,911)

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1 Statistical significance was assessed using Pearson's Chi-square for categorical variables

† "Other" cancer includes thyroid cancer and melanoma

Exhibit 9.2 shows average unadjusted utilization rates (all-cause hospitalizations, ACS hospitalizations, and ED visits) and total cost of care during a quarter. The columns in the table indicate the number of quarters enrolled in the COME HOME intervention. For example, all 699 patients in our sample were enrolled for at least one-quarter and the “1 Quarter” column displays the average utilization rates and cost experienced by these patients during the first quarter in which they were enrolled in the IOBS program. Using analysis of variance (ANOVA) methods, we tested for trends in cost and utilization over time. For all but the ACSC hospitalization rates, we observed statistically significant decreases in cost and utilization measures the longer participants were enrolled in the intervention (p<0.001).

**Exhibit 9.2: Average Outcomes for IOBS Patients, by Quarters of Enrollment**

	Number of Quarters Enrolled in Intervention 1 Quarter	Number of Quarters Enrolled in Intervention 2 Quarters	Number of Quarters Enrolled in Intervention 3 Quarters
<b>Number of Patients</b>	699	362	92
Total Medicare Cost per person quarter ***	\$16,353 (\$18,893)	\$14,660 (\$20,209)	\$7,711 (\$12,810)
Number of IP Hospitalizations per 1,000 person quarters***	396 (725)	320 (659)	130 (450)
Number of ACSC Hospitalizations 1,000 person quarters	61 (251)	77 (287)	22 (147)
Number of ED Visits per 1,000 person quarters***	372 (790)	240 (737)	130 (425)

Statistical significant differences are indicated as \*p<0.1 \*\*p<0.05, \*\*\*p<0.01

Exhibit 9.3 shows the results from population-average GEE models for total cost of care, all-cause hospitalizations, ACSC hospitalizations, and ED visits across number of quarters patients were enrolled in the intervention, types of cancer, provider sites, and types of intervention—after adjusting for demographic factors, comorbidities, and other covariates. The results are displayed as the adjusted average outcome and 95% confidence interval (95% CI) for each number of quarters enrolled, cancer type, provider site, and intervention component. This section provides a summary of these findings.

**Enrollment time.** Average cost of care per beneficiary was progressively lower across the three quarters of enrollment in IOBS’s program, after adjusting for other beneficiary covariates. The average adjusted cost of care for those enrolled for three quarters (\$7,360) and those enrolled for two quarters (\$14,855) was significantly lower (p<0.01) compared to the average adjusted cost of care for patients in their first quarter of program enrollment (\$18,181). A similar trend was observed for all-cause hospitalizations per 1,000 patients, with the number of admissions decreasing as patients were enrolled in the program for longer periods of time (p<0.05). Although there were no significant decreases in ACSC hospitalization rates or ED visits across the quarters of program enrollment, the nominal trend was toward decreasing utilization for both of these measures.

**Cancer type.** The average total cost of care varied by the type of cancer. Patients in the unknown cancer group had significantly lower costs of care in comparison to all other cancer types (p <0.05), with the exception of breast cancer. The adjusted average cost per quarter was highest for beneficiaries with thyroid/melanoma cancer (\$32,074), followed by those with colorectal cancer (\$23,181) and multiple cancers (\$21,531). For the utilization measures, the only significant difference by cancer type was for the rate of ACSC hospitalizations, where thyroid cancer and melanoma patients had a significantly higher rate of ACSC hospitalizations compared to those with unknown cancers (200 vs. 54 admissions per 1,000 patients, p<0.05).

**Program site.** There were few differences in cost and utilization rates by program site, with only the New Mexico site showing significantly lower average cost of care and ACS hospitalizations compared to other sites (p<0.05). The COME HOME model originated at the New Mexico site and has been expanded to the other practices, and thus the lower rates may reflect the New Mexico site’s greater experience with the

COME HOME program. However, we did not standardize costs of care to account for geographic differences, meaning we cannot ascertain whether the lower cost of care in the New Mexico site was attributable to the longer history of the program at that site or a reflection of geographic variability in cost of care.

**Intervention component.** Although the number of patients who used the treatment pathway was small (n=29), this group did have significantly higher costs of care and all-cause hospitalizations rates when compared to the triage pathway group. The average cost of care and hospitalization rates was nearly two times higher among the treatment pathway group (cost: \$27,829 vs. \$15,774; hospitalizations: 664 vs. 342). There were no differences between the two groups in ACS hospitalization or ED visit rates.

**Exhibit 9.3:** Model-Based Estimates of Adjusted Average Outcomes for IOBS Patients<sup>1</sup>

	Total Cost of Care in Quarter	All-Cause Hospitalizations per 1,000 patients	Adjusted ACSC Hospitalizations per 1,000 patients	ED Visits per 1,000 patients
	Mean (95% CI)	Mean (95% CI)	Mean (95% CI)	Mean (95% CI)
<b>Number of Quarters Enrolled</b>				
1 Quarter <sup>2</sup>	\$18,181 (\$16,478–\$19,885)	408 (352–466)	63 (44–81)	382 (325–438)
2 Quarters	\$14,855 (\$12,780–\$16,931) ***	314 (251–376)**	80 (51–109)	237 (168–308)*
3 Quarters	\$7,360 (\$4,628–\$10,091) ***	119 (38–200)***	22 (-9–54)	138 (51–226)
<b>Cancer Type</b>				
Unknown <sup>2</sup>	\$11,822 (\$9,629–\$14,015)	339 (248–431)	54 (29–79)	335 (0.25–0.42)
Colorectal	\$23,181 (\$17,445–\$28,917) ***	447 (300–594)	54 (8–100)	187 (71–303)
Lung	\$19,936 (\$16,348–\$23,525) **	431 (333–530)	116 (66–166)	362 (231–492)
Breast	\$12,995 (\$10,482–\$15,507)	206 (138–275)	34 (11–57)	225 (150–300)
Lymphoma	\$17,900 (\$14,636–\$21,164) **	350 (245–455)	58 (21–95)	280 (178–382)
Other (Melanoma/Thyroid)	\$32,074 (\$9,975–\$54,174) **	500 (159–841)	200 (21–378)**	202 (-14–417)
Multiple	\$21,531 (\$16,632–\$26,430) **	501 (363–639)	74 (31–117)	528 (336–719)
<b>Provider Site</b>				
Ohio <sup>2</sup>	\$18,766 (\$15,993–\$21,539)	434 (353–516)	79 (48–110)	392 (293–491)
Texas 1	\$18,735 (\$13,239–\$24,231)	257 (111–402)*	123 (45–202)	562 (326–798)
New Mexico	\$11,533 (\$9,360–\$13,707) ***	284 (207–361)	37 (14–59)**	226 (159–292)
Texas 2	\$16,687 (\$13,932–\$19,441)	352 (268–436)	49 (24–75)	339 (236–442)
Georgia	\$19,713 (\$16,105–\$23,321)	416 (321–511)	97 (52–141)	232 (147–317)
<b>Intervention Component</b>				
Treatment Pathway <sup>2</sup>	\$27,829 (\$20,875–\$34,783) ***	664 (440–888)**	201 (68–335)	394 (211–578)
Triage Pathway	\$15,774 (\$14,421–\$17,126)	342 (299–386)	59 (45–73)	314 (267–360)

<sup>1</sup>Coefficients for Total Cost of Care per Quarter Obtained from GEE model with gamma distribution and log link. Coefficients for All-Cause Hospitalizations, ACS Hospitalizations, and ED Visits per Quarter obtained from GEE with a negative binomial distribution. All models controlled for enrollment time, type of cancer, provider site, intervention type, age, race, FFS coverage, dual eligible status, disability, ESRD status, and beneficiary cost and utilization a year prior to program enrollment (HCC Score, annual cost of care, counts of hospitalizations, ED visits, and E&M visits)

<sup>2</sup>Reference category. Statistical significant differences compared to the reference category are indicated as \*p<0.1 \*\*p<0.05, \*\*\*p<0.01

In sum, we find that longer length of enrollment in the IOBS COME HOME program was associated with both lower cost of care and lower rates of hospitalizations. Medicare beneficiaries with longer lengths of enrollment also had lower point estimates for ED visits and ACS hospitalizations. However, due to limitations in the study design used for our analyses, we cannot say whether the reduction in cost and utilization over greater lengths of program enrollment is a consequence of IOBS's program or a consequence of regression to the mean<sup>80</sup> in the care trajectory of newly diagnosed patients with cancer. We found that among beneficiaries enrolled in the program, those with unknown cancer diagnoses had lower cost of care compared to those with specific or multiple cancer diagnoses (with the exception of breast cancer). For future reports, we will work with IOBS to understand the beneficiaries for whom we could not identify a cancer diagnosis ("unknown" group) and seek to identify their diagnosis from program enrollment data. We found that IOBS's program site in New Mexico, which had the longest program implementation experience, had lower cost of care and ACS hospitalizations compared to other sites. In future reports, we will examine whether these differences persist after other program sites also gain implementation experience. Finally, we will work with IOBS to understand differences between patients enrolled in their treatment and triage pathways, which might be contributing to difference in cost of care.

Overall, caution should be used in interpreting the quantitative finding presented here. They include information from only the early stages of implementation when IOBS was still refining and ramping up its implementation. More follow-up time and a more thorough understanding from our qualitative data of the key factors related to participant selection and implementation are necessary before drawing any conclusions about the impact of the awardee program on health, quality of care, and utilization and cost measures.

Over the next year, we plan to expand the scope of our evaluation to bring in data for the period prior to a patients enrollment in IOBS's program. This will allow us to see if the COME HOME program changed health, quality, and utilization outcomes for the patients treated by IOBS. Even with information on the patient experiences before joining the COME HOME program, we will not have enough information to draw conclusions about the effectiveness of the COME HOME program. Thus, future reports will also include data for a comparison group of patients with cancer not enrolled in IOBS's program. This will allow us to test the impact of the COME HOME program as compared to usual care. Finally, future reports will include additional measures of program effectiveness relevant to understanding the impact of the IOBS program.

## Qualitative Results

In addition to performing a claims-based quantitative analysis, we gathered data during our site visit by speaking with patients enrolled in the COME HOME program as well as providers about their outcomes and experiences. Below we summarize initial findings.

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<sup>80</sup> Regression to the mean would occur if patients newly diagnosed with cancer have higher utilization and costs in the months proximal to their date of diagnosis, and lower utilization and costs thereafter.

**Participant outcomes and experiences with intervention.** Staff at NMCC have provided anecdotal stories of increased quality of life, prolonged life, and participants' lives saved due to the COME HOME model. Accessibility of the practice has led to quick decision-making by triage nurses and other providers, as well as better coordinated care. Patients noted extremely positive experiences with the care provided at NMCC and indicated that the approach to care was unlike any they had received in the past. Patients are able to call the triage line or come into their clinic whenever they need to without waiting, as they would typically have to do in a hospital ER setting. Not only do patients feel that the triage line is helpful for getting their needs met, but it also provides a sense of security that the practice is ready and available when they need it. One caregiver said of the triage line,

*“We haven't had to use it, but the fact that it is there is a big relief.”*

According to patients, the COME HOME practice does not feel like going to a typical doctor's office; they are treated with respect and dignity rather than being treated like any other standard patient. Patients appreciate that efficiency and the flexibility of the system. One patient stated,

*“Somehow there's a flexibility built into the system. ... If I come in and I have a new problem or something, they're able to quickly move on it.”*

In addition, the COME HOME model gives patients confidence that they will receive the care that they need, even if their regular doctor or nurse happens to be unavailable at a given time. One enthusiastic patient noted that he has consistently been able to see the same doctors and nurses throughout his time at NMCC so far. What's more, he is confident that even if they weren't available, he would still be taken care of. This patient said,

*“The way everything else works, I expect if I suddenly come up with something different that they need a different kind of a doctor, he'll pop up out of the waste basket.”*

Patients appreciate the extended and weekend hours, as it allows them to manage their schedules without having to modify their lives based on their cancer treatment. One caregiver noted that his father has several health issues beyond his cancer, and other providers are not nearly as flexible in scheduling their appointments. The ability to come to the NMCC clinic during extended and weekend hours have been invaluable to him and his father because

*They “don't have to shuffle everything around just for this disease.”*

This means that patients generally feel an improved quality of life because not only do they feel that they are receiving better care, but they are able to live without cancer treatment constantly dictating day-to-day activities.

One patient has experienced care at NMCC in two ways—20 years ago his wife received treatment at NMCC before COME HOME, and now he himself is a cancer patient at NMCC. He originally came to NMCC for a second opinion but was so impressed with the communication and operations at NMCC that he switched from his previous practice. He feels that the NMCC care now with the COME HOME model is even better than what he experienced with his wife's treatment as well as his own treatment prior to becoming a COME HOME patient.

Program staff also reported that patients are very happy with the program so far because they are able to see a provider immediately. The structure of the triage pathways also makes it such that all patients benefit from time saved. The time savings are a result of the fact that COME HOME practices have mid-level providers (e.g., physician assistants) who are on call and have open schedules, giving them the flexibility to see patients with acute needs or to step in if physicians must attend to someone else urgently. Thus, all patients continue receiving the care that they need without having their schedules disrupted. The broader and deeper impact of the COME HOME model, however, is its role in lengthening patients' lives.

Although the IOBS practices are all implementing the core components of the COME HOME model, outcomes will likely differ based on organizational and structural factors at the different sites. It will be important to visit other COME HOME practices in addition to NMCC to learn about different patient outcomes and experiences.

### Workforce Development and Deployment

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IOBS's COME HOME model is staffed by existing providers and staff at each of the seven practices as well as by new hires funded by the CMMI award. The innovation at IOBS uses a combination of clinical staff and staff without clinical degrees or credentials. Across the seven sites through March 2014, IOBS employs 44 clinical support staff, 49 management and administrative staff, and 67 triage nurses (including 52 RNs and 15 LPNs).

**Triage nurses and first responders.** HCIA-funded staff for the triage pathway component of IOBS' innovation includes first responders (i.e., phone operators) and triage nurses. When a participant calls in about a symptom, it is the first responder's job to enter the call into the triage dashboard in the COME HOME system and then route the call to the triage nurses. A medical background or experience in a health care setting is helpful but not required for first responders. Triage nurses must have medical credentials (e.g., RN or LPN), as they are responsible for managing patients' calls as well as patient walk-ins.

**Patient care coordinators (PCCs) and medical administrative assistants.** The PCCs help nurses and physicians manage participants and coordinate their care, while the medical administrative assistants assist physicians with scheduling appointments and ordering. Similar to the first responders, the PCC and medical administrative assistant positions do not require medical credentials or experience, although some education or experience in a health care setting may be helpful.

**Physicians and mid-level providers.** At COME HOME practices, physicians and mid-level providers are responsible for carrying out the treatment pathways. Most physicians at the practices are medical oncologists. All physicians are trained on the treatment pathways and documenting the use of COME HOME pathways in their practice's EHR systems. In addition, some physicians and mid-level providers (e.g., nurse practitioners, physician assistants) assist with staffing during extended and weekend hours. Finally, physicians, along with all other staff, are also trained on the overall COME HOME model.

**Support staff.** Data analysts and a training specialist help support implementation of the COME HOME model. Each COME HOME practice has a data analyst to assist in managing the data necessary for measuring the outcomes associated with the IOBS innovation. IOBS also employs a program-wide data

manager who coordinates with the analysts at each site and assists in data collection and reporting process. These individuals are trained on the overall COME HOME program but are not required to have any specific medical credentials. A full-time training specialist is available as a resource to all practices. Training for staff is primarily related to topics relevant to their work, including how to use the triage software (Coming Home), practice-specific EHR systems, and the triage process.

Both clinical and support staff at COME HOME practices play a role in increasing patient access to the practice. In order to provide the extended and weekend hours component of the intervention, some practices have hired additional staff. Multiple mid-level providers are available throughout the day to take same-day appointments so that physicians do not have to alter their schedules. NMCC even hired a retired ER physician to manage the first responders, triage nurses, and other providers that work during the extended hours.

## Context

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Throughout the implementation process and progress of the COME HOME program so far, IOBS has encountered several endogenous and exogenous contextual factors.

### Endogenous Factors

Strong physician and organizational leadership are critical in the culture change necessary to transition to an oncology medical home. While implementing the initial model at NMCC, IOBS learned that a strong physician champion is necessary for on-boarding practice staff and carrying out the work to put the model in place. Although IOBS has not noted any significant barriers with regard to internal physician resistance to the model, strong leadership and staff willingness to embrace changes in their approach to care are two elements that should be considered with respect to program replicability.

Another practice-level factor is prior staff experience with EHR systems. This familiarity with the EHR systems, as well as the EHR systems themselves, facilitated implementation and helped monitor compliance with pathways. This, in turn, allowed IOBS leadership to make necessary course adjustments in the event of non-compliance. Given COME HOME staff's previous experience with EHRs before its participation in the innovation, it would be challenging to replicate the COME HOME program in its current state at a practice that is not already using EHRs.

### Exogenous Factors

IOBS faces competition from local hospitals. One particular hospital in Albuquerque has expressed interest in purchasing NMCC; however, NMCC leadership was concerned that being hospital-owned would not allow NMCC provide the kind of care they currently provide at a lower cost. A 2009 NMCC data analysis estimated that that providing care in the community oncology setting rather than in a hospital saved millions of dollars. The local hospital, which also has its own health insurance plan, was unhappy with this information because they felt that these savings came at a loss to the hospital. Local health care market dynamics may pose further challenges in the future as IOBS tries to build up its program and work toward sustainability.

Sustainability of the COME HOME model after the award ends will be a challenge. Without additional funding, it may be extremely difficult for practices to maintain the extended hours and other key elements of the COME HOME model. IOBS' goal is to be able to set up a bundled payment structure in order to continue funding the COME HOME model. However, insurers have expressed that although they like the ideas of the COME HOME model and they like that it keeps patients out of ERs and hospitals, they do not want to pay for it. The practices so far do not have the insurance reserves to set up this structure without knowing that the system is going to work, and insurers are unwilling to make the financial investment without seeing proven outcomes. IOBS is seeking additional funding to be able to conduct intensive actuarial data analysis to demonstrate cost savings including testing a virtual bundled payment system simultaneously with the fee-for-service model in order to compare the two options.

## Summary

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IOBS has developed the COME HOME model to provide comprehensive outpatient oncology care through two mechanisms: (1) treatment pathways that provide consistent disease management guidance and (2) triage pathways for triage nurses to identify and manage patient symptoms as they access the practice on a 24/7 basis. The program focuses on team-based care and aims to improve the timeliness and appropriateness of care, reduce unnecessary testing, and reduce avoidable ED visits and hospitalizations. IOBS' triage pathways and triage nurses are one of the main components of their intervention, helping clinic staff determine the urgency of a patient's concern and how it can best be handled and then guiding the patient through the next steps in their care.

IOBS is implementing the COME HOME model at seven practices throughout the country, including New Mexico Cancer Center, which was built with the model in mind. Because each site has a unique culture and structure, practices can alter the COME HOME model to fit their specific needs so long as core functions of the model are maintained. IOBS has identified strong physician leadership within each practice to be an important facilitator of the program's progress. Although the flexibility of the model and strong physician leadership have facilitated implementation so far, IOBS has faced some challenges such as collecting and standardizing data from the different practices and challenges with regards to patient engagement.

Preliminary claims analysis from the first three quarters of IOBS's program found that longer length of enrollment in the IOBS COME HOME program was associated with both lower cost of care and lower rates of hospitalizations. Medicare beneficiaries with longer lengths of enrollment also had lower point estimates for ED visits and ACS hospitalizations. We also found that among beneficiaries enrolled in the program, those with unknown cancer diagnoses had lower cost of care compared to those with specific or multiple cancer diagnoses (with the exception of breast cancer).

The challenges that IOBS has faced and the progress that it has made so far will be helpful for informing the program's sustainability plans, as well as the replicability of the model at additional sites. Sustainability of the COME HOME model after the Innovation Award ends will be a challenge because without additional funding, it may be extremely difficult for practices to maintain the extended hours and other key elements of the COME HOME model. Because some important components of the program vary across different sites, there may be questions as to how replicable the program will be at an even wider variety of sites.

There are several topics that warrant further investigation during the second year of the evaluation, including:

- how the implementation of the COME HOME model has varied across sites;
- challenges to program replicability;
- how IOBS has made steps toward sustainability; and
- provider/ hospital relationships with IOBS;

Continued research and communication with the awardee on these topics will help to better inform the evaluation of IOBS in order to determine the potential for replicability and scalability of the intervention, as well as how the program itself is serving its immediate patients currently in its program.

## Joslin Diabetes Center, Inc.

This report presents our evaluation of the Joslin Diabetes Center, Inc. (Joslin) On the Road (OTR) program.

We provide preliminary observations about the program based on a review of the awardee’s application, operational plan, and quarterly reports as well as telephone interviews with the awardee and site visits conducted on May 12 (Washington, DC), May 27 (Pennsylvania), and June 19–20 (New Mexico), 2014. At the time this report was written, we had not conducted an interview with the Joslin leadership and management team. While this report presents themes that we have identified during the first year of the evaluation, it is important to note that our findings are tentative at this point, as we have not completed all of our data collection, coded site visit data, or fully analyzed the data collected to date. We look forward to providing more definitive findings and results for future reports.

<b>Program Title</b>	<b>On the Road</b>
<b>Targeted Disease/Condition</b>	<b>Diabetes, Pre-Diabetes</b>
<b>Total Amount Awarded</b>	\$4,967,276.00
<b>Description of Target Population</b>	Adults with diabetes or who are at high risk for diabetes and their interested friends and/or family members.
<b>Description of the Awardee Organization</b>	Joslin Diabetes Center, Inc. is a diabetes research and clinical care organization affiliated with the Harvard Medical School in Boston, Massachusetts. The center focuses on type 1 and type 2 diabetes research, clinical care, education, and awareness.
<b>Setting of Intervention</b>	The innovation program is delivered by New Mexico State University Extension Office in southern New Mexico in and near Las Cruces, New Mexico; Pennsylvania State University Extension Offices in 67 counties across Pennsylvania; and On the Road staff at Providence Hospital in Washington, DC. The program conducts education sessions at sites in each of the communities served.
<b>Overview of Intervention</b>	The goal of the On the Road program is to demonstrate that training instructors <sup>81</sup> can deliver Joslin’s well-established, community-based series of health and lifestyle information sessions to improve key biomarkers and demonstrate participant reengagement with the health care system—all reducing medical costs. The focus of the classes is on key diabetes information and tests, nutrition, and exercise.

### Introduction

Diabetes poses significant health threats and cost burdens. In 2012, the estimated cost of diabetes was \$245 billion.<sup>82</sup> Diabetes dramatically increases individuals’ risk of dying from heart disease and is the leading cause of new cases of blindness among adults ages 20–74 and of new cases of kidney failure.<sup>83</sup>

<sup>81</sup> “Community health advocates” is the workforce title currently used by the Joslin Diabetes Center since its instructors are not required to obtain a third-party certification. However, each site has a different title for its instructors. In Pennsylvania, they are called “Extension Educators”; in New Mexico, they are called “Promotoras” or “Ben Archer Educators”; and in DC, they are called “Community Health Workers (CHWs).”

<sup>82</sup> Economic costs of diabetes in the US in 2012. American Diabetes Association. *Diabetes Care*. Alexandria, VA: American Diabetes Association; 2013.

<sup>83</sup> Fast facts: Data and statistics about diabetes. American Diabetes Association Web site.

<http://professional.diabetes.org/admin/UserFiles/0%20-%20Sean/FastFacts%20March%202013.pdf>. Published 2013. Accessed November 2, 2014.

The need to respond to the increasing cost and disease burden of diabetes is clear; researchers have estimated that, based on current trends, one in three U.S. adults could have diabetes by 2050.<sup>84</sup> Joslin has cited a number of studies to explain OTR's emphasis on the management of glucose levels and blood pressure as a means of reducing the risk of diabetes-related complications.

The Joslin Diabetes Center is a nonprofit research and clinical care organization affiliated with the Harvard Medical School in Boston, Massachusetts. The center focuses on type 1 and type 2 diabetes research, clinical care, education, and awareness. Joslin developed the OTR program in 2000 with funding from a USDA National Institute of Food and Agriculture (NIFA) grant and partnerships with Cooperative Extension Services (Extension) in land-grant universities that are NIFA agents in Pennsylvania, New Mexico, Hawaii, West Virginia, and Washington state. These agents are organized at the county level and implement community programming on agriculture, the home, and the environment. The agents' focus on extending university health education resources to counties made them an ideal partner to implement OTR's community-based group diabetes education and point-of-care testing. When the USDA funding ended in 2011, Joslin applied for the Health Care Innovation Award (HCIA). The HCIA funding allowed Joslin to continue to serve a mostly rural, older white population in Pennsylvania and a younger suburban Latino population in New Mexico. The funding also allowed Joslin to add the DC Providence Hospital site to introduce the program to a non-NIFA Extension agent medical care institution that was in the process of establishing an affiliate Joslin Diabetes Center to target an urban African-American population. This diverse group of partners and target populations results in some variations in class content and materials, recruitment, and staffing across sites.

### Innovation Components

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The OTR program partners with university extension offices and a hospital to deliver community-based group diabetes education and hemoglobin A1c and blood pressure point-of-care testing by Joslin-trained educators. While Joslin provides general program requirements, a curriculum, and class materials, each site has a fair amount of implementation discretion.

**Recruitment.** Joslin does not have a standardized protocol for recruitment. Each site's OTR program staff is responsible for recruiting community members to participate in the classes. In DC, the community health advocates (CHAs) recruit participants by posting and handing out flyers at community centers, churches, and apartment buildings. More interactive approaches include presenting at a community event or nursing home lunch and approaching people on the street. Speaking to existing groups ahead of time has proven to be a more successful strategy than distributing flyers. In Pennsylvania, the staff can use Extension assistants to help with recruitment and to submit advertisements to local newspapers as a key recruitment strategy. In New Mexico, the Ben Archer educators contact patients from their clinic's individual diabetes education referral list. The community-based *promotoras* rely on word of mouth and will sometimes go door-to-door to recruit participants for the program.

While the program manager at the DC site is heavily involved in supporting the CHAs' recruitment efforts, the program manager at the New Mexico site provides little support since the *promotoras'* pay depends on the number of participants they are able to recruit.

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<sup>84</sup> Ibid.

**Setting.** Most programming is held in community centers, churches, apartment complexes, hospitals, and senior-living communities. In New Mexico, there is little public space or public transportation available; *promotoras* have hosted classes in their own homes or in participants’ homes.

**Education and testing.** Although the sites can mold the curriculum to their target population, there is a basic structure they must follow (see table below).

OTR Session	OTR Session Activities
Baseline	<ul style="list-style-type: none"> <li>■ baseline questionnaire</li> <li>■ hemoglobin A1c testing</li> <li>■ blood pressure testing</li> <li>■ program overview</li> <li>■ introduction of important diabetes medical tests</li> </ul>
Two to Four Weekly Content Sessions	<ul style="list-style-type: none"> <li>■ educational sessions delivered by an instructor on diabetes, nutrition, and physical activity</li> </ul>
<b>Three Months of <u>No</u> OTR Sessions</b>	
Follow-up	<ul style="list-style-type: none"> <li>■ follow-up questionnaire</li> <li>■ hemoglobin A1c testing</li> <li>■ blood pressure testing</li> <li>■ review of program content and key diabetes medical tests</li> </ul>

Instructors provide small gifts for participants at each session (e.g., pedometers, exercise bands, and lunchboxes) to encourage them to make lifestyle changes and come back to the educational and follow-up sessions.

Joslin provides instructors with an OTR manual for training and a roadmap for future program delivery, as well as English and Spanish versions of booklets, PowerPoint presentations, paper food models, nutrition and activity reference books, and flip charts for the program sessions. Joslin also provides all necessary supplies for point-of-care A1C and blood pressure testing. The Joslin administrative site and each intervention site communicate regularly to share challenges and best practices.

**Incentives.** Joslin pays each site \$200 for each baseline participant and an additional \$100 for each participant that comes back for follow-up. They use this incentive to test a model for reimbursing community-based education through Medicare. Providence Hospital is still in the process of developing a plan for using these funds. As of May 2014, Providence is considering using the incentive payments for strategic initiatives such as renovating clinics, seed funds for new faculty practices in endocrinology, or new equipment for the OTR program. The New Mexico site uses these funds to compensate the *promotoras*. Because the *promotoras*’ pay depends on how many participants they recruit to the OTR program, there is a strong incentive for them to recruit as many participants as possible.

## Target Population and Program Participants

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Joslin’s intervention targets people with diabetes or people who are at high risk for diabetes and their interested friends and/or family members residing in a 20–30 mile radius around Las Cruces, New Mexico; 67 counties in Pennsylvania; and Washington, DC. Participants must be 18 years of age or older.<sup>85</sup> The table below shows combined demographic information for Q7 participants at all Joslin sites.

**Participant characteristics.** About half of OTR participants have diabetes; the other half are made up of participants who either are at high risk of developing diabetes, care for someone with diabetes, or are interested in learning more about preventing the disease. A Joslin summary of baseline data through December 2013 shows that approximately three-quarters of participants at each site are female.

The New Mexico population is mostly Hispanic and does not have diabetes. It is also the youngest population. Most participants live in rural or suburban areas and have no health insurance.

The Pennsylvania population is mostly rural, older, and white. The majority of the Pennsylvania participants are insured by Medicare. The Pennsylvania State University site is the only site that has a registration fee and online enrollment protocol. If the prospective participant is insured by Medicare or Medicaid, the participant can turn the registration fee into his or her provider and the class is free, but if the participant is uninsured or has private insurance, there is a fee. Participants must register through an online Pennsylvania State Extension portal at least three weeks in advance of the class start date.

The Washington, DC, population is urban, older, and African American. Most participants are insured by Medicaid or Medicare.

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<sup>85</sup> Exclusion criteria are systolic blood pressure > 180 or diastolic blood pressure > 100; regular use of a cane or walker; inability to walk due to musculoskeletal problems; chest pain the previous week; heart attack, angioplasty, or heart surgery in the previous three months; resting heart rate less than 50 beats per minute or greater than 100 beats per minute; and/or doctor has told participant not to exercise.

Demographic Information	Jan–March 2014 Patient Count	Jan–March 2014 Patient Count		Jan–March 2014 Patient Count	Jan–March 2014 Patient Count
<b>Sex</b>	<b>#</b>	<b>%</b>	<b>Age (Years)</b>	<b>#</b>	<b>%</b>
Male	115	25.2%	Elderly: >75	97	21.2%
Female	327	71.6%	Elderly: 65–74	173	37.9%
Unknown	15	3.3%	Adults: 26–64	164	35.9%
			Young Adults: 19–25	9	2.0%
			Adolescents: 12–18	1	0.2%
			Unknown	13	2.8%
<b>Race/Ethnicity</b>	<b>#</b>	<b>%</b>	<b>Insurance Type</b>	<b>#</b>	<b>%</b>
Black/African American	135	29.5%	Medicaid	68	14.9%
Hispanic or Latino	35	7.7%	Medicare (FFS/Unspecified)	145	31.7%
Asian	2	0.4%	Medicare Advantage	70	15.3%
White	259	56.7%	Dually Eligible	42	9.2%
Two or More Races/Ethnicities	11	2.4%	Private/Commercial	68	14.9%
American Indian/Alaska Native	3	0.7%	Uninsured	27	5.9%
Unknown	12	2.6%	Unknown	37	8.1%

Source: HCIA 7QR Awardee Performance Report. Reflects unique count of quarterly direct program participants.

**Identification method.** Site-based program managers and/or instructors conduct community outreach to recruit participants. Recruitment efforts are not informed by population data. Program administrators trust the instructors to understand the local communities and their needs well enough to make targeting decisions.

### Implementation Effectiveness

Joslin’s operational plan was approved on September 4, 2012. The program began in October 2012 at the Pennsylvania State University site; on January 30, 2013, at the New Mexico State University site; and on March 31, 2013, at the DC site. Because the DC site had never implemented the OTR program before the HCIA program, it took longer to hire and train new staff and establish the relationships necessary to recruit participants and schedule classes.

A number of instructors across sites noted difficulties in recruiting participants and finding reliable sites to conduct classes. A primary concern was the amount of time it takes to successfully recruit participants and coordinate with class sites. Although both New Mexico and Pennsylvania reported high retention rates among recruited participants, DC CHAs identified retention as a barrier to success. The DC CHAs suggested that the root of the issue could be that participants come to the first class to get their blood pressure and hemoglobin A1c screening free of charge but are not interested in attending the sessions focused on education. Other DC program staff did not identify retention as an issue. Culturally fluent and well-trained instructors establish strong rapport with participants, which helps instructors to successfully communicate course content. Areas that successfully bring participants to sessions include testing for hemoglobin A1c and blood pressure and participants’ desire to know and improve test scores, all of which facilitates diabetes education.

One of the goals of the OTR program is to present simple, easy-to-remember information about diabetes, key tests, nutrition, and exercise. However, there appeared to be great variation in the length of the sessions, the level of detail presented, and ergonomics and format of the materials used. For example, the Pennsylvania State University site offered two hour-long sessions and supplemented the Joslin teaching materials with PowerPoint presentations that provided more detailed information about nutrition. The New Mexico sessions were about an hour, and one of the instructors also supplemented the classes with information about foot care because she felt that the curriculum could be more in-depth in this area. Although the DC site adhered closely to the curriculum, they used large pieces of white paper to highlight key information instead of using the flip charts that Joslin provided.

While the impact of the level of detail on participants is unclear, staff at one site shared that they felt the program needed more in-depth materials than what was available through Joslin, while staff at another site noted that participants benefited from learning simple and repeated key content. The fact that one site created additional materials and expanded the curriculum but has not shared this with other sites seems like a missed opportunity. Sites could discuss what combination of and presentation of material they believe can be optimally digested by participants to improve the Joslin curriculum.

Even though Joslin is unable to address exogenous factors influencing program success, the sites have taken active steps to address certain barriers and challenges. Although sites reported difficulty finding suitable locations for classes, instructors have overcome this challenge through persistent and constant in-person and telephone outreach to community organizations. Furthermore, instructors have overcome recruitment challenges by recruiting participants at events arranged by other community organizations. Although some instructors who are not experts in diet and nutrition may struggle to answer more complex questions about nutrition, some sites employ instructors with professional degrees in nutrition and diet, enabling them to better present complex nutrition content.

Finally, the way in which instructors present the content, focusing on the many options available to people with diabetes rather than the limitations the disease imposes, resonates with participants. Many participants highlighted this component of the classes, indicating that it enables them to change behaviors.

## Program Effectiveness

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Our evaluation of the program's effectiveness will focus on quantitative and qualitative analysis as described below.

### Quantitative Results

Our evaluation of program effectiveness of the Joslin program will be based largely on quantitative data, and we continue to work with the Joslin team and its partners to put the necessary agreements in place to receive data to support our evaluation. Once finalized, we will use the data provided by Joslin and its partners to assess the program's impact on measures of health, quality of care, and utilization and costs for the Medicare and Medicaid populations served by the Joslin OTR program.

## Qualitative Results

Our qualitative findings of program effectiveness for the Joslin program will be based largely on analysis of data collected during our site visit, including discussions with staff and patients and observations of the program. At the time of this report, we had not yet conducted the analysis of this data and will therefore present the results of this analysis in a future report.

## Workforce Development and Deployment

### General Workforce Titles and Qualifications by Site

Site	Instructor Title	General Qualifications
Pennsylvania	Extension Educators	Primarily registered dietitians, nutritionists, or educators who have taught classes for the PSU Extension offices for years
Washington, DC	Community Health Advocates	Health- or social work–related bachelor’s degree
New Mexico	Ben Archer Educators	Training from Ben Archer in health education
New Mexico	<i>Promotoras</i>	Experience as a <i>promotora</i>

**The Pennsylvania State University site** relies on Pennsylvania State University (PSU) Extension Health Educators across 67 counties to implement the OTR program. Many of the Extension Educators had been implementing OTR for a number of years prior to the Innovation Award funding. The two educators we spoke to during the site visit, and many other PSU OTR educators, are experienced registered dietitians and spend about 50–100% of their time as educators for OTR. All of the educators have a background in health and/or education. Because PSU has a network of Extension offices with nutrition, diet, and health workers that implement lifestyle programming in each Pennsylvania county, the existing workforce was educated, experienced, and connected to their communities; as a result, it was ready to implement OTR with little training. One educator reported that recruitment and finding venues was her responsibility; another reported that she has an assistant that helps with recruitment.

**The Providence Hospital site** created its OTR workforce of a program manager and three CHAs with HCIA funding. Two CHAs work full time on OTR, and one works part time. The DC program manager works full time and has a master’s degree in public health and extensive experience implementing community health programs in DC. Before her role within OTR, she established strong ties with community organizations that have helped her partner with successful class sites. She is responsible for coordinating CHAs’ schedules, ordering incentives, collecting questionnaires, and entering and sharing data with Joslin. She also acts as a liaison between the OTR program and the Joslin Diabetes Center at Providence Hospital.

CHAs are young professionals with a health- or social work–related bachelor’s degree, a contrast to the highly experienced Pennsylvania CHAs. During the site visit, one program administrator noted that a key lesson learned is the ability of the CHAs to teach so much with relatively limited training. In addition to teaching the classes, the CHAs travel to local community events and promising locations (e.g., apartment buildings) to look for partners to host the classes. Once the partner is on board, they are expected to do most of the recruiting. The DC workforce shared that the administrative tasks were burdensome. They could use an additional part-time person who is not a CHA to reach out to sites, send out reminders, organize schedules, mail data to Joslin, and order supplies.

**The New Mexico State University site** has two sources for its workforce. The first is health educators who work for a local chain of community health centers, Ben Archer Health Centers. A number of the educators were implementing the OTR program before the Innovation Award. Most of these health educators do not have college degrees but were trained by Ben Archer to provide one-on-one diabetes education for patients. These health educators use their patient referral list to recruit class participants and are not compensated by New Mexico State University (NMSU) or Joslin. The second is community-based *promotoras* who were recruited after the Innovation Award and are not connected to Ben Archer. Before the *promotoras* were hired, home economists employed by NMSU Cooperative Extension were teaching the diabetes classes. However, program leadership observed that this model was not yielding enough participants and that retention was low. The *promotora* model has proven to be much more successful, largely because the *promotoras* had already built rapport in the communities and their investment in implementing the program is strong. The *promotoras* are hired as contractors and paid in proportion to their recruiting success.

**Training.** Joslin and each site's program management trains instructors to deliver a well-established community-based series of health and lifestyle information classes. Instructors must gain the required skills to deliver information about diabetes, nutrition, and physical activity and to perform point-of-care hemoglobin A1c and blood pressure tests. The training focuses on key diabetes, nutrition, and exercise information; administering the questionnaires and hemoglobin A1c and blood pressure tests; and fielding common questions. The DC staff and *promotoras* received the most training sessions since they were new to OTR. Joslin does not require the instructors to complete any certification requirements and, as a result, calls the instructors community health advocates. Although each site's instructors implement the same program, the background, recruitment, and payment of each site's workforce is different.

## Context

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Below we discuss some of the contextual barriers and facilitators Joslin has encountered in the implementation of the OTR program.

### Endogenous Factors

Implementation at Providence Hospital was supported by a broader hospital initiative to focus on diabetes care and open an affiliate Joslin Diabetes Center. Contracting with Joslin allowed Providence Hospital to take advantage of Joslin's existing resources for community outreach and, as a result, attract more patients. In addition, PSU's Extension Office mobilized its existing resources, partnerships, and internal expertise to expand the curriculum of OTR. For example, PSU is able to provide in-depth nutrition content and cooking demonstrations because many of the classes are taught by Extension Office nutritionists or dietitians. NMSU's relationship with Ben Archer Health Centers allows them to implement OTR in health centers in and around Las Cruces without additional instructor staffing costs.

Although linking *promotora* payment to recruitment can incentivize community health advocates to recruit participants, it can be difficult to find qualified instructors who are willing to embrace a flexible and uncertain pay schedule.

## Exogenous Factors

A number of instructors noted difficulties in recruiting participants and finding reliable sites to conduct classes. A primary concern was the time it takes to recruit participants and coordinate with class sites. Although both New Mexico and Pennsylvania reported high retention rates among participants, DC CHAs identified retention as a barrier to success. The DC CHAs suggested that the root of the issue could be that participants come to the first class to receive free blood pressure and HbA1c screening but are not interested in attending the educational sessions. Other DC program staff did not identify retention as an issue.

Instructors at all sites shared that participants have difficulty accessing or affording healthy food and, as a result, have trouble applying the information they learn in OTR. Also, some participants reported that safety concerns and harsh weather make exercise difficult. Despite these challenges, many participants commented that educators were very flexible in coming up with alternatives and suggestions that fit their specific needs.

## Summary

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Joslin's On the Road (OTR) program is a community-based group for diabetes education and testing intervention that targets adults with diabetes and their interested friends and family. The OTR program includes a baseline session, two to four weekly sessions, and a three-month follow-up session. The sessions cover nutrition, exercise, and key information about diabetes and important diabetes tests. Joslin designed the program to help participants understand the connection between diet and exercise and key diabetes biomarkers and, in turn, improve those biomarkers, reengage participants in the health care system, and reduce medical costs. Classes are typically held in community centers, churches, apartment complexes, hospitals, and senior living communities.

Joslin used the Innovation Award to continue its OTR program in partnership with New Mexico State University's and Pennsylvania State University's Cooperative Extension Offices and to implement the program in partnership with Providence Hospital in Washington, DC. Because Joslin provides sites with implementation discretion and sites have varying resources and target populations, each site has unique staffing models and approaches to the OTR curriculum. Recruitment is a key component of the program, and each site's understanding of its target population has been key to recruiting and retaining participants. Although the program's curriculum and training is designed to be implemented by instructors with a range of credentials and experience, an instructor's background appears to influence the content and format of the classes and the ability of the instructor to answer participants' questions.

There are several topics that warrant further investigation during the second year of the evaluation, including:

- the use of different recruitment practices across the sites
- retention challenges
- how variations in site staffing models, resources, and program materials influence program effectiveness and health outcomes

Continued research and communication with the awardee on these topics will help to better inform the evaluation of Joslin in order to determine the potential for replicability and scalability of the intervention, as well as how the program itself is serving current program participants.

## Le Bonheur Community Health and Well Being

This report presents our evaluation of the Le Bonheur Community Health and Well Being (Le Bonheur) Changing High Risk Asthma in Memphis through Partnership (CHAMP) program.

We provide preliminary observations about the program based on a review of the awardee’s application, operational plan, and quarterly reports as well as telephone interviews with the awardee and a site visit conducted May 27–28, 2014. While this report presents themes that we have identified during the first year of the evaluation, it is important to note that our findings are tentative at this point, as we have not completed all of our data collection, coded site visit data, or fully analyzed the data collected to date. We look forward to providing more definitive findings and results in subsequent reports.

<b>Program Title</b>	<b>Changing High-Risk Asthma in Memphis through Partnership (CHAMP)</b>
<b>Targeted Disease/ Condition</b>	<b>Pediatric Asthma</b>
<b>Total Amount Awarded</b>	\$4,040,657
<b>Description of Target Population</b>	Individuals who are high-risk pediatric asthma patients between 2 and 18 years old and who live in Memphis or Shelby County, Tennessee.
<b>Description of Awardee Organization</b>	The awardee is the Division of Community Health and Well Being of the Le Bonheur Children’s Hospital in Memphis, Tennessee.
<b>Setting of Intervention</b>	The HCIA intervention is delivered through a clinical setting at Le Bonheur’s Children Hospital and in community-based settings in Memphis and Shelby County, Tennessee.
<b>Overview of Intervention</b>	Le Bonheur’s CHAMP program includes an inter-agency asthma collaborative and a focus on care management throughout the intervention. Le Bonheur has developed a pediatric asthma registry to inform evidence-based treatment. Asthma specialists develop a care plan for participants after their initial visit to the CHAMP clinic. Asthma care coordinators and community health workers enroll participants in the registry, orient caregivers, check home conditions, and encourage medication adherence.

### Introduction

In 2011, the Task Force on Community Preventive Services released recommendations to decrease asthma morbidity for children and adolescents with asthma through “home-based, multi-trigger, multicomponent interventions with an environmental focus.”<sup>86</sup> These interventions typically involve home visits, identification and assessment of asthma triggers in the home environment, and education about asthma and self-management, all key features of Le Bonheur Children Hospital’s CHAMP program.

Evidence surrounding successful pediatric asthma home-visiting programs emphasizes the importance of assisting clients in managing social stressors that may overshadow asthma as a concern.<sup>87</sup> For example,

<sup>86</sup> Recommendations from the Task Force on Community Preventive Services to decrease asthma morbidity through home-based, multi-trigger, multicomponent interventions. Task Force on Community Preventive Services. *American Journal of Preventive Medicine*. 2011; 41(2S1): S1-S4.

<sup>87</sup> Krieger J, Philby M, Brooks M. Better home visits for asthma: Lessons learned from the Seattle–King County Asthma Program. *American Journal of Preventive Medicine*. 2011; 41(2S1): S48-S51.

the United States Environmental Protection Agency notes that social service referrals can be critical in ensuring the success of a home-visiting program among low-income populations.<sup>88</sup> Recognizing the importance of addressing the social factors that influence high-risk asthma, the CHAMP leadership team focused on building a workforce of community health workers (CHWs) who could help participants overcome resource barriers and psychosocial issues.

All CHAMP program participants must attend an initial visit at the CHAMP asthma clinic to receive critical components of the intervention, including comprehensive asthma education and an asthma action plan. This approach is supported by the findings of a National Heart, Lung, and Blood Institute (NHLBI) expert panel that released comprehensive guidelines for the diagnosis and management of asthma. The panel recommends establishing and maintaining partnerships between patients and clinicians to encourage successful asthma management. The panel further suggests that clinicians should provide basic asthma education and develop a written asthma action plan for each patient.<sup>89</sup> As described below, Le Bonheur employs a nurse and a respiratory therapist, who are also certified asthma educators, to provide self-management education to participants in the CHAMP clinic.

The principal investigator of the CHAMP program based another key component of the intervention, the participant asthma registry, on the Cambridge Health Alliance's Childhood Asthma Registry. The Cambridge Health Alliance developed its web-based registry to assist providers and school nurses in managing pediatric asthma. The registry incorporates guidelines from the NHLBI and is linked to the patient's electronic health record. The program evaluation found that the registry reduced asthma-related inpatient admissions and emergency department visits among pediatric patients and led to significant cost savings.<sup>90</sup>

The CHAMP program award is housed within the Division of Community Health and Well Being at Le Bonheur's Children Hospital. Before implementing the CHAMP intervention, Le Bonheur had participated in several home-visiting programs, including Healthy Families America and Nurse-Family Partnership, but had not used lay CHWs for these programs. In developing the CHAMP program, the leadership chose to include asthma-specific home visits in order to conduct more effective disease management.

## Innovation Components

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The CHAMP program is a comprehensive community-based care model designed to “close the loop” in the continuum of care for pediatric asthma patients in the City of Memphis and Shelby County, Tennessee. Several different providers can refer patients to the CHAMP program, including primary care physicians (PCPs) in the community and medical staff at Le Bonheur (e.g., allergists, immunologists, and

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<sup>88</sup> Implementing an asthma home visit program: 10 steps to help health plans get started. United States Environmental Protection Agency Web site. [http://www.epa.gov/asthma/pdfs/implementing\\_an\\_asthma\\_home\\_visit\\_program.pdf](http://www.epa.gov/asthma/pdfs/implementing_an_asthma_home_visit_program.pdf). Published 2005. Accessed November 2, 2014.

<sup>89</sup> National Asthma Education and Prevention Program. Expert Panel 3: Guidelines for the diagnosis and management of asthma. National Heart, Lung and Blood Institute Web site. <http://www.ncbi.nlm.nih.gov/books/NBK7232/pdf/TOC.pdf>. Published 2007. Accessed November 2, 2014.

<sup>90</sup> Registry assists physicians and school nurses in managing childhood asthma, leading to fewer inpatient admissions and emergency department visits. Rockville, MD: Agency for Healthcare Research and Quality; 2013. <http://www.innovations.ahrq.gov/content.aspx?id=3216>. Accessed November 2, 2014.

pediatricians). The asthma care coordinator (ACC)—who is a certified asthma educator (AE-C)—also receives a daily report of patients who were admitted to the emergency room and prescribed albuterol. The ACCs, and in some cases, the CHW supervisor, screen all these cases for eligibility.

**Initial clinic visit with asthma specialists.** After the ACC and the CHW supervisor identify eligible participants, the CHW supervisor assigns cases to the CHWs. The CHWs then contact participants to set up a time to fill out the consent paperwork in person. While the CHWs usually visit the home, they can also meet the caregiver at a public space. Participants are not considered enrolled until they have signed an informed consent and an agreement to participate. Once enrolled, the CHWs conduct initial assessments and make an appointment for an asthma specialist to see the enrolled child at the CHAMP clinic. During the initial clinic visit, the asthma specialist works with the participant to assess asthma self-management techniques and to develop an asthma action plan.

**Social support services delivered by CHWs.** Throughout their enrollment, participants have access to a CHW who can assist in linking CHAMP families to social support services. CHWs also monitor medication adherence, reinforce asthma education, and conduct environmental assessments. Participants can reach out to CHWs as frequently as needed, and CHWs are required to conduct a follow-up home visit with participants every six months.

**Asthma health education.** A cornerstone of the CHAMP program is providing asthma education to participants, their families, and community members. This education occurs through clinic visits and “group experiences,” which involve group activities and discussions for participants and their families.

**Care coordination.** Another key feature of the CHAMP program is care coordination with local schools and primary care practices. At the time of the site visit, the CHAMP program employed two ACCs—a registered nurse (RN) and a respiratory therapist (RT). The RN was chiefly responsible for making connections with pediatrician’s offices, while the RT focused on reaching out to schools and day cares to train staff in asthma education. Both ACCs were responsible for disseminating the most recent versions of CHAMP participants’ asthma action plans to primary care practices and schools. Since our site visit to Le Bonheur, the RN ACC has resigned and the program elected not to replace her. Instead, the program is contracting with an RT who is an AE-C and has experience working with families in their homes.

The CHAMP team also coordinates care via call lines. During business hours, the ACC or clinic nurse answers sick calls and connects the child with his or her primary care practitioner or with CHAMP medical staff, calls in medications, and arranges appointments. Participants can also access a 24/7 telephone assistance line, intended to reduce hospital admissions and lengths of stay. At the initial clinic visit, the clinical team informs participants about the 24/7 line and provides a loading dose of prednisone to caregivers. When caregivers call the line, an EMT walks them through a protocol, including administering the initial dose of prednisone, if necessary.

To close the loop of asthma care, the CHAMP team reviews a daily report generated from the hospital’s electronic health record that lists participants who experienced an emergency room visit or hospitalization at the Le Bonheur system. An ACC attempts to call participants within 24 hours after their encounter to coordinate follow-up care. The ACC summarizes these calls and transfers cases to the CHWs so they can address any barriers to care with the families.

**CHAMP pediatric asthma registry.** Finally, the CHAMP program uses a Slim-Prim registry that was developed by the bioinformatics unit of the University of Tennessee Health Science Center (UTHSC). The registry includes the enrollment date, active/inactive status, encounters with CHWs, information collected by CHWs during assessments, identifying information (e.g., date of birth and TennCare ID number), and TennCare claims data, including prescription fill data. The registry also includes environmental tracking, such as information about a participant’s home, day care, and school.

### Target Population and Program Participants

The CHAMP program targets individuals who are high-risk pediatric asthma patients between 2 and 18 years old and who live in Memphis or Shelby County, Tennessee. Patients are eligible if they have experienced two or more asthma-related health care visits within a 12-month period, including emergency department visits, hospital observation, hospital admission, or urgent care clinics; had an admission to the pediatric intensive care unit in the last 24 months; been recommended for inclusion in the intervention by an asthma specialist; and/or had two or more steroid bursts in the past 12 months.

**Participant characteristics.** As of Quarter 7, the CHAMP program has served 218 participants, 223 participants below projection (see Implementation Effectiveness below for details). The majority of participants are male, and approximately three-quarters are between the ages of 1 year and 11 years old. The vast majority of participants identify as Black or African American, and virtually all participants are insured through Medicaid. This information is illustrated in the table below.

Demographic Information	Jan–March 2014 Patient Count	Jan–March 2014 Patient Count		Jan–March 2014 Patient Count	Jan–March 2014 Patient Count
<b>Sex</b>	<b>#</b>	<b>%</b>	<b>Age (Years)</b>	<b>#</b>	<b>%</b>
Male	92	62.2%	Children: 1–11	122	82.0%
Female	56	37.8%	Adolescents: 12–18	25	16.9%
			Young Adults: 19–25	1	0.7%
<b>Race/Ethnicity</b>	<b>#</b>	<b>%</b>	<b>Insurance Type</b>	<b>#</b>	<b>%</b>
Black/African American	139	93.9%	Medicaid	148	100.0%
Unknown	2	1.4%			
White	3	2.0%			
Two or More Races/Ethnicities	4	2.7%			

Source: HCIA 7QR Awardee Performance Report. Reflects unique count of quarterly direct program participants.

### Implementation Effectiveness

While CMS approved Le Bonheur’s operational plan on September 14, 2012, the team did not begin enrolling patients until January 10, 2013. During the interim, the Le Bonheur team focused on building the necessary infrastructure to carry out the project, which included developing the asthma registry and refining the staffing model for CHAMP.

**Enrolling participants.** The CHAMP team has seen less than half of the expected number of participants at this point in the implementation process. The main limiting factor is too few participating physicians, which has caused a backlog of participants waiting to be seen at the CHAMP clinic. Participants often wait six weeks for their initial appointment and can wait up to four hours to see a provider during a clinic visit. The project team reports that initial clinic visits take longer than follow-up visits due to history taking and allergy testing. Team members also noted that there are several no-shows to clinic, likely due to transportation issues or unwillingness to miss work (caregivers) and school (participants). The program team has taken steps to address this barrier, including contracting with a primary care physician to aid in the clinic.

In order to improve enrollment figures, the project team has implemented a new protocol that assigns eligible patients to a CHW within 24 hours of identification. The CHW must place a phone call to these families on the same day that they receive the case. If the family cannot be reached early in the day, the CHWs must attempt to reach them between 5:00 and 5:30 pm. To improve attendance at the initial clinic visits, Le Bonheur now instructs CHWs to make written, telephone, and personal contacts to get participants to the clinic. Since our site visit in May 2014, the project team has enrolled approximately 100 additional participants into the CHAMP program.

ACCs were originally responsible for enrolling the participants in the CHAMP program, but the project team revised this approach due to low enrollment. One factor contributing to low enrollment was that ACCs attempted to enroll participants in the hospital, when caregivers were overwhelmed and less receptive to filling out necessary paperwork. The new approach of using CHWs to enroll participants has been successful, and several team members commended the trusting relationships that the CHWs have built with the CHAMP families. The CHWs attribute their success to their backgrounds in human services and their ability to relate to the families. During the focus group, several parents noted that the CHWs have provided education, guidance, and support to allow them to actively engage with physicians to control their child's asthma and reduce the severity and number of attacks.

**CHW caseload.** The CHWs reported a very heavy work load. In addition to enrolling participants, they are responsible for connecting families to necessary social services, reinforcing asthma education, and entering data into the registry. There is no maintenance phase for participants, so CHWs are consistently following up with participants while taking on new cases. Moreover, the CHWs do not have established connections with social supports in the community and have to spend a significant amount of time building relationships with these services.

To help alleviate the burden on CHWs, the program: (1) stopped requiring CHWs to contact CHAMP families on a monthly basis and (2) contracted with a psychology consultant who can address mental health needs for referred CHAMP participants. CHAMP families can still contact CHWs as often as necessary to inform them of issues that need to be addressed. Therefore, CHWs can focus on families that express great social needs.

**Connecting with community primary care physicians.** The CHAMP team encouraged caregivers to call program staff if participants are experiencing asthma symptoms. The program team hypothesizes that this may cause issues for local primary care practices, which compete for the same patient population. The program team has attempted to create relationships with local primary care physicians by sending the

ACC out to provide information about the program. It also provides asthma health education, offering AE-C training to primary care office staff, and shares asthma action plans that have been developed for the PCPs' patients. The project team plans to have a physician portal built into the registry to enable local practitioners to track their patients' treatment history. As of our site visit, the project team has contracted with a PCP who will be able to help forge connections between CHAMP and the community of local providers.

## Program Effectiveness

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Our evaluation of the program's effectiveness will focus on quantitative and qualitative analysis as described below.

### Quantitative Results

Our evaluation of the effectiveness of the Le Bonheur program will be based largely on quantitative data, and we continue to work with Le Bonheur and the state of Tennessee to put the necessary agreements in place to receive data to support our evaluation. Once finalized, we will use the data provided by Le Bonheur and TennCare to assess the program's impact on measures of health, quality of care, utilization, and costs for the Medicaid and Children's Health Insurance Program populations.

### Qualitative Results

Our qualitative findings of program effectiveness for the CHAMP program will be based largely on analysis of data collected during our site visit, including discussions with staff and participants and observations of the program. At the time of this report, we had not yet conducted the analysis of this data and will therefore present the results of this analysis in a future report.

## Workforce Development and Deployment

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While some members of the CHAMP team were already employed by Le Bonheur prior to the Innovation Award (e.g., the asthma specialists), the majority of the staff were hired specifically to serve on the CHAMP project. Program management includes co-principal investigators (co-PIs), a CHAMP clinic medical director, and a program manager.

**Program management.** The co-PIs include a pulmonologist and an allergy-immunologist who also serves as the CHAMP medical director. Both of the co-PIs initially served as the asthma specialists for the project, along with an allergy-immunology fellow. Recently, the project team reports that the pulmonologist is no longer performing clinical work. Instead, the program is contracting with a PCP to assist in the clinic. The asthma specialists and physicians serve as the first clinical point of contact for CHAMP participants at their initial clinic visit and continue to see participants for follow-up appointments.

**Asthma care coordinator.** The ACC role is also a critical component of the CHAMP program. The ACC and RT are responsible for performing spirometry services during the CHAMP clinic visit, providing asthma health education to CHAMP families and community members, and coordinating follow-up asthma care for program participants. The supervisor of community collaborations oversees the work of

the ACC and RT. They are also responsible for performing data analysis, creating connections with community resources and organizations, and disseminating information about the mission of CHAMP.

**Community health workers.** The majority of the CHAMP participants are considered high risk because their cases involve potentially preventable factors, including inadequate asthma education, asthma triggers in the home environment, psychosocial issues, cultural barriers, and medication noncompliance. In order to address some of these risk factors, the program uses CHWs to link participants with social support services. While there is no standard educational level for the CHWs and none have specific clinical experience, they all have experience working in human services. Le Bonheur provided an initial day-long training on basic asthma principles, followed by a teach-back session. The CHWs also attended a seminar on motivational interviewing and receive informal training on how to address the concerns and needs of participants during weekly staff meetings.

**Community health worker supervisor.** A CHW supervisor oversees the work of the CHWs and assists in screening referred participants for eligibility. The project team initially hired a licensed clinical social worker (LCSW) to serve as supervisor of the CHWs. Since our site visit in May 2014, the program team reports that they have changed the supervision of the CHWs and introduced a supervisor with a different style and approach. The CHAMP team also recently hired a clinical psychologist to serve as a psychology consultant for the program. The psychology consultant sees participants who are referred for mental health services by the CHWs.

At the onset of the project, the team recognized that they would have to change the proposed staff mix in order to effectively carry out the program. In the original proposal, the project team indicated that they would hire six respiratory therapists to serve as health care coordinators, in addition to an asthma program manager. After consulting with CMS staff, the project team decided to hire only two clinical professionals—an RT and an RN with experience in asthma care—to serve as ACCs. The team also chose to hire four CHWs to carry out the nonclinical activities of the health care coordinator role: engaging families, reinforcing asthma education, and helping participants to overcome barriers to self-management.

## Context

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Below we discuss some of the contextual barriers and facilitators Le Bonheur has encountered in the implementation of the CHAMP program.

### Endogenous Factors

A facilitating factor is the fact that the CHAMP Program Evaluator is a member of Le Bonheur's institutional review board (IRB). As a result of the Program Evaluator's understanding of the IRB processes, the project team was able to quickly secure and submit all necessary documentation and experienced smooth IRB approval process. This allowed the team to launch the program with minimal delays. The project team also developed comprehensive consent forms to minimize issues with securing participants' TennCare data.

## Exogenous Factors

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The CHAMP team has faced challenges in mitigating some environmental asthma triggers in the homes of participants. The project does not have the resources to offer some services that would reduce or remove triggers, such as mold and mildew removal. In addition, Memphis housing codes do not help support healthy home environments (i.e., it is very difficult for tenants to force landlords to maintain an asthma-trigger-free environment). On a policy level, the supervisor of community collaborations is developing a grant with the University of Memphis School of Law in order to reform housing codes. This would help families work with landlords to reduce environmental triggers for asthma. The CHAMP team would be responsible for connecting the law school to participants who are affected by housing issues and who could be advocates for change.

The team also faced obstacles coordinating care with staff in the local school districts. Memphis City and Shelby County Schools merged into one school district in 2013, and the unified school district will split into six separate districts in 2014. These changes pose challenges for the ACC, who must maintain relationships with changing school administrators to offer asthma education and disseminate the asthma action plans.

**Future plans and sustainability.** The project team garnered a great deal of support and recognition from senior leadership at Le Bonheur Children’s Hospital. It recently received a \$500,000 grant from the Le Bonheur Foundation to continue the program beyond the HCIA grant period. Other sustainability efforts center on engaging insurers such as TennCare, which are interested in the outcomes of CHAMP and are receptive to cost-saving programs.

## Summary

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Le Bonheur Children’s Hospital began the Changing High Risk Asthma in Memphis through Partnership (CHAMP) program to address the high volume of pediatric asthma-related hospital admissions in Memphis, Tennessee. The program focuses on providing care management, self-management support, and asthma education for children with high-risk asthma and their families. The care team involved in the program includes asthma specialists who provide care at the CHAMP clinic; the ACCs, who work in both the clinic and in the community; and the CHWs, who provide support to families through home visits. By engaging families both in and outside of the clinic and by addressing both medical and nonmedical needs, CHWs and the care team are hoping to reduce the number of asthma-related Emergency Department visits and hospitalizations.

The social barriers the primarily low-income Medicaid population face have presented several challenges that CHWs have struggled to address. These challenges include lack of transportation, lack of resources to mitigate asthma triggers in the home, and lack of access to preventive care, which may contribute to participants seeking care only when exacerbations occur. Despite these challenges, CHWs have been successful in establishing trusting relationships with many families participating in the program. With support from senior leadership and a foundation grant, Le Bonheur staff are planning to continue the program beyond the HCIA funding period.

There are several topics that warrant further investigation during the second year of the evaluation, including:

- low enrollment of CHAMP participants, including how many of enrolled population have received services;
- changes to the staffing model and recent hires; and
- engaging local primary care physicians.

Continued research and communication with the awardee on these topics will help to better inform the evaluation of Le Bonheur in order to determine the potential for replicability and scalability of the intervention, as well as how the program itself is serving current participants.

## Mountain Area Health Education Center, Inc.

This report presents our evaluation of the Mountain Area Health Education Center, Inc. (MAHEC) Integrated Chronic Pain Treatment and Training Project (ICPTTP).

We provide preliminary observations about the program based on a review of the awardee’s application, operational plan, and quarterly reports as well as telephone interviews with the awardee and a site visit conducted June 9–10, 2014. While this report presents themes that we have identified during the first year of the evaluation, it is important to note that our findings are tentative at this point, as we have not completed all of our data collection, coded site visit data, or fully analyzed the data collected to date. We look forward to providing more definitive findings and results for future reports.

<b>Program Title</b>	<b>Integrated Chronic Pain Treatment and Training Project (ICPTTP)</b>
<b>Targeted Disease/Condition</b>	<b>Chronic Pain</b>
<b>Total Amount Awarded</b>	\$1,186,045.00
<b>Description of Target Population</b>	Medicare and Medicaid patients seeking care at approved sites with a diagnosis of chronic pain (ICD-9 diagnosis code 338.4) and prescribed an opioid medication.
<b>Description of the Awardee Organization</b>	Mountain Area Health Education Center (MAHEC) is a family health center and medical education center with established residency programs. MAHEC is partnering with six other clinics to serve a 16-county region in western North Carolina. MAHEC’s chronic pain program has already been implemented at MAHEC and at two of its partner sites, and implementation at four additional partner sites are projected to begin on schedule.
<b>Setting of Intervention</b>	The HCIA intervention is delivered through primary care practices throughout western North Carolina.
<b>Overview of Intervention</b>	MAHEC’s Integrated Chronic Pain Treatment and Training Project creates multidisciplinary teams to offer enhanced primary care using midlevel providers who co-manage care and provide counseling and medication-management services. MAHEC is also partnering with a community-based educational initiative, Project Lazarus, to conduct community outreach and education around prevention of opioid overdose deaths.

### Introduction

Chronic pain affects approximately 100 million American adults and costs the United States up to \$635 billion per year in medical treatment and lost productivity.<sup>91</sup> To treat chronic pain, many patients use opioids, drugs that account for 60% of overdoses, according to the Office of the Assistant Secretary for Health.<sup>92</sup> Opioid use is particularly problematic in the Appalachian region, where usage rates are rising

<sup>91</sup> Report brief: Relieving pain in America: A blueprint for transforming prevention, care, education, and research. Institute of Medicine Web site. <http://www.iom.edu/~media/Files/Report%20Files/2011/Relieving-Pain-in-America-A-Blueprint-for-Transforming-Prevention-Care-Education-Research/Pain%20Research%202011%20Report%20Brief.pdf>. Published June 2011. Accessed November 2, 2014.

<sup>92</sup> Prescription drug monitoring program interoperability standards: A report to Congress. The Office of the Assistant Secretary for Health. Department of Health and Human Services Web site. [http://www.healthit.gov/sites/default/files/fdasial141report\\_final.pdf](http://www.healthit.gov/sites/default/files/fdasial141report_final.pdf). Published September 2013. Accessed November 2, 2014.

more quickly than in other regions and admission rates for opiate abuse are the highest in the nation.<sup>93</sup> The Institute of Medicine report, *Relieving Pain in America: A Blueprint for Transforming Prevention, Care, Education, and Research*, which informed MAHEC's project goals, presents pain as a national challenge such that "a cultural transformation is necessary to better prevent, assess, treat, and understand pain of all types." Pain is complex in nature and is influenced by biological, psychological, and social factors. Pain severity is subjective, varying significantly by patient, and is therefore difficult to measure objectively. As such, the Institute of Medicine (IOM) recommends that pain care be tailored to each patient's experience. The report also calls for improving care by promoting self-management.<sup>94</sup>

MAHEC has integrated behavioral health care services into its program to address the psychological factors that influence both pain and substance abuse. Mental health issues, including substance abuse, are prevalent throughout the nation, especially among low-income populations. Approximately 70% of patients treated by health care safety net providers have a coexisting mental health or substance abuse diagnosis. The need to improve access to behavioral health care for the low-income population is well documented for rural North Carolina.<sup>95</sup>

In addition, MAHEC acknowledges the need for increased community awareness and education about mental health and substance abuse treatment services. In 2008, Fred Brason started Project Lazarus, the community component of MAHEC's intervention, in Wilkes County, North Carolina. Project Lazarus builds community awareness around substance abuse, focusing specifically on abuse and accidental overdose of prescription drugs. The Project Lazarus team is working with community leaders to implement projects that help raise awareness and promote safe use, storage, and disposal of medications, such as countywide "med drop days." Results from a preliminary evaluation of Project Lazarus showed a reduction in unadjusted overdose death rates in Wilkes County, from 43 per 100,000 in 2008 to 29 per 100,000 in 2010, while every other county in North Carolina experienced increases.<sup>96</sup>

MAHEC's Integrated Chronic Pain Treatment and Training Project (ICPTTP) stemmed from increased concern around drug-seeking behavior in western North Carolina known as "shopping around." Some chronic pain patients visit multiple providers to obtain multiple prescriptions, a practice partially enabled by frequent turnover in the MAHEC residency program. In 2011, MAHEC's current Project Director was working with the Appalachian Regional Commission to train community groups on substance abuse issues. Around the same time, the CEO of Project Lazarus began his community engagement work, and the MAHEC Project Director became interested in replicating the community component of Project Lazarus to supplement provider training.

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<sup>93</sup> Zhang Z, Infante A, Meit M, English N. An analysis of mental health and substance abuse disparities & access to treatment services in the Appalachian Region. Appalachian Regional Committee Web site. [http://www.arc.gov/assets/research\\_reports/AnalysisofMentalHealthandSubstanceAbuseDisparities.pdf](http://www.arc.gov/assets/research_reports/AnalysisofMentalHealthandSubstanceAbuseDisparities.pdf). Published August 2008. Accessed November 2, 2014.

<sup>94</sup> Report brief: Relieving pain in America: A blueprint for transforming prevention, care, education, and research. Institute of Medicine Web site. <http://www.iom.edu/~media/Files/Report%20Files/2011/Relieving-Pain-in-America-A-Blueprint-for-Transforming-Prevention-Care-Education-Research/Pain%20Research%202011%20Report%20Brief.pdf>. Published June 2011. Accessed November 2, 2014.

<sup>95</sup> Mim, S. A sustainable behavioral health program integrated with public health primary care. *Journal of Public Health Management and Practice*. 2006; 12(5): 456-461.

<sup>96</sup> Albert S, Brason F, Chaplain, et al. Project Lazarus: Community-based overdose prevention in rural North Carolina. *Pain Medicine*. 2011; 12: S77-S85.

As these partnerships developed, MAHEC researched ways to structure chronic pain care to help physicians and residents learn best practices and, in the process, increase the safety and quality of care for patients. Although MAHEC had already integrated mental health services into its model of care, physicians were not effectively or consistently incorporating those services into treatment of chronic pain patients. Thus, MAHEC created an integrated care model for chronic pain that includes components of the chronic care model, chronic pain treatment, and mental health services—including self-management support, delivery system redesign, clinical information systems, and decision support. In addition, the program incorporates a new midlevel provider who provides self-management support to chronic pain patients, such as medication management, and ensures that their treatment includes all program elements.

### Innovation Components

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MAHEC and its six partner sites are implementing an integrated care model for chronic pain management in a phased approach. After implementation at MAHEC, Andrews Internal Medicine (Cherokee County), Glenwood Community Family Practice (McDowell County), and Blue Ridge Community Health Services (Henderson County) were the first three sites added.

The MAHEC model incorporates several components that operate in tandem to achieve the goals of consistent chronic pain management, improved quality of life, and enhanced community awareness of pain medications and substance abuse. The main components of the ICPTTP include standardized treatment policies for chronic pain patients, care management by a midlevel provider (including the use of medical group visits), and a community-based component called Project Lazarus. Services beyond primary care, including behavioral health services and pharmacy services, are integrated throughout the components of the chronic pain program model. These components are described in more detail below.

**Standardized protocols and EHR use.** To enhance care consistency across providers, MAHEC developed standardized protocols for chronic pain treatment. These include standard procedures for referring chronic pain patients to the midlevel provider and behavioral health services as well as guidelines on how to conduct assessments and screenings and how to write prescriptions. The protocols were developed with input from program leadership, resident representatives, behavioral health service representatives, and pharmacotherapy representatives. MAHEC leadership provides the training for these treatment standards across its partner sites.

All participating MAHEC clinics use an EHR system as part of care delivery. MAHEC and its partner sites are working to identify and monitor its patient population and to capture several self-monitoring measures through EHR data. However, MAHEC and its partner sites have encountered difficulties efficiently accessing the data from the EHRs, so they are accessing their data manually. At several of MAHEC's partner sites, limitations on their EHR systems' capabilities have required staff to manually audit patient charts to identify eligible program participants. Additional information about EHRs is discussed later in this chapter.

**Care management.** The ICPTTP involves changes to the workforce model. At each clinic, a midlevel provider plays a key role in chronic pain management and education. This midlevel provider serves as the main point of contact for issues related to chronic pain patients, both from providers and patients themselves.

Primary care providers refer their chronic pain patients to the midlevel provider to discuss medication management. The midlevel provider is one of a small number of people who can prescribe medications to these chronic pain patients. This provides consistency of prescription writing by having one responsible party who is familiar with the patients' backgrounds rather than several providers who may not see the same patients consistently.

The midlevel provider is also responsible for conducting the medical group visits designed to help chronic pain patients learn more about self-management. During these group visits, the midlevel provider checks in with each patient, writes prescriptions, and provides brief private consultations to those who need them. To allow time for individual consultations, the medical group visits are typically co-led by someone from pharmacy or behavioral health services. The medical group visits also serve as an educational venue on topics such as potential dangers of medications, how to properly and safely store medications, alternative treatment mechanisms (e.g., yoga and acupuncture), and the social aspects of chronic pain.

**Project Lazarus.** MAHEC and Project Lazarus collaborate on the implementation of the Project Lazarus community component: building community awareness around substance abuse issues throughout MAHEC's 16-county region. The Project Lazarus team works with community leaders to raise awareness and promote safe use, storage, and disposal of medications through projects such as countywide med drop days. To reach the community through as many channels as possible, the Project Lazarus model is flexible and adapted to suit community needs. For example, Project Lazarus seeks out and works with important stakeholders in each community, including chronic pain clinics, law enforcement, local organizations, schools, state public health department, and others. Project Lazarus essentially provides the template for communities to build their own coalitions to address substance abuse and accidental overdose.

### Target Population and Program Participants

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All participants of the ICPTTP are considered indirect participants because they are not receiving services that are directly funded by the grant. Eligible patients are those at approved sites with a diagnosis of chronic pain (ICD-9 diagnosis code 338.4) entered into the practice's EHR system and a prescribed opioid medication. Priority is given to those patients prescribed an opioid medication for more than three months. Because providers across different practices were not using this code consistently, MAHEC reviews the chronic pain population through its EHR. Those who meet the opioid medication criteria without a recorded chronic pain diagnosis code (ICD-9 338.4) are assigned that code in the EHR and monitored. For the purposes of this evaluation, MAHEC is only tracking Medicare and Medicaid patients.

**Participant characteristics.** The table below shows demographic information for indirect patient participants. Program participants are largely female (68.3%), and most are between the ages of 26 and 64 years old (80.2%), which may reflect the demographics of the Medicaid-eligible population in North Carolina. The awardee was unable to report on race/ethnicity on indirect program participants for Q7. The most common insurance type among MAHEC's participants is Medicare Fee for Service or Medicare Unspecified, followed by Medicaid.

Demographic Information	Jan–March 2014 Patient Count	Jan–March 2014 Patient Count		Jan–March 2014 Patient Count	Jan–March 2014 Patient Count
<b>Sex</b>	<b>#</b>	<b>%</b>	<b>Age (Years)</b>	<b>#</b>	<b>%</b>
Male	32	31.7%	Elderly: >75	4	4.0%
Female	69	68.3%	Elderly: 65–74	14	13.9%
			Adults: 26–64	81	80.2%
			Young Adults: 19–25	2	2.0%
<b>Race/Ethnicity</b>	<b>#</b>	<b>%</b>	<b>Insurance Type</b>	<b>#</b>	<b>%</b>
The awardee has noted in its Q7 report that it is unable to report data on indirect program participant race/ethnicity.			Medicaid	31	30.7%
			Medicare Fee for Service or Medicare Unspecified	45	44.6%
			Private/Commercial	20	19.8%
			Unknown	5	5.0%

Source: HCIA 7QR Awardee Performance Report. Reflects unique count of quarterly indirect program participants.

### Implementation Effectiveness

MAHEC received approval for its operational plan on October 3, 2012. It hired a nurse practitioner to serve as its primary midlevel provider in December 2012. MAHEC considers all of its participants “indirect” because they receive services that are not directly funded by the Innovation Award. While MAHEC did not formally enroll participants, in the first quarter of 2013 it began including referred chronic pain patients in the program.

A key facilitator to implementation across MAHEC’s three sites has been its flexibility and adaptability. The chronic pain program model is flexible in that each individual practice can adapt it to suit its capabilities, resources, and needs. This flexibility extends to the Project Lazarus component of MAHEC’s program, a key feature of which is the ability to mold implementation to suit the needs and resources of a given community, as long as it carries out Project Lazarus’s core philosophy.

Through identifying their program’s facilitators and barriers, MAHEC has also identified lessons learned. One is the recognition of a necessary paradigm shift required by MAHEC’s chronic pain treatment program. In order for that paradigm shift to occur successfully, everyone at the practice must work together to implement the new program, understand its core elements, and consistently provide care in this new way.

MAHEC has also found that its focus on holistic, patient-centered, interdisciplinary, and team-based care contributes to its effectiveness and success. MAHEC has been consistently integrating behavioral health and pharmacy services into its chronic pain program and includes different types of providers and non-clinical staff in its workforce and motivational interviewing trainings. This promotes team-based care, which allows primary care providers to focus on the patient’s overall well-being and lets other team members to step in with specific expertise. This division of labor is central to MAHEC’s holistic approach, which incorporates multiple providers in the care process, encourages alternative pain

management mechanisms, and incorporates community education and awareness. It is important for practices to maintain and promote this holistic approach in order to continue to appeal to and fulfill patients' diverse needs and to facilitate providers' involvement.

## Program Effectiveness

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Our evaluation of the program's effectiveness will focus on quantitative and qualitative analysis as described below.

### Quantitative Results

Our evaluation of program effectiveness of the ICPTTP will be based largely on quantitative data. At the time we began work on this report, we did not have the necessary agreements in place to receive data from MAHEC. Since that time we have finalized these agreements and look forward to presenting results on the MAHEC program's impact on measures of health, quality of care, and utilization and costs for both the Medicare and Medicaid populations served by this program. A challenge for presenting Medicaid analysis is the availability of contemporaneous Medicaid claims for North Carolina, where the MAHEC program is located. Without Medicaid data, it will not be possible to conduct a claims-based analysis, and the evaluation will focus on data the awardee is collecting.

### Qualitative Results

Our qualitative findings of program effectiveness for the MAHEC program will be based largely on analysis of patient focus group data. We will present the results in a future report.

## Workforce Development and Deployment

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The care team for the ICPTTP includes primary care physicians, residents, midlevel providers, mental health specialists, and pharmacists. The midlevel provider for the chronic pain program is a new position that MAHEC created specifically for this program and is therefore funded through the award. However, the midlevel providers at MAHEC, Hendersonville Family Health Center, and one of the partner sites in the Blue Ridge Community Health Services system are employed only half time for the HCIA/chronic pain program. For the most part, participating physicians, nurses, mental health specialists, and pharmacists are existing staff employed by MAHEC and its partner sites, some of which bill part of their time to the award. The community engagement component of MAHEC's program, Project Lazarus, is coordinated by 16 county coordinators, one for each county in MAHEC's service region.

As of March 2014, the award covered five management or administrative staff, three nurse practitioners (NPs), one pharmacist, one physician assistant (PA), one physician, and four social workers.

**Midlevel providers.** Midlevel providers—including NPs and PAs—are the main component of the HCIA-funded staff for MAHEC's innovation. There is one midlevel provider for the chronic pain program at each of MAHEC's sites. The midlevel provider is the main provider of chronic pain management services at the chronic pain clinics. Physicians and residents refer chronic pain patients to the midlevel provider, who consults with those patients and develops a treatment plan. The midlevel provider leads medical group visits for chronic pain patients, where he or she educates patients, conducts screening tests, and monitors patients' vitals. The midlevel provider at each clinic is the main prescription

writer for chronic pain patients in order to ensure consistency in prescribing in adherence with the standardized protocols for chronic pain care and to limit opportunities for patients to engage in drug-seeking behavior. Because this position is a midlevel position, the midlevel provider meets regularly with a physician preceptor to review patient cases and monitor progress of the chronic pain program.

MAHEC trains its midlevel providers with training on the overall program as well as on-the-job training with chronic pain patients. Midlevel providers may also attend chronic-pain-related conferences. In addition, midlevel providers at MAHEC's partner sites can consult and/or shadow MAHEC's midlevel provider for further training.

**Primary care physicians and residents.** Primary care physicians and residents provide primary care services to chronic pain patients as well as other patients at their practices. Their responsibility is to follow the standardized protocols for chronic pain patients at the practice and to identify patients who can be referred to the midlevel provider for chronic pain management support. Physicians can also refer patients to behavioral health services, according to the standardized protocols, as necessary.

Because the ICPTTP involves overhauling a previous workflow and model of care, it has done extensive physician training. MAHEC trains physicians and residents on how to assess and treat chronic pain, including how and when to refer patients to the midlevel provider and to behavioral health services. In the last year, MAHEC has also conducted two continuing medical education trainings around chronic pain management. One of these trainings was with the state's opioids prescribing program, and the other was provided by Project Lazarus. MAHEC's workforce training team also conducts ongoing training for providers on motivational interviewing, a communication skills approach for encouraging behavior change in patients. Throughout the program, MAHEC will continue to provide more training on specialized pain treatment approaches for its providers.

**Behavioral health care providers.** Behavioral health care providers participate in the program by providing counseling around substance abuse and other behavioral health issues related to chronic pain. They also participate in the medical group visits by assisting the midlevel provider in leading visits, discussions, and education sessions on behavioral health topics related to chronic pain. Similar to the primary care physicians and residents, the behavioral health care providers are trained on the standardized protocols, the overall program and its goals, and on motivational interviewing through the workforce training team.

**Pharmacists.** Pharmacists provide medications for MAHEC patients as prescribed by primary care providers and the midlevel provider. Pharmacists also participate in the medical group visits by assisting the midlevel provider in leading those visits and by leading discussions and education sessions on pharmacotherapy topics related to chronic pain, such as side effects of pain medications and alternative treatment options. MAHEC's workforce training team instructs pharmacists on the overall program as well as on motivational interviewing. Pharmacists may also participate in other sessions conducted by the workforce training team.

**Project Lazarus county coordinators.** Project Lazarus county coordinators are responsible for carrying out the community component of Project Lazarus for MAHEC's program. In this role, they work with Project Lazarus leadership to tailor the model to best fit their communities. They are responsible for

outreach and engagement of community organizations (including churches, first responders, schools, and law enforcement) in order to raise community involvement and awareness surrounding substance abuse and accidental overdose.

## Context

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Discussions with MAHEC and its partner sites have revealed several lessons learned, facilitators, and barriers.

### Endogenous Factors

Strong leadership, from within MAHEC, its partner sites, and Project Lazarus, has been an important endogenous factor facilitating the success of the program implementation. Having a strong leader at the project level has been instrumental in engaging stakeholders and keeping the team focused, which has enabled the creation of consistent and effective mechanisms for treating and managing chronic pain patients. The leadership of the Project Director was noted by multiple people involved in MAHEC's program as crucial for engaging providers and clearly communicating across all of the people involved in the MAHEC innovation. Similarly, according to the project leadership, the founder and CEO of Project Lazarus brings a unique ability to engage people from all corners of different communities, which has been vital to pushing the program forward. Within the Project Lazarus framework, community champions have been noted as a crucial component to the success of Project Lazarus in any given community. In addition to leadership at the broader program level as well as at the community level, having strong provider and community engagement and support is important in facilitating progress of each of the components of MAHEC's program.

### Exogenous Factors

One exogenous barrier to MAHEC's holistic approach has been the dearth of tools and resources available to patients. For instance, Medicaid only covers three physical therapy visits, regardless of the patients' needs, and MAHEC does not have the ability to provide additional visits. As a result, some providers noted that if they identify serious issues beyond patients' immediate pain management, such as substance abuse or addiction problems, they are not able to provide the proper treatment. Additionally, the local health care market does not always align with MAHEC's holistic approach, so the resources are not readily available for patients to seek additional specialized treatment, continue their treatment, or incorporate various treatment and self-management mechanisms into their care.

The attitude of other primary care practices in the region toward chronic pain treatments has affected program implementation and practice. Because chronic pain medications are often associated with drug-seeking behavior and overdose, many practices have adopted a "hands-off attitude," deeming it too complicated or too difficult to treat chronic pain patients. Consequently, a number of those patients are left without the treatment that they need, and many ultimately come to MAHEC or one of its affiliated practices. This has further underscored the importance of MAHEC's standardized protocols for treating chronic pain patients.

MAHEC has encountered challenges with regard to its data collection and evaluation processes. Each of the sites operate on different EHR systems, and several of the EHR vendors are updating their systems.

Therefore, MAHEC has not yet been able to combine data from its sites. Furthermore, MAHEC is not 100% confident in the data that it reports from its EHRs and is manually pulling data for patient identification and reporting purposes, which is time consuming. MAHEC leadership intended to track participants using claims data; however, North Carolina's new multi-payer Medicaid Management Information System, NC Tracks, was temporarily inaccessible, preventing the integration of claims information with program data thus far.

## Summary

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MAHEC developed the Integrated Chronic Pain Treatment and Training Project (ICPTTP) to address the problem of epidemic rates of opioid overdoses in western North Carolina and to improve care and reduce costs associated with chronic pain management. MAHEC designed its program to address two primary issues in chronic pain management—(1) a lack of consistency in the providers seeing patients, which led to chronic pain patients “shopping around” for different providers to obtain multiple prescriptions from several sources, and (2) inconsistency in treatment practices, including integration of mental health services. The intervention uses a midlevel provider to manage chronic pain care of all program participants, working closely with behavioral health providers, pharmacists, and primary care providers to help address these two issues in chronic pain management.

In order to ensure consistency in pain medication prescribing practices, MAHEC and its partner sites are developing standardized chronic pain treatment protocols based on evidence-based guidelines. In an effort to increase community-wide awareness around prevention of opioid overdoses, the awardee is also partnering with a community-based educational initiative, Project Lazarus, to conduct community outreach and education in the 16 counties served by their seven participating sites.

MAHEC's strong program leadership and the flexibility of the program's care model have facilitated implementation of the program across its sites—each of which has unique resources and needs. While MAHEC has embraced a holistic approach to chronic pain treatment, Medicaid does not cover many of the services that patients may need, such as physical therapy. The paucity of clinics in the region that are willing to treat chronic pain patients has resulted in most patients coming to MAHEC or partner sites for treatment. This has underscored the importance of standardized treatment protocols across all providers within MAHEC, since the practice has in essence become the practice of choice for chronic pain treatment in the region. This standardized care model has required a paradigm shift, and the success of the program depends on providers' willingness to embrace the team-based approach to care management.

There are several topics that warrant further investigation during the second year of the evaluation, including:

- scalability and expansion of physician training
- expansion of the pharmacist's role in MAHEC's intervention
- challenges of limited community resources for chronic pain patients

Continued research and communication with the awardee on these topics will help to better inform the evaluation of MAHEC in order to determine the potential for replicability and scalability of the intervention, as well as how the program itself is serving current program participants.

## Alfred I. duPont Hospital for Children NCC-W of the Nemours Foundation

This report presents our evaluation of the Alfred I. duPont Hospital for Children NCC-W of the Nemours Foundation (Nemours) Optimizing Health Outcomes for Children with Asthma in Delaware Project.

We provide preliminary observations about the program based on a review of the awardee’s application, operational plan, and quarterly reports as well as telephone interviews with the awardee and site visits conducted on June 26–27, 2014, and August 27, 2014. While this report presents themes that we have identified during the first year of the evaluation, it is important to note that our findings are tentative at this point, as we have not completed all of our data collection, coded site visit data, or fully analyzed the data collected to date. We look forward to providing more definitive findings and results for future reports.

<b>Program Title</b>	<b>Optimizing Health Outcomes for Children with Asthma in Delaware Project</b>
<b>Targeted Disease/Condition</b>	<b>Pediatric asthma</b>
<b>Total Amount Awarded</b>	\$3,697,300.00
<b>Description of Target Population</b>	Children with high-risk asthma between the ages of 2–17.9 years that had at least one office visit to one of the participating clinics between the 18-month period from January 1, 2011–June 30, 2012 and had been prescribed a bronchodilator.
<b>Description of Awardee Organization</b>	The awardee is an integrated pediatric health system that provides both hospital-based and clinic-based care to children in the state of Delaware. Three primary care clinics (in Wilmington, Dover, and Seaford, DE) of the Nemours health system serve as the setting for the HCIA intervention; the program is overseen by staff of Nemours Health and Prevention Services.
<b>Setting of Intervention</b>	The HCIA intervention is delivered in the clinic, home and community setting throughout Delaware.
<b>Overview of Intervention</b>	Nemours is enhancing family-centered medical homes by adding services for children with asthma and developing a population health initiative in neighborhoods surrounding targeted primary care practices. Each of the three participating clinics is undergoing NCQA accreditation as a family-centered medical home and has integrated the services of a care coordinator to serve the broader population as well as offering an HCIA-funded mental health professional who provides counseling services for program participants and their families. Community liaisons have been integrated at each of the practices and are tasked with engaging communities in asthma prevention and education activities. Nemours has also developed a registry of high-risk asthma patients and is deploying community health workers to provide support to the families of children added to the registry by addressing social needs, performing an environmental home assessment, providing asthma education, and promoting medication adherence.

## Introduction

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Nemours is an integrated pediatric health system that provides both hospital-based and clinic-based care to children in Delaware. The work being funded by the Health Care Innovation Award is mainly housed within the Nemours Division of Health and Prevention Services (NHPS). NHPS has a history of community primary prevention work focusing on obesity and active living at a population level. Over the last 10 years, there has been a movement toward the integration of population health management (e.g., obesity, BMI measurement, obesity care management, pediatric developmental screening) into the Nemours primary care practices. The Nemours National Office of Policy and Prevention encouraged the integration of population health when developing the project proposal for the Innovation Award.

The overarching goal of Nemours' HCIA Program is to improve asthma care and reduce asthma triggers in three Delaware communities. Nemours is enhancing family-centered medical homes by integrating new services for children with asthma in three pediatric practice sites, and developing a community initiative focused on reducing asthma triggers and raising asthma awareness in neighborhoods surrounding these sites. In its proposal, Nemours noted that its family-centered model is based on the Merck Childhood Asthma Network Inc. community-based care coordination model, which demonstrated reductions in emergency department visits among asthmatics by 36% to 63% and hospitalizations by 26% to 78% through the use of community health workers and school nurses.<sup>97</sup> Each of the participating practices integrated the services of a care coordinator as well as a mental health professional who provides counseling services for program participants and their families. This integration of mental health care services aligns with evidence that shows that both child and parent psychological functioning influences asthma outcomes and medication compliance.<sup>98</sup> Nemours' proposal described two workforce roles integral to their intervention: community health workers (CHWs) and community liaisons. CHWs provide support to the families of children with asthma by addressing social needs, performing an environmental home assessment, providing asthma education and promoting medication adherence. Community liaisons work with community partners to implement initiatives aimed at providing healthier environments for children with asthma in schools, child care centers, and housing.

## Innovation Components

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For the HCIA Program, Nemours selected three pediatric clinics that were also pursuing NCQA certification to become patient-centered medical homes (PCMH). The program components focus on providing asthma care management, education, and support in the clinic, home and community setting—components that are supported by the PCMH model of care. The three clinic sites are tracking high-risk pediatric asthma patients through an asthma registry embedded in the Nemours EPIC EHR system. The registry was prepopulated with eligible patients through a retrospective look at EHR data. Providers may add children that they identify as high-risk asthma patients to the registry and remove patients they deem inappropriate for the intervention.

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<sup>97</sup> Findley S, Rosenthal M, Bryant-Stephens T. Community-based care coordination: practical applications for childhood asthma. *Health Promotion Practice*. November 2011; 12: 52S-62S.

<sup>98</sup> Kaugars AS, Klinnert MD, Bender BG. Family influences on pediatric asthma. *Journal of Pediatric Psychology*. 2004; 29(7): 475-491.

**Home visits and community health workers.** Each child in the registry is assigned a community health worker (CHW). The CHWs are responsible for contacting families and connecting them to the clinic, community supports, and Nemours-based resources. In addition to providing support to address non-medical needs that may interfere with families' ability to manage their children's asthma, the CHWs provide self-management support through education. The CHWs works with providers to ensure that each registry patient has an asthma action plan. The CHWs review the asthma action plan with the family during home visits and ensure that the patient's school nurse has a copy of the plan. Nemours has an existing program called the School Health Collaborative, which allows participating school nurses to access the Nemours EHR system. CHWs encourage each participant's family to sign up for this program so that the school nurse can access the child's record. To support whole-person-oriented care, CHWs share information about participants gathered during the home visits with the clinical care teams in the three clinic sites.

**Care management.** The clinical care teams at the three participating sites use the asthma registry to flag participants who require more intense clinical care management. Providers work closely with CHWs to ensure that caregivers of patients are filling and using medications appropriately and following the asthma action plan. CHWs and the practice management staff work with families to ensure that the child can be seen at the clinic sites (rather than the Emergency Department) during asthma flare-ups. The nurses and providers provide asthma education during the clinic visits; this education is then reinforced by CHWs during home visits. Participants and their families also have access to other clinic-based resources—not all of which are funded by the HCIA Program—including the care coordinator and resource room that has asthma education materials, social service information packets, and computers with Internet access. These clinic-based resources are available to all patients seen at these clinics, not just those on the asthma registry.

**Community engagement.** Nemours describes community liaisons as “integrators.” Community liaisons work within the community to identify ways to improve the environment where children live, learn, and play. They provide community outreach and education around environmental triggers of asthma to schools, urban housing departments, community centers, places of worship, and other community outlets. They work with community partners to form strategic plans to reform or enforce local and state policies to support an asthma-friendly environment. Community liaisons also connect CHWs, care coordinators, and other practitioners within the site to resources in the community.

The assessment information collected by CHWs and the Nemours clinical care teams from the participants—including the asthma control test, parental confidence assessments, asthma quality of life, and other assessments—are all recorded in the EHR system. The information and assessments are collected during the initial encounter with participants as well as subsequent encounters at specified time intervals. The EHRs also have provider tools embedded within them to support care management. These tools include asthma-specific templates for recording asthma progress notes, medications, action plans, etc. The EHR system is also capable of generating dashboard reports that are used by the care team to review information on a population or panel of patients (i.e. all children on the asthma registry).

## Target Population and Program Participants

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The project aims to serve children with asthma and their families that are seen in three Delaware practice sites located in Wilmington, Dover, and Seaford. The project also serves children with asthma in the broader community. The initial set of inclusion criteria to identify children with high-risk asthma included the requirement that they are (1) between the ages of 2–17.9 years; (2) had at least one office visit to one of the participating clinics between the 18-month period from January 1, 2011 and June 30, 2012; (3) were prescribed any bronchodilator; and (4) had an asthma diagnosis code (primary or other) noted on any office encounter during the 18-month period. Each clinic also applied additional inclusion criteria to identify children with high-risk asthma for the asthma registry. In the Wilmington clinic, all Nemours pediatric patients with at least one asthma-related ER visit in the past year were added to the registry. Because there are no Nemours hospitals located in Seaford or Dover, these sites included children who had two or more asthma-related visits to the Seaford or Dover clinics.

While pediatric patients on the asthma registry are exposed to the most components of the Nemours HCIA Program—CHW home visits, care management, and community liaisons—program leaders noted that broader populations in the clinic and the surrounding communities also benefit from the program. Therefore, Nemours describes its enrollment population as a nested population model. The model includes four patient populations:

- population A: high-risk pediatric asthma patients of the three clinic sites;
- population B: pediatric asthma patients seen at the three clinic sites (not high risk);
- population C: all pediatric patients seen at the three clinic sites (regardless of asthma status); and
- population D: all children with asthma in the community surrounding the three clinic sites (Dover, Seaford, and Wilmington).

Since the inception of the program, the Nemours program has affected more than 9,500 participants.<sup>99</sup> This includes all patients on the asthma registry as well as patients who have interacted with CHWs or the psychologist even if the patients are not diagnosed with asthma (e.g., siblings of a child on the registry).<sup>100</sup>

**Participant characteristics.** The table below shows demographic information for patients identified as direct program participants during Q7 (not a cumulative count of direct participants). The majority of the patients are male (57.6%) and most patients are between the ages of 1-11 (77.0%). Those utilizing Medicaid constituted 53.4% of the direct participant population.

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<sup>99</sup> At time of report, subpopulation data was not available.

<sup>100</sup> Nemours has a unique way of defining direct and indirect program participants. Patients who are part of the registry are direct participants; patients with asthma who are receiving treatment at Jessup, Dover or Seaford are indirect participants. Any patient that receives services provided by the CHWs (regardless of asthma or registry status) is direct participant. Any clinic patient that receives services provided by one of the three HCIA funded psychologists (regardless of asthma or registry status) is considered a direct participant. Any clinic patient that receives services provided by the Asthma Educator (regardless of asthma or registry status) is also considered a direct participant.

Demographic Information	Jan–March 2014 Patient Count	Jan–March 2014 Patient Count		Jan–March 2014 Patient Count	Jan–March 2014 Patient Count
<b>Sex</b>	<b>#</b>	<b>%</b>	<b>Age</b>	<b>#</b>	<b>%</b>
Male	2656	57.6%	Infants: >1 month – < 1 year	2	0.04%
Female	1958	42.4%	Children: 1–11 years	3,550	77.0%
			Adolescents: 12–18 years	1,062	23.02%
<b>Race/Ethnicity</b>	<b>#</b>	<b>%</b>	<b>Insurance Type</b>	<b>#</b>	<b>%</b>
Unknown	221	4.8%	Medicaid	2,463	53.4%
Hispanic or Latino	426	9.2%	Private/Commercial	1689	36.6%
White	1270	27.5%	Uninsured	412	8.9%
Two or More Race/Ethnicity	241	5.2%	TRICARE (Armed Forces)	50	1.1%
Black/African American	2399	52.0%			
Native Hawaiian or Other Pacific Islander	3	0.1%			
Asian	51	1.1%			
American Indian/Alaska Native	3	0.07%			

Source: HCIA 7QR Awardee Performance Report. Reflects unique count of quarterly direct program participants.

### Implementation Effectiveness

During the first quarter of the HCIA grant, Nemours focused efforts on building up its workforce, including the team of CHWs, community liaisons, and mental health professionals across the three sites. All three of Nemours participating sites began implementation of the HCIA Program at the same time. Each of the sites began the process of applying for NCQA certification just as it began implementation of the HCIA project.

Program leadership and staff have gleaned several lessons learned from the implementation of the Nemours HCIA Program:

**Identifying participants.** CHWs and providers noted that the initial list of registry patients identified through retrospective review of EHR data included some patients who were not ideal candidates for the program. Some patients on the registry had several asthma-related ED visits in the past year, but they had not visited Nemours pediatric clinics in several years. CHWs and providers had more difficulty communicating with and engaging these patients and their families. CHWs also noted that some parents of children initially added to the registry did not think that their child’s asthma was uncontrolled and so they declined services from the CHW.

**Engaging and enrolling participants.** CHWs initially had a difficult time connecting with families, relying primarily on cold calls to families identified through the registry. Several families did not understand the purpose of the program and were reluctant to allow CHWs into their homes. The number of families interested in the intervention increased once doctors started talking to parents of registry patients about the program and took the time to introduce parents to CHWs during clinic visits. The clinic

noted that simply displaying pictures of CHWs helped to increase awareness about the program and sent a clear message that the CHWs were an extension of the Nemours clinical team.

**Flexibility in defining workforce roles.** CHWs and community liaisons are not traditionally part of the clinical care teams at Nemours clinics; therefore, Nemours developed new job descriptions for both roles at the start of the program. Over the course of the implementation, the roles and responsibilities of CHWs and community liaisons evolved in response to the needs of the participant population and target communities. Additionally, CHWs and community liaisons work out of clinic sites but are supervised by non-clinical management staff at NHPS headquarters. As a result, they sometimes received conflicting guidance from NHPS management staff and clinic management staff on the scope of their responsibilities. Nemours has therefore learned that flexibility, patience, and initiative are important characteristics to look for when hiring to fill brand-new roles to an organization

## Program Effectiveness

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Our evaluation of the program's effectiveness will focus on quantitative and qualitative analysis as described below.

### Quantitative Results

Our evaluation of program effectiveness of the Nemours program will be based largely on quantitative data. At the time we began work on this report, we did not have the necessary agreements in place to receive data from Nemours. Since that time, we have finalized these agreements and look forward to presenting results on the Nemours program's impact on measures of health, quality of care, utilization, and costs for the Medicaid and Children's Health Insurance Program population served by this program.

### Qualitative Results

Our qualitative findings on program effectiveness for the Nemours program will be based largely on analysis of data collected during focus groups with caregivers. At the time of this report, we had not yet conducted focus groups. We will present the results of our analysis in a future report.

## Workforce Development and Deployment

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Practice teams in all three sites consist of primary care providers, a care coordinator, community liaison, and nurses—none of whom are funded by the award. NHPS provides community liaisons in-kind. The practice teams also include three CHW positions at each site and a mental health professional at each site—all of which are funded by the Innovation Award. CHWs and community liaisons are a new addition to the practice staff team. Care teams are also a new development of care teams; they came about at the start of the grant and the PCMH NCQA certification process. Each clinic site also receives support from an asthma educator funded through the grant. This role leads asthma education sessions with patients and their families at the clinics and at community events. The Innovation Award also supports management staff housed at the NHPS including the Community Liaison Manager and CHW Manager.

**Physicians and mental health professionals.** Physicians are responsible for creating asthma action plans for patients on the registry. They can also help connect CHWs with patients whom have been difficult to reach via phone and mail. Over time, as physicians acclimated to having CHWs in the practice and

understood their role more clearly, they became much more active about referring patients and informing them about the home-based component. Physicians can also refer patients with social needs to care coordinators and patients with behavioral health needs to the co-located mental health professional at their respective practices. The mental health provider is fully funded by the Innovation Award and therefore only meet with patients on the registry. The mental health professional provided training to CHWs around patient engagement and motivational interviewing skills. Although clinic staff sees the benefit of having this behavioral health provider as a resource for registry patients, they would like to expand the role's scope beyond patients on the registry. Although neither of these roles received formal training specific to grant activities, they were provided support and guidance from NHPS staff throughout the implementation of the program. All clinic staff, including physicians and the mental health professionals, were encouraged to go on a community tour—arranged by community liaisons—in order to understand where their patients' families live and how their living environment impacts their health and medical compliance.

**Community health workers.** Each family has a dedicated CHW whose main role is to provide asthma education and management strategies for families, usually in the home. During home visits, they work with patients and their families to improve self-management practices, discuss asthma action plans, identify triggers via home assessments, and connect patients to resources when needs arise. Often, CHWs must address multiple social barriers with families before they even begin the asthma management intervention. Training for CHWs was extensive. The initial group received more than 100 hours of training in a two-month period, including the following:

- Nemours employee training, including organization expectations, systems access training, and Epic training for EMR competency;
- training on data collection instruments, including the Pediatric Quality of Life Asthma Module and the Family Asthma Management System Scale;
- community health worker training through the Community Health Worker Network of New York City;
- Healthy Homes training provided by the Delaware Department of Public Health; and
- CPR and first aid.

Beyond the initial training, Nemours provides occasional refresher trainings for CHWs and ongoing mentoring provided by the CHW manager, a mental health provider, and other members of the program management staff.

Nemours uses a matrix management model for the CHWs, meaning that CHWs report to both a CHW supervisor who is employed by the NHPS division and to the office manager at the clinic where the CHW is based. The NHPS-based supervisor meets with CHWs periodically to discuss challenges and lessons learned. The NHPS-based supervisor also worked to ensure that CHWs were appropriately integrated into the three clinic teams. Many staff members commented that CHWs often receive direction from management staff at NHPS and receive conflicting direction from the clinic manager. They suggested that in future iterations of the intervention CHWs should receive direction from the clinic manager and broader oversight from management at NHPS in order to avoid conflicting direction and promote integration into the clinic.

**Community liaisons.** While the community liaison role was an existing position within NHPS prior to the grant program, they have assumed a slightly different role under the HCIA Program. The community liaisons have had years of prior training around community development and mobilization, but under the HCIA Program, they focus on issues related to asthma, and coordinate more closely with the hospital and the clinics. In fact, the community liaisons work at least one day a week out of the clinic sites. They focus primarily on policy, system, and environmental change related to asthma by working with schools, communities, and urban housing development authorities to reduce environmental asthma triggers. Community liaisons report to a community liaison supervisor who meets with them weekly to develop their community-engagement plan and ensure that they are meeting all the appropriate implementation milestones.

**Care coordinators.** While care coordinators are not funded directly by the HCIA Program, they are considered a key part of the care team. Care coordinators were added to the care team as part of the PCMH certification process. The care coordinator role varies at each of the three clinics. They are charged with multiple tasks including maintaining and updating the asthma registry, working with care teams to coordinate care of patients, and monitoring the care teams to ensure flow and communication run smoothly. They can also interact with patients directly regarding specific social issues. In Jessup, patients will often come directly to the care coordinator with issues or questions, and physicians can refer patients to the care coordinator. The CHWs also use the care coordinator as a resource if during visits with patients they identify a social barrier or need that must be addressed. Their backgrounds vary: one care coordinator is a registered nurse, another is a social worker, and the third is a patient services representative who had extensive experience as front-office staff in the clinic.

## Context

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Nemours has encountered some of contextual barriers and facilitators in the implementation of their program:

### Endogenous Factors

Endogenous factors within Nemours have contributed to the progress of the Nemours HCIA Program. The support that the Nemours HCIA Program received from leadership at the highest levels of the Nemours healthcare system has facilitated its implementation. For example, during early phases of the intervention the program implementation team was having difficulty extracting the necessary self-monitoring data from the Epic EHR system. However, after receiving support from leadership, the HCIA Program staff was able to meet weekly with the Epic information system team to customize the system to support the HCIA implementation. Nemours program leadership has also noted that the Nemours organization is moving toward integration of population health in all its clinics. This organizational shift in culture has also facilitated the rollout of the HCIA Program. One step that the Nemours organization has taken is pursuit of PCMH NCQA certification for all its pediatric clinics. Since the three sites participating in the HCIA Program were already undergoing this transformation, these sites were able to leverage these changes to support the Innovation Award. For example, the sites had all hired care coordinators to staff each of the three sites and had expanded clinic hours to address access issues for this patient population. There were also several enhancements made to the Epic EHR system. Another program that was already underway at Nemours similarly supported the HCIA Program. Called the

School Health Collaborative, this program provides limited read-only access to the Nemours EHR system for school nurses around Delaware. Parents of children on the asthma registry were encouraged to take advantage of this program by consenting for their child's nurse to access the child's medical record, including their asthma action plan.

### Exogenous Factors

Nemours staff described several exogenous barriers specific to their program's target population and the social environment that limits the impact of their intervention. Patients and their families are dealing with a myriad of social and personal issues including unstable and poor housing, financial constraints, lack of transportation, and unsafe neighborhoods. CHWs must address these social barriers before they can begin to work on the asthma-specific issues. In many cases, CHWs are not able to provide solutions to all the challenges faced by the participants and their families. For example, transportation continues to be a challenge as the public transport system in Delaware is often inconvenient and difficult to navigate. While CHWs and care coordinators can connect Medicaid eligible families to LogistiCare (Delaware's Medicaid non-emergency transportation service), there are still challenges in ensuring that transportation arrives on time and can be booked for specific medical appointments. CHWs who work in Wilmington noted that they often feel unsafe traveling to the homes of some participants and have had to reduce or eliminate home visits during the summer months when gang violence and shootings increased. They also observed that the city is saturated with social service organizations, so they have to work harder to distinguish themselves as a different service to participants while also working in tandem and collaborating with the pre-existing resources.

### Summary

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The Nemours HCIA intervention focuses on improving care management and providing self-management support for children with high-risk pediatric asthma and their families. The HCIA program leverages several other programs and initiatives underway at Nemours, including its pursuit of NCQA certification as a patient-centered medical home. The community health workers (CHWs) provide self-management support to families caring for children with asthma by addressing non-medical social needs as well as reinforcing asthma education. Clinics have incorporated CHWs into the care team and are focused on providing whole-person-oriented care that addresses all the needs of their patients through the use of CHWs, care coordinators, and behavioral health providers. Community liaisons are working in the communities of the three participating clinics to identify ways in which to improve the environment and reduce asthma triggers where children live, learn, and play.

The participating clinics have found the addition of the CHW role to be invaluable and are looking into ways to support the role in the future. Although increasing evidence is being found to support CHWs in home-based interventions,<sup>101,102</sup> there are still barriers to implementing the role more broadly. At this

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<sup>101</sup> Swider S. Outcome effectiveness of community health workers: an integrative literature review. *Public Health Nurs.* January-February 2002; 19: 11-20.

Perez M, et al. The impact of community health worker training and programs in NYC. *Journal of Healthcare for the Poor and Underserved.* February 2006; 17(1S):S26-S43.

<sup>102</sup> Krieger J, Philby M, Brooks M. Better home visits for asthma: lessons learned from the Seattle-King County Asthma Program. *American Journal of Preventive Medicine.* 2011; 41(2S1): S48 -S51.

time, there is a lack of certification mechanisms for home visitors, a lack of reimbursement for home visits by health insurers, and a lack of awareness among medical providers about the value of home visits.<sup>103</sup> The last barrier is one that the CHWs at Nemours felt firsthand when they first became integrated into the clinic. The lack of reimbursement options continues to be a stressor for CHWs, who must be funded through grants.

There are several topics that warrant further investigation during the second year of the evaluation, including:

- the breakdown of the patient populations, both by demographics and by encounters, based on program data;
- the minimum “dose” of intervention (home visits) required to improve outcomes for registry patients;
- model of supervision of CHWs;
- impact of CHW caseloads on program implementation, including CHW job satisfaction and program reach; and
- how Nemours will continue to address the needs being filled by the community health worker and community liaison roles.

Continued research and communication with the awardee on these topics will help to better inform the evaluation of Nemours in order to determine the potential for replicability and scalability of the intervention as well as an examination of how the program itself is serving its immediate patients currently in the program.

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<sup>103</sup> Ibid.

## Ochsner Clinic Foundation

This report presents our evaluation of the Ochsner Clinic Foundation’s comprehensive stroke care model, including the in-hospital (Stroke Central) and outpatient (Stroke Mobile) programs.

We provide preliminary observations about the program based on a review of the awardee’s application, operational plan, and quarterly reports as well as telephone interviews with the awardee. We conducted a site visit on August 5–6, 2014, and continue to work to code and analyze the data collected on that visit. While this report presents themes that we have identified during the first year of the evaluation, it is important to note that our findings are tentative and descriptive at this point. We look forward to providing more definitive findings and results, including analysis of the data collected at our site visit, for future reports.

<b>Program Title</b>	<b>Stroke Central/Stroke Mobile</b>
<b>Targeted Disease/Condition</b>	<b>Stroke (ischemic, hemorrhagic, and TIAs)</b>
<b>Target Population</b>	Stroke Central serves patients who presented at and were admitted to Ochsner Medical Center with suspected stroke symptoms. Stroke Mobile serves a subset of these patients who had a final discharge diagnosis of stroke who live in Jefferson and St. Tammany Parishes, Louisiana.
<b>Total Amount Awarded</b>	\$3,867,944
<b>Description of Awardee Organization</b>	Ochsner Clinic Foundation is a nonprofit acute-care hospital.
<b>Setting of the Intervention</b>	Stroke Central services are provided at Ochsner Medical Center in New Orleans, Louisiana, and consultations are provided via telemedicine at 22 affiliated hospitals. Stroke Mobile visits are made to patients and their families in their homes or at care facilities throughout Jefferson and St. Tammany parishes, part of the greater New Orleans region.
<b>Overview of Intervention</b>	Ochsner’s program is comprised of two key components: Stroke Central and Stroke Mobile. <b>Stroke Central</b> is a care coordination system in which registered nurses (RNs) and advance practice clinicians (APCs) manage patients across all “nodes” of stroke care, including communication and coordination with multidisciplinary teams both in-hospital and following discharge. <b>Stroke Mobile</b> is a one-year post-discharge care model with RN and lay health educator teams who conduct monthly, home-based follow-up care for patients and provide targeted education for patients, caregivers, and their families about stroke. Stroke Mobile only serves patients who were discharged from Ochsner Medical Center with a final diagnosis of stroke and who live in Jefferson and St. Tammany parishes.

### Introduction

Immediate medical attention is critically important in acute stroke management to minimize the potential of brain injury and the long-term effects of stroke.<sup>104</sup> For example, the American Heart Association

<sup>104</sup> Jauch E, Cucchiara B, Adeoye O, Meurer W, Brice B, Chan Y, et al. Part 11, Adult Stroke: 2010 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. *Circulation*. 2010; 122, S818-S828. [http://circ.ahajournals.org/content/122/18\\_suppl\\_3/S818.full](http://circ.ahajournals.org/content/122/18_suppl_3/S818.full).

Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care cite studies that document better outcomes when providers administer recombinant tissue plasminogen activator (tPA), the only FDA-approved treatment for ischemic stroke, to patients within the first three hours of symptom onset. However, due to a range of factors, including lack of awareness of stroke symptoms and logistical issues preventing appropriate treatment in the hospital, national rates of tPA use remain low.<sup>105</sup>

In addition to delays in diagnosis and initial treatment, stroke patients can receive suboptimal post-stroke care due to fragmented healthcare delivery systems. The American Stroke Association's Task Force on the Development of Stroke Systems notes,

*“Although individual components of a stroke system may be well developed, these components often operate in isolation.”*<sup>106</sup>

The Task Force recommends building integrated stroke systems of care that coordinate care across several stroke services and activities in order to improve patient outcomes.

Seeking to improve patient access to evidence-based care and practitioners for timely diagnosis and treatment, the Ochsner Clinic Foundation (Ochsner) has been involved in a telestroke program for several years. In 2009, the CDC awarded a grant to Ochsner's Department of Neurology, the Louisiana Department of Health and Hospitals, and the American Heart Association/American Stroke Association to implement a stroke telemedicine network in 10 hospitals across Louisiana.<sup>107</sup> The hospitals participating in the telestroke program showed significant improvements in the length of time between admission and tPA administration.<sup>108</sup> This previous grant built much of the infrastructure that Ochsner's Telestroke Network currently uses to diagnose and treat patients who present at 22 spoke sites with stroke-like symptoms. As a Joint Commission-certified Comprehensive Stroke Center,<sup>109</sup> Ochsner Medical Center (OMC) in New Orleans has practitioners with expertise to assist staff at affiliated hospitals with timely patient evaluation. Of patients evaluated through the Telestroke Network, approximately 30% are then transferred to OMC for in-hospital care.

In addition to working with affiliate sites, Ochsner has made efforts to improve care within the Ochsner Medical Center. Ochsner applied for HCIA funding at the beginning of 2012 to implement an in-hospital model of care coordination and delivery. The program, called **Stroke Central**, went live in January 2013. The goal of the program is to increase efficiencies in initial stroke treatment, improve adherence to stroke

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<sup>105</sup> Johnson M, Bakas T. A review of barriers to thrombolytic therapy: implications for nursing care in the emergency department. *The Journal of Neuroscience Nursing*. 2010; 42(2): 88-94.

Fang M, Cutler D, Rosen A. Trends in thrombolytic use for ischemic stroke in the United States. *Journal of Hospital Medicine*. 2010; 5(7): 406-409.

<sup>106</sup> Schwamm L, Pancioli A, Acker J, Goldstein L, Zorowitz R, Shephard T, et al. Recommendations for the establishment of stroke systems of care: recommendations from the American Stroke Association's Task Force on the Development of Stroke Systems. *Stroke*. 2005; 36(3): 690-703.

<sup>107</sup> Neurology department awarded \$600k for stroke program. Ochsner Health System. 2009. <http://academics.ochsner.org/audyn.aspx?id=34536>

<sup>108</sup> Joshi P, Marino M, Bhoi A, Gaines K, Allen E, and Mora J. Implementing telestroke to reduce the burden of stroke in Louisiana. *Journal of Cardiovascular Disease Research*. 2013; 4(1): 71-73.

<sup>109</sup> The Joint Commission and the American Heart Association/American Stroke Association launched Advanced Certification for Comprehensive Stroke Centers in September 2012. It requires certain infrastructure, staff, and training standards.

guidelines, decrease complications in the hospital, and improve coordination across the continuum of stroke care.

Ochsner developed a companion HCIA-funded program to address long-term post-stroke management and prevention of recurrent strokes, called Stroke Mobile. This effort launched in February 2013. The American Heart Association estimates that approximately 185,000 individuals experience a recurrent stroke each year.<sup>110</sup> While stroke risk can be mitigated through management of stroke risk factors and lifestyle modifications, several studies have noted low levels of knowledge of risk factors<sup>111</sup> as well as low levels of risk factor modification overall.<sup>112</sup> Risk factor modification for stroke often requires complex treatment plans for patients who might have impaired cognition and barriers to accessing care. With this in mind, the Ochsner program team designed Stroke Mobile as a home-visiting program to provide targeted stroke care and education. The design of Stroke Mobile was informed by the principal investigator's previous work on an NIH-funded project that aimed to reduce risk factors for vascular disease in at-risk populations in South Carolina. That project, also called Stroke Mobile, trained community outreach teams to travel to community gathering places and homes to deliver health education, screenings, and secondary prevention programs.<sup>113</sup>

### Innovation Components

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The Ochsner team developed a program to coordinate stroke care across all “nodes” of stroke care, from the ER to the inpatient stroke unit to post-discharge care, including the home setting, outpatient rehab, and skilled or long-term nursing facilities if needed.

There are four nodes of stroke care, and this section describes how Stroke Central and Stroke Mobile work to improve care and coordination across these nodes. Stroke Central targets the acute stroke and in-hospital nodes, while Stroke Mobile focuses on the sub-acute and chronic stroke nodes.

**Acute stroke node.** When a patient with a suspected stroke arrives at the ER at the Ochsner Medical Center via emergency medical services, personal transport, or Telestroke Network transfer, a provider can activate a “stroke code” to connect the patient to Stroke Central. A vascular neurologist or a Stroke Central advanced practice clinician (APC) then evaluates the patient to diagnose a stroke.

The Ochsner team instituted a single Stroke Central telephone line that has 24/7 coverage, which ensures that other departments in the hospital can always reach an APC or a vascular neurologist when necessary.

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<sup>110</sup> Go A, Mozaffarian D, Roger V, Benjamin E, Berry J, Blaha M, et al. Heart disease and stroke statistics—2014 update: a report from the American Heart Association. *Circulation*. 2014; 128.

<sup>111</sup> Nicol M, Thrift A. Knowledge of risk factors and warning signs of stroke. *Vascular Health Risk Management*. 2005; 1(2), 137–147.

<sup>112</sup> Ruland S, Raman R, Chaturvedi S, Leurgans S, Gorelick PB. Awareness, treatment, and control of vascular risk factors in African Americans with stroke. *Neurology*. 2003; 60(1): 64–68.

Kernan W, Viscoli C, Brass L, Makuch R, Sarrel P, and Horwitz R. Blood pressure exceeding national guidelines among women after stroke. *Stroke*. 2000; 31(2): 415–419.

Joseph LN, Babikian VL, Allen N, Winter M. Risk factor modification in stroke prevention: the experience of a stroke clinic. *Stroke*. 1999; 30(1): 16–20.

<sup>113</sup> Howe D, Gaines K, Kurtzman A, Gebbia M, Brown M, Ford J. StrokeMobile: a primary and secondary prevention program in African American communities. 2013. <http://www.carecarolina.com/wp-content/uploads/2013/04/Amer-Acad-Neurology-Poster-Stroke-Mobile-Disparities-1.pdf>

The Stroke Central registered nurse (RN) triages these calls and answers questions from hospital personnel when possible.

**In-hospital node.** In order to streamline stroke care coordination across Ochsner Medical Center, the Stroke Central team worked with Ochsner to create a dedicated stroke unit. All non-critical stroke patients who are admitted to the hospital now receive beds on the same floor, which helps the Stroke Central staff monitor patients, provide timely treatment, and prevent complications. The project team reports that all critical care patients will also be housed on the same floor by December 2014, which will further increase accessibility.

Co-locating patients helps facilitate a key component of the Stroke Central program:

**Daily multidisciplinary rounds.** These rounds involve a range of providers that care for stroke patients, including—among others—the Stroke Central vascular neurologists, APCs, and RN; hospitalists, residents, and medical students rotating through the stroke unit; a case manager and social worker; and physical, speech, and occupational therapists. During these rounds, the team discusses the health status of new and existing patients in the stroke unit and proposes recommendations for treatment. The team, led by a vascular neurologist, also develops a plan of action for post-acute care. When developing the plan, every member of the team has the opportunity to contribute to the discussion and provide information about potential caregivers, insurance status, and available housing as well as eligibility for Stroke Mobile and rehabilitation or nursing needs.

The Ochsner team has also developed a Stroke Patient Education Guide, which is provided to all patients and caregivers at hospital admission. The Stroke Central RN/APCs use the guide to provide ongoing stroke care-related education. It also serves as a resource for patients and caregivers after discharge from the hospital. The Stroke Central RN also calls all participants post-discharge to evaluate their understanding of post-stroke care and recurrence risk factors.

**Sub-acute and chronic stroke nodes.** Patients leaving the in-hospital node can be discharged to one of two types of settings as appropriate: (1) an outpatient rehab or skilled/long-term nursing facility (the sub-acute node) or (2) the home setting (the chronic stroke node). The Stroke Mobile team begins visiting eligible patients—those with a final discharge diagnosis of stroke who live in St. Tammany or Jefferson Parishes—regardless of their setting. However, the teams' ability to visit patients can depend on the policies of the facility and the medical condition of the participant. In addition, three Stroke Mobile teams comprised of an RN and lay health educator provide in-home follow-up care, education, and support in the chronic stroke mode for post-stroke patients and their caregivers. This minimizes risk for recurrent strokes. Stroke Central staff members can continue to make care recommendations post-discharge for some patients who transition to rehab and skilled nursing facilities as part of the sub-acute node.

In order to maximize efficiency and minimize travel time, each Stroke Mobile team is assigned to a particular zone in Jefferson or St. Tammany Parish. The program manager alerts the teams when a new eligible patient has been admitted to the hospital, and the Stroke Mobile teams and the Stroke Central RN and APCs attempt to enroll patients while in-hospital. The Stroke Mobile teams each spend one day a week in the Ochsner Medical Center, trying to approach patients in the hospital for enrollment. However, the Stroke Mobile team reports that some families decline to participate in the program because they feel

overwhelmed or have competing priorities when the stroke patient is still in the hospital. The Stroke Mobile teams continues to reach out to patients who initially refuse to participate over the following months.

The Stroke Mobile team provides monthly visits over the course of a year. Each visit has a different topic and is timed to address stroke risks when they are likely to occur in recovering patients. For example, Stroke Mobile targets recurrence risks in the first three months, when stroke recurrences are most common. In addition, the Stroke Mobile team discusses issues related to hospital readmission, depression, and common complications, such as infection and urinary incontinence. Stroke Mobile also educates caregivers through family-based health education that is intended to address preventable stroke risk factors among family members. The Stroke Mobile RN administers assessments to the patient that are assigned to each Stroke Mobile visit, such as depression scales or Modified Rankin scales to measure the extent of disability resulting from the stroke. There is a protocol for each of the 12 visits, but the Stroke Mobile team may choose to deviate somewhat from the protocol based on observation of the patient. In addition, the RN administers a Modified Caregiver Strain Index to caregivers of Stroke Mobile patients to measure burden and identify any emerging concerns.

The Stroke Mobile staff can also use Jabber—which allows for HIPAA-compliant, remote video communication—to contact Stroke Central staff for consultations during home visits.

### Target Population and Program Participants

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Ochsner’s Stroke Central intervention targets stroke patients who present at the Ochsner Medical Center ED and are admitted with suspected stroke symptoms. The program includes patients who receive telemedicine services as part of the Ochsner’s Telestroke Network from another local ER.

Ochsner limited Stroke Mobile to patients who reside in Jefferson and St. Tammany parishes and have a discharge diagnosis of stroke. The team chose to include St. Tammany and Jefferson parishes because they are close in proximity to the main Ochsner Medical Center, and their demographics reflect those of the Louisiana population in general. Stroke patients residing in Jefferson and St. Tammany parishes in Louisiana receive the full intervention (Stroke Central and Stroke Mobile).

**Participant characteristics.** As of March 31, 2014 (the end of Quarter 7 of the award), Stroke Central has served 1,306 participants, and Stroke Mobile has served 216. Overall, the project has 144 more participants than the team had originally projected throughout Quarter 7. Participants are split fairly evenly between men and women. Approximately 40% of participants are over 75 years of age, and an equal proportion are between 26 to 64 years of age. The majority of participants are insured by Medicare. A majority of participants also identify as White, while approximately one-third identify as Black or African American. Demographics for participants in Quarter 7 are illustrated in the table below.

Demographic Information	Jan–March 2014 Patient Count	Jan–March 2014 Patient Count		Jan–March 2014 Patient Count	Jan–March 2014 Patient Count
<b>Sex</b>	<b>#</b>	<b>%</b>	<b>Age (Years)</b>	<b>#</b>	<b>%</b>
Male	132	45.1%	Elderly: >75	116	39.6%
Female	161	54.9%	Elderly: 65–74	57	19.5%
			Adults: 26–64	118	40.3%
			Young Adults: 19–25	2	0.7%
<b>Race/Ethnicity</b>	<b>#</b>	<b>%</b>	<b>Insurance Type</b>	<b>#</b>	<b>%</b>
White	176	60.1%	Medicare (FFS/Unspecified)	172	64.4%
Black/African American	93	31.7%	Private/Commercial	42	15.7%

### Implementation Effectiveness

Ochsner’s operational plan was approved prior to Q1, Stroke Central went live on January 2, 2013, and the first Stroke Mobile team began seeing patients in February 2013.

At the time of this report, we had not yet conducted a thorough analysis of the data collected during our site visit. We will therefore present our findings relating to implementation progress and experience in a future report.

### Program Effectiveness

Our evaluation of the program’s effectiveness will focus on quantitative and qualitative analysis as described below.

### Quantitative Results

We primarily employ quantitative analyses to assess the effectiveness of Ochsner’s Stroke Central and Stroke Mobile programs using Medicare claims. The impact of these two programs is studied on core priority measures (Stroke Central: hospital readmissions, ED visits, and total cost of care within 90 days of discharge; Stroke Mobile: all-cause hospitalizations, ACS hospitalizations, ED visits and total cost of care per quarter) as well as supplemental measures specific to the two programs. In our subsequent reports to CMMI, we will present a comprehensive set of findings about Ochsner’s program effectiveness, as we gather and analyze both quantitative and qualitative data from Ochsner.

At the time we conducted data analysis for this report, we had finalized a data sharing agreement with Ochsner, but had not yet received a finder-file from the awardee listing the participants enrolled in the Stroke Central and Stroke Mobile programs. Therefore, we do not present program effectiveness results for Ochsner in this Annual Report. Since drafting this report, we received a finder-file from Ochsner that allows us to identify their program participants, enabling us to present our analysis in our next quarterly report.

## Qualitative Results

Our qualitative findings of program effectiveness for Ochsner's program will be based largely on analysis of data collected during our site visit, including discussions with staff and participants and observations of the program. At the time of this report, we had not yet conducted the analysis of this data and will therefore present the results of this analysis in a future report.

## Workforce Development and Deployment

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While some members of the Stroke Central team were already employed by Ochsner prior to the Innovation Award (e.g., the vascular neurologists), the majority of the Stroke Central staff and all of the Stroke Mobile staff were hired specifically as part of this intervention.

**Stroke Central advanced practice clinician and registered nurse.** APCs and an RN are primarily responsible for carrying out Stroke Central. APCs coordinate the care of program participants, from evaluating the patients when they arrive at the hospital to managing care plans in inpatient units to holding daily discussions with Stroke Mobile staff to discuss post-acute care for discharged patients. The Stroke Central RN performs several roles, including helping to facilitate daily rounds, triaging calls to the Stroke Central line, ensuring that the Stroke Central staff adhere to quality metrics, providing stroke education to inpatients, and evaluating patient understanding of post-stroke care and risk factors.

The project team has had difficulties finding and retaining qualified APCs due to regional shortages, higher salaries in the private sector, and the specific demands of the position, such as night and weekend hours. To address this issue, the team implemented an alternate staffing model that decreases APC positions (from five to four) and increases RN positions (from one to three).

**Vascular neurologists.** Stroke Central also works closely with vascular neurologists, who provide care to patients in the stroke unit. Vascular neurologists are equipped with videoconferencing-enabled laptops and tablets to provide consults during admission to the ER, which is the first point of care in the stroke care continuum. Stroke Mobile staff can use telemedicine to contact the vascular neurologists for consults during home visits.

**Lay health educator and nurse.** Stroke Mobile currently has three teams and plans to add one more as patient volume requires. The teams each consist of a lay health educator and an RN. Stroke Mobile nurses are responsible for ordering lab assessments and working with patients to evaluate risk factors, cognitive function, depression, ability for self-care, and more. The Stroke Mobile lay health educators present educational modules to participants, their caregivers, and their family members. Stroke Mobile staff input information from their forms and assessments into the EHR, which ensures that the entire program team has ongoing access to the patient's data and can track their progress.

**Dedicated information systems liaison.** The Ochsner hospital system changed their EHR system to Epic at the onset of the project. While this allowed the team to build several custom forms for the program, it had issues with pulling data and generating useful reports. The program decided to hire a dedicated information systems (IS) liaison to help interface with the IS Epic staff. Though the funding for this position has ended, the specialist helped the project team to create lasting relationships with the IS staff, which has facilitated reporting initiatives.

**Training.** Stroke Central staff receives training to become certified in the NIH Stroke Scale and undergo several hours of shadowing, while Stroke Mobile staff receive a day-long training conducted by a partner at the Tulane School of Medicine and also shadow 25 home visits with an experienced team. Other hospital staff who interact with Stroke Central patients, such as neurology floor nurses and emergency department staff, have varying levels of knowledge of stroke-related care. To standardize some aspects of training and to provide targeted education modules for Stroke Central/Mobile staff members, the program team is developing an online training curriculum through a platform called DialogEdu. The team also plans to use DialogEdu to create tailored modules for patients and caregivers, to reinforce education between home visits and after the Stroke Mobile program ends.

## Context

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To implement Stroke Central and secure the Joint Commission’s Comprehensive Stroke Center Certification, the program staff had to institute organizational changes across the Ochsner system. This involved collaborating with several departments and stakeholders at Ochsner to (1) provide basic stroke education and training to all nurses who interact with stroke patients; (2) reorganize admitting protocols to create a stroke unit on one floor of the hospital; (3) conduct multidisciplinary rounds; and (4) educate personnel about Stroke Central and the 24/7 telephone line. The program team reports that the broader Ochsner system had been accommodating of these changes, which has facilitated the implementation of Stroke Central.

Our qualitative findings of contextual factors for the Ochsner program will be based largely on data collected during our site visits. At the time of this report, we had not conducted the analysis of the site visit data and will therefore present the results of this analysis in a future report.

## Summary

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The Ochsner Clinic Foundation’s Stroke Central/Stroke Mobile program is designed to enhance care coordination and improve care quality across the nodes of stroke care, from admission to the emergency room to one year post-discharge from the hospital. Stroke Central focuses on increasing care coordination in the fragmented stroke delivery system by employing APCs and an RN to provide 24/7 stroke care to inpatients. Stroke Central also addresses early diagnosis and treatment by incorporating a telemedicine consulting service that reaches 22 affiliated hospitals across the state of Louisiana. In implementing Stroke Central, the Ochsner team also instituted critical organizational changes that included creating a dedicated stroke unit in the hospital and holding multidisciplinary rounds with a range of providers involved in stroke care. The Stroke Mobile program targets post-stroke care outside the hospital and aims to decrease stroke recurrence and improve patient outcomes through risk factor modifications. Stroke Mobile employs teams of lay health educators and RNs that conduct home visits to deliver tailored health education and assessments to eligible patients over the course of a year. While Stroke Central includes all stroke patients who are admitted to the main Ochsner Medical Center or captured via the telemedicine system at an affiliated hospital, Stroke Mobile only includes discharged stroke patients who reside in Jefferson and St. Tammany Parishes in Louisiana.

There are several topics that warrant further investigation during the second year of the evaluation, including:

- whether the Stroke Central staffing model affected the implementation of the intervention;
- implementation of changes to the staffing model, particularly related to the roles of registered nurses and advanced practice nurses in the intervention the role of each team member in the development of action plans for Stroke Central participants; and
- the role of the leadership team in helping the Stroke Mobile teams to address the high social-support needs of the Stroke Mobile participants.

Continued research and communication with the awardee on these topics will help to better inform the evaluation of Ochsner to determine the potential for replicability and scalability of the intervention as well as to discover how the program itself is serving the immediate patients currently in its program.

## The Trustees of the University of Pennsylvania

This report presents our evaluation of the Trustees of the University of Pennsylvania (UPenn) Comprehensive Longitudinal Advanced Illness Management (CLAIM) program.

We provide preliminary observations about the program based on a review of the awardee’s application, operational plan, and quarterly reports as well as telephone interviews with the awardee. We conducted a site visit on July 1–2, 2014 and continue to work to code and analyze the data collected on that visit. While this report presents themes that we have identified during the first year of the evaluation, it is important to note that our findings are tentative and descriptive at this point. We look forward to providing more definitive findings and results, including analysis of the data collected at our site visit, for future reports.

<b>Program Title</b>	<b>Comprehensive Longitudinal Advanced Illness Management (CLAIM)</b>
<b>Targeted Disease/ Condition</b>	<b>Cancer</b>
<b>Total Amount Awarded</b>	\$4,361,539.00
<b>Description of Target Population</b>	Adults with advanced cancers who are homebound and qualify for skilled home care.
<b>Description of Awardee Organization</b>	The Trustees of the University of Pennsylvania intervention is being implemented through the University of Pennsylvania Health System, a university-based health system in Philadelphia, Pennsylvania.
<b>Setting of Intervention</b>	The HCIA intervention is being delivered to participants in their homes in counties throughout the Philadelphia region.
<b>Overview of Intervention</b>	The Comprehensive Longitudinal Advanced Illness Management (CLAIM) program is a comprehensive set of home care services for individuals with advanced cancer who are receiving skilled home care and have substantial palliative care needs but are not yet eligible for hospice care. Using care coordination and planning, the intervention provides in-home support, symptom management, crisis management, and emotional and spiritual support for individuals with advanced cancer, enabling them to remain in their homes and avoid unnecessary hospitalizations.

### Introduction

Cancer patients, particularly those with advanced cancers, experience significant care needs. These needs may be more clinical in nature (e.g., pain management), but they may also be the result of social, emotional, or financial burden. While traditional hospice services include counselors, nurses, home health aides, respite care, and chaplains, they are designed to meet the needs of patients near the end of life.<sup>114</sup> In fact, to qualify for traditional hospice services, patients must forgo life-sustaining treatments. Some patients with significant needs may not have the necessary prognosis from their doctor or may simply not be willing to forgo these treatments, making them ineligible for hospice and home care that could improve their quality of life.

<sup>114</sup> Casarett D, Fishman J, Dwyer P, et al. How should we design supportive cancer care? The patient’s perspective. *Journal of Clinical Oncology*. 2007. March 2010; 26(8): 1296-1301.

The CLAIM program seeks to provide home care and supportive services to advanced cancer patients who are not eligible for, or may not be interested in, hospice. The focus is on treating patients in the home for symptoms such as nausea, pain, and fatigue to prevent unnecessary trips to the emergency room and improve the patient's quality of life. In an article published by UPenn Medicine, the CLAIM Principal Investigator (PI) notes that although these patients aren't eligible for hospice care,

*“They still need the symptom management that hospice offers.”<sup>115</sup>*

Home-based care can be as rudimentary as a physical exam or involve more complicated treatments such as blood work, wound care, and draining of fluid—tasks that would normally require a hospital visit but can now be handled in the home. According to the PI, the CLAIM program has reduced hospitalizations for the treatment population by 40%. Case managers also coordinate home-based social services for the patient, such as physical therapy, home health aides, chaplains, and social work services. In addition, home visits by case managers establish close relationships with the patient, which can elicit important conversations about end-of-life care and often serve as a bridge between the physician and the patient.

The PI's early research on hospice care led him to realize that hospice is not necessarily the right choice for all patients. There are many patients pursuing aggressive treatments and are thus ineligible for hospice but still have substantial needs for home care services similar to those provided by hospice. As such, these patients form a “hospice gap.” The motivation behind the UPenn program is to fill this gap. The CLAIM program builds upon Caring Way, a home health palliative care program under UPenn Home Care and Hospice Services. Caring Way is a skilled home care program that provides palliative care and nursing as well as 24-hour triage. Caring Way seeks to provide pain and symptom management for individuals with life-limiting conditions with a goal of keeping patients at home where they can preserve their independence. CLAIM adds resources to the existing Caring Way program, including social workers, visiting nurse practitioners, chaplains, and home health aides.

### Innovation Components

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Although CLAIM is not a home hospice program, it follows a similar model. Once a provider refers a patient to CLAIM, a nurse or nurse practitioner conducts an initial assessment and communicates back with the oncologist to engage in a discussion about care planning and next steps for that patient. Unlike hospice, CLAIM participants can continue to receive chemotherapy and other treatment services while receiving palliative care. A social worker or chaplain from CLAIM may also try to conduct an assessment of the patient and his/her family's needs and figure out how they may have a role in the care plan. In the CLAIM program model, the oncologist is the primary attending physician for compliance, regulatory, and medical legal purposes. The oncologist also oversees all aspects of the patient's care and is responsible for managing medication changes and keeping abreast of the health status of the participants.

Another crucial aspect to the CLAIM program is the 24/7 triage line that participants are encouraged to use for medical advice and triage home-based care. Participants are encouraged to call CLAIM first when

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<sup>115</sup> Sapega S. CLAIM helps cancer patients avoid unnecessary trips to the hospital. University of Pennsylvania Perelman School of Medicine. March 2014. <http://news.penmedicine.org/inside/2014/03/claim-helps-cancer-patients-avoid-unnecessary-trips-to-the-hospital.html>.

an issue arises or when they have a medical concern. Often the program is able to send a nurse to the participants' home to provide necessary care or make a prescription change for a more appropriate medication, thus avoiding an emergency room visit. Certainly, there are times where a participant may need to go to the hospital or emergency room; UPenn uses the triage line to determine whether an ER visit is appropriate.

Most of the communication between the participant and the oncologist occurs through nurses, who communicate directly with the different oncology teams participating with CLAIM. The communication among the various team members happens through informal phone conversations; with joint visits by the nurse, nurse practitioner, and/or social worker, chaplain, or home health aide; through emails; in interdisciplinary team meetings; and with notes in the electronic health record (EHR) system. Central to the CLAIM program is a nurse practitioner who oversees CLAIM participants, reviewing cases on a weekly basis with case managers and serving as a resource for all CLAIM nurses. The nurse practitioner is also a liaison between the CLAIM program and the clinical oncology team and is able to write short-term prescriptions in the event of an emergent situation.

Throughout their care, participants are able to select which CLAIM services they receive. Nurses or the nurse practitioner then usually provide those services in participants' homes. Because UPenn designed CLAIM as an upstream complement to hospice—available to patients before they meet hospice eligibility criteria—no participant receiving CLAIM services will receive hospice services at the same time. Instead, providers manage transitions to hospice in the same way as home care to hospice. Specifically, the transition is discussed with the participant and/or family, as well as with the participant's physician, and if a participant decides to transition to hospice care, they are discharged from the CLAIM program.

**Supporting activities/tools.** UPenn uses an EHR system to manage its patients' information. Providers and nurses can document their interactions with the patient through the EHR system so that other members of the team caring for the patient can access this information. The information documented in the EHR system can be passed to a hospice provider if/when that becomes necessary. The EHR is not the primary intervention but rather supports the overall intervention of providing services to fill the hospice gap. Additionally, communication about participants often occurs through informal calls and emails rather than via the EHR.

### Target Population and Program Participants

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University of Pennsylvania's innovation focuses on individual patients. Specifically, the CLAIM program's target population is adults with advanced cancers who are homebound and who qualify for skilled home care.

- “Advanced cancer” is defined as the presence of cancer as a primary diagnosis.
- All CLAIM participants must meet eligibility criteria for Caring Way (the presence of a skilled care need and homebound status.)
- The primary physician of all CLAIM participants must be within the University of Pennsylvania Health System.

UPenn has served 700 individuals through the CLAIM program. A little more than half of the participants are female, and the majority of the population is between the ages 26 and 64. More than half of the participants have a private or commercial health plan.

**Patient characteristics.** The table below shows demographic information for participants receiving services from the CLAIM program during Quarter 7.

Demographic Information	Jan–March 2014 Patient Count	Jan–March 2014 Patient Count	Jan–March 2014 Patient Count	Jan–March 2014 Patient Count
<b>Sex</b>	<b>#</b>	<b>%</b>	<b>Age</b>	<b>%</b>
Male	131	47.5%	Elderly: >75 years	26.8%
Female	145	52.5%	Elderly: 65–74 years	29.7%
			Adults (26–64 years)	43.1%
			Young Adults (19–25 years)	0.4%
<b>Race/Ethnicity</b>	<b>#</b>	<b>%</b>	<b>Insurance Type</b>	<b>%</b>
Hispanic or Latino	2	0.7%	Medicaid	2.2%
Asian	5	1.8%	Medicare Fee for Service or Medicare Unspecified	29.7%
Black/African American	82	29.7%	Private/Commercial Health Insurance/Health Plan	68.1%
White	100	36.2%		
Unknown	87	31.5%		

Source: HCIA 7QR Awardee Performance Report. Reflects unique count of quarterly direct program participants.

### Implementation Effectiveness

The CLAIM program began recruiting participants on November 1, 2012; providers refer patients to receive home care services through the CLAIM program. Because the CLAIM program builds directly off Caring Way, patients may also be referred to the Caring Way program and ultimately enrolled in the CLAIM program.

At the time of this report, we had not yet conducted a thorough analysis of the data collected during our site visit. We will therefore present our findings relating to implementation progress and experience in a future report.

### Program Effectiveness

Our evaluation of the program’s effectiveness will focus on quantitative and qualitative analysis as described below.

### Quantitative Results

Our evaluation of program effectiveness of the UPenn program will be based largely on quantitative data, and we continue to work with the UPenn team and their partners to put the necessary agreements in place to receive data to support our evaluation. Once finalized, we will use the data provided by UPenn to

assess the program's impact on measures of health, quality of care, utilization, and costs for the Medicare population served by the UPenn program.

### Qualitative Results

Our qualitative findings of program effectiveness for the UPenn program will be based on analysis of data collected during our site visit, including discussions with staff and observations of patient home visits. At the time of this report, we had not yet completed the analysis of this data and will therefore present the results of this analysis in a future report.

### Workforce Development and Deployment

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The CLAIM team consists of a nurse practitioner, nurses, chaplains, social workers, and home health aides.

**Nurse practitioner.** The Nurse Practitioner (NP) oversees all CLAIM participants and directs the majority of the communication among the different oncology teams within the UPenn Hospital System. The NP also conducts home visits to participants and may occasionally attend clinic visits with participants. The NP currently conducts about 10 home visits per week, ranging from one to three hours each and also interacts with nurses, nurse case managers, and physicians over the phone and via email. The nurse practitioner also provides weekly demonstrations for CLAIM staff on how to conduct end-of-life-care conversations with CLAIM patients.

**Nurses.** Nurses play a significant role in the CLAIM program as the primary clinicians who visit patients' homes. During these home visits, a CLAIM nurse may complete the initial assessment of newly enrolled participants, assessing current symptoms and discussing current patient needs. Nurses also help manage participant cases and assist in communicating with physicians. Finally, as case managers, they not only help manage participant cases but also supervise the home health aides who may work with their patients.

**Home health aides.** Home health aides serve as part of the CLAIM team by conducting home visits to CLAIM participants and families and providing personal care services (such as assistance with bathing or dressing) rather than nursing services.

**Chaplains and social workers.** Even though chaplains and social workers are not involved with every CLAIM patient, patients and caregivers may request their services or they may be recommended by one of the clinical workers involved in a patient's care. Chaplains assist in advanced care planning, complete their own initial assessments of participants, and provide emotional and spiritual support for participants and families. Social workers complete their own initial assessments of participants to identify potential social service needs.

**Medical oncologists and palliative care physicians.** In addition to the providers mentioned above, both medical oncologists and palliative care physicians are involved in the CLAIM program. Oncologists may refer their patients to CLAIM, while palliative care physicians tend to manage patient care and symptoms.

**Program management.** Finally, program management and administrative staff for the program include the CLAIM Project Director, who is a medical oncologist, as well as two project coordinators, who manage all administrative elements of the CLAIM program.

Currently, the CLAIM program shares clinical staff with UPenn Home Health and Hospice, so many of those who provide CLAIM services and have CLAIM participants are not dedicated to CLAIM full time. In the near future, UPenn will be shifting to dedicated teams of CLAIM providers (e.g., nurses, social workers, home health aides, and chaplains) who only work with CLAIM participants.

## Context

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Our qualitative findings of contextual factors for the UPenn program will be based largely on data collected during our site visits. At the time of this report, we had not conducted the analysis of the site visit data and will therefore present the results of this analysis in a future report

## Summary

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The CLAIM program offers comprehensive home care services to advanced cancer patients who have significant palliative care needs but are not yet ready for hospice care. The central aspects to the program are managing pain and other symptoms; clarifying and documenting goals of care; initiating advance care planning; providing emotional and spiritual support; and coordinating after-hours calls and crisis management. The goal of the program is to reduce unnecessary hospitalizations and improve the quality of life of participants while keeping them in their homes. The CLAIM team provides symptom management, routine check-ups, and other more complicated tasks, as well as coordinating physical therapy, home health aides, chaplains, and social work services.

The CLAIM program allows participants to undergo treatment services such as chemotherapy while receiving palliative care, filling the “hospice gap” and providing robust home care to advanced stage cancer patients who are still actively seeking treatment. The oncologist remains the primary attending physician, but CLAIM participants are able to choose additional home-based services to complement their treatment. In addition, the CLAIM program institutes a 24/7 triage line that participants are instructed to use before calling emergency services. The triage line offers medical advice, and CLAIM will send a nurse to the participant’s home to assess the participant’s condition and provide non-emergent care. The social work and chaplain components of the program—as well as the close relationships participants have with their case managers—allow for important conversations about end-of-life care. Vital to the CLAIM program is the Nurse Practitioner, who oversees CLAIM participants and is a resource to all CLAIM nurses and case managers. The Nurse Practitioner was also instrumental in establishing a strong relationship between the CLAIM and oncology teams.

There are several topics that warrant further investigation during the second year of the evaluation, including:

- the implementation of organizational restructuring on CLAIM staffing and workforce;
- whether having frontloaded NP visits impacted a patient’s trajectory; and,
- the alignment of UPenn and home-care electronic health records.

Continued research and communication with the awardee on these topics will help to better inform the evaluation of UPenn in order to determine the potential for replicability and scalability of the intervention as well as to determine how the program itself is serving its immediate patients currently in the program.

## University of Alabama at Birmingham

This report presents our evaluation of the University of Alabama at Birmingham (UAB) Deep South Cancer Navigation Network Program (DSCNN), also known as Patient Care Connect (PCC).

We provide preliminary observations about the program based on a review of the awardee’s application, operational plan, and quarterly reports as well as telephone interviews with the awardee and a site visit conducted on June 25–26, 2014. While this report presents themes that we have identified during the first year of the evaluation, it is important to note that our findings are tentative at this point, as we have not completed all of our data collection, coded site visit data, or fully analyzed the data collected to date. We look forward to providing more definitive findings and results for future reports.

<b>Program Title</b>	<b>Deep South Cancer Navigation Network Program (DSCNN), also known as Patient Care Connect</b>
<b>Targeted Disease/Condition</b>	<b>Cancer</b>
<b>Total Amount Awarded</b>	\$15,007,263.00
<b>Description of Target Population</b>	Patient Care Connect serves Medicare beneficiaries 65 years and older with active cancer, cancer remission, and advanced cancer in 11 sites throughout Alabama, Florida, Georgia, Mississippi, and Tennessee.
<b>Description of the Awardee Organization</b>	The University of Alabama at Birmingham (UAB) is implementing their lay health navigator program at the UAB Comprehensive Cancer Center in Birmingham, Alabama, and at 10 other partner sites located throughout Alabama, Florida, Georgia, Mississippi, and Tennessee.
<b>Setting of Intervention</b>	All navigators provide support services to patients in their home environment, at doctor’s visits, in the hospital, in the emergency department, and over the phone as needed in 11 communities throughout Alabama, Florida, Georgia, Mississippi, and Tennessee.
<b>Overview of Intervention</b>	UAB’s Deep South Cancer Navigation Network Program (DSCNN), or Patient Care Connect (PCC), as it is known to patients, provides coordinated oncology care by employing a workforce of lay navigators to expand comprehensive cancer care support services through five states in the deep South. Working through the participating UAB Cancer Care Network affiliated sites, these patient navigators help to improve adherence to care plans and educate cancer survivors on how to find and use the resources they need, with the overall goal of empowering patients to be able to better advocate for themselves in their cancer care.

### Introduction

Traditional cancer care can be complex, and patient navigators are emerging as one approach to improve coordination through the various challenges of cancer care.<sup>116</sup> Ultimately, navigators can provide a variety of supports to cancer patients, ranging from logistical and informational assistance to emotional support and problem solving.<sup>117</sup>

<sup>116</sup> Case M. Oncology nurse navigator. *Clin J Oncol Nurs*. February 2011; 15(1): 33-40.

<http://ons.metapress.com/content/r1j28w64775q11vu/?genre=article&id=doi%3a10.1188%2f11.CJON.33-40>.

<sup>117</sup> Caroll J, Humiston S, Meldrum S, Salamone C, Jean-Peirre P, Epstein R, Fiscella K. Patients’ experiences with navigation for cancer care. *Patient Educ Couns*. August 2010; 80(2): 241-7. PMID: PMC2891343.

Patient navigation can be defined as a barrier-focused intervention that has the following common characteristics:

- Patient navigation is provided to individual patients from the time of their entry into the program, across the cancer trajectory;
- Although tracking patients over time is emphasized, most patient navigation has a definite endpoint when the services provided are complete (e.g., the patient achieves diagnostic resolution after a screening abnormality);
- Patient navigation targets a defined set of health services that are required to complete an episode of cancer-related care;
- Patient navigation services focus on the identification of individual patient-level barriers to accessing cancer care or those producing distress that affects their health;
- “Patient navigation aims to reduce delays in accessing the continuum of cancer care services, with an emphasis on timeliness of diagnosis and treatment and a reduction in the number of patients lost to follow-up.”<sup>118</sup>

While navigators have been studied with respect to improving cancer screening and patient outcomes, the UAB navigator program is seeking to explore navigators’ effect on patient-centered outcomes across the cancer care continuum. In the early 1990s, UAB was the only nationally designated cancer center in the Deep South. Early programs at UAB involved training lay people from the community as community health advisors to promote awareness around screenings for breast and cervical cancer in rural, underserved areas of Alabama and Mississippi. UAB has built upon these earlier navigator programs by adding new programs, including training community health advisors to help newly diagnosed cancer patients in rural areas navigate the health system and training community health advisors to serve as clinical trial navigators to help patients understand the pros and cons of clinical trial participation. UAB also developed the Integrated Multidisciplinary Cancer Care Program (IMCCP), where a nurse identified cancer patients who had significant barriers and then linked them to a navigator. The UAB Health System Cancer Community Network works with ten community-based cancer centers across a five-state area of the Deep South to improve the quality of care in these centers by providing continuing medical education, quality assurance, cancer program development, genetic counseling by telephone to rural areas, and—where possible—clinical trials at the site. Through the HCIA grant, UAB is expanding the navigator program through the entire continuum of cancer—beyond active treatment and into survivorship and end of life—and through the entire network in order to include all 10 affiliated institutions.

### Innovation Components

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When a patient enters the PCC program, a lay navigator makes initial contact, typically by telephone or letter, to introduce the patient to the program and conduct an initial evaluation using the distress thermometer tool. The navigators use the distress thermometer to evaluate the patient’s global level of distress and any reported barriers that may interfere with the patient’s ability to receive treatment. The lay navigator and the patient then discuss the patient’s reported barriers and health concerns to identify the

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<sup>118</sup> Paskett E, Harrop J, Wells K. Patient navigation: an update on the state of the science. *CA Cancer J Clin.* July-August 2011; 61(4): 237-49. <http://onlinelibrary.wiley.com/doi/10.3322/caac.20111/full>.

appropriate course of action. The lay navigator documents all patient information in Medical Concierge, the program's navigation documentation system. Care maps developed by UAB leadership then guide navigators in how to handle patients with different situations and in different types of treatment. Depending on the patient's circumstances, the navigator may contact the patient's provider or nurse to request clarification on the patient's treatment or information on upcoming appointments or find resources to address a patient's barriers. Resources may be as varied as home health agencies, transportation services to help participants get to their appointments, or wig providers for participants who may lose their hair due to their treatment. The navigator essentially serves as the conduit between the provider and the participant or caregiver, as well as the liaison with other community resources that could assist participants throughout the course of their care.

Throughout the participant's care at a UAB site, the lay navigator engages with participants both face to face and through telephone interaction to make sure they are identifying and addressing any barriers that surface throughout the course of care. Depending on availability and time restrictions, navigators may conduct either formal or informal distress thermometers. The formal distress thermometer involves thoroughly discussing each item on the assessment tool, whereas the informal distress thermometer typically involves a more casual conversation to determine whether there are any updates on participant's barriers and whether any new barriers have come up. The navigator attempts to attend the participant's first appointment in the program and subsequent appointments (to the extent possible and/or desired by the participant) to assist in communicating any new and complicated information. Additionally, some navigators call participants before and after appointments if they are in active treatment (and periodically if they are in survivorship) to follow up and answer any questions. Participants are also encouraged to contact navigators when they need assistance or support. The goal of the navigators' interaction with their participants is to empower them to achieve their maximum level of health.

**Supporting activities/tools.** UAB has modified a web-based navigation software documentation system called Medical Concierge to track all of its participant navigation related activities. Navigators input participant information, including demographics, clinical and resource contacts, and results of distress thermometer assessments and their resolution. Medical Concierge can create reports to send to providers, including how navigators are addressing the top barriers identified with the distress thermometer. Additionally, Medical Concierge helps with organization and participant prioritization by identifying high-risk patients so that navigators can balance their workloads. UAB navigators can pull information from IMPACT, their health system's EHR, to view—but not edit—participant information and to keep track of participants' appointments. They can also communicate directly with providers and nurses through IMPACT to address any questions regarding appointments, treatments, etc. The documentation system and the hospital system's EHR are not the primary intervention but support the overall intervention of the expanded lay navigator network.

### Target Population and Program Participants

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The UAB program targets fee-for-service Medicare patients ages 65 and older who have a cancer diagnosis. The population includes patients who have received some type of primary treatment at the participating institutions and/or who have been cancer-free and have developed a recurrence. This is a change from the inclusion criteria outlined at the beginning of the grant period. UAB originally stated that they would only include high-acuity patients and patients with fee-for-service Medicare and Medicaid but

ultimately decided to change their criteria to include anyone age 65 and older with a cancer diagnosis and fee-for-service Medicare only in order to make their program a standard of care.

Although UAB is not specifically targeting this group, many of its patients have complex or advanced disease with a rapidly progressing cancer (i.e., lung or pancreatic cancer) or with psychosocial barriers to receiving appropriate cancer care. This population represents the highest risk for the inappropriate use of health care resources and also has some of the greatest challenges to receiving guideline-based treatment. They are more likely to reside in high-risk communities, both in urban or rural locations. Members of this population tend toward lower income, lower education, poor nutrition, and poorer overall health (due to obesity, diabetes, etc.). They are often minorities.

**Participant characteristics.** The PCC program has served more than 2,500 participants. Fee for service Medicare covers all of UAB’s participants, as this is part of the inclusion criteria for participation in the program. Generally, about half of participants are male and half are female. Half of the participants are over 75 years old, while the other half are between 65 and 74 years old.

**Patient characteristics.** The table below shows demographic information for patients receiving services from any one of the 11 DSCNN/UAB HCIA-funded sites during Quarter 7.

Demographic Information	Jan–March 2014 Patient Count	Jan–March 2014 Patient Count		Jan–March 2014 Patient Count	Jan–March 2014 Patient Count
<b>Sex</b>	<b>#</b>	<b>%</b>	<b>Age</b>	<b>#</b>	<b>%</b>
Male	1,011	46.4%	Elderly: >75 years	1,082	49.6%
Female	1,134	52%	Elderly: 65–74 years	1,099	50.4%
<b>Race/Ethnicity</b>	<b>#</b>	<b>%</b>	<b>Insurance Type</b>	<b>#</b>	<b>%</b>
Black or African American	297	13.6%	Medicare Fee for Service or Medicare Unspecified	2,181	100%
White	1,716	78.7%			
Hispanic or Latino	9	0.4%			
Asian	9	0.4%			
Two or More Race/Ethnicity	7	0.3%			
Unknown	143	6.6%			

Source: HCIA 7QR Awardee Performance Report. Reflects unique count of quarterly direct program participants.

### Implementation Effectiveness

Between February 2013 and June 2013, the UAB navigation team began identifying eligible beneficiaries and began pilot project interventions. The PCC program became fully operational upon IRB approval in July 2013. By September 2013, all ten partner sites were implementing the program.

The flexibility and adaptability of UAB’s program has facilitated its progress so far. While there are some core components and principles to the lay navigator program, each site can adapt the model to best fit their institutions. For example, at sites where there were already nurse navigator programs in place, program leadership has worked to integrate the lay navigators into the course of care along with the nurse

navigators to ensure smooth and effective process flows. This adaptability has allowed the program to integrate into the overall care process and care teams at each institution.

## Program Effectiveness

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Our evaluation of the program's effectiveness will focus on quantitative and qualitative analysis as described below.

### Quantitative Results

Our evaluation of program effectiveness for the UAB program will be based largely on quantitative data. At the time we began work on this report, we did not have the necessary agreements in place to receive data from UAB. Since that time, we have finalized these agreements and look forward to presenting results on UAB's impact on measures of health, quality of care, utilization, and costs for the Medicare and Medicaid population served by the UAB innovation program.

### Qualitative Results

Our qualitative findings of program effectiveness for the UAB program will be based largely on analysis of data collected during our site visit, including a focus group conducted with patients and discussions with staff and navigators. At the time of this report, we had not yet completed the analysis of this data and will therefore present the results of this analysis in a future report.

## Workforce Development and Deployment

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At each of sites in the UAB Health System Cancer Community Network, lay navigators hired with funds from the Innovation Award staff the PCC program. The providers, nurses, and social workers indirectly involved in the program are existing staff employed by UAB and its affiliated sites. While the program uses a combination of non-clinical and clinical staff, the navigators do not have clinical training or credentials. Across UAB's 11 sites through March 2014, current employment includes 26 navigators (six of whom are employed specifically at the UAB Health System), 20 management or administrative staff, and seven registered nurses.

**Lay navigators.** Lay navigators are the main component of the HCIA-funded staff for UAB's innovation. They assist participants in navigating all aspects of their cancer care, which involves regular contact with participants (both in person and via telephone) and attending physician appointments with participants when possible and/or as the patient desires. Lay navigators are responsible for conducting the distress thermometer assessment to identify participants' barriers to accessing care and then for addressing those barriers and following up on any issues. They also assist participants in finding community resources, such as transportation or lodging services, depending on their needs. Lay navigators are non-clinical staff. They are required to have a minimum of a bachelor's degree, although it is not necessary for this degree to be in a medical field. Even though they are non-clinical, many of the navigators have experience working in a clinical or healthcare-related setting. For example, one lay navigator at UAB worked as a grant-writer in one of UAB's hospital departments, and another worked in mental health services. Navigators at UAB report that relevant experience is helpful to their success as lay navigators.

UAB provides all navigators with training on the overall program, including information about the program's goals and core components, the services that navigators can provide, communication skills, and identifying community resources. This training also includes how to use Medical Concierge, the program's navigation documentation system. UAB additionally trains navigators on oncology and geriatrics so that they are familiar with the kinds of health issues, medications, and treatments that their patient population may encounter. UAB's navigators are required to complete Institutional Review Board (IRB) training, which is a component of the training specific to this program because it is part of a research project. As part of their training, lay navigators shadow fellow navigators, and they have opportunities for continuing education through conferences and webinars. More recently, lay navigators have also begun training on Respecting Choices, an approach to starting discussions regarding advance-care planning that UAB recently incorporated into the program.

**Site managers.** Also included in the HCIA-funded staffing mix at UAB and its affiliated sites are site managers. There is one site manager at each site, all of whom are registered nurses as the site manager plays both a clinical and administrative role for the lay navigator program. The administrative component of the site manager role is to oversee the lay navigators and to assist in identifying patients and managing navigator caseloads. On the clinical side, the site manager serves as the clinical expert for navigators to raise questions regarding whether patients' issues are of a clinical nature. They also serve as a liaison between the lay navigators and providers at each site when it becomes necessary to elevate an issue to a nurse or physician. Navigators can elevate issues to providers on their own but can seek assistance from the site manager if necessary.

**Director of Nursing.** At UAB, a Director of Nursing helps oversee the navigators at UAB, as well as the site managers at the partner sites. One of the Director of Nursing's main roles is to develop and deliver navigator trainings and interventions. The Director of Nursing also leads monthly calls with site managers to address any program-related issues or questions that arise at each site and to help ensure consistency of the program across sites.

**Medical directors.** At each site, medical directors also play an important role in UAB's lay navigator program, although they are not employed specifically by the program. UAB trains the medical directors on the overall program and serves as each site's liaison with the overall UAB program's medical director. Medical directors communicate with the overall program medical director and disseminate program-related and site-specific information from UAB program leadership to providers at their own sites. As such, this position is important in garnering and maintaining provider support and engagement throughout UAB's network for the program.

**Physicians and nurses.** The PCC program does not specifically employ physicians and nurses at UAB and its affiliated sites, but these clinicians play a role by way of their interaction with patients and lay navigators. Physicians provide oncology care and treatment to their cancer patients, and nurses assist in providing that care. UAB provides training to physicians and nurses throughout all of their sites on the overall program, with particular attention on how the lay navigators fit into patients' care teams.

## Context

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UAB has identified facilitators, encountered barriers, and gleaned important lessons learned, including endogenous and exogenous contextual factors affecting their program:

### Endogenous Factors

UAB's long history with navigation programs has been an important facilitator of progress for their program. This history of success with past navigation programs as well as strong leadership have been important for building buy-in for this program, both at UAB and at its partner institutions. Because of this successful program history, providers throughout the UAB system have been exposed to navigation programs and are more receptive to the new lay navigator program. To this point, one provider at UAB expressed that she did not have any misgivings about this program because of the institution's history and experience. It is likely that if one were to create this program completely from scratch, it would be more difficult to build provider support and implement the program across different institutions.

Along with the credibility and strong reputation that this history of navigation programs provides, it also facilitates the program by providing an existing network of cancer centers through which UAB can implement its program. Because the UAB Health System Cancer Community Network pre-dated the expansion of the lay navigator program, UAB program leadership was able to focus on the program itself rather than struggling to establish relationships with other sites.

One initial barrier to UAB's progress was reluctance and pushback from providers, nurses, and social workers. Some physicians expressed hesitation due to concerns about how the navigators would fit into their practice and the ability of non-clinical partners to work with participants and convey clinical information. Because of this reluctance, UAB encountered some challenges accessing certain clinics. To address these concerns, program leadership provided physician education to clarify the role of the lay navigators relative to the patient and the rest of the care team. Program leadership reports that as providers have seen how navigators help with participant communication, they appreciate the program and wonder how they ever got along without navigators.

One facilitator that has been particularly helpful in engaging providers has been presenting the program as part of a research study. Providers are typically highly motivated by data, thus the data monitoring and evaluation components of the program appeal to them. Providers are able to see how they and their institutions are performing within the program as well as how the program is benefitting their patients.

UAB also encountered some barriers with social workers feeling threatened by the lay navigator program. The distinction between the roles of a lay navigator and a social worker is less clear than the distinction between clinical and non-clinical personnel. At UAB, in particular, a recent merging of the social work and case management departments compounded these concerns. After the merger, there was some concern that the RN case managers would replace social workers; bringing in the lay navigators heightened that worry. UAB has been working to make it clear that the navigators can use the social workers as a resource and that the navigator's initial conversations with participants may lead participants to seek services from the social worker. The UAB leadership believes social workers are won over as they see how navigators fit into the course of cancer care. It also helps that navigators assist patients in ways that help lighten social workers' heavy workloads, allowing social workers more time for clinical visits.

Workforce developing and hiring has presented another challenge. As the program was gearing up and hiring staff, some sites were in the midst of workforce reductions and/or hiring freezes elsewhere within their institutions. Thus, there was some concern about hiring new staff for the program while reducing staff elsewhere. Regardless of the ability to pay new staff using the HCIA grant, these sorts of hiring freezes slowed down implementation progress in the beginning.

UAB has also encountered some issues with sites' information systems, which have been particularly relevant for identifying and tracking patients through hospital census reports. Some sites do not have electronic health records, so it has been difficult to identify and keep track of patients through their paper records. Additionally, some sites—including some of the large academic health systems—have antiquated systems that do not lend themselves to sending real-time information to UAB. This has translated into some difficulties keeping track of patients, particularly those visiting ERs, since hospitals have not produced census reports as quickly as necessary. This was an unanticipated challenge that program leadership has been working with each site to address.

Through identifying their program's facilitators and barriers, UAB has also identified some lessons learned from its program's progress to date. One important takeaway has been that changing an institution's culture and environment is a necessary part of implementing the lay navigator program. Thus, it is important to work with each institution to see how the program can best fit within its existing culture and work with providers and other stakeholders to modify their practices and workflows to integrate the navigators into the care team. Changing institutional culture also requires finding program champions to promote the program, communicate its purpose and value, and push others in the institution to get on board. To assist in addressing institutional culture, it is crucial to thoroughly evaluate each site before beginning implementation. This evaluation involves identifying information system challenges, key stakeholders, potential sticking points with existing administrative and clinical staff, and other barriers to facilitate program implementation at each unique site as seamlessly as possible.

### Exogenous Factors

A few exogenous factors contribute to the context in which the UAB program has been implemented. For instance, Blue Cross Blue Shield (BCBS) of Alabama, one of the largest payers in the state, has been moving towards requiring all oncology providers to use Eviti, the software for guideline-based care. BCBS's significant role and influence on care in Alabama contributed to UAB's decision to initially include Eviti in its program. Provider pushback led UAB to move towards a different approach to guideline-based care (e.g., Choosing Wisely) in the short term. The BCBS Alabama push toward Eviti may eventually mean another shift in the UAB approach towards guideline-based care. UAB leadership also noted that it will be interesting to see how providers use Eviti moving forward, especially given the early negative feedback they received from their physicians regarding the software tool.

Market context and policy and regulatory levers are additional exogenous factors associated with UAB's program—particularly relating to program sustainability. UAB is pursuing a number of opportunities to ensure it is able to sustain its navigator program beyond the end of the award period. For example, it is pursuing a grant opportunity to test the concept of having a navigator focused on both the patient and the caregiver since research has shown the importance of the caregiver in cancer care. This program would involve additional training in how to work with the caregiver. Additionally, for the next round of site

visits with partner sites, UAB leadership is planning to speak with hospital administrators about how the evidence so far demonstrates the effectiveness of the PCC program. Leadership hopes this evidence will encourage hospital administrators to consider including the navigation program as a line item in their budgets going forward.

## Summary

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UAB developed Patient Care Connect (PCC) to provide coordinated oncology care by employing a workforce of lay navigators to expand comprehensive cancer care support services through five states in the Deep South. UAB's program is designed to have its lay navigators help improve adherence to care plans and educate cancer survivors on how to find and use the resources they need, with the overall goal of reducing patients' barriers to care and empowering patients to be able to better advocate for themselves in their cancer care. The lay navigators and their tools—the distress thermometer and the Medical Concierge—are the main components of UAB's intervention.

Although each site is different, UAB is working with its partner sites to integrate the lay navigators into care teams to work effectively and efficiently with providers, nurses, and social workers. UAB's history with navigation programs has lent credibility to and facilitated the implementation of the lay navigator program. Nevertheless, some providers had concerns about having non-clinical personnel working with patients, and social workers had worries regarding the somewhat blurry boundaries between the roles of a social worker and a lay navigator. UAB leadership sought to engage and educate providers about the program, which has helped each party see the benefits of lay navigators both for participants and for themselves.

There are several topics that warrant further investigation during the second year of the evaluation, including the following topics and questions:

- whether characteristics of sites using lay navigators through Patient Care Connect impacted the implementation and outcomes;
- any changes in the implementation of Respecting Choices, the initiative to start discussions about advance-care planning;
- providers and navigators' responses to Respecting Choices; and,
- the distinction between the social worker and lay navigator roles.

Continued research and communication with the awardee on these topics will help to better inform the evaluation of UAB in order to determine the potential for replicability and scalability of the intervention as well as to determine how the program itself is serving its immediate patients currently in the program.

## Regents of the University of California, Los Angeles

This report presents our evaluation of the University of California, Los Angeles (UCLA) Alzheimer's and Dementia Care Program (ADC).

We provide preliminary observations about the program based on a review of the awardee's application, operational plan and quarterly reports as well as telephone interviews with the awardee and data collected during a site visit on May 7–8, 2014. We present these initial findings based on a review of the notes collected during our site visits; we will add to them after coding the site visit data and fully analyzing the data collected to date. This report thus presents themes that we have identified during the first year of the evaluation. It is important to note that our findings are tentative at this point. We look forward to providing more definitive findings and results for future reports.

<b>Program Title</b>	<b>UCLA Alzheimer's and Dementia Care (ADC) program</b>
<b>Targeted Disease/Condition</b>	<b>Dementia</b>
<b>Description of Target Population</b>	Targeted patients are adults with Alzheimer's disease or another form of dementia who have a UCLA primary care physician.
<b>Total Amount Awarded</b>	\$3,208,541
<b>Description of Awardee Organization</b>	UCLA is an academic/university medical center based in Los Angeles, California. The awardee is working with community-based organizations (Alzheimer's Association, Jewish Family Service of Los Angeles, the Leeza Gibbons Memory Foundation, Opica, and Wise & Healthy Aging) to implement the Alzheimer's and Dementia Care (UCLA ADC) management program.
<b>Site of Intervention</b>	The in-person visits take place in program offices in Santa Monica, Westwood, and Thousand Oaks in the Los Angeles, California, region. Follow-up visits are conducted by phone.
<b>Overview of Intervention</b>	UCLA's program provides care for Medicare and Medicaid beneficiaries with Alzheimer's disease or other forms of dementia by coordinating and managing patient care, conducting patient needs assessments, creating individualized dementia care plans, providing caregiver support and education, and expanding a dementia registry.

### Introduction

An estimated 5.4 million people in the United States have Alzheimer's disease. One in nine adults over age 65 and one-third of people over age 85 have Alzheimer's. The number of adults living with dementia is significantly higher, as those with Alzheimer's only account for 60% to 80% of all dementia cases. Other forms of the condition include dementia with Lewy bodies, vascular dementia, and frontotemporal lobar degeneration. These conditions have diverse clinical manifestations, including declining cognitive function, immobility, and increased risk of falls, swallowing disorders, urinary and fecal incontinence, and behavioral disturbances. One in three seniors die from Alzheimer's or another form of dementia, making it the fifth leading cause of death for Americans 65 and older. The death rate from Alzheimer's increased by 66% between 2000 and 2008.<sup>119</sup>

<sup>119</sup> [http://www.alz.org/downloads/Facts\\_Figures\\_2014.pdf](http://www.alz.org/downloads/Facts_Figures_2014.pdf)

Alzheimer's and dementia also have a tremendous, if often overlooked, impact on patients' families. According to the Alzheimer's Association, more than 15 million unpaid caregivers provided an estimated 17.7 billion hours of care to patients with Alzheimer's and dementia in 2010. This quantity of unpaid caregiving is valued to be worth \$220.2 billion. This level of caregiving responsibility has significant psychosocial implications. Fifty-nine percent of primary caregivers report experiencing "high" or "very high" emotional stress, and 38% report experiencing "high" or "very high" physical stress. An estimated 44% of caregivers of people with dementia report depressive symptoms compared to 27% of caregivers of people with milder forms of cognitive impairments.<sup>120</sup>

Due to the complexity in caring for patients with dementia, physicians often lack the time and skills to successfully manage the care of patients with Alzheimer's disease and other dementia disorders. Although many community resources exist to support social and medical needs of patients, these services are often uncoordinated or inadequately integrated into the healthcare system. In response to these challenges and shortcomings, many health systems and community organizations have developed dementia care models to assist caregivers and manage patient care.

For the past 15 years, Dr. David Reuben and a group of UCLA physicians have worked together to develop different models of care for geriatric patients with dementia and other chronic diseases. While previous clinical approaches, such as the Assessing Care of Vulnerable Elders (ACOVE) framework, have integrated new models of care directly into physician practices,<sup>121</sup> researchers recognized that many physicians lack the time, resources, and occasionally the skills to manage all aspects of a patient's care. Acknowledging the limited capacity of primary care physicians and clinical advantages of a team-based approach, the Alzheimer's and Dementia Care (ADC) program deploys nurse practitioners to provide coordinated patient care, education, and counseling to families. The nurse practitioners are employed as dementia care managers (DCMs) and are the primary points of contact for patients and their caregivers. This model is based on the dementia care model developed by Indiana University, although with a different staffing model.<sup>122</sup>

Funding from the UCLA Health System, as well as a private donation of \$1.25 million made in 2011, allowed Dr. Reuben and his staff to begin to implement the ADC program, hiring the first Dementia Care Manager and enrolling the program's first 250 patients. With \$3.2 million in HCIA funding, UCLA has expanded the ADC program to serve more patients throughout the UCLA medical system.

### Innovation Components

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The ADC program aims to reduce preventable emergency department visits and hospitalizations, as well as to ease caregiver strain and stress by providing coordinated, comprehensive patient- and family-centered care for patients with Alzheimer's disease or other forms of dementia. The program conducts patient needs assessments, creates individualized dementia care plans, and provides caregiver support and education. The primary program workforce consists of nurse practitioners in the role of dementia care

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<sup>120</sup> [http://www.cdc.gov/features/agingandhealth/state\\_of\\_aging\\_and\\_health\\_in\\_america\\_2013.pdf](http://www.cdc.gov/features/agingandhealth/state_of_aging_and_health_in_america_2013.pdf)

<sup>121</sup> Reuben D, Evertson L, et al. The University of California at Los Angeles Alzheimer's and Dementia Care program for comprehensive, coordinated, patient-centered care: preliminary data. *J Am Geriatr Soc*. December 2013; 61:2214-2218.

<sup>122</sup> Ibid

managers, who serve as the primary contact for the patients and their caregivers. The staffing model projects a 250-patient panel per DCM, but only one is currently near that level. To carry out the program components, the UCLA ADC program engages a number of other stakeholders, including primary care physicians, who refer patients and provide input into the development of a dementia care plan, and community-based organizations, which provide patients with behavioral and social services.

The program has a Steering Committee that facilitates seven “working groups,” each providing additional guidance and quality improvement. The working groups include assessment, software, outcomes, community-based organizations, communications and referrals, development, and media and marketing.

**Structured needs assessment.** New participants to the program are first scheduled for a 90-minute intake evaluation visit with a dementia care manager (nurse practitioner) to assess the patient’s and caregiver’s needs. Prior to the in-person visit, patients and caregivers complete an ADC Program Pre-Visit Patient Questionnaire and several other baseline questionnaires.<sup>123</sup> During the visit, the DCM reviews the completed questionnaires and asks the caregivers and/or family members to complete instruments about patient and caregiver depression<sup>124</sup> and a HIPAA release form. The DCM leads a discussion with the patient and caregivers to better understand the patient’s needs, goals, and availability of resources (e.g., financial, human capital). The DCM also tests the patient’s cognitive functioning using the Mini-Mental State Examination (MMSE) and the Montreal Cognitive Assessment.<sup>125</sup> In some cases, the DCM is unable to get through all the instruments in 90 minutes and must follow up with the caregivers after the visit.

Most intake visits are conducted in a UCLA primary care office suite in Santa Monica, Westwood, or Thousand Oaks. If a patient is unable to travel to one of the program sites, the DCM will conduct the intake visit in the patient’s home. According to program staff, approximately 10% of patients are unable to have an office-based visit.

**Individualized dementia care plan.** Dementia care managers develop an individualized care plan based on the needs assessment conducted at the initial visit. Each patient’s unique care plan includes medical, behavioral, and social components. The medical components of the care plan include an assessment and plan related to the current condition of the patient’s dementia and medications, fall risk, swallowing difficulties, and advanced care planning. Notes and recommendations on the patient’s dementia-related behaviors, home safety, and wandering are included in the behavioral component. The social component of the care plan includes notes on caregiver respite, caregiver support, and caregiver education.

The DCM immediately implements recommendations for social supports, such as referrals to community-based organizations and caregiver training, and sends medical recommendations to the patient’s primary care physician (PCP) for review and approval via UCLA’s electronic health record (EHR) system. Examples of medical recommendations often included in care plans include beginning or discontinuing a

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<sup>123</sup> Prior to the in-person evaluation, patients and caregivers complete an ADC Program Pre-visit Patient Questionnaire (with questions such as the patient’s medical and social history, help needed with daily activities, and current medications), a modified caregiver strain index, a functional assessment questionnaire, and a Neuropsychiatric Inventory Questionnaire (NPI-Q).

<sup>124</sup> The Cornell Scale for Depression in Dementia is used to measure depression exhibited by the dementia patient. The Patient Health-9 Questionnaire captures depressive symptoms in the caregiver.

<sup>125</sup> The Montreal Cognitive Assessment is only used if the patient scores a 20 or better on the Mini-Mental State Examination.

medication or referral to a specialist for evaluation or additional testing. DCMs noted that some PCPs review the draft care plan and send it back quickly, while others require follow-up to ensure completion. DCMs report that the plan is typically implemented within 1.5 weeks of being drafted.

A significant goal of the ADC program is to reduce caregiver strain from the burden of caring for a family member with dementia. DCMs specify particular activities in a patient's dementia care plan to be targeted toward the patient's caregiver(s). For example, UCLA hospitals offer support groups and community-based organizations provide individual counseling services. Because many caregivers have limited free time, educational webinars and training videos are offered online, providing instruction on how to deal with common challenges.

**Ongoing monitoring and 24/7 access.** Participants are enrolled in the program for the duration of their lives unless they opt out, and individuals with dementia and their families receive ongoing support from their assigned DCM. Their DCM is available to answer questions about behavioral or medical problems, community-based resources, or other concerns related to the implementation of the care plan during their working hours. Outside of normal business hours, a physician is on call for caregivers and patients.

Once a care plan is in place, the DCM is responsible for its coordination, which may involve arranging appointments with consultants when new behavioral symptoms arise, providing referrals to community-based organizations for specific services and presenting information on financial, legal, and end-of-life planning. Through ongoing monitoring and troubleshooting, the DCM may determine that revisions to the patient's dementia care plan are necessary and will communicate such changes to the patient's primary care physician. After one year in the program, DCMs schedule a follow-up visit with patients and their caregivers to reassess disease progression, any new needs, and challenges identified by the patient or caregiver. At this one-year follow-up visit, patients and caregivers complete the same instruments as they did at the initial visit, except the ADC Program Pre-Visit Questionnaire is shorter.

**Community-based organizations (CBOs).** The ADC program has contracted with five CBOs—the California Southland chapter of the Alzheimer's Association; Jewish Family Services; Leeza's Place; Optimistic People In a Caring Atmosphere (OPICA) Adult Day Care and Caregiver Support Center; and Wise and Healthy Aging—to help support the needs of patients and their caregivers (as outlined in Exhibit 10.1). The community-based organizations serve three primary roles: advise on the program's implementation by participating on the Steering Committee; provide support services to patients and caregivers; and provide training and education to families and caregivers.

**Exhibit 10.1:** Examples of Services Offered by Community-Based Organizations

Support Services	Recipient	Organization
Care management	Patient, caregiver	JFS, Wise, AA, OPICA
Support groups and counseling	Patient, caregiver	AA, OPICA, Leeza’s
Adult day care	Patient	OPICA, Wise
Caregiver Development/Training	Recipient	Organization
Savvy Caregiver	Caregiver	AA, OPICA
Partnering with Your Doctor	Caregiver	AA, OPICA
Professional Caregiver Training Program	Paid provider	AA

Source: UCLA Operational Plan

Originally the program had paid each CBO a block grant for participating in the program but has since begun using a voucher system that pays for specific services provided to program patients or caregivers. When a DCM refers a patient to a CBO, they may choose to give them a voucher that will cover all or part of the cost of the service at the CBO for a certain period of time.

**Supporting activities/tools.** The UCLA ADC program uses UCLA’s Epic-based eMR system to identify patients in the UCLA network who have been flagged with a dementia diagnosis. In addition, the program built its own case management software. The software allows UCLA staff to communicate and transmit vouchers with community-based programs. The program used philanthropic money to develop a website, offering patients and caregivers information on a variety of community resources, including in-home services, classes, respite services, disease-specific services, financial services, legal services, and adult day health centers.

**Target Population and Program Participants**

All of the ADC participants are referred to the program by a UCLA-affiliated physician. In order to enroll in the program, patients must satisfy three inclusion criteria:

- Patients must have a diagnosis of dementia; moderate memory loss or mild cognitive impairment is not sufficient.
- Patients must be in the UCLA medical system by virtue of having a UCLA-affiliated provider, such as a geriatrician, general internist, family practitioner, neurologist, or psychiatrist.
- Patients must live in a community-based setting rather than a nursing home when beginning the program. If a participant moves into a nursing facility after enrollment, they are allowed to continue participating provided that they stay local to Los Angeles.

Patients must have a physician referral to the program to allow for coordination between program staff and the patient’s primary care provider. Patients’ primary care providers are typically geriatricians or internal medicine physicians. Age, Medicare status, and primary versus secondary dementia diagnosis are not factors in a prospective patient’s eligibility.

**Participant characteristics.** UCLA ADC program has enrolled 658 patients with dementia in their program. The table below shows demographic information for patients seen by the UCLA team in Quarter

7. More than 60% of participants are female, and the vast majority is over 75 years old (80%). Approximately 70% of participants are White. The single largest payer source is Medicare FFS.

Demographic Information	Jan–March 2014 Patient Count	Jan–March 2014 Patient Count		Jan–March 2014 Patient Count	Jan–March 2014 Patient Count
<b>Sex</b>	<b>#</b>	<b>%</b>	<b>Age (Years)</b>	<b>#</b>	<b>%</b>
Male	46	32.9%	Elderly: >75	112	80.0%
Female	94	67.1%	Elderly: 65–74	20	14.3%
			Adults: 26–64	8	5.7%
<b>Race/Ethnicity</b>	<b>#</b>	<b>%</b>	<b>Insurance Type</b>	<b>#</b>	<b>%</b>
Black/African American	10	7.1%	Medicaid	1	0.7%
Hispanic or Latino	14	10.0%	Medicare (FFS/Unspecified)	71	50.7%
Asian	12	8.6%	Medicare Advantage	2	1.4%
White	97	69.3%	Dually Eligible	17	12.1%
Two or more races	6	4.3%	Private/Commercial	47	33.6%
American Indian/Alaska Native	1	0.7%	TRICARE (Armed Forces)	1	0.7%

Source: HCIA 7QR Awardee Performance Report. Reflects unique count of quarterly direct program participants.

**Caregivers.** The UCLA ADC program also provides services to caregivers of patients enrolled in the program. Caregivers are considered “indirect participants” and include family members, paid caregivers, friends, and spouses. Caregivers can participate in community-based services, education programs, and support groups.

**Identification method.** The program uses two methods to identify and enroll new participants. First, the ADC program staff use UCLA’s Epic-based eMR system to identify potential participants by querying the system for patients with a dementia diagnosis code in their medical records.<sup>126</sup> Then ADC staff contact the primary care physicians of the identified patients and inquire about enrolling them in the program. Alternatively, program leaders reach out to UCLA medical groups and deliver presentations describing the main intervention activities, inclusion criteria, and how physicians can refer eligible patients.

The second method is patients or their family members can contact the program directly to inquire about participating. In these cases, ADC staff contact the patient’s physician to confirm that a diagnosis of dementia has been made and request a formal referral.

### Implementation Effectiveness

UCLA launched its program in July 2012 and hired dementia care managers one at a time for a current total of four. Due to the hiring process and turnover, the UCLA ADC program did not have four

<sup>126</sup> Program staff mine patient records for ICD-9 codes: 290.0, 290.1, 290.2, 290.3, 290.4, and 331.0.

simultaneously employed DCMs (nurse practitioners) until May 2014. There are currently no plans to hire additional DCMs.

The overall framework of the innovation has adhered to UCLA's initial plans. The recruitment of patients, initial needs assessments, development of dementia care plans, ongoing monitoring, and 24/7 patient access to DCMs have all been consistently implemented. However, in meeting some challenges, program leaders and staff have adapted certain intervention components, affecting the fidelity to how the program was originally conceived. Examples of variations include hiring a care manager assistant, changing the model of payment with community-based organizations, implementation of a patient alert system, and the evolution of the case management software.

**Coordination with primary care providers.** Program administrators noted that they have made a concerted effort to coordinate with PCPs, but this has been a challenge because PCPs have different preferences in terms of how the DCMs should work with patients. For example, some physicians prefer that the DCM focus solely on the patient's dementia and dementia-related symptoms, while others are comfortable with the DCM serving the patient's broader health care needs, such as advising patients on other health conditions or taking steps to reduce a fall risk. UCLA ADC staff reported that they decided to leave it to the PCPs to tell patients that they can no longer drive as a result of their dementia. This can be a contentious issue, and ADC staff did not want this to impede the ability to develop a positive relationship with patients. The intervention is structured in a way that respects the medical territory of a patient's PCP and aims to fill any gaps.

The program administrators have worked to alleviate any territorial concerns the PCPs may have over serving the same patient. To cultivate this trust, program leaders have visited UCLA medical groups in order to clearly describe the services they will provide. Administrators of the ADC program noted that these in-person conversations with UCLA-affiliated physicians have led to productive working relationships between PCPs and DCMs.

**Enrollment.** One ongoing challenge for the program has been enrolling new patients and conducting initial visits. Although this has improved over the past few months, the program has enrolled fewer patients than expected at this point. There are 92 fewer patients enrolled as of Quarter 7 than were initially projected.<sup>127</sup> At the time of our site visit, there were 67 patients who had been enrolled but had not yet had their initial visit or had not been scheduled for one.<sup>128</sup>

According to UCLA administrators, part of the challenge in enrolling patients and scheduling visits is related to recruitment of nurse practitioners with experience in geriatric care. The UCLA ADC program did not have four simultaneously employed nurse practitioners until May 2014. Program leadership stated that several factors had made recruitment of dementia care managers challenging: (1) the position requires someone who is highly skilled, has geriatrics experience, and is easily approachable and personable, and (2) the creation of new healthcare jobs in the context of an aging population has resulted in a "seller's market" for many in the healthcare profession.

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<sup>127</sup> Quarterly Awardee Performance Report: University of California at Los Angeles, 7th Quarterly Reporting Period (January, February, March 2014). 2014.

<sup>128</sup> UCLA-provided data, reflecting patient demographic characteristics. May 7, 2014.

**Workload.** Another challenge has been the DCMs' workload, which has—among other implications—affected their availability to schedule new patient visits. Despite having patient panels not yet at the 250-patient capacity (the highest caseload for a DCM is 244 patients), DCMs reported that their caseload is too high for them to manage patients effectively. They said they are working very long hours, nights, and weekends, and that the current workload is stressful. Program leadership arrived at the patient panel threshold of 250 per DCM based on discussions with leadership for the Indiana University program, another Innovation Award recipient.

When discussing possible solutions to the challenging case load, one DCM suggested,

*“The answer is either ... the case number would come down or we split the current number of patients among more NPs. The answer is not to hire more NPs and give them each 250. The problem is the numbers....”*

DCMs indicated that if they had fewer patients in their panel, they would be able to check in with patients and caregivers on a more frequent basis, either face-to-face or by telephone, and draft a dementia care plan more quickly. One DCM described a typical day:

*“Three to four hours of direct patient time, then I'm trying to catch up on the phone calls and messages that are being collected while I'm seeing the patients. Never mind the ones that I already promised I would call that day. That includes getting the care plans out, interfacing with the community-based organizations, scheduling the next however many days, and what have you; the meetings that seem to be ... quite ... quite great in number.”*

It was also noted by at least one DCM that families who ask for more help get more of her attention and that she would like to have the time to be proactive with families who need help but are not asking for it. This might allow the DCMs and caregivers to prevent possible crises with the patient.

One strategy that program staff has used to manage the workload is the development of a risk-stratification method to organize the patients by greatest need. This alert system was created out of a recognition that patients presented with different needs and complications at different times, and that some needed urgent attention more than others. Staff may move patients to different categories when there are changes in their needs (e.g., their condition worsens or strategies successfully address the needs of a patient in crisis). The frequency of caregiver contact and what is discussed during such communication, depends on a patient's risk level. Patients placed in the green category are stable and require fewer “touches” by the DCMs. Caregivers for patients in the yellow category are contacted more frequently by the DCM, who discusses medication changes, hospitalizations, and recent ED visits. Caregivers or patients in crisis are placed in the red category and are the highest risk. DCMs report that they spend the most time with the patients in the high or red category who have the greatest needs at that time. The recently hired dementia care manager assistant will spend time managing the patients in the low or green category.

**Exhibit 10.2: UCLA Patient Alert Levels**

	RISK STRATIFYING CRITERIA	ACTIONS TAKEN
<b>GREEN</b>	<ul style="list-style-type: none"> <li>■ No acute crisis</li> <li>■ No behavioral issues</li> <li>■ No medication compliance issues</li> <li>■ Low NPI-Q, MCGSI, PHQ9 scores</li> <li>■ No serious social or medical issues</li> </ul>	<ul style="list-style-type: none"> <li>■ Patient and caregiver contact by phone or email two and four months after initial visit. Discuss dementia care plan, recommended services and community-based organizations.</li> <li>■ Regular check in by phone with patient and caregiver three months thereafter.</li> </ul>
<b>YELLOW</b>	<ul style="list-style-type: none"> <li>■ Mild to moderate CG stress (stabilizing)</li> <li>■ Recently controlled behavioral issues</li> <li>■ Hospitalizations in the past <u>three</u> months</li> </ul>	<ul style="list-style-type: none"> <li>■ Patient and caregiver contact by phone six weeks after initial visit. Discuss medication changes, hospitalizations, and ED visits.</li> <li>■ Patient and caregiver contact by phone or email every four weeks until patient is “green.”</li> </ul>
<b>RED</b>	<ul style="list-style-type: none"> <li>■ Caregiver is extremely stressed</li> <li>■ ED/hospitalizations in the last <u>30</u> days</li> <li>■ Active psychosis</li> <li>■ Adult protective services referral</li> <li>■ Safety concerns</li> <li>■ Medication recommendation that was acted upon.</li> </ul>	<ul style="list-style-type: none"> <li>■ Patient and caregiver contact by phone four weeks after initial visit. Check in with caregiver about his/her stress level. Discuss any hospitalizations, ED visits, medication changes, or referrals.</li> <li>■ Patient and caregiver contact every two weeks until stabilized and “yellow.”</li> </ul>

**Use of social support services.** One challenge has been ensuring that caregivers access services recommended for them and for the family member that they care for. The care managers reported that they used the vouchers to provide an incentive for caregivers to access needed services, even in some cases when families could afford the service. However, it is unclear whether program participants continue using the community-based resource after the voucher has expired.

During a caregiver focus group, one participant reported that she attended a caregiver support group and found it helpful in understanding the disease and how to interact with her mother with dementia. Another participant took her mother to adult daycare, but her mother did not want to continue to attend. This caregiver wanted to find programs that serve people with moderate dementia and thought that the CBOs only served people with severe dementia. This represented a broader concern among the focus group participants, who did not seem aware of the range of resources available to them. While the caregivers did understand the potential benefit of some services, they discussed being far too busy and overwhelmed to fully take advantage of the resources.

In speaking with two CBOs, it seems that their adult daycare services are primarily being used by ADC patients for short periods of time. DCMs are able to offer vouchers for patients or caregivers to cover the cost of services for a given period of time, but then families must find a way to pay for ongoing services. It seems that often caregivers use adult daycare services to provide a temporary respite for families while they determine a longer-term solution for the family member’s care needs. At the time of our site visit, few ADC patients were receiving services from the organizations. When the program’s case management software is complete, it will be able to track the use of vouchers at the CBOs, so there will be data to analyze how families are using these services.

**One-year follow-up visit.** Many families have not scheduled the annual in-person follow-up with the dementia care manager, despite being contacted by the program. Some families have expressed reluctance to have a one-year follow-up visit because it is challenging to bring the patient into the UCLA ADC office. Given the ongoing interaction with DCMs, families may not see the value in bringing their family member in for another visit. However, one DCM reported that it would be challenging to continue to offer medical recommendations without a thorough assessment. UCLA is currently considering whether the one-year follow-up visit is necessary and if it could be conducted by telephone.

## Program Effectiveness

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Our evaluation of the program's effectiveness will focus on quantitative and qualitative analysis as described below.

### Quantitative Results

Our evaluation of program effectiveness for the UCLA program will be based largely on quantitative data. At the time we began work on this report, we did not have the necessary agreements in place to receive data from UCLA. Since that time, we have finalized these agreements and look forward to presenting results on the UCLA program's impact on measures of health, quality of care, utilization, and costs for the Medicare population served by this awardee.

### Qualitative Results

Our qualitative findings of program effectiveness for the UCLA program will be based largely on analysis of patient focus group data. We will present the results in a future report. We did gather some sense of program effectiveness from the perspective of physicians. During our site visit, we spoke with geriatricians who had overwhelmingly positive views of the program. They noted that the program has been a tremendous help to them. The geriatricians indicated that the DCMs are performing work that the physicians do not have time to do, such as coordinating community-based services, or are not trained to do, such as providing patient education. The ADC program surveyed referring physicians and received mostly positive feedback with only a few negative responses. Eighty-two percent of the respondents had a positive view of the program's behavioral and social recommendations, and 57% thought that medical recommendations made for patients were valuable. Most (62%) of the physicians thought that the program explored new issues that had not been previously addressed clinically, and 87% noted that they would recommend the program to other patients with dementia.

Survey results from the awardee indicate that caregivers have found the program to be helpful. Most thought that the initial visit and needs assessment conducted by the DCM was time well spent (91%) and that they received information about sources of support for care that they were not aware of before (77%).

## Workforce Development and Deployment

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The Innovation Award partially funds four dementia care managers and partially funds several other UCLA employees—a Project Director, medical director, and a program manager. UCLA hired a care manager assistant in June 2014 to take over some of the DCM's tasks for patients with less complex needs.

**Directors and project manager.** The Project Director is a geriatrician who oversees hiring, oversees the medical director, chairs the Steering Committee, and communicates with CMS. The medical director supervises the DCMs, meeting with them weekly to discuss challenging patient cases and provide them with feedback. The project manager oversees day-to-day operations of the program, assists the DCMs, and helps with program monitoring efforts.

**Dementia care managers.** The program has four dementia care managers—two based at the Santa Monica office, one based at Westwood, and one who splits her time between Santa Monica and Thousand Oaks. All are certified nurse practitioners with geriatric experience. One of the DCMs was hired during the pilot phase of the intervention, and three have been hired since the program received HCIA funding. The DCMs conduct initial patient evaluations and needs assessments, generate and implement dementia care plans for each patient and caregiver, provide ongoing monitoring of the patient through phone calls with their caregivers, communicate with the patient’s primary care provider, and coordinate services with community-based organizations. Each DCM will care for a panel of approximately 250 patients, with the goal of four care managers serving 1,000 patients. Recruitment of nurse practitioners has posed a challenge to the program. A fourth DCM was not hired until the sixth quarter of the demonstration.

**Training for dementia care managers.** For new DCMs, there is a period of orientation that involves shadowing and observation of existing dementia care managers. There is also a training on the use of the EHR and materials provided for the new DCM to study on their own (e.g., presentations from conferences, articles about dementia and dementia care, information from the CBOs about their social services). Once the new DCM begins seeing patients, the medical director and the project director observe visits and provide feedback. DCMs reported that learning how to address the social service component of their job has been the most challenging aspect of onboarding in the role of dementia care manager.

**Care manager assistant.** To deal with the heavy workload for DCMs, the program hired a care manager assistant. This person will make phone calls to touch base with the green patients who are not currently in crisis and allow the DCMs to focus on the more complex patients. The assistant will also help with data management. DCMs have some concern that patients and caregivers may be reluctant to speak with anyone other than them, given that they have worked hard to build a relationship and gain their trust.

**Workforce lessons learned.** As noted previously, the workload of the DCMs has affected their ability to effectively manage patients’ care. Establishing systematic, regular communication with patients, caregivers, and community-based organizations is seen as a priority. However, the DCMs noted that it is difficult to make contact or follow-up in a timely manner, and it is a challenge to keep track of and organize all of the information they receive during such communications. The program is in the process of developing a case management software to manage care for their patients. It will be used to enter information about each interaction with patients and caregivers and to communicate with CBOs. One DCM has worked closely with the software developers to ensure that the software meets the needs of the program. While the software is not yet fully operational, the program administrators and DCMs predict that it will make their patient workload more manageable.

## Context

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Below we discuss some of the contextual barriers and facilitators UCLA has encountered in the implementation of the ADC program.

### Endogenous Factors

Institutional support and partnership will be explored on future site visits for UCLA.

### Exogenous Factors

The geography of Southern California, and Los Angeles in particular, has affected the program's implementation. For example, patients with advanced dementia or other physical disabilities have difficulty visiting one of the program's clinic sites. Staff have tried to accommodate these patients, making home visits when possible. However, urban sprawl and traffic congestion are obstacles to conducting more home visits, despite the fact that more visits could benefit certain patients. The dementia care managers who had conducted home visits reiterated the challenge of having to travel across Los Angeles to UCLA's clinic locations and patients' homes. In addition to the geographical challenges affecting patients, the location of the program had an impact on staffing and recruitment. Given the dispersed residential development, high cost of living, and heavy traffic in Los Angeles, many of the candidates for the position did not live close enough to the program's clinical sites (Westwood and Santa Monica).

**Replicability.** Other clinical organizations might find certain qualities of the ADC program challenging to replicate. Los Angeles has a dense population of medical professionals. Access to care may be less of a concern for patients with dementia and Alzheimer's disease who reside near UCLA than those living elsewhere. As in other metropolitan areas, there are also abundant community resources and social service organizations in Southern California. ADC patients can receive a variety of services and support that may not be available in other, less affluent and less populated locales. Clinical organizations in other locations may find home visits more feasible if there is less traffic than in the Los Angeles region.

**Sustainability.** Of note, almost all of the program's components are not covered by fee-for-service (FFS) Medicare, which is the predominant insurance for UCLA dementia patients. Traditional Medicare FFS covers the initial in-person visit with the DCMs but does not cover the significant time invested by DCMs to follow up with patients, return phone calls to caregivers, communicate with community-based services, and other time-intensive patient monitoring activities. However, such components could be financed through managed care reimbursement agreements.

## Summary

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The Alzheimer's and Dementia Care (ADC) program was designed to provide individualized care management to patients with diseases of cognitive impairment. The program consists of four intervention components—a structured needs assessment, an individualized dementia care plan, ongoing monitoring, and 24/7 access to care managers. The program employs four dementia care managers (DCMs), nurse practitioners who conduct thorough needs assessments of each participating patient. The DCMs develop a unique care plan that includes recommendations to additional services and suggestions for caregivers

intended to provide respite and alleviate strain. The DCMs work with patients and caregivers for the duration of the disease and revise the care plan as needed.

While the program has not yet reached full patient enrollment, dementia care managers reported that their caseloads are too high to effectively manage all of their patients' needs. To help the DCMs manage their patient panels, the program is developing case management software—which caregivers have found useful—and recently hired a dementia care management assistant. The program's staff has developed positive working relationships with patients' primary care physicians. The ADC program has also established linkages to five community-based organizations, where referred patients and caregivers can receive social services. Dementia care managers offer patients a temporary voucher to try these services; however, these services have been underutilized thus far. At this point, the program has enrolled fewer patients than expected, partly because it had only employed three DCMs as of May 2014. However, with the hiring of a fourth DCM, the program has increased its capacity to recruit new patients.

There are several topics that warrant further investigation during the second year of the evaluation, including:

- the poor attendance to the one-year in-person follow up visit;
- strategies to make the dementia care managers' workload more manageable and reduce the potential for burnout; and,
- strategies to increase the use of services offered by community-based organizations to support patients and their caregivers.

Continued research and communication with the awardee on these topics will help to better inform the evaluation of UCLA in order to determine the potential for replicability and scalability of the intervention as well as to evaluate how the program itself is serving its immediate patients currently in the program.

## Upper San Juan Health Services District

This report presents our evaluation of the Upper San Juan Health Services District (USJHD) HCIA Program.

We provide preliminary observations about the program based on a review of the awardee’s application, operational plan, and quarterly reports as well as telephone interviews with the awardee and a site visit conducted on June 16–17, 2014. While this report presents themes that we have identified during the first year of the evaluation, it is important to note that our findings are tentative at this point, as we have not completed all of our data collection, coded the site visit data, or fully analyzed the data collected to date. We look forward to providing more definitive findings and results for future reports.

<b>Program Title</b>	<b>Upper San Juan Health Services District HCIA Program</b>
<b>Targeted Disease/ Condition</b>	<b>Cardiovascular Disease</b>
<b>Total Amount Awarded</b>	\$1,724,581.00
<b>Description of Target Population</b>	Residents of the Upper San Juan Health District (USJHD) at risk for cardiovascular disease and patients presenting with acute cardiac and stroke events.
<b>Description of Awardee Organization</b>	The Upper San Juan Health Service District includes Pagosa Spring Emergency Medical Services (EMS) and the Pagosa Springs Medical Center (Medical Center). The Medical Center opened six years ago and houses an emergency department, primary care clinic, hospital, and wellness center. The Medical Center is in a rural, medically underserved area of southwestern Colorado.
<b>Setting of Intervention</b>	The intervention touches participants in a number of locations: the Medical Center; businesses and community organizations across the district; participants’ homes; and ambulances.
<b>Overview of Intervention</b>	USJHD focuses strategically on reducing cardiovascular risk for the district population and improving care for cardiovascular disease patients. The intervention contains four primary initiatives: <ol style="list-style-type: none"> <li>(1) <b>Community outreach initiative:</b> a cardiovascular early detection screening and wellness program for participants at risk in the community.</li> <li>(2) <b>Telemedicine initiative:</b> telemedicine-enabled consultations with neurologists for patients at risk for stroke and remote diagnostics and treatment for patients who display signs of stroke. Follow-up cardiology telemedicine is available to patients in the Medical Center primary care clinic post-acute event.</li> <li>(3) <b>Paramedicine initiative:</b> education, equipment, and upgrades to scope of service to the community Emergency Medical Services (EMS); expanding paramedics’ role to include specialized critical care during urgent care transport and in-home, follow-up services for the most vulnerable patients.</li> <li>(4) <b>Care coordination:</b> for patients 30 days after an acute cardiac event and <b>patient navigation</b> for patients at risk for or with cardiac disease who need to be connected to health care resources and social support.</li> </ol>

## Introduction

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Heart disease and stroke are among the top three leading causes of death for men and women. As a result, heart disease and stroke add significant burden to the health care system.<sup>129</sup> Despite the high prevalence and costs of cardiovascular disease in their community, USJHD did not have adequate prevention programming or treatment for cardiovascular patients. Without a cardiologist or neurologist, patients were regularly transported to larger hospitals in Durango or Denver, Colorado. Eager to address the local burden of cardiovascular disease, USJHD leadership identified key components to holistic cardiovascular care. They used these components to develop a program that incorporated innovative approaches to early detection, prevention, and acute and urgent care of cardiovascular disease. Below we outline the evidence base for USJHD's four primary intervention components.

**Community outreach initiative.** USJHD cites the Centers for Disease Control and Prevention's National Heart Disease and Stroke Prevention Program, U.S. Department of Health and Human Services' Healthy People 2020, and Colorado Heart Healthy Solutions (CHHS) as models for its early detection and wellness programming. USJHD looked to those resources for standards and guidelines for cardiovascular early detection, health assessments, education, referrals of at-risk patients to local medical and healthy living resources, and ongoing support for at-risk participants in rural communities. Before the Innovation Award, the primary care clinic at Pagosa Springs Medical Center (PSMC) tested the CHHS early-detection program in a trial, screening patients for cardiovascular risk and referring them to the appropriate follow-up care or testing. The pilot project results validated the district's hypothesis that early-detection screenings and wellness programming will identify many patients at risk for cardiovascular disease, improve key cardiovascular biomarkers, and connect patients to care.

**Telemedicine initiatives.** Before the Innovation Award, USJHD did not have a neurologist immediately available for acute stroke symptom diagnosis. As a result, most patients were transported to Denver for neurology care. The two-hour transportation time to Denver meant that patients arrived after the critical first hour after symptom onset during which administration of thrombolytics is most effective. Recognizing this gap, USJHD partnered with Swedish Medical Center through an established telemedicine system—the Colorado Digital Online Consultant (CO-DOC)—to provide remote neurology expertise for patients and providers at PSMC. With the guidance of remote neurologists USJHD is able to provide thrombolytic treatment, limit the need for transportation outside of the USJHD service area, and increase the likelihood of successful treatment for stroke patients.

The District also lacks cardiology specialty services. The closest cardiology specialists are one hour away in Durango, Colorado. While the District did not share an evidence base specific to cardiology telemedicine, it hoped that digital transmission of key cardiology tests, lab results, remote consultations, and early thrombolytic therapy would have positive outcomes similar to the neurology telemedicine.

**Paramedicine initiatives.** As noted above, USJHD's geographic isolation often leads to costly emergency medical transportation. In most acute cases, costly air transportation was necessary because

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<sup>129</sup> National Heart Disease and Stroke Prevention Program: Staff Orientation Guide. Centers for Disease Control and Prevention National Center for Chronic Disease Prevention and Health Promotion and Division for Heart Disease and Stroke Prevention. September 2011. [http://www.cdc.gov/dhdsp/programs/spha/docs/Orientation\\_Manual.pdf](http://www.cdc.gov/dhdsp/programs/spha/docs/Orientation_Manual.pdf)

USJHD did not offer critical care transport. Critical care transport allows paramedics to provide better care for patients during ground transit and make faster, more informed decisions about whether a participant needs to be transported to Durango or Denver. Research suggesting that outreach paramedicine can reduce Emergency Medical Services usage by as much as 64%<sup>130</sup> prompted USJHD to add an outreach paramedicine component to its HCIA Program. USJHD planned to integrate outreach paramedicine follow-up according to patient-centered medical care by using the outreach paramedics as extenders of the physician in the patients' homes.

**Care coordination and patient navigation.** The final component of USJHD plans was to hire one patient advocate to perform care coordination and patient navigation activities. The District did not share an evidence base for adding a patient advocate, but it proposed that the patient advocate coordinate patients' participation in the wellness, telemedicine, and paramedicine programs and participate in community outreach activities and help connect patients to insurance and refer patients to medical care. The patient advocate would work toward being a part of a patient-centered medical home (PCMH) model taking shape at PSMC and act as a representative of the PSMC primary care clinic.

### Innovation Components

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The USJHD focuses strategically on reducing cardiovascular risk and improving care for and health outcomes of cardiovascular disease patients. More broadly, the district also aims to reduce health care costs and create a healthier community. This requires USJHD to enhance its infrastructure and improve and retain its workforce. The intervention contains four primary initiatives outlined below.

**Community outreach.** The PSMC Wellness Center administers all community outreach programming. Under the Innovation Award, it has been able to hire an additional wellness coordinator to expand the program portfolio to include a worksite wellness program and increase outreach efforts targeting individuals not connected to health care. Wellness coordinators conduct cardiovascular early detection screening and a 12-week community wellness program recruiting participants at health fairs, schools, and local business. In addition, the patient navigator or doctors at the PSMC refer patients and some community members enroll in programming after seeing local advertisements distributed by the PSMC marketing team.

The Wellness Center is hoping to move to a more integrated model: blending wellness back into the care team to help with referrals. PSMC's new Cerner electronic medical records system provides a platform for providers to refer patients to Wellness Center programs and for Wellness Center staff to make referrals and notes about patients' participation. In addition, USJHD hired a contractor to develop a Microsoft Access database for wellness program data management. The database allows the Wellness Center to effectively track patient screening data, patient goals, and patient encounters and contact attempts.

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<sup>130</sup> Discussion paper on Development of Community Paramedic Programs. Joint Committee on Rural Emergency Care (JCREC). 2010. <https://www.nasemso.org/Projects/RuralEMS/documents/CPDiscussionPaper.pdf>.

**Early detection screening.** The early detection screening includes calculation of 10-year risk score for heart disease/stroke, blood pressure check, cholesterol and blood glucose measurements, and BMI calculation. The main goals of the screening are to (1) identify people at risk for cardiovascular disease and (2) connect them to the resources and care they need. Participants with high-risk scores or abnormal results are referred to the 12-week community wellness program.

**Community wellness program.** The 12-week community wellness program is a diet and exercise program developed by the Mayo Clinic for patients with or at risk for cardiac disease. Classes are taught by a wellness coordinator not funded by the Innovation Award. The weekly classes are about one and a half hours long and located at the medical center's Wellness Center. Throughout the program, participants are encouraged to journal. At the beginning and end of the series, participants receive the early detection screening described above. Those with normal screening results after the wellness program do not need to be checked for another year, while participants with abnormal screening results are invited back for follow-up screening in six months. Participants in the wellness program pay a \$150 registration fee, with scholarships available for prospective participants with abnormal early detection screening results and prospective participants who lack the means to pay out of pocket. These scholarships are made possible by the Innovation Award and have allowed the Wellness Center to enroll more participants.

**Worksite wellness program.** The worksite wellness program, a new component added as part of the Innovation Award, focuses on early detection of cardiovascular disease, positive diet and exercise changes, and stress management. The program includes four group sessions with the entire worksite and four individual sessions over the course of a year—all taught by a wellness coordinator. At the first program session, the wellness coordinator screens patients with a cardiovascular early detection screening and administers a survey on health and wellness priorities. The content of subsequent sessions is tailored based on the survey results. At the final session, participants are invited to complete a second early detection to see his or her progress on reducing their cardiovascular risk.

**Telemedicine.** PSMC uses equipment from In-Touch Health for its Internet-based, HIPAA-compliant telemedicine system. Through a partnership with CO-DOC, PSMC emergency doctors can consult with outside neurologists at Swedish Medical Center in Denver, CO to help diagnose stroke and assess the need for thrombolytic treatment. The emergency room medical team at PSMC interfaces with neurologists in Denver who can direct care or make the decision to initiate or forgo transport to their facility. The Denver neurologists can also speak directly with the patient's family to discuss treatment options and associated risks, which is particularly important for patients who qualify for thrombolytic treatment. The neurologist's ability to diagnose via the camera has decreased the number of EMS flights, allowing patients to stay close to home and eliminating the cost of helicopter transport. A massive community education effort led by the marketing team on identifying symptoms of stroke and presenting early to the hospital to allow thrombolytics to be administered has gotten more patients in the door that are eligible for thrombolytic treatment. As of June 2014, four patients have received thrombolytic treatment without requiring a transport to Denver.

**Paramedicine.** The USJHD paramedicine program has two components—outreach paramedicine and critical care paramedicine. The elements of each component are discussed below.

**Outreach paramedicine.** The outreach paramedicine program is focused on the prevention of readmission for congestive heart failure (CHF), acute coronary syndrome, stroke, post-coronary artery blockage grafting (CABG), and chronic obstructive pulmonary disease (COPD). Five self-selected paramedics are trained to perform post-acute event follow-up home visits with vulnerable patients living in remote areas. In addition to providing follow-up medical care, the paramedics connect patients to a medical home and primary care provider and ensure that all the patients' needs are met. The paramedics act as physician extenders, using mobile telemedicine to connect a PSMC doctor for exams, vitals, medication reconciliation, and treatment instructions. USJHD is pursuing options for sustainable reimbursement of these physician extender services. They currently use an InTouch RPEXpress and an iPad to facilitate this exchange. Other equipment includes a manual blood pressure cuff, video otoscope, glucose monitoring kits, tympanic thermometer, and portable oxygen.

**Critical care paramedicine.** As part of their critical care paramedicine program Emergency Medical Services offers expanded ground transport training for paramedics to improve the continuity of care, enhance paramedics' scope of practice in the field, and reduce costs for cardiac and stroke patients in transition to higher-level care facilities. These goals are facilitated by new ambulance equipment (refurbished multi-channel transport infusion pump, portable ventilator, refurbished I-STAT, and blood testing/sampling equipment), allowing paramedics to stabilize and increase treatment options for patients during transport. In addition, these tools help paramedics, and the physicians they are in contact with, more quickly and accurately decide whether a patient needs to be transported to Durango or Denver or if the patient can be treated in Pagosa.

All paramedics received critical care level certification within two years of the program's launch. A simultaneous upgrade to the district ED's capabilities has enhanced the critical care component of the HCIA Program.

**Care coordination and patient navigation.** Care coordination is intended to meet cardiovascular patients' needs in the 30 days post-discharge following an acute event. Patient navigation is intended to provide ongoing, as-needed support for patients with and at high risk for cardiac disease. The award provided funding for one fulltime worker to perform both care coordination and patient navigation activities. As of May 2014, care coordination and patient navigation activities were split between two people—one part-time care coordinator and one part-time patient navigator.

The care coordinator refers appropriate patients to either the Outreach Paramedic program or Patient Navigation, depending on the case. Patients are contacted by the Outreach Paramedic within 48 hours of discharge following an acute cardiac event. During this initial call, the Outreach Paramedic makes sure patients are receiving adequate follow-up care and addresses any medication or medical questions, social needs, or barriers to care. The care coordinator continues to monitor patients for 30 days after discharge, with the goal of preventing readmissions. The care coordinator position, funded by the Innovation Award, is part time and is staffed by an Emergency Medical Technician who also supports outreach paramedicine.

**Patient navigation.** The patient navigator provides a wide range of supportive services to patients who have or are at risk for cardiac disease. Most referrals to the navigation program come from the critical care team, but PCPs, the ER, and other wellness center staff also refer patients. Once the navigator

receives a referral, she makes three contact attempts by phone and a fourth time via mail. Once contact is established, patients have a wide variety of responses. Some deny the need for navigation services. Others have specific one-time needs, such as finding a primary care provider. Still others have multi-layered, complex issues requiring significant navigator time and effort to resolve. These may include access to transportation, healthy food, or insurance coverage. The program in Pagosa was initially modeled after a patient navigation program administered by Rocky Mountain Health plan, but the patient navigation program in Pagosa has been modified to respond to the needs of the local population.

### Target Population and Program Participants

This program is a population-level intervention that targets District residents at risk for cardiac disease and acute cardiac and stroke patients. Over half of the target population is over the age of 46 and, as a result, enrolled in Medicare and Medicaid. Almost two-thirds of the participants are female, and over half of the participants are between the age of 26 and 64. A large portion of data for race/ethnicity and insurance type is unknown.

**Participant characteristics.** The table below shows demographic information for patients enrolled in Upper San Juan’s programs during Quarter 7. Two-thirds of the participants are female and over half of the participants are between the age of 26 and 64. A majority of participants (76.4%) are White.

Demographic Information	Jan–March 2014 Patient Count	Jan–March 2014 Patient Count		Jan–March 2014 Patient Count	Jan–March 2014 Patient Count
<b>Sex</b>	<b>#</b>	<b>%</b>	<b>Age</b>	<b>#</b>	<b>%</b>
Male	61	35.1%	Elderly: >75 years	16	9.2%
Female	109	62.6%	Elderly: 65–74 years	37	21.3%
Unknown	4	2.0%	Adults: 26–64	115	66.1%
			Young Adults: 19–25	2	1.1%
			Adolescents: 12–18	0	0.0%
			Unknown	4	2.3%
<b>Race/Ethnicity</b>	<b>#</b>	<b>%</b>	<b>Insurance Type</b>	<b>#</b>	<b>%</b>
White	133	76.4%	Medicare (FFS/Unspecified)	33	19.0%
Hispanic or Latino	24	13.8%	Private/Commercial	60	34.5%
American Indian/Alaska Native	2	1.15%	Medicaid	10	5.7%
Unknown	15	8.6%	Dually Eligible	4	2.4%
			Children Health Insurance Plan	1	0.6%
			Uninsured	27	15.5%
			Other	2	1.1%
			Unknown	36	20.7%

Source: HCIA 7QR Awardee Performance Report. Reflects unique count of quarterly direct program participants.

**Identification method.** In general, participants are referred by a patient navigator, care coordinator, wellness coordinator, or a physician at PSMC. Here are the specific ways participants are identified for each part of the intervention:

- Wellness program: Participants for these programs are recruited at health fairs, schools, and local business or are referred by a patient navigator or doctors at the Medical Center.
- Stroke telemedicine program: Patients who present to the hospital with stroke symptoms.
- Cardiac telemedicine program: Patients who need follow-up care after a cardiac event.
- Outreach paramedic program: Paramedics facilitate post-discharge primary care visits with patients based on established criteria.
- Care coordination: Patients who are discharged following an acute cardiovascular event.
- Patient navigation: Referrals come from community partners, health partners, EMS, PCPs, the ER, or Wellness Center staff.

### Implementation Effectiveness

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The USJHD HCIA Program operational plan was approved September 30, 2012. The wellness program enrollment began in July 2012; the neurology telemedicine enrollment began in January 2013; the clinic-based cardiology telemedicine and patient navigation program enrollment began in April 2013; the critical transports began in October 2013; and the outreach paramedicine began in February 2014.

The District hoped that a cardiology telemedicine program would mimic the acute neurology telemedicine program. However, because USJHD is already an hour away from the catheterization lab, the telemedicine intervention would have delayed EMS's ability to get acute myocardial infarction patients to Durango in the 90-minute window for Percutaneous Coronary Interventions. Accordingly, protocols are in place for immediate transport to either the ED at PSMC or the catheterization lab in Durango. When patients with chronic diseases present to the ER, it is within the scope of the ER physician to diagnose a heart attack or other condition that would require transport out of Pagosa. Therefore, the cardiologists in Durango did not see it as clinically necessary to evaluate patients on the telemonitor when timeliness of treatment post-diagnosis is so critical. Follow-up cardiology care is available to patients at the PSMC primary care clinic through cardiology telemedicine. All telemedicine activities are managed by a telemedicine coordinator funded by the award.

Because the population in USJHD is not used to having local access to health resources, it has been more challenging than expected to engage the target number of participants. The clinical staff identified "cowboy syndrome" as a significant barrier, which they describe as patients avoiding care until their condition becomes debilitating. They believe this happens in part because a lot of patients have seen friends or family crippled by the financial consequences of medical transport or treatment.

Still, the PSMC marketing team has been key to developing a communications strategy that facilitates more participation in the innovation components. The purpose of the marketing initiative is to make people more comfortable with the new technology; to combat the "cowboy syndrome" so that people will come in when they are experiencing symptoms of a heart attack or stroke; and to remind people that they no longer have to drive to Durango or Denver for many types of care.

The implementation process has helped USJHD identify key components and gaps in its health care system. Dubbed by the USJHD staff as the hub of all intervention activities, care coordination and patient navigation have received many more referrals than expected from clinicians at PSMC. The patient navigation program has also uncovered an unmet need in the community for behavioral health services and navigation services for patients who do not have cardiovascular disease. As a result, moving forward navigation will be a larger part of USJHD activities, and USJHD is investigating expanding telemedicine programming to include psychiatry services.

## Program Effectiveness

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Our evaluation of the program's effectiveness will focus on quantitative and qualitative analysis as described below.

### Quantitative Results

Our evaluation of program effectiveness for the USJHD program will be based largely on quantitative data. Because the USJHD innovation program is designed to impact the entire community and aims to change health outcomes, quality, utilization, and costs for the population served by their medical center, we currently plan to conduct an area level study of this awardee. Under this analytic framework, we would compare service utilization rates in the USJHD service area before the Innovation Awardee to rates after implementation. We look forward to presenting results for these analyses in future reports.

### Qualitative Results

Our qualitative findings of program effectiveness for the USJHD program will be based largely on analysis of patient focus group data. We will present the results in a future report.

## Workforce Development and Deployment

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The innovation team is a combination of clinical and non-clinical staff. Despite the wide range of backgrounds and credentials, there is significant communication and collaboration across the innovation components—especially for patients involved in multiple areas of the intervention. This collaboration between staff is facilitated by the multi-faceted nature of the USJHD program, where patients often move through several components as their needs change.

**Wellness coordinator.** The wellness coordinator schedules and implements the early detection and wellness programming. Out of these programs participants can be referred to other services like patient navigation. At the Wellness Center, there are a number of wellness coordinators, one of which is funded by the Innovation Award. Training for wellness coordinators consists of a two and a half day in-person course that includes training on using the screening tools and tactics for motivational interviewing and counseling. A wellness coordinator may have a range of experience and education, including personal training, nutrition, or health education. The supervisor of the wellness coordinators shared that a strong understanding of behavior change, an ability to build personal relationships, and empathy were important characteristics of a successful wellness coordinator.

**Telemedicine coordinator.** Telemedicine coordinator is responsible for training and supporting medical staff for the telemedicine program and performing tests of systems to ensure functionality. She, along

with the wellness coordinator and patient navigator, is also responsible for conducting community education classes on telemedicine and early signs of stroke as well as integrating the primary care telemedicine programs into a PCMH model. The telemedicine coordinator position is full time and funded by the Innovation Award. The telemedicine coordinator was a paramedic for more than 20 years and received training on telemedicine equipment operation, cardiovascular and stroke telemedicine protocols, and medical staff support.

**Outreach paramedics.** All full-time paramedics employed by PSMC are trained by Hennepin Community Paramedic to perform home visits for vulnerable patients post-discharge. The outreach paramedics follow 15 to 20 protocols based on the American College of Cardiology Foundation/American Heart Association quality measure guidelines. They act as physician extenders by using a wireless telemedicine camera in the patient’s home to beam in a physician at the Medical Center who can evaluate the patient and make adjustments to their medications and treatment as needed. The outreach paramedic role is in the early implementation phase.

**Critical care paramedics.** The critical care paramedicine role expands the responsibilities of the traditional paramedic through waivers approved by Colorado’s Emergency Medical Practice and Advisory Council that allow paramedics to “exceed the scope of practice of an EMS Provider as defined in the rules.”<sup>131</sup> All paramedics will be trained and receive the certification within two years of the program’s launch. Their expanded scope allows them to improve critical care during transport. As outlined in Upper San Juan’s job descriptions, it is important that the paramedics function independently, readily adapt to a changing pre-hospital environment, have strong personal skills, and a professional demeanor.

**Care coordinator.** The care coordinator’s primary goal is to prevent readmissions by working with patients for 30 days post-discharge for acute cardiovascular event. She coordinates follow-up care and addresses patients’ medical and social needs as they arise. The care coordinator funded by the Innovation Award is an EMT who has been with PSMC for almost five years and works part time as a care coordinator and part time as outreach paramedic administrative support. In-person and online trainings are available on the PCMH model, motivational interviewing, health equity, Colorado’s Health Insurance Marketplace, and addressing social determinants of health.

**Patient navigator.** The patient navigator provides a wide range of supportive services to patients who have or are at risk for cardiovascular disease. The patient navigator engages with patients over the phone or in the clinic or the hospital to connect them to medical or social resources. Until recently, there were not clear benchmarks for navigation services. The benchmarks have become critical to ensuring a manageable caseload (20 patients per full-time employee) and holding patients accountable. The patient navigator attended a level-one, four-day patient navigation training in Denver. In person and online trainings are also available on the PCMH model, motivational interviewing, Medicaid, health equity, Colorado’s Health Insurance Marketplace, and addressing social determinants of health. The patient navigator funded by the Innovation Award works part time and had previous experience as a holistic health coach.

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<sup>131</sup> Colorado Department of Public Health and Environment: Emergency Medical and Trauma Services. “Medical direction: waiver requests.” 2014. <http://www.colorado.gov/cs/Satellite/CDPHE-EM/CBON/1251589738546>

## Context

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Below we discuss some of the contextual barriers and facilitators USJHD has encountered in the implementation of their program.

### Endogenous Factors

**Support from leadership and utilizing existing resources.** Over the past six years, USJHD has been in the process of building a health system that can provide local care for its residents. The newness of the system means that the Innovation Award plays a pivotal role in expanding its workforce and resources. The broader health system effort includes morphing PSMC into a PCMH, a model that the intervention activities have been shaped to support. Backing from USJHD leadership and a strong mission have facilitated the implementation of the program.

Another facilitator of implementation for community outreach programming and neurology telemedicine has been the pre-existing Wellness Center and the telemedicine acute stroke care program, respectively. Specifically, staff was able to use PSMC's existing relationships with surrounding hospitals to further develop the telemedicine portion of the project and enroll more patients. Additionally, access to the PSMC marketing team has been key to developing a communications strategy that increases participation in the innovation components. The purpose of the marketing initiative is to increase comfort with the new technology; encourage people to recognize and seek treatment for symptoms; and remind people of the availability of local services.

### Exogenous Factors

**Target population's cultural attitudes and awareness of local health resources.** Because the population is not used to having local access to health resources, it has been more challenging than expected to attract participants. Moreover, many patients avoid care until symptoms are debilitating, in part for fear of crippling medical expenses.

**Limitations of data available.** Lastly, USJHD identified barriers to accurate measurement of the intervention's impact and the ability of the district to experiment with billing for post-discharge care coordination. Because the district is a temporary home for many retirees and vacationers, much of the population it cares for is not captured in data available.

## Summary

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USJHD's goal is to create a healthier community and lower health care costs by reducing risk for cardiovascular disease and improving health outcomes for patients with cardiovascular disease. Before the Innovation Award, patients with urgent and non-urgent cardiovascular issues had to travel up to three hours for care. USJHD's approach to achieving its goals includes expanding an early-detection cardiovascular health screening and wellness program by deploying an additional wellness coordinator; giving patients local access to cardiovascular care by introducing cardiology and neurology telemedicine managed by an Innovation Award-funded telemedicine coordinator; upgrading training of paramedics to include outreach and critical care paramedicine as well as improving the paramedical equipment; and adding specialized 30-day post-acute cardiac episode care coordination and long-term patient navigation services.

Throughout the implementation process, the USJHD team has carefully adapted the program components, such as shifting cardiology telemedicine to follow-up care to reduce transportation time in response to community and workforce needs and barriers.

Support from PSMC leadership who have a strong focus on expanding the scope and quality of services available within the District has facilitated implementation of the Innovation Award. However, because residents are used to incurring cost to obtain care (e.g. travel and time), they delay care, causing the program to not reach its participation target. The patient navigation and care coordination referrals by doctors have helped USJHD to identify gaps in access to mental health care. The district is responding by looking into expanding its navigation program and telemedicine program to include psychiatric care. Finally, limited internal capacity has prevented or delayed USJHD from pursuing certain navigation and care coordination billing options and limited data on much of the patient population, temporary resident retirees and vacationers, which may make data analysis and demonstrating impact more challenging.

There are several topics that warrant further investigation during the second year of the evaluation, including the following topics and questions:

- successes and challenges of the new care coordinator and patient navigator roles.
- whether the implementation of outreach paramedicine has expanded as well as any factors that have influenced the program's reach; and
- how the cardiac telemedicine program evolved.

Continued research and communication with the awardee on these topics will help to better inform the evaluation of USJHD in order to determine the potential for replicability and scalability of the intervention as well as to evaluate how the program itself is serving its immediate patients currently in the program.

## The Rector and Visitors of the University of Virginia

This report presents our evaluation of the Rectors and Visitors of the University of Virginia (UVA) Innovation Award, which combines three programs—My Course, Care Track, and STAT RAD—to provide palliative care to patients with advanced cancer.

We provide preliminary observations about the program based on a review of the awardee’s application, operational plan and quarterly reports as well as telephone interviews with the awardee and a site visit conducted on May 29–30, 2014. It is important to note that our findings are tentative, as we have not completed all of our data collection, coded site visit data, or fully analyzed the data collected to date. We look forward to providing more definitive findings and results for future reports.

<b>Program Title</b>	<b>My Course, CARE Track, STAT RAD</b>
<b>Targeted Disease/Condition</b>	<b>Cancer</b>
<b>Total Amount Awarded</b>	\$2,571,322.00
<b>Description of Target Population</b>	Patients with advanced cancers—especially those with metastatic cancer or locally advanced/recurrent loco-regional cancer
<b>Description of Awardee Organization</b>	The Rector and Visitors of the University of Virginia (UVA) are working to improve care for patients with advanced cancer. They are currently implementing their program at the Emily Couric Clinical Cancer Center within the University of Virginia Medical Center in Charlottesville, Virginia.
<b>Setting of Intervention</b>	Oncology practices at the University of Virginia Medical Center Emily Couric Clinical Cancer Center in Charlottesville, Virginia
<b>Overview of Intervention</b>	The UVA program uses palliative care to provide symptom management to stage 4 cancer patients. Paying close attention to patient reported outcomes via the MyCourse questionnaire, the CARE Track team identifies when patients are in need of additional care, and works with palliative care doctors, social workers, oncologists, radiation oncologists, pharmacists, and others to both maintain the course of treatment as well as prioritize the quality of life and symptom management of the patient. The STAT RAD portion of the intervention uses a condensed schedule of targeted radiation treatment for metastatic cancer patients, providing the opportunity for same-day treatment and streamlining the delivery of palliative radiation therapy.

## Introduction

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Patients with advanced cancer use significant medical resources near the end of life. Nearly 16% of cancer patients receive chemotherapy within two weeks of death, and 7.2% of cancer patients are admitted into the ER within one month of death.<sup>132</sup> Aggressive care of this type can negatively impact patient quality of life and imposes a large financial burden on the U.S. healthcare system.<sup>133</sup> Early palliative care can, however, improve quality of life and reduce costs. Studies show cancer patients receiving early palliative care exhibit fewer depressive symptoms, experience a higher quality of life, and live, on average, 2.7 months longer than patients receiving standard care.<sup>134</sup> Similarly, cancer patients exposed to early palliative care report higher satisfaction with care.<sup>135</sup> Studies also show early palliative care saves an average of \$4,855 per patient.<sup>136</sup>

In a UVA piece titled “Putting Patients at the Center of Cancer Care,” the Principal Investigator (PI) of the UVA HCIA Program emphasized the importance of patient-reported outcomes. According to the PI, having patients report levels of pain, anxiety, depression, constipation, and other psychosocial and physical conditions using validated measures leads to improved identification of patients that need additional care and symptom management.<sup>137</sup> In the same article, the PI also found high-dosage radiation therapy as an alternative to typical radiation therapy regimes “just as effective as the ten smaller doses.”<sup>138</sup> Additionally, the PI noted, “We have good data showing reductions in pain med requirements that are fairly rapid once the radiation treatment is completed.” Reducing pain medication can alleviate symptoms such as constipation, a common side effect of the pain medication required after receiving several treatments of radiation, thereby potentially reducing unnecessary ER visits.

Leadership of the palliative care team at UVA cites a study published in the *New England Journal of Medicine* as an important impetus for the intervention. The study compared patients receiving typical oncology care to an intervention group receiving typical care plus referral to palliative care soon after diagnosis. The intervention group had a higher quality of life and lived an average of three months longer due to the services offered by palliative care.<sup>139</sup> Patients were also better equipped to make end-of-life care decisions that helped them avoid dying in an intensive care unit.<sup>140</sup>

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<sup>132</sup> Earle C, Neville B, Landrum M, et al. Trends in the aggressiveness of cancer care near the end of life. *Journal of Clinical Oncology*. January 2004; 22(2): 315-321.

<sup>133</sup> Goodman D, Etsy A, Fisher E, Chang C. Trends and variation in end-of-life care for Medicare beneficiaries with severe chronic illness. The Dartmouth Institute for Health Policy and Clinical Practice. April 2011.

<sup>134</sup> Temel J, Greer J, Muzikansky A, et al. Early palliative care for patients with metastatic non-small-cell lung cancer. *The New England Journal of Medicine*. August 2010; 363: 733-742.

<sup>135</sup> Gade G, Venohr I, Conner D, et al. Impact of an inpatient palliative care team: a randomized control trial. *Journal of Palliative Medicine*. March 2008; 11(2): 180-90.

<sup>136</sup> Ibid.

<sup>137</sup> Kobert L. Putting patients at the center of cancer care. Vitals University of Virginia School of Medicine; Patient Centered Cancer Care. Fall 2013; 17-21.

<sup>138</sup> Ibid

<sup>139</sup> Temel J, Greer J, Muzikansky A, et al. Early palliative care for patients with metastatic non-small-cell lung cancer. *The New England Journal of Medicine*. August 2010; 363: 733-742.

<sup>140</sup> Ibid

This intervention builds on UVA Cancer Center’s history of excellence in palliative care. To this end, the UVA team developed the three programs that are part of their intervention: CARE Track, MyCourse, and STAT RAD. We describe each component in the section below.

### Innovation Components

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The UVA intervention has three components: CARE Track, MyCourse, and STAT RAD. CARE Track is a comprehensive and coordinated approach to palliative cancer care focused on helping participants better control their pain and other symptoms. Investigators enroll participants into CARE Track when they enter the UVA Cancer Center and the nurse coordinator determines that they meet the eligibility criteria (i.e., patients with advanced cancer who are not being treated for a cure but who may be under treatment for pain and extension of life). Through CARE Track, patients with particularly complex cases or who are experiencing difficulty controlling symptoms are discussed in an interdisciplinary Supportive Care Tumor Board (SCTB), a forum in which palliative care doctors, oncologists, psychiatrists, anesthesiologists, social workers, palliative care pharmacists, and others gather weekly. The SCTB is presented with roughly 10 patients per week based on recommendations by the treating physician, palliative team, or other supportive service involved with the patient. Cases are typically brought to the board to improve the pain and symptom management plan of the patient, thereby improving his or her quality of life.

MyCourse is a patient-reported outcomes questionnaire that focuses on psychosocial, functional, and clinical status used to support the CARE Track program. The MyCourse questionnaire is an electronic version of the Patient Reported Outcomes Measurement Information System (PROMIS) survey, incorporating cancer specific questions, and embedded in Epic’s MyChart personal health record system and the hospital’s electronic health record (EHR). When a patient comes to the Cancer Center for an appointment, the patient responds to the MyCourse questions on an iPad while a nurse takes the patient’s vital signs. Questions are posed as a series of Likert scale responses (e.g., strongly agree, agree, disagree, strongly disagree) and algorithms are used to calculate combined scores (1 through 10) for patients’ overall level of pain, anxiety, etc. The results are displayed in the patients’ medical record, tracking values over time in a chart or graph. Their responses are also immediately available to the entire care team in the EHR to assist clinical decision-making. For example, the provider might note that the patient reported significantly higher pain levels than previously reported, prompting a detailed discussion around pain management and medication. Another feature of MyCourse is an alert system that notifies the care teams when a patient’s profile meets certain criteria, usually indicating the need for an intervention. The nurse coordinator will typically be the first respondent to the alert and take immediate action to aid the patient.<sup>141</sup>

The third element of the UVA program is STAT RAD, which uses advanced radiation therapy to implement a high-dosage, single 30-to-40-minute session of radiation to individuals with metastatic, non-spinal bone cancers. The STAT RAD model compresses the entire treatment into a one-day visit, including consultation, CT scans, and a treatment plan in contrast to the typical model requiring the patient to return to the hospital for 10 separate treatments. The protocol is an innovative workflow process

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<sup>141</sup> Kobert L. Putting patients at the center of cancer care. *Vitals University of Virginia School of Medicine; Patient Centered Cancer Care*. Fall 2013; 17-21.

aimed at achieving rapid pain relief and more efficient clinical care. Through same-day treatment and more rapid radiation therapy, UVA hopes to decrease complications from the metastatic disease.

### Target Population and Program Participants

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UVA's intervention focuses on individual patients with advanced cancer who are not being treated for a cure—specifically, with metastatic cancer or locally advanced/recurrent loco-regional cancer.

Eligible participants for the UVA intervention are identified through several mechanisms. First, patients who are referred by their providers to the UVA palliative care clinic enter the program through CARE Track. UVA's nurse coordinator also identifies patients from UVA cancer center records who meet the advanced cancer eligibility criteria, even if they are not immediately referred for palliative care. Finally, an individual may be suggested for STAT RAD if they are eligible for the CARE Track program and have advanced non-spinal bone cancer.

**Participant characteristics.** UVA has served more than 900 participants. Approximately one-third of program participants have Medicare, while another quarter have private insurance. Nearly three-quarters of program participants are White, and most are between the ages of 26 and 64 years old. Participants are fairly evenly split between male and female, with slightly more female than male patients.

**Patient characteristics.** The table below shows demographic information for patients receiving services from UVA during Quarter 7, all of whom are qualified as indirect participants.

Demographic Information	Jan–March 2014 Patient Count	Jan–March 2014 Patient Count
<b>Sex</b>	<b>#</b>	<b>%</b>
Male	101	43.5%
Female	131	56.5%
<b>Age</b>	<b>#</b>	<b>%</b>
Elderly: >75 years	31	13.4%
Elderly: 65–74 years	42	18.1%
Adults: 26–64 years	154	66.4%
Young Adults: 19–25 years	1	0.43%
Adolescents: 12–18 years	1	0.4%
<b>Race/Ethnicity</b>	<b>#</b>	<b>%</b>
Hispanic or Latino	10	4.3%
Black/African American	31	13.4%
White	172	74.14%
Unknown	19	8.2%
<b>Insurance Type</b>	<b>#</b>	<b>%</b>
Medicaid	35	15.1%
Medicare Fee for Service or Medicare Unspecified	73	31.5%
Medicare Advantage	7	3.0%
Dually Eligible (Medicare + Medicaid)	7	3.0%
Private/Commercial Health Insurance/Health Plan	62	26.7%
Uninsured	18	7.8%
Unknown	29	12.5%

Source: HCIA 7QR Awardee Performance Report. Reflects unique count of quarterly indirect program participants.

## Implementation Effectiveness

UVA's operational plan was approved on October 1, 2012, followed by the immediate launch of the program. UVA began enrolling patients on October 1, 2012.

UVA's focus on implementing palliative care early in the patient's treatment helps establish a close relationship between the patient and the palliative care team. This approach allows the palliative care team to facilitate conversations about hospice care with the patient and his/her caregiver which is integral to UVA's mission of improving the quality of life of the patient. Closely tracking the end-of-life trajectory also allows the palliative care team to ease the burden on the patient and his/her family. Furthermore, the introduction of palliative care earlier in the patient's treatment provides important pain and symptom management services that otherwise would have to wait until the end of the patient's life.

The MyCourse component of the program provides a longitudinal view of the participant's medical and psychosocial history and facilitates the use of patient-reported outcomes in their treatment plan. Although some participants found the iPad-based questionnaire cumbersome and time consuming, they understood its utility. Program leadership believes that tracking symptoms will provide physicians with a better

understanding of patient conditions, ultimately improving care. MyCourse is also able to capture information that patients are sometimes unwilling to disclose in person.<sup>142</sup>

The intervention benefitted from having a full-time nurse coordinator and administrative assistant to facilitate the treatment of patients between the palliative and oncology clinicians. The coordinator is often the agent who identifies patients in need of attention to the SCTB and enrolls patients in the CARE Track program. Having nurse practitioners as part of the existing oncology and palliative care teams has also been a benefit. These mid-level providers often have more flexibility than the oncologists and palliative physicians, which can allow them to support CARE Track patients as needed.

The SCTB, a platform to address the most challenging patients and their symptoms, is also a mechanism to coordinate care across various disciplines. Due to the complexity of stage IV cancer patients, the collaboration of a multi-disciplinary group of medical personnel greatly aids efforts to reduce patient discomfort and improve quality of life for the patient. Although effective, the group reviews only 10 patients a week, due to time constraints. Further, many of the oncologists are often unavailable to attend the meetings in person and thus rely on the meeting notes.

### Program Effectiveness

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Our evaluation of the program's effectiveness will focus on quantitative and qualitative analysis as described below.

#### Quantitative Results

Our evaluation of program effectiveness for the UVA program will be based largely on quantitative data; however, when we began work on this report we did not have the necessary agreements in place to receive data from UVA. Since that time, we have finalized these agreements and look forward to presenting results on UVA's impact on measures concerning health, quality of care, utilization, and costs for the UVA program's Medicare and Medicaid population.

#### Qualitative Results

Our qualitative findings of program effectiveness for the UVA program will be based on data collected during our site visit, including discussions with staff and patients/caregivers and observations of the program. At this time, we have not yet completed the analysis of this data and will therefore present the results in a future report.

### Workforce Development and Deployment

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Most of the individuals involved in the UVA interventions were employed by UVA prior to the Innovation Award. Program management and administrative staff include an overall Program Director, a Project Manager, and leads for MyCourse, CARE Track, and the outcomes components of the program.

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<sup>142</sup> Ibid.

**Providers.** A variety of providers, including palliative care physicians, medical oncologists, social workers, chaplains, and others, are involved in the intervention. The SCTB that meets weekly to discuss complex CARE Track patients includes a wide variety of interdisciplinary providers employed by UVA. The oncologists and palliative care doctors involved in the intervention provide care through CARE Track, discuss patients through SCTB meetings, and/or administer STAT RAD.

**Medical physicist.** A critical component of the STAT RAD intervention is a medical physicist who oversees radiation therapy and helps build and test the quality-improvement algorithms. She also works on developing and supporting the health IT infrastructure used to track program participants and outcomes.

**Nurse coordinator.** Integral to CARE Track's success is a nurse coordinator who serves as the main point of contact for program participants. She is a registered nurse with previous palliative care experience who follows the CARE Track participants and ensures they have what they need. She was hired specifically for the program and, as a result, often has more immediate availability for the CARE Track patients than a palliative or oncology nurse might. The nurse coordinator schedules CARE Track visits, answers questions over the phone or in person, administers the MyCourse questionnaire, and helps patients through the system. She also connects them with social work or other supports, as needed. Ultimately, she supports clinical care by coordinating all elements of the CARE Track program. An administrative specialist who assists with recruiting, gathering statistics and data, and other non-clinical tasks serves as support for the nurse coordinator.

## Context

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A number of endogenous and exogenous factors affected the integration of MyCourse, CARE Track, and STAT RAD into the palliative care program at UVA.

### Endogenous Factors

The palliative care program at UVA had a strong foundation prior to the Innovation Award. The leadership of the palliative care department and the PI foster a strong relationship between the palliative care team and the radiation oncology department. This trusting relationship enhanced the program's ability to both treat the disease (to extend life) and manage patient symptoms. Both strong leadership and a preexisting palliative care program have been key factors in program implementation and are important considerations for program replicability.

### Exogenous Factors

Meaningful use (MU) serves as an important facilitator for MyChart. The UVA program designed MyCourse to require patients to sign up for MyChart, which in turn helps providers satisfy MU. For every physician that satisfies the MU requirement, the hospital is awarded roughly \$17,000, and the UVA hospital has hundreds of physicians. This financial reward created motivation for clinicians to sign up their patients for MyChart.

The STAT RAD program has provided a reliable, well-structured, highly efficient workflow for radiation treatment. Oncologists at UVA trust this model and incorporated STAT RAD into the treatment plans of

stage IV metastatic cancer patients. This model is further encouraged by the largely rural population that UVA serves. Instead of having participants travel back and forth from the hospital on various occasions, the STAT RAD workflow condenses the process into a single day.

However, the current per-diem payment model for radiation creates a major barrier to the STAT RAD approach of condensed radiation treatment. Under the current system, providers derive financial benefit from multiple visits stretched over several weeks to plan for and conduct radiation treatments. The PI discusses this fundamental issue with the payment scheme for radiation treatment, saying,

*“It turns out that you can’t do a CT scan and a treatment plan and the delivery of treatment in one day, because you can only get paid for one of those.”* He continues, *“And if you only give one treatment instead of ten—even if you’re spending significantly more time than one treatment takes—you’re going to get only one-tenth of the payment.”*<sup>143</sup>

## Summary

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The UVA program focuses on improving the quality of care for stage IV cancer patients by integrating early palliative care. By properly managing a patient’s end-of-life trajectory, the UVA program strives to both increase patient quality of life as well as reduce cost of care at the end of life. Concentrating on patient-reported outcomes through the MyCourse questionnaire, the CARE Track team delivers pain and symptom treatment to patients suffering from advanced cancer. UVA believes that patient-reported outcomes aid treatment teams in managing a patient’s symptoms as well as identifying when patients need additional care. The CARE Track team uses a multidisciplinary approach, referring the most challenging patients to the SCTB, which meets weekly to discuss pain and symptom management for these patients.

One of the most innovative aspects of the UVA program is its STAT RAD radiation delivery approach, which provides state-of-the-art radiation treatment to metastatic, non-spinal cancer patients. STAT RAD condenses a radiation series into a high-dosage, highly targeted single session, providing rapid pain relief and reducing the need for pain medications. However, the current per diem payment model for radiation therapy will likely limit the sustainability of STAT RAD and prevent other similar programs from forming. The present payment structure incentivizes multiple sessions of radiation instead of one highly concentrated dose and thus without changes to the payment model, radiation is likely to continue in the form of multiple sessions.

The success of the UVA program stems from the strong leadership of the Principal Investigator (PI) and the Palliative Care Director. The solid foundation of palliative care at the hospital along with the strong connection between the oncological and palliative care disciplines should be considered for program replicability. Instrumental to the functionality of the CARE Track program is the role of care coordination, specifically a nurse coordinator who serves as a facilitator between the different medical disciplines and the patient. The nurse coordinator also helps identify patients for the CARE Track program and monitors the MyCourse questionnaire. Ultimately, the UVA program relies on a variety of coordinated early palliative care efforts to increase the quality of life for advanced cancer patients.

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<sup>143</sup> Ibid.

There are several topics that warrant further investigation during the second year of the evaluation, including:

- sustainability of STATRAD using the current payment schemes;
- scaling of Supportive Care Tumor Board Meetings; and
- oncologists' use of Mycourse results for their treatment.

Continued research and communication with the awardee on these topics will help to better inform the evaluation of UVA in order to determine the potential for replicability and scalability of the intervention as well as to evaluate how the program itself is serving its immediate patients currently in the program.

## Vanderbilt University Medical Center

This report presents our evaluation of the Vanderbilt University Medical Center (Vanderbilt) MyHealth Team Project.

We provide preliminary observations about the program based on a review of the awardee’s application, operational plan, and quarterly reports as well as telephone interviews with the awardee and initial claims analysis. We conducted a site visit on July 7–9, 2014 and continue to work to code and analyze the data collected on that visit. While this report presents themes that we have identified during the first year of the evaluation, it is important to note that our findings are tentative and descriptive at this point. We look forward to providing in future reports more definitive findings and results, including analysis of the data collected at our site visit.

<b>Program Title</b>	<b>MyHealth Team</b>
<b>Targeted Disease/ Condition</b>	<b>Cardiovascular Disease</b>
<b>Total Amount Awarded</b>	\$18,846,090.00
<b>Description of Target Population</b>	Patients with acute myocardial infarction (AMI), pneumonia, congestive heart failure (CHF), chronic kidney disease (CKD), diabetes, hypertension, or chronic obstructive pulmonary disease (COPD)
<b>Description of the Awardee Organization</b>	Vanderbilt University Medical Center is a non-profit, academic/university medical center based in Nashville, Tennessee. The Center serves populations living in Tennessee and Kentucky. For this Innovation Award, they are partnering with Maury Regional Medical Center in Columbia, Tennessee, and Williamson Medical Center, in Franklin, Tennessee.
<b>Setting of Intervention</b>	Transition care coordination takes place in hospital inpatient units at Vanderbilt Medical Center, Maury Regional Medical Center, and Williamson Medical Center. Chronic care coordination takes place at affiliated physician practices: Vanderbilt Medical Group, Family Health Group (Maury), and Williamson Medical Group.
<b>Overview of Intervention</b>	Vanderbilt’s goal is to improve health through disease management and the reduction of hospital readmissions and emergency room visits for patients with various conditions. Vanderbilt’s program has two care-coordinator-driven interventions: <ol style="list-style-type: none"> <li>(1) An inpatient clinical care coordination program uses health IT-enabled monitoring and patient education to produce continuous care quality improvement and improved health outcomes.</li> <li>(2) An outpatient chronic care coordination program uses health IT-enabled self-monitoring and management as well as care coordinator-performed assessments and personalized care plans to improve mortality outcomes and process of care quality performance.</li> </ol> Vanderbilt’s interventions use a real-time, informatics-based, and closed-loop approach to health IT-enabled care coordination paired with an inter-professional team to integrate evidence-based decision support into the clinical workflow.

## Introduction

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There is a growing body of research suggesting that adults are vulnerable during the transition from hospital to home. Systematic factors that contribute to this vulnerability are the gap in communication between the provider and healthcare agencies, inadequate patient and caregiver education, poor continuity of care, and limited access to services. Therefore, re-hospitalization rates are high, especially among those who are admitted for a cardiovascular disease, such as congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD), and acute myocardial infarction (AMI).

The goal of Vanderbilt's MyHealth Team program is to improve health through disease management and to reduce hospital readmissions and emergency room visits for patients with CHF, COPD, AMI, pneumonia, hypertension, and diabetes. Vanderbilt's program has two care-coordinator-driven interventions: an inpatient clinical care coordination program and an outpatient chronic care management program.

Vanderbilt previously implemented a pilot program under the same name that included a patient-centered medical home approach and care coordination targeting hypertension. In designing the HCIA intervention, Vanderbilt incorporated the ambulatory care coordination component of the pilot and expanded it to include additional diseases and transitional care coordinators. The expansion of the informatics capabilities has become a key aspect of the MyHealth Team intervention. New informatics systems have been developed to enable the care coordinators to work more efficiently and handle a larger caseload than during the pilot.

Vanderbilt also received an Innovation Award for a Complex/High Risk patient intervention, which focuses on patients being transitioned to skilled nursing facilities. For this intervention, only patients discharged to home are followed in the transitions portion from the Vanderbilt Medical Center. Maury Regional Medical Center and Williamson Medical Center do not have a conflict with the Complex/High Risk patient intervention so they engage patients regardless of the discharge location.

## Innovation Components

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The program has two components: (1) transition care coordination which coordinates care for participants before and after they are discharged from the hospital and (2) outpatient chronic care coordination helping participants manage chronic conditions in the ambulatory care setting. Providing patient education to help participants manage their own condition is an important part of both components of the MyHealth Team program.

**Transition care coordination.** When patients are admitted to the hospital for CHF, COPD, AMI or pneumonia, they are identified by the transition care coordinator for intervention. The risk level determines the intensity of services participants receive, which may include an in-person visit, health education, multi-disciplinary team transitional planning, patient-centric discharge planning, and medication reconciliation. Recently, Vanderbilt has added a post-discharge-only intervention for participants who did not have transition care coordination while in the hospital.

Once discharged, patients receive follow-up phone call(s). These calls may include medication reconciliation, care plan review, and risk evaluation. Between appointments, care may also be provided as

necessary. Based on the EHR and information submitted by the participants, they are monitored for 30 days post discharge. After 30 days, patients with participating primary care providers are transitioned to the outpatient chronic care coordination arm of the intervention. Transition care coordinators may continue to be in touch regarding physician follow-up scheduling or chronic disease self-management.

**Outpatient chronic care coordination.** Participants are also able to enter the MyHealth Team innovation through their participating primary care provider. At Vanderbilt affiliated clinics, all primary care patients participate in varying degrees, based on chronic condition and risk level. The Vanderbilt health IT system automatically enrolls patients into care coordination for hypertension based on clinical data and assigns them to one of two patient groups: Surveillance or Active Engaged. Active Engaged participants are higher risk and need more intense interventions. Surveillance participants are monitored automatically by the system, allowing care coordinators to focus their attention on creating more personalized plans of care for a smaller number of higher-priority patients. Maury Regional and Williamson-affiliated clinics do not have this risk stratification tool built into their health IT systems and therefore do not have a formal strategy for prioritizing participants.

Outpatient care coordination activities include chronic disease education for patients, such as nutrition and exercise advice, or assistance using self-monitoring tools (e.g., blood pressure monitoring).

**Supporting activities/tools.** Vanderbilt created and customized its own EHR system. An algorithm collects and analyzes participant information continuously, reassessing health needs as information becomes available. This information feeds into a dashboard so care coordinators can easily monitor patient status, set up reminders, place low-maintenance participants on surveillance, and access the notes from participants' most recent doctor appointments. The dashboard assists outpatient care coordinators with the maintenance of the large participant panels they must handle. The panels generally range from 1,400 to 1,600, depending on the level of needs of the participants. The Vanderbilt algorithm groups patients into risk levels based on clinical characteristics, allowing care coordinators focus their efforts on patients identified as higher risk .

The Vanderbilt EHR and care coordinator dashboard are only available to staff within the direct Vanderbilt University Medical Center network. The staff at the affiliate sites, Maury Regional and Williamson, have unique EHR systems that are not linked to the Vanderbilt system. The same is true for the clinics associated with the affiliate sites. The transition care coordinator and the outpatient care coordinator in these locations use REDCap™ to collect data and share patient information with the Vanderbilt.

The Vanderbilt team is also developing Project Commodore, an initiative that utilizes automated communications to improving care coordinator efficiency. It has developed various scripts and is testing the program. Automated calls will provide patients with reminders about medication changes, blood pressure monitoring, and appointment-related reminders. The automated calls will allow the care coordinators to assist patients who are having difficulties in these areas without requiring hands-on intervention.

In addition, participants are encouraged to use My Health at Vanderbilt, the patient portal available to all Vanderbilt patients. This allows participants to access various tools, such as a place to record their home

blood pressure readings. At this time, the portal is not optimized for the MyHealth Team program, so there is no way to directly contact the care coordinators with questions or follow up. These interactions must occur through the treating physician. However, since many participants were familiar with the patient portal prior to the intervention, it presents a sense of continuity of care.

### Target Population and Program Participants

Vanderbilt is implementing two programs under the MyHealth Team umbrella, with slightly different inclusion criteria. Participants of the transition care coordination intervention must be 18 years or older and admitted for one of four conditions: CHF, COPD, AMI, or pneumonia. Outpatient chronic care coordination intervention participants must be 18 years or older, have a participating primary care physician (or nurse practitioner), and have been diagnosed with one of the four following conditions: hypertension, CHF, diabetes, or COPD. Vanderbilt has recently expanded its target conditions and will also begin to enroll patients with Chronic Kidney Disease (CKD).

**Participant characteristics.** Vanderbilt has enrolled 32,486 unique participants in the program since the project began. The awardee aims to enroll 50,161 by the end of year two. Participants are evenly split between male (46.3%) and female (52.8%) (with 0.9% reported as unknown), and over half are between 26-64 years old. A majority of participants are White (81.8%) and over half are privately insured (54.7%).

Demographic Information	Oct 2012– March 2014 Patient Count	Oct 2012– March 2014 Patient Count		Jan– March 2014 Patient Count	Jan– March 2014 Patient Count
<b>Sex</b>	<b>#</b>	<b>%</b>	<b>Age (Years)</b>	<b>#</b>	<b>%</b>
Male	14663	46.3%	Elderly: >75	6,016	19.0%
Female	16727	52.8%	Elderly: 65–74	8,092	25.5%
Unknown	301	0.9%	Adults: 26–64	17,145	54.1%
			Young Adults: 19–25	137	0.4%
			Unknown	301	0.9%
<b>Race/Ethnicity</b>	<b>#</b>	<b>%</b>	<b>Insurance Type</b>	<b>#</b>	<b>%</b>
Black/African American	4,369	13.8%	Medicaid	0	0%
Asian	489	1.5%	Medicare (FFS/Unspecified)	7,993	25.2%
White	25,565	80.7%	Medicare Advantage	5,815	18.3%
American Indian/Alaska Native	42	0.1%	Private/Commercial	17,243	54.4%
Unknown	804	2.5%	TRICARE (Armed Forces)	275	0.9%
Two or more Race/Ethnicity	267	0.8%	Uninsured	64	0.2%
Native Hawaiian or Other Pacific Islander	22	0.1%	Unknown	301	0.9%
Hispanic or Latino	133	0.4%			

Source: HCIA 7QR Awardee Performance Report. Reflects unique count of quarterly direct program participants.

## Implementation Effectiveness

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The operational plan was approved on September 27, 2012, and Vanderbilt was able to begin enrolling patients into MyHealth Team by October 2, 2012.

Our qualitative findings of implementation effectiveness for the MyHealth Team program will be based largely on analysis of data collected during our site visit, including discussions with staff and patients/caregivers and observations of the program. At the time of this report, we had not yet conducted the analysis of this data and will therefore present the results of this analysis in a future report.

## Program Effectiveness

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Our evaluation of program effectiveness of the MyHealth Team Program will be based on quantitative and qualitative data. As we continue to gather and analyze primary (qualitative and quantitative) data from Vanderbilt over the coming year, we will present a more comprehensive set of observations and findings about program effectiveness in subsequent reports to CMMI.

## Quantitative Results

The evaluation uses quantitative analysis to answer questions about program effectiveness related to the core outcome measures used with all awardees (number of hospitalizations or hospital readmissions, number of hospital emergency department visits, and total cost of care) and supplemental measures specific to an individual awardee.

At the time analysis for this report, we had not finalized a data-sharing agreement with Vanderbilt and thus were not able to receive information from Vanderbilt to identify their program participants.

## Qualitative Results

Our qualitative findings of program effectiveness for the Vanderbilt program will be based largely on analysis of patient focus group data. We will present the results in a future report.

## Workforce Development and Deployment

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The multi-disciplinary team—consisting of a care coordinator or transition care coordinator, doctor, and medical assistant—form the basis of this intervention. The care coordinators serve as the focal point for the MyHealth Team intervention. There are two types of care coordinators: transition care coordinators and outpatient care coordinators.

**Transition care coordinators.** The TCCs work within the hospitals to facilitate the care of participants meeting the enrollment criteria. Transition care coordinators identify participants through their presenting diagnoses to begin the process of reconciling the care of hospitalized patients, which involves patient education and goal setting, follow-up calls, medication reconciliation, dietary compliance, and addressing social needs.

Depending on the setting of the intervention, some care coordinators have more of a case management function than others. At Maury Regional, the TCCs do not have a case management role because Maury Regional already has case managers on staff. Vanderbilt had been asking its TCCs to assume a case

management role, but it recently hired a discharge planner (with a master's in social work) to assist the care coordinators and allow them to focus on education and goal setting. Vanderbilt is planning to task TCCs with making home coaching visits.

At Vanderbilt, there are two TCCs, both of whom are BSNs and are funded through the Innovation Award. At Maury Regional, there are three RNs and one social worker. At Williamson, there are two RNs.

**Outpatient care coordinator.** The OCC serves to enrich the primary care of eligible participants by working with the primary care team in a physician's office. Within Vanderbilt, this is accomplished through the care coordinator dashboard, which allows for OCCs to monitor the most recent health information of enrolled participants, such as doctor's appointments, medication adjustments, or changes in health status. The monitoring then leads the OCC to initiate participant outreach, as needed.

**Physicians, medical assistants, and pharmacists.** The physicians are involved in the outpatient setting as the diagnosing clinician, who regularly consults with the care coordinator about the care plans. The medical assistants, who are located within the clinic locations, assist the care coordinators via phone communications with patients or updating the dashboard records of participants. Additionally, the primary care physician works with the OCC to facilitate the MyHealth Team care within their office. Recently a pharmacist was added to the transitions team at both Williamson and Maury Regional to assist with medication reconciliation and teaching.

**Training.** New staff shadow experienced providers for several weeks and are trained on the hospital system and EHR. TCCs and other involved staff receive training in effective health communication skills and medication reconciliation and Vanderbilt conducts ongoing training, such a Health Coaching session, to improve care coordinators' patient engagement and self-management skills. Staff from Williamson and Maury Regional are included in Vanderbilt's ongoing training sessions.

## Context

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Our qualitative findings of contextual factors for the Vanderbilt program will be based largely on data collected during our site visits. At the time of this report, we had not conducted the analysis of the site visit data and will therefore present the results of this analysis in a future report.

## Summary

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Vanderbilt's goal is to improve health through the reduction of major cardiovascular risk, hospital readmissions, and emergency department visits for patients with CHF, COPD, AMI, pneumonia, hypertension, and diabetes. Vanderbilt's MyHealth Team program has two care-coordinator-driven components: (1) inpatient transition care coordination and (2) outpatient chronic care coordination. The transition care coordination program uses health IT-enabled monitoring and patient education to produce continuous care quality improvement and improved health outcomes. The outpatient chronic care coordination program uses health IT-enabled self-monitoring and management as well as care coordinator-performed assessments and personalized care plans to improve both mortality outcomes and process-of-care quality performance. Both programs use a real-time, informatics-based, and closed-loop

approach to health IT-enabled care coordination paired with an inter-professional team to integrate evidence-based decision support into the clinical workflow.

The transition care coordination and outpatient care coordination programs have slightly different inclusion criteria. The transition care coordination intervention participants must be 18 years or older and admitted to the hospital for one of four conditions—CHF, COPD, AMI, or pneumonia. Outpatient care coordination intervention participants must be 18 years or older, have a participating primary care physician, and have been diagnosed with one of the following conditions: hypertension, CHF, diabetes, or COPD.

There are several topics that warrant further investigation during the second year of the evaluation, including the following topics and questions:

- understanding of the factors influencing patient demographics and self-selection into the program;
- the outpatient care coordinators' role in terms of prioritizing patients, interaction with patients, and identifying patients to enroll in the program;
- outpatient care coordinators' management of large patient panels, especially with regards to risk stratification;
- number of patients being handed off between inpatient and outpatient;
- the role of the pharmacist, particularly at the Maury and Williamson sites.

Continued research and communication with the awardee on these topics will help to better inform the evaluation of Vanderbilt in order to determine the potential for replicability and scalability of the intervention as well as to determine how the program itself is serving its immediate patients currently in the program.

## Appendix A: Quantitative Research Methods

The quantitative analysis presented in this report is limited to two awardees—Indiana and IOBS—that we define as ambulatory care, or community-based, interventions. Ambulatory care interventions identify and care for patients with specific chronic conditions in the outpatient setting, and include Indiana and IOBS. We provide details of our quantitative research methods beginning with a description of the data sources and populations, then measure specifications, and finally the analytic models.

### Ambulatory Care Awardees

In general, ambulatory care awardee programs focus on improving health, increasing quality of care, and decreasing cost for patients who need ongoing outpatient care for specific chronic conditions. Program participants are often a convenience sample of patients presenting to the awardee’s program site with the targeted chronic condition during the intervention period. Thus, participants for these awardees cannot be easily identified from claims rules alone and are only identifiable when awardees provide us with finder files containing claims-linkable patient identifiers. Awardees from this group included in this report are Indiana and IOBS.

### Data Sources and Populations

The primary data source for evaluation analyses is the Medicare and Medicaid data archives as hosted on the CMS Chronic Condition Warehouse (CCW) data enclave environment. The enclave includes all historical Medicare claims and enrollment data and is updated on a monthly basis. For the analysis in this report, we included Medicare data reported and posted to the CCW data enclave through May 2014. Due to the standard delay between the provision of a service and the submission of a claim (usually between three to six months), we only included claims through December 2013 in this analysis. We pulled claims for each calendar quarter (approximately a 90-day period) to construct measures of hospitalizations, emergency department visits, and costs.

Using the finder files provided by the awardees, we were able to identify program participants and their initial enrollment date. We then integrated claims and Medicare enrollment records for all the Medicare beneficiaries in the treatment group by calendar quarter, beginning with the quarter of initial enrollment in the intervention to create a beneficiary-level longitudinal summary records. The unit of analysis of the resulting analytic dataset was a patient-quarter (i.e. each row in the analytic file contained all the calendar quarters in which persons in the finder file were enrolled in the intervention). For the initial quarter of intervention enrollment, we only included claims that had a date of service on or after the date of intervention enrollment. All subsequent quarters include all claims with a date of service in the quarter.

Each patient-quarter in the analytic file included the following information:

- patient demographics/region;
- beneficiary administrative status at the beginning of the quarter;
- hierarchical condition categories (HCC) flags and scores for the 12 months prior to the quarter;

- utilization of hospital, skilled nursing facility (SNF), and outpatient emergency room care in the 12 months prior to the quarter; and
- utilization of hospital and outpatient emergency room care during the quarter.

### Measure Specification

In this report, our results focus on the core measures that CMS has identified. Below we provide details on the specification for each of the measures included here.

**All-cause hospitalization rate per quarter** is defined as the number of inpatient hospitalizations occurring within the calendar quarter per 1,000 beneficiaries. We included hospitalization for any cause, both planned and unplanned, at any hospital, identified from the Medicare inpatient claims file. The admission measure excluded hospital observation stays that resulted in an inpatient hospital stay found on the Medicare outpatient claims file. For the initial intervention quarter, we only included a hospitalization if the admission date was on or after the date of enrollment in the intervention.

**Ambulatory Care Sensitive (ACS) hospitalization rate per quarter** is defined as the number of ACS hospitalizations within the calendar quarter from program enrollment per 1,000 beneficiaries. We included hospitalization for ambulatory care sensitive conditions<sup>144</sup> at any hospital, identified from the Medicare inpatient claims file, while excluding excluded hospital observation stays found on the Medicare outpatient claims file. Any ACS hospitalization included in this measure must have occurred on or after the date of enrollment in the intervention.

**Emergency department visit rate per quarter** is defined as the number of outpatient hospital claims with a visit to an emergency department (ED), a hospital observation stay, or both within the calendar quarter per 1,000 beneficiaries. ED visits and hospital observation stays for any cause were identified from Medicare outpatient hospital claims from appropriate revenue center codes.<sup>145</sup> To avoid double-counting hospital admissions as ED visits or observation stays, we excluded ED visits and hospital observation stays that resulted in a short-term hospital stay. We also counted ED visits and observation stays occurring on the same date as a single event. For the purposes of calculating ED visit rate during the initial intervention quarter, we only included ED visits or observation stays occurring on or after the date of enrollment in the intervention. To align our measures with those recommended by the meta-evaluator, in future reports we will include separate measures of ED visits and observation stays for primary care sensitive conditions, as defined in the specifications to be provided by the meta-evaluator.

**Total cost of care per quarter** is defined as the total Medicare payment amount for all Medicare part A & B claims incurred within the calendar quarter and was expressed as the average (mean) total cost of care. We included costs related to any visit, admission, or service provided to a beneficiary if the beginning date of the claim was within the calendar quarter. For the initial intervention quarter we only

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<sup>144</sup> Prevention Quality Indicators #92 Technical Specifications, Prevention Quality Chronic Composite. Rockville, MD: Agency for Healthcare Research and Quality; May 2013.  
<http://www.qualityindicators.ahrq.gov/Downloads/Modules/PQI/V45/TechSpecs/PQI%2092%20Prevention%20Quality%20Chronic%20Composite.pdf>.

<sup>145</sup> Research Data Assistance Center. CMMI – Payment Bundling Initiative. 2012;  
[www.resdac.org/sites/resdac.org/files/CMMI\\_FAQs.pdf](http://www.resdac.org/sites/resdac.org/files/CMMI_FAQs.pdf). Relevant revenue codes on page 20 include “0450-0459” and “0981”.

included costs related to services occurring on or after the date of enrollment in the intervention. For beneficiaries with partially enrollment in Medicare in a quarter, we “quarterized” the cost of care to what should have been expected were the beneficiary to be enrolled in Medicare for the entire quarter. About 10% to 16% percent of the beneficiary-episodes across all post-acute awardees were quarterized to account for Medicare FFS disenrollment during the analysis time period. However, we did not quarterize cost of care if a beneficiary died in a program quarter. Costs for calendar quarters for all years were expressed in 2013 dollars. To align our specifications with those provided by the meta-evaluator we will compile costs based on the “to date” instead of “from date,” meaning we will only include costs related to visits, admission, or services provided to a beneficiary if the ending date of the claims is within the relevant quarter.

In future reports, we will expand the detail in the analytic record to include more measures and modify the time frames of existing measures as appropriate to meet the specifications provided by the meta-evaluator. Instead of defining time as the calendar quarter, we will begin using quarter since enrollment in the intervention for all ambulatory care awardees.

### Analytic Methods

For these awardees, where we do not yet have a control group, we conducted a time-series analysis, looking at the effect of duration of enrollment on outcomes for participants enrolled in these interventions. Duration was categorized into quarters, and for each calendar quarter after enrollment measures for four outcomes were created. These outcomes were:

- all-cause hospitalization rate
- ACS hospitalization rate
- all-cause ED visit rate
- total Medicare cost of care

For each awardee, we estimated the average outcome measure for each quarter of enrollment in the intervention by employing population averaged generalized estimating equations (GEEs). This class of regression model is flexible to allow for the dependent variable to take different functional forms such as linear (e.g., cost of care), binary (e.g., mortality), or count data (e.g., number of ED visits). A key advantage of this class of models is the ability to account for correlated data structures including clustering (e.g., by provider site) or longitudinal data (e.g., observations over multiple quarters), and parameter estimates are robust even when the covariance structure is unknown or incorrectly specified.

As mentioned above, GEE models allow for the outcome or dependent variable to take a variety of functional forms, which must be specified when building the model. For the four outcomes we investigated here, we used the following functional forms:

- *all-cause hospital admission rate*: Negative binomial distribution with a log link was used to model the count dependent variable
- *ACS hospital admission rate*: Negative binomial distribution with a log link was used to model the count dependent variable

- *all-cause ED visit rate*: Negative binomial distribution with a log link was used to model the count dependent variable
- *total Medicare cost of care*: We first converted all costs to 2013 dollars and used a gamma distribution with a log link to model costs in order to account beneficiary episodes with zero costs and for the skewed distribution of costs across episodes.

We modified the covariance structure to account for the repeated measures over time for each participant (each quarter of participation in the intervention) and obtained clustered standard errors at the patient level.

For each of the four measures, we constructed both unadjusted and adjusted GEE models. Unadjusted models included covariates for quarter. In adjusted models, we included potentially confounding patient characteristics. The specification for the fully adjusted GEE model is:

$$Y_{ij} = \beta_0 + \beta_1 \text{Quarter}_{ij} + \beta_2 \text{Patient}_i + \epsilon_i$$

Here  $Y_i$  is the outcome variable for the  $i^{\text{th}}$  beneficiary episode seen by during the  $j^{\text{th}}$  quarter; *Quarter* is a set of indicator variables for the number of quarters since enrollment in the intervention; and *Patient* is a vector of patient demographic clinical variables, qualifying condition, and the awardee implementation site where the patient was seen. Although the overall effect of enrollment time is the primary parameters of interest for this analysis, we also looked at effects over time by qualifying condition and awardee implementation site.

The beneficiary covariates included in our models were beneficiary's age at program enrollment, gender, race, dual eligible status, disability status, and type of target condition (e.g., type of cancer for IOBS). We also included time variant beneficiary covariates for comorbidity (HCC score from the CMS HCC Model for all diagnoses one year prior to start of a specific program quarter<sup>146</sup>) as well as utilization and cost variables for a year prior to the start of a specific program quarter, including all-cause hospital admissions, ED visits, evaluation and management visits for the target condition, and total cost of care.

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<sup>146</sup> CMS HCC Model. Centers for Medicare & Medicaid Services. 2013. <http://www.cms.gov/Medicare/Health-Plans/MedicareAdvtgSpecRateStats/Risk-Adjustors-Items/Risk2013.html?DLPage=1&DLSort=0&DLSortDir=descending>.

## Appendix B: Characteristics of Awardee Interventions

In the front matter of this report, we outlined key components of awardee innovation and the corresponding workforce. Exhibit A presents the distribution of awardees across the intervention components described above, as well as workforce categories.

**Exhibit A:** Summary of Basic Program Characteristics

Program Characteristics	Awardee Christiana	Awardee Duke	Awardee FirstVitals	Awardee GWU	Awardee HRIA	Awardee Indiana	Awardee IOBS	Awardee Joslin	Awardee Le Bonheur	Awardee MAHEC	Awardee Nemours	Awardee Ochsner	Awardee UPenn	Awardee UAB	Awardee UCLA	Awardee Upper San Juan	Awardee UVA	Awardee Vanderbilt	Total
Care Coordination																			
Longitudinal	•	•	•		•	•	•		•	•	•	•	•	•	•	•	•	•	16
Post-acute care specific	•											•				•		•	4
Use of risk stratification algorithm	•	•													•		•	•	5
Home visits		•			•	•			•		•	•	•			•			8
Use of PCMH model							•				•								2
Management of clinical needs	•	•	•		•	•	•		•	•	•	•	•		•		•	•	14
Communication and coordination	•	•	•		•	•	•		•	•	•	•	•	•	•	•	•	•	16
Addressing non-clinical needs	•	•			•	•			•		•	•	•	•	•	•	•	•	13
Use of health IT tools	•	•			•	•	•		•	•	•	•	•	•	•		•	•	14

Program Characteristics	Awardee Christiana	Awardee Duke	Awardee FirstVitals	Awardee GWU	Awardee HRIA	Awardee Indiana	Awardee IOBS	Awardee Joslin	Awardee Le Bonheur	Awardee MAHEC	Awardee Nemours	Awardee Ochsner	Awardee UPenn	Awardee UAB	Awardee UCLA	Awardee Upper San Juan	Awardee UVA	Awardee Vanderbilt	Total
Education and outreach																			
Community outreach and education		•						•		•	•					•			5
One-on-one education	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	17
Telehealth																			
Home telemonitoring			•	•															2
Virtual consultations			•	•								•				•			4
Workforce																			
Lay health workers	•	•			•	•		•	•		•	•		•		•			10
Care managers	•		•			•						•	•		•		•	•	8

The above summary table shows that the most frequent intervention components for awardees are care coordination and education and outreach. GWU and Joslin are the only awardees that are not using a care coordination component in their interventions, and UVA is the only awardee that does not have an education and outreach component in their intervention. Within care coordination, longitudinal care management and communication and coordination are the most frequent program characteristics. Sixteen awardees have a one-on-one education component in their program. While most awardees use health information technology, only four awardees have a telehealth component to their intervention. Half of the awardees use lay health workers, and eight awardees use care managers. We expect future analysis of site visit transcripts to produce a more detailed accounting of elements and themes across implementation effectiveness, program effectiveness, workforce, and context.