ACUMEN

Evaluation of the Shared Decision Making (SDM) & Medication Management (MM) Health Care Innovation Awardees

Annual Report 1

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EXECUTIVE SUMMARY

This report contains findings for the first annual evaluation of the Centers for Medicare & Medicaid Services (CMS) Health Care Innovation Awards (HCIA) Round One recipients, who received awards for implementing shared decision making (SDM) or medication management (MM) programs. These awards are provided to organizations implementing promising new ideas for obtaining better health outcomes, improving care, and lowering medical expenditures for beneficiaries enrolled in Medicare, Medicaid, and the Children's Health Insurance Program (CHIP). This annual assessment of the Round One HCIA SDM and MM awardees is based on qualitative interviews with program staff conducted through July 2014, documentation provided by the awardees, progress reports provided by the Lewin Group in its role as the implementation contractor, and analysis of quantitative data on participants in two of the SDM programs, MedExpert International (MedExpert) and Welvie, LLC (Welvie).

The ability to reach valid conclusions on the impact of the three SDM and six MM programs is limited as of August 2014. There are four principal reasons for this. First and foremost, Acumen was only able to obtain and analyze quantitative data on program participants for two of the nine HCIA awardees. Thus, information contained in this report is primarily qualitative and originated from interviews with program staff and providers. For one of the awardees with quantitative data, MedExpert, data on randomized control groups were not available. Our evaluation is thus subject to limitations of a non-randomized study design as well as the limitations of using Medicare data to capture predictive variables to create well matched comparison groups. As a result, we cannot rule out in our results the influence of unobserved baseline differences and differential trends in unobserved characteristics between the intervention and control groups. Second, the number of beneficiaries in most of the programs is small thus far, limiting our ability to assess program effectiveness both qualitatively and quantitatively. Third, the availability of the Medicaid claims data needed to assess the effectiveness of the awardees' programs is limited and will remain so for at least the next year. Fourth, several programs have enrolled primarily non-Medicare participants, which limits Acumen's ability to quantitatively assess program effects.

The qualitative information, obtained from progress reports and through interviews with program staff, and the analysis of quantitative data for MedExpert and Welvie reveal important trends related to the implementation of the SDM and MM awardee programs.

- *Most of the awardees have not met their enrollment goals*. Six of the nine awardees have cumulative enrollment below original projections, for at least some aspect of their intervention.

- *Awardees have identified several major implementation challenges that have hampered implementation and the ability of many of the awardees to meet their participation goals.* These challenges include:
    - Loss of access to Medicare claims data needed for identifying and monitoring program participants in Medicare Fee For Service (FFS);
    - Delays due to bureaucratic or legal issues with partners;
    - Lack of provider buy-in; and
    - Difficulty expanding the traditional roles of providers such as pharmacists and integrating these new roles into existing workflows.

- *Many of the SDM and MM interventions are actively making program changes in response to enrollment and implementation challenges.* Many of the awardees are exploring the best ways to train and integrate providers; recruit and target enrollees; and effectively deliver their innovation.

- *Our analyses found mixed results for MedExpert for both the FFS and MA intervention groups.* The impact of the MedExpert program on mortality was inconclusive for both FFS and MA groups, with intervention group mortality exceeding control group mortality in some, but not all, quarters and with no differences achieving statistical significance. Additionally, Acumen found that unplanned readmissions were consistently lower in the FFS intervention group and the differences between the intervention and control groups were statistically significant in some quarters. Finally, we found mixed effects on total Medicare expenditure growth for FFS beneficiaries and for most categories of expenditures; however, none of these observed effects were statistically significant. However, given the non-randomized design of the analysis and limitations of using Medicare data to match comparison groups to the intervention groups, we cannot rule out the possibility that our results reflect the influence of unobserved baseline differences between the two groups.

- *Our analyses suggest that Welvie was effective in improving beneficiary health and reducing health service use and medical expenditures for FFS beneficiaries in the intervention group. However, we did not identify these effects for MA beneficiaries.* Acumen's analysis found consistently lower mortality rates in the FFS intervention group (compared with the control group) for all three quarters after program enrollment, although the difference was statistically significant only in the first quarter. Additionally, we found lower readmissions following all surgeries and preference sensitive orthopedic surgeries for FFS beneficiaries, again the difference was statistically significant only in the first quarter for the latter measure. FFS beneficiaries also saw a statistically significant reduction of $100 per person in medical expenditures and had 2 fewer surgical

hospital stays per 1,000 beneficiaries in the first three months after program enrollment; reductions in these measures in subsequent quarters were not statistically significant.

Acumen continues to pursue information sources to inform the evaluation of the SDM and MM HCIA awardees. Additional awardees have recently provided data to the evaluation team or report that they will do so in the near future. Assuming timely receipt of functional data, we will report additional quantitative results in the next interim quarterly report and in the next annual report. Acumen also expects to obtain additional information for the evaluation from continued stakeholder and staff interviews, additional quantitative data analysis, patient surveys, and awardee site visits scheduled for Fall 2014.

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1 INTRODUCTION

Acumen, LLC ("Acumen") and its partner, Westat, Inc., are contracted by the Centers for Medicare & Medicaid Services (CMS) to conduct a mixed methods evaluation of nine programs implementing shared decision making (SDM) or medication management (MM) innovations. The nine programs are awardees of CMS' Health Care Innovation Awards (HCIA) Round One funding. CMS provided the awards to organizations with compelling new ideas for improving health, delivering better care, and reducing expenditures for individuals enrolled in Medicare, Medicaid, and the Children's Health Insurance Program (CHIP). Round One HCIA awardees began enrolling participants in 2012. Acumen is evaluating the nine awardee innovations' effects on beneficiaries' health status, resource use, and health care expenditures, among other outcomes. As part of the evaluation, Acumen is also identifying factors that have contributed to awardee implementation successes and challenges. This annual report presents our findings for all nine HCIA awardees for the evaluation period of September 2013 through August 2014. Section 1.1 below provides an overview of the awardees, while Section 1.2 describes our data sources and evaluation methods.

1.1 Overview of Awardees

The three SDM and six MM HCIA awardees aim to improve patient health, reduce health care resource use, and lower health care expenditures through novel patient-level care interventions. SDM encourages patients to become fully informed about the risks and benefits of available medical treatments and to participate in selecting the most appropriate treatments or care management options for their individual needs. SDM provides patients with decision aids and other information to encourage decision making based on the best scientific evidence available and on the patient's values and preferences. The HCIA SDM programs provide patients with advice on how to effectively communicate with their health care providers as well as unbiased information on their medical conditions and treatment options, in an effort to reduce preference-sensitive procedures, reduce expenditures, and improve health outcomes and quality of care. The three SDM awardees are

- Welvie LLC (Welvie),
- MedExpert International (MedExpert), and
- Trustees of Dartmouth College (Dartmouth).

MM programs aim to reduce medication-related adverse events and improve patient outcomes through improved medication use. The HCIA MM programs conduct medication reviews, work to improve care coordination and transition, and communicate with patients, physicians, and other health care providers through a range of means, including phone, in-person meetings, and health information technology (HIT). The six MM awardees are

- Carilion New River Valley Medical Center's "Improving Health for At-risk Rural Patients" (IHARP),
- University of Southern California (USC),
- The Trustees of the University of Pennsylvania's HeartStrong Program (UPenn),
- The Pharmacy Society of Wisconsin (PSW),
- The University of Hawaii at Hilo's pharmacy-to pharmacy program (Pharm2Pharm), and
- The University of Tennessee Health Science Center's SafeMed program.

The target populations, interventions, enrollment figures, and geographic reach of the SDM and MM awardees are described in greater detail in Section 2 and Section 3, respectively.

1.2 Data and Methods

Our mixed methods evaluation, over the course of the contract, will focus on addressing the following overarching research questions:

1. What innovative approaches reduced health care costs while improving or maintaining the standard of care, patient health, and quality of life?
2. Which contextual factors and mechanisms contribute to an intervention's success?

To comprehensively address these overarching research questions, Acumen has begun to examine each awardee program across five evaluation categories. These five key research categories are: (i) innovation components, (ii) implementation effectiveness, (iii) program effectiveness, (iv) workforce issues, and (v) context. The first evaluation category, innovation components, provides a comprehensive description of the key components of the innovation, including the target population(s), theory of action, and theory of change driving the innovation. The second evaluation category, implementation effectiveness, focuses on identifying the factors associated with successful operational launch of the program and uptake by target populations. The third evaluation category, program effectiveness, examines the overall success of the intervention in improving patient health outcomes and quality of care and reducing resource use and medical expenditures. The fourth category, workforce issues, explores the innovation's impact on workforce training, staff size, skills development, and provider satisfaction. The fifth category, context, assesses the extent to which external policy factors, health system factors, and endogenous organizational factors influence program impacts. Table 1-1 details the key research questions that address each evaluation category and further highlights the research questions addressed by this evaluation report.

Table 1-1: Evaluation Framework and Key Research Questions

Evaluation Category	Evaluation Dimension	Key Research Questions
Innovation Components	• Target • Complexity	• How is the innovation designed to reduce expenditures or improve care quality? • Who does the intervention target? Which priority population(s) does the intervention target? Does it target individuals, organizations, or both? • What are the key components of the innovation? • To what extent is the innovation viewed as a "plug in" versus a fundamental and major change within the implementing organization?
Implementation Effectiveness	• Fidelity • Reach • Dosage • Overall Effectiveness • Implementation Process	• Was the intervention delivered as intended to the target population in doses associated with effectiveness? • What were key successes in implementing the innovation as designed and what factors were associated with success? • What were the challenges in implementing the innovation as designed? • What changes were made to the innovation to increase enrollment, improve care, or reduce expenditures? • Did the innovation use internal evaluation findings to inform the implementation process, when necessary?
Program Effectiveness	• Health • Cost • Resource Use • Care Quality	• What are the effects of the innovation on participants' health outcomes? • What are effects of the innovation on healthcare expenditures and health service resource utilization? • What is the impact of the innovation on quality of care? • If the innovation has positive effects with respect to health, cost, resource use, or care quality, how long are these changes sustained? • If the innovation has positive effects, what are the innovation components that are driving the change? • Does the innovation reduce disparities in care quality or health service utilization by race, ethnicity, gender, age or geographical location that are not attributable to differences in health status? • Do program effects on expenditures or utilization differ by subpopulation (e.g., priority populations, complex care patients, dual eligibles)?
Workforce Issues	• Development and Training • Deployment • Satisfaction	• Did the innovation contribute to filling health care workforce gaps? • What type and level of workforce training does the innovation provide? • What type of support structure is available for staff? • What type of support structure is effective for staff deployment? • How does the innovation affect staff satisfaction? • Has the innovation experienced high staff turnaround? If so, what measures have been taken to remedy the problem? • What workforce changes were made by the innovation, and did these changes help improve patient outcomes and experience or reduce expenditures and health service use?

Evaluation Category	Evaluation Dimension	Key Research Questions
Context	• Leadership Engagement • Team Characteristics • Organization Capacity • Sustainability • Scalability	• What endogenous (e.g. organizational) and exogenous (policy and environmental) factors affect implementation? • How is senior management structured, and how does it lead and communicate innovation changes to implementers? How does the innovation affect existing hospitals, medical practices, or other settings that provide health care to participants? • Are there unintended negative consequences of the innovation? If so, how can they be mitigated in similar models in the future? • To what extent does the innovation duplicate practices or programs that are already existent? • How can successful innovation components be scaled and replicated in other settings?

Note: This evaluation framework is based on evaluation domains, dimensions and research questions recommended in "CMS Innovation Center Health Care Center Innovation Awards: Evaluation Plan" (RAND, 2013) and CMS feedback during the evaluation process.

1.2.1 Qualitative Analysis

This annual report presents qualitative findings for all nine HCIA awardees for the period September 2013 through August 2014, unless otherwise noted. The qualitative findings address four categories of the evaluation framework: innovation components, implementation effectiveness, workforce issues, and context. As part of our qualitative analysis, we identified cross-cutting themes that were common across the SDM and MM awardees.

To obtain the qualitative information presented in this report, we conducted quarterly in-depth telephone interviews with program leaders, staff, and providers. In addition, we reviewed a number of secondary materials, including narrative reports prepared by each awardee and submitted to the Lewin Group; quarterly progress reports on the awardees developed by the Lewin Group; and supplemental information provided by each awardee (e.g., program policy and training documents, participant recruitment and educational material). For our interviews, we developed an interview protocol designed to capture information consistently across awardees to address the research questions in the four evaluation categories noted above. Some findings related to the qualitative research questions in this report are listed as "to be determined" (TBD) and will be further explored as part of the upcoming site visits to awardees and surveys of program staff and participants.

1.2.2 Quantitative Analysis

Acumen conducted single difference and difference-in-differences (DiD) analyses of health outcomes, quality of care, resource use, and medical expenditures for Medicare beneficiaries targeted by awardee innovations using program data, and Medicare data to address the evaluation category of program effectiveness. This report presents quantitative analyses for the two SDM programs (Welvie and MedExpert) that were able to provide participant-level program data in time for analysis and inclusion in this report. For both single difference and DiD

analyses, we used randomized control groups provided by the awardee (in the case of Welvie) or propensity score matched comparison groups (in the case of MedExpert). The single difference analyses compared health outcomes and quality of care indicators for intervention and comparison groups in the post-intervention period, while DiD analyses compared the average change over time (from a pre-intervention period to a post-intervention period) in each outcome of interest between the intervention and comparison groups.

The inclusion criteria defining analytic intervention groups differed by program. For Welvie, we conducted analysis on Medicare Fee For Service (FFS) and Medicare Advantage (MA) beneficiaries in the intervention group with a program start date of September 30, 2013 or prior, using Medicare claims data through December 31, 2013. For MedExpert, we included Medicare FFS and MA beneficiaries in Southern California with a program start date of November 30, 2013 or prior, using Medicare claims data through February 28, 2014. Our quantitative data sources, comparison group selection methodology, study inclusion criteria, analytical methods, and outcome measures are further described below.

Data Sources

Acumen obtained identifiers and program start dates for individual beneficiaries in awardee intervention groups and linked them to their Medicare data files to create longitudinal profiles of demographics, health status, health service utilization, and medical expenditures for analysis. Acumen also linked control group beneficiaries (who were either identified by awardees or selected by Acumen via non-experimental methods) to their Medicare data for analysis. Medicare data drawn from Acumen's CMS data holdings for the analyses included: Medicare eligibility and enrollment data, Medicare Part A, B and D claims, and Risk Adjustment and Payment System (RAPS) data. Health service utilization and medical expenditure data for most care settings were available for Medicare FFS beneficiaries. For MA beneficiaries, however, health service utilization data were limited to the inpatient care setting, and medical expenditure data were unavailable for any care setting.

Comparison Groups

Acumen used comparison groups identified by awardees whenever available (Welvie), and when not available, Acumen constructed propensity score matched comparison groups drawn from Medicare data files (MedExpert). If awardees identified comparison groups, Acumen compared summary statistics on values of important predictive covariates between the intervention groups and comparison groups to ensure their comparability before using them for analysis. In the absence of well-matched comparison groups identified by awardees, Acumen selected Medicare FFS or MA beneficiaries from CMS data files to create comparison groups using propensity score matching. Acumen matched intervention group beneficiaries to one or more controls based on scores constructed to reflect the beneficiaries' propensity to receive the

awardee's intervention; the scores took into account predictive claims data variables, including measures of sociodemographics, medical conditions, and pre-enrollment health service use and medical expenditures. Acumen also leveraged program-specific information on intervention group characteristics and selection criteria to identify the appropriate set of variables to include in the propensity score matching model. Acumen estimated the probability that a beneficiary would enroll in the intervention given observed covariates *X*. Assume *D* = 1 for beneficiaries in the intervention group, and *D* = 0 for beneficiaries in the comparison group who do not receive an intervention. $\Pr(D_i = 1|X_i)$, is calculated using the following logistic formula:

$$\Pr(D_i = 1|X_i) = \frac{e^{\lambda X_i}}{1 + e^{\lambda X_i}}$$

where X_i represents binary terms of the X covariates, and λ represents a vector of estimation parameters including a constant. The X covariates included age, sex, race, geographic indicators, dual eligibility, disability status, comorbidities, and pre-enrollment levels and patterns of medical expenditures and health service use as appropriate. The propensity score was calculated for both intervention group beneficiaries and potential controls, after which the evaluation team used caliper matching to match each beneficiary in the intervention group to multiple controls within 0.2 standard deviation of their propensity scores. Intervention group beneficiaries without a matched comparison group member were excluded from the analysis.

Study Inclusion Criteria

Program participants and comparison group members were only included in the analysis if they had complete Medicare claims or encounter data beginning with a one year pre-intervention baseline period and continuing through the intervention quarter of interest. As such, program participants and comparison group members were only included in the analysis if they were continuously enrolled in Medicare over this period. Beneficiaries who are continuously enrolled in Medicare but switched between FFS and MA were included in Acumen's MA analyses; Acumen uses the lowest common denominator of available data (inpatient utilization data for the MA population) in order to make sound comparisons over time. Acumen applied additional exclusion criteria as appropriate to each analysis, such as limiting the MedExpert analysis to four counties in Southern California, which captured more than 95 percent of the MedExpert population in the data received from the awardee and limited the scope of the population considered for the control group.

Analytic Method

Acumen evaluated program effects by using both single difference and DiD estimation methods. Two health outcomes, mortality and hospital readmission, were examined by calculating the difference in each outcomes between program participants and comparison group members during the post intervention period. Additional measures of health service use, and

medical expenditures were examined using DiD by first calculating average changes in health service use, and medical expenditures for intervention group beneficiaries in the period after program enrollment compared with the pre-enrollment period, and then calculating the corresponding changes for comparison groups over the same period. For each measure, we subtracted the average change in the comparison group from that of the intervention group to obtain the DiD estimate, and then calculated heteroskedastic-consistent standard errors.

We report the single difference and DiD estimates for each quarter after program enrollment in a non-cumulative fashion. For example, the DiD estimate for Medicare expenditures in the first quarter after program enrollment (Q1) reflects difference between the intervention group and the control group in Q1 compared with the difference in per-person Medicare expenditures between the intervention group and the control group during the entire pre-enrollment year, scaled to one quarter (divided by four). Similarly, the DiD estimate for the second quarter after enrollment (Q2) reflects the difference between the intervention and control groups in Q2 compared again with the difference between the groups in the pre-enrollment year, scaled to one quarter. Because awardees enrolled beneficiaries into their programs on a rolling basis since program launch, we used each beneficiary's enrollment date as a reference for defining the pre- and post-enrollment period for the DiD estimates.

Outcome Measures

Acumen used CMS-recommended measures of health outcomes and quality of care indicators, health service use, and medical expenditures, and also constructed program-specific measures as relevant to evaluate program effects. In this annual report, we analyze rates of mortality, 30-day readmissions (all-cause, and unplanned) , inpatient admissions, days spent in a hospital, emergency room (ER) visits, total Medicare expenditures, and categorical Medicare expenditures (inpatient, outpatient ER, outpatient non-ER, carrier/PB, skilled nursing, durable medical equipment, home health and hospice) for Welvie and MedExpert program participants. We additionally report program-specific measures (e.g., all-cause and preference-sensitive surgery rates and costs for Welvie) when relevant based on the focus of the awardee intervention. CMS recommends reporting trends in four of these measures (total Medicare expenditures, ER visit rate, inpatient admission rate, and 30-day unplanned readmission rate) for meta-evaluation purposes in a non-cumulative quarterly fashion. We thus report quarterly trends in these meta-evaluation measures separately in Appendix D of this report. Detailed definitions of all outcomes measures included in this report are provided in Appendix A.

The remainder of the report is structured as follows: Sections 2 and 3 summarize SDM and MM group-level findings, respectively. Sections 4 through 12 describe the major findings for each of the nine awardees through August 2014, unless noted otherwise.

2 SHARED DECISION MAKING AWARDEE GROUP SUMMARY

SDM encourages patients to become fully informed about the risks and benefits of available medical treatments and to participate in selecting the most appropriate treatments or care management options for their individual needs. SDM provides patients with decision aids and other information to encourage decision making that is based on the best scientific evidence available and on the patient's values and preferences. According to a Cochrane Database Systematic Review,[1] patients who receive specific, unbiased information about their treatment options tend to receive lower-intensity services compared to patients who do not receive such information. Patients who are fully informed of risks and benefits of various treatment options tend to select less aggressive treatments and are more likely to participate in treatment decisions with their doctor.

This section provides a group-level summary of the HCIA SDM awardees, including descriptions of the interventions and findings of the evaluation as of August 2014, unless otherwise noted. Section 2.1 provides an overview of the HCIA SDM portfolio: a brief description of each of the three SDM awardees, their target populations, interventions provided, enrollment, and geographic reach. Section 2.2 summarizes SDM group-level evaluation findings for the evaluation categories of implementation effectiveness, program effectiveness, workforce, and context.

2.1 HCIA SDM Programs

The HCIA SDM program portfolio consists of three SDM awardees: Welvie, MedExpert, and Dartmouth. All three SDM awardees provide interventions directly to individuals who are SDM program participants.

(i) *Welvie* offers education, health information, and decision-making resources regarding preference-sensitive surgeries to Medicare beneficiaries with the goal of enhancing patient experiences, increasing surgery literacy, improving surgical outcomes, and reducing the incidence of inappropriate surgeries.

(ii) *MedExpert* offers Medicare beneficiaries educational information, physician advice, and assistance interpreting health benefits and treatment options primarily over the phone—all with the goal of increasing transparency, improving health care quality, and reducing health care costs.

(iii) *Dartmouth* offers decision aids and other support for patients considering hip, knee, or spine surgery and for complex patients with diabetes or congestive heart failure. The

[1] Cochrane Database Syst Rev. 2011 Oct 5;(10):CD001431. Decision aids for people facing health treatment or screening decisions. Stacey D1, Bennett CL, Barry MJ, Col NF, Eden KB, Holmes-Rovner M, Llewellyn-Thomas H, Lyddiatt A, Légaré F, Thomson R.

goal of the innovation is to improve patient engagement and decision making and thereby increase care quality and reduce unnecessary costs.

The remainder of this section details various aspects of the SDM programs: (i) target population and key intervention characteristics, (ii) enrollment, and (iii) geographic reach.

2.1.1 Target Population and Intervention

The SDM target populations and interventions vary by awardee. Both Welvie and Dartmouth focus on patients who are candidates for preference-sensitive surgeries. Dartmouth also offers SDM interventions to patients with specific chronic conditions (diabetes, depression, or congestive heart failure). MedExpert is the broadest in scope; it provides general health education, resources, and support not focused on any specific condition or procedure.

2.1.2 Enrollment

The SDM awardees have been enrolling patients since 2012. Table 2-1 lists each awardee's cumulative enrollment. As the table shows, Welvie and MedExpert have a large number of beneficiaries in their intervention group—over 169,000 and 99,000, respectively. With respect to insurance payer mix, both Welvie and MedExpert include only individuals covered by Medicare. Linkage of awardee program data to Medicare data shows Welvie and MedExpert have served both FFS and MA beneficiaries, although Welvie is evolving to focus its expansion efforts only on MA beneficiaries due to loss of access to CMS data on FFS beneficiaries. Dartmouth stated in their original proposal that their intention was to target a combination of Medicare, Medicaid, and dual eligible beneficiaries; however, data to confirm Dartmouth's enrollment profile are not available at this time.

Table 2-1: Cumulative Enrollment Estimates by SDM Awardee

Awardee	Medicare (#, %)		Medicaid Only (#, %)	Dual-Eligible (#, %)	Other (#, %)	Unknown #, %)	Total (#, %)
	FFS	MA					
Welvie[a]	65,557 (39%)	95,355 (56%)	n/a	n/a	n/a	8,514 (5%)	169,426 (100%)
MedExpert[b]	48,758 (49%)	45,156 (45%)	n/a	n/a	n/a	5,939 (6%)	99,853 (100%)
Dartmouth[c]	n/a	n/a	n/a	n/a	n/a	n/a	5,364 (100%)
Total	n/a	n/a	n/a	n/a	n/a	n/a	**274,643 (100%)**

[a]Cumulative through February 27, 2014 based on program data provided by Welvie on May 1, 2014. Note: These estimates exclude duplicate records and beneficiaries who died prior to the intervention start date.

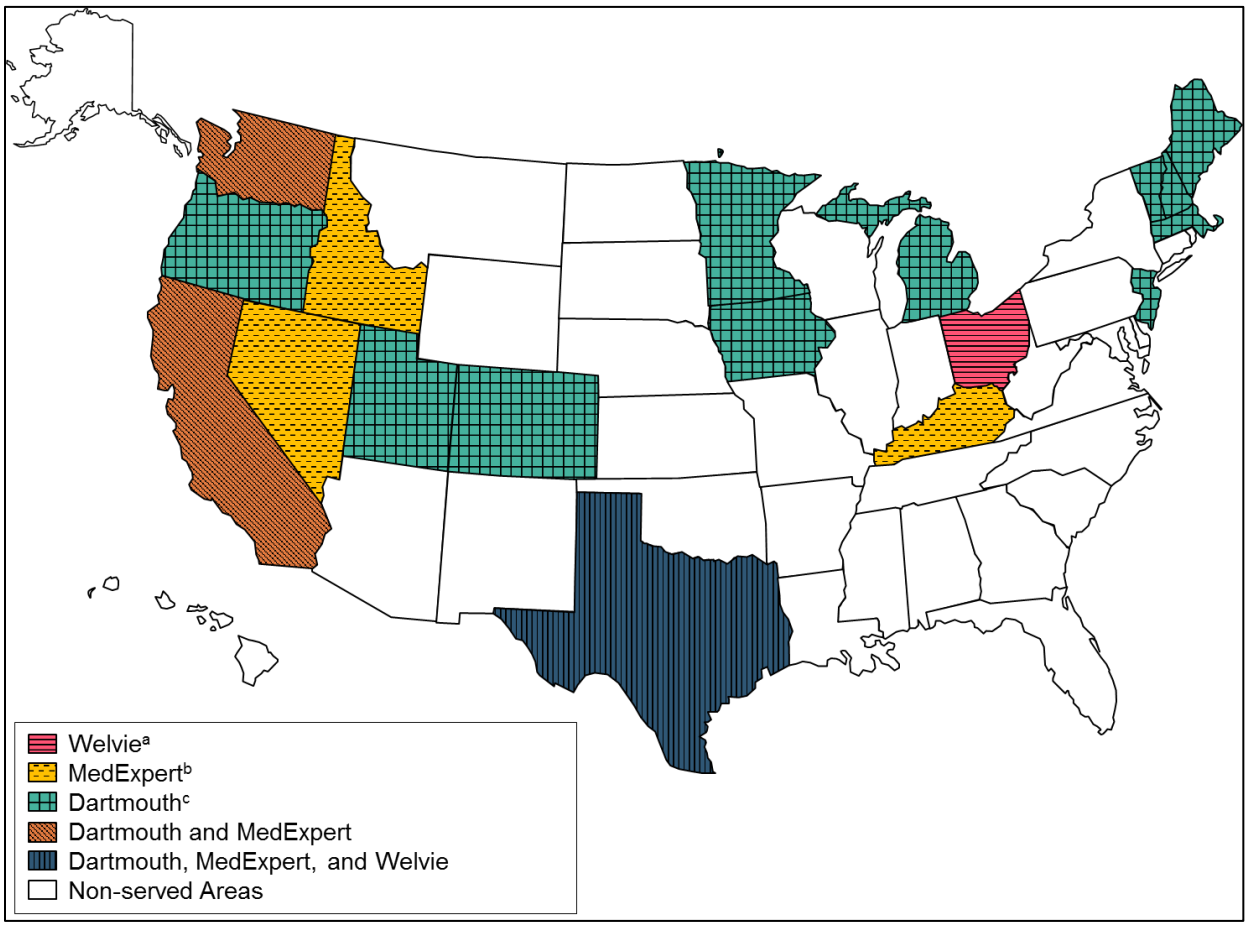
[b]Cumulative through May 22, 2014 based on program data provided by MedExpert on May 22, 2014, which did not include United HealthCare beneficiaries. Note: These estimates exclude duplicate records and beneficiaries who died prior to the intervention start date. If a given beneficiary was enrolled in FFS (or MA) on program start date as recorded in Acumen's CMS data files, we identified them as a FFS (or MA) beneficiary in this table. The payer mix included in the Lewin reports, however, show 100% Medicare FFS due to an issue with the data that MedExpert received from Buccaneer/CMS.

[c]Cumulative through March 2014. Source: Lewin Quarterly Awardee Progress Report, Dartmouth, (January- March 2014).

2.1.3 Geographic Reach

The geographic reach of SDM HCIA awardees is shown in Figure 2-1. Welvie started serving participants in Ohio, and expanded into Texas in May 2014. MedExpert has offered its services primarily to individuals in California, Texas, Nevada, Idaho, Kentucky, Washington, and a smaller number of individuals in other states as of May 22, 2014.[2] Dartmouth provides services in multiple states spread across the country.

Figure 2-1: Geographic Reach of SDM Awardees



[a]Source: Program data provided by Welvie on May 1, 2014 for enrollees through February 27, 2014.
[b]Source: Program data provided by MedExpert on May 22, 2014 for individuals reached by MedExpert through May 22, 2014, excluding United HealthCare beneficiaries. Note: States with fewer than 200 MedExpert beneficiaries are not shown in the map.
[c]Source: Lewin Quarterly Awardee Progress Report, Dartmouth, (January- March 2014) for enrollees through March 2014.

[2] Source: Program data provided by MedExpert on May 22, 2014 for individuals reached by MedExpert through May 22, 2014, excluding 4,500 UnitedHealthcare beneficiaries.

2.2 Evaluation Findings

This section provides an overview of the group-level evaluation findings for the HCIA SDM awardees, based on a review of available awardee progress reports and other materials, in-depth telephone interviews with awardees, and analysis of quantitative data on awardees' program participants. This section summarizes common trends, lessons learned, and challenges across the three SDM HCIA awardees.

Our analyses of quantitative data on program participants for Welvie and MedExpert show promising but modest results. Welvie's intervention was associated with consistently positive effects on measures of health outcomes, quality of care, health service utilization, and medical expenditures in the first three quarters following program enrollment among Medicare FFS beneficiaries receiving the intervention. However, only some of these effects were statistically significant. In general, for MA beneficiaries receiving the Welvie intervention, the effects on health outcomes, care quality, and service utilization were mixed—sometimes positive, sometimes negative—and in most cases not statistically significant. In the case of MedExpert, we found that the awardee's SDM intervention had mixed effects on health outcomes, quality of care, health service utilization and medical expenditures for FFS beneficiaries and mixed effects on health outcomes, quality of care, and health service utilization for MA beneficiaries, though in many cases these results were not statistically significant. Expenditures data and resource use data on non-inpatient settings were not available for MA beneficiaries for either Welvie or MedExpert at this time.

While the evidence on the effectiveness of these two SDM programs is encouraging, all the SDM programs continue to face implementation challenges. As of March 2014, Welvie's reported participation rate (defined as usage of its decision aid) was below original projections, and all the awardees have identified implementation challenges that include a loss of access to Medicare data needed for identifying and monitoring program participants, implementation delays due to bureaucratic and legal issues with partners, and poor buy-in or acceptance among physicians. To improve their implementation efforts, the SDM awardees have identified a range of best practices for optimizing their innovation, recruiting program participants, and obtaining buy-in from physicians. Some of these best practices or lessons learned are listed below.

- **Awardees are seeking to optimize the timing of their SDM interventions.** SDM innovations are time-sensitive because beneficiaries' treatment decisions are often made shortly after their initial diagnosis. For example, multiple awardees report ongoing challenges engaging patients with cardiac conditions due to the relatively short amount of time between diagnosis and treatment decision. Each of the SDM awardees has developed strategies to optimize the timing of their intervention. For example, during the first year of implementation, Dartmouth implemented its decision aids earlier in the patient's treatment (e.g., during a physical therapy session instead of during a surgical

specialty visit or during a primary care clinic visit instead of during specialty visits) to engage patients even earlier before they make surgery-related decisions.

- **Awardees are building relationships with beneficiaries.** MedExpert and Welvie are administered outside of the clinical setting, and as such, these two programs have taken steps to build trusted relationships with beneficiaries. Both programs offer beneficiaries ways to validate that they are legitimate Medicare service providers. The programs also seek to build relationships with beneficiaries over time and do not pressure beneficiaries to participate in the innovation immediately at the time of contact. Dartmouth's implementation model has the benefit of building on existing relationships within the clinical setting.
- **Two SDM awardees reported workforce-related success by hiring staff with different backgrounds and experience than originally envisioned.** Dartmouth and MedExpert use staff in new roles to deliver information about treatment options, patient safety, and clinical guidelines. MedExpert originally sought to hire individuals with experience in health insurance customer service; however, the awardee experienced high staff turnover among these individuals and was able instead to recruit individuals with nursing training and experience to fill the position. Dartmouth initially filled its new workforce roll with predominantly clinically-trained staff, but has since found value in training non-clinical staff to deliver the SDM information as well. According to Dartmouth, any staff member with proper SDM training can effectively apply the SDM skill set.

Table 2-2 summarizes group-level finding across the three SDM HCIA awardees. These findings are organized by the four evaluation categories: implementation effectiveness, program effectiveness, workforce, and context.

Table 2-2: SDM Group-Level Evaluation Findings

Evaluation Categories	Key Findings
Implementation Effectiveness	• MedExpert reports meeting its cumulative enrollment goals as of March 2014. Welvie has not met enrollment goals for beneficiaries who receive its "high-dose" intervention—that is, beneficiaries who use the decision aids. As of March 2014, Dartmouth was at projected cumulative participation, according to the January-March 2014 Lewin Quarterly Awardee Progress Report; however, Dartmouth also directly reported in its January-March 2014 Narrative Report that patient enrollment is low for some targeted conditions.[a] • The SDM awardees reported success reaching beneficiaries at the optimal time (i.e., prior to finalizing a major health care decision) by conducting outreach well before surgery or other major health care interventions were recommended to beneficiaries by their health care providers. Welvie and MedExpert accomplish this by conducting population-based outreach to build awareness of their services, and Dartmouth moved its outreach upstream to primary care rather than specialty care settings. • SDM awardees reported multiple challenges affecting implementation, including a loss of access to Medicare data needed for identifying and monitoring program participants, delays due to bureaucratic and legal issues with partners, and poor physician buy-in. • MedExpert and Welvie demonstrated that direct outreach to beneficiaries can be an effective approach for increasing participation. • The two awardees both reported that it was important to provide beneficiaries with a method to verify the legitimacy of the programs as CMS service providers. • SDM awardees are using self-monitoring data to identify best practices, identify implementation issues, and make course-corrections.
Program Effectiveness	• Welvie's SDM intervention was associated with consistently positive effects on mortality for the FFS cohort, but we found mixed effects of the intervention for the MA cohort. MedExpert's intervention had mixed effects on mortality for both FFS and MA beneficiaries. However, most of these observed effects were not statistically significant. • Welvie's intervention also had positive effects on quality of care, health service utilization, and medical expenditures among FFS beneficiaries receiving the intervention. All these effects were observed for three quarters after the intervention, although only some of these effects were statistically significant. In general, for MA beneficiaries receiving the Welvie intervention, the effects on health outcomes, care quality, and service utilization were mixed and in most cases not statistically significant. • MedExpert's intervention showed mixed effects on health outcomes, care quality, and service utilization for both FFS and MA beneficiaries, though in most cases these results were not statistically significant. MedExpert's effects on expenditures for FFS beneficiaries were also mixed. • For both Welvie and MedExpert, expenditures data and resource use data on non-inpatient settings were not available for MA beneficiaries. • For Dartmouth, program data needed for a credible analysis of program effectiveness were not available at the time of this report.

Evaluation Categories	Key Findings
Workforce	• Each SDM intervention provides an alternative source of information about treatment options, patient safety, and clinical guidelines that can support or fill gaps in patient education traditionally delivered by a physician, nurse, or other health care provider. • Dartmouth's and MedExpert's interventions may also fill gaps in chronic care management and patient advocacy, respectively. • Staff retention rates for Welvie and Dartmouth have been consistently above 90%; however, MedExpert experienced turnover among its Medical Information Coordinators (MICs) early in the project and had a staff retention rate of 81.4% in Q5. • Each intervention provides staff with tools and resources (e.g., scripts, talking points) to support effective interactions with the beneficiaries.
Context	• Each SDM awardee has experienced challenges with partnerships, including lengthy processes to develop legal agreements, challenges working with the bureaucracies of large organizations, or competing demands of other quality improvement projects at partner sites. • Each SDM awardee offers its decision aids in Spanish, and MedExpert offers interpreter services in 19 languages, making the SDM intervention accessible to some non-English speaking populations. • Dartmouth and MedExpert offer interventions that rely heavily on staff to deliver the intervention, and these may be more challenging to scale to the national level than Welvie's intervention, which is offered primarily online or in paper format.

[a]Source: Lewin Quarterly Awardee Progress Reports and Quarterly Awardee Narrative Reports.

3 MEDICATION MANAGEMENT AWARDEE GROUP SUMMARY

MM programs aim to optimize therapeutic outcomes and reduce adverse events through improved medication use. The HCIA MM awardees' interventions involve conducting in-depth medication reviews, improving care coordination and transitions, and communicating with patients, physicians, and other health care providers to resolve medication-related problems using phone calls, in-person meetings, and Health Information Technology (HIT).

This section provides a group-level summary of the HCIA MM awardees, including descriptions of the interventions and findings of the evaluation as of August 2014, unless otherwise noted. Section 3.1 provides an overview of the HCIA MM portfolio: a brief description of each of the six MM awardees, target populations, interventions provided, enrollment, and geographic reach. Section 3.2 details the MM group-level findings for the evaluation categories of implementation effectiveness, program effectiveness, workforce, and context.

3.1 HCIA MM Programs

The HCIA MM portfolio includes six awardees: IHARP, USC, UPenn, PSW, UHawaii, and UTHSC. The awardees partner with primary care physicians, hospital pharmacists, community pharmacists, and other health care staff to improve medication use. The programs seek to improve health conditions, reduce unnecessary hospitalizations, and reduce unnecessary emergency department use.

(i) *The IHARP* program uses hospital-, community-, and primary care-based pharmacists to provide medication management with the aim of improving post-discharge care coordination and reducing medication-related problems.

(ii) *The USC* program integrates pharmacy teams into safety net clinics, offering medication and disease management, counseling, and education to high risk patients to improve care coordination and to reduce unnecessary hospitalizations and emergency department use.

(iii) *UPenn's HeartStrong* program uses GlowCap pill bottles, phone reminders, and incentives to monitor and improve patient adherence to cardioprotective medication in the year after acute myocardial infarction.

(iv) *The PSW* program accredits pharmacies and trains pharmacists to deliver comprehensive medication reviews and point-of-sale medication therapy management (MTM) services to chronically ill patients.

(v) *UHawaii's Pharm2Pharm* program aims to develop a formal "hospital pharmacist-to-community pharmacist" care coordination model designed to address medication management risks during post-discharge transitions of care.

(vi) *The UTHSC's SafeMed* program offers medication therapy management (MTM) care coordination services to post-discharge patients, focusing on intensive community-based outreach, follow-up calls, and home visits.

As a group, the MM programs vary substantially in patient enrollment, intervention components, and reach. However, there are similarities among certain awardees. For example, SafeMed and Pharm2Pharm focus primarily on immediate post-discharge care coordination, ensuring that beneficiaries' drug therapies are not disrupted during this transition. Most awardees, with the exception of Pharm2Pharm, use HIT systems to target participants. HeartStrong, USC, and PSW rely heavily on HIT systems to optimize delivery of the interventions. The remainder of this section details various aspects of the MM programs: (i) target population and key intervention characteristics, (ii) enrollment, and (iii) geographic reach.

3.1.1 Target Population and Intervention

All MM awardees focus on patients with multiple chronic conditions, except for the HeartStrong program, which delivers MM services to patients in the first year after acute myocardial infarction.

3.1.2 Enrollment

The MM awardees began enrolling patients in mid-2012. Table 3-1 lists each awardee's cumulative enrollment through March 2014, as well as payer mix for participants enrolled from January 2014 through March 2014. As the table shows, the programs vary widely in size. SafeMed has the fewest number of enrollees, 155, while PSW reports enrollment of more than 21,000 patients. With respect to insurance payer mix, a substantial portion of patients served by five of six awardees are Medicaid beneficiaries. While some of the Medicaid patients served by these awardees are dual eligible for Medicare, the portion of Medicaid-only patients ranges from 7% for IHARP to 65% for PSW.

Table 3-1: Payer Mix and Enrollment Estimates by MM Awardee

Awardee	Payer Mix for January-March 2014 Enrollment					Cumulative Enrollment since Program Inception (#)
	Medicare FFS or Unspecified (%)	Medicare MA (%)	Medicaid Only (%)	Dual-Eligible (%)	Other (%)	
IHARP[a] (Carilion)	56%	n/a	7%	7%	30%	1,634
USC[a]	6%	7%	38%	16%	33%	3,898
HeartStrong[a] (UPenn)	3%	27%	n/a	n/a	70%	392
PSW[a]	n/a	n/a	65%	31%	4%	21,829
Pharm2Pharm (UHawaii)[b]	22%	28%	14%	n/a	36%	1,157
SafeMed (UTHSC)[a]	25%	n/a	26%	49%	n/a	155
Total	n/a	n/a	n/a	n/a	n/a	**29,065**

Note: The enrollment estimates are cumulative through March 2014, while the payer mix figures are for January-March 2014

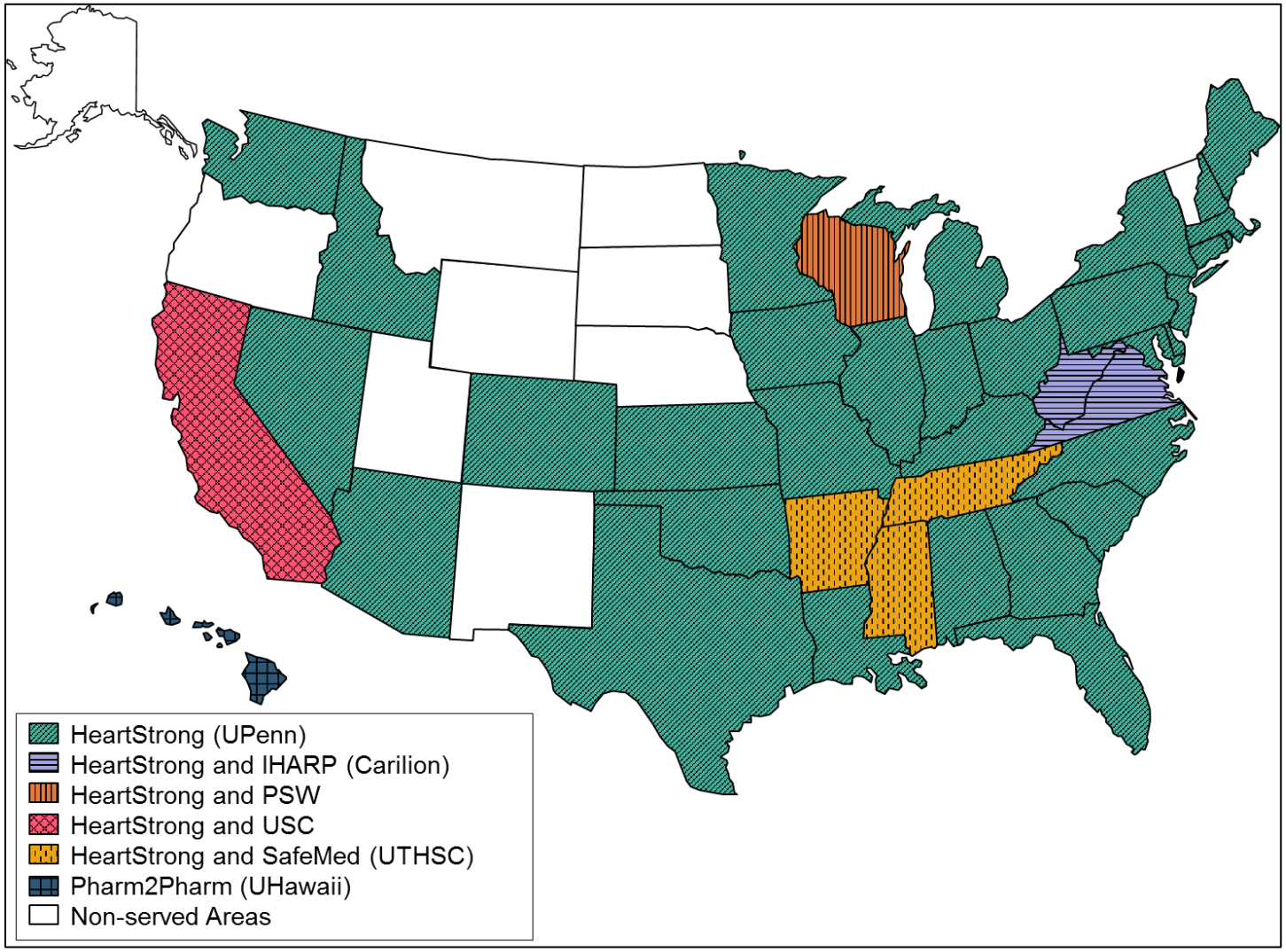
[a]Source: Lewin Quarterly Awardee Progress Reports (January-March 2014).

[b]Source: Awardee email, Pharm2Pharm, August 1, 2014 that corrects erroneous information included in the Lewin Quarterly Awardee Progress Reports (January-March 2014).

3.1.3 Geographic Reach

The MM awardees differ greatly in geographic reach, as shown in Figure 3-1. PSW, Pharm2Pharm, and USC each focus their services on a single state: PSW serves pharmacies and patients in Wisconsin, the Pharm2Pharm program is available in Hawaii, and USC provides services only in clinics in Southern California. SafeMed and IHARP are both regionally focused, with SafeMed serving patients in Tennessee, Arkansas, and Mississippi, and IHARP serving patients in Virginia and West Virginia. HeartStrong currently has the broadest geographic coverage. It initially operated only in Pennsylvania and New Jersey, but has expanded to a total of 39 states in an effort to increase enrollment.

Figure 3-1: Geographic Reach of MM Awardees



Source: Program data provided by Carilion for IHARP enrollees through May 2014. Lewin Quarterly Awardee Progress Reports (January-March 2014) for enrollees in the USC, HeartStrong, PSW, Pharm2Pharm and SafeMed programs through March 2014.

3.2 Evaluation Findings

This section provides an overview of the group-level evaluation findings for the six HCIA MM awardees, based on a review of available awardee progress reports and other materials and in-depth telephone interviews with awardees, and summarizes common themes, lessons learned, and challenges across the awardees. At the time this report was written, Acumen could not assess the impact of the HCIA awardees' MM programs on health outcomes, care quality, service utilization, or health expenditures, due to limited data on program participants. As of August 2014, IHARP was the only MM awardee that had provided data on program participants, but these data were not received in time for Acumen to construct well-matched control groups necessary for DiD analysis.

The qualitative data collected as of August 2014 indicate that the MM awardees continue to face enrollment and other implementation challenges to varying degrees but also highlight steps taken by MM awardees to address these challenges. Below is a list of the key implementation trends, including lessons learned, reported by the MM awardees.

- **Awardees continue to make efforts to boost enrollment and improve implementation.** Many of the MM awardees have not met their enrollment goals. As a result, many of the awardees have expanded their eligibility criteria and tailored outreach approaches for eligible patients. This includes developing specifically designed or co-branded patient-friendly materials as well as applying tailored scripts or talking points when communicating with patients.
- **Program leaders are working to optimize staff skills.** Many of the MM programs rely on mixed staffing models of pharmacists, pharmacist technicians, nurses (of varying preparation levels), social workers, and/or physicians. While the intended composition of their program staff have not changed significantly, many of the awardees continue to adjust staffing models to ensure that staff skills are maximized and used efficiently. For example, MM awardees have found that pharmacy technicians can serve in patient outreach and patient navigation roles and that entry-level staff (e.g., research assistants) can be trained to assist with care coordination efforts, allowing clinically-trained or other professional staff to focus on other tasks, such as developing best practices.
- **Many awardees have implemented regular, ongoing training and collaborative learning for staff.** In general, MM awardees are using standardized training to ensure that staff members are adequately prepared to deliver an expanded scope of services. Some of the awardees are using learning collaboratives to support ongoing learning and staff training. MM awardees also meet regularly with staff to share lessons learned and discuss opportunities for program improvement.
- **Negotiating partnerships has been an important but also a time and resource intensive activity.** Many of the MM awardees have leveraged partnerships with insurers, provider groups, and/or health care institutions to help implement their innovations, raise awareness of the need for enhanced pharmacy services, and obtain guidance on

sustaining their programs after HCIA funding expires. While these partnerships have been valuable, in some cases, the upfront time required to formalize the partnerships and institute data sharing or other contractual agreements has resulted in delays or other implementation challenges.

- **Awardees continue to work towards integrating their innovations into the larger health care context and obtaining physician buy-in.** Awardees identified the importance of integrating their MM services into the existing health care workflow. Notably, the awardees' programs expand the role of pharmacists and other staff members and require a shift in workflow and care processes. As a result, the awardees are working to ensure that the enhanced pharmacy services they provide are complementary, not duplicative. Awardees are also working towards building relationships with primary care providers, recognizing that physician buy-in is crucial for patient acceptance of MM services and for the success of the innovation.
- **Awardees feel their innovations are broadly scalable, but most report concerns about the financial sustainability of their models.** Some awardees have reported that the failure to recognize pharmacists as health care providers—precluding direct reimbursement for pharmacist services—may pose a challenge to efforts to sustain and scale the awardees' MM innovations. According to many of the MM awardees, Accountable Care Organization (ACO) models, as well as capitated or bundled payment systems, hold promise as a way to sustain the MM innovations. Some of the MM awardees are actively pursuing relationships with ACOs as a result.

Table 3-2 summarizes common themes, lessons learned, and challenges across the six MM HCIA awardees based on a review of available awardee progress reports, outreach materials, training and other materials, as well as in-depth telephone interviews with awardees. Findings are organized by the evaluation categories of implementation effectiveness, workforce, and context.[3]

[3] There are no MM group-level findings for program effectiveness in this report because Acumen did not receive participant data from the MM awardees in time to conduct these quantitative analyses. We plan on reporting program effectiveness analysis results in subsequent reports.

Table 3-2: MM Group-Level Evaluation Findings

Evaluation Categories	Key Findings

Implementation Effectiveness	• All MM awardees except for one have failed to meet initial cumulative enrollment projections.[a]
	  ○ Awardees have taken a variety of steps to increase enrollment, including broadening inclusion criteria, introducing new patient outreach strategies, and partnering with additional insurers.
	  ○ Some MM awardees have lowered their enrollment goals, realizing that their programs reach capacity with fewer patients than previously thought.
	• MM awardees identified several successful communication strategies, including cobranding the innovation with organizations familiar to patients, avoiding technical jargon, using recruitment scripts, tailoring talking points to patients' individual needs, using multiple follow-up methods, and ensuring that patients interact with the same staff or team members throughout the enrollment process.
	• Engaging and retaining patients after hospital discharge is an ongoing challenge for MM awardees.
	• MM awardees have had difficulty administering comprehensive medication reviews in the community pharmacy or outpatient setting – patients are reluctant to attend reviews and even when patients are willing, scheduling reviews has proven challenging.
	• MM awardees are using data generated from performance reports, staff and patient surveys, staff focus groups, and employee workgroups, among other sources, to monitor implementation and inform changes to their innovation components, workflow, staffing levels, and enrollment strategies.

Workforce	• The MM awardees fill existing workforce gaps through comprehensive medication and care management services that the health care delivery system has not been adequately providing (e.g., medication and disease management assessments, care transition support, and care coordination).
	• The MM innovations expand traditional roles of health care workers, including pharmacists, pharmacy technicians, and licensed practical nurses.
	  ○ For example, to implement the innovations pharmacists function in an expanded role across a variety of settings, including inpatient, primary care, and community pharmacy settings, while licensed practical nurses perform non-traditional tasks such as conducting patient outreach and providing social support services.
	• All awardees provide training for their innovation teams, though the nature of the training varies across awardees.
	  ○ Some programs provide continuing education credits for training.
	  ○ Pharm2Pharm and SafeMed have identified cultural competency as an important training need that was not adequately addressed during initial training.
	  ○ SafeMed and IHARP have focused on motivational interviewing techniques, though SafeMed indicated that such skills are not easy for team members to apply.
	• Many MM awardees hold weekly or bi-weekly meetings to provide ongoing support to staff members implementing the innovation.
	• Staff retention has varied across awardees. Some awardees have not experienced turnover, while others have had substantial turnover.
	• Program leaders report that innovation team members are generally satisfied with their roles.

Evaluation Categories	Key Findings

Context	• The MM innovations affect the delivery of patient care in the hospital, home, primary care, and community/outpatient pharmacy settings.
	• Many awardees are using health information technology tools to identify patients, share patient information, document care, and guide the provision of intervention services.
	• Some awardees have found that issues with cost and care coordination have negatively affected patients' ability to take prescribed medications.
	• Awardees indicate that their innovations are broadly scalable, but most report concerns about the financial sustainability of their models.
	  o Many indicate that Accountable Care Organization (ACO) models, as well as capitated or bundled payment systems, hold promise for sustaining MM innovations. Some are pursuing relationships with ACOs.
	• MM awardees continue to focus on forming and sustaining partnerships with insurers, community pharmacies, and provider groups/health care institutions.
	• Some MM awardees rely on steering committees or advisory boards to provide guidance for their programs and enable buy-in from community stakeholders.
	• According to awardees, physician/prescriber involvement and buy-in are critical implementation factors, and as a result awardees are taking steps to
	  o improve collaboration and communication with physicians/prescribers;
	  o increase physician/prescriber awareness of the innovation; and
	  o increase referrals and handoffs from physicians/prescribers.

[a]Source: Lewin Quarterly MM Awardee Progress Reports (January-March 2014)

4 EVALUATION OF THE WELVIE, LLC HEALTH CARE INNOVATION AWARD

This section provides an overview of the evaluation findings for the Welvie, LLC ("Welvie") award as of August 2014, unless noted otherwise. The qualitative findings are based on interviews with Welvie project staff, a review of progress reports developed by the Lewin Group, and documentation provided by the awardee; the quantitative findings are based on analysis of the program and Medicare data. Section 4.1 summarizes the evaluability of the awardee. Section 4.2 provides a detailed description of the innovation components, including target populations. Sections 4.3 through 4.6 present the findings for the evaluation categories of implementation effectiveness, program effectiveness, workforce issues, and context. Section 4.7 provides concluding observations on the Welvie award.

4.1 Evaluability

Table 4-1 provides an overview of the primary factors affecting the evaluability of Welvie, based on information available as of August 2014, unless otherwise noted. These factors are sample size, comparison group, data availability, and program maturity, which is defined by the program's stage of implementation and the extent to which it has changed since launch.

Table 4-1: Welvie Evaluability Overview

Evaluability Factor	Status
Sample Size	• Welvie reports 169,426 individuals in the intervention group as of February 27, 2014. Payer mix: 39% Medicare FFS, 56% MA, 5% other/unknown. [a]
Comparison Group	• Acumen used randomized control groups provided by Welvie in the intention-to-treat analysis of program effectiveness presented in this report for both the FFS and MA cohorts. o FFS control group came from the general Ohio population, excluding those under age 65 years, nursing home residents, and those without verifiable addresses. o MA control group came from Anthem BlueCross BlueShield beneficiaries in Ohio and included the same exclusions as FFS above. • Welvie describes the subset of beneficiaries in its intervention group who select to use the surgery decision aid component of the program as its "high dose intervention group," and randomized comparison groups are not available for these users by design. o Acumen is limited in its ability to match a credible comparison group and evaluate program effects for this subgroup. The decision aid is designed for beneficiaries contemplating surgery and this sub-group self-selects to use this decision aid. Medicare data alone are unable to capture important predictive characteristics of such decision aid users that are needed to create a well matched comparison group. Our comparison group selection and analysis approach for this subgroup is provided in a subsection of Section 4.4.3 titled "Program Effects for Decision Aid Users".
Data Availability	• Acumen acquired program data from Welvie on Medicare FFS and MA beneficiaries in the randomized intervention and control groups, and linked them to Medicare FFS and MA claims data for the analyses of program effectiveness.
Program Maturity	• In September 2012, Welvie adapted its decision aid for use in the Medicare population. The decision aid was originally designed for the commercial insurance population. • The intervention has been relatively stable since early 2013.

[a]Source: Welvie's program data sent on May 1, 2014, excluding duplicate records and beneficiaries who died prior to the intervention start date.

4.2 Innovation Components

The Welvie Shared Decision-Making (SDM) program seeks to enable patients to make informed decisions about preference-sensitive surgeries and procedures (e.g., surgeries of the knee, spine, heart, and eye). The innovation aims to enhance patients' experience of care, increase patients' surgical literacy, improve surgical outcomes, and reduce the incidence of inappropriate surgical procedures. Under the HCIA award, Welvie sends outreach materials and health information materials to Medicare beneficiaries and invites them to use a six-step decision aid that assists them with making informed decisions regarding surgeries.

Welvie first started conducting mail-based outreach in randomly selected groups of Medicare FFS beneficiaries and Medicare Advantage beneficiaries insured through Anthem BlueCross BlueShield (Anthem) in Ohio, after excluding those under age 65 years, nursing home residents, and those without verifiable addresses. Welvie now also conducts outreach to Medicare Advantage beneficiaries of all ages in Texas who are insured through Humana again excluding nursing home residents and those without verifiable addresses. Welvie considers participants who receive only the outreach materials as their "low dose" intervention group and participants who then choose to use Welvie's decision aid as the "high dose" intervention group.

The components of the Welvie innovation are described in more detail below.

- **Welvie Decision Aid:** The Welvie decision aid is a six-step curriculum designed to educate patients about potential risks, benefits, alternatives, and expectations related to a proposed surgery. Steps 1-3 of the decision aid focus on helping patients interact more effectively with their physician and understand their treatment options. All beneficiaries are invited to complete Steps 1-3, and beneficiaries who complete these steps may be eligible for a $25 incentive payment. Steps 4-6 focus on surgery optimization (e.g., preparation, information regarding safety risks, recovery) and are intended for patients who decide to proceed with surgery.

  <u>Welvie 6-Step Curriculum:</u>

  - Step 1: Participants learn the importance of working with their primary care doctor to get the right diagnosis.
  - Step 2: Through video role-plays, participants learn how to interview doctors in a non-threatening manner to determine experience levels, credentials, and bedside manner.
  - Step 3: Participants are shown the importance of understanding all treatment options (surgical and non-surgical) and can view surgical animations to gain an in-depth understanding of potential surgeries.

- Step 4: Participants learn they have a voice in selecting their health care team, including anesthesiologists.
- Step 5: This step sets expectations for preparing for surgery and provides the organizing tools for patients and their Surgery Buddies.
- Step 6: This step prepares beneficiaries for recovery at home. Discharge education and expectation setting can reduce the risk of complications and hospital readmission.

The decision aid can be completed online, on paper, or by phone with support from a Welvie-trained nurse.

- **Outreach/Health Education Mailings:** A portion of Welvie's outreach mailings contain educational content related to decision-making, patient safety, and clinical guidelines about surgeries, medical procedures and treatment alternatives. For example, Welvie has developed a mailing with the "top ten things to know if you are admitted to the hospital" and a mailing with information about appropriate candidates for colonoscopies.

Table 4-2 highlights the research questions and findings related to Welvie's innovation components.

Table 4-2: Welvie Innovation Components Research Questions and Findings

Research Questions	Findings
How is the innovation designed to reduce expenditures or improve care quality?	• Welvie provides beneficiaries with information regarding preference-sensitive surgeries and their alternatives, which may reduce surgery rates and associated expenditures, improve satisfaction with treatment decisions, and encourage appropriate utilization of care alternatives. • Welvie also helps patients obtain the right diagnosis by communicating effectively with their health care providers, which may improve care quality. • If beneficiaries decide to undergo surgery, the last three steps of the Welvie decision aid helps them prepare for surgery and recovery, which may also minimize complications, improve patient safety, and reduce expenditures.
Who does the intervention target?	• Welvie's intervention targets Medicare FFS and MA individuals who are candidates for preference-sensitive surgery. All beneficiaries in the randomized intervention group, regardless of health condition, receive outreach materials and can use the decision aid. • Welvie's intervention group includes, but is not limited to, CMS priority populations such as racial or ethnic minorities, low-socioeconomic status populations, and patients with specific disease groups (e.g., congestive heart failure).

Research Questions	Findings
What are the key components of the innovation?	• Welvie sends outreach mailings to the randomized intervention group that provide information related to surgery decision-making, patient safety, and clinical guidelines (e.g., when to get a second opinion, colonoscopy guidelines). The outreach mailings also provide information on how to access Welvie's six-step decision aid. • Beneficiaries in the randomized intervention group can choose to use Welvie's six-step decision aid which can be completed online, on paper, or by phone. The decision aid is designed to educate patients about potential risks, benefits, treatment alternatives, and expectations related to surgery. Welvie considers decision aid users the "high dose intervention group". ○ Steps 1-3 of the decision aid focus on getting the right diagnosis, finding the right doctor, and making a treatment decision. ○ Steps 4-6 of the decision aid focus on learning about hospitals, preparing for surgery, and recovering at home. ○ The decision aid also engages "Friends and Family Buddies" who are expected to play a key support role before, during, and after surgery. The decision aid provides them with tools, such as pre-surgery checklists and medication trackers. • Welvie is preparing to implement a "Surgery Buddies" component, which will consist of peer-to-peer support and counseling.
To what extent is the innovation viewed as a relatively simple "plug in" or a fundamental and major change within the implementing organization?	• The Welvie innovation is implemented as a "plug in" program so that it does not require significant change on the part of the health care delivery system.

4.3 Implementation Effectiveness

This section summarizes findings on Welvie's implementation effectiveness, based on qualitative information obtained from interviews with awardees and other stakeholders, awardee progress reports provided by the Lewin Group, and quantitative analyses performed by Acumen. Table 4-3 summarizes findings as of August 2014, unless otherwise noted.

Table 4-3: Welvie Implementation Effectiveness Research Questions and Findings

Research Questions	Findings

Was the intervention delivered as intended to the target population in doses associated with effectiveness?	• As of March 2014, overall cumulative participation in the six-step decision aid component of the Welvie program is below projections by 14%.[a]
	  ○ MA participation rates are above self-defined targets.[b]
	  ○ Medicare FFS participation rates are below targets due to implementation delays and a loss of access to CMS FFS data.
	• 28% of online or phone version decision aid users completed the entire 6 steps, and 56% completed the first 3 steps. Completion rates of individual steps among beneficiaries who used the paper version are not tracked because monitoring tools that are used for the online and phone versions (e.g., clickstream analysis) could not be implemented for the paper version.[c]
	• As of February 27, 2014, 169,426 unique individuals received the minimally effective dose of the Welvie intervention,[c] which Welvie defines as receipt of at least one outreach communication.[d]

What were key successes in implementing the innovation as designed and factors associated with success?	• Welvie reports that the following outreach strategies have been effective in engaging beneficiaries in the program and generating better response rates: 1) providing incentives; 2) mailing outreach materials followed by a telephone reminder; 3) mailing envelopes, as compared to postcards, with the CMS or Department of Health and Human Service logo; and 4) delivering outreach materials to beneficiaries on Monday, as compared to later in the week.
What were the challenges in implementing the innovation as designed?	• Welvie is unable to recruit additional FFS beneficiaries or conduct claims analysis on existing FFS beneficiaries, due to changes in access to CMS FFS data. • Welvie faced barriers in recruiting new partners due to a CMS rule that prohibits MA plans from offering incentives for health improvement programs. • Program leaders report that outreach to cardiac patients has been challenging due to the short timeframe between when surgery is recommended and when decision-making occurs.
What changes were made to the innovation to increase enrollment, improve care, or reduce expenditures?	• Welvie is seeking to increase early use of the decision aid among cardiac patients by customizing outreach materials and offering early incentives that may be particularly attractive, such as a blood pressure monitor. • Welvie added Humana as a new implementation partner to increase program enrollment. • Welvie developed new educational outreach materials to improve guidelines-based utilization of colonoscopies. • Welvie reformatted its online video content to accommodate users with different types of computers and mobile devices (e.g., iPads, Macintosh computers). • Welvie translated its decision aids into Spanish to facilitate wider participation.
Did the innovation use internal evaluation findings to inform the implementation process, when necessary?	• The design and content of Welvie's outreach materials are informed by ongoing measurement of response rates. • Welvie used trend analyses of surgery utilization data to optimize the timing of its Year 2 communications in Ohio.

[a]Source: Lewin Quarterly Awardee Progress Report, Welvie (January- March 2014)

[b]Source: Quarterly Awardee Narrative Reports, Welvie (January- March 2014)

[c]Program data sent by Welvie on May 1, 2014 (total count excludes duplicate records and beneficiaries who died prior to the intervention start date).

[d]Source: Email communication with Welvie, July 14, 2014

4.4 Program Effectiveness

Acumen estimated Welvie program effects on health outcomes, quality of care, health service use, and medical expenditures for Medicare FFS and MA beneficiaries who enrolled in the Welvie intervention on or prior to September 27, 2013,[4] using Medicare claims data through December 31, 2013. Welvie randomized Medicare beneficiaries in Ohio into intervention or control groups. The intervention group received outreach materials, health information resources, and an invitation to use the six-step decision aid from Welvie, while those in the control group did not. To calculate program effects on resource use and medical expenditures in the intervention group relative to the control group, we conducted a difference-in-difference (DiD) analysis over a pre- and post-intervention period with an intention-to-treat (ITT) approach on both the FFS and MA cohorts. Because beneficiaries entered into the intervention on a rolling basis since program launch, we used each beneficiary's enrollment date as a reference for defining the pre- and post-enrollment period for the DiD estimates. To assess program effects on health outcomes and quality of care, we measured differences in mortality and readmissions between the intervention and control groups in the intervention period itself, instead of a DiD analysis. The available claims data allowed Acumen to conduct analyses on the effects of the intervention for 9 months (3 quarters) after program initiation in the FFS cohort and for 15 months (5 quarters) in the MA cohort because Welvie started conducting outreach in the MA cohort earlier than in the FFS cohort. The MA cohort included in the program effectiveness analysis was also larger than the FFS cohort.

After applying study inclusion restrictions (e.g., continuous Medicare enrollment restrictions) described in Section 1.2.2 on beneficiaries in Ohio who joined the Welvie program on or prior to September 27, 2013, the FFS cohort consisted of 64,609 intervention group beneficiaries and 54,429 controls, while the MA cohort consisted of 82,640 intervention group beneficiaries and 84,259 controls.

Table Appendix B-1 and Table Appendix B-2 in Appendix B show that the intervention and control groups for both FFS and MA cohorts were well-matched, consistent with randomization, on demographic and health characteristics prior to program enrollment. Table 4-4 summarizes our key findings, while Sections 4.4.1, 4.4.2, and 4.4.3 provide detailed results for health outcomes and quality of care, resource use, and medical expenditures, respectively. Results are reported in a non-cumulative basis by quarter after program enrollment.

[4] September 27, 2013 was the latest enrollment date for beneficiaries in the program data provided by Welvie to Acumen on May 1, 2014. On September 19, 2014, Welvie sent an updated program dataset which includes additional beneficiaries through August 8, 2014; and Acumen is in the process of linking these additional beneficiaries to Medicare data for analysis and inclusion in subsequent reports.

We also conducted a sub-population analysis of Welvie program effects on total medical expenditures and inpatient surgery expenditures for the high dose intervention group, a subset of FFS beneficiaries in the randomized intervention group who used the six-step decision aid component of the program, as described in Table 4-2. The results of this analysis are reported in a subsection of Section 4.4.3 titled "Program Effects for Decision Aid Users".

Table 4-4: Welvie Program Effectiveness- Key Research Questions and Findings

Key Research Questions	Findings
What are the effects of the innovation on participants' health outcomes?	• For the Medicare FFS cohort, we found consistently lower mortality rates in the Welvie intervention group compared with the control group; these effects were statistically significant for all three quarters after program enrollment. ○ Mortality reductions ranged from 1 to 4 deaths per 1,000 beneficiaries from Q1 through Q3. • For the MA cohort, we found mixed effects on mortality rates from Q1 through Q5.

What are the effects of the innovation on health care resource use (service utilization)?	• In the resource use analysis for the FFS cohort, we found consistent reductions in inpatient admissions, total surgeries, and preference-sensitive (PS) cardiac and PS orthopedic outpatient surgeries for the intervention group compared with the control group from Q1 through Q3.
	  ○ For every 1,000 FFS beneficiaries, there were on average, 4 fewer inpatient admissions in Q1, 2 fewer inpatient admissions in Q2, and 1 fewer inpatient admission in Q3.
	  ○ We also found an average reduction of about 2 total surgeries per 1,000 FFS beneficiaries in Q1, 1 surgery per 1,000 FFS beneficiaries in Q2, and less than 1 surgery per 1,000 beneficiaries in Q3. However, none of the effects were statistically significant.
	• In the MA cohort, although we did not find consistent reductions in any inpatient resource use measure for all five quarters after program enrollment for the intervention group compared with controls, we did find reductions in inpatient admissions, inpatient surgeries, and surgical hospital days from Q2 through Q5.
	  ○ For example, we found reductions of 0.1 to 1.2 inpatient surgeries per 1,000 MA beneficiaries from Q2 through Q5.

What are effects of the innovation on healthcare expenditures?	• For the FFS cohort, we found reductions in average total Medicare Part A and B expenditures of $100 per person in Q1, $23 per person in Q2, and $16 per person in Q3, in the intervention group compared with the control group. These changes appear to be driven by reductions in inpatient expenditures and surgery-related expenditures.
	  ○ Inpatient expenditures were reduced by $73 per person in Q1, $18 per person in Q2, and $6 per person in Q3.
	  ○ Episode-based inpatient surgery expenditures were reduced by $77 per person in Q1, $14 per person in Q2, and $3 per person in Q3.
	  ○ We also found reductions in expenditures specific to PS cardiac surgery of $19 per person in Q1 and $2 per person in Q2, but observed a $9 per person increase in Q3.
	  ○ The intervention did not appear to reduce PS orthopedic surgery expenditures from Q1 through Q3.
	• Expenditure data were unavailable for analysis of the MA cohort.

Key Research Questions	Findings
What is the impact of the innovation on quality of care?	• For the FFS cohort, we found consistently lower readmissions following inpatient surgery and preference sensitive (PS) orthopedic surgery for the intervention group compared with the control group from Q1 through Q3, and we found mixed effects on readmissions following PS cardiac surgery; however, only some of these effects were statistically significant. o For every 1,000 beneficiaries with an inpatient surgery, there were on average 14 to 29 fewer 30-day readmissions following inpatient surgery from Q1 through Q3; however, none of the effects were statistically significant. o For every 1,000 beneficiaries with an inpatient PS orthopedic surgery, beneficiaries in the intervention group experience about 60 fewer readmissions in the 30 days following surgery in Q1, 4 fewer readmissions in Q2, and 29 fewer readmissions in Q3 compared with controls; however, only the effect observed in Q1 was statistically significant. • For the MA cohort, we found mixed effects on readmissions in the five quarters after program enrollment, although most of these effects were not statistically significant.
If the innovation has positive effects with respect to health, cost, resource use, or care quality, how long are these changes sustained?	• For the FFS cohort, we found sustained reductions for at least 9 months after program enrollment (Q1 through Q3) for a number of health expenditure, resource use, health outcome, and quality of care measures, with effect magnitudes generally getting smaller over time. Analytic results for subsequent quarters for the FFS cohort will be included in upcoming reports to better assess the long-term sustainability of these effects. o We found sustained reductions in total Medicare Part A and B expenditures and categorical medical expenditures, including inpatient and surgery-related expenditures, from Q1 through Q3; although Q2 and Q3 effects were not statistically significant. o We also found consistent reductions in inpatient admissions, total surgeries, and PS orthopedic and cardiac outpatient surgeries from Q1 through Q3, although not all of these effects were statistically significant. o Reductions in mortality and most readmission measures were sustained from Q1through Q3. • For the MA cohort, we were able to estimate effects from Q1 through Q5 (15 months), and did not find consistent effects for this entire period for most measures. However, we found consistent reductions in inpatient admissions from Q1 through Q3 and reductions in inpatient PS orthopedic surgeries from Q1 through Q2. Reductions in inpatient surgeries and length of surgical hospital stay were not observed until Q2 and were sustained through Q5.
If the innovation has positive effects, what are the innovation components that are driving the change?	• For the FFS cohort, we found substantial reductions in total Medicare expenditures and inpatient surgery expenditures for beneficiaries who used the decision aid component of the program in the first three months after program enrollment (Q1). However, only the reduction in inpatient surgery expenditures of $617 per beneficiary associated with use of steps 4-6 of the decision aid was found to be statistically significant. We were not able to include results for subsequent quarters for this report due to small sample size constraints, but these results will be included in upcoming reports. (Steps 4-6 focus on providing guidance on surgery preparation and recovery and include information on risks and safety tips).

Key Research Questions	Findings
Does the innovation reduce disparities in care quality or health service utilization by race, ethnicity, gender, age or geographical location that are not attributable to differences in health status?	• TBD
Do program effects on expenditures or utilization differ by subpopulation (e.g., priority populations, complex care patients, dual-eligibles)?	• TBD

4.4.1 Health Outcomes and Quality of Care

We found consistently lower mortality rates in the Welvie intervention group compared to the control group in the Medicare FFS cohort; however, effects on mortality rates were mixed for the MA cohort. For the FFS cohort, Table 4-5 shows that there were 4 fewer deaths per 1,000 beneficiaries in the intervention group compared with the control group in the first quarter after program enrollment (Q1) and about 1 less death in the intervention group compared with controls in both Q2 and Q3; however, only the effect observed in Q1 was statistically significant. For the MA cohort, Table 4-5 shows that estimated effects on mortality were mixed from Q1 through Q5.

Table Appendix A-2 in Appendix A includes the mortality measure definition; while Table Appendix B-3 and Table Appendix B-4 in Appendix B contain mortality per 1,000 beneficiaries for the intervention and control groups after program enrollment from which these differences were calculated for the FFS and MA cohorts, respectively.

For the FFS cohort, we found consistently lower readmissions following inpatient surgery and preference sensitive (PS) orthopedic surgery in the intervention group compared with the control group, from Q1 through Q3, and we observed mixed effects on readmissions following PS cardiac surgery, from Q1 through Q3; however, only some of these effects were statistically significant. For example, Table 4-6 shows that for every 1,000 beneficiaries (with an inpatient PS orthopedic surgery), 30-day readmissions following inpatient PS orthopedic surgery were lower in the intervention group on average by 60 readmissions in Q1, 4 readmissions in Q2, and 29 readmissions in Q3 compared with the control group; however, only the effect observed in Q1 was statistically significant. 30-day readmissions following any inpatient surgery were also lower in the intervention group by 14 to 29 readmissions per 1,000 beneficiaries on average

compared with the control group from Q1 through Q3; however, none of the effects were statistically significant.

Table 4-7 shows that we found mixed effects on readmissions per 1,000 beneficiaries in the five quarters after program enrollment for the MA cohort, although most of these effects were not statistically significant. For example, Table 4-7 shows that following inpatient PS orthopedic surgery, readmissions were lower on average by 10 to 34 readmissions per 1,000 beneficiaries in the intervention group compared with the control group from Q1 through Q2, but higher in the intervention group on average by 1 to 21 readmissions per 1,000 beneficiaries from Q3 through Q5; however, none of these effects were statistically significant.

Table Appendix A-2 in Appendix A includes definitions of the readmissions measure, and Table Appendix B-3 and Table Appendix B-4 in Appendix B contain the readmission measures after program enrollment for the intervention and control groups from which these differences were calculated for the FFS and MA cohorts, respectively.

Table 4-5: Difference in Mortality per 1,000 Beneficiaries after Welvie Enrollment, Medicare FFS and MA Cohorts

Medicare Cohort	Q1			Q2			Q3			Q4			Q5		
	Difference[a]	95% Confidence Interval		Difference	95% Confidence Interval		Difference	95% Confidence Interval		Difference	95% Confidence Interval		Difference	95% Confidence Interval	
		Lower	Upper		Lower	Upper		Lower	Upper		Lower	Upper		Lower	Upper
FFS	-4.0*	-5.0	-3.0	-1.0	-2.0	0.0	-1.0	-2.0	0.0	n/a	n/a	n/a	n/a	n/a	n/a
MA	0.2	-0.7	1.1	-0.4	-1.4	0.7	-0.5	-1.5	0.5	-0.2	-1.2	0.8	0.6	-0.4	1.7

*Statistically significant at the 5% level.

[a]The "difference" estimate represents the difference in the number of deaths per 1,000 beneficiaries between the intervention group and control group in the relevant quarter of the intervention period. There were no deaths in the intervention or control groups prior to program enrollment as beneficiaries were required to be alive on program start date to be included in the study.

Note: The available claims data allowed Acumen to conduct analyses on the effects of the intervention for at least 9 months (3 quarters) after program initiation in the FFS cohort and for 15 months (5 quarters) in the MA cohort. Welvie started conducting outreach in the MA cohort earlier than in the FFS cohort.

Table 4-6: Difference in Readmissions per 1,000 Beneficiaries after Welvie Enrollment, Medicare FFS Cohort

Measures	Q1			Q2			Q3		
	Difference[b]	95% Confidence Interval		Difference	95% Confidence Interval		Difference	95% Confidence Interval	
		Lower	Upper		Lower	Upper		Lower	Upper
30-Day Hospital Readmissions per 1,000 Beneficiaries Following:									
All Inpatient Admissions	-6.0	-23.3	11.2	7.4	-10.8	25.5	-14.8	-32.8	3.1
Inpatient Surgery Admissions	-24.0	-55.9	7.8	-14.4	-46.3	17.6	-29.0	-60.4	2.4
Inpatient PS Orthopedic Surgery Admissions[a]	-60.4*	-116.8	-4.0	-3.6	-61.3	54.2	-28.6	-83.6	26.3
Inpatient PS Cardiac Surgery Admissions	-55.0	-140.2	30.1	8.5	-72.7	89.7	85.4	7.1	163.6
30-Day Hospital Unplanned Readmissions per 1,000 Beneficiaries Following any Inpatient Admission	-1.4	-17.8	14.9	2.7	-14.4	19.8	-11.2	-28.0	5.5

* Statistically significant at the 5% level.

[a]PS = Preference Sensitive.

[b]The "difference" estimate represents the average difference in the number of beneficiaries with at least one readmission for every 1,000 beneficiaries who have at least one inpatient admission, as compared between the intervention and control groups during the relevant quarter in the intervention period.

Note: The available claims data allowed Acumen to conduct analyses on the effects of the intervention for at least 9 months (3 quarters) after program initiation in the FFS cohort.

Table 4-7: Difference in Readmissions per 1,000 Beneficiaries after Welvie Enrollment, Medicare Advantage Cohort

Measures	Q1			Q2			Q3			Q4			Q5		
	Difference[b]	95% Confidence Interval		Difference	95% Confidence Interval		Difference	95% Confidence Interval		Difference	95% Confidence Interval		Difference	95% Confidence Interval	
		Lower	Upper		Lower	Upper		Lower	Upper		Lower	Upper		Lower	Upper
30-Day Hospital Readmissions per 1,000 Beneficiaries Following:															
All Inpatient Admissions	-1.5	-17.1	14.0	-0.6	-16.1	15.0	-15.7	-31.9	0.4	-0.2	-17.7	17.2	-14.1	-31.2	3.0
Inpatient Surgery Admissions	7.3	-18.0	32.5	-13.9	-40.8	13.1	-16.0	-43.4	11.4	4.2	-24.3	32.8	-8.0	-34.9	18.9
Inpatient PS Orthopedic Surgery Admissions[a]	-10.3	-50.1	29.6	-33.8	-78.3	10.6	3.2	-40.2	46.5	1.2	-44.6	47.0	20.8	-16.5	58.0
Inpatient PS Cardiac Surgery Admissions	33.7	-43.8	111.1	-14.5	-87.4	58.5	-8.2	-81.4	65.1	-2.1	-90.3	86.1	-12.5	-91.2	66.1
30-Day Hospital Unplanned Readmissions per 1,000 Beneficiaries Following any Inpatient Admission	-4.1	-18.9	10.7	4.5	-10.4	19.4	-14.6	-30.1	0.8	0.4	-16.3	17.1	-16.7*	-32.9	-0.5

* Statistically significant at the 5% level

[a]PS = Preference Sensitive.

[b]The "difference" estimate represents the average difference in the number of beneficiaries with at least one readmission for every 1,000 beneficiaries who have at least one inpatient admission, as compared between the intervention and control groups during the relevant quarter in the intervention period.

Note: The available claims data allowed Acumen to conduct analyses on the effects of the intervention for at least 15 months (5 quarters) after program initiation in the MA cohort.

4.4.2 Health Service Resource Use

We found consistent reductions in inpatient admissions, total surgeries, and outpatient preference-sensitive (PS) surgeries in the intervention group compared with the control group from Q1 through Q3 for the FFS cohort; however, most of these effects were not statistically significant. For example, Table 4-8 shows that for every 1,000 FFS beneficiaries, we found reductions of 0.6 to 4.4 inpatient admissions per 1,000 beneficiaries on average, although none of these effects were statistically significant. We also found reductions in outpatient PS orthopedic and cardiac surgeries ranging from 0.1 to 0.4 per 1,000 FFS beneficiaries from Q1 through Q3, although these effects were also not statistically significant. We found mixed effects on ER visits, length of all-cause hospital stay, inpatient surgeries, and PS-specific inpatient surgeries for FFS beneficiaries from Q1 through Q3. For example, Table 4-8 shows that we found a statistically significant reduction of 2.1 inpatient surgeries per 1,000 FFS beneficiaries in Q1. Inpatient surgeries also fell in Q2, with a reduction of 0.9 inpatient surgeries per 1,000 FFS beneficiaries, but increased by 0.1 surgeries per 1,000 FFS beneficiaries in Q3. However, only the Q1 change was statistically significant.

For the MA cohort, although we did not find consistent reductions in any inpatient resource use measure for all five quarters after program enrollment for the intervention group compared with controls, we found reductions in inpatient admissions, inpatient surgeries, and surgical hospital days from Q2 through Q5. However, none of the observed effects were statistically significant. Table 4-9 shows that we found reductions of 0.4 to 1.2 inpatient admissions per 1,000 MA beneficiaries on average from Q2 through Q5; this reduction appears to be driven by reductions of 0.1 to 1.2 inpatient surgeries per 1,000 MA beneficiaries on average over the same period. Claims data on ER visits or outpatient surgeries were not available for the MA cohort.

Appendix A includes definitions of each resource use measure. Table Appendix B-5 and Table Appendix B-6 in Appendix B include the resource use measures for the intervention and control groups in the pre- and post-intervention periods from which these DiD estimates were calculated for the FFS and MA cohorts, respectively.

Table 4-8: Difference-in-Difference Estimates of Welvie's Effects on Resource Use, Medicare FFS Cohort

Measures (Number of Events or Days per 1,000 Beneficiaries)	Q1			Q2			Q3		
	DiD Estimate	95% Confidence Interval		DiD Estimate	95% Confidence Interval		DiD Estimate	95% Confidence Interval	
		Lower	Upper		Lower	Upper		Lower	Upper
ER Visits	0.8	-4.5	6.0	-3.9	-9.3	1.5	-5.9*	-11.0	-0.7
Inpatient Admissions	-4.4	-9.4	0.7	-1.6	-6.5	3.3	-0.6	-5.4	4.2
Unplanned Inpatient Admissions	-3.2	-7.8	1.4	-1.0	-5.5	3.5	-0.2	-4.5	4.2

Measures (Number of Events or Days per 1,000 Beneficiaries)	Q1			Q2			Q3		
	DiD Estimate	95% Confidence Interval		DiD Estimate	95% Confidence Interval		DiD Estimate	95% Confidence Interval	
		Lower	Upper		Lower	Upper		Lower	Upper
Hospital Days	-33.9	-73.9	6.1	13.9	-23.8	51.5	5.6	-31.1	42.3
All Surgeries	-1.7	-7.5	4.1	-0.6	-6.5	5.4	-0.3	-6.4	5.8
Inpatient Surgeries	-2.1*	-4.1	-0.1	-0.9	-2.9	1.1	0.1	-1.8	2.1
Surgical Hospital Days	-20.7	-41.8	0.4	2.6	-16.0	21.1	4.7	-13.6	23.1
Outpatient Surgeries	0.4	-5.0	5.7	0.3	-5.1	5.8	-0.4	-6.0	5.2
All PS Orthopedic Surgeries[a]	-0.1	-1.1	0.9	-0.3	-1.3	0.7	0.1	-0.9	1.1
Inpatient PS Orthopedic Surgeries	0.1	-0.9	1.0	0.0	-0.9	0.9	0.5	-0.5	1.4
PS Orthopedic Surgery Hospital Days	-0.8	-5.9	4.2	0.1	-5.2	5.5	3.2	-2.6	9.0
Outpatient PS Orthopedic Surgeries	-0.3	-1.1	0.5	-0.4	-1.2	0.4	-0.1	-0.9	0.7
All PS Cardiac Surgeries	-0.9	-2.0	0.3	-0.5	-1.7	0.6	0.3	-0.8	1.4
Inpatient PS Cardiac Surgeries	-0.6	-1.3	0.1	-0.1	-0.8	0.6	0.4	-0.3	1.0
Inpatient PS Cardiac Surgical Hospital Days	-1.3	-7.7	5.1	0.0	-6.6	6.6	3.5	-2.9	9.9
Outpatient PS Cardiac Surgeries	-0.2	-0.6	0.2	-0.3	-0.7	0.2	-0.4	-0.8	0.0

Note: The difference-in-differences (DiD) estimate is the average difference in the number of outcome events per 1,000 beneficiaries in the intervention group as compared to controls between the post-intervention period and the pre-intervention (baseline) period

* Statistically significant at the 5% level.

[a]PS = Preference Sensitive.

Table 4-9: Difference-in-Difference Estimates of Welvie's Effects on Resource Use, Medicare Advantage Cohort

Measures (Number of Events or Days per 1,000 Beneficiaries)	Q1			Q2			Q3			Q4			Q5		
	DiD Estimate	95% Confidence Interval		DiD Estimate	95% Confidence Interval		DiD Estimate	95% Confidence Interval		DiD Estimate	95% Confidence Interval		DiD Estimate	95% Confidence Interval	
		Lower	Upper		Lower	Upper		Lower	Upper		Lower	Upper		Lower	Upper
Inpatient Admissions	0.6	-3.0	4.1	-0.4	-4.0	3.3	-1.2	-4.8	2.4	-0.5	-4.1	3.2	-1.0	-4.6	2.6
Unplanned Inpatient Admissions	-0.4	-3.7	2.8	0.0	-3.3	3.4	-1.5	-4.8	1.7	-0.5	-3.9	2.8	-0.8	-4.1	2.4
Hospital Days	11.0	-15.2	37.1	2.7	-24.8	30.2	-22.2	-48.7	4.3	-7.9	-34.1	18.3	-2.4	-27.5	22.7
Inpatient Surgeries	0.2	-1.4	1.8	-0.1	-1.7	1.5	-0.4	-2.0	1.1	-0.3	-1.9	1.4	-1.2	-2.8	0.5
Surgical Hospital Days	3.2	-10.4	16.7	-1.0	-15.1	13.1	-13.3	-27.0	0.3	-6.5	-20.6	7.6	-6.5	-19.7	6.7
Inpatient PS Orthopedic Surgeries[a]	0.4	-0.4	1.2	0.1	-0.6	0.9	0.2	-0.5	1.0	-0.2	-0.9	0.6	0.0	-0.8	0.8
PS Orthopedic Surgery Hospital Days	1.9	-1.3	5.2	0.2	-3.3	3.8	0.3	-2.8	3.4	-1.3	-4.3	1.8	0.8	-2.5	4.0
Inpatient PS Cardiac Surgeries	0.1	-0.4	0.7	0.4	-0.2	1.0	0.0	-0.6	0.6	-0.3	-0.8	0.3	-0.3	-0.8	0.3
Inpatient PS Cardiac Surgical Hospital Days	1.4	-2.8	5.7	4.9*	0.4	9.6	0.4	-4.4	5.2	-1.2	-5.6	3.1	-1.3	-5.6	3.0

Note: The difference-in-differences (DiD) estimate is the average difference in the number of outcome events per 1,000 beneficiaries, in the intervention as compared to controls between the post-intervention period and the pre-intervention (baseline) period.

* Statistically significant at the 5% level.

[a]PS = Preference Sensitive

4.4.3 Medical Expenditures

We found consistent reductions in average total Medicare Part A and B expenditures and expenditures in various categories, including all-cause inpatient expenditures and episode-based inpatient surgery expenditures, in the intervention group compared with the control group from Q1 through Q3 for the FFS cohort. However, only some of the effects observed in Q1 were statistically significant, and the magnitudes of reductions were generally smaller in subsequent quarters. For example, Table 4-10 shows that we found an average reduction in total Medicare Part A and B expenditures of $100 per person in Q1 and $23 and $16 per person in Q2 and Q3, respectively, although the latter two estimates were not statistically significant. The reductions in total Medicare expenditures appear to be driven in part by reductions in inpatient expenditures and surgery-related expenditures. We found all-cause inpatient expenditure reductions of $73 per person in Q1, $18 per person in Q2, and $6 per person in Q3; however, only the effect observed in Q1 was statistically significant. We also found reductions in episode-based inpatient surgery expenditures of $77 per person in Q1, $14 per person in Q2, and $3 per person in Q3, although only the Q1 effect was statistically significant. We found PS cardiac surgery expenditure reductions of $19 per person in Q1, and $2 per person in Q2, but noticed an increase of $9 per person in Q3, although again only the Q1 effect was statistically significant. However, the intervention did not appear to reduce PS orthopedic inpatient surgery expenditures in any of the three quarters. Table 4-10 also shows mixed effects on total surgery expenditures, non-episode based inpatient surgery expenditures, and all-cause outpatient surgeries.

Expenditure data were unavailable for analysis for the MA cohort.

Appendix A includes definitions of the expenditure measures, and Table Appendix B-7 includes the expenditures for the FFS intervention and control groups in the pre- and post-enrollment periods from which these DiD estimates were calculated.

Table 4-10: Difference-in-Difference Estimates of Welvie's Effects on Expenditures, Medicare FFS Cohort

Measures (2012 USD per Person)	Q1			Q2			Q3		
	DiD Estimate	95% Confidence Interval		DiD Estimate	95% Confidence Interval		DiD Estimate	95% Confidence Interval	
		Lower	Upper		Lower	Upper		Lower	Upper
Total Medicare Parts A and B Expenditures	-$100*	-$198	-$2	-$23	-$119	$73	-$16	-$111	$78
Inpatient Expenditures	-$73*	-$132	-$14	-$18	-$76	$40	-$6	-$62	$50
Outpatient ER Expenditures	-$3	-$8	$3	-$2	-$7	$2	-$1	-$6	$5
Outpatient Non-ER Expenditures	$10	-$9	$30	$12	-$8	$31	-$1	-$21	$19
Carrier/PB Expenditures	-$18	-$39	$3	-$9	-$29	$12	-$6	-$26	$15

Measures (2012 USD per Person)	Q1			Q2			Q3		
	DiD Estimate	95% Confidence Interval		DiD Estimate	95% Confidence Interval		DiD Estimate	95% Confidence Interval	
		Lower	Upper		Lower	Upper		Lower	Upper
Skilled Nursing Facility Expenditures	-$21	-$52	$9	$3	-$26	$33	-$3	-$33	$27
Durable Medical Equipment Expenditures	$2	-$4	$8	$0	-$6	$6	$2	-$4	$7
Home Health Expenditures	$4	-$6	$14	$0	-$10	$9	$7	-$1	$16
Hospice Expenditures	-$1	-$19	$16	-$7	-$24	$10	-$8	-$25	$9
Total Medicare Parts A, B, and D Expenditures[a]	-$75	-$213	$63	$59	-$77	$195	$5	-$128	$138
Total Surgery Expenditures	-$51*	-$94	-$7	-$1	-$43	$40	$7	-$33	$47
Inpatient Surgery Expenditures	-$53*	-$94	-$11	-$7	-$46	$32	$8	-$30	$46
Episode-Based Inpatient Surgery Expenditures	-$77*	-$132	-$22	-$14	-$68	$40	-$3	-$55	$49
Outpatient Surgery Expenditures	$2	-$10	$13	$5	-$6	$17	-$1	-$13	$12
PS Orthopedic Surgery Expenditures[b]	$0	-$11	$11	$0	-$12	$12	$3	-$10	$16
Inpatient PS Orthopedic Surgery Expenditures	$0	-$11	$11	$0	-$12	$12	$4	-$9	$17
Outpatient PS Orthopedic Surgery Expenditures	$0	-$1	$1	$0	-$1	$1	-$1	-$2	$0
PS Cardiac Surgery Expenditures	-$19*	-$35	-$2	-$2	-$18	$15	$9	-$7	$24
Inpatient PS Cardiac Surgery Expenditures	-$17*	-$33	-$1	$0	-$17	$16	$10	-$5	$25
Outpatient PS Cardiac Surgery Expenditures	-$2	-$5	$1	-$1	-$4	$2	-$1	-$4	$3

Note: The difference-in-differences (DiD) estimate is the average per-person difference in expenditures occurring in the intervention as compared to control cohorts between the intervention period and the pre-intervention (baseline) period

[a]Denominator is subset to beneficiaries enrolled in Medicare Part D

*Statistically significant at the 5% level.

[b]PS = Preference Sensitive.

Program Effects for Decision Aid Users

As noted in Table 4-1, Welvie describes the subset of beneficiaries in its intervention group who select to use the surgery decision aid component of the program as its "high dose intervention group," and randomized comparison groups are not available for these users by design. We initially conducted DiD analysis on all Welvie beneficiaries who accessed the decision aid, but were unable to find a well matched comparison group for this group despite exhaustive efforts to include a large number of relevant Medicare data variables in the propensity

score matching model.[5] Welvie decision aids are designed for beneficiaries contemplating surgery, and Medicare data lack observable variables to define and match this population to non-participants despite our extensive investigation of medical diagnoses, surgeon visits, and pre-operative diagnostics.

In an effort to minimize selection bias, we also evaluated Welvie program effects on total medical expenditures and inpatient surgery expenditures for Medicare FFS beneficiaries in the Welvie high dose intervention group who completed some steps of the decision aid in comparison to those who simply accessed the decision aid. In other words, we conducted a DiD analysis in which beneficiaries who accessed the decision aid, but did not complete any of the six steps, served as a comparison group for those beneficiaries who completed some or all of the steps. Using this comparison group, we evaluated effects on three different intervention groups: (i) completers of any of the first three steps (Steps 1-3) that focus on obtaining the correct diagnosis and making treatment decisions, (ii) completers of any of the last three steps (Steps 4-6) that focus on surgery preparation and recovery, and (iii) completers of any of the six steps of the decision aid.

Table 4-11 and Table 4-12 show that, depending on the number of steps completed, use of the decision aid was associated with reduction in inpatient surgery expenditures ranging from $144 to $617 per person, as well as a reduction in total Medicare expenditures ranging from $157 to $435 in Q1; however, not all of these observed effects were statistically significant. Reductions associated with the use of Steps 4-6 of the decision aid were the largest in magnitude for both total Medicare and inpatient surgery expenditures. The reduction in inpatient surgery expenditures of $617 per person associated with the use of Steps 4-6 was also statistically significant. We do not include results for subsequent quarters due to small sample sizes of beneficiaries with currently available data over this period.

[5]Variables used in the propensity score matching model included age brackets, gender, disability and dual eligibility indicators, potential risk indicators for preference sensitive surgeries targeted by Welvie (knee diagnosis, hip diagnosis, back diagnosis, heart diagnosis, visit to any surgeon, visit to an orthopedic surgeon, evaluation and management visits, physical therapy claims, pre-operative service claims, coronary artery disease screening indicators, CT or MRI claims), pre-enrollment resource use levels and patterns (number of inpatient stays in the previous year and by quarter, average cost by quarter, days spent in a skilled nursing facility), and diagnosis categories using Healthcare Cost and Utilization Project (HCUP single-level Clinical Classifications Software (CCS) for ICD-9-CM, including osteoarthritis, rheumatoid arthritis, spondylosis/intervertebral dis disorder/other back problems, hypertension, congestive heart failure, heart valve disorders, etc.

Table 4-11: Difference-in-Differences Estimates of Welvie Decision Aid Effects on Inpatient Surgery Expenditures in Q1, FFS Cohort

Welvie Decision Aid Component	Number of Beneficiaries	Difference-in-Differences Estimate	95% Confidence Interval
Steps 1-3[a]	491	-$144	(-825, 536)
Steps 4-6[b]	635	-$617*	(-1128, -106)
Steps 1-6[c]	1,126	-$411	(-917, 95)

*Statistically significant at the 5% level.

[a]Includes completers of any of the first three steps that focus on obtaining the correct diagnosis and making treatment decisions

[b]Includes completers of any of the last three steps that focus on surgery preparation and recovery

[c]Includes completers of any of the six steps of the decision aid

Table 4-12: Difference-in-Differences Estimates of Welvie Decision Aid Effects on Total Medical Expenditures in Q1, FFS Cohort

Welvie Decision Aid Component	Number of Beneficiaries	Difference-in-Differences Estimate	95% Confidence Interval
Steps 1-3 [a]	491	-$157	(-1064, 750)
Steps 4-6 [b]	635	-$435	(-1171, 301)
Steps 1-6 [c]	1,126	-$314	(-1001, 373)

[a]Includes completers of any of the first three steps that focus on obtaining the correct diagnosis and making treatment decisions

[b]Includes completers of any of the last three steps that focus on surgery preparation and recovery

[c]Includes completers of any of the six steps of the decision aid

4.5 Workforce

This section summarizes findings on workforce issues related to the Welvie intervention, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee progress reports provided by the Lewin Group. Table 4-13 summarizes findings as of August 2014, unless otherwise noted.

Table 4-13: Welvie Workforce Research Questions and Findings

Research Questions	Findings
Did the innovation contribute in filling health care workforce gaps?	• The Welvie innovation is an alternative source of information about treatment options, pre- and post-surgical care, patient safety, and clinical guidelines. The intervention can support or fill gaps in patient education delivered by a physician, nurse, or other health care provider.
What type and level of workforce training does the innovation provide?	• Welvie staff participate in a one-week intensive training which includes a thorough review of the SDM program; health plan partner services and Medicare plans and programs; specifics of the CMS HCIA initiative; the special needs of the senior population; HIPAA and privacy; and reporting, budgeting, and analytic systems and processes. • Nurse Line Representatives are trained to administer the decision aid over the phone and to interview the beneficiaries requesting the paper decision aid to determine which condition-specific version of the decision aid should be mailed.
What type of support structure is available for staff?	• Welvie has developed scripts for their nurse staff to use when delivering the telephone version of the surgery decision aids. The scripts were developed because the nurse staff did not have experience delivering the intervention over the phone. • Welvie's Quality Committee reviews implementation challenges and develops action plans to address the issues.
What type of support structure is effective for staff deployment?	• Welvie leadership and implementation staff meet multiple times per week to provide support and address challenges.
How does the innovation affect staff satisfaction?	• Welvie does not formally measure staff satisfaction.
Has the innovation experienced high staff turnaround? If so, what measures have been taken to remedy the problem?	• Welvie has experienced minimal staff turnover, with one information technology (IT) specialist leaving the project since quarterly staff retention rates were first reported in September 2013.[a]
Did workforce changes made by the innovation improve patient outcomes and experience, or reduce expenditures and health service use?	• TBD

[a]Source: Email communication with Welvie, June 4, 2014

4.6 Context

This section summarizes findings on context issues related to the Welvie intervention, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee progress reports provided by the Lewin Group. Table 4-14 summarizes findings as of August 2014.

Table 4-14: Welvie Context Research Questions and Findings

Research Questions	Findings
What endogenous (e.g. organizational) and exogenous (policy and environmental) factors affect implementation?	• Welvie and its partner organizations, Anthem and Humana, had existing partnerships prior to the HCIA project, and they used existing mechanisms for data sharing and privacy and security, which facilitated HCIA project implementation. • Internet use is increasing among seniors, which may facilitate beneficiary utilization of the online decision aid.
How is the senior management structured, and how does it lead and communicate innovation changes to implementers?	• The Welvie Chief Operating Officer, Project Director, and Implementation Lead provide management and oversight to the HCIA implementation. • The Welvie leadership team has collaborated on similar implementation projects for 15+ years. • Implementation changes are communicated during staff meetings. • Welvie proposes changes in implementation plans to the leadership of partner organizations (Anthem and Humana) and seeks their approval before execution.
How does the innovation affect existing hospitals, medical practices, or other settings that provide health care to participants?	• As part of the Humana implementation in Texas, Welvie plans to: o implement computer kiosks in selected clinics, which will allow patients to use the online decision aid during a medical visit, and o provide educational materials to health care providers to increase their awareness of the Welvie program.
Are there unintended negative consequences of the innovation? If so, how can they be mitigated in similar models in the future?	• Welvie reported no negative unintended consequences of its innovation.
To what extent does the innovation duplicate practices or programs that are already existent?	• The Dartmouth and MedExpert HCIA shared decision making programs are also available in Texas.
How can successful innovation components be scaled and replicated in other settings?	• The workforce requirements for scaling are likely to be relatively minimal. • Welvie's decision aids are conducted using online, paper, and phone formats, and English and Spanish versions, all of which make the innovation scalable and able to be easily disseminated. • Outreach materials previously developed are likely to be relevant and applicable across many populations, facilitating more rapid expansion to new populations in the future.

4.7 Concluding Observations

Our preliminary program effective analysis found some promising evidence of the Welvie intervention's positive effects on Medicare beneficiaries in Ohio who were randomly

selected to be in the intervention group and received outreach and educational materials focused on preference-sensitive procedures and surgeries, although only a small portion of these beneficiaries actually accessed the six-step surgery decision aid. We found consistent improvements in a number of health outcomes and quality of care measures and consistent reductions in total Medicare expenditures and preference-sensitive cardiac surgery expenditures over the first nine months after program initiation for the Medicare FFS Ohio cohort. Our analysis on the randomized MA beneficiaries from Ohio, however, was conducted over a longer period (15 months) after program initiation and did not find sustained positive effects on most measures over this entire period. It is important to note that data on expenditures and a number of resource use and readmission measures were unavailable for analysis of the MA cohort. Acumen is working with Welvie to obtain a fuller set of MA claims data from Anthem BlueCross and BlueShield in Ohio for Welvie's Ohio MA population to conduct a richer set of analyses in subsequent reports.

Welvie has tested and identified a number of effective direct outreach strategies in its randomized intervention groups for encouraging Medicare beneficiaries to participate in its shared decision making program. Welvie has developed twenty versions of its outreach materials, and monitors the response rates to each version in order to optimize its outreach. Welvie reports that the following outreach strategies have been effective in engaging beneficiaries in the program and generating better response rates: 1) providing incentives; 2) mailing outreach materials followed by a telephone reminder; 3) mailing envelopes, as compared to postcards, with the CMS or Department of Health and Human Service logo; and 4) delivering outreach materials to beneficiaries on Monday, as compared to later in the week.

Although response rates to outreach have exceeded expectations, Welvie's reported participation rate (based on usage of the decision aid) was below its original projections by about 14% as of March 2014. Welvie was unable to reach participation goals after it lost access to CMS FFS data and as a result could not conduct outreach to a large percentage of its original intervention group. To improve its enrollment, Welvie sought to add Medicare Advantage partners to increase the size of its intervention group. In early 2014, Welvie partnered with Humana and began offering the intervention to Humana's Texas population in May. Since partnering with Humana, overall participation rates have improved, and Welvie appears to be on track to meet enrollment goals.

The Welvie intervention repurposes clinically-trained nurses to deliver the intervention by phone; however, there is not a significant need to develop this workforce because beneficiaries prefer to access the intervention online or in a paper booklet. The Welvie decision aid is available in variety of modes, with the online version being the most popular (preferred by 54.6 % of users), followed by paper booklet (45%), and then the phone version, which includes

support provided by a Welvie nurse (0.4 %). The popularity of both the paper and online versions of the intervention suggests that shared decision making programs should strive to offer high-tech versions of their interventions but also continue to offer them in low-tech formats to Medicare beneficiaries. The limited popularity of the nurse assisted phone version also suggests that the health care workforce requirements for scaling up program delivery to a national level could be minimal.

5 EVALUATION OF THE MEDEXPERT INTERNATIONAL HEALTH CARE INNOVATION AWARD

This section provides an overview of the evaluation findings for the MedExpert International ("MedExpert") award as of August 2014, unless noted otherwise. The qualitative findings are based on interviews with MedExpert project staff, a review of progress reports developed by the Lewin Group, and documentation provided by the awardee; the quantitative findings are based on analysis of program and Medicare data. Section 5.1 summarizes the evaluability of the awardee. Section 5.2 provides a detailed description of the innovation components, including target populations. Sections 5.3 through 5.6 present the findings for the evaluation categories of implementation effectiveness, program effectiveness, workforce issues, and context. Section 5.7 presents concluding observations on the MedExpert program.

5.1 Evaluability

Table 5-1 provides an overview of the primary factors affecting the evaluability of MedExpert, based on information available as of August 2014, unless otherwise noted. These factors are sample size, comparison group, data availability, and program maturity, which is defined by the program's stage of implementation and the extent to which it has changed since launch.

Table 5-1: MedExpert Evaluability Overview

Evaluability Factor	Status
Sample Size	• MedExpert provided data on 99,853 individuals enrolled since program inception through May 22, 2014.[a] o Payer mix: 49% Medicare FFS; 45% MA; 6% other/unknown.
Comparison Group	• MedExpert is unable to provide data on its randomized control group due to changes in data sharing agreements with CMS. o While MedExpert reports randomly assigning control groups, it had to purge CMS data on control group individuals when the data sharing arrangements changed in late 2013. • Acumen constructed a comparison group by selecting Medicare beneficiaries from the general beneficiary population who are matched to the MedExpert intervention group on important demographic and health characteristics observed in Medicare data. o Our evaluation is thus subject to limitations of a non-randomized study design, as well as the limitations of Medicare data, to capture predictive variables to create well matched comparison groups.
Data Availability	• Acumen used program data on intervention group beneficiaries provided by the awardee and linked these data to Medicare data files.
Program Maturity	• The core components of the MedExpert innovation are mature and have been relatively stable for the duration of the project.

[a]Source: MedExpert's program data sent on May 22, 2014 excluding duplicate records and beneficiaries who died prior to the intervention start date.

5.2 Innovation Components

The MedExpert shared decision-making innovation is a primarily phone-based intervention which provides Medicare beneficiaries with evidence-based health information on a wide range of medical conditions, physician advice, and assistance with understanding and interpreting treatment options. The program also offers care coordination support and assistance with interpreting and coordinating health insurance benefits. The program does not target any particular medical condition, and it serves Medicare beneficiaries of all ages. The program aims to improve quality of care, reduce costs, and increase the transparency of the treatment decision-making process by providing evidence-based and accurate information to patients.

MedExpert conducts outreach by mail and phone to encourage Medicare beneficiary participation in the program. MedExpert reports initially conducting outreach to a randomized intervention group of Medicare beneficiaries, drawn from Medicare data files provided by CMS.[6] As partnerships with United HealthCare and Segal Consulting matured, MedExpert began outreach to additional Medicare beneficiaries. Beneficiaries are mailed a welcome letter and a list of frequently asked questions that describe MedExpert's services and provide other information on the program. MedExpert staff follow up with phone calls to answer questions and encourage beneficiaries to participate in the program. Beneficiaries are invited to contact MedExpert by phone, fax, text, or email with questions about their care.

MedExpert employs physicians, who are responsible for providing patients with information on health outcomes and treatment options to help them make health care decisions. MedExpert's medical information coordinators (MIC) are responsible for fielding inquiries and working on behalf of patients under the direction of the staff physicians and also provide administrative support and patient advocacy services to beneficiaries.

The components of the MedExpert program are described in more detail below.

- **Quality Medical Management Systems (QMMS):** MedExpert physicians and MICs use the QMMS to provide evidence-based health information to beneficiaries. The QMMS is a system that incorporates clinical guidelines, medical research, and other evidence-based health information on 22,000 medications and conditions, including related comorbidities. The QMMS is intended to supplement physician and MIC expertise and is regularly updated to include current clinical information. The QMMS includes a robust analytics system that tracks each MedExpert encounter with a beneficiary. Encounters are defined as any action MedExpert has with or on behalf of a beneficiary.

[6] Source: Lewin Quarterly Awardee Progress Report, MedExpert (April- June 2014)

- **Patient Advocacy and Administrative Support:** MedExpert offers a range of additional administrative services, including, but not limited to, scheduling appointments with health care providers, and coordinating and interpreting health insurance benefits. These patient advocacy services are typically performed by MedExpert MICs.

Table 5-2 highlights the research questions and findings related to MedExpert innovation components.

Table 5-2: MedExpert Components Research Questions and Findings

Research Questions	Findings
How is the innovation designed to reduce expenditures or improve care quality?	• The MedExpert innovation is designed to improve quality of care and reduce expenditures by providing beneficiaries with up-to-date information on treatment options and clinical guidelines, which may help prevent unnecessary utilization of health services, including surgeries, emergency room visits, and outpatient care. • MedExpert's patient advocacy services may improve quality of care by helping beneficiaries obtain necessary services and by improving care coordination.
Who does the intervention target?	• MedExpert's innovation targets Medicare beneficiaries regardless of medical condition. • The MedExpert intervention group includes, but is not limited to, CMS priority populations such as racial or ethnic minorities, low-socioeconomic status populations, and populations with specific conditions (e.g., congestive heart failure). • MedExpert targets individual beneficiaries, as opposed to organizations.
What are the key components of the innovation?	• MedExpert's staff of Medical Information Coordinators (MICs) and physicians use the Quality Medical Management System (QMMS), an information-harvesting and report-generating system that incorporates clinical guidelines, medical research, and other evidence-based health information, to provide evidence-based information on around 22,000 medical conditions to beneficiaries. • MedExpert also offers a range of patient advocacy and administrative services, such as transferring medical records, scheduling appointments, coordinating health insurance benefits, and other services. • MedExpert consults with world experts on complex cases that require additional professional judgment. • Beneficiaries can engage with MedExpert by phone, fax, text message, or email, with phone being the most frequently used method.
To what extent is the innovation viewed as a relatively simple "plug in" or a fundamental and major change within the implementing organization?	• The MedExpert innovation is a "plug in" program that does not require significant change on the part of the health care delivery system.

5.3 Implementation Effectiveness

This section summarizes findings on MedExpert's implementation effectiveness, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee progress reports provided by the Lewin Group. Table 5-3 summarizes findings as of August 2014, unless otherwise noted.

Table 5-3: MedExpert Implementation Effectiveness Research Questions and Findings

Research Questions	Findings
Was the intervention delivered as intended to the target population in doses associated with effectiveness?	• Cumulative participation in the MedExpert program through March 2014 is consistent with original expectations.[a] For reporting purposes, participation is defined as a telephone conversation between a beneficiary and a MedExpert physician wherein at least one medical condition is discussed. • MedExpert defines the minimally effective dose of the intervention as at least one conversation on any topic with a MedExpert MIC or physician (Awardee was not able to provide the number of individuals who received the minimally effective dose in time for inclusion in this report).[b]
What were key successes in implementing the innovation as designed and factors associated with success?	• MedExpert reports that its direct outreach has been successful and it attributes this success to a natural-sounding, low-pressure approach during phone-based outreach and beneficiaries' ability to verify MedExpert as a legitimate Medicare service provider.
What were the challenges in implementing the innovation as designed?	• MedExpert is unable to provide data on its comparison groups for analysis or use claims data to identify additional Medicare FFS beneficiaries for outreach because of changes in its data sharing arrangement with CMS in late 2013. ○ MedExpert is seeking Institutional Review Board (IRB) approval to regain access to Medicare FFS data. MedExpert has experienced significant delays in the IRB process. • The implementation partnership between MedExpert and United HealthCare (UHC) experienced significant implementation delays due to a lengthy legal agreement process and operational issues. • The planned partnership between MedExpert and the University of California- Los Angeles (UCLA) could not overcome bureaucratic challenges, and the partnership ended in late 2013.
What changes were made to the innovation to increase enrollment, improve care, or reduce expenditures?	• MedExpert added a direct outreach and new implementation partner, Segal Consulting, to increase program enrollment and make up for challenges in the UCLA and UHC partnerships. • MedExpert upgraded to a new call routing system, which has many benefits, including (i) increasing capacity from 30,000 to 3 million calls per day, (ii) automating some verification steps, and (iii) directly routing patients to the MedExpert staff they engaged with earlier. • Improvements to the QMMS onscreen display make it easier for staff to find and use information about beneficiaries.
Did the innovation use internal evaluation findings to inform the implementation process, when necessary?	• MedExpert demonstrated the feasibility of direct outreach to beneficiaries by testing its outreach methods and materials in phases with three sample populations of 200, 2,000, and 10,000 beneficiaries. • MedExpert is monitoring call times and sharing best practices about time management to increase efficiency. • MedExpert has started to codify information in the call notes to improve tracking of all services provided to beneficiaries and plans to use the codified data for future analyses of program benefits.

[a]Source: Lewin Quarterly Awardee Progress Report, MedExpert (January- March 2014)

[b]Source: Qualitative Interview with MedExpert staff, July 17, 2014.

5.4 Program Effectiveness

Acumen estimated MedExpert program effects on health outcomes, quality of care, resource use, and medical expenditures for Medicare FFS and MA beneficiaries in Southern California who enrolled in the MedExpert intervention on or prior to November 30, 2013, using Medicare claims data through February 28, 2014. MedExpert reports creating a random sample of Medicare beneficiaries reflective of the age, sex, and Medicare cost distribution of the general Medicare population and assigning these beneficiaries to either the intervention group to whom MedExpert offers its services or a control group.[7] MedExpert provided data to Acumen on Medicare beneficiaries in its intervention group but was unable to provide identifiers of beneficiaries in its control group due to changes in its data sharing arrangements with CMS. Acumen thus created a comparison group of beneficiaries drawn from Medicare data files and matched them to intervention groups beneficiaries based on propensity scores that captured important predictive demographic and health characteristics observed in claims data, including age, race, dual eligibility, disability, levels and patterns of health service use and medical expenditures, and diagnostic indicators for important medical conditions in the year prior to enrollment. Our intention-to-treat (ITT) analysis used a difference-in-differences (DiD) estimation method to calculate the effects of the program on resource use and medical expenditures in the intervention group as compared to this matched comparison group. To assess program effects on health outcomes and quality of care, we measured differences in mortality and readmissions between the intervention and control groups in the intervention period itself, instead of conducting DiD analyses on changes in these outcomes. Because beneficiaries entered into the intervention on a rolling basis since program launch, we used each beneficiary's enrollment date as a reference for defining the pre- and post-enrollment period for the DiD estimates.

Table Appendix C-1 and Table Appendix C-2 show that the intervention and comparison groups in the analysis were well matched on demographic and health characteristics, as well as pre-enrollment resource use and expenditure variables observable in Medicare claims data for the FFS and MA cohorts, respectively. However, given the non-randomized design of this analysis and limitations of using Medicare data to match comparison groups, we cannot rule out the influence of unobserved baseline differences and differential trends in unobserved characteristics between the two groups in our results. We are thus limited in our ability to draw conclusions from the analysis presented in this report, and we plan on continuing to refine our comparison group matching criteria in future reports.

[7] Source: Lewin Quarterly Awardee Progress Report, MedExpert (January- March 2014)

After applying study inclusion restrictions (e.g., continuous Medicare enrollment requirement) described in Section 1.2.2 on beneficiaries in Southern California who joined the MedExpert program on or prior to February 28, 2014, the FFS cohort consisted of 29,456 intervention group beneficiaries and 208,311 matched controls, while the MA cohort consisted of 35,872 intervention group beneficiaries and 234,283 matched controls.

Table 5-4 summarizes our key findings, while Sections 5.4.1, 5.4.2, and 5.4.3 provide detailed results for health outcomes and quality of care, resource use, and medical expenditures, respectively. Results are reported in a non-cumulative basis by quarter after program enrollment.

Table 5-4: MedExpert Program Effectiveness Research Questions and Findings

Key Research Questions	Findings[a]
What are the effects of the innovation on participants' health outcomes?	• We found mixed effects on mortality in the first three quarters after program enrollment (Q1 through Q3) for both the Medicare FFS and MA cohorts; however none of the observed effects were statistically significant.
What is the impact of the innovation on quality of care?	• We found consistent reductions in unplanned readmissions following inpatient admissions in the Medicare FFS cohort but not in the MA cohort. o For every 1,000 beneficiaries with an inpatient admission, the intervention group had, on average, 2 fewer 30-day hospital unplanned readmissions in Q1, 40 fewer readmissions in Q2, and 16 fewer readmissions in Q3 compared with controls; however, only the effect observed for Q2 was statistically significant.
What are effects of the innovation on health care resource use (service utilization)?	• Inpatient admissions were consistently reduced from Q1 through Q3 for both the FFS and MA cohorts; however, these effects were not statistically significant for either cohort. o For every 1,000 FFS beneficiaries, we found an average reduction of about 2 inpatient admissions in Q1, 8 inpatient admissions in Q2, and less than 1 inpatient admission in Q3. o In the MA cohort, inpatient admissions were reduced, on average, by about 1 to 6 admissions per 1,000 beneficiaries from Q1 through Q3. • We found mixed effects on ER visits from Q1 through Q3 for the FFS cohort, although only the effect observed in Q1 was statistically significant. o For every 1,000 FFS beneficiaries, we found an average reduction of 8 ER visits in Q1, an increase of less than 1 ER visit in Q2, and again a reduction of about 5 ER visits in Q3. • ER data were unavailable for analysis on the MA cohort.
What are the effects of the intervention on health care expenditures?	• For the FFS cohort, we found mixed effects on total Medicare expenditures and most categories of expenditures from Q1 through Q3. However, non-ER outpatient expenditures were consistently increased, while hospice expenditures were consistently reduced in the intervention group compared with controls over this period. None of these observed effects were statistically significant. o Average total Medicare Part A and B expenditures per beneficiary increased by $35 in Q1, decreased by $28 in Q2, and increased again by $32 in Q3 in the intervention group compared with controls. o Non-ER outpatient expenditures increased by $9 to $19 per beneficiary from Q1 through Q3. o We found consistent reductions in hospice expenditures (of $5 to $45 per beneficiary) over this period. • Expenditure data were unavailable for analysis for the MA cohort.

Key Research Questions	Findings[a]
If the innovation has positive effects with respect to health, cost, resource use, or care quality, how long are these changes sustained?	• As noted above, we found sustained positive effects on a few quality of care and resource use measures (unplanned readmissions and inpatient admissions), and sustained reduction in one of the expenditure categories (hospice) for at least the first nine months after program enrollment (Q1 through Q3) for the FFS cohort. However, observed effects were not statistically significant in most cases. Upcoming reports will include analysis for subsequent quarters, and provide a better assessment of the long-term sustainability of these effects. • For the MA cohort, we only found sustained reductions in the resource use measure of inpatient admissions in the first 9 months after program enrollment, although none of these effects were statistically significant. We will be including analysis on additional quarters in upcoming reports to assess longer term effects.
If the innovation has positive effects, which innovation components are driving the change?	• TBD
Does the innovation reduce disparities in care quality or health service utilization by race, ethnicity, gender, age or geographical location that are not attributable to differences in health status?	• TBD
Do program effects on utilization or expenditures differ by subpopulation (e.g., priority populations, complex care patients, dual-eligibles)?	• TBD

[a]Given the non-randomized nature of this analysis and limitations of using Medicare data to match comparison groups, we cannot rule out the influence of unobserved baseline differences and differential trends in our findings.

5.4.1 Health Outcomes and Quality of Care

We found mixed effects of MedExpert program enrollment on mortality rates in the first three quarters after program enrollment for both the Medicare FFS and MA cohorts, although none of the observed effects were statistically significant. For example, Table 5-5 shows that mortality per 1,000 beneficiaries in the intervention group was higher in Q1, but lower in Q2 and Q3, compared with controls for the FFS cohort. Mortality differences between intervention and controls groups ranged from less than 1 death per 1,000 beneficiaries to about 3 deaths per 1,000 beneficiaries on average.

Table 5-5: Difference in Mortality per 1,000 Beneficiaries after MedExpert Enrollment, Medicare FFS and MA Cohorts

Medicare Cohort	Q1			Q2			Q3		
	Difference[a]	95% Confidence Interval		Difference	95% Confidence Interval		Difference	95% Confidence Interval	
		Lower	Upper		Lower	Upper		Lower	Upper
FFS	0.1	-1.8	1.9	-0.5	-3.0	2.0	-2.8	-7.6	2.0
MA	1.1	-0.5	2.7	-0.2	-2.4	2.0	2.0	-2.6	6.5

[a]The "difference" estimate represents the difference in the number of deaths per 1,000 beneficiaries between the intervention group and control group in the relevant quarter of the intervention period. There were no deaths in the intervention or control groups prior to program enrollment as beneficiaries were required to be alive on program start date to be included in the study.

We found consistently lower unplanned hospital readmissions in the intervention group compared with controls and mixed effects on all-cause hospital readmissions from Q1 through Q3 for the Medicare FFS cohort; however, only some of these effects were statistically significant. Table 5-6 shows that for every 1,000 beneficiaries with an inpatient admission, 30-day hospital unplanned readmissions were lower in the intervention group compared with controls, on average, by 2 readmissions in Q1, 40 readmissions in Q2, and 16 readmissions in Q3; however, only the effect observed for Q2 was statistically significant.

We found mixed effects on both unplanned and all-cause hospital readmissions for the MA cohort from Q1 through Q3, although none these effects were statistically significant. For the MA cohort, Table 5-7 shows that that for every 1,000 MA beneficiaries with an inpatient admission, 30-day hospital unplanned readmissions in the intervention group were lower, on average, by about 5 readmissions in Q1, higher by about 7 readmissions in Q2, and again lower by about 28 readmissions in Q3 compared with controls.

Appendix A includes definitions of the mortality rate and readmission rate measures, and Table Appendix C-3 and Table Appendix C-4 in Appendix C contain the mortality and readmission rates in the intervention period for the intervention group and controls from which these differences were calculated for the FFS and MA cohorts, respectively.

Table 5-6: Difference in Readmissions per 1,000 Admissions after MedExpert Enrollment, Medicare FFS Cohort

Measures	Q1			Q2			Q3		
	Difference[a]	95% Confidence Interval		Difference	95% Confidence Interval		Difference	95% Confidence Interval	
		Lower	Upper		Lower	Upper		Lower	Upper
30-Day Hospital Readmissions	3.4	-22.1	29.0	-34.9*	-67.9	-1.9	16.4	-50.5	83.2
30-Day Hospital Unplanned Readmissions	-1.9	-26.1	22.3	-39.6*	-70.5	-8.7	-16.3	-78.2	45.7

*Statistically significant at the 5% level

[a]The "difference" estimate represents the average difference in the number of beneficiaries with at least one readmission for every 1,000 beneficiaries who have at least one inpatient admission, as compared between the intervention and control groups during the relevant quarter in the intervention period.

Table 5-7: Difference in Readmissions per 1,000 Beneficiaries after MedExpert Enrollment, Medicare Advantage Cohort

Measures	Q1			Q2			Q3		
	Difference[a]	95% Confidence Interval		Difference	95% Confidence Interval		Difference	95% Confidence Interval	
		Lower	Upper		Lower	Upper		Lower	Upper
30-Day Hospital Readmissions	-6.4	-31.9	19.1	2.5	-30.4	35.5	-31.7	-96.7	33.2
30-Day Hospital Unplanned Readmissions	-5.4	-30.2	19.4	6.6	-25.5	38.6	-27.8	-91.3	35.7

[a]The "difference" estimate shown is the average difference in the number of beneficiaries with at least one readmission per 1,000 beneficiaries with at least one inpatient admission, as compared between the intervention and control groups in the intervention period itself.

5.4.2 Health Service Resource Use

We found consistent reductions in inpatient admissions, and mixed effects on ER visits and hospital days for the Medicare FFS cohort from Q1 through Q3, although only some of the observed effects were statistically significant. For example, Table 5-8 shows that for every 1,000 beneficiaries, we found an average reduction of about 2 inpatient admissions in Q1, 8 inpatient admissions in Q2, and less than 1 inpatient admission in Q3 in the intervention group compared with controls; however, none of these effects were statistically significant. For every 1,000 FFS beneficiaries, we also found an average reduction of 8 ER visits in Q1, an average increase of less than 1 ER visits in Q2, and an average reduction of about 5 ER visits in Q3; however, only the effect observed in Q1 was statistically significant.

For the MA cohort, we found consistent reductions in inpatient admissions and mixed effects on hospital days from Q1 through Q3; however, none of these observed effects were statistically significant. As Table 5-9 shows, for every 1,000 beneficiaries, we found an average reduction of about 1 inpatient admission in Q1, about 6 inpatient admissions in Q2, and about 5 inpatient admissions in Q3; although none of these observed effects were statistically significant. ER visit data for the MA cohort are unavailable for analysis.

Appendix A includes definitions of the health service use measures, while Table Appendix C-5 and Table Appendix C-6 in Appendix C contain the health service use in the pre- and post-enrollment period for the intervention group and controls from which these DiD estimates were calculated for the FFS and MA cohorts, respectively.

Table 5-8: Difference-in-Difference Estimates of MedExpert's Effects on Resource Use, Medicare FFS Cohort

Measures (Number of Events per 1,000 Beneficiaries)	Q1			Q2			Q3		
	DiD Estimate	95% Confidence Interval		DiD Estimate	95% Confidence Interval		DiD Estimate	95% Confidence Interval	
		Lower	Upper		Lower	Upper		Lower	Upper
ER Visits	-8.0*	-14.9	-1.1	0.5	-8.5	9.5	-4.8	-22.1	12.6
Inpatient Admissions	-1.7	-8.8	5.3	-7.8	-16.6	0.9	-0.5	-18.0	17.1
Unplanned Inpatient Admissions	-1.5	-7.9	5.0	-9.2*	-17.2	-1.1	-5.2	-21.3	10.9
Hospital Days	19.6	-41.9	81.2	-22.8	-100.7	55.2	22.4	-124.4	169.2

Note: The difference-in-differences (DiD) estimate is the average difference in the number of outcome events per 1,000 beneficiaries occurring in the intervention as compared to control cohorts between the intervention period and the pre-intervention (baseline) period

*Statistically significant at the 5% level

Table 5-9: Difference-in-Difference Estimates of MedExpert's Effects on Resource Use, MA Cohort

Measures (Number of Events per 1,000 Beneficiaries)	Q1			Q2			Q3		
	DiD Estimate	95% Confidence Interval		DiD Estimate	95% Confidence Interval		DiD Estimate	95% Confidence Interval	
		Lower	Upper		Lower	Upper		Lower	Upper
Inpatient Admissions	-0.8	-5.4	3.8	-5.6	-11.9	0.6	-5.1	-17.0	6.8
Unplanned Inpatient Admissions	-1.1	-5.4	3.2	-4.9	-10.8	0.9	-4.2	-15.3	6.9
Hospital Days	8.7	-18.1	35.4	-21.7	-61.7	18.3	-72.0	-145.5	1.6

Note: The difference-in-differences (DiD) estimate is the average difference in the number of outcome events per 1,000 beneficiaries occurring in the intervention as compared to control cohorts between the intervention period and the pre-intervention (baseline) period

5.4.3 Medical Expenditures

We found mixed effects of the MedExpert intervention on total Medicare expenditures, as well as most categorical Medicare expenditures, in the first three quarters after program enrollment for the FFS cohort. However, none of these observed effects were statistically significant. For example, Table 5-10 shows that total Medicare Part A and B expenditures increased by $35 per beneficiary in Q1, decreased by $28 per beneficiary in Q2, and again increased by $32 per beneficiary in Q3 for the intervention group compared with controls, although none of the effects were statistically significant. We also found consistent increases in outpatient non-ER expenditures, ranging from $9 to $19 per beneficiary, and consistent

reductions in hospice expenditures, ranging from $5 to $45 per beneficiary, in Q1 through Q3; however, none of these effects were statistically significant.

For the MA cohort, expenditure data were unavailable for analysis.

Appendix A includes definitions of the expenditure measures, and Table Appendix C-7 in Appendix C contains expenditures in the pre- and post-enrollment period for the FFS intervention group and controls from which these DiD estimates were calculated.

Table 5-10: Difference-in-Difference Estimates of MedExpert's Effects on Expenditures, Medicare FFS Cohort

Measures (2012 USD per Beneficiary)	Q1			Q2			Q3		
	DiD Estimate	95% Confidence Interval		DiD Estimate	95% Confidence Interval		DiD Estimate	95% Confidence Interval	
		Lower	Upper		Lower	Upper		Lower	Upper
Total Medicare Parts A and B Expenditures	$35	-$125	$195	-$28	-$238	$183	$32	-$374	$439
Inpatient Expenditures	$6	-$97	$109	-$80	-$216	$56	$54	-$200	$308
Outpatient ER Expenditures	-$6	-$12	$0	$3	-$6	$13	$3	-$18	$23
Outpatient Non-ER Expenditures	$9	-$23	$40	$19	-$26	$63	$10	-$73	$93
Carrier/PB Expenditures	$16	-$27	$60	$24	-$35	$82	-$4	-$144	$135
SNF Expenditures	$26	-$15	$67	$5	-$48	$57	$2	-$100	$105
Durable Medical Equipment Expenditures	$3	-$7	$13	$4	-$9	$17	$6	-$23	$35
Home Health Expenditures	-$8	-$26	$9	$4	-$19	$26	$5	-$41	$52
Hospice Expenditures	-$10	-$30	$10	-$5	-$32	$21	-$45	-$94	$4
Total Medicare Parts A, B, and D Expenditures[a]	$33	-$198	$265	-$98	-$402	$206	$88	-$498	$674

Note: The difference-in-differences (DiD) estimate is the average per-person difference in expenditures occurring in the intervention as compared to control cohorts between the intervention period and the pre-intervention (baseline) period

[a]Denominator is subset to beneficiaries enrolled in Medicare Part D

5.5 Workforce

This section summarizes findings on workforce issues related to the MedExpert intervention, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee progress reports provided by the Lewin Group. Table 5-11 summarizes findings as of August 2014, unless otherwise noted.

Table 5-11: MedExpert Workforce Research Questions and Findings

Research Questions	Findings
Did the innovation contribute in filling health care workforce gaps?	• The MedExpert innovation is an alternative source of information about treatment options, patient safety, and clinical guidelines that can support or fill gaps in patient education delivered by a physician, nurse, or other health care provider.
What type and level of workforce training does the innovation provide?	• All MedExpert staff receive training on Health Insurance Portability and Accountability Act (HIPAA) regulations and receive guidance on how to assist beneficiaries on sensitive health topics, such as mental and behavioral health issues. • New staff observe experienced staff and field calls with direct supervision before they begin to field calls independently. o New staff work reduced hours (i.e., 4-5 hours per day) during the 1-2 week training period.
What type of support structure is available for staff?	• MedExpert leadership and implementation staff meet regularly to provide support and address challenges. • MedExpert staff share key phrases that are successful and easy to understand as opposed to terminology that does not resonate with patients. • MedExpert leadership and implementation staff meet regularly to provide support and address challenges.
What type of support structure is effective for staff deployment?	• TBD
How does the innovation affect staff satisfaction?	• MedExpert does not formally measure staff satisfaction.
Has the innovation experienced high staff turnaround? If so, what measures have been taken to remedy the problem?	• MedExpert's quarterly staff retention rate has ranged from 81.4% to 95.6%, with retention rates above 90% for November 2013 to March 2014.[a] • MedExpert reported high staff turnover among MICs with health insurance customer service experience, but the program has had recent success hiring and retaining MICs with nursing experience.
Did workforce changes made by the innovation improve patient outcomes and experience, or reduce expenditures and health service use?	• TBD

[a]Source: Lewin Quarterly Awardee Progress Reports, MedExpert International (July 2013 - March 2014)

5.6 Context

This section summarizes findings on context issues related to the MedExpert intervention, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee progress reports provided by the Lewin Group. Table 5-12 summarizes findings as of August 2014.

Table 5-12: MedExpert Context Research Questions and Findings

Research Questions	Findings
What endogenous (e.g. organizational) and exogenous (policy and environmental) factors affect implementation?	• MedExpert reported that environmental factors have not had a significant impact on implementation.
How is the senior management structured, and how does it lead and communicate innovation changes to implementers?	• The senior management team is led by the project director who has over 14 years of experience leading similar projects, and was closely involved in the development of the software used in the innovation. • Implementation changes are communicated during staff meetings. • MedExpert communicates proposed innovation changes to UHC leadership for approval before front-line managers execute them. • Segal Consulting reviews and approves implementation plans provided by MedExpert as needed. ○ Segal Consulting provides data to MedExpert, but otherwise is not closely involved in the development or execution of implementation plans.
How does the innovation affect existing hospitals, medical practices, or other settings that provide health care to participants?	• MedExpert staff may directly contact a beneficiary's treating physician to share information discussed between the beneficiary and MedExpert staff upon beneficiary's request. • MICs contact medical practices and other community services as part of MedExpert's patient advocacy services (e.g., appointment scheduling, medical records transfer).
Are there unintended negative consequences of the innovation? If so, how can they be mitigated in similar models in the future?	• MedExpert did not report any negative unintended consequences resulting from its innovation.
To what extent does the innovation duplicate practices or programs that are already existent?	• The Dartmouth and Welvie HCIA innovations are also available in Texas but focus on providing shared decision making support for a relatively limited set of medical conditions and/or surgical procedures. • MedExpert considers the care coordination services provided by UHC in partnership with OptumHealth Care Solutions to be a direct competitor in the Spokane, WA region.
How can successful innovation components be scaled and replicated in other settings?	• MedExpert's approach of leveraging its QMMS for up-to-date medical information on a variety of topics can likely be scaled up to serve a population with a wide range of medical conditions. • MedExpert has interpreter services available in 19 languages, which may facilitate further program expansion. • MedExpert's new phone system shows promise for handling increased call volumes from additional partners and populations. • Existing outreach mailings can potentially be used with additional recruitment partners to reach new groups of enrollees. • MedExpert's staffing model, which requires additional MICs and physicians to serve more beneficiaries, may be challenging to scale to the national level.

5.7 Concluding Observations

Our preliminary program effectiveness analysis found some promising indications of the MedExpert intervention's positive effects on Medicare beneficiaries in Southern California, although we are limited in our ability to draw conclusions based on non-randomized comparison groups. We found consistent but statistically non-significant reductions in inpatient admissions for the FFS and MA cohorts in the 9 months after program enrollment, but this did not always translate to reductions in Medicare expenditures. We also found consistent reductions in unplanned readmissions for the FFS cohort in the first 9 months, which while not always statistically significant, suggest that the program could be associated with positive quality of care outcomes. However, our findings are subject to limitations of a non-randomized study design and use of Medicare data to match comparison groups. We are thus limited in our ability to draw conclusions from the analysis presented in this report, and we plan on continuing to refine our comparison group matching criteria in future reports. It is also important to note that data on expenditures and on a number of resource use measures were unavailable for analysis of the MA cohort. Acumen will explore additional MA data sources to conduct a richer set of analyses on the MA cohort in subsequent reports.

MedExpert's shared decision making program does not target any particular medical condition and seeks to serve Medicare beneficiaries of all ages. As a result, the program is able to serve a wide variety of Medicare patients, including complex patients with multiple comorbidities. MedExpert reaches out to beneficiaries by mail and phone to encourage participation in the program, and it is also one of the few HCIA awardees that reports meeting its participation targets.[8] MedExpert leaders attribute the success of their direct outreach to the program's natural-sounding, low-pressure approach during phone-based outreach and to beneficiaries' ability to verify MedExpert as a legitimate Medicare service provider.

MedExpert has faced some workforce challenges and has worked to stabilize its staffing model. Throughout 2013, MedExpert experienced frequent turnover among MICs. The program's staffing model may be challenging to scale on a national level to the extent that additional staff physicians and MICs will need to be hired and retained to serve an increased number of participants. The stability of MedExpert's MIC workforce in particular appears dependent on local economic conditions, which may change over time. The program originally sought to hire as MICs individuals with experience in health insurance customer service, but later revised the position's qualifications to include individuals with nursing training and experience. Program officials report that this change has had positive results in hiring and retaining recent nursing school graduates.

[8] Source: Lewin Quarterly Awardee Progress Report, MedExpert (January- March 2014)

6 EVALUATION OF THE TRUSTEES OF DARTMOUTH COLLEGE HEALTH CARE INNOVATION AWARD

This section provides an overview of the evaluation findings for the Trustees of Dartmouth College ("Dartmouth") award as of August 2014, unless otherwise noted. The findings are based on interviews with Dartmouth project staff, a review of progress reports developed by the Lewin Group, and documentation provided by the awardee. Section 6.1 summarizes the evaluability of the awardee, and Section 6.2 provides a detailed description of the innovation components, including targeted populations. Sections 6.3 through 6.5 present, respectively, the findings on implementation effectiveness, workforce issues, and context. Section 6.6 provides concluding observations. At the time this report was written, Acumen did not have sufficient data on Dartmouth participants and comparison groups for a credible analysis of program effectiveness.

6.1 Evaluability

Table 6-1 provides an overview of the primary factors affecting the evaluability of Dartmouth, based on information available as of August 2014, unless otherwise noted. These factors are sample size, comparison group, data availability, and program maturity, which is defined by the program's stage of implementation and the extent to which it has changed since launch.

Table 6-1: Dartmouth Evaluability Overview

Evaluability Factor	Findings
Sample Size	• In March 2014, Dartmouth reported a cumulative enrollment of 5,364 participants. Dartmouth data show approximately 40% of these enrollees were over age 65.[a]
Comparison Group	• Dartmouth has not provided data on comparison groups. However, it plans on establishing control groups using CMS claims data and comparing these groups to outcomes at sites in member hospital referral regions.
Data Availability	• Acumen received data on some program participants from Dartmouth on August 15, 2014.
Program Maturity	• The maturity of the Dartmouth program varies across its 15 sites; some sites, such as Eastern Maine, have completed full implementation of the innovation components in the second year of the program.

[a]Source: Lewin Quarterly Awardee Progress Report, Dartmouth (January-March 2014)

6.2 Innovation Components

The Dartmouth Institute and its partners in the High Value Healthcare Collaborative (HVHC) are implementing patient engagement and shared decision making across 15 HVHC member organizations to reduce unwarranted variations in the use of discretionary surgery and to help patients manage chronic illnesses. With the HCIA funding, Dartmouth offers condition-specific decision aids to patients; provides implementation tools and resources to HVHC member

organizations; and provides resources to hire and train health coaches, who guide patients through the decisions and support the implementation of patient engagement processes. Dartmouth hosts webinars, teleconferences, and online discussion boards to encourage collaboration among HVHC members and Health Coaches and to accelerate the sharing of best practices across implementation sites.

The Dartmouth patient engagement program is available to Medicare fee-for service (FFS), Medicaid, and dual eligible patients at the HVHC member organizations who are considering preference-sensitive hip, knee, or spine surgery. It is also available to patients diagnosed with diabetes or congestive heart failure (CHF). Each condition-specific care model in the program provides patients with an evidence-based decision aid describing the condition and treatment options. Patients meet with a health coach to discuss the decision aid and treatment options. Patients also complete a survey about their health status, treatment decisions, and Dartmouth's SDM program. Some HVHC organizations use a health IT tool, referred to as the Survey Administration Tool (SAT), to deliver portions of the intervention. Analysis of intervention data is supported by the HVHC Data Trust.

Details about the role of health coaches, decision aids, patient surveys, and data trust are provided below.

- **Health Coaches.** The health coach is responsible for guiding patients and families in the Dartmouth program's shared decision making models and providing support for one-time surgical decision making, ongoing lifestyle decision making, and/or chronic disease management. Health coaches use the Ottawa Personal Decision Guide framework to help patients explore their treatment options, understand their values and treatment goals, and plan for their next steps in the decision making process. Health coaches are also responsible for ensuring that participating patients complete the intervention, including the patient survey.
- **Decision Aids.** Dartmouth is using a variety of condition-specific decision aids in the innovation. Decision aids provide evidence-based information on the condition, possible causes of the condition, and treatment options. Decision aids are available via the SAT or in paper booklet form with an accompanying DVD.
- **Patient Surveys.** The Dartmouth patient survey is used to assess the following domains and outcomes: 1) decision quality 2) medical history; 3) general quality of life; 4) depression; 5) condition-specific quality of life; (6) patient characteristics and demographics; and 7) patient experience. Surveys are administered at baseline and at 3 months, 6 months, 1 year, and 2 years post-intervention.
- **HVHC Data Trust:** The Data Trust is an informatics infrastructure to process, standardize, and merge incoming EHR and administrative data from HVHC members and claims data from CMS. Currently under development, the Data Trust is intended to support HVHC analytics and allow members to view site-specific and aggregate reports.

Table 6-2 highlights the research questions and findings related to Dartmouth innovation components.

Table 6-2: Dartmouth Components Research Questions and Findings

Research Questions	Findings
How is the innovation designed to reduce expenditures or improve care quality?	• The Dartmouth innovation aims to: (i) improve preference sensitive surgery decision making, which may reduce rates of inappropriate surgeries, and (ii) improve chronic disease management, which could reduce disease exacerbations/complications, thus lowering ER and hospital service use.
Who does the intervention target?	• The intervention targets organizations and individuals—that is, both the care delivery at the 15 HVHC health care systems as well as beneficiaries in Medicare FFS, MA, or dual eligible beneficiaries who are candidates for preference-sensitive hip replacement, knee replacement, or spine surgery and patients with congestive heart failure (CHF) or diabetes.

What are the key components of the innovation?	• The Dartmouth innovation consists of the following patient engagement and SDM components:
	  ○ Hip and knee interventions for patients considering joint replacement surgery, including optional components, such as pre-operative clinics that provide risk assessment and patient education prior to surgery, education about post-discharge self-care, and length of stay expectation management.
	  ○ An intervention for patients considering spine surgery.
	  ○ Interventions for patients with diabetes, including complex patient management, remote management, and collaborative care for patients with diabetes and depression.
	  ○ An intervention for patients considering implantable cardio-defibrillator (ICD) surgery or chronic disease management of CHF.
	• Participants in the Dartmouth patient engagement and SDM innovation review decision aids that describe the evidence-based risks and benefits of various treatment options (Hip, Knee, Spine) and decision aids that describe health behaviors for living with chronic disease (congestive heart failure and diabetes). Decision aids are available in video or paper form or online via the Survey Administration Tool (SAT).
	• A health coach meets with the patient to explain treatment options, discuss the patient's personal values and certainty about the treatment decision, and help plan next steps.
	• The Dartmouth program management office (PMO) provides implementation guidance, analytics expertise, and administrative support to implementing organizations. It provides the guidance via online collaborative workspaces, webinars, and teleconferences.

To what extent is the innovation viewed as a relatively simple "plug in" or a fundamental and major change within the implementing organization?	• Dartmouth requires implementing organizations to enact major changes in the workflow and culture of care teams, make enhancements to the local informatics infrastructure, and agree to ongoing resource commitments.

6.3 Implementation Effectiveness

This section summarizes findings on Dartmouth's implementation effectiveness, based on qualitative information obtained from interviews with awardees and other stakeholders and

awardee progress reports provided by the Lewin Group. Table 6-3 summarizes findings as of August 2014.

Table 6-3: Dartmouth Implementation Effectiveness Research Questions and Findings

Research Questions	Findings
Was the intervention delivered as intended to the target population in doses associated with effectiveness?	• As of March 2014, Dartmouth had matched its projected participation rates[a]; however, Dartmouth also reported in their 7th quarter narrative progress report that patient enrollment was low for some conditions.[b] • Once enrolled, 59% of participants have completed the innovation's patient survey, a rate that exceeds the goal of a 50% completion rate. • Dartmouth defines the minimally effective dose of its innovation as patient exposure to a patient engagement intervention, including but not limited to use of a decision aid, health coaching, motivational interviewing, educational videos, etc.[b] CMS is currently working with Dartmouth to obtain measures of beneficiaries who have received the minimally effective dose.
What were key successes in implementing the innovation as designed and factors associated with success?	• Dartmouth leadership reports that health coach and implementation training were effectively implemented, and, as of March 2014, Dartmouth was ahead of schedule in implementing training courses. • More experienced implementation sites are sharing knowledge with newer implementation sites by creating tools (e.g., implementation guides), and working closely with newer sites as part of Dartmouth's "buddy" program.

What were the challenges in implementing the innovation as designed?	• Dartmouth experienced significant implementation challenges that resulted in delays across many of its 15 sites.
	  ○ The Dartmouth HCIA project is funded by CMS and HVHC member in-kind contributions. Members report that the expense related to EHR system modifications and health coach salaries (beyond the salaries provided through the award) present a financial challenge. The Dartmouth PMO reports that members are struggling most with aligning IT staff resources and expertise necessary to meet data submission requirements.
	  ○ Sites have experienced challenges related to clinician buy-in due to perceived burden on patients, a belief that the physician should be the source of information about treatment options, and competing demands for clinicians' time.
	  ○ Sites have experienced many technical issues, such as integrating the SAT into clinical workflow and integrating program measures into the sites' local EHRs.
	  ○ Sites have reported challenges allocating resources (e.g., office space) for health coaching to occur in private.
	  ○ Dartmouth reports that some sites view the data collection requirements as burdensome, with limited value to the stakeholders performing the data collection.
	• Although sites serve a large number of patients eligible for the chronic disease SDM models, sites' resource constraints limit the number of patients that can be enrolled and followed up with over time.
	• Some sites report difficulty incorporating the ICD care model into existing CHF clinic workflows without disrupting aspects of the workflow that are part of existing, successful workflows.

What changes were made to the innovation to increase enrollment, improve care, or reduce expenditures?	• Implementation sites are developing innovative approaches for increasing enrollment (e.g., using the local EHR to automate identification of eligible patients). • Dartmouth is providing educational webinars to improve attitudes towards data collection and related measures. • Dartmouth PMO is offering centralized resources to support survey administration and follow-up. Previously, sites were solely responsible for these tasks. • The hip, knee, and diabetes decision aids are currently available in Spanish. Health coaching is available in Spanish depending on staff capabilities.

Research Questions	Findings
Did the innovation use internal evaluation findings to inform the implementation process, when necessary?	• Dartmouth uses patient satisfaction measures to track the extent to which patients find the surveys to be helpful. • Dartmouth uses health coach survey results to identify important topics to address (e.g., how to explain the value of the decision aids, the concept of SDM, and the role of the health coach).

[a]Source: Lewin Quarterly Awardee Progress Report, Dartmouth (January-March 2014)
[b]Source: Quarterly Awardee Progress Report, Dartmouth (January-March 2014)

6.4 Workforce

This section summarizes findings on workforce issues related to the Dartmouth intervention, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee progress reports developed by the Lewin Group. Table 6-4 summarizes findings as of August 2014.

Table 6-4: Dartmouth Workforce Research Questions and Findings

Research Questions	Findings
Did the innovation contribute in filling health care workforce gaps?	• Dartmouth decision aids are designed as an alternative method for delivering information about treatment options, which may fill gaps in patient education traditionally delivered by a physician, nurse, or other health care provider. • Many HVHC sites did not previously have designated health coaches. • As a result of the Dartmouth innovation, clinical staff at implementation sites are reportedly learning new methods to engage patients in shared decision-making.
What type and level of workforce training does the innovation provide?	• Dartmouth offers training courses on implementing its interventions. • Health coaches are initially trained using a three-part curriculum, which provides an introduction to SDM and patient-centered care, strategies for successful SDM program implementation, and decision coaching techniques, such as assessing patient knowledge and values. • Dartmouth also provides ongoing health coach training during monthly health coach webinars. • Dartmouth PMO is transitioning health coach training from a centralized model to a train-the-trainer model to accommodate increasing demand for training and to ensure sustainability of health coach training at the sites. Additionally, Dartmouth is developing an asynchronous model of delivering the health coach training, an option which has received positive response from members.
What type of support structure is available for staff?	• Dartmouth provides ongoing implementation support through the HVHC collaborative website, learning collaborative webinars, in-person conferences, and ad hoc technical support. • A Chief Nursing Officer (CNO) workgroup meets monthly to discuss common issues with health coaching and care management activities at the sites.
What type of support structure is effective for staff deployment?	• TBD
How does the innovation affect staff satisfaction?	• TBD

Research Questions	Findings
Has the innovation experienced high staff turnaround? If so, what measures have been taken to remedy the problem?	• Dartmouth has adequate quarterly staff retention, ranging from 92.9 to 100%.[a]
What workforce changes were made by the innovation, and did these changes improve patient outcomes and experience, or reduce expenditures and health service use?	• Dartmouth initially filled its new workforce roll with predominantly clinically-trained staff, but has since found value in training non-clinical staff to deliver the SDM information as well. According to Dartmouth, any staff member with proper SDM training can effectively apply the SDM skill set.

[a]Source: Lewin Quarterly Awardee Progress Report, Dartmouth (January-March 2014).

6.5 Context

This section summarizes findings on context issues related to the Dartmouth intervention, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee progress reports provided by the Lewin Group. Table 6-5 summarizes findings as of August 2014.

Table 6-5: Dartmouth Context Research Questions and Findings

Research Questions	Findings
What endogenous (e.g. organizational) and exogenous (policy and environmental) factors affect implementation?	• Implementing organizations are reportedly facing competing demands, (e.g., other quality improvement initiatives that compete for clinicians' time and priorities). • Although HVHC member organizations have significant experience with local quality improvement projects, the HVHC members are collaborating for the first time on the HCIA award.
How is senior management structured, and how does it lead and communicate innovation changes to implementers?	• Major implementation decisions affecting all sites are reviewed by an executive committee, which includes representatives from each HVHC member organization. • Dartmouth management includes multiple senior leaders who oversee the clinical interventions or data analytics. • Three physicians serve as subject matter experts for 1) hip and knee, 2) spine, and 3) chronic conditions interventions • The project director has overseen implementation of similar SDM interventions.
How does the innovation affect existing hospitals, medical practices, or other settings that provide health care to participants?	• The innovation adds health coaches as a new role in clinical practice. • The innovation requires significant cultural change for providers and patients to rely on decision aids and health coaches as trusted information sources. • In some implementing clinics, administrative staff are engaged in patient outreach. For example, HVHC members report that administrative staff use EHRs to identify patients who are eligible for the intervention or assist with outreach mailings.
Are there unintended negative consequences of the innovation? If so, how can they be mitigated in similar models in the future?	• Dartmouth reported no negative unintended consequences of its innovation.

Research Questions	Findings
To what extent does the innovation duplicate practices or programs that are already existent?	• Like Dartmouth, HCIA awardees Welvie and MedExpert offer shared decision making innovations in multiple geographic regions. All three innovations are offered in Texas, and all three provide information about treatment options for hip, knee, spine, and heart surgeries. Dartmouth and MedExpert also provide information about chronic disease management. However, only the Dartmouth innovation includes health coaching and rigorous measurement of patient-reported measures.
How can successful innovation components be scaled and replicated in other settings?	• Implementation tools and resources can be leveraged for more rapid start-up at new implementation sites. • According to Dartmouth, the train-the-trainer model allows health coach training to potentially be scaled and replicated at multiple sites. • Two sites (Dartmouth-Hitchcock and University of Iowa) have contracts with Health Dialog that allow the sites to continue offering the decision aids through their EHRs post-award.

6.6 Concluding Observations

The Dartmouth SDM innovation is a multi-site, multi-intervention SDM project that aims to reduce the inappropriate utilization of preference-sensitive surgeries and improve the management of chronic diseases. A key component of the Dartmouth innovation are the 245 health coaches who provide decision making support to patients. Health coaches represent a new clinical role created by the innovation and come from a variety of training backgrounds, including nursing, physical therapy, and social work. At many of Dartmouth's implementing sites, the scope of an individual's existing role has been expanded to include health coaching responsibilities. Approximately 220 of the health coaches are funded through in-kind funding provided by the implementing organizations, which prefer to use in-kind funding to ensure sustainability of the health coach role after the HCIA award concludes. In its implementation efforts, Dartmouth also relies on a range implementation support and shared learning strategies, such as collaborative websites, collaborative webinars, and in-person conferences. For example, the HVHC collaborative website contains more than 50 tools and resources for implementation that were created by the implementation sites and incorporate best practices and lessons learned.

These implementation resources notwithstanding, Dartmouth has experienced significant delays in implementing all of the innovation's condition-specific models across all of its 15 implementation sites. Some recently-added sites were still in the process of implementing models in year two of the program, and at some sites, enrollment in some of the condition-specific models is still low. On the other hand, Dartmouth reports overall enrollment consistent with its original projections. As of March 2014, the program reported having 5,364 participants. Given its growing enrollment, an important milestone for the Dartmouth innovation will be an independent analysis of its data on program participants. Dartmouth provided data on approximately 3,000 of its participants in August 2014; however, the data lacked identifiers for the majority of participants that would allow Acumen to match participants with claims and

identify comparison groups. When these issues are resolved, Acumen will be able to assess the impact of Dartmouth's SDM innovation on health outcomes, care quality, service utilization, and expenditures.

7 EVALUATION OF THE IHARP HEALTH CARE INNOVATION AWARD

This section provides an overview of the evaluation findings for the Carilion New River Valley Medical Center's "Improving Health for At-risk Rural Patients" (or "IHARP") award as of August 2014, unless otherwise noted. The findings are based on interviews with project leaders, a review of progress reports developed by the Lewin Group, and documentation provided by the awardee. Section 7.1 summarizes the evaluability of the awardee. Sections 7.2 through 7.5 present the findings for four evaluation categories: innovation components, implementation effectiveness, workforce issues, and context. Section 7.6 provides concluding observations on the IHARP program. In this report there are no findings on IHARP's program effectiveness. Acumen received data on program participants from IHARP. However, the awardee did not provide data for a comparison group, and Acumen did not receive the participant data in time to construct a well-matched comparison group for difference in difference (DiD) analyses using Medicare claims data. In subsequent reports, we plan on reporting the results of these analyses.

7.1 Evaluability

Table 7-1 provides an overview of the primary factors affecting the evaluability of IHARP, based on information available as of August 2014. These factors are sample size, comparison group, data availability, and program maturity, which is defined by the program's stage of implementation and the extent to which it has changed since launch.

Table 7-1: IHARP Evaluability Overview

Evaluability Factor	Findings
Sample Size	• As of May 31, 2014, the program had 1,734 enrollees, with 35% Medicare FFS and Medicare Part D, 10% Medicare FFS and not Medicare Part D, 16% Medicare Advantage and Medicare Part D, and 38% other.[a]
Comparison Group	• Carilion does not provide comparison group data. As a result, Acumen's ability to create well-matched comparison groups based solely on Medicare data is limited.
Data Availability	• Program data on intervention participants are available for analysis of program effectiveness and have been linked to Medicare data.
Program Maturity	• The core components of the IHARP program's intervention have been relatively stable since implementation began in January 2013, with changes being made to the target population and enrollment approaches in May 2013.

[a]Source: IHARP's program data sent on July 16, 2014, excluding duplicate records and beneficiaries who died prior to the intervention start date. Due to rounding, the percentage of enrollees in each payer category may not sum to 100%.

7.2 Innovation Components

Carilion's IHARP program is a patient-centered care model that provides medication management services to patients with multiple chronic conditions through hospital, primary care,

and community-based pharmacists. Individuals with chronic illnesses often do not receive the long-term support necessary to adequately manage their conditions. The IHARP program addresses this problem by using pharmacists to provide disease and medication management services, with the goal of improving health outcomes and reducing health care costs for the chronically ill. IHARP is implemented predominately in Virginia in collaboration with the Carilion New River Valley Medical Center, Virginia Commonwealth University (VCU), the Canadian Pharmacist Association, and community pharmacies.

Patients eligible for IHARP are identified during hospitalization at participating hospitals and in Carilion primary care clinics and are recruited by hospital-based pharmacists or Carilion clinic staff. For patients enrolled in the hospital, hospital-based pharmacists perform initial medication reviews and other related medication management services, and a Carilion clinic primary care clinical pharmacist (PCCP) takes over after hospital discharge. Patients enrolled in Carilion clinics are also assigned a PCCP. PCCPs perform face-to-face assessments to address various medication management issues, perform medication history reviews and reconciliation, assist with adherence, and provide medication management for the patients' chronic diseases. PCCPs also communicate with community pharmacists to help them address any patient care needs that are likely to occur in the community pharmacy setting. The participating pharmacists use evidence-based disease state management protocols to inform their clinical recommendations. The IHARP program leverages Carilion's system-wide Epic EHR to document and help coordinate interactions among pharmacists and other providers.

Patients eligible for the IHARP program include those with two or more chronic conditions (one of which must be hypertension, diabetes, chronic obstructive pulmonary disease, asthma, congestive heart failure, hyperlipidemia, or depression) who are taking four or more medications and seeing a participating Carilion primary care provider. To identify eligible patients, hospital pharmacists use a daily list of eligible patients generated by an algorithm in the Epic electronic health record system. Clinic office staff and PCCPs identify and recruit patients who meet the targeting criteria.

The key components of the IHARP innovation are described in more detail below.

- **Expanding pharmacist roles to provide primary care services:** IHARP pharmacists perform clinical functions that are non-standard for pharmacists, providing chronic disease state and comprehensive medication management services in the inpatient and primary care settings that were previously delivered by inpatient and primary care physicians. The PCCP is a new role created by the innovation and is incorporated into the workforce of participating Carilion clinics. The hospital and community-based pharmacists incorporate IHARP services into their regular, existing practices.
- **Use of system-wide EHR for documentation and care coordination:** The Epic EHR system displays health record information from all participating providers, including

home health providers, and includes a tool designed specifically for the IHARP program that allows for medication management documentation within the Epic system. The system-wide EHR system facilitates communication between PCCPs and hospital pharmacists, promotes medication prescription consistency across care settings, and helps prevent fragmented care documentation.

Table 7-2 highlights the research questions and findings related to IHARP innovation components.

Table 7-2: IHARP Components Research Questions and Findings

Research Questions	Findings
How is the innovation designed to reduce expenditures or improve care quality?	• The IHARP program is designed to optimize the safety of medication use, improve patients' medication-related clinical outcomes, and enhance patient and health care providers' satisfaction with care through the use of hospital-, primary care-, and community-based pharmacists.
Who does the intervention target?	• The program targets at-risk rural populations regardless of insurance status who have two or more chronic conditions, one of which must be hypertension, diabetes, chronic obstructive pulmonary disease, asthma, heart failure, hyperlipidemia, or depression, and take four or more medications to manage these diseases. • Targeted patients include CMS priority populations such as racial and ethnic minorities.
What are the key components of the innovation?	• The IHARP program provides medication management services to targeted patients through hospital, primary care, and community-based pharmacists. The program involves o patient oversight by a primary care clinical pharmacist (PCCP) based in a participating Carilion primary care clinic; o medication reviews by hospital-based pharmacists for patients enrolled at a participating hospital; o medication history reviews, medication reconciliation, assistance with adherence, chronic disease state and comprehensive medication management, as well as preventive care services by community pharmacists; and o visits with PCCPs approximately every three months a year. Visits include medication management assessments, medication reconciliation, assessments of progress towards therapeutic goals, and recommendations for ongoing care plans. • Patients are enrolled in participating hospitals or in Carilion primary care clinics. o Hospital pharmacists use a daily list of patients produced by a targeting algorithm in the Epic electronic health record system to identify and recruit eligible patients. o Clinic office staff and PCCPs identify and recruit patients who meet the targeting criteria.
To what extent is the innovation viewed as a relatively simple "plug in" or a fundamental and major change within the implementing organization?	• The IHARP program requires significant change on the part of the health care delivery system. o The program incorporates pharmacists into the primary care setting. PCCPs and primary care providers (PCPs) work together to address patient medication management needs. o The program adds additional tasks to hospital- and community-based pharmacists' existing workflows.

7.3 Implementation Effectiveness

This section summarizes findings on IHARP's implementation effectiveness, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee progress reports provided by the Lewin Group. Table 7-3 summarizes findings as of August 2014, unless otherwise noted.

Table 7-3: IHARP Implementation Effectiveness Research Questions and Findings

Research Questions	Findings

Was the intervention delivered as intended to the target population in doses associated with effectiveness?	• According to IHARP, as of March 2014, cumulative participation is 46% below initial projections.[a]
	  o Program leaders attribute lower than anticipated patient participation to patient complexity, communication logistics, overestimates of PCCP workload, and hospital enrollment challenges.
	  o As of March 2014, program leaders revised enrollment projections to 2,500 to 2,800 when recruiting ends in December 2014. This assumes a full PCCP capacity of around 500 patients, as opposed to the estimate of 800 patients used to project a total target enrollment of 4,000, which more accurately aligns with a reasonable pharmacist caseload.
	• Program leaders are currently analyzing data to determine the "minimally effective dose" of the program.

What were key successes in implementing the innovation as designed and factors associated with success?	• The IHARP program reports that the following strategies have helped increase enrollment and patient acceptance of the program:
	  o using talking points during enrollment to customize information based on patient needs and circumstances
	  o emphasizing that IHARP is part of primary care and not a separate program
	  o increasing focus on patient referrals from primary care providers
	• IHARP pharmacists report that the following strategies have helped integrate the program into primary care offices:
	  o paying attention to clinic dynamics and workflow (e.g., PCP communication preferences),
	  o working with office managers to understand the "lay of the land,"
	  o recognizing clinic priorities, and
	  o understanding the role and workflow of the care coordinators.
	• Experienced PCCPs have played an important leadership and mentorship role. PCCPs who started in Year 2 indicated that experienced PCCPs helped them successfully integrate into primary care offices.

Research Questions	Findings

What were the challenges in implementing the innovation as designed?	• PCCPs have had difficulty following up with patients who were enrolled in the hospital.
	  o Patients agree to participate in IHARP during hospitalization, but then PCCPs are unable to reach them post-discharge.
	• Coordinating and communicating with community pharmacies has been challenging.
	  o Hiring a community pharmacy coordinator to serve as a liaison between the program and community pharmacists has improved communication.
	• There is no one-way-fits-all approach to integrating IHARP into practices.
	  o Participating practices have different organizational characteristics, including how they manage patients, leading to variations in how the IHARP program fits into each practice.

What changes were made to the innovation to increase enrollment, improve care, or reduce expenditures?	• In May 2013, the IHARP program expanded its inclusion criteria, reducing the medication requirement from six to four medications and enrolling patients in the primary care setting in addition to the hospital setting to increase enrollment. • In March 2014, the IHARP program added additional staff on Fridays at Roanoke Memorial Hospital to increase enrollment. • IHARP pharmacists now review the home health medical records of Carilion Home Health patients to identify discrepancies between patients' discharge medication and home health medication lists.
Did the innovation use internal evaluation findings to inform the implementation process, when necessary?	• Weekly data reports inform enrollment priorities and staffing levels. • Internal chart reviews and external reviews assess the fidelity of PCCPs' identification of medication related problems and interventions. Root-cause analyses are used to monitor accuracy and appropriateness of services. • Surveys and interviews of physicians and other staff are used to monitor program implementation and staff satisfaction. • Surveys of patients to assess patient engagement and gaps in care. o As of July 2014, approximately 50 IHARP patient surveys have been collected through the Wellby system, which uses an electronic interactive kiosk. This information is monitored by IHARP leadership and is shared with other departments for their assessments of value to Carilion. The interactive kiosk provides IHARP with medical risk alerts and notifications of other issues unknown or not discovered by the primary care provider or pharmacist in a face to face encounter. The kiosk also allows IHARP to measure quality of performance of primary care providers and pharmacists against National Committee for Quality Assurance standards.

[a]Source: Quarterly Awardee Progress Report, IHARP (January-March 2014)

7.4 Workforce

This section summarizes findings on workforce issues related to the IHARP intervention, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee progress reports provided by the Lewin Group. Table 7-4 summarizes findings as of August 2014.

Table 7-4: IHARP Workforce Research Questions and Findings

Research Questions	Findings
Did the innovation contribute in filling health care workforce gaps?	• The IHARP program expands the role of pharmacists in the inpatient and primary care settings; pharmacists provide medication management services previously delivered by inpatient and primary care providers. o While clinical pharmacists have traditionally targeted single diseases, IHARP PCCPs provide medication and disease management for all conditions.
What type and level of workforce training does the innovation provide?	• Hospital pharmacists and PCCPs received "ADAPT" training, a 19-week online continuing education course provided by IHARP's partner, the Canadian Pharmacist Association. • A core group of more than 30 community pharmacists, representing approximately 25 pharmacies, received training on medication therapy management and motivational interviewing, through Virginia Commonwealth University (VCU). The training was designed specifically for IHARP.
What type of support structure is available for staff?	• Pharmacists have access to VCU's electronic library to research clinical or medication-related issues that surface in their day-to-day practice. The IHARP program also provides pharmacists with chronic disease management guidelines based on national consensus guidelines in order to guide their clinical practice.
What type of support structure is effective for staff deployment?	• Pharmacists participate in weekly standing conference calls to discuss challenges, review specific cases, and provide ongoing, project-specific information.
How does the innovation affect staff satisfaction?	• When interviewed by program leaders, pharmacists reported positive reactions to IHARP. o Pharmacists indicated that they "overwhelmingly" envision themselves in roles similar to those in IHARP when thinking about their ideal job responsibilities. • IHARP internal surveys and interviews of other staff members, including physicians, care coordinators, and primary care clinic office managers, indicate that the staff is largely satisfied with IHARP and supportive of the program.
Has the innovation experienced high staff turnaround? If so, what measures have been taken to remedy the problem?	• The IHARP program has experienced no staff turnover.

Research Questions	Findings
What workforce changes were made by the innovation, and did these changes help improve patient outcomes and experience or reduce expenditures and health service use?	• PCCPs were incorporated into the workforce of participating Carilion clinics, since the PCCP role is new. • Hospital and community pharmacists incorporated IHARP services into their regular, existing practice.

7.5 Context

This section summarizes findings on context issues related to the IHARP intervention, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee progress reports provided by the Lewin Group. Table 7-5 summarizes findings as of August 2014.

Table 7-5: IHARP Context Research Questions and Findings

Research Questions	Findings

What endogenous (e.g. organizational) and exogenous (policy and environmental) factors affect implementation?	• Sharing electronic health records between participating hospitals and primary care clinics is a crucial factor in implementing the IHARP program.
	  o Program leaders noted that it would be extremely difficult to identify and manage patients and operate the program without shared electronic health records.
	  o The roll out of regional and state health information exchanges may partially address this issue.
	• Some community pharmacies, particularly large chains concerned with liability, have declined participation in IHARP.
	• In some cases, participating community pharmacy partners have struggled to implement the program fully due to strained relationships with Carilion and other workflow barriers.
	  o A Carilion policy implemented in January 2014 requires Carilion employees and their families to receive maintenance medications from Carilion pharmacies exclusively, reducing business for community pharmacies and harming the relationship between community pharmacies and IHARP.
	  o Workflow barriers have limited community pharmacists' ability to provide IHARP services. Barriers include communication and documentation challenges, inadequate staff time, and the difficulty identifying patients enrolled in IHARP.
	• Previous clinic experience working with pharmacists facilitates uptake of the IHARP program in the Carilion clinics.
	• Physical environment can affect integration of PCCPs.
	  o When pharmacists are visible in the clinic, as opposed to sitting in an isolated area, clinic staff have a better understanding of the pharmacists' role and are more likely to make referrals and support the program.

Research Questions	Findings
How is senior management structured and how does it lead and communicate innovation changes to implementers?	• IHARP has a simple management structure. All IHARP pharmacists report to the Project Director, who reports to the Principal Investigator. • Senior management at Carilion and its subcontractor, VCU, collaboratively make decisions about the direction of the project and allocation of resources. Decisions are communicated directly to program staff.
How does the innovation affect existing hospitals, medical practices, or other settings that provide health care to participants?	• Pharmacists are incorporated in the participating primary care clinics and work closely with primary care providers to manage patients' medications and chronic conditions. • Hospital-based IHARP pharmacists work side-by-side with inpatient medical and nursing staff. • Community pharmacists work with PCCPs to address patient issues that arise in the community pharmacy setting.
Are there unintended negative consequences of the innovation? If so, how can they be mitigated in similar models in the future?	• Program leaders did not report any unintended negative consequences of the innovation.
To what extent does the innovation duplicate practices or programs that are already existent?	• The program's services overlap with the work of existing care coordinators in the primary care clinics. PCCPs and care coordinators have worked together to reduce areas of redundancy. • To obtain medications PCCPs have worked with Carilion's Medication Assistance Program (MAP) to leverage existing Carilion MAP resources instead of spending time filling out paperwork.
How can successful innovation components be scaled and replicated in other settings?	• The training programs used to prepare pharmacists are readily available and can be scaled and used by other organizations. • Organizations that use an electronic health records similar to Carilion's Epic system could adopt the identification and documentation systems used in the program. • Research conducted by IHARP to determine reasonable pharmacist case load for the program can inform staffing requirements for potential adopting organizations. • Program leaders believe ACO models are important for future sustainability and scalability of IHARP, since these models redesign health care practice and payment mechanisms, creating an environment and incentive structure conducive to transforming the delivery of care across settings. o IHARP leaders are having discussions with one developing ACO in Richmond that is interested in exploring and possibly incorporating the IHARP model. • IHARP is exploring incorporating a call center as part of the program's long term strategy to be able to triage and handle more patients and meet the challenges of scalability.

7.6 Concluding Observations

The IHARP innovation provides medication management services to patients with multiple chronic conditions through hospital, primary care, and community-based pharmacists, with the goal of improving health outcomes and reducing health care costs. The innovation leverages pharmacists to provide medication management services previously delivered by inpatient and primary care providers. The innovation creates a new position, the PCCP, and incorporates medication management services into the existing role of hospital and primary care-based pharmacists. Additionally, while clinical pharmacists have traditionally targeted single diseases, IHARP PCCPs provide medication and disease management for a range of chronic conditions. A critical component of the innovation is the use of a system-wide EHR to document and facilitate care coordination.

IHARP has faced challenges enrolling patients and integrating PCCPs into primary care clinics. Like most HCIA MM awardees, the program's enrollment is below expectations – 46% less than initial projections as of March 2014 – due in part to patient complexity, communication logistics, overestimates of PCCP workload, and hospital enrollment challenges. The program has also found that there is no one-way-fits-all approach to integrating IHARP into practices. Participating practices have different organizational characteristics, including how they manage patients, leading to variations in how the IHARP program fits into each practice.

Despite these challenges, the innovation continues to improve its implementation efforts and effectiveness. In May 2013, the IHARP program expanded its inclusion criteria and enrolled patients in the primary care setting in addition to the hospital setting to increase enrollment. The program has also reallocated staff to hospitals with larger eligible patient populations. It has also recognized that physician buy-in and health care team collaboration are critical for program success. IHARP program leaders emphasize the importance of cultivating relationships between pharmacists and physicians and showing how primary care pharmacists can streamline the care delivery process and collaborate and complement the health care team. Moving forward, the program is developing collaborative practice agreements between primary care pharmacists and primary care physicians that would allow pharmacists to act upon observations and recommendations in real time, initiate drug therapies, and refer patients for care when necessary to streamline care. IHARP has already made data available on program participants, and when these data can be compared to well-matched control groups, the impact of the IHARP program on health outcomes, care quality, service utilization and costs can be determined.

8 EVALUATION OF THE UNIVERSITY OF SOUTHERN CALIFORNIA HEALTH CARE INNOVATION AWARD

This section provides an overview of the evaluation findings for the University of Southern California (USC) award as of August 2014, unless otherwise noted. The findings are based on interviews with project leaders, a review of progress reports developed by the Lewin Group, and documentation provided by the awardee. Section 8.1 summarizes the evaluability of the awardee. Sections 8.2 through 8.5 present the findings for four evaluation categories: innovation components, implementation effectiveness, workforce issues, and context. Section 8.6 provides concluding observations. There are no quantitative findings as of August 2014 for USC, as Acumen has not received participant-level data from the awardee. The research category of program effectiveness will be evaluated once participant-level data are available.

8.1 Evaluability

Table 8-1 provides an overview of the primary factors affecting the evaluability of USC, based on information available as of August 2014, unless otherwise noted. These factors are sample size, comparison group, data availability, and program maturity, which is defined by the program's stage of implementation and the extent to which it has changed since launch.

Table 8-1: USC Evaluability Overview

Evaluability Factor	Findings
Sample Size	• USC reports that as of March 2014 the program had 3,898 enrollees, with 6% Medicare FFS, 7% Medicare Advantage, 38% Medicaid, 16% dual eligible, and 33% other.[a]
Comparison Group	• Comparison groups have not been selected for quantitative analyses.
Data Availability	• Program data on intervention participants are not yet available for analysis of program effectiveness.
Program Maturity	• USC's innovation is mature; its key components and target population have remained stable since implementation began in October 2012.

[a]Source: Lewin Quarterly Awardee Progress Report, USC (January-March 2014)

8.2 Innovation Components

The USC innovation is a collaboration among USC's School of Pharmacy, USC's Schaeffer Center for Health Policy and Economics, and AltaMed Health Services. Partnering with AltaMed, the USC innovation integrates pharmacy teams comprising a pharmacist, a pharmacy resident, and a clinical pharmacy technician into primary care settings at participating AltaMed clinics. The pharmacy teams provide comprehensive medication and disease management services to patients at high risk for poor medical outcomes. These services include medication reconciliation, medication access services, patient counseling and drug education, preventive care, and provider education.

Pharmacy teams are central to the USC innovation. The pharmacists and pharmacy residents provide the innovation's MM services to participating patients, using clinical protocols to guide their care. The clinical pharmacy technician is responsible for reviewing the lists of eligible patients, conducting initial patient outreach, scheduling the innovation's MM services, and serving as the liaison between patients and the pharmacists and pharmacy residents. Pharmacy team activities are supported by AltaMed's NextGen EHR system, which the pharmacists, pharmacy residents, and pharmacy technician use to document all contact with patients and to communicate with other health care providers

Program participants are identified either after hospital discharge through a systematic review of electronic medical records or during primary care visits. Eligible patients include patients 65 years of age or older discharged from a hospital or emergency room; patients with difficulty managing their diabetes, hypertension, or LDL-cholesterol in secondary prevention and/or diabetics; patients with suboptimal asthma or heart failure management; patients receiving warfarin; patients taking eight or more medications, having four or more chronic conditions, or seeing two or more providers; and patients with difficulty adhering to a drug therapy for a chronic disease.

Key components of the innovation are described in more depth below.

- **Integrated pharmacy team within primary care setting.** Program participants receive MM services in the primary care setting from a pharmacy team, consisting of a pharmacist, a pharmacy resident, and a clinical pharmacy technician. Most participating AltaMed sites have a dedicated team, though several smaller locations use a multi-site team, which also provides services at busier locations. Additionally, a float team is available to provide additional support for busier locations.
- **Patient enrollment in a primary care setting.** Patients are typically enrolled in the program using a handoff approach in which the patient's primary care provider walks the patient over to the pharmacy team. Pharmacists and pharmacy residents are encouraged to keep an appointment slot or two open so that they can conduct an initial visit during these handoffs.
- **Patient enrollment through EHR-generated lists and discharge reports.** Clinical pharmacy technicians also recruit patients by phone whom they have identified through lists generated by the AltaMed electronic health record and daily hospital discharge reports on managed care patients.
- **Initial patient visit and subsequent follow up.** The initial patient visit with the pharmacist or pharmacy resident is conducted in the clinic and lasts approximately 45 minutes. After the initial visit, the pharmacist or pharmacy resident will determine follow-up care based on the patient's needs and severity of illness. Follow-up from the pharmacy team usually occurs within four to six weeks – either by phone or in-person. If an in-person visit is warranted, the innovation's clinical pharmacy technician will attempt to align the follow-up with the patient's next primary care visit. Services provided by the pharmacists and pharmacy residents include medication management, disease

management, medication reconciliation, medication access, patient counseling, drug education, and provider education services

- **Use of clinical protocols.** In providing the innovation's MM services, the program's pharmacists and pharmacy residents use clinical protocols developed in conjunction with AltaMed. The protocols contain clinical guidelines for the six conditions that make patients eligible for the program: asthma, congestive heart failure, dyslipidemia, hypertension, anticoagulation, and diabetes. There is also a general MM protocol and a prescription refill and medication reconciliation protocol.
- **Use of EHR system to document care, communicate with other providers, and track patient interaction.** All medication-related interventions made by the pharmacists and pharmacy residents are documented in the NextGen EHR system, so that the patient's primary care provider can view the information. NextGen also tracks in-person visits and follow-up communication with patients, including outreach and clinically-related calls.

Table 8-2 highlights the research questions and findings related to USC innovation components.

Table 8-2: USC Components Research Questions and Findings

Research Questions	Findings
How is the innovation designed to reduce expenditures or improve care quality?	• The program aims to achieve cost savings through improved medication use and quality of patient care by integrating clinical pharmacy teams into primary care safety net clinics to allow these clinics to provide comprehensive medication and disease management services.
Who does the intervention target?	• The program targets patients (regardless of insurance status or ability to pay) who are high risk and have high clinical need for pharmacy services as defined by specific inclusion criteria. Enrolled patients must meet at least one of the following inclusion criteria: o 65 years of age or older and discharged from a hospital or emergency room o poor control of diabetes, hypertension, or LDL-cholesterol in secondary prevention and/or diabetics o suboptimal asthma or congestive heart failure management o use of warfarin o use of 8 or more medications OR having 4 or more chronic conditions OR seeing 2 or more providers o poor adherence with drug therapy for a chronic disease • The target population also includes other CMS priority populations such as racial minorities and individuals with low-socioeconomic status.

Research Questions	Findings
What are the key components of the innovation?	• The USC innovation leverages novel clinical protocols to provide medication and disease management services through the use of pharmacy teams consisting of a clinical pharmacy technician, pharmacy resident, and pharmacist. The innovation involves: o medication-related and clinical services provided by pharmacists and pharmacy residents, including medication management, disease management, medication reconciliation, medication access, patient counseling, drug education, and provider education services; o use of USC-developed clinical protocols that include clinical checklists, suggested interventions, patient counseling and education topics, preventive care screenings, dosage guidelines for targeted disease states (asthma, CHF, diabetes, hypertension, dyslipidemia, anticoagulation therapy), and medication management services (medication adjustments, prescription refills, medication reconciliation, and orders for medication-related tests); o telephone follow up from clinical pharmacy technicians to verify patients' health and medication status; and o telephone follow up after patient discharge from the program by clinical pharmacist technicians to determine if a patient is no longer meeting clinical goals and needs to re-enroll in the program. • Primary care pharmacists recruit patients during in-person office visits at AltaMed clinics. Physicians and care coordinators regularly refer patients to the clinical pharmacy teams. Clinical pharmacy technicians recruit patients by phone whom they have identified through lists generated by the AltaMed electronic health record and daily discharge reports on managed care patients.
To what extent is the innovation viewed as a relatively simple "plug in" or a fundamental and major change within the implementing organization?	• The intervention requires significant change on the part of the health care delivery system. Pharmacy teams are integrated into the traditional primary care clinic staff, where they work with other staff members to address patient medication, disease management, and preventive care needs.

8.3 Implementation Effectiveness

This section summarizes findings on USC's implementation effectiveness, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee progress reports provided by the Lewin Group. Table 8-3 summarizes findings as of August 2014, unless otherwise noted.

Table 8-3: USC Implementation Effectiveness Research Questions and Findings

Research Questions	Findings
Was the intervention delivered as intended to the target population in doses associated with effectiveness?	• According to USC, as of March 2014, participation was 51% below initial projections.[a] Program leaders attribute low participation numbers to a complex medical population requiring more follow up than expected, overly optimistic enrollment projections, and inefficiencies at some of the clinics due to medical assistant shortages. • Analyses conducted by USC indicate the innovation is reaching the majority of high risk, active patients at the clinics. • Program leaders note that the minimally effective dose of the program varies depending on patients' disease states, individual needs, and patient goals. For example, the minimally effective dose for patients with hypertension is 45 to 90 days, the typical time required for patients to reach their blood pressure management goals. USC uses the following parameters for the targeted clinical conditions: o hypertension: 45-90 days o diabetes: 6 -9 months o asthma: 4 visits o congestive heart failure and anticoagulation therapy: indefinitely
What were key successes in implementing the innovation as designed and factors associated with success?	• USC reports that the following strategies have helped increase enrollment: o having primary care providers endorse the program through warm handoffs to pharmacists o continually improving outreach scripts to incorporate lessons learned (e.g., asking patients how they feel about their care and medications rather than explaining the program during the first call) o Having clinical pharmacy technicians who speak English and Spanish • Regular calls with program leaders and pharmacy teams to discuss roles and team dynamics have helped pharmacy teams understand their roles and function better as teams. • Follow-up calls by clinical pharmacy technicians every two months after patients discharge from the program are effective in identifying patients who do not maintain health goals and need to re-enroll in the program.
What were the challenges in implementing the innovation as designed?	• Physical space constraints required program leaders to decrease the size of the pharmacy team from six members to three. The program requested that clinics allocate two exam rooms and an office to the pharmacy team, but many locations have not been able to provide this amount of workspace. For example, several sites offer only one exam room or no office, and some assign space on a day-to-day basis. • Some pharmacy teams have struggled to manage and follow up with program participants because they have too many patients – many have more than 600 patients, whereas program leaders say 300 to 500 is a sustainable caseload. • The Program of All-Inclusive Care for the Elderly (PACE) program clinic sites, which were added in Year 2 of implementation, serve high-risk elderly patients who require more pharmacy team time and resources than originally planned. • High turnover among medical assistants, who provide logistical support to clinical pharmacy technicians, has hindered implementation and team efficiency.
What changes were made to the innovation to increase enrollment, improve care, or reduce expenditures?	• USC reallocated pharmacy team staff time from one site that did not have as many participating patients to a couple of sites that had more eligible patients, in an effort to enroll and serve more patients. • USC is rolling out a telehealth application that uses videoconferencing technology and will allow pharmacy team members to provide remote services to three additional AltaMed clinics from a central location. Program leaders expect to implement the telehealth program by August 2014.

Research Questions	Findings
Did the innovation use internal evaluation findings to inform the implementation process, when necessary?	• USC reviews and updates the patient identification trigger lists on an ongoing basis to ensure they have adequate specificity and are effective in identifying eligible patients. • USC reviews measures on enrollment rates, populations served, and chronic conditions, to monitor and compare implementation across participating clinics. • USC uses AltaMed's existing peer review process conducted by clinic site medical directors and administrators to collect feedback from sites about implementation. • USC uses findings from pharmacy resident projects to inform program operations and implementation. o A chart review revealed that clinical pharmacy technicians were not consistently following up with patients within two months of patient discharge from the program. Program leaders provided additional education to clinical pharmacy technicians and reported that they have resolved this issue. o Patient and provider satisfaction data collected and analyzed through a pharmacy resident project identified program strengths, including good communication and satisfaction with clinical pharmacy services, and also identified areas for improvement, such as following up on test results. o An analysis of variables related to frequent hospitalizations for PACE program participants helped identify the most at-risk PACE patients. o Patient focus groups revealed concerns with using telehealth technology. o An investigation of near-misses revealed opportunities for improvement in documentation.

[a]Source: Lewin Quarterly Awardee Progress Report, USC (January-March 2014)

8.4 Workforce

This section summarizes findings on workforce issues related to the USC intervention, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee progress reports provided by the Lewin Group. Table 8-4 summarizes findings as of August 2014, unless otherwise noted.

Table 8-4: USC Workforce Research Questions and Findings

Research Questions	Findings
Did the innovation contribute in filling health care workforce gaps?	• The intervention fills gaps in the primary care setting by providing medication and disease management services that are often too time-consuming for primary care providers to deliver adequately. • The program expands the role of clinical pharmacy technicians beyond providing medication acquisition and processing services to a patient navigator role. This allows pharmacists, who previously provided these services, to dedicate more time to activities that fill gaps in patient care and education.
What type and level of workforce training does the innovation provide?	• Clinical pharmacy technicians receive training through USC on how to interview and interact with patients. Program leaders are also working with local pharmacy technician schools to incorporate this training into the schools' curricula. • Pharmacists and pharmacy students do not receive training specific to the innovation, though they receive general training on the clinical protocols and the EHR system used in the AltaMed clinics.
What type of support structure is available for staff?	• The program requests that each participating AltaMed clinic allocates at least two exam rooms and an office to the pharmacy team. • Pharmacists, pharmacy residents, and USC School of Pharmacy faculty review and discuss journal articles relevant to the innovation on an online discussion board. • Every three to four months, clinical pharmacy technicians and faculty at the USC School of Pharmacy meet to discuss common concerns and ideas for improvement.

Research Questions	Findings
What type of support structure is effective for staff deployment?	• Anecdotally, program leaders indicate that pharmacy team members find frequent team meetings to be helpful with implementing the program. These meetings include o bi-weekly calls for pharmacy team members to discuss questions and concerns about the program; o monthly meetings for pharmacists involved in the innovation and primary care pharmacists affiliated with USC to share best practices and learn about recently published research; o quarterly meetings with clinic providers during which pharmacists present medication-related updates; and o weekly interdisciplinary meetings for staff at each clinic site, including physicians, pharmacists, medical assistants, and nurses, to discuss patient cases, challenges and lessons learned.
How does the innovation affect staff satisfaction?	• Program leaders report that pharmacy team members are satisfied with the innovation. • According to program leaders, clinical pharmacy technicians feel the program exceeds their expectations of the role they had envisioned performing. • Program leaders have found that pharmacists and residents have been particularly receptive to having a clinical pharmacy technician assist with their workflow, which can boost the number of patients they can see in a day by up to 50 percent.
Has the innovation experienced high staff turnaround? If so, what measures have been taken to remedy the problem?	• The program has experienced some direct staff turnover; five individuals have left the project since its launch. o One clinical pharmacy technician and one pharmacist were let go for performance reasons. o According to program leaders, three clinical pharmacy technicians left the program due to lengthy commutes and not due to dissatisfaction with the program. • Program leaders expressed concern that staff turnover may increase further since it is uncertain whether the program will continue after grant funding ends. • AltaMed clinics have experienced frequent turnover of medical assistants. Many of these open positions have not been filled. According to program leaders, there are few qualified medical assistants, a problem they say is a general workforce issue external to AltaMed. In some cases, temporary support people have been assigned to assist the pharmacy team.
What workforce changes were made by the innovation, and did these changes help improve patient outcomes and experience or reduce expenditures and health service use?	• Incorporating pharmacy teams into AltaMed clinics was a major workforce change. • The pharmacist, pharmacy resident and clinical pharmacy technician roles, all part of the pharmacy teams in AltaMed clinics, are new positions created by the program. The innovation also expands the role of medical assistants who provide logistical support to the program's clinical pharmacy technicians.

8.5 Context

This section summarizes findings on context issues related to the USC intervention, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee progress reports provided by the Lewin Group. Table 8-5 summarizes findings as of August 2014, unless otherwise noted.

Table 8-5: USC Context Research Questions and Findings

Research Questions	Findings
What endogenous (e.g. organizational) and exogenous (policy and environmental) factors affect implementation?	• California law permits pharmacists to modify medication therapy according to institution-specific protocols, which allows pharmacists involved in the innovation to change patients' medications according to AltaMed clinical protocols. Yet despite the fact that California recognizes pharmacists as providers, pharmacists cannot receive reimbursement from Medicare for medication management services. • AltaMed clinics are concurrently implementing a broader team-based care model that has made clinic staff more accepting of the pharmacy teams. This broader model promotes comprehensive, high quality care through the patient-centered medical home concept.[a] • Some participants changed insurance due to the Affordable Care Act and subsequently left the innovation. • The program has instituted collaborative practice agreements, which allow pharmacy teams to provide MM services directly and independently to patients without prior physician approval.
How is senior management structured, and how does it lead and communicate innovation changes to implementers?	• Three senior leaders assume primary responsibility for the management of the project: the principal investigator oversees data collection; the clinical manager oversees program operations, makes decisions regarding allocation of team resources, and supervises pharmacy teams; and a physician leader from AltaMed serves as the point person for all participating clinics. • AltaMed operates under a subcontract to USC. • Program leaders meet frequently and communicate project decisions during calls with front-line staff.
How does the innovation affect existing hospitals, medical practices, or other settings that provide health care to participants?	• The innovation supplements existing clinic practices; pharmacy teams are integrated with primary care clinic staff and assume responsibility for providing in-depth medication management services to supplement the services delivered by primary care providers. • Program leaders shared that one clinic had been less successful because the staff were reluctant to change how their practice functioned, wanted to maintain control of their patients, and were skeptical of the pharmacy team's involvement in patient care. As a result, the pharmacy team was reassigned to another location.
Are there unintended negative consequences of the innovation? If so, how can they be mitigated in similar models in the future?	• Program leaders did not report any unintended negative consequences of the innovation.
To what extent does the innovation duplicate practices or programs that are already existent?	• AltaMed reports that the pharmacy team does not duplicate existing programs in the clinics and fills a void in care. Previously, primary care providers responsible for medication management activities did not have time to perform the extensive services that the pharmacy team now provides.

Research Questions	Findings
How can successful innovation components be scaled and replicated in other settings?	• The federal government and many states do not recognize pharmacists as health care providers, which may impede scale of the program. These policies make it difficult for health plans/insurers to pay for clinical pharmacy services since pharmacists cannot receive direct reimbursement for pharmacy services. California does recognize pharmacists as providers, but does not permit pharmacists to receive direct reimbursement for pharmacy services. o As a result, implementing this innovation in capitated or bundled payment systems would be easier than a fee-for-service system, which would likely require strong evidence of positive return-on-investment. • Program leaders believe the innovation can be implemented without the USC pharmacy school and resident training program. o Program leaders report that pharmacist resident graduates have been successful in developing similar programs in other locations. o USC is developing an interactive web-based training and credentialing program, which can be used to help pharmacists who are not currently providing expanded medication and clinical services to obtain the competencies needed to function in this capacity. o USC faculty is working with three pharmacy technician schools to integrate clinical pharmacy technician training into their curriculums.

[a]"Defining the Patient-centered Medical Home," Agency for Healthcare Research and Quality, available at: http://pcmh.ahrq.gov/page/defining-pcmh

8.6 Concluding Observations

The USC innovation integrates pharmacy teams into AltaMed primary care clinics to provide comprehensive medication and disease management services to patients at high risk for poor medical outcomes. The implementation of the USC program benefits from several factors. Flexible collaborative practice agreements allow pharmacy teams to provide MM services directly and independently to patients without prior physician approval. A relationship with the USC pharmacy school has helped the program recruit and train pharmacy residents for the innovation. Spanish-speaking clinical pharmacy technicians serve as patient navigators and help to engage the Hispanic patient population. Finally, USC's EHR system documents care provided by the pharmacy team, tracks interactions with patients, and aids in communication with other health care providers.

These advantages notwithstanding, one of the main challenges in implementing USC's program has been enrollment. As of March 2014, program participation was approximately 51 percent below projections. One contributing factor was USC's initial recruiting approach—having pharmacy teams conduct unscripted "cold calls" to patients. To improve enrollment, USC, similar to other MM awardees, developed scripts to help guide interactions with patients and held meetings for sharing best practices. Like other awardees, USC also recognized that physician buy-in was an important factor in enrollment; clinics whose physicians recognize and appreciate the pharmacy team's services have been most successful in implementing the program. USC took steps to cultivate provider support, such as meeting with primary care

physicians to explain the benefits of the program. Program leaders report that the USC innovation has been well accepted by AltaMed clinics.

The USC innovation workforce includes a number of new positions, but USC has faced challenges with staff turnover and hiring. The innovation creates new workforce positions, which include the pharmacy team roles of pharmacist, pharmacy resident, and clinical pharmacist technician. All pharmacy team members were hired specifically for the program. To implement the innovation, all of the positions on the pharmacy team were expanded beyond their traditional duties; pharmacists and pharmacy residents provide a variety of medication and disease management services, and clinical pharmacy technicians conduct many tasks that go beyond their traditional administrative responsibilities, including reviewing the lists of eligible patients, conducting initial outreach, and serving as the liaison between patients and pharmacists. The innovation also expands the role of medical assistants who provide logistical support to the clinical pharmacy technicians. USC has faced challenges in filling and maintaining this positions, however. Since launch there has been some staff turnover, and program leaders have expressed concerns that turnover may increase when funding ends for the HCIA award. AltaMed clinics have also experienced challenges hiring qualified medical assistants.

In anticipation of the end of the HCIA award, USC program leaders have identified strategies that will allow the program to continue after award funding ends. These strategies include a telepharmacy program that will be piloted in October 2014 and will allow USC to use videoconferencing to deliver components of the intervention to more remote areas and to clinics that may not have the physical space to accommodate pharmacy teams on site. MM programs like USC's may have limited scalability, however, due to limited pharmacy reimbursement. Although California is one of the few states that recognizes pharmacists as health care providers, pharmacists are not considered for direct reimbursement for health care services. This makes it difficult for health plans and insurers to pay pharmacists directly for the types of medication management services offered under the USC innovation.

Looking forward, Acumen will conduct analysis of the program's effectiveness. Once data on USC program participants are made available and these data are matched with claims, Acumen will evaluate the impact of the program on health outcomes, care quality, service utilization, and expenditures.

9 EVALUATION OF THE HEARTSTRONG HEALTH CARE INNOVATION AWARD

This section provides an overview of the evaluation findings for the Trustees of the University of Pennsylvania's (UPenn) HeartStrong award as of August 2014, unless otherwise noted. The findings are based on interviews with project leaders, a review of progress reports developed by the Lewin Group, and documentation provided by the awardee. Section 9.1 summarizes the evaluability of the awardee. Section 9.2 provides a detailed description of the innovation components, including targeted populations. Sections 9.3 through 9.5 present the findings for three evaluation categories: implementation effectiveness, workforce issues, and context. Finally, Section 9.6 presents concluding observations.

9.1 Evaluability

Table 9-1 provides an overview of the primary factors affecting the evaluability of HeartStrong based on information available as of August 2014, unless otherwise noted. These factors are sample size, comparison group, data availability, and program maturity, which is defined by the program's stage of implementation and the extent to which it has changed since launch.

Table 9-1: HeartStrong Evaluability Overview

Evaluability Factor	Findings
Sample Size	• HeartStrong reports that as of March 2014 the program had 392 enrollees • January-March 2014 Payer Mix: 3% Medicare Fee For Service, 27% Medicare Advantage, and 70% other.[a]
Comparison Group	• UPenn reports randomly assigning individuals to a control group.
Data Availability	• Program data on intervention participants are not available for analysis of program effectiveness.
Program Maturity	• The core components of the HeartStrong program's intervention have been stable since implementation began in March 2013. Changes include increasing the geographic reach of the program (expanding to 39 states as of March 2014), and increasing the enrollment window from 45 to 60 days after hospital discharge.

[a]Source: Quarterly Awardee Progress Report, HeartStrong (January-March 2014)

9.2 Innovation Components

The HeartStrong innovation is a collaborative partnership between the Trustees of the University of Pennsylvania and contracted payers, including Humana, Horizon Blue Cross Blue Shield, Independence Blue Cross Blue Shield, Aetna, and HealthFirst. The program aims to improve patient adherence to cardioprotective medication in the year after acute myocardial infarction (AMI). Studies have shown low rates of adherence to cardioprotective medications, despite the proven benefits of medications such as aspirin, beta blockers, statins, and platelet

blockers (e.g., Plavix) to significantly reduce the rate of cardiovascular events and repeat treatment procedures. Poor adherence to cardioprotective medications leads to worse medical treatment outcomes, higher hospitalization and mortality rates, and increased health care costs. Many previous successful efforts to improve adherence to these medications have been too complex to be implemented in clinical practice, not easily packaged or standardized, or required tremendous resource expenditures. The HeartStrong innovation attempts to improve adherence to cardioprotective medication with a simple, easily scalable, and less-resource intensive approach that uses contemporary technology and concepts of behavior change. The HeartStrong program provides patients who were recently hospitalized for AMI with GlowCap pill bottles that emit light and sounds to remind the patients to take their medications. When opened, the bottles send alerts to HeartStrong, which enables the program to track adherence.

The HeartStrong innovation targets patients discharged from the hospital with a diagnosis of AMI after a hospital stay of 2 to 180 days. Eligible patients must be between 18 and 80 years old and taking at least 2 of the following medication types: aspirin, beta-blockers, other platelet blockers (e.g. Plavix), and statins. To identify eligible patients, insurer partners scan discharge diagnosis codes and submit the data to HeartStrong. HeartStrong staff members then review and clean the claims data and send recruitment letters to eligible patients. HeartStrong then follows up on the letters with multiple recruitment calls to potential participants.

The components of the HeartStrong innovation are described in detail below.

- **GlowCap pill bottles:** Participants receive GlowCap pill bottles for each of four targeted cardioprotective medications/medication classes: aspirin, beta-blockers, other platelet blockers (e.g. Plavix), and statins. The bottles are programmed to alert and remind patients when to take their medications. An embedded chip within each bottle sends alerts to HeartStrong's electronic portal whenever the patient opens the bottle, which enables the program to track adherence.
- **Adherence Incentives:** Patients who open their GlowCap pill bottles, and are therefore considered to be adhering to their medications, are entered into a lottery. Each month, lottery winners receive a monetary incentive.
- **Follow-up interventions for non-adherent patients:** Patients who do not adhere to their medications receive follow-up interventions that escalate in intensity with an increase in the number of non-adherent days. Interventions begin with automated texts, emails, or interactive voice response (IVR) alerts to patients. Additionally, upon enrollment, patients choose three family members or friends to be support persons who can help the patient improve adherence if needed. If a patient does not open the GlowCap bottles after two days, a support person will receive an alert. If the patient has still not taken his or her medications after four days, the patient's assigned program advisor (a research coordinator or social worker hired specifically for this program) contacts the patient to help navigate adherence issues. The advisors may even contact the patient's physician.

Table 9-2 highlights the research questions and findings related to HeartStrong innovation components.

Table 9-2: HeartStrong Components Research Questions and Findings

Research Questions	Findings
How is the innovation designed to reduce expenditures or improve care quality?	• HeartStrong uses a medication reminder system to improve patient adherence to cardioprotective medications, limit cardiovascular events, and reduce unnecessary health care service utilization.
Who does the intervention target?	• HeartStrong targets beneficiaries discharged from the hospital with a diagnosis of AMI after a hospital stay of 2 to 180 days.

What are the key components of the innovation?	• The HeartStrong program provides program participants with automated and person-based medication reminder systems, as well as financial incentives to encourage medication adherence.
	  ○ Participants receive GlowCap pill bottles for each of four targeted medications/medication classes: aspirin, beta-blockers, other platelet blockers (e.g. Plavix), and statins. The bottles are programmed to alert and remind patients when to take their medications and to send a signal to a transmitter to allow the program to track adherence.
	  ○ Patients who adhere to their medications by opening their GlowCap pill bottles are entered into a lottery to receive incentive payments.
	  ○ Patients who do not adhere to their medications receive follow-up interventions that escalate with an increase in the number of non-adherent days. Interventions begin with automated text, email or interactive voice response (IVR) alerts to patients and escalate to alerts to an identified friend/family member and then to phone calls, mailed letters, and contact with the patient's physician if non-adherence persists.
	  ○ Program advisors – research coordinators or social workers – work with patients over the phone to address adherence issues.
	• To identify potential program participants, insurer partners scan discharge diagnosis codes and submit the data to HeartStrong. HeartStrong staff members review and clean the claims data and send recruitment letters to eligible patients.

To what extent is the innovation viewed as a relatively simple "plug in" or a fundamental and major change within the implementing organization?	• The HeartStrong program does not require significant change on the part of the health care delivery system.

9.3 Implementation Effectiveness

This section summarizes findings on HeartStrong's implementation effectiveness, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee progress reports provided by the Lewin Group. Table 9-3 summarizes findings as of August 2014, unless otherwise noted.

Table 9-3: HeartStrong Implementation Effectiveness Research Questions and Findings

Research Questions	Findings
Was the intervention delivered as intended to the target population in doses associated with effectiveness?	• According to HeartStrong, as of March 2014 participation was 51% below initial projections.[a] ○ As of July 2014, program leaders reported a substantial increase in enrollment associated with the addition of insurer partner Humana. • Program leaders stated that they consider any patient enrolled in the program as receiving the "minimally effective dose" of the program.

What were key successes in implementing the innovation as designed and factors associated with success?	• HeartStrong reports that the following strategies have helped increase enrollment:
	  ○ using a tracking mechanism on the recruitment mailings which helps program advisors gauge when to time the outreach call, improving staff efficiency and ability to recruit patients
	  ○ co-branding recruitment letters with insurer partners
	  ○ conducting multiple recruitment follow-up calls during different times of the day, including evenings and weekends
	  ○ offering a $25 incentive first for enrollment and again upon setting up the GlowCap devices
	• HeartStrong reports that the following strategies have helped increase patient engagement:
	  ○ using a single program advisor to work with the patient, which helps establish relationships between advisors and patients and improves the program's ability to address non-adherence
	  ○ developing standardized responses to common patient concerns (e.g., why do you need my claims information?), which has helped program advisors communicate effectively with patients
	• HeartStrong reports that an inventory tracking system (database) for GlowCap bottles has enabled the program to track device malfunctions and helped ensure that the program has enough GlowCaps for the increasing number of program participants.

What were the challenges in implementing the innovation as designed?	• HeartStrong reports that it has had difficulty recruiting patients due to
	  ○ incomplete contact information, particularly phone numbers, for a substantial proportion of eligible participants; and
	  ○ lack of familiarity with Penn Medicine (as the sponsor of the HeartStrong program) in some areas not near Philadelphia.
	• HeartStrong has encountered connectivity issues among patients without a cell phone signal; GlowCaps use cell phone signals to transmit alerts and other data.

Research Questions	Findings

What changes were made to the innovation to increase enrollment, improve care, or reduce expenditures?	• HeartStrong has added insurer partners, increased staff, and improved its process for finding patient contact information (through the use of a fee-based web searching service, Intelius) to increase patient enrollment.
	• Program leaders decided to temporarily suspend the "opt-out" and "alternative device" side experiments in an effort to focus staff time and attention on meeting enrollment targets for the program.
	  o The "opt-out" experiment tested the effectiveness of giving patients GlowCap bottles by mail as part of recruitment, and the "alternative device" experiment tested a device that uses a landline instead of cell phone service to transmit alerts and other data.
	• HeartStrong has worked with insurer partners to refine the patient recruitment letter.
	  o The Aetna beneficiary recruitment letter now includes a paragraph that explains the collaboration with UPenn since Aetna has a national presence, and not all beneficiaries are familiar with Penn Medicine.
	• HeartStrong has redesigned the patient website to provide more program information and created a brochure to accompany the recruitment letter to improve patient engagement.

Did the innovation use internal evaluation findings to inform the implementation process, when necessary?	• Program leaders review recruitment data on a weekly basis to monitor enrollment deficits. • UPenn is conducting a "social influence" experiment to learn more about whether involving friends and family members in the HeartStrong program is an effective way to improve adherence. • HeartStrong used qualitative interviews with patients to revise components of the innovation, particularly related to timing enrollment (recruiting patients after discharge instead of during hospitalization). • HeartStrong collects feedback from patients through end-of-program surveys and during interactions with program advisors to inform ongoing program operations. • Since January 2014, HeartStrong has been tracking how program advisors spend their time. This information will provide insights into the ideal staffing model for the program. • HeartStrong tracks web metrics to monitor patient use of the website.

[a]Source: Lewin Quarterly Awardee Progress Report, HeartStrong (January-March 2014)

9.4 Workforce

This section summarizes findings on workforce issues related to the HeartStrong innovation, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee progress reports developed by the Lewin Group. Table 9-4 summarizes findings as of August 2014, unless otherwise noted.

Table 9-4: HeartStrong Workforce Research Questions and Findings

Research Questions	Findings
Did the innovation contribute in filling health care workforce gaps?	• The HeartStrong innovation relies on automated alerts and program advisors to follow up with non-adherent patients. As a result, the HeartStrong program can serve as an additional source of patient support beyond what existing health care professionals and other care team members traditionally offer.

Research Questions	Findings
What type and level of workforce training does the innovation provide?	• Staff receive training on patient engagement techniques and specific medical issues, such as AMI. • The program has conducted two in-house coaching sessions during which program advisors make mock calls, listen to recordings of the calls, and receive feedback.
What type of support structure is available for staff?	• Scripts and resource materials for non-adherent patients are available for program advisors to use during communication and outreach with patients.
What type of support structure is effective for staff deployment?	• Weekly social worker rounds provide opportunities to discuss challenges or themes that arise from recruitment calls and participant case management. • Program leaders and program advisors meet twice a week to check in on the execution of the program.
How does the innovation affect staff satisfaction?	• Anecdotally, program leaders report that research coordinators have responded positively to their new roles, including performing social work functions. However, HeartStrong does not formally measure staff satisfaction.
Has the innovation experienced high staff turnaround? If so, what measures have been taken to remedy the problem?	• HeartStrong has experienced minimal staff turnover, with only two individuals leaving the project since its launch (both separations occurred in July 2014). HeartStrong has filled both these positions.
What workforce changes were made by the innovation, and did these changes help improve patient outcomes and experience or reduce expenditures and health service use?	• The program advisor role, which includes research coordinators and social workers, was created specifically for HeartStrong, so this position represents a workforce change. HeartStrong also hired information technology specialists specifically for the program.

9.5 Context

This section summarizes findings on context issues related to the HeartStrong intervention, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee progress reports developed by the Lewin Group. Table 9-5 summarizes findings as of August 2014, unless otherwise noted.

Table 9-5: HeartStrong Context Research Questions and Findings

Research Questions	Findings
What endogenous (e.g. organizational) and exogenous (policy and environmental) factors affect implementation?	• Insurers have been receptive to partnerships with HeartStrong, but contractual agreements and data transfer requirements with the insurers have required significant HeartStrong program staff time. ○ In some cases, HeartStrong has leveraged the leadership of an advisory board consisting of University of Pennsylvania Health System and insurance partner senior leaders to help shepherd and expedite contractual agreements. • Anecdotal reports from HeartStrong indicate that exogenous factors such as cost of medications/copayments, patient behavioral health issues, and gaps in care coordination account for the majority of patient medication adherence challenges. • UPenn's regulatory environment requiring all program updates to be submitted to the local Institutional Review Board for approval has somewhat limited the rapid innovation change cycle the program intended to implement.
How is senior management structured, and how does it lead and communicate innovation changes to implementers?	• The Principal Investigators (PIs) oversee the program and make decisions related to the study design and intervention, with input from a study-level decision making team consisting of co-investigators and statisticians. • The Project Director and Project Manager report to the PIs and supervise all other HeartStrong staff, including research assistants and social workers. • Small decisions about the program are communicated via email, and more substantive decisions are communicated during in-person meetings to allow for discussion and questions.
How does the innovation affect existing hospitals, medical practices, or other settings that provide health care to participants?	• The HeartStrong program does not affect the existing health care setting structure because it is mostly delivered separately. • Program advisors reach out to a patient's primary care provider or cardiologist (whomever the patient designates) when a patient is non-adherent, though program advisors usually do not speak to the physician directly and instead leave a brief message to be minimally invasive.
Are there unintended negative consequences of the innovation? If so, how can they be mitigated in similar models in the future?	• Program leaders did not report any unintended negative consequences of the innovation.
To what extent does the innovation duplicate practices or programs that are already existent?	• Program leaders indicated that there has not been any conflicting overlap with or duplication of other programs, including care management programs, with which patients may be involved. Program leaders see the HeartStrong program as being complementary and not competing with other available programs • UPenn encourages patients to take advantage of care management programs available through their partner insurers.
How can successful innovation components be scaled and replicated in other settings?	• The program may be easily scalable when implemented through a hospital (i.e., as part of the discharge plan) or insurance company with existing patient relationships, which would reduce the amount of effort required to recruit patients. • To facilitate scalability, program leaders designed the innovation components to be simple, low-touch, and low-intensity, while leveraging existing technology.

9.6 Concluding Observations

The HeartStrong program aims to improve patient adherence to cardioprotective medication in the year after AMI through a simple, low-resource innovation. Compared to other MM programs, the HeartStrong innovation is low-touch and low-intensity, leveraging existing technology to facilitate scalability, and it is implemented more or less independently from the rest of the health care system. Its model for improving medication adherence serves as a source of patient support beyond what existing health care professionals traditionally offer. The innovation created a new staff role, the program advisor, which is filled by research coordinators and social workers who work with patients over the phone to address adherence issues. HeartStrong also hired new information technology specialists, who perform data analysis and web development for the program. Additionally, HeartStrong has expanded the roles of existing management, administrative, and physician staff positions to assist with the program.

HeartStrong has faced challenges enrolling patients, navigating the existing regulatory environment, and implementing contractual agreements with partner insurers. Like most HCIA MM awardees, the program's enrollment is below expectations – 51% less than initial projections as of March 2014 – due in part to incomplete contact information for many eligible participants and a lack of familiarity by potential enrollees with Penn Medicine outside the Philadelphia area. HeartStrong has tried numerous strategies to increase enrollment. According to program leaders, successful strategies include adding additional insurer partners, using tracking mechanisms on recruitment mailings, co-branding recruitment letters with insurer partners, conducting multiple recruitment follow-up calls during different times of the week, and offering financial incentives for enrolling and using the GlowCaps. Other challenges have been more difficult to address, such as the amount of staff time required to set up contracts with partner insurers. In addition, because all program updates must be submitted to the local Institutional Review Board for approval, HeartStrong is limited in its ability to make program changes in a short timeframe.

Despite these challenges, the innovation continues to improve its implementation efforts and effectiveness, most notably by identifying effective strategies for increasing patient engagement. For example, using a single program advisor to work with each patient has helped establish relationships between advisors and patients and has improved the program's ability to address non-adherence. Additionally, developing standardized responses to common patient concerns (e.g., why do you need my claims information?) has helped program advisors communicate effectively with patients. Looking forward, the next milestone in HeartStrong's implementation will be to provide data on program participants and comparison groups that will allow a quantitative analysis of the impact of the innovation on health care outcomes, care quality, service utilization, and costs.

10 EVALUATION OF THE PHARMACY SOCIETY OF WISCONSIN HEALTH CARE INNOVATION AWARD

This section provides an overview of the evaluation findings for the Pharmacy Society of Wisconsin (PSW) award as of August 2014, unless noted otherwise. The findings are based on interviews with project leaders, a review of progress reports developed by the Lewin Group, and documentation provided by the awardee. Section 10.1 discusses the evaluability of the awardee. Section 10.2 through 10.5 present the findings for the following evaluation categories: innovation components, implementation effectiveness, workforce issues, and context. Finally, Section 10.6 provides concluding observations on the PSW innovation. There are no quantitative findings as of August 2014 for PSW, as Acumen has not received participant-level data from the awardee. The research category of program effectiveness will be evaluated once participant-level data are available.

10.1 Evaluability

Table 10-1 provides an overview of the primary factors affecting the evaluability of PSW based on information available as of August 2014, unless otherwise noted. These factors are sample size, comparison group, data availability, and program maturity, which is defined by the program's stage of implementation and the extent to which it has changed since launch.

Table 10-1: PSW Evaluability Overview

Evaluability Factor	Status
Sample Size	• PSW reports 21,829 participants enrolled through March 2014.[a] ○ Payer mix (January- March 2014): 65% Medicaid; 31% dual eligible; 4% other.
Comparison Group	• PSW does not identify a comparison group.
Data Availability	• Acumen has not received participant-level program data from awardee.
Program Maturity	• The medication therapy management (MTM) model that PSW is spreading across the state of Wisconsin is mature, given that it has been in existence for the past eight years and has undergone only minimal changes since the launch of the HCIA project.

[a]Source: Lewin Quarterly Awardee Progress Report, PSW (January- March 2014)

10.2 Innovation Components

The PSW project implements across the state of Wisconsin a standardized MTM model in which existing community pharmacists and pharmacy technicians provide expanded set of services to help beneficiaries effectively manage their medications. The project has developed the Wisconsin Pharmacy Quality Collaborative (WPQC), a network of pharmacies and contracted health plans, for the expansion and standardization of the MTM model. Under the innovation, participating pharmacies become members of WPQC through a registration and accreditation process, and pharmacists or pharmacy technicians affiliated with the accredited pharmacies receive training and become certified to provide the innovation's MTM services.

The PSW project is a collaboration among PSW, the University of Wisconsin-School of Pharmacy, and contracted payers, including United Way of Dane County, Wisconsin Medicaid, Unity Health Insurance, Network Health, Gunderson Health System, Wisconsin Physician Service (WPS), and United Healthcare.

The project generally targets Medicaid and partnering commercial insurance plans' beneficiaries who have at least one of the following health conditions: diabetes, heart failure, asthma, or other geriatric syndromes, although the inclusion criteria vary by the type and level of the MTM intervention. Eligible beneficiaries are usually identified through an analysis of claims submitted by partner insurance plans to the Aprexis Health Solutions system, which uses logic algorithms based on medication markers and other proxies to flag eligible beneficiaries. Participating insurance payers can tailor the patient identification algorithm to meet their needs and standards. Eligible beneficiaries are also identified by participating community pharmacists, through physician referrals, or by the United Way of Dane County. Once an eligible beneficiary is identified, staff from a participating community pharmacy contacts the individual about enrolling in the program.

All participating pharmacies and pharmacists are required to use the Aprexis software platform to provide decision support, document all MTM interventions, generate reports to primary care providers (PCPs) of the patients being served, and bill for services. Key components of the innovation are:

- **Pharmacy registration and accreditation and pharmacist certification.** To participate in the program, pharmacies must register with WPQC and meet rigorous standards to become accredited. When a pharmacy registers, it signs a good faith agreement stating that it will comply with the standards of the PSW program, including community pharmacy quality best practices, and that it will implement policies and procedures for providing PSW's MTM services. The agreement also requires registered pharmacies to have at least one pharmacist working at their location receive training to become certified to deliver PSW's MTM services.
- **Standardized provision of MTM services.** Once pharmacists of an accredited pharmacy become certified under the PSW innovation, they are authorized to provide two levels of MTM services:
    - *Level 1*(L1) services are provided during medication drug dispensing (point of sale) and include interventions that address medication cost-effectiveness, initiation, discontinuation, modification, and instruction.
    - *Level 2*(L2) medication management services comprise an initial face-to-face comprehensive medication review and assessment and up to three follow-up visits annually per covered beneficiary. The initial review and assessment typically lasts 45 to 60 minutes and is provided by appointment in a private area within the pharmacy.
- **Use of Aprexis health information technology platform.** In addition to using Aprexis to identify eligible beneficiaries, pharmacists use the platform to document patient encounters, for billing and reporting purposes, and to inform their consultations with

beneficiaries. Aprexis provides evidence-based clinical toolkits that serve as the framework for the pharmacists' MTM consultations. The toolkits are intended to help with the workflow of the intervention and provide clinical decision support by leading the pharmacists through the various topics and questions that need to be asked, depending on responses from the beneficiary.

- **Coordination with other health care providers.** As part of the PSW innovation, pharmacists are required to communicate every event or service they perform to the beneficiary's PCP/prescriber. In cases where the pharmacist is recommending a modification to the medication regimen, the PCP must approve (and the patient must be amenable to) the change. Aprexis facilitates communication between pharmacists and PCPs by automatically generating and faxing documents summarizing each interaction with the beneficiary.

Table 10-2 highlights the research questions and findings related to PSW's innovation components.

Table 10-2: PSW Components Research Questions and Findings

Research Questions	Findings
How is the innovation designed to reduce expenditures or improve care quality?	• PSW's innovation is designed to improve health outcomes and decrease costs by using pharmacists to identify and resolve drug therapy problems and to ensure adherence to evidence-based medication therapy guidelines. • The innovation also aims to reduce costs by providing information on less expensive drug alternatives to patients.
Who does the intervention target?	• The innovation targets community pharmacies, as well as some clinic ("non-traditional") pharmacies throughout the state of Wisconsin, in order to expand the traditional role of pharmacists. The innovation targets Wisconsin Medicaid and partnering commercial insurance plan beneficiaries who have at least one of the following conditions: diabetes, heart failure, asthma, and geriatric syndromes. • The innovation's targeted patient population includes, but is not limited to, CMS priority populations such as racial or ethnic minorities, low-socioeconomic status populations, and patients with specific disease groups (as listed above).

Research Questions	Findings

What are the key components of the innovation?	• The PSW innovation consists of pharmacy- and patient-level interventions.
	  ○ The pharmacy-level intervention involves registration and accreditation of participating pharmacies to meet rigorous standards, including training and certification of at least one of their pharmacists to deliver MTM services.
	  ○ During medication dispensing (point-of-sale), pharmacists participating in the innovation provide Level 1 (L1) services to eligible beneficiaries that include: (i) review of cost effectiveness of medications and opportunities to change the dose, dosage form, or duration of therapy; (ii) consultation and education to improve patient adherence and in home medication management; (iii) consultation on any device associated with a medication; and (iv) review of opportunities to add or delete medications based on clinical guidelines, indication, or other reason as determined by the pharmacist.
	  ○ Eligible beneficiaries may also receive Level 2 (L2) services: a more in-depth comprehensive medication review and assessment provided on an appointment basis followed by up to three pharmacist visits annually. L2 services include: (i) identification, resolution, and prevention of medication-related problems; (ii) assessment of patient's health status; (iii) formulation of a medication treatment plan; (iv) in-depth education and training on adherence and appropriate medication use; (v) provision of a personal medical record and medication action plan following each encounter; and (vi) follow-up medication reviews to monitor and evaluate patient response to therapy.
	• A representative from an accredited pharmacy (pharmacist, pharmacy technician, or pharmacy student) contacts eligible beneficiaries to enroll them in the program.

To what extent is the innovation viewed as a relatively simple "plug in" or a fundamental and major change within the implementing organization?	• The innovation requires significant change on the part of participating pharmacies.
	  ○ The innovation requires a rigorous pharmacy accreditation process, extensive pharmacy staff training and certification, and the use of a health information technology platform (Aprexis) for documenting patient encounters and for billing and reporting purposes.
	  ○ Provision of L2 services also requires a significant change to the workflow of participating pharmacies.

10.3 Implementation Effectiveness

This section summarizes findings on PSW's implementation effectiveness, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee progress reports provided by the Lewin Group. Table 10-3 summarizes findings as of July 2014.

Table 10-3: PSW Implementation Effectiveness Research Questions and Findings

Research Questions	Findings
Was the intervention delivered as intended to the target population in doses associated with effectiveness?	• According to PSW, as of March 2014, program participation (i.e., beneficiaries who receive the MTM intervention from a certified pharmacist) was 8.1 % above initial projections.[a] • According to PSW, as of March 2014, the innovation has cumulatively certified 1,136 pharmacists and has accredited 281 pharmacies, well exceeding Year 2 (and even Year 3) expectations for both measures. [b] • L1 services are utilized at high rates compared with PSW projections, while L2 services are underutilized relative to projections.
What were key successes in implementing the innovation as designed and factors associated with success?	• Program leaders report the following factors have cumulatively led to more beneficiaries than expected receiving L1 services: o the efforts of designated program staff called Regional Implementation Specialists (RIS) who focus on educating pharmacies about PSW's MTM model and helping them implement the innovation; o sharing data with participating pharmacies on their utilization trends (e.g., number of services provided), and o encouraging pharmacy technicians to become more involved in the process of identifying beneficiaries, particularly those eligible for L1 services. • PSW reports that the following strategies have improved patient engagement: o providing training webinars to pharmacists that include topics on how to better engage beneficiaries; o using clear and jargon-free language with beneficiaries; o improving the scripts used by recruiting staff for patient enrollment (e.g., clearly describing services and speaking from the first person perspective); o individualizing messaging to the patient (e.g., tailoring the benefits of the program to the patient's unique circumstances); and o using an "opt-out" approach for scheduling L2 services, in which follow-up visits are scheduled for beneficiaries unless they explicitly decline.

Research Questions	Findings
What were the challenges in implementing the innovation as designed?	• PSW reported experiencing some false positive patient identification occurring when a private payer began using the Aprexis system. Program leaders believe this trend was largely driven by one private payer who was able to explain that the cases identified were not false positives based on the logic models. Rather, the timing of the patient eligibility data upload contributed to the appearance of false positives. • PSW reports that they have had difficulty getting pharmacists to provide L2 services due to the following two factors: o Aprexis does not identify eligible Wisconsin Medicaid beneficiaries for L2 services because the system is not yet approved as a MTM HIT Vendor o Pharmacists have struggled with providing L2 services because many pharmacies are "one-man" pharmacies, and these services require dedicated time outside of the traditional dispensing workflow (where the majority of L1 services are identified and processed) and require an expanded set of skills.
What changes were made to the innovation to increase enrollment, improve care, or reduce expenditures?	• PSW is developing "starter discussions" on certain topics (such as adherence) to help pharmacists learn how to customize service invitations for beneficiaries to use L2 services. These talking points will supplement existing scripts, which are focused primarily on explaining the benefits of the program. • PSW added a health plan partner, UnitedHealthcare (UHC) of Wisconsin, in March 2014. PSW updated a policy defining the type of pharmacy practice sites acceptable to perform and bill for WPQC MTM services. This policy update resulted in specific clinic pharmacy models providing WPQC MTM services, which will contribute to the total number of services provided and billed and number of beneficiaries served. • PSW continues to engage in efforts to increase patient referrals to the program by encouraging participating pharmacies to contact local physicians or physician groups and educate them about the MTM program. o PSW collaborated with a local health system on a pilot program coordinating the transition of care communications from an inpatient unit of a health system to the patient's home pharmacy, which was well-received. The health system is interested in expanding this transition of care communication model to other parts of the health system.
Did the innovation use internal evaluation findings to inform the implementation process, when necessary?	• Program leaders (including Regional Implementation Specialists), insurance payers, and participating pharmacies are using performance reports generated by the Aprexis system to monitor program implementation. • Program leaders use the semi-annual quality review process to solicit feedback from pharmacists about barriers to implementation and other areas of need. • PSW is surveying participating pharmacies about their current staffing models and service hours and will compare this information with performance data to determine optimal staffing models for the program.

[a]Source: Lewin Quarterly Awardee Progress Report, PSW (January- March 2014)
[b]Source: HCIA Measurement Report, PSW (January- March 2014)

10.4 Workforce

This section summarizes findings on workforce issues related to the PSW intervention, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee progress reports provided by the Lewin Group. Table 10-4 summarizes findings as of July 2014.

Table 10-4: PSW Workforce Research Questions and Findings

Research Questions	Findings
Did the innovation contribute in filling health care workforce gaps?	• The innovation focuses on enabling existing community pharmacists, technicians, and pharmacies to provide an expanded set of services to beneficiaries to help them effectively manage their medications.
What type and level of workforce training does the innovation provide?	• Certified pharmacists must complete an 11-hour online training program on the innovation, including program policy and procedures, patient eligibility criteria, and relevant clinical information. The training also provides simulations and case studies for pharmacists to review. • Pharmacy technicians at accredited pharmacies receive a modified 5-hour training that does not include the clinical and case study content. • PSW developed additional clinical training (available online) on the targeted medical conditions, based on feedback that this training was needed to build pharmacist confidence in offering L2 services. PSW offers half-day- to all-day pre-conference workshops and 6 hours of dedicated WPQC trainings at each of its two annual education conferences in the state for its membership. • The WPQC team conducts webinars, publishes a bimonthly e-newsletter, and contributes an operations and clinical article to the bi-monthly journal for the PSW membership. • In response to pharmacist feedback, program leaders are considering a training session for pharmacy owners and managers on concepts such as organizational culture change and appropriate staffing models for an MTM program.
What type of support structure is available for staff?	• PSW offers educational resources and other tools on its website to help pharmacies that are implementing the innovation. These resources include: FAQ's, recorded webinars on operational and clinical issues, patient identification tools, physician and patient brochures, payer MTM program specifics, quality indicators, metrics, policies, etc. • The Aprexis software incorporates the flow and evidence-based guidance of the WPQC-designed clinical toolkits that serve as the framework for MTM services, providing help with the workflow of the services and clinical decision support. PSW updates these toolkits periodically to include new evidence-based guidelines as they become available. • PSW is creating content for an implementation manual for participating pharmacies that provides detailed information on how to become a WPQC accredited pharmacy and certified pharmacist/technician, transitioning from a traditional pharmacy model to an MTM service provider model, providing WPQC services via the HIT software platform, and marketing the MTM service to beneficiaries and prescribers. • PSW established 10-week statewide workgroups to address the low L2 rates. These workgroups offer guidance to pharmacists on topics such as administering L2 services, inviting patients to use the program, and helping pharmacies transition from an existing medication dispensing model to a medication therapy management model to effectively offer both L1 and L2 MTM services.

Research Questions	Findings
What type of support structure is effective for staff deployment?	• Program leaders report that the 10-week pharmacist workgroups have been well-received, useful, and effective; PSW reports that sites that were not providing L2 services before the workgroups have begun doing so because of participation in the workgroups. o Recent survey data from PSW support this finding, with 71% of participating pharmacists indicating that the workgroups have improved their understanding of how to identify, recruit, and retain beneficiaries for L2 services.
How does the innovation affect staff satisfaction?	• PSW does not formally measure staff satisfaction.
Has the innovation experienced high staff turnaround? If so, what measures have been taken to remedy the problem?	• The core PSW team implementing the pharmacy-level intervention has not experienced staff turnover throughout the implementation of this innovation. PSW does not formally track but estimates minimal participating pharmacist turnover.
What workforce changes were made by the innovation, and did these changes improve patient outcomes and experience, or reduce expenditures and health service use?	• Participating pharmacists have expanded their roles by integrating the services provided as part of this innovation into their regular, existing practices. • Pharmacy technician roles have also expanded as they participate in the MTM workflow. Technicians are able to identify potential L1 services for the pharmacist to evaluate, phone beneficiaries to schedule L2 services, document non-clinical details in the patient profile, and assist in claims processing. • PSW has created a new position, the Regional Implementation Specialist (RIS), to facilitate the spread and adoption of the innovation throughout Wisconsin. The program's RISs conduct site visits to each pharmacy in their region at least twice per year and communicate regularly with each pharmacy via email, phone, or in-person to problem-solve and motivate each pharmacy.

10.5 Context

This section summarizes findings on context issues related to the PSW intervention, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee progress reports developed by the Lewin Group. Table 10-5 summarizes findings as of August 2014.

Table 10-5: PSW Context Research Questions and Findings

Research Questions	Findings
What endogenous (e.g. organizational) and exogenous (policy and environmental) factors affect implementation?	• Program leaders indicated that the steering committee has played a critical role in the successful implementation of the program by providing guidance on program design and implementation, quality and evidence-based best practices, and assistance in recruiting pharmacies and pharmacists. ○ The 13-member steering committee comprises representatives from major health plans; chain, health-system, and independent community pharmacies; the University of Wisconsin School of Pharmacy; the Wisconsin Medical Society; and PSW. • Program leaders believe that PSW's role as the state's only pharmacy organization and its ability to leverage its leadership, membership, and existing marketing resources to promote the program have increased pharmacy/pharmacist buy-in and the willingness to implement the program. • Program leaders also stated that the clinical advisory group, whose role is to ensure alignment with evidence-based practices, advise on clinical logic, and review program data, has also contributed to successful implementation and development of the participating pharmacists. • Program leaders identify the need for a more systematic change in pharmacy practices, including changes in the organizational culture and workflow, to deliver MTM services for the innovation to be maximally effective, and that it is difficult to "retrofit MTM services into a traditional dispensing workflow." • To reimburse for MTM services, commercial payers require pharmacists providing MTM services to be directly affiliated with a dispensing pharmacy, whereas the Wisconsin Medicaid program allows pharmacists practicing in community and clinic pharmacies to participate as long as the billing pharmacy is a Wisconsin Medicaid provider. • Program leaders indicated that if a patient's provider supports the service, beneficiaries are more likely to participate in the program.
How is senior management structured, and how does it lead and communicate innovation changes to implementers?	• The CEO/VP of PSW is the overall lead of the project, and he, along with the VP of Healthcare Quality Initiatives and the HCIA Project Director, constitute the lead management staff. They are responsible for programmatic direction and decisions related to implementation with input from the steering committee and clinical advisory group. • Other staff members who work on the project either directly or indirectly report to the CEO/VP of PSW or the Project Director. • Project leaders use team staff meetings to ensure the project stays on task and to communicate decisions or address issues.
How does the innovation affect existing hospitals, medical practices, or other settings that provide health care to participants?	• The innovation is based in the community pharmacy setting with community pharmacists collaborating with prescribers and health care providers, as appropriate, to address patient needs. All recommendations for intervention are communicated directly to the patient's prescriber.

Research Questions	Findings
Are there unintended negative consequences of the innovation? If so, how can they be mitigated in similar models in the future?	• Program leaders did not report any unintended negative consequences of the innovation.
To what extent does the innovation duplicate practices or programs that are already existent?	• Some participating pharmacies also offer other MTM programs, often through MTM vendors such as Outcomes MTM or Mirixa.
How can successful innovation components be scaled and replicated in other settings?	• L1 services have potential for wider dissemination since they do not require as significant a change in pharmacy workflow compared with L2 services. • The program can leverage its corporate partners with a national presence (i.e., United Healthcare, Walgreens, and Shopko) to scale the model more broadly beyond Wisconsin. • PSW has developed a Quality Assurance Process and education/training that is scalable across multiple organizations. • Program leaders prepared a return on investment document that can be used by interested pharmacies to assess the viability of including this MTM intervention in their business practices. • A newly pilot-tested inpatient transitions of care communication model uses Epic, an electronic health records (EHR) system widely used by health care providers. The communication model has the potential to be expanded.

10.6 Concluding Observations

PSW relies on an information technology platform, Aprexis, to identify eligible beneficiaries and support other program functions. The program has been successful at enrolling eligible beneficiaries; total enrollment as of March 2014 is 8 percent above initial projections.[9] However, enrollees' use of PSW's two levels of services is more concentrated in point-of-sale L1 MTM services than in the more comprehensive L2 MTM services. As a result, L1 services are utilized at higher rates compared with PSW projections, while L2 services are underutilized relative to projections.

PSW is working to further improve its enrollment practices and has identified a number of factors associated with successful enrollment. For example, PSW has found that sites that establish relationships with beneficiaries and foster trust between pharmacists and beneficiaries have been the most successful with enrollment. PSW provides training to pharmacists on these best practices and has developed toolkits to help pharmacists enroll beneficiaries.

The PSW program has been successful in its goal of spreading its MTM model throughout the state; it projects that by the end of 2014 over 50 percent of pharmacies in

[9] Source: Lewin Quarterly Awardee Progress Report, PSW (January- March 2014)

Wisconsin will be providing the innovation's services.[10] According to PSW officials, the key to this success has been the program's newly developed RIS role. RISs assist multiple pharmacies in each region with adopting the innovation. The PSW innovation does not establish new workforce positions at each delivery site. Instead, it requires existing pharmacists and pharmacy technicians to expand their roles by incorporating the MTM services into their workflow. PSW officials also attribute their implementation success to the program's 13-member steering committee, which includes representatives from partner insurance plans, community pharmacies, the University of Wisconsin School of Pharmacy, the Wisconsin Medical Society, and PSW.

The PSW MTM program's large number of total enrollees and participating pharmacies across Wisconsin may support a robust evaluation of its downstream effects on health outcomes, quality of care, health service use, and medical expenditures of the population it serves. The next step for the PSW program is to provide the necessary data on program participants to Acumen to allow for an independent evaluation of the program's effectiveness.

[10] Source: Quarterly Awardee Narrative Reports, PSW (January- March 2014)

11 EVALUATION OF THE PHARM2PHARM HEALTH CARE INNOVATION AWARD

This section provides an overview of the evaluation findings for the University of Hawaii at Hilo's "pharmacist-to-pharmacist" or "Pharm2Pharm" award as of August 2014, unless noted otherwise. The findings are based on interviews with project leaders, a review of progress reports developed by the Lewin Group, and documentation provided by the awardee. Section 11.1 summarizes the evaluability of the awardee. Section 11.2 provides a detailed description of the innovation components, including targeted populations. Sections 11.3 through 11.5 present the findings for the evaluation categories of implementation effectiveness, workforce issues, and context. Section 11.6 contains concluding observations. There are no quantitative findings as of August 2014 for Pharm2Pharm, as Acumen has not received participant-level data from the awardee. The research category of program effectiveness will be evaluated once participant-level data are available.

11.1 Evaluability

Table 11-1 provides an overview of the primary factors affecting the evaluability of Pharm2Pharm, based on information available as of August 2014, unless noted otherwise. These factors are sample size, data availability, adequacy of Pharm2Pharm's comparison group, and program maturity, which is defined by the program's stage of implementation and the extent to which it has changed since launch.

Table 11-1: Pharm2Pharm Evaluability Overview

Evaluability Factor	Findings
Sample Size	• Pharm2Pharm reports 1,157 participants enrolled through March 2014.[a] ○ February 2013-March 2014 Payer Mix: 23% Medicare FFS; 38% MA; 14% Medicaid; 25% other.[a]
Comparison Group	• Pharm2Pharm does not have a randomized control group.[11]
Data Availability	• Program data on intervention group beneficiaries are not yet available for analysis of program effectiveness.
Program Maturity	• The Pharm2Pharm program is in a growth and development phase; since the program was implemented in February 2013, program leaders have instituted changes to patient identification and enrollment and modified program components and workflow.

[a]Source: Awardee email, Pharm2Pharm, August 1, 2014. Note: University of Hawaii sent corrected version of the enrollment and payer mix figures from the Lewin Quarterly Awardee Progress Report, Pharm2Pharm (January- March 2014)

[11] For self-evaluation purposes, the awardee considers individuals in the same age group and county as program participants but who do not receive Pharm2Pharm as their comparison group.

11.2 Innovation Components

University of Hawaii at Hilo's Pharm2Pharm program is a hospital pharmacist to community pharmacist care coordination program in Hawaii designed to address medication management risks that occur during transitions of care. According to the Hawaii Health Information Corporation, medication-related hospitalizations in Hawaii cost over $100,000,000 in 2010.[12] The elderly and those living in medically underserved areas are at particular risk for medication-related acute care use.

The Pharm2Pharm program aims to tackle medication-related issues that are particularly challenging to address in rural counties in Hawaii, which can suffer from physician shortages. The program is a partnership among the University of Hawaii at Hilo, the Hawaii Community Pharmacist Association, the Hawaii Health Information Corporation, and the Hawaii Health Information Exchange, as well as other partners. Patients eligible for Pharm2Pharm are identified during hospitalization by a hospital consulting pharmacist (HCP), who provides medication management services and follows up with patients after discharge. Pharm2Pharm also accepts referrals from ED staff and community physicians for patients who are at risk of hospitalization due to medication-related issues. After discharge from the hospital or ED, patients are linked to a community consulting pharmacist (CCP) who provides post-discharge medication management services, as well as ongoing medication management interventions. Primary care physicians (PCPs) receive updates from both the hospital and community pharmacist to promote open communication, collaboration, and coordinated care management across various health care and community settings.

Pharm2Pharm targets the elderly and others who have been hospitalized and are most at risk for subsequent medication-related hospitalizations and ED visits, regardless of insurance status. Eligible patients include patients age 65 or older; patients taking multiple medications, including drugs with a high incidence of adverse drug reactions or a narrow therapeutic index (i.e., drugs with a small difference between therapeutic and toxic doses, such as phenobarbital or lithium); patients experiencing an acute care episode due to a drug therapy problem; patients with previous acute care episodes or hospitalizations due to uncontrolled chronic conditions; and patients discharged and on a new home medication regimen for newly diagnosed acute coronary syndrome, atrial fibrillation, chronic obstructive pulmonary disease, congestive heart failure, or diabetes.[13] Hospitalized patients meeting these criteria may be identified by the HCP, who

[12] Source: HCIA Standard Operating Procedures, Pharm2Pharm (April-June 2014)

[13] Patients are considered ineligible if they will be discharged to a skilled nursing facility or hospice care, are not a full time county resident, have severe dementia, have active psychosis, are hospitalized related to a suicide attempt, or leave against medical advice.

manually reviews admissions or patient charts. Eligible patients may also be referred into the program by ED staff or community physicians.

The components of the Pharm2Pharm innovation are described in more detail below.

- **HCP medication management services:** An HCP provides in-depth medication reconciliation for admitted patients and provides education about the medication regimen, including home medications, and discusses any new medications that were ordered for the patient during the hospitalization. The HCP role was created specifically for the Pharm2Pharm program, and the HCPs serve as members of the hospital discharge planning team.
- **Handoff to community consulting pharmacist:** Prior to discharge, the HCP works with the patient to schedule a follow-up appointment with a CCP, ideally within three days of discharge. Once the patient is discharged from the hospital, the HCP sends a coordination of care document to the CCP (typically by fax, though some locations use secure electronic messaging). The HCP will also call the patient within one day of discharge to ensure the patient picked up his or her medications, answer any questions about the medications, and remind the patient of the appointment with the CCP.
- **CCP-coordinated medication management:** As noted, the patient attends an appointment with the CCP, ideally within three days of discharge. This appointment is nearly always face-to-face, either at a community pharmacy or in the patient's home. (If the patient requests to follow up only by telephone instead of in-person, the CCP will accommodate the patient's preference; however, this is very rare.) This initial visit typically consists of reviewing the patient's medication appropriateness and adherence. The pharmacist then conducts ongoing medication management at least once a month for a year after this initial appointment. All participating CCPs use a standard tool (designed specifically for the project) to document interventions and bill for services.
- **Payment restructuring for pharmacists:** CCPs receive four fixed payments per beneficiary over the course of the year. If a patient exits the program prior to his or her one year completion, the payment is prorated based on the duration the patient remained in the program. This payment model recognizes advanced, coordinated, and integrated medication management services for at-risk beneficiaries as a critical value-added specialty provided by pharmacists, rather than basing payment on the number of medications filled by the pharmacist.

Table 11-2 highlights the research questions and findings related to Pharm2Pharm innovation components.

Table 11-2: Pharm2Pharm Innovation Components Research Questions and Findings

Research Questions	Findings
How is the innovation designed to reduce expenditures or improve care quality?	• The Pharm2Pharm program aims to reduce costs; medication-related adverse events; medication errors; and rates of medication-related hospitalizations, readmissions, and emergency department (ED) visits by increasing collaboration between hospital- and community-based pharmacists during transitions of care and by increasing access to outpatient pharmacy services.

Research Questions	Findings
Who does the intervention target?	• Pharm2Pharm targets older adults in hospitals who are most at risk for medication-related hospitalizations and ED visits regardless of insurance status. • Initially, Pharm2Pharm targeted only rural areas with severe physician shortages; however, program leaders decided to expand the program to Honolulu County, an urban setting, as health care providers perceived a strong need for Pharm2Pharm services there, as well. • The innovation includes, but is not limited to, CMS priority populations such as racial or ethnic minorities, low-socioeconomic status populations, and patients with specific disease groups (acute coronary syndrome, atrial fibrillation, chronic obstructive pulmonary disease, congestive heart failure, and/or diabetes)
What are the key components of the innovation?	• The Pharm2Pharm program consists of medication management and care coordination services provided by hospital- and community-based pharmacists. o Hospital consulting pharmacists (HCPs) perform in-depth medication reconciliation for program participants prior to discharge. o Immediately after patient discharge, HCPs follow up with patients to check on their medication status and arrange a visit with one of the program's community consulting pharmacists (CCPs). Once this communication occurs, HCPs provide a formal handoff to the CCP by transmitting care transition documents, either by fax or secure electronic messaging. o Post-handoff, the CCP has face-to-face visits with the patient, unless the patient prefers telephone. The CCP has an average of twelve follow-up visits over the course of the year with frequency based on the patient's need; the visits are more frequent in the period immediately after discharge. These visits focus on the patient's health status; recent acute care visits; progress toward personal health goals; medication reconciliation, appropriateness, effectiveness, safety, and adherence; and patient education. o CCPs contact prescribers on a quarterly basis to provide patient updates, and make recommendations to optimize medications, as needed. • Patients are identified and enrolled by HCPs in participating hospitals. Eligible patients may also be referred into the program by ED staff or community physicians.
To what extent is the innovation viewed as a relatively simple "plug in" or a fundamental and major change within the implementing organization?	• The Pharm2Pharm program requires significant change on the part of the health care delivery system. o The program requires hospital pharmacists to engage in significant coordination efforts for patient care transition post discharge. o The program requires hospitals to include newly hired HCPs in their inpatient care team to deliver Pharm2Pharm services. o The program substantially expands the role of community pharmacists, who participate in the program through formal partnerships and contracts.

11.3 Implementation Effectiveness

This section summarizes findings on Pharm2Pharm's implementation effectiveness, based on qualitative information obtained from interviews with awardees and other stakeholders, and awardee progress reports developed by the Lewin Group. Table 11-3 summarizes findings as of August 2014, unless noted otherwise.

Table 11-3: Pharm2Pharm Implementation Effectiveness Research Questions and Findings

Research Questions	Findings
Was the intervention delivered as intended to the target population in doses associated with effectiveness?	• According to Pharm2Pharm, as of March 2014, participation is 68% below initial projections.[a] • Program leaders have not defined a minimally effective dose of the program at this time ○ The University of Hawaii has data on patients enrolled at hospital discharge, but does not have patient-level intervention data on their subsequent visits with community pharmacists as of July 2014. • Program leaders hope to qualitatively identify a minimally effective dose in consultation with HCPs and CCPs as part of the next quarterly learning collaborative.

What were key successes in implementing the innovation as designed and factors associated with success?	• Pharm2Pharm reports that the following strategies have helped increase patient enrollment:
	  ○ using more standardized enrollment criteria,
	  ○ creating scripts for HCPs and CCPs to use during patient encounters, and
	  ○ providing examples of services the patient will receive during recruitment to demonstrate the value of the program.
	• Pharm2Pharm reports that the following strategies have helped increase patient retention:
	  ○ having HCPs conduct the immediate post-discharge follow-up calls and schedule appointments with CCPs,
	  ○ using an "opt-out" method consisting of sending a letter to a non-responsive patient with a scheduled date and time for an appointment with the CCP, and
	  ○ using multiple follow-up methods, including trying to reach a patient at various times of the day.

What were the challenges in implementing the innovation as designed?	• Program leaders report that enrolling patients has been a challenge due to patient perception that PCPs are already monitoring their medications closely and effectively.
	• Program leaders also report challenges in engaging patients in follow-up appointments with CCPs within three days post-discharge, though the process change of having the HCP schedule the follow-up appointment has helped with this.
	• Pharm2Pharm reports relatively low rates of prescriber/provider acceptance of pharmacist recommendations.
	  ○ Physician surveys conducted by Pharm2Pharm suggest this is driven by a lack of awareness of the program, failure to identify patients as program participants, and receipt of large volumes of information by fax causing communication from CCPs to get lost.
	  ○ Efforts to encourage electronic communication as opposed to fax-based communication have helped physicians distinguish CCP communication from other less "meaningful" information.
	• Pharm2Pharm reports that ED-based recruitment by HCPs was not cost-effective and had limited added value, as most ED patients eligible for Pharm2Pharm are admitted to the hospital and already enrolled through the inpatient enrollment process. (HCPs no longer conduct formal ED recruitment, though referrals from ED staff are encouraged).

Research Questions	Findings
What changes were made to the innovation to increase enrollment, improve care, or reduce expenditures?	• Pharm2Pharm has expanded to Honolulu County (the first urban county). ○ Beginning mid-June 2014, the program was offered in one hospital in Honolulu County, and at the end of July 2014, the program expanded to a second hospital. • Pharm2Pharm is focusing on improving the quality and consistency of services by emphasizing adherence to Standard Operating Procedures (SOPs), and standardizing how patient visits are conducted. • As of May 2014, Pharm2Pharm allows referrals from community providers who have patients at risk of medication-related hospitalization.
Did the innovation use internal evaluation findings to inform the implementation process, when necessary?	• Internal monitoring data related to the frequency of CCP contact with enrolled patients' physicians are used to identify CCPs with low rates of physician contact. • Site visits conducted by partner Altarum were used to monitor and standardize implementation practices across sites. • Program leaders are working to identify top performing pharmacists and compare patient outcomes based on program data on patient retention, frequency of physician contact, and patient visits with CCPs within three days after discharge. This information will be used to identify minimum performance standards for CCPs. • Program leaders plan on using quarterly learning collaboratives to collect qualitative information from HCPs and CCPs regarding program effectiveness, successful engagement strategies, and skills that will be used to inform ongoing implementation of the program.

[a]Source: Lewin Quarterly Awardee Progress Reports, Pharm2Pharm (January- March 2014)

11.4 Workforce

This section summarizes findings on workforce issues related to the Pharm2Pharm intervention, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee progress reports developed by the Lewin Group. Table 11-4 summarizes findings as of August 2014.

Table 11-4: Pharm2Pharm Workforce Research Questions and Findings

Research Questions	Findings
Did the innovation contribute in filling health care workforce gaps?	• The Pharm2Pharm model expands the traditional role of hospital- and community-based pharmacists by emphasizing care coordination and enabling pharmacists to provide an expanded set of services to help patients properly and effectively manage their medications. As such, the program can support or fill gaps in care that occur during health care delivery, particularly during transitions of care.

What type and level of workforce training does the innovation provide?	• HCPs and CCPs receive training on the goals and objectives of the Pharm2Pharm model, specific processes and procedures involved in the model, high risk medication, and continuous quality improvement.
	  ○ Program leaders have refined how this training is provided to HCPs and CCPs. An eight-hour live training session has been modified to a two-hour home-based (electronic) SOP review followed by a six-hour live training focusing on case-based learning.
	  ○ Program leaders are currently in the process of converting the training to an entirely web-based, interactive format.
	• Pharm2Pharm is currently developing additional training on cultural competency, which should be instituted by the end of the year.

Research Questions	Findings
What type of support structure is available for staff?	• Pharm2Pharm created SOPs to ensure consistent practice, optimize program efficiency and effectiveness, and standardize training of providers involved in Pharm2Pharm care delivery. SOPs are periodically updated and disseminated to Pharm2Pharm pharmacists. • Quarterly learning collaboratives are available to participating pharmacists, providing them with an opportunity to give feedback on additional training/education needs and to share challenges, successes, and lessons learned. (Pharmacists receive two hours of continuing education credit for participating in the quarterly collaborative.)
What type of support structure is effective for staff deployment?	• TBD
How does the innovation affect staff satisfaction?	• Surveys conducted by the Pharm2Pharm program have found that HCPs and CCPs are generally satisfied with Pharm2Pharm. For example, they report that direct patient contact as well as identification and resolution of drug therapy problems "almost always" have a positive, meaningful impact on care.
Has the innovation experienced high staff turnaround? If so, what measures have been taken to remedy the problem?	• Pharm2Pharm has experienced minimal staff turnover, with only three individuals (a project manager, a project assistant, and an HCP) leaving the project since its launch.
What workforce changes were made by the innovation, and did these changes improve patient outcomes and experience, or reduce expenditures and health service use?	• The HCP role was created specifically for the Pharm2Pharm program, so this position represents a workforce change for participating hospitals. • Community pharmacists incorporated Pharm2Pharm services into their regular, existing practice, though some participating pharmacies had to hire new pharmacists for Pharm2Pharm.

11.5 Context

This section summarizes findings on context issues related to the Pharm2Pharm intervention, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee progress reports developed by the Lewin Group. Table 11-5 summarizes findings as of August 2014.

Table 11-5: Pharm2Pharm Context Research Questions and Findings

Research Questions	Findings
What endogenous (e.g. organizational) and exogenous (policy and environmental) factors affect implementation?	• Pharm2Pharm has been implemented largely in rural settings, though the recent expansion in June 2014 to an urban location has been reported to be going smoothly. • Data sharing agreements through the Hawaii Health Information Exchange (HHIE) enable electronic communication between HCPs and CCPs and give CCPs access to patient prescription histories. These agreements have facilitated implementation. o Recent data sharing agreements between all community pharmacies and the HHIE allow CCPs to now use secure messaging to communicate with HCPs (e.g., receiving care transition documents from the HCPs), which has improved workflow. (HCPs previously had access to the HHIE through participating hospitals.) o The majority of physicians have also signed separate agreements authorizing CCPs to access patient lab tests via the HHIE, which provides useful information that allows CCPs to better perform their tasks. • Prior to implementation of Pharm2Pharm, there was no compensation available to hospitals or community pharmacies for these services. As part of the innovation, Pharm2Pharm has instituted a payment structure for reimbursing CCPs' pharmacy for medication management services to facilitate implementation. o CCPs receive $695 per patient per year. Approximately 25% of this amount is disbursed once patient handoff from HCPs occurs, another 25% at month 4, another 25% at month 8, and the final 25% at 12 months based on continued patient participation.
How is senior management structured, and how does it lead and communicate innovation changes to implementers?	• The Principal Investigator oversees all Pharm2Pharm activities, and is ultimately responsible for the direction of the program. One of the HCPs assumes responsibility for handling staffing and coverage for all HCPs. • Senior leaders of the project partners formally convene annually to review progress, make recommendations, and advance sustainability planning. The Principal Investigator sends out a one-page project status report every month to project partners. In addition, service agreements and amendments are used to communicate project deliverables to partners.
How does the innovation affect existing hospitals, medical practices, or other settings that provide health care to participants?	• HCPs work with the inpatient care team to ensure that medication issues are resolved and also serve as members of the discharge planning team. • CCPs collaborate with prescribers and health care providers to make recommendations and adjust patient medications, as needed.
Are there unintended negative consequences of the innovation? If so, how can they be mitigated in similar models in the future?	• Pharm2Pharm reports that community pharmacies have invested more resources than they have recouped financially from implementing the intervention, though they are getting closer to a break-even point.

Research Questions	Findings
To what extent does the innovation duplicate practices or programs that are already existent?	• Program leaders indicated that Pharm2Pharm does not duplicate other care transition programs available to patients through local medical centers, given its focus on medication management and pharmacist-to-pharmacist communication
How can successful innovation components be scaled and replicated in other settings?	• The HCPs used in Pharm2Pharm were hired specifically for the program; however, other organizations may consider using existing hospital pharmacy staff instead of hiring new hospital pharmacists to implement the program. ○ In these cases, program leaders recommend that hospitals carefully examine staffing and management structures since hospital pharmacy operations are not traditionally geared towards patient care. • The SOPs and training materials developed for Pharm2Pharm are likely to be relevant and applicable across other care settings, allowing standardized expansion to other locations. • Program leaders have developed an educational marketing video that can be used to promote and scale the program. • Program leaders have attempted to integrate the Pharm2Pharm model into the curriculum of the University of Hawaii School of Pharmacy, and pharmacy students and residents are completing clinical rotations in settings implementing the Pharm2Pharm model. • Research conducted by the program to determine reasonable pharmacist case load and associated cost can inform staffing requirements for potential adopting organizations. • A full-time equivalent (FTE) analysis revealed that one FTE HCP can enroll about 25 patients per month at a cost of about $500/patient. On the community side, one FTE CCP can handle approximately 300 active patients.

11.6 Concluding Observations

The Pharm2Pharm innovation addresses medication management issues among the elderly and other high-risk patient populations during transitions of care from hospitals and EDs to other settings. The innovation targets rural counties in Hawaii, which typically suffer from physician shortages, and represents a workforce change for participating hospitals. All the HCPs are new hires, employed specifically for the purposes of the Pharm2Pharm program. The innovation also expands the role of participating CCPs who incorporate an additional set of services for the Pharm2Pharm program into their daily practice.

Like other MM awardees, Pharm2Pharm has faced implementation challenges. Enrollment has been below program targets, in part because of a lack of awareness of the program in the target population and patient perception that the innovation's services are already provided by primary care providers. Pharm2Pharm also reports relatively low rates of prescriber/provider acceptance of Pharm2Pharm pharmacists' recommendations.

Despite these challenges, the innovation continues to work towards improving its implementation efforts and program effectiveness. Pharm2Pharm holds quarterly learning collaboratives to provide participating pharmacists with the opportunity to share challenges,

successes, and lessons learned. Pharm2Pharm also developed SOPs to ensure consistent practices, optimize program efficiency and effectiveness, facilitate training, and support the roll-out of the program in additional communities. Program leaders continue to refine the SOPs based on lessons learned from program implementation. To promote the program and increase provider buy-in, Pharm2Pharm program leaders have attended physician staff meetings and met with hospital case managers. Although Pharm2Pharm targets rural counties, it has also had some success expanding into an urban county. Beginning mid-June 2014, the program was offered in one hospital in Honolulu County, and at the end of July 2014 the program expanded to a second Honolulu hospital. As Pharm2Pharm continues to grow, a key milestone will be to provide Acumen with the data on program participants that will allow an independent analysis of the impact of the innovation on health care outcomes, care quality, service utilization, and costs.

12 EVALUATION OF THE SAFEMED HEALTH CARE INNOVATION AWARD

This section provides an overview of the evaluation findings for the University of Tennessee Health Science Center's SafeMed award as of August 2014, unless otherwise noted. The findings are based on interviews with project leaders, a review of progress reports developed by the Lewin Group, and documentation provided by the awardee. Section 12.1 summarizes the evaluability of the awardee. Sections 12.2 through 12.5 present the findings for four evaluation categories: innovation components, implementation effectiveness, workforce issues, and context. Section 12.6 provides concluding observations on the SafeMed innovation. There are no quantitative findings as of August 2014, as Acumen has not received participant-level data from the awardee. The research category of program effectiveness will be evaluated once participant-level data are available.

12.1 Evaluability

Table 12-1 provides an overview of the primary factors affecting the evaluability of SafeMed, based on information available as of August 2014, unless otherwise noted. These factors are sample size, comparison group, data availability, and program maturity, which is defined by the program's stage of implementation and the extent to which it has changed since launch.

Table 12-1: SafeMed Evaluability Overview

Evaluability Factor	Findings
Sample Size	• As of June 2014, SafeMed had 203 enrollees, with 32% Medicare, 30% Medicaid, and 39% dual eligible.[a]
Comparison Group	• SafeMed identifies a non-randomized comparison group consisting of patients who refused the program, patients who met electronic health record (EHR) eligibility requirements but were discharged before staff could screen them, and patients who met eligibility requirements in EHR screening but did not qualify for the study.
Data Availability	• Program data on intervention participants are newly available for analysis of program effectiveness and have not yet been linked to claims.
Program Maturity	• The core components of the SafeMed intervention have been stable since implementation began in February 2013, with changes being made in June 2013 to expand the eligibility criteria and reduce the length of the program.

[a]Source: SafeMed's program data sent on July 16, 2014. Due to rounding, the percentage of enrollees in each payer category may not sum to 100%.

12.2 Innovation Components

The SafeMed program is a collaborative partnership between the University of Tennessee Health Science Center and Methodist LeBonheur Healthcare. The program provides medication and care management support to patients during hospitalization and after discharge in their

homes. Services include expanded access to inpatient and community-based medication therapy management, community-based outreach and follow up, and community-based education on medication use and disease management. To provide its services, SafeMed relies on a care transitions team comprising a community health pharmacist, community health pharmacist technician, licensed practical nurse, advanced practice nurse, registered nurse, and social worker. The program expands the roles of existing staff to fill the team.

SafeMed targets hospitalized Medicaid and Medicare beneficiaries with multiple chronic conditions, high rates of inpatient utilization, and high costs. Eligible patients must reside within a 30-minute drive of Methodist North, Methodist South, or Methodist University Hospitals in Memphis, Tennessee and satisfy at least one of the following eligibility criteria: have two or more chronic diseases (hypertension, congestive heart failure, coronary artery disease, diabetes, chronic lung disease, depression, or anxiety), take more than six medications (or take a "high-risk" medication), have self-reported drug related problems, have two or more hospital admissions *or* one prior hospital admission and two or more ED visits within the past six months, or have a targeted chronic condition which serves as a driving diagnosis significantly contributing to a majority of inpatient or ED utilization.[14]

The SafeMed team uses a daily eligibility report pulled from the EHR system used by all participating hospitals to identify patients eligible for program participation. Depending on the enrollment site, a SafeMed team's advanced practice nurse, registered nurse, and/or social worker perform additional screenings before enrolling patients. The advanced practice nurse and registered nurse focus on clinical needs, while the social worker addresses patient concerns related to social determinants of health. Once patients are enrolled, a community health pharmacist performs detailed medication reviews. A licensed practical nurse and community health pharmacist technician conduct a home visit within 72 hours of discharge, and coordinate with the community health pharmacist who provides more extensive MTM services going forward, including comprehensive medication reviews, patient education, and disease management.

The components of the SafeMed innovation are described in more detail below.

- **Medication management services during hospitalization.** Patients are enrolled in the hospital, where they receive comprehensive medication reviews, enhanced discharge planning, and medication reconciliation.

[14] Patients are excluded from the SafeMed program if the primary reason for admission(s) is related to cancer, pregnancy, or surgical procedure for an acute problem; are currently experiencing or are at high risk for psychosis or suicidal ideation; are homeless or at imminent risk of homelessness in the past 30 days; have a repeated history of current illicit drug use; have severe substance abuse disorder; have an end-stage condition (life expectancy < 6 months); have been discharged to another location other than home; or have severe cognitive difficulties AND lack of caregiver to assist SafeMed Program participation.

- **Outpatient interventions following hospital discharge.** Once patients are discharged from the hospital, they receive a number of outpatient interventions, including home visits, telephone follow-ups, comprehensive medication reviews, and other medication therapy management services. Patients are also required to participate in SafeMed support sessions to share experiences and challenges related to managing their diseases and medications. The program provides services for a 45-day period, with an optional 3-month extension period, and these services are tailored to patients' needs and medical/social complexity.
- **Use of electronic systems to document care.** The community health pharmacist documents all medication therapy management interventions, and the community health pharmacist technicians and licensed practical nurses document medication lists in the OutcomesMTM database, a secure online platform.[15] The innovation relies on a SafeMed database designed specifically for this program to track all other interventions and contacts.

Table 12-2 highlights the research questions and findings related to SafeMed innovation components.

Table 12-2: SafeMed Components Research Questions and Findings

Research Questions	Findings
How is the innovation designed to reduce expenditures or improve care quality?	• SafeMed aims to reduce readmissions, emergency room (ER) visits, and health care expenditures by using an interdisciplinary team to provide inpatient and community-based medication and care management services.
Who does the intervention target?	• SafeMed targets Medicaid and Medicare beneficiaries 18 years of age and older who reside within a 30-minute drive of participating hospitals and have multiple chronic conditions and high inpatient utilization. Enrolled patients must meet at least one of the following inclusion criteria: o diagnosis of two of the following chronic diseases: hypertension, congestive heart failure, coronary artery disease, diabetes, chronic lung disease, depression, or anxiety; o use of more than six medications (or are taking a "high-risk" medication); o self-reported drug related problems; o two or more hospital admissions OR one prior hospital admission and two or more ED visits within the past 6 months; and o a targeted chronic condition serves as a driving diagnosis significantly contributing to majority of inpatient or ED utilization. • The innovation includes CMS priority populations such as racial or ethnic minorities, low-socioeconomic status populations, and patients with specific disease groups (as listed above).

[15] See http://www.outcomesmtm.com/

Research Questions	Findings
What are the key components of the innovation?	• SafeMed consists of inpatient and community-based medication and care management services that are provided by an inter-disciplinary team. Services include: o medication management from a community health pharmacist during hospitalization, including a comprehensive medication review; o education and case management from a nurse during hospitalization, including a comprehensive discharge plan; o post-discharge home visits from a community health pharmacist technician and licensed practical nurse to review and reinforce the discharge plan, during which the licensed practical nurse performs a brief, condition-specific assessment and the community health pharmacist technician reviews medications, discusses medication side effects, and oversees the disposal of unnecessary or expired medications; o periodic phone contact from the community health pharmacist technician and licensed practical nurse, who assess medication problems, symptom exacerbations, and psychosocial issues and make referrals to the advance practice nurse, registered nurse, social worker, or community health pharmacist as necessary; o a post-discharge comprehensive medication review by a community health pharmacist, ideally after the patient visits his/her primary care provider; o ongoing medication management services from a community health pharmacist as needed; o group support sessions, in which enrolled patients share experiences and challenges related to managing their diseases and medications. • A registered nurse or advance practice nurse enrolls eligible patients during hospital admission after reviewing daily EHR-generated patient eligibility reports and screening patients. Patients enroll for an initial 45-day period and then can opt to receive services for an additional 3 months.
To what extent is the innovation viewed as a relatively simple "plug in" or a fundamental and major change within the implementing organization?	• The SafeMed intervention requires significant change on the part of the health care delivery system. The intervention creates new roles for health care team members and changes how inpatient, discharge, and follow-up services are provided to participating patients.

12.3 Implementation Effectiveness

This section summarizes findings on SafeMed's implementation effectiveness, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee performance reports provided by the Lewin Group. Table 12-3 summarizes findings as of August 2014, unless otherwise noted.

Table 12-3: SafeMed Implementation Effectiveness Research Questions and Findings

Research Questions	Findings

Was the intervention delivered as intended to the target population in doses associated with effectiveness?	• According to SafeMed, as of March 2014, participation is 72% below initial projections.[a]
	  ○ Program leaders have found that initial enrollment expectations were unrealistic given program staff size.
	  ○ Enrollment goal has been lowered to approximately 25 patients per month. The revised goal has been met consistently since March 2014.
	• According to SafeMed, the minimally effective dose of the program is 30 days of program participation, regardless of the services provided during this time frame. Data on the number of patients who received this dose are not yet available.

What were key successes in implementing the innovation as designed and factors associated with success?	• SafeMed reports that the following strategies have helped increase enrollment:
	  ○ making enrollment requirements less stringent: instead of requiring participants to make a 9-month commitment to the program, participants are enrolled for an initial 45-day period and then can opt to receive services for an additional 3 months;
	  ○ expanding inclusion criteria: the program eliminated the criterion that program participants had to have a principal diagnosis for a targeted chronic condition, added depression and anxiety to the list of targeted chronic conditions, and expanded the criteria to include patients with one prior inpatient admission and two or more ED visits within the past six months;
	  ○ reducing screening burden and simplifying the intake process by minimizing the information collected from patients during enrollment; and
	  ○ using patient-centered recruitment approaches, such as telling patients they have been "selected" for the program, and tailoring marketing of the program to focus on patients' individual needs.
	• Increased collaboration with primary care providers has been critical for successful implementation.
	  ○ The program has made increased efforts to coordinate care with primary care providers, including discussing patient care with primary care offices, especially after patient discharge, and having patients attend appointments with nurses when appropriate.
	  ○ Primary care providers with stronger relationships with SafeMed are more likely to accept community health pharmacist recommendations.
	  ○ SafeMed has used partnerships with the regional Medicare Quality Improvement Organization and the Memphis Medical Society to build awareness about the program among primary care providers, which has generated support for SafeMed.
	• The outreach workers have been successful in establishing connections and building strong relationships with patients, as they serve as liaisons for patients during the transition from hospital to home.
	• A one-time travel incentive of $25 appears to be effective in getting patients to attend group support sessions.

Research Questions	Findings

What were the challenges in implementing the innovation as designed?	• SafeMed reports difficulty enrolling patients due to a diminishing pool of eligible patients in participating hospitals.
	  o Many eligible patients are "repeat utilizers," patients who have multiple hospital admissions and have already been screened for the program.
	• SafeMed has struggled with low post-discharge comprehensive medication review rates. Program leaders attribute the low rates to patient reluctance to receive the medication reviews, a limited number of community health pharmacists, and difficulty timing the reviews after the post-discharge primary care provider visits.
	• SafeMed has encountered challenges administering accurate standardized depression and anxiety screenings across all patients during the enrollment process.
	  o The program switched from 7- and 9-item screening tools to a less-sensitive 2-item screening tool due to burden on the SafeMed team.
	  o Program leaders believe cultural biases have skewed interpretation of the screening results, leading to underreporting.

What changes were made to the innovation to increase enrollment, improve care, or reduce expenditures?	• Program leaders incorporated care transition services into the program to improve care quality and coordination among health providers.
	• Program leaders are considering expanding the target population to increase enrollment. Possible approaches include adding beneficiaries from other insurers, requiring patients to have only one major chronic condition (instead of two), and expanding the list of targeted chronic conditions.
	• SafeMed recently expanded to a third site to increase enrollment. The expansion increased the number of enrolled patients, but only temporarily, since, as noted previously, the pool of eligible patients decreases over time.
	• In August 2014, SafeMed outreach teams will begin using iPads during home visits for real-time data entry to improve efficiency and accuracy of data collection.
	• SafeMed extended the program "cut-off" date (i.e., when the program concludes after the optional 3-month period) to improve care for those with very complex medical and social needs, with the SafeMed team determining the length of extension.
	• The program hired a second community health pharmacist to effectively reach the full set of enrolled patients.
	  o According to program leaders, it was "nearly impossible" to operate the SafeMed model effectively with only one community health pharmacist, but two community health pharmacists is sufficient.
	• Program leaders have increased efforts to improve care and referrals for patients with depression and anxiety, including:
	  o ensuring those with high depression and anxiety levels are referred back to a mental health provider;
	  o notifying PCPs when their patients screen positively for these conditions;
	  o referring those with moderate to high levels of depression and anxiety to the peer support group; and
	  o partnering with a local affiliate of National Alliance of Mental Illness to do onsite "bridges" classes that educate patients with depression and anxiety about mental health diagnoses, medications, and services, as well as self-advocacy and wellness tools.
	• To address low post-discharge CMR rates, program leaders have dovetailed the comprehensive medication reviews off of group support sessions and increased reimbursement incentives to patients who attend CMRs, from $25 to $50.

Research Questions	Findings
Did the innovation use internal evaluation findings to inform the implementation process, when necessary?	• To monitor implementation, SafeMed uses a monthly dashboard of process and quality measures, such as enrollment rates, comprehensive medication review rates, post-discharge visit rates, readmission rates, and rates of emergency department use,. • SafeMed uses Plan-Do-Study-Act (PDSA) cycles to evaluate changes that are designed to improve the program. Examples include: o revamping the group support session format to increase interactivity and leverage peer leaders; and o identifying strategies to reduce adverse events requiring emergency department visits and hospitalizations, such as increased patient education and coordination with primary care providers.

[a]Source: Quarterly Awardee Performance Report, SafeMed (January- March 2014)

12.4 Workforce

This section summarizes findings on workforce issues related to the SafeMed intervention, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee performance reports provided by the Lewin Group. Table 12-4 summarizes findings as of August 2014.

Table 12-4: SafeMed Workforce Research Questions and Findings

Research Questions	Findings
Did the innovation contribute in filling health care workforce gaps?	• The SafeMed innovation utilizes outreach workers to perform expanded patient care roles. It also relies on pharmacists to provide comprehensive medication management services and nurses to provide discharge support services. As such, the program can support or fill gaps in care that occur during health care delivery, particularly during transitions of care.
What type and level of workforce training does the innovation provide?	• SafeMed staff receive general orientation training through the Methodist Healthcare system. They also receive SafeMed-specific training on health disparities, health literacy, cultural competence, patient empowerment, and the OARS (Open questions, Affirming, Reflection, and Summarizing) model. o SafeMed has found that it is critical to train staff on motivational interviewing, though the techniques are not easy to apply. As a result, the program has adopted the OARS model, which focuses on the beginning level skills of motivational interviewing. o SafeMed staff use simulated situations to practice applying OARS principles to patient interactions.
What type of support structure is available for staff?	• SafeMed has compiled a community resource guide that outreach workers can use during home visits. The guide includes information about home health agencies and skilled nursing facilities, meal assistance, low cost prescription services, local pharmacies, available support groups, and non-emergent transportation assistance.
What type of support structure is effective for staff deployment?	• All SafeMed staff participate in twice monthly meetings with management to share information, ask questions, and address concerns related to implementation and operation of the program. • The front-line staff have weekly team meetings to discuss patient cases and share best practices or challenges.

Research Questions	Findings
How does the innovation affect staff satisfaction?	• SafeMed reports that team members are largely satisfied with the innovation. This is particularly true for the community health pharmacy technicians, who have higher job satisfaction than pharmacy technicians in the retail setting. • For community health pharmacy technicians, satisfaction with their new roles as outreach workers varies. Program leaders attribute this to personality, with some being more comfortable with the lack of structure inherent in being an outreach worker. • Anecdotally, SafeMed reports that staff development and teamwork promotion efforts are contributing to higher staff satisfaction, since staff members are collaborating more.
Has the innovation experienced high staff turnaround? If so, what measures have been taken to remedy the problem?	• SafeMed has experienced significant staff turnover; only two of the original program staff members are still with the project. o Program leaders attribute turnover to staff members not feeling comfortable in their new roles for the reasons described above (e.g., preferring structure) and are trying to remedy this problem by focusing on candidates' leadership and care coordination skills during the hiring process. o Program leaders now use contracts during the hiring process and have undertaken efforts to promote teamwork in an effort to boost staff retention.
What workforce changes were made by the innovation, and did these changes help improve patient outcomes and experience or reduce expenditures and health service use?	• The SafeMed program has resulted in major workforce changes; the innovation has expanded the traditional roles of health care providers and professionals (social workers, nurses, and pharmacists), incorporating team-based care and roles as outreach workers.

12.5 Context

This section summarizes findings on context issues related to the SafeMed intervention, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee performance reports provided by the Lewin Group. Table 12-5 summarizes findings as of August 2014.

Table 12-5: SafeMed Context Research Questions and Findings

Research Questions	Findings

What endogenous (e.g. organizational) and exogenous (policy and environmental) factors affect implementation?	• The Methodist system did not have an evidence-based care transitions program in place prior to SafeMed, which affected the scope and ease of implementation of the program. Program leaders, therefore, incorporated care transition elements into the program.
	• Patient feedback collected by SafeMed indicates that patient-related issues such as cost concerns, trust of providers, and difficulty obtaining medications affect medication match rates (i.e., whether medications taken at home match the list provided at hospital discharge).
	  o Patients report that the ability to afford medications is a significant barrier. While SafeMed has attempted to leverage available medication access assistance programs, it has found that most of these are geared toward the uninsured, which is not SafeMed's target population.
	  o Patients report reluctance to accept medication changes made in the hospital without first having the usual, trusted care provider approve them.
	  o Patients report that the timing required for preauthorization of certain medications and challenges finding transportation to the pharmacy have made it difficult to receive medications.
	• Other organizational factors have made achieving high medication match rates difficult, including:
	  o doctors changing a patient's medications immediately before discharge, impeding the community health pharmacist from performing an accurate discharge medication reconciliation; and
	  o issues with mismatch of prescription history.
	• Interdisciplinary team function is a critical part of SafeMed and is something that needs to be actively fostered.
	  o After finding that individual members weren't communicating well, program leaders decided to use graphical representations called eco maps to get a better understanding of the factors that contribute to patient outcomes and thereby increase the ability of the team to address patient needs.
	  o SafeMed has been hesitant to broaden the role of the community health pharmacy technician due to concerns about scope of practice. SafeMed is working with the state pharmacy board to define the community health pharmacy technician role.

How is senior management structured, and how does it lead and communicate innovation changes to implementers?	• SafeMed has a distributed management structure, with various individuals at the University of Tennessee and the university's subcontractor, Methodist, responsible for specified leadership tasks and functions. These individuals include the Principal Investigator, the President and Chief Operating Officer of Methodist, the SafeMed Program Manager, and Methodist Program Managers. • Both organizations have collaboratively made all major project decisions, which are communicated to SafeMed staff during meetings twice a month.

Research Questions	Findings
How does the innovation affect existing hospitals, medical practices, or other settings that provide health care to participants?	• The SafeMed team collaborates with the Methodist inpatient providers and staff members to address patients' medication and discharge care needs. ○ Program leaders report that they have worked to differentiate inpatient staff responsibilities from those of SafeMed staff. • SafeMed also collaborates with primary care providers and health care providers to address ongoing patient care needs.
Are there unintended negative consequences of the innovation? If so, how can they be mitigated in similar models in the future?	• SafeMed reports the program has created some uncertainties about respective roles and responsibilities at several levels within the Methodist system, particularly related to perceptions by existing Methodist employees and staff that the program appears to perform activities that have traditionally been the responsibility of Methodist staff.
To what extent does the innovation duplicate practices or programs that are already existent?	• The Methodist system has implemented a care transition program simultaneously with the SafeMed program, but there is little overlap between the target populations of the respective programs. ○ When relevant, SafeMed has eliminated redundancy and coordinated efforts so that patients who are receiving multiple post-discharge visits/communication are not confused. • Program leaders also indicate that the SafeMed home visits do not duplicate traditional home care services because SafeMed provides services not included in traditional home care.
How can successful innovation components be scaled and replicated in other settings?	• Program leaders suggest that health systems with existing evidence-based care transitions programs would be better equipped to adopt SafeMed. • They also believe SafeMed would be more easily implemented in health systems where there is primary care capacity, since relationships with primary care providers are important for successful implementation. • Program leaders feel the protocol and procedures of SafeMed are scalable. • Program leaders do not believe that any one component of SafeMed will be successful without the others. ○ SafeMed's goal is to sustain the program in its entirety, though this might require seeking different funding mechanisms for the various components.

12.6 Concluding Observations

The University of Tennessee Health Science Center's SafeMed program provides medication and care management support to patients during hospitalization and following discharge home. The innovation is intensive and complex, targeting high cost and high utilization patients and offering a range of services: comprehensive medication reviews, enhanced discharge planning, medication reconciliation, and other medication therapy management services. The innovation expands the traditional roles of health care workers. Pharmacists provide comprehensive medication management services and nurses provide discharge support services. Community health pharmacist technicians and licensed practical nurses act as "outreach workers", calling patients and making home visits to monitor patients' medication regiments and disease management. SafeMed reports that outreach workers have been successful in establishing connections and building strong relationships with patients as they serve as liaisons for patients during the transition from hospital to home.

However, the program has faced implementation challenges. Enrollment has been significantly below original projections, leading the program to lower enrollment goals. To increase enrollment, SafeMed shortened the program from 9 months to 45 days with an option to extend for 3 additional months, hoping to recruit patients who were reluctant to commit to a long time frame. The program has also expanded eligibility criteria and its geographic reach in order to identify more patients. Despite these modifications, SafeMed is still experiencing an overall reduction in the pool of new eligible patients. In addition, the program has struggled with low post-discharge comprehensive medication review rates. Program leaders attribute the low rates to patient reluctance to receive medication reviews, a limited number of community health pharmacists, and difficulty timing the reviews after post-discharge primary care provider visits. Finally, the innovation has experienced significant staff turnover. While some staff members have been receptive to their expanded roles, others have left the program because they did not feel comfortable with their new responsibilities. Only two original staff members remain in the program.

Despite these challenges, the innovation continues to improve its implementation efforts and effectiveness. To help acclimate staff to their roles, SafeMed has implemented various trainings, including the OARS model,[16] to train staff on motivational interviewing. During the interview process, the program has made a strong effort to communicate roles clearly to potential hires, including the emphasis on teamwork and the need to engage patients in various settings, including patients' homes. The program has also focused attention on increasing collaboration

[16] Open question, Affirmation, Reflection and Summary (OARS) client centered communication skills.

with primary care providers, recognizing that provider buy-in to the program is critical for successful implementation.

Looking forward, as SafeMed continues to work on improving implementation and enrollment, Acumen will conduct analysis of the program's effectiveness. Data on SafeMed program participants and comparison groups are available, and after these data are matched with claims, Acumen will evaluate the impact of the program on health outcomes, care quality, service utilization, and expenditures.

APPENDIX A: OUTCOME MEASURE SPECIFICATIONS BY AWARDEE

The tables below define the outcome measures presented for the Welvie and MedExpert programs. Table Appendix A-1 provides definitions of key terms used in the outcome measure definitions, and Table Appendix A-2 provides definitions of the outcome measures themselves.

Table Appendix A-1: Definitions of Terms Used in Outcome Measure Definitions

Term	Definition	Relevant Awardees
Expenditure	All expenditure measures represent Medicare payments. Cost data prior to 2014 are payment standardized using the CMS payment standardization methodology to remove differences due to geographic variation in Medicare payment rates and variation among classes of providers. All costs are adjusted monthly for inflation from a 2011 base year using the Bureau of labor Statistics Consumer Price Index for medical care services. Cost data are not risk adjusted.	MedExpert, Welvie
Beneficiary	Beneficiaries must be continuously enrolled in Medicare Parts A and B (Fee For Service, FFS) or C (Medicare Advantage, MA) for one year prior to the program's intervention date. Beneficiaries who switch between FFS and MA are included in the MA analysis. If a beneficiary dies, the beneficiary will be included in the quarter in which he or she died and in all subsequent quarters.	MedExpert, Welvie
Inpatient Surgery	Inpatient surgery stays (hospital inpatient claim only). Includes inpatient stays billed with a surgical MS-DRG. Excludes stays with ICD-9-CM diagnosis codes indicating a trauma/accident. See supplementary *Surgery_Codes* Excel file for list of MS-DRGs and ICD-9-CM diagnosis codes.	Welvie
Inpatient Preference-Sensitive Orthopedic Surgery	Inpatient preference-sensitive orthopedic surgery stays. Includes inpatient stays billed with a preference-sensitive orthopedic MS-DRG from major diagnostic category (MDC) 08: diseases and disorders of the musculoskeletal system and connective tissue. Excludes stays with ICD-9-CM diagnosis codes for trauma/accident or fracture. See supplementary *Surgery_Codes* Excel file for list of MS-DRGs and ICD-9-CM diagnosis codes.	Welvie
Inpatient Preference-Sensitive Cardiac Surgery	Inpatient preference-sensitive cardiac surgery stays. Includes inpatient stays billed with a preference-sensitive cardiac MS-DRG from MDC 05: diseases and disorders of the circulatory system. Excludes stays with ICD-9-CM diagnosis codes for trauma/accident or acute coronary syndrome. See supplementary *Surgery_Codes* Excel file for list of MS-DRGs and ICD-9-CM diagnosis codes.	Welvie

Term	Definition	Relevant Awardees
Episode-Based Inpatient Surgery	Inpatient surgery stays and associated Part B Carrier and post-acute care claims. Includes (a) inpatient stays billed with a surgical MS-DRG, (b) all Part B carrier claims billed during the surgical stays, (c) SNF stays linked to the surgical stays (i.e., the surgical stay qualified the beneficiary for SNF care), (d) home health claims beginning within 30 days of surgical stay discharge, and (e) inpatient rehabilitation facility claims beginning within 30 days of surgical stay discharge.[a] SNF, home health, and inpatient rehabilitation facility costs are prorated to include only costs incurred in the 30 days following surgical stay discharge; the average stay/claim cost per day is attributed to each day that falls in the 30 day post-discharge window. Excludes inpatient stays, inpatient rehabilitation facility stays, and home health claims with ICD-9-CM diagnosis codes indicating a trauma/ accident. Also excludes Part B Carrier ambulance claims. See supplementary *Surgery_Codes* Excel file for list of MS-DRGs, ICD-9-CM diagnosis codes, and HCPCS codes.	Welvie
Outpatient Surgery	Outpatient surgery claims. Includes outpatient claims billed with a surgical HCPCS/CPT code.[b] Excludes claims with ICD-9-CM diagnosis codes indicating a trauma/ accident. Also excludescosts for ambulance services. See supplementary *Surgery_Codes* Excel file for list of HCPCS/CPT codes, and ICD-9-CM diagnosis codes.	Welvie
Outpatient Preference-Sensitive Orthopedic Surgery	Outpatient preference-sensitive orthopedic surgery claims. Includes outpatient claims billed with a preference-sensitive orthopedic HCPCS/CPT code.[c] Excludes claims with ICD-9-CM diagnosis codes indicating a trauma/ accident. Also excludes costs for ambulance services. See supplementary *Surgery_Codes* Excel file for list of HCPCS/CPT codes, and ICD-9-CM diagnosis codes.	Welvie
Outpatient Preference-Sensitive Cardiac Surgery	Outpatient preference-sensitive cardiac surgery claims. Includes outpatient claims billed with a preference sensitive cardiac HCPCS/CPT code.[d] Excludes claims with ICD-9-CM diagnosis codes indicating a trauma/ accident. Also excludes costs for ambulance services. See supplementary *Surgery_Codes* Excel file for list of HCPCS/CPT codes, and ICD-9-CM diagnosis codes.	Welvie

[a]Inpatient rehabilitation facilities defined as inpatient claims with the last four digits of PROVIDER (CCN) in 3025-3099 OR third digit of "R" (CAH) or "T" (acute hospital)

[b]Outpatient surgical HCPCS/CPT codes include all HCPCS/CPTs in BETOS categories P1-P3 (major procedure), P4 (eye procedure), P5 (ambulatory procedure), P8 (endoscopy), and additional codes from the surgical CPT range 10000-70000

[c]Outpatient preference-sensitive orthopedic surgery HCPS/CPT codes include selected HCPCS/CPTs in BETOS categories P3 (major procedure – orthopedic), P5B (ambulatory procedures – musculoskeletal), and P8A (endoscopy – arthroscopy)

[d]Outpatient preference-sensitive cardiac surgery HCPS/CPT codes include selected HCPCS/CPTs in BETOS categories P2D (major procedure – cardiovascular – coronary angioplasty) and P2F (major procedure – cardiovascular – other)

Table Appendix A-2: Definitions of Outcome Measures

Measure	Relevant Population	Definition	Relevant Awardees
All-Cause Mortality per 1,000 Beneficiaries	FFS and MA	Numerator: Number of deaths * 1,000 Denominator: Total number of beneficiaries.	MedExpert, Welvie
Total Medicare Expenditures Per Beneficiary (1 of 4 core meta-evaluation measures)	FFS	Numerator: Total Medicare Parts A and B claim costs. Part D costs are not included. Denominator: Total number of beneficiaries.	MedExpert, Welvie
Total Medicare Parts A, B, and D Expenditures Per Beneficiary	FFS	Numerator: Total Medicare Parts A, B, and D[a] claim costs. Denominator: Total number of beneficiaries.	MedExpert, Welvie
Inpatient Expenditures Per Beneficiary	FFS	Numerator: Total inpatient stay costs. Denominator: Total number of beneficiaries.	MedExpert, Welvie
Outpatient ER Expenditures Per Beneficiary	FFS	Numerator: Total emergency room (ER)-only outpatient claim costs. Denominator: Total number of beneficiaries.	MedExpert, Welvie
Outpatient Non-ER Expenditures Per Beneficiary	FFS	Numerator: Total non-ER outpatient claim costs. Denominator: Total number of beneficiaries.	MedExpert, Welvie
Carrier/PB Expenditures Per Beneficiary	FFS	Numerator: Total physician/carrier claim costs. Denominator: Total number of beneficiaries.	MedExpert, Welvie
Skilled Nursing Facility Expenditures Per Beneficiary	FFS	Numerator: Total skilled nursing facility claim costs. Denominator: Total number of beneficiaries.	MedExpert, Welvie
Home Health Expenditures Per Beneficiary	FFS	Numerator: Total home health claim costs. Denominator: Total number of beneficiaries.	MedExpert, Welvie
Hospice Expenditures Per Beneficiary	FFS	Numerator: Total hospice claim costs. Denominator: Total number of beneficiaries.	MedExpert, Welvie
Total Surgery Expenditures Per Beneficiary	FFS	Numerator: Total outpatient and inpatient surgery cost. Denominator: Total number of beneficiaries.	Welvie
Total Preference-Sensitive Orthopedic Surgery Expenditures Per Beneficiary	FFS	Numerator: Total outpatient and inpatient preference-sensitive orthopedic surgery cost. Denominator: Total number of beneficiaries.	Welvie
Total Preference-Sensitive Cardiac Surgery Expenditures Per Beneficiary	FFS	Numerator: Total outpatient and inpatient preference-sensitive cardiac surgery cost. Denominator: Total number of beneficiaries.	Welvie
Inpatient Surgery Cost Per Beneficiary	FFS	Numerator: Total inpatient surgery stay cost. Denominator: Total number of beneficiaries.	Welvie
Episode-Based Inpatient Surgery Expenditures Per Beneficiary	FFS	Numerator: Total episode-based inpatient surgery stay cost. Denominator: Total number of beneficiaries.	Welvie
Inpatient Preference-Sensitive Orthopedic Surgery Expenditures Per Beneficiary	FFS	Numerator: Total inpatient preference-sensitive orthopedic surgery stay cost. Denominator: Total number of beneficiaries.	Welvie

Measure	Relevant Population	Definition	Relevant Awardees
Inpatient Preference-Sensitive Cardiac Surgery Expenditures Per Beneficiary	FFS	Numerator: Total inpatient preference-sensitive cardiac surgery cost. Denominator: Total number of beneficiaries.	Welvie
Outpatient Surgery Expenditures Per Beneficiary	FFS	Numerator: Total outpatient surgery claim cost. Denominator: Total number of beneficiaries.	Welvie
Outpatient Preference-Sensitive Orthopedic Surgery Expenditures Per Beneficiary	FFS	Numerator: Total outpatient preference-sensitive orthopedic surgery claim cost. Denominator: Total number of beneficiaries.	Welvie
Outpatient Preference-Sensitive Cardiac Surgery Expenditures Per Beneficiary	FFS	Numerator: Total outpatient preference-sensitive cardiac surgery claim cost. Denominator: Total number of beneficiaries.	Welvie
ER Visit Rate Per 1,000 Beneficiaries (1 of 4 core meta-evaluation measures)	FFS	Numerator: Number of beneficiaries with at least one outpatient ER claim with no inpatient admission on the same day * 1,000. Denominator: Total number of beneficiaries.	MedExpert, Welvie
Number of ER Visits Per 1,000 Beneficiaries	FFS	Numerator: Number of days with an ER claim for beneficiaries with no inpatient admission on the same day * 1,000. Denominator: Total number of beneficiaries.	MedExpert, Welvie
Inpatient Admission Rate Per 1,000 Beneficiaries (1 of 4 core meta-evaluation measures)	FFS and MA	Numerator: Number of beneficiaries with at least one inpatient stay * 1,000. Denominator: Total number of beneficiaries.	MedExpert, Welvie
Number of Inpatient Admissions Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of inpatient stays * 1,000. Denominator: Total number of beneficiaries.	MedExpert, Welvie
Unplanned Inpatient Admission Rate Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of beneficiaries with at least one unplanned inpatient stay * 1,000. Denominator: Total number of beneficiaries.	MedExpert, Welvie
Unplanned Inpatient Admissions Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of unplanned inpatient stays * 1,000. Denominator: Total number of beneficiaries.	MedExpert, Welvie
30-Day Hospital Readmissions Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of beneficiaries with an inpatient stay admission within 30 days of discharge from a previous inpatient stay * 1,000. Denominator: Number of beneficiaries with an inpatient stay.	MedExpert, Welvie
30-Day Hospital Readmissions Following Inpatient Surgery Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of beneficiaries with an inpatient stay admission within 30 days of discharge from an inpatient surgery stay * 1,000. Denominator: Number of beneficiaries with an inpatient surgery stay.	Welvie

Measure	Relevant Population	Definition	Relevant Awardees
30-Day Hospital Readmissions Following Preference-Sensitive Orthopedic Surgery Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of beneficiaries with an inpatient stay admission within 30 days of discharge from an inpatient preference-sensitive orthopedic surgery stay * 1,000. Denominator: Number of beneficiaries with an inpatient preference-sensitive orthopedic surgery stay.	Welvie
30-Day Hospital Readmissions Following Preference-Sensitive Cardiac Surgery Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of beneficiaries with an inpatient stay admission within 30 days of discharge from an inpatient preference-sensitive cardiac surgery stay * 1,000. Denominator: Number of beneficiaries with an inpatient preference-sensitive cardiac surgery stay.	Welvie
30-Day Hospital Unplanned Readmissions Per 1,000 Beneficiaries (1 of 4 core meta-evaluation measures)	FFS and MA	Numerator: Number of beneficiaries with an unplanned inpatient stay admission within 30 days of discharge from a previous inpatient stay * 1,000 Denominator: Number of beneficiaries with an inpatient stay.	MedExpert, Welvie
Number of Hospital Days Per 1,000 Beneficiaries	FFS and MA	Numerator: Total number of inpatient days * 1,000. Denominator: Total number of beneficiaries.	MedExpert, Welvie
Total Surgery Rate Per 1,000 Beneficiaries	FFS	Numerator: Number of beneficiaries with at least one inpatient surgery stay or outpatient surgery claim * 1,000. Denominator: Total number of beneficiaries.	Welvie
Number of All Surgeries Per 1,000 Beneficiaries	FFS	Numerator: Number of inpatient surgery stays and outpatient surgery claims * 1,000. Denominator: Total number of beneficiaries.	Welvie
Inpatient Surgery Rate Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of beneficiaries with at least one inpatient surgery stay * 1,000. Denominator: Total number of beneficiaries.	Welvie
Number of Inpatient Surgeries Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of inpatient surgery stays * 1,000. Denominator: Total number of beneficiaries.	Welvie
Outpatient Surgery Rate Per 1,000 Beneficiaries	FFS	Numerator: Number of beneficiaries with at least one outpatient surgery claim * 1,000. Denominator: Total number of beneficiaries.	Welvie
Number of Outpatient Surgeries Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of outpatient surgery claims * 1,000. Denominator: Total number of beneficiaries.	Welvie
Number of Surgical Hospital Days Per 1,000 Beneficiaries	FFS and MA	Number of inpatient surgery stay days * 1,000. Denominator: Total number of beneficiaries.	Welvie
Inpatient Preference-Sensitive Orthopedic Surgery Rate Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of beneficiaries with at least one inpatient preference-sensitive orthopedic surgery stay * 1,000. Denominator: Total number of beneficiaries.	Welvie
Number of Inpatient Orthopedic Preference-Sensitive Surgeries Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of inpatient preference-sensitive orthopedic surgery stays * 1,000. Denominator: Total number of beneficiaries.	Welvie

Measure	Relevant Population	Definition	Relevant Awardees
Number of Inpatient Preference-Sensitive Orthopedic Surgery Hospital Days Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of inpatient preference-sensitive orthopedic surgery stay days * 1,000. Denominator: Total number of beneficiaries.	Welvie
Inpatient Preference-Sensitive Cardiac Surgery Rate Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of beneficiaries with at least one inpatient preference-sensitive cardiac surgery stay * 1,000. Denominator: Total number of beneficiaries.	Welvie
Number of Inpatient Cardiac Preference-Sensitive Surgeries Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of inpatient preference-sensitive cardiac surgery stays * 1,000. Denominator: Total number of beneficiaries.	Welvie
Number of Inpatient Preference-Sensitive Cardiac Surgery Hospital Days Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of inpatient preference-sensitive cardiac surgery stay days * 1,000. Denominator: Total number of beneficiaries.	Welvie

[a](a) For beneficiaries without a low-income subsidy, Part D costs are estimated as (0.75*Covered D Plan Paid prior to the catastrophic phase) + [0.75*(Covered D Plan Paid in the catastrophic phase – 80% Above Out of Pocket Threshold)] + 80% Above Out of Pocket Threshold + Low Income Cost-Sharing Subsidy Amount.

(b) For beneficiaries with a low-income subsidy, Part D costs are estimated as Covered D Plan Paid + Low Income Cost-Sharing Subsidy Amount.

[b]Unplanned readmissions are defined using the QualityNet *Planned Readmissions Algorithm Flow Diagram*, available for download at: https://www.qualitynet.org/dcs/ContentServer?cid=1228772504995&pagename=QnetPublic%2FPage%2FQnetTier4&c=Page

APPENDIX B: RESULTS FOR WELVIE

The following tables provide the baseline demographic and health characteristics; mortality, and readmission rates; health service utilization, and medical costs results for intervention and comparison group beneficiaries in the Welvie FFS and MA cohorts.

B.1 Demographic and Health Characteristics

Table Appendix B-1: Welvie Baseline Demographic and Health Characteristics, FFS Cohort

Characteristics	Intervention Group	Control Group	Percentage Point Difference	Standardized Mean Difference
Number of Beneficiaries	64,609	54,429	n/a	n/a
Average Age	76.3	76.6	n/a	0.04
Age Categories				
Age under 65	0%	0%	0.0	0.00
Age 65-69	23%	22%	0.8	0.02
Age 70-74	25%	25%	0.4	0.01
Age 75-79	19%	19%	0.0	0.00
Age 80-84	16%	16%	-0.1	0.00
Age 85-89	11%	11%	-0.1	0.00
Age 90+	6%	7%	-1.0	0.04
Gender				
Male	43%	42%	0.6	0.01
Female	57%	58%	-0.6	0.01
Race				
White	91%	91%	0.0	0.00
Black	7%	7%	-0.1	0.00
Other	2%	2%	0.1	0.00
Dual Eligible	9%	12%	-2.4	0.08
Disabled	10%	10%	-0.8	0.03
ESRD	0%	0%	0.0	0.00
Potential Risk Indicators for Preference Sensitive Surgeries targeted by Welvie				
Any targeted diagnosis	91%	92%	-0.2	0.01
Knee diagnosis	25%	26%	-0.7	0.02
Hip diagnosis	23%	23%	-0.5	0.01
Back diagnosis	35%	34%	0.6	0.01
Heart diagnosis	41%	41%	-0.6	0.01
Evaluation and Management (E&M) Visits				
Evaluation and Management (E&M) Visits: 0	9%	10%	-1.2	0.04
E&M Visits: 1-5	33%	33%	-0.4	0.01
E&M Visits: 6-10	27%	27%	0.6	0.01
E&M Visits: 11-15	15%	14%	0.7	0.02
E&M Visits: 16+	16%	16%	0.3	0.01

Characteristics	Intervention Group	Control Group	Percentage Point Difference	Standardized Mean Difference
Resource Use per Beneficiary (Pre-Enrollment Year)				
Average Number of Skilled Nursing Facility Days	3.3	4.3	n/a	0.05
Average Number of Inpatient Admissions	0.3	0.3	n/a	0.02
Medical Cost per Beneficiary (Pre-Enrollment Year)				
Average total medical costs	$8,218	$8,599	n/a	0.03
Healthcare Cost and Utilization Project (HCUP) Diagnosis Categories				
Essential hypertension	73%	74%	-0.5	0.01
Disorders of lipid metabolism	67%	66%	0.8	0.02
Immunizations and screening for infectious disease	61%	61%	0.4	0.01
Other connective tissue disease	44%	45%	-1.2	0.02
Other aftercare	42%	42%	-0.2	0.00
Cataract	37%	37%	-0.6	0.01
Other screening for suspected conditions (not mental disorders or infectious disease)	37%	36%	1.5	0.03
Diabetes mellitus without complication	34%	35%	-0.7	0.02
Other lower respiratory disease	33%	34%	-0.8	0.02
Other non-traumatic joint disorders	32%	33%	-0.9	0.02
Other skin disorders	31%	32%	-0.2	0.00
Osteoarthritis	31%	31%	-0.4	0.01
Spondylosis; intervertebral disc disorders; other back problems	31%	30%	0.6	0.01
Coronary atherosclerosis and other heart disease	27%	28%	-0.4	0.01

Table Appendix B-2: Welvie Baseline Demographic and Health Characteristics, MA Cohort

Characteristics	Intervention Group	Control Group	Percentage Point Difference	Standardized Mean Difference
Number of Beneficiaries	82,640	84,259	n/a	n/a
Average Age	75.0	75.0	n/a	0.0
Age Categories				
Age under 65	0%	0%	0.0	0.00
Age 65-69	27%	28%	0.3	0.01
Age 70-74	26%	26%	-0.2	0.01
Age 75-79	20%	20%	0.1	0.00
Age 80-84	15%	15%	0.0	0.00
Age 85-89	8%	8%	-0.1	0.00
Age 90+	4%	4%	-0.2	0.01
Gender				
Male	43%	43%	0.0	0.00

Characteristics	Intervention Group	Control Group	Percentage Point Difference	Standardized Mean Difference
Female	57%	57%	0.0	0.00
Race				
White	91%	91%	-0.4	0.01
Black	7%	8%	0.4	0.02
Other	2%	2%	0.0	0.00
Dual Eligible	6%	6%	0.0	0.00
Disabled	12%	11%	-0.6	0.00
ESRD	0%	0%	0.0	0.00
Resource Use per Beneficiary (Pre-Enrollment Year)				
Average Number of Inpatient Admissions	0.2	0.2	n/a	0.01
Risk Adjustment Processing System (RAPS) V21 Hierarchical Condition Categories				
Diabetes Without Complication	15%	15%	-0.2	0.01
Chronic Obstructive Pulmonary Disease	14%	14%	-0.1	0.00
Specified Heart Arrhythmias	13%	13%	0.1	0.00
Vascular Disease	12%	12%	-0.3	0.01
Congestive Heart Failure	11%	11%	0.0	0.00
Diabetes With Chronic Complications	9%	9%	0.2	0.01
Breast, Prostate, And Other Cancers And Tumors	6%	6%	0.0	0.00
Polyneuropathy	5%	5%	-0.2	0.01
Dementia Without Complication	5%	5%	-0.1	0.01
Rheumatoid Arthritis And Inflam Connective Tissue Disease	4%	4%	-0.2	0.01
Coagulation Defects & Other Specified Hematological Disorders	3%	3%	0.1	0.00
Ischemic Or Unspecified Stroke	3%	3%	-0.2	0.01

B.2 Mortality and Readmissions

Table Appendix B-3: Welvie Mortality and Readmissions per 1,000 Beneficiaries by Quarter Following Enrollment, Medicare FFS Cohort

Measures	Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls
All-Cause Mortality per 1,000 Beneficiaries	13.4	17.1	13.3	14.4	13.4	14.8
30-Day Hospital Readmission per 1,000 Beneficiaries Following:						
All Inpatient Admissions	215.0	221.1	229.1	221.8	204.2	219.0
Inpatient Surgery Admissions	199.8	223.9	202.8	217.2	186.9	215.8

Measures	Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls
Inpatient PS Orthopedic Surgery Admissions[a]	105.6	166.0	138.7	142.3	133.3	162.0
Inpatient PS Cardiac Surgery Admissions	183.3	238.4	189.7	181.3	190.2	104.8
30-day Hospital Unplanned Readmission per 1,000 Beneficiaries, Following any Inpatient Admission	186.7	188.1	193.2	190.5	171.1	182.3

[a]PS= Preference Sensitive.

Table Appendix B-4: Welvie Mortality and Readmissions per 1,000 Beneficiaries by Quarter Following Enrollment, MA Cohort

Measures	Q1		Q2		Q3		Q4		Q5	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
All-Cause Mortality per 1,000 Beneficiaries	9.7	9.5	11.5	11.8	10.0	10.5	9.3	9.5	10.6	10.0
30-Day Hospital Readmission per 1,000 Beneficiaries Following:										
All Inpatient Admissions	184.7	186.2	195.1	195.7	188.4	204.1	187.2	187.5	168.9	182.9
Inpatient Surgery Admissions	164.9	157.7	179.1	193.0	173.1	189.1	162.7	158.5	141.1	149.0
Inpatient PS Orthopedic Surgery Admissions[a]	94.1	104.4	98.3	132.1	106.7	103.5	92.4	91.2	77.1	56.4
Inpatient PS Cardiac Surgery Admissions	221.2	187.5	176.7	191.2	177.0	185.2	189.8	191.9	160.3	172.8
30-day Hospital Unplanned Readmission per 1,000 Beneficiaries, following any Inpatient Admission	162.3	166.5	177.3	172.8	167.5	182.2	166.8	166.5	145.8	162.5

[a]PS = Preference Sensitive.

B.3 Health Service Resource Use

Table Appendix B-5: Welvie Resource Use by Quarter Following Enrollment, Medicare FFS Cohort

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	64,609	54,429	64,609	54,429	64,606	54,425	64,604	54,423
Health Service Use Rate per 1,000 Beneficiaries (%)								
ER Visits	250.0	251.7	86.3	86.9	87.5	91.0	81.3	85.7
All Inpatient Admissions	194.5	197.0	71.6	77.0	67.1	70.4	66.9	68.1
Unplanned Inpatient Admissions	163.8	169.0	62.3	68.0	58.5	61.9	56.9	59.0
All Surgeries	236.3	235.6	80.2	81.6	79.6	79.5	82.0	80.4
Inpatient Surgeries	74.7	73.6	20.6	22.2	20.9	21.4	21.5	21.1
Outpatient Surgeries	188.4	187.9	62.7	63.0	61.9	61.8	63.9	62.9
All PS Orthopedic Surgeries[a]	25.0	23.4	5.8	5.6	5.7	5.8	6.6	6.1
Inpatient PS Orthopedic Surgeries	21.3	20.3	5.0	4.8	4.8	4.6	5.8	5.2
Outpatient PS Orthopedic Surgeries	14.8	14.5	3.7	3.9	3.5	3.7	3.6	3.6
All PS Cardiac Surgeries	3.9	3.3	0.9	0.9	0.9	1.1	0.8	0.9
Inpatient PS Cardiac Surgeries	11.3	10.7	2.8	3.2	3.0	2.9	2.8	2.3
Outpatient PS Cardiac Surgeries	3.9	3.3	0.9	0.9	0.9	1.1	0.8	0.9
Number of Events per 1,000 Beneficiaries								
ER Visits								

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Mean	396.4	403.1	105.9	107.3	107.7	113.0	98.7	105.9
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	970.6	975.7	401.0	403.0	413.1	423.2	378.9	396.2
All Inpatient Admissions								
Mean	317.2	326.9	93.6	100.4	88.4	92.5	85.8	88.8
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	839.4	853.1	382.7	391.3	370.6	378.5	358.6	370.0
Unplanned Inpatient Admissions								
Mean	261.0	274.4	80.0	86.5	75.1	79.4	71.6	75.1
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	762.1	781.0	348.4	358.3	335.3	345.9	323.9	335.4
Hospital Days								
Mean	1,585.6	1,681.4	496.7	554.5	480.2	490.4	477.5	495.9
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	5,899.1	6,646.0	2,956.4	3,277.4	2,943.0	2,854.8	2,764.3	2,843.9
All Surgeries								
Mean	393.4	396.3	102.5	104.9	101.6	102.9	104.5	105.5
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	1,101.6	1,192.6	424.2	422.1	430.2	438.4	419.8	473.2
Inpatient Surgeries								
Mean	84.9	84.8	21.4	23.4	21.8	22.7	22.3	22.2
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	319.4	324.1	150.3	159.8	152.4	158.2	153.9	154.7
Surgical Hospital Days								
Mean	487.0	505.4	130.7	156.0	135.4	137.5	141.7	141.6

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	2,824.1	3,367.3	1,390.4	1,879.1	1,428.7	1,428.6	1,391.1	1,418.3
Outpatient Surgeries								
Mean	308.5	311.5	81.1	81.5	79.8	80.2	82.1	83.3
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	1,014.7	1,112.8	388.3	380.4	394.4	397.8	383.5	437.5
All PS Orthopedic Surgeries								
Mean	26.6	25.1	5.9	5.7	5.9	5.8	6.7	6.2
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	170.9	167.8	77.7	76.0	78.0	76.7	83.0	79.8
Inpatient PS Orthopedic Surgeries								
Mean	22.4	21.6	5.0	4.8	4.8	4.7	5.9	5.3
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	155.5	154.8	71.4	69.2	70.1	68.8	78.1	72.8
PS Orthopedic Surgery Hospital Days								
Mean	92.2	84.5	19.7	18.6	21.1	19.1	27.0	21.8
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	902.0	833.3	398.4	370.2	438.8	395.5	497.1	427.2
Outpatient PS Orthopedic Surgeries								
Mean	15.8	15.2	3.8	3.9	3.5	3.8	3.7	3.6
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	138.5	127.4	62.2	62.3	59.7	62.6	61.7	61.4
All PS Cardiac Surgeries								

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Mean	27.7	26.3	6.6	7.1	6.6	6.8	6.5	5.9
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	189.5	178.1	84.6	88.0	86.2	88.3	85.5	83.0
Inpatient PS Cardiac Surgeries								
Mean	11.8	11.2	2.8	3.2	3.1	3.0	2.8	2.3
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	113.9	109.7	53.6	58.1	56.1	56.0	53.3	48.3
PS Cardiac Surgery Hospital Days								
Mean	65.9	71.7	14.5	17.3	16.2	17.6	16.7	14.6
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	836.1	1,969.6	372.8	432.2	399.8	455.2	413.8	399.3
Outpatient PS Cardiac Surgeries								
Mean	4.1	3.5	0.9	0.9	1.0	1.1	0.8	1.0
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	67.6	61.7	30.2	31.5	34.3	33.5	28.4	32.9

[a]PS = Preference Sensitive

Table Appendix B-6: Welvie Resource Use by Quarter Following Enrollment, MA Cohort

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3		Q4		Q5	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	84,259	82,640	84,259	82,640	82,774	81,120	82,489	80,705	73,228	73,148	72,776	72,733
Health Service Use Rate per 1,000 Beneficiaries (%)												

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3		Q4		Q5	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
All Inpatient Admissions	153.2	155.6	57.9	57.6	60.4	61.4	56.3	57.5	52.2	52.7	51.8	53.1
Unplanned Inpatient Admissions	128.0	129.5	49.1	49.4	52.1	53.1	48.4	49.7	44.7	45.1	43.5	44.6
All Surgeries												
Inpatient Surgeries	62.4	63.6	19.6	19.5	19.4	19.6	18.3	18.9	17.3	17.5	17.5	18.7
Inpatient PS Orthopedic Surgeries[a]	17.0	16.9	5.4	5.0	4.9	4.8	4.9	4.5	4.1	4.2	4.8	4.6
Inpatient PS Cardiac Surgeries	9.4	9.8	2.5	2.5	2.8	2.5	2.5	2.7	1.9	2.4	2.1	2.6
Number of Events per 1,000 Beneficiaries												
All Inpatient Admissions												
Mean	235.0	238.5	72.5	72.8	76.3	77.5	71.0	72.9	65.1	66.3	64.2	66.0
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	688.2	697.7	325.0	329.1	333.8	337.8	324.0	328.0	306.2	312.3	302.9	307.7
Unplanned Inpatient Admissions												
Mean	193.8	196.0	60.5	61.5	65.2	65.8	60.3	62.3	55.0	56.0	53.5	54.9
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	623.3	635.6	294.7	298.9	307.9	306.0	296.3	301.2	279.3	284.8	275.8	278.8
Hospital Days												
Mean	1,137.9	1,165.8	387.9	383.9	422.7	426.1	374.8	402.6	340.8	354.6	336.1	344.7
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	4,734.1	4,921.3	2,451.1	2,442.5	2,573.0	2,570.2	2,395.8	2,509.6	2,178.7	2,325.3	2,148.5	2,101.6
Inpatient Surgeries												

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3		Q4		Q5	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Mean	69.9	70.8	20.5	20.5	20.2	20.6	19.1	19.8	17.9	18.4	18.1	19.5
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	287.5	288.0	148.0	148.8	146.5	149.3	143.5	145.9	138.0	141.9	138.1	144.0
Surgical Hospital Days												
Mean	378.4	388.0	123.2	122.4	128.5	131.6	113.1	128.4	106.8	115.4	106.0	114.3
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	2,369.6	2,354.4	1,271.0	1,299.6	1,320.8	1,336.7	1,192.1	1,350.5	1,185.5	1,296.1	1,124.2	1,163.9
Inpatient PS Orthopedic Surgeries												
Mean	17.7	17.5	5.5	5.0	5.0	4.8	4.9	4.6	4.2	4.2	4.8	4.7
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	136.8	136.6	74.2	71.5	71.5	69.9	70.2	68.4	65.1	65.0	69.5	69.4
PS Orthopedic Surgery Hospital Days												
Mean	60.9	59.5	19.4	17.1	18.1	17.4	17.0	16.2	14.5	15.1	16.7	15.3
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	562.4	571.2	325.7	282.9	347.0	328.8	289.8	288.3	257.4	274.7	306.8	258.9
Inpatient PS Cardiac Surgeries												
Mean	9.7	10.2	2.6	2.5	2.8	2.6	2.6	2.8	1.9	2.4	2.2	2.6
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	102.1	104.7	52.3	50.5	53.9	51.9	52.0	53.8	44.2	49.7	47.6	51.6
PS Cardiac Surgery Hospital Days												
Mean	50.9	59.9	14.7	15.5	18.5	15.9	16.1	18.1	11.1	15.3	11.9	16.1
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	687.8	807.3	393.2	410.2	449.6	422.8	458.8	455.4	337.4	411.9	325.5	415.4

[a]PS= Preference Sensitive

B.4 Medical Expenditures

Table Appendix B-7: Welvie Expenditures by Quarter Following Enrollment, Medicare FFS Cohort

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	64,609	54,429	64,609	54,429	64,606	54,425	64,604	54,423
Total Medicare Parts A, B, and D Expenditures[a]								
Mean	$10,836	$11,667	$3,010	$3,293	$2,694	$2,845	$2,663	$2,870
Median	$3,714	$4,042	$717	$788	$441	$495	$475	$502
75th percentile	$10,997	$12,086	$2,046	$2,318	$1,672	$1,904	$1,719	$1,871
90th percentile	$29,996	$32,015	$7,203	$8,201	$6,246	$6,906	$6,075	$6,894
99th percentile	$92,047	$97,129	$38,297	$39,640	$36,900	$37,136	$36,377	$37,526
Total Medicare Parts A and B Expenditures								
Mean	$8,218	$8,599	$2,368	$2,563	$2,283	$2,401	$2,297	$2,409
Median	$2,125	$2,217	$329	$347	$325	$334	$362	$367
75th percentile	$6,955	$7,279	$1,203	$1,280	$1,139	$1,203	$1,185	$1,204
90th percentile	$23,810	$24,954	$5,417	$6,027	$4,939	$5,387	$4,867	$5,230
99th percentile	$80,118	$84,241	$34,986	$36,758	$34,875	$35,056	$34,314	$35,012
Inpatient Expenditures								
Mean	$2,432	$2,510	$744	$836	$727	$764	$728	$753
Median	$0	$0	$0	$0	$0	$0	$0	$0
75th percentile	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$7,816	$7,866	$0	$0	$0	$0	$0	$0
99th percentile	$37,976	$39,189	$18,001	$19,695	$18,026	$18,385	$18,450	$18,378
Outpatient ER Expenditures								
Mean	$204	$207	$55	$59	$56	$60	$58	$60
Median	$0	$0	$0	$0	$0	$0	$0	$0
75th percentile	$0	$4	$0	$0	$0	$0	$0	$0
90th percentile	$553	$561	$0	$0	$0	$0	$0	$0
99th percentile	$2,932	$2,982	$1,271	$1,387	$1,312	$1,386	$1,356	$1,367
Outpatient Non-ER Expenditures								
Mean	$1,276	$1,325	$338	$340	$322	$323	$331	$345
Median	$260	$265	$8	$12	$0	$0	$15	$18
75th percentile	$987	$1,054	$151	$157	$146	$148	$158	$163

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
90th percentile	$2,676	$2,857	$654	$680	$616	$644	$641	$665
99th percentile	$21,285	$21,842	$6,664	$6,457	$6,007	$5,774	$6,470	$6,647
Carrier/PB Expenditures								
Mean	$2,311	$2,352	$614	$642	$596	$616	$628	$645
Median	$1,168	$1,197	$196	$205	$199	$205	$235	$236
75th percentile	$2,712	$2,777	$580	$605	$560	$578	$602	$610
90th percentile	$5,201	$5,279	$1,506	$1,567	$1,462	$1,480	$1,516	$1,531
99th percentile	$19,380	$18,871	$6,314	$6,808	$6,111	$6,344	$6,003	$6,412
Skilled Nursing Facility Expenditures								
Mean	$973	$1,091	$285	$335	$273	$299	$282	$314
Median	$0	$0	$0	$0	$0	$0	$0	$0
75th percentile	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$26,908	$28,204	$12,177	$13,790	$11,661	$12,538	$11,737	$13,034
Durable Medical Equipment Expenditures								
Mean	$232	$238	$58	$58	$54	$56	$48	$48
Median	$0	$0	$0	$0	$0	$0	$0	$0
75th percentile	$88	$85	$0	$0	$0	$0	$0	$0
90th percentile	$573	$580	$146	$141	$139	$136	$100	$99
99th percentile	$3,366	$3,317	$885	$876	$788	$817	$775	$775
Home Health Expenditures								
Mean	$474	$473	$133	$128	$125	$126	$99	$91
Median	$0	$0	$0	$0	$0	$0	$0	$0
75th percentile	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$200	$0	$0	$0	$0	$0	$0	$0
99th percentile	$9,872	$10,166	$4,053	$3,954	$3,926	$3,926	$3,181	$3,102
Hospice Expenditures								
Mean	$271	$350	$128	$149	$117	$143	$110	$138
Median	$0	$0	$0	$0	$0	$0	$0	$0
75th percentile	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$2,441	$8,631	$5,267	$7,554	$3,928	$6,788	$3,327	$6,203
Total Surgery Expenditures								
Mean	$1,649	$1,667	$429	$484	$439	$445	$456	$454

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Median	$0	$0	$0	$0	$0	$0	$0	$0
75th percentile	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$3,725	$3,527	$0	$0	$0	$0	$0	$0
99th percentile	$28,291	$28,252	$11,511	$13,224	$12,277	$12,607	$12,830	$13,044
Inpatient Surgery Expenditures								
Mean	$1,180	$1,187	$310	$364	$323	$331	$335	$329
Median	$0	$0	$0	$0	$0	$0	$0	$0
75th percentile	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$26,709	$26,593	$10,167	$12,416	$10,608	$11,055	$11,462	$11,412
Episode-Based Inpatient Surgery Expenditures								
Mean	$1,717	$1,720	$457	$535	$484	$499	$488	$492
Median	$0	$0	$0	$0	$0	$0	$0	$0
75th percentile	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$36,518	$36,955	$17,989	$21,125	$19,612	$20,369	$20,103	$20,364
Outpatient Surgery Expenditures								
Mean	$469	$481	$118	$120	$116	$114	$121	$124
Median	$0	$0	$0	$0	$0	$0	$0	$0
75th percentile	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$1,154	$1,162	$0	$0	$0	$0	$0	$0
99th percentile	$8,176	$8,582	$2,697	$2,854	$2,766	$2,666	$2,756	$2,909
Total PS Orthopedic Surgery Expenditures[b]								
Mean	$277	$269	$58	$56	$59	$57	$73	$69
Median	$0	$0	$0	$0	$0	$0	$0	$0
75th percentile	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$10,219	$10,219	$0	$0	$0	$0	$0	$0
Inpatient PS Orthopedic Surgery Expenditures								
Mean	$266	$259	$56	$54	$57	$55	$71	$66
Median	$0	$0	$0	$0	$0	$0	$0	$0
75th percentile	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
99th percentile	$10,219	$10,219	$0	$0	$0	$0	$0	$0
Outpatient PS Orthopedic Surgery Expenditures								
Mean	$11	$10	$2	$2	$3	$2	$2	$3
Median	$0	$0	$0	$0	$0	$0	$0	$0
75th percentile	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$0	$0	$0	$0	$0	$0	$0	$0
Total PS Cardiac Surgery Expenditures								
Mean	$274	$259	$62	$77	$71	$69	$69	$57
Median	$0	$0	$0	$0	$0	$0	$0	$0
75th percentile	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$9,911	$9,829	$0	$0	$0	$0	$0	$0
Inpatient PS Cardiac Surgery Expenditures								
Mean	$224	$210	$51	$65	$61	$58	$58	$45
Median	$0	$0	$0	$0	$0	$0	$0	$0
75th percentile	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$9,598	$9,459	$0	$0	$0	$0	$0	$0
Outpatient PS Cardiac Surgery Expenditures								
Mean	$50	$49	$11	$12	$10	$10	$11	$12
Median	$0	$0	$0	$0	$0	$0	$0	$0
75th percentile	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$1,809	$1,804	$0	$0	$0	$0	$0	$0

[a]Denominator is subset to beneficiaries enrolled in Medicare Part D
[b]PS = Preference Sensitive

APPENDIX C: RESULTS FOR MEDEXPERT

C.1 Demographic and Health Characteristics

Table Appendix C-1: MedExpert Baseline Demographic and Health Characteristics, FFS Cohort

Characteristics	Intervention Group	Control Group	Percentage Point Difference	Standardized Mean Difference
Number of Beneficiaries	29,456	208,311	n/a	n/a
Number of Matched Beneficiaries	29,424	29,424	n/a	n/a
Number of Matched Beneficiaries - Weighted	29,424	29,424	n/a	n/a
Average Age	77.9	77.5	n/a	0.04
Age Categories				
Age under 65	8%	8%	-0.5%	0.02
Age 65-69	3%	2%	0.3	0.02
Age 70-74	18%	18%	0.0	0.00
Age 75-79	27%	27%	0.1	0.00
Age 80-84	21%	21%	-0.2	0.00
Age 85-89	15%	15%	0.2	0.00
Age 90+	9%	9%	0.1	0.00
Gender				
Male	45%	44%	0.4	0.01
Female	55%	56%	-0.4	0.01
Race				
White	74%	74%	-0.1	0.00
Black	7%	7%	0.0	0.00
Other	19%	19%	0.1	0.00
Dual Eligible	24%	25%	-0.5	0.01
Disabled	15%	16%	-0.6	0.02
ESRD	0%	0%	-0.1	0.01
Evaluation and Management (E&M) Visits				
E&M Visits: 0	8%	8%	-0.1	0.00
E&M Visits: 1-5	22%	22%	-0.1	0.00
E&M Visits: 6-10	24%	24%	-0.3	0.01
E&M Visits: 11-15	17%	17%	0.0	0.00
E&M Visits: 16+	29%	29%	0.6	0.01
Resource Use per Beneficiary (Pre-Enrollment Year)				
Average Number of Skilled Nursing Facility Days	2.2	2.6	n/a	0.02
Average Number of Inpatient Admissions	0.3	0.3	n/a	0.00
Medical Cost per Beneficiary				

Characteristics	Intervention Group	Control Group	Percentage Point Difference	Standardized Mean Difference
(Pre-Enrollment Year)				
Average total medical costs	$9,693	$9,679	n/a	0.00
Healthcare Cost and Utilization Project (HCUP) Diagnosis Categories				
Essential hypertension	72%	72%	0.2	0.00
Disorders of lipid metabolism	69%	68%	0.6	0.01
Immunizations and screening for infectious disease	56%	55%	0.4	0.01
Other connective tissue disease	49%	49%	-0.1	0.00
Other skin disorders	45%	45%	0.1	0.00
Other non-traumatic joint disorders	38%	38%	0.5	0.01
Diabetes mellitus without complication	38%	38%	0.4	0.01
Other lower respiratory disease	38%	38%	-0.1	0.00
Cataract	37%	37%	0.5	0.01
Spondylosis; intervertebral disc disorders; other back problems	37%	36%	0.5	0.01
Osteoarthritis	34%	34%	0.4	0.01
Deficiency and other anemia	34%	34%	-0.1	0.00
Other aftercare	34%	34%	0.0	0.00
Medical examination/evaluation	33%	33%	0.0	0.00
Cardiac dysrhythmias	33%	32%	0.4	0.01

Table Appendix C-2: MedExpert Baseline Demographic and Health Characteristics, MA Cohort

Characteristics	Intervention Group	Control Group	Percentage Point Difference	Standardized Mean Difference
Number of Beneficiaries	35,872	234,283	n/a	n/a
Number of Matched Beneficiaries	35,846	35,846	n/a	n/a
Number of Matched Beneficiaries - Weighted	35,846	35,846	n/a	n/a
Average Age	78.4	78.1	n/a	0.03
Age Categories				
Age under 65	5%	5%	0.0	0.00
Age 65-69	3%	3%	0.0	0.00
Age 70-74	20%	20%	0.2	0.01
Age 75-79	29%	29%	-0.2	0.00
Age 80-84	22%	23%	-0.2	0.01
Age 85-89	14%	14%	-0.2	0.00
Age 90+	7%	6%	0.4	0.01
Gender				

Characteristics	Intervention Group	Control Group	Percentage Point Difference	Standardized Mean Difference
Male	44%	43%	1.3	0.03
Female	56%	57%	-1.3	0.03
Race				
White	74%	75%	-0.7	0.02
Black	10%	8%	1.1	0.04
Other	16%	17%	-0.4	0.01
Dual Eligible	12%	12%	-0.1	0.00
Disabled	13%	13%	0.0	0.00
ESRD	0%	0%	0.0	0.00
Resource Use per Beneficiary (Pre-Enrollment Year)				
Average Number of Inpatient Admissions	0.2	0.2	n/a	0.02
Risk Adjustment Processing System (RAPS) V21 Hierarchical Condition Categories				
Vascular Disease	22%	22%	0.4	0.01
Diabetes With Chronic Complications	20%	19%	0.7	0.02
Chronic Kidney Disease, Moderate (Stage 3)	17%	17%	0.3	0.01
Polyneuropathy	15%	14%	0.9	0.03
Chronic Obstructive Pulmonary Disease	15%	15%	0.4	0.01
Specified Heart Arrhythmias	13%	12%	0.8	0.02
Major Depressive, Bipolar, And Paranoid Disorders	12%	11%	0.5	0.02
Congestive Heart Failure	11%	10%	0.9	0.03
Diabetes without Complication	9%	9%	0.3	0.01
Chronic Kidney Dis, Mild Or Unspecified	7%	7%	0.2	0.01
Rheumatoid Arthritis And Inflam Connective Tissue Disease	6%	6%	0.3	0.01
Angina Pectoris	6%	5%	0.3	0.01
Breast, Prostate, And Other Cancers And Tumors	6%	5%	0.5	0.02
Dementia Without Complication	5%	4%	0.4	0.02
Drug/Alcohol Dependence	3%	3%	0.1	0.01

C.2 Mortality and Readmissions

Table Appendix C-3: MedExpert Mortality and Readmissions per 1,000 Beneficiaries by Quarter Following Enrollment, Medicare FFS Cohort

Measures	Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls
All-Cause Mortality per 1,000 Beneficiaries	13.3	13.3	14.0	14.4	11.5	14.3
30-Day Hospital Readmissions per 1,000 Beneficiaries Following:						
All Inpatient Admissions	223.1	219.6	193.0	227.9	227.4	211.1
30-day Hospital Unplanned Readmissions Following any Inpatient Admission	190.3	192.2	157.2	196.8	170.6	186.9

Table Appendix C-4: MedExpert Mortality and Readmissions per 1,000 Beneficiaries by Quarter Following Enrollment, MA Cohort

Measures	Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls
All-Cause Mortality per 1,000 Beneficiaries	12.9	11.8	13.0	13.2	16.5	14.6
30-Day Hospital Readmissions per 1,000 Beneficiaries	163.8	170.2	165.3	162.7	155.0	186.8
30-day Hospital Unplanned Readmissions per 1,000 Beneficiaries	153.7	159.0	157.0	150.5	147.3	175.1

C.3 Health Service Resource Use

The tables below include the results of the resource use and quality of care measures for the Medicare FFS analysis.

Table Appendix C-5: MedExpert Resource Use by Quarter Following Enrollment, Medicare FFS Cohort

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	29,424	29,424	29,424	29,424	17,128	17,128	4,258	4,258
Health Service Use Rate per 1,000 Beneficiaries (%)								
ER Visits	211.0	213.3	65.8	72.5	70.2	71.9	68.6	71.9
All Inpatient Admissions	188.7	187.4	68.4	69.3	66.8	69.4	70.2	67.9
Unplanned Inpatient Admissions	162.0	161.4	60.2	61.2	58.3	61.3	58.9	60.8
Number of Events per 1,000 Beneficiaries								
ER Visits								
Mean	329.9	341.1	80.9	92.1	85.6	89.7	86.0	89.7
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	892.6	932.0	343.0	391.0	357.9	374.5	367.4	365.8
All Inpatient Admissions								
Mean	314.2	312.9	90.1	91.5	83.8	90.6	88.3	87.8
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	845.4	850.1	378.6	382.2	349.6	369.5	356.4	366.9
Unplanned Inpatient Admissions								
Mean	263.3	263.7	77.5	79.1	70.9	79.3	72.3	77.5
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Standard Deviation	775.0	782.6	346.9	348.3	314.9	345.4	318.5	342.9
Hospital Days								
Mean	1,775.9	1,814.0	549.1	539.0	512.6	545.6	505.9	512.4
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	7,230.0	8,168.9	3,318.2	3,257.0	3,072.4	3,239.8	3,001.2	3,174.8

Table Appendix C-6: MedExpert Resource Use by Quarter Following Enrollment, MA Cohort

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	35,846	35,846	35,846	35,846	20,555	20,555	5,628	5,628
Health Service Use Rate per 1,000 Beneficiaries								
All Inpatient Admissions	130.5	122.5	46.8	45.1	47.1	47.5	45.8	45.7
Unplanned Inpatient Admissions	111.6	104.4	40.2	38.5	41.2	41.9	40.0	40.2
Number of Events per 1,000 Beneficiaries								
All Inpatient Admissions								
Mean	190.0	178.9	56.7	54.8	57.7	58.2	56.5	57.0
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	605.3	592.8	279.6	277.8	285.6	288.5	287.8	287.4
Unplanned Inpatient Admissions								

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Mean	161.5	152.6	48.3	47.2	50.5	51.1	49.2	50.1
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	561.8	553.8	256.8	261.0	267.7	269.8	269.1	270.5
Hospital Days								
Mean	724.9	702.3	235.5	221.1	246.4	254.6	215.7	266.7
Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Deviation	3,117.0	3,450.8	1,663.7	1,600.9	1,821.2	1,953.6	1,536.6	2,067.1

C.4 Medical Expenditures

Table Appendix C-7: MedExpert Expenditures by Quarter Following Enrollment, Medicare FFS Cohort

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	29,424	29,424	29,424	29,424	17,128	17,128	4,258	4,258
Total Medicare Parts A, B, and D Expenditures[a]								
Mean	$14,067	$13,943	$3,919	$3,844	$3,666	$3,815	$3,547	$3,582
Median	$5,731	$5,571	$1,126	$1,114	$998	$1,010	$919	$951
75th percentile	$15,012	$14,738	$3,192	$3,132	$2,965	$3,013	$2,751	$2,789
90th percentile	$35,745	$35,404	$9,358	$9,183	$8,809	$9,082	$8,783	$8,623
99th percentile	$119,137	$117,344	$45,146	$42,223	$41,652	$46,862	$40,762	$40,503
Total Medicare Parts A and B Expenditures								
Mean	$9,693	$9,678	$2,773	$2,734	$2,743	$2,749	$2,644	$2,672

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Median	$3,005	$3,010	$531	$526	$502	$472	$496	$467
75th percentile	$8,675	$8,513	$1,590	$1,599	$1,540	$1,505	$1,437	$1,583
90th percentile	$25,809	$25,791	$5,895	$5,963	$5,975	$5,896	$5,519	$5,998
99th percentile	$94,042	$95,153	$39,370	$37,828	$39,781	$39,604	$37,678	$37,593
Inpatient Expenditures								
Mean	$2,723	$2,692	$877	$863	$879	$940	$854	$842
Median	$0	$0	$0	$0	$0	$0	$0	$0
75th percentile	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$7,617	$7,639	$0	$0	$0	$0	$0	$0
99th percentile	$46,423	$44,755	$22,167	$20,420	$21,699	$22,303	$19,726	$22,587
Outpatient ER Expenditures								
Mean	$167	$167	$40	$46	$47	$45	$50	$49
Median	$0	$0	$0	$0	$0	$0	$0	$0
75th percentile	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$411	$426	$0	$0	$0	$0	$0	$0
99th percentile	$2,529	$2,496	$1,008	$1,136	$1,037	$1,019	$1,083	$1,273
Outpatient Non-ER Expenditures								
Mean	$1,068	$1,159	$271	$285	$279	$285	$223	$281
Median	$72	$80	$0	$0	$0	$0	$0	$0
75th percentile	$491	$523	$57	$60	$57	$54	$52	$52
90th percentile	$1,984	$2,092	$345	$373	$338	$340	$254	$327
99th percentile	$23,438	$26,685	$6,791	$6,967	$6,775	$6,942	$6,701	$7,210
Carrier/PB Expenditures								
Mean	$3,583	$3,526	$952	$921	$926	$879	$956	$891

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Median	$2,067	$2,045	$402	$395	$380	$359	$388	$349
75th percentile	$4,287	$4,192	$1,014	$981	$974	$950	$987	$986
90th percentile	$7,674	$7,569	$2,116	$2,077	$2,101	$2,057	$2,096	$2,083
99th percentile	$26,026	$25,949	$8,561	$8,433	$8,488	$8,237	$8,339	$8,246
Skilled Nursing Facility Expenditures								
Mean	$880	$961	$272	$266	$256	$262	$237	$248
Median	$0	$0	$0	$0	$0	$0	$0	$0
75th percentile	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$29,371	$30,570	$11,458	$11,431	$10,794	$11,441	$10,126	$11,381
Durable Medical Equipment Expenditures								
Mean	$258	$247	$58	$53	$53	$47	$54	$53
Median	$0	$0	$0	$0	$0	$0	$0	$0
75th percentile	$59	$58	$0	$0	$0	$0	$0	$0
90th percentile	$520	$513	$79	$68	$46	$45	$32	$59
99th percentile	$4,212	$3,783	$947	$962	$928	$882	$796	$963
Home Health Expenditures								
Mean	$742	$701	$202	$200	$201	$190	$201	$193
Median	$0	$0	$0	$0	$0	$0	$0	$0
75th percentile	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$2,621	$2,493	$0	$0	$0	$0	$0	$0
99th percentile	$11,950	$11,573	$4,444	$4,252	$4,524	$4,360	$4,636	$4,444
Hospice Expenditures								
Mean	$248	$202	$94	$92	$97	$94	$66	$111

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Median	$0	$0	$0	$0	$0	$0	$0	$0
75th percentile	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$427	$0	$1,891	$2,220	$2,360	$2,056	$0	$3,833

[a]Denominator is subset to beneficiaries enrolled in Medicare Part D

APPENDIX D: QUARTERLY TRENDS IN META-EVALUATION MEASURES

The following tables report baseline and intervention period trends by quarter for the meta-evaluation measures of health care spending, admissions, readmissions, and ER visits recommended by CMS for Welvie and MedExpert. Please note that while outcome measures and results in Section 4.4, 5.4, and Appendix sections B, C and D are presented in a cumulative fashion by quarter for analysis purposes, the meta-evaluation measure tables presented in this section are for individual quarters consistent with CMS recommendations on reporting meta-evaluation measures.

Table Appendix D-1: Baseline & Intervention Meta-Evaluation Measure Trends: Total Medicare Expenditures per Patient for Medicare FFS Beneficiaries[a]

Description	Baseline Q1	Baseline Q2	Baseline Q3	Baseline Q4	Intervention Q1	Intervention Q2	Intervention Q3
Intervention Group							
Welvie (1C1CMS330984)							
Spending Rate[b]	$1,932	$1,946	$2,129	$2,211	$2,368	$2,283	$2,297
Standard Deviation	$5,831	$6,004	$6,458	$7,218	$7,082	$7,106	$6,875
Unique Patients	64,609	64,609	64,609	64,609	64,609	64,606	64,604
MedExpert (1C1CMS331038)							
Spending Rate	$2,257	$2,306	$2,507	$2,623	$2,773	$2,743	$2,644
Standard Deviation	$6,410	$6,946	$7,790	$7,903	$8,557	$8,670	$8,377
Unique Patients	29,424	29,424	29,424	29,424	29,424	17,128	4,258
Control Group							
Welvie (1C1CMS330984)							
Spending Rate	$2,070	$2,009	$2,189	$2,330	$2,563	$2,401	$2,409
Standard Deviation	$6,278	$6,140	$6,579	$7,412	$7,730	$7,314	$7,237
Unique Patients	54,429	54,429	54,429	54,429	54,429	54,425	54,423
MedExpert (1C1CMS331038)							

Description	Baseline Q1	Baseline Q2	Baseline Q3	Baseline Q4	Intervention Q1	Intervention Q2	Intervention Q3
Spending Rate	$2,257	$2,357	$2,471	$2,594	$2,734	$2,749	$2,672
Standard Deviation	$6,383	$7,188	$7,535	$7,518	$8,480	$8,436	$8,162
Unique Patients	29,424	29,424	29,424	29,424	29,424	17,128	4,258

[a]The definition of "Total Medical Expenditures" is provided in Appendix A of this report and follows CMS recommendations on meta-evaluation measures with some exceptions. For example, medical expenditures could not be quarterized for this annual report. Acumen plans to incorporate all CMS recommendation in subsequent reports.

[b]Spending Rate: Total payments/Number of unique patients

Note: Measures with 10 or fewer beneficiaries in the numerator are suppressed.

Table Appendix D-2: Baseline & Intervention Meta-Evaluation Measure Trends: Inpatient Admission Rate per 1,000 Medicare FFS Beneficiaries[a]

Description	Baseline Q1	Baseline Q2	Baseline Q3	Baseline Q4	Intervention Q1	Intervention Q2	Intervention Q3
Intervention Group							
Welvie (1C1CMS330984)							
Admit Rate[b]	60.0	58.2	63.6	69.2	71.6	67.1	66.9
Standard Deviation	0.9	0.9	1.0	1.0	1.0	1.0	1.0
Unique Patients	64,609	64,609	64,609	64,609	64,609	64,606	64,604
MedExpert (1C1CMS331038)							
Admit Rate	56.9	63.4	62.7	66.1	68.4	66.8	70.2
Standard Deviation	1.4	1.4	1.4	1.4	1.5	1.9	3.9
Unique Patients	29,424	29,424	29,424	29,424	29,424	17,128	4,258
Control Group							
Welvie (1C1CMS330984)							
Admit Rate	63.0	59.1	63.0	72.6	77.0	70.4	68.1

Description	Baseline Q1	Baseline Q2	Baseline Q3	Baseline Q4	Intervention Q1	Intervention Q2	Intervention Q3
Standard Deviation	1.0	1.0	1.0	1.1	1.1	1.1	1.1
Unique Patients	54,429	54,429	54,429	54,429	54,429	54,425	54,423
MedExpert (1C1CMS331038)							
Admit Rate	55.6	61.4	62.3	67.3	69.3	69.4	67.9
Standard Deviation	1.3	1.4	1.4	1.5	1.5	1.9	3.9
Unique Patients	29,424	29,424	29,424	29,424	29,424	17,128	4,258

[a]The definition of "Inpatient Admission Rate" is provided in Appendix A of this report and follows CMS recommendations on meta-evaluation measures with some exceptions. Acumen plans to incorporate all CMS recommendation in subsequent reports.

[b]Admit Rate: (Number of beneficiaries with at least one admission/Number of beneficiaries) *1,000.

Note: Measures with 10 or fewer beneficiaries in the numerator are suppressed.

Table Appendix D-3: Baseline & Intervention Meta-Evaluation Measure Trends: Inpatient Admission Rate per 1,000 Medicare Advantage Beneficiaries[a]

Description	Baseline Q1	Baseline Q2	Baseline Q3	Baseline Q4	Intervention Q1	Intervention Q2	Intervention Q3	Intervention Q4	Intervention Q5
Intervention Group									
Welvie (1C1CMS330984)									
Admit Rate[b]	44.8	47.7	48.3	50.9	57.9	60.4	56.3	52.2	51.8
Standard Deviation	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8
Unique Patients	84,259	84,259	84,259	84,259	84,259	82,774	82,489	73,228	72,776
MedExpert (1C1CMS331038)									
Admit Rate	35.7	40.7	40.6	41.8	46.8	47.1	45.8	- (see note below)	-
Standard Deviation	1.0	1.0	1.0	1.1	1.1	1.5	2.8	-	-
Unique Patients	35,846	35,846	35,846	35,846	35,846	20,555	5,628	-	-
Control Group									

Description	Baseline Q1	Baseline Q2	Baseline Q3	Baseline Q4	Intervention Q1	Intervention Q2	Intervention Q3	Intervention Q4	Intervention Q5
Welvie (1C1CMS330984)									
Admit Rate	45.0	48.2	50.7	50.4	57.6	61.4	57.5	52.7	53.1
Standard Deviation	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Unique Patients	82,640	82,640	82,640	82,640	82,640	81,120	80,705	73,148	72,733
MedExpert (1C1CMS331038)									
Admit Rate	33.5	39.1	37.7	39.8	45.1	47.5	45.7	-	-
Standard Deviation	1.0	1.0	1.0	1.0	1.1	1.5	2.8	-	-
Unique Patients	35,846	35,846	35,846	35,846	35,846	20,555	5,628	-	-

[a]The definition of "Inpatient Admission Rate" is provided in Appendix A of this report and follows CMS recommendations on meta-evaluation measures with some exceptions. Acumen plans to incorporate all CMS recommendation in subsequent reports.

[b]Admit Rate: (Number of beneficiaries with at least one admission/Number of beneficiaries)*1,000.

Note: Measures with 10 or fewer beneficiaries in the numerator are suppressed.

Table Appendix D-4: Baseline & Intervention Meta-Evaluation Measure Trends: 30-Day Unplanned Hospital Readmissions per 1,000 Admissions for Medicare FFS Beneficiaries[a]

Description	Baseline Q1	Baseline Q2	Baseline Q3	Baseline Q4	Intervention Q1	Intervention Q2	Intervention Q3
Intervention Group							
Welvie (1C1CMS330984)							
Readmit Rate[b]	144.9	157.2	143.7	172.9	186.7	193.2	171.1
Standard Deviation	5.7	5.9	5.5	5.7	5.7	6.0	5.7
Total Admissions	3,879	3,760	4,107	4,471	4,623	4,338	4,325
MedExpert (1C1CMS331038)							
Readmit Rate	146.4	143.7	171.7	177.4	190.3	157.2	170.6
Standard Deviation	8.6	8.1	8.8	8.7	8.7	10.8	21.8

Description	Baseline Q1	Baseline Q2	Baseline Q3	Baseline Q4	Intervention Q1	Intervention Q2	Intervention Q3
Total Admissions	1,674	1,865	1,846	1,945	2,013	1,145	299
Control Group							
Welvie (1C1CMS330984)							
Readmit Rate	156.1	150.2	159.4	185.7	188.1	190.5	182.3
Standard Deviation	6.2	6.3	6.2	6.2	6.0	6.3	6.3
Total Admissions	3,427	3,215	3,431	3,953	4,189	3,833	3,708
MedExpert (1C1CMS331038)							
Readmit Rate	143.7	155.0	166.3	191.9	192.2	196.8	186.9
Standard Deviation	8.7	8.5	8.7	8.9	8.7	11.5	22.9
Total Admissions	1,635	1,806	1,834	1,980	2,040	1,189	289

[a]The definition of "30-Day Unplanned Hospital Readmission Rate" is provided in Appendix A of this report and follows CMS recommendations on meta-evaluation measures with some exceptions. Acumen plans to incorporate all CMS recommendation in subsequent reports.

[b]Readmit Rate: (Number of beneficiaries with one or more readmissions/Number of beneficiaries with one or more admissions)*1,000.

Note: Measures with 10 or fewer beneficiaries in the numerator are suppressed.

Table Appendix D-5: Baseline & Intervention Meta-Evaluation Measure Trends: 30-Day Unplanned Hospital Readmissions per 1,000 Admissions for Medicare Advantage Beneficiaries[a]

Description	Baseline Q1	Baseline Q2	Baseline Q3	Baseline Q4	Intervention Q1	Intervention Q2	Intervention Q3	Intervention Q4	Intervention Q5
Intervention Group									
Welvie (1C1CMS330984)									
Readmit Rate[b]	134.3	139.9	134.7	170.8	162.3	177.3	167.5	166.8	145.8
Standard Deviation	5.5	5.5	5.4	5.7	5.3	5.4	5.5	6.0	5.7
Total Admissions	3,775	4,017	4,068	4,285	4,879	5,003	4,644	3,824	3,772
MedExpert (1C1CMS331038)									

Description	Baseline Q1	Baseline Q2	Baseline Q3	Baseline Q4	Intervention Q1	Intervention Q2	Intervention Q3	Intervention Q4	Intervention Q5
Readmit Rate	109.5	127.6	145.1	155.4	153.7	157.0	147.3	- (see note below)	-
Standard Deviation	8.7	8.7	9.2	9.4	8.8	11.7	22.1	-	-
Total Admissions	1,278	1,458	1,454	1,499	1,679	968	258	-	-
Control Group									
Welvie (1C1CMS330984)									
Readmit Rate	123.6	135.7	141.3	166.5	166.5	172.8	182.2	166.5	162.5
Standard Deviation	5.4	5.4	5.4	5.8	5.4	5.4	5.7	6.0	5.9
Total Admissions	3,715	3,986	4,189	4,163	4,758	4,983	4,639	3,857	3,859
MedExpert (1C1CMS331038)									
Readmit Rate	125.6	129.7	117.8	139.4	159.0	150.5	175.1	-	-
Standard Deviation	9.6	9.0	8.8	9.2	9.1	11.4	23.7	-	-
Total Admissions	1,202	1,403	1,350	1,428	1,616	977	257	-	-

[a]The definition of "30-Day Unplanned Hospital Readmission Rate" is provided in Appendix A of this report and follows CMS recommendations on meta-evaluation measures with some exceptions. Acumen plans to incorporate all CMS recommendation in subsequent reports.

[b]Readmit Rate: (Number of beneficiaries with one or more readmissions/Number of beneficiaries with one or more admissions)*1,000.

Note: Measures with 10 or fewer beneficiaries in the numerator are suppressed.

Table Appendix D-6: Baseline & Intervention Meta-Evaluation Measure Trends: ER Visit Rate per 1,000 Medicare FFS Beneficiaries[a]

Description	Baseline Q1	Baseline Q2	Baseline Q3	Baseline Q4	Intervention Q1	Intervention Q2	Intervention Q3
Intervention Group							
Welvie (1C1CMS330984)							
ER Visit Rate[b]	80.5	82.0	79.8	84.3	86.3	87.5	81.3
Standard Deviation	1.1	1.1	1.1	1.1	1.1	1.1	1.1

Description	Baseline Q1	Baseline Q2	Baseline Q3	Baseline Q4	Intervention Q1	Intervention Q2	Intervention Q3
Unique Patients	64,609	64,609	64,609	64,609	64,609	64,606	64,604
MedExpert (1C1CMS331038)							
ER Visit Rate	65.7	65.5	67.4	69.3	65.8	70.2	68.6
Standard Deviation	1.4	1.4	1.5	1.5	1.4	2.0	3.9
Unique Patients	29,424	29,424	29,424	29,424	29,424	17,128	4,258
Control Group							
Welvie (1C1CMS330984)							
ER Visit Rate	80.9	84.3	78.7	85.8	86.9	91.0	85.7
Standard Deviation	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Unique Patients	54,429	54,429	54,429	54,429	54,429	54,425	54,423
MedExpert (1C1CMS331038)							
ER Visit Rate	67.1	67.7	69.9	71.8	72.5	71.9	71.9
Standard Deviation	1.5	1.5	1.5	1.5	1.5	2.0	4.0
Unique Patients	29,424	29,424	29,424	29,424	29,424	17,128	4,258

[a]The definition of "ER Visit Rate" is provided in Appendix A of this report and follows CMS recommendations on meta-evaluation measures with some exceptions. Acumen plans to incorporate all CMS recommendation in subsequent reports.

[b]ER Visit Rate: (Number of beneficiaries with at least one outpatient ER claim /Number of beneficiaries)*1,000.

Note: Measures with 10 or fewer beneficiaries in the numerator are suppressed.