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Introduction

We are at an unprecedented moment in American health care. Our costs are rising, our budgets are shrinking, and access to and quality of health care - as well as the outcomes experienced by patients - vary widely depending on geography and demographic characteristics. As a nation, we spend more and get less than most of our industrialized peers. Health care costs, more so than outcomes, continue to dominate the public debate. This is not surprising given the economic and political realities of the day. And yet, there are Beacon Community Program efforts across the country that are testing new and innovative strategies for improving patient care and enhancing the health of individuals and populations, while simultaneously driving down costs – all enabled by advances in the use of health information technology (health IT) and exchange.

With federal investment and support, communities across the nation are testing the use of health IT to transform health and health care. There is a tremendous opportunity for us to learn from these experiments and innovations. The challenge is to accurately gather, assess, and synthesize what is happening and why – factoring in the diversity in contexts and resources from one community to another. Policymakers, health care providers, patient advocates, and researchers alike need to understand when, how, and under what conditions health IT can be leveraged to help address the pressing challenges of cost, quality and access to care. As a society, we need to be able to answer those questions with speed and confidence, capturing and translating lessons from one site to another so that early experiences and lessons learned can be shared broadly, and tested more fully.

It is in this spirit that we launch this new series of publications, the first of which introduces the Three Pillars of the Beacon Community Cooperative Agreement Program. Based on the work of the communities involved, this policy brief, and those that will follow, provide an early look at the activities of the 17 Beacon Communities, including their success, challenges, lessons learned, and the role health IT can play in improving health and health care while reducing costs. Future publications will cover such topics as the use of information exchange to improve care coordination, the collection and reporting of measures to drive care improvement, and emerging models for sustaining such efforts at the community level. Each publication in the series is designed to advance public discourse around, and understanding of, the applications of findings from the Beacon Communities so that all might benefit from the public and private investments made here.

AcademyHealth is delighted to be working with the many experts and stakeholders in the 17 Beacon communities and Office of the National Coordinator for Health IT (ONC) as they guide this landmark investment in transforming health and health care within communities through the use of health IT. As an organization committed to the development and use of evidence to inform policy and practice and improve health and

health care, we are excited by this unique opportunity to move beyond one-off pilots and develop a more generalized approach to researching the impact of health IT. This will not only require the successful implementation of very challenging and multi-faceted initiatives, but also the rigorous assessment and rapid dissemination of the associated findings. As such, the Beacon Community Program is an important example of how the health services research community can partner with system innovators to generate policy relevant information in shorter timeframes, using new data streams, and innovative methods. We are pleased to be collaborating in these efforts.

A handwritten signature in black ink, appearing to read "Lisa Simpson". The signature is fluid and cursive, with a large initial "L" and "S".

Lisa Simpson, MB, BCh, MPH, FAAP
President and CEO of AcademyHealth

The Beacon Community Program: Three Pillars of Pursuit

The march to wire America's health sector is well underway. Technology offers the promise of modernizing health systems and the broader health care ecosystem to help address well-documented challenges in bettering health, improving care and lowering per capita costs.

The Full Promise of Health IT Has Not Yet Been Realized

Despite considerable progress in medical science, it is widely acknowledged that the performance of the U.S. health care system is sub-optimal in many respects.¹ Even those with insurance navigate a largely uncoordinated terrain in which providers in different settings have limited incentive to be jointly accountable for monitoring and coordinating care for their patients. Decisions are frequently made with inadequate or incorrect information, and patient needs and preferences are often insufficiently prioritized.² As a result, there is broad evidence of overuse, underuse, and misuse of care even though the United States spends more per person on health care than any other nation in the world. Clearly there is room for improvement, and emerging technologies have much to offer.

An assembly of national health care experts recently identified four “value-driving” essential ingredients for the transformation of the U.S. health care system: better care coordination, better access to care, better technology, and better payment models.³ Historically, demonstrations and pilot projects by public and private stakeholders have focused on only a subset of these problems at a time, falling short of a coordinated, comprehensive strategy. For example, the Patient-Centered Medical Home has gained traction as an approach to ensuring coordinated care across settings—and as one that could have a particularly significant impact for patients with chronic conditions or complex care needs.⁴ And yet, medical homes alone will not “fix” the system.

¹ Better to Best: Value-Driving Elements of the Patient Centered Medical Home and Accountable Care Organizations. Website. Available at: http://www.pcpcc.net/files/better_best_guide_full_2011.pdf. Accessed May 16, 2011.

² Highlights From the National Healthcare

Quality and Disparities Reports. Website. Available at: <http://www.ahrq.gov/qual/nhdr10/nhdr10key.pdf>. Accessed August 19, 2011.

³ Better to Best: Value-Driving Elements of the Patient Centered Medical Home and Accountable Care Organizations. Website available at: http://www.pcpcc.net/files/better_best_guide_full_2011.pdf. Accessed May 16, 2011.

⁴ Nutting AN, Crabtree BF, Miller WL, Strange KC, Stewart E, Jaén C. Transforming Physician Practices To Patient-Centered Medical Homes: Lessons From The National Demonstration Project. *Health Affairs*. 2011 Mar; 30(4): 439-445

Similarly, newer and less conventional approaches like virtual patient care via secure messaging or e-visits have shown potential for expanding access to care in limited studies or settings.⁵ Decades of research and several recent reviews on the impact of health information technology (health IT) have pointed to generally positive results.⁶ These findings have fostered an expectation that investments in the health IT infrastructure will facilitate the timely and appropriate generation, exchange, and use of information to support care coordination and access objectives, as well as improve workflow efficiency, evidence-based practice, and other key aspects of quality health care. Other studies challenge the notion that technology alone will lead to improvement absent parallel changes in reimbursement and process redesign.⁷

Beacon Community Program Helps Bring HITECH to Life

Most agree that single site, single focus approaches will no longer be adequate.⁸ Discrete, incremental efforts will not sufficiently demonstrate meaningful and measurable improvements in health, nor determine how and where greater value and efficiency can be extracted from the health care system. This is the impetus for the Beacon Community Cooperative Agreement (Beacon Community) Program; it builds on the foundation of Meaningful Use of electronic health records to test what happens when communities simultaneously apply multiple initiatives designed to set clear goals and establish optimal care processes and organizational roles - leveraging technology as an enabler.

This brief describes how the Beacon Community Program has been structured to move beyond “one-off” pilots that address limited aspects of health care delivery. The program’s aim is to help communities generate a more robust, integrated, and generalizable body of knowledge that can be shared broadly to improve care at the local level, and ultimately inform national policy.

Authorized under the Health Information Technology for Economic and Clinical Health (HITECH) Act included in the American Recovery and Reinvestment Act (ARRA), the Beacon Community Program provides support and technical assistance to 17 communities across the country so that each can apply, in various permutations and combinations, a set of strategies designed to enhance care coordination, improve health, and reduce—or at least hold steady—health care costs. The program is a signature initiative of the Office of the National Coordinator for Health Information Technology’s (ONC) portfolio.

⁵ Dixon RF. Enhancing Primary Care Through Online Communication. *Health Affairs*. 2010 Jan; 29(7): 1364-1369.

⁶ Buntin, M., Burke, M., Hoaglin MC, et al. The Benefits Of Health Information Technology: A Review Of The Recent Literature Shows Predominantly Positive Results. *Health Affairs*. 2011 Mar; 30(3): 464 - 471.

⁷ DesRoches CM, Agarwal R, Angst CM, et al. Differences Between Integrated And Stand-Alone E-Prescribing Systems Have Implications For Future Use. *Health Affairs*. 2010 Dec; 29(12): 2268-2277

⁸ McKethan A, Brammer C. Uniting the Tribes of Health System Improvement. *American Journal of Managed Care*. 2010 Dec; 16(12): SP13-SP18.

Each Beacon Community is distinct, and each is designing activities and setting clinical improvement goals that reflect its own environment. For example, Cincinnati, Salt Lake City, San Diego, and Detroit are urban settings with a dynamic marketplace of competing health plans and providers. By contrast, the Inland Northwest (Spokane), Maine (Bangor), and Mississippi Delta (Greenville) Beacon Communities are rural, and engage smaller hospitals and providers who typically work in less-resourced and more isolated practices.

Three Beacon Pursuits Link Health IT, Improvement, and Innovation

Beacon Communities are tackling many of the most prevalent and costly conditions today, including cardiovascular disease, diabetes and asthma. They are architecting new provider and community-level information systems and testing novel technologies that show great promise. The expectation is that—along with other initiatives at the local, state, and national level—this effort will test a number of coordinated strategies for transforming health care in “real-world” settings. And, as these strategies prove effective, or teach the communities important lessons, private insurers, local health care organizations, and the Centers for Medicare and Medicaid Services could build on these test cases by layering on new payment models to sustain performance improvements attained at the local level.

Roughly \$12–16 million dollars in funding over a three-year period was provided to each Beacon Community to support three aims:

- 1) **Build and strengthen** health IT infrastructure and exchange capabilities, positioning each community to pursue a new level of sustainable health care quality and efficiency over the coming years.
- 2) **Improve cost, quality, and population health** - translating investments in health IT in the short run to measureable improvements.
- 3) **Test innovative approaches** to care delivery, performance measurement, and technology integration thereby accelerating evidence generation for novel technologies and design characteristics.

Through the generation of evidence and example, the program has already illustrated to other communities the possibilities for leveraging health IT to achieve these desired goals. Thus, the Beacon Community Program can be thought of as a “proof of concept”

demonstrating that the proven benefits from research studies and small-scale pilot projects hold up when deployed across diverse communities with complex employer, provider, payer, and other market interactions.

Building & Strengthening Health IT Community Infrastructure

The fragmented nature of today's health care system can make information sharing difficult among all the different health care providers involved in a patient's care. Using funding from ONC's Beacon Community Program, the Greater Cincinnati Beacon Collaboration is combining technology and community collaboration to help solve some of the common information disruptions that affect health care.

Greater Cincinnati Targets Transitions of Care

Many hospitals and practices lack a complete view of the patient and therefore miss opportunities or may repeat care needlessly. With so many providers involved in a patient's care, care coordination can be a complex task, especially patients with chronic illness. One of the most fundamental changes Greater Cincinnati is undertaking is building and strengthening its existing health information exchange and data analysis capabilities to give health care professionals better decision-making tools.

HealthBridge, a Cincinnati-based organization with a long history of facilitating exchange of health information, has implemented an advanced master patient index as well as a robust data warehouse and business intelligence tools. These elements will enable better identification, tracking and management of patients across a range of care settings. Together, these technologies can provide a more complete view of the patient, minimize the number of missed opportunities to coordinate care, identify patients most at risk for complications, and target interventions that reduce the rate of avoidable emergency department visits and hospital readmissions for adults and children. The first use case for this new set of technologies will be to work with Beacon primary care providers to coordinate care more effectively for adults with diabetes and children with asthma.

They are taking this approach because the cost of poor coordination and management is high. Many patients experience avoidable and costly readmissions to the hospital or visits to the emergency department.⁹ It is also well-known that between 20 and 40 percent of potentially avoidable readmissions occur at different hospitals (i.e., initial visit is to hospital A and readmission is to hospital B).¹⁰ By deploying this advanced exchange technology and linking patients across institutions, Greater Cincinnati hopes to provide more coordinated care and reduce the likelihood that patients are readmitted.

But, in the event that they *are* readmitted, this technology also will enable Cincinnati to connect information about multiple hospitalizations —thereby giving the hospital-based team, primary care team, and post-acute provider team access to more complete clinical information on which to base care decisions. Previous efforts aimed at reducing potentially avoidable readmissions demonstrated significant impact on care quality, but they have also —in most cases — yielded substantial cost savings.¹¹

A Medicare Payment Advisory Commission (MedPAC) analysis found that 17.6 percent of all Medicare hospital admissions are readmissions that account for \$15 billion annually in expenditures. Of the \$15 billion in readmission costs, \$12 billion were potentially preventable.

Central Indiana Extends the Reach of a Health Information Exchange-Supported Quality Tool

A number of Beacon Communities have also expanded proven technical approaches to reach a broader population of providers and patients. The Central Indiana Beacon Community, for example, is building on the success of its robust and well-established Indiana Health Information Exchange and associated services (e.g., DOCS4DOCS®¹²)

⁹ Hackbarth GM, Reischauer RD, and Miller ME. Report to the Congress: Medicare Payment Policy. Washington, DC: Medicare Payment Advisory Commission; 2007 [cited 2011 August 22]. Available from: http://www.medpac.gov/chapters/Jun07_Ch05.pdf

¹⁰ Jencks SF, Williams MV, Coleman EA. Rehospitalizations among patients in the Medicare fee-for-service program. *New England Journal of Medicine*. 2009; 360(14): 1418-28.

¹¹ Boutwell AE, Johnson MB, Rutherford P, et al. An Early Look At A Four-State Initiative To Reduce Avoidable Hospital Readmissions. *Health Affairs*. July 2011; 30(7): 1272-1280.

Boutwell AE, Hwu S. *Effective interventions to reduce rehospitalizations: a survey of published evidence*. Cambridge (MA): Institute for Healthcare Improvement; 2009.

Boutwell AE, Griffin F, Hwu S, Shannon G. *Reducing avoidable rehospitalizations: a compendium of 15 promising interventions*. Cambridge (MA): Institute for Healthcare Improvement; 2009.

¹² The Docs4Docs® Clinical Messaging Service, launched by IHIE is an electronic results delivery service used to address day-to-day healthcare inefficiencies by helping providers manage patient test results and other information efficiently and securely. These services provide a single source for clinical results including laboratory results, radiology reports, transcriptions, pathology and admissions, discharge, and transfer information. More than 21,000 healthcare providers in

The QHF Program leverages the support and participation of a sophisticated infrastructure in the Indianapolis area that securely aggregates and accurately delivers clinical data (laboratory results, radiology reports, medication and treatment history), along with pharmacy data from all participating providers, regardless of hospital system or location. The Program provides physicians with information on patients regardless of whether they have commercial insurance, Medicare, Medicaid, or no insurance.

to expand the Quality Health First® (QHF®) Program. The QHF® Program, launched in late 2008, helps primary care providers manage chronically ill patients by compiling a variety of clinical and health plan data, and giving providers reports, alerts, and reminders for common screenings and well-care visits. The reports include disease-based summaries and comparisons, which allows providers and payers to compare consistent quality measures and better align incentives with

improvements in patient health. By design, QHF® helps providers identify and prioritize health screening, treatments, and other essential testing for their patients. Health plans like WellPoint use results to power their physician incentive programs.

Since the launch of the Beacon Community Program in 2010, the number of providers enrolled in the QHF® Program throughout Indiana has increased 89 percent, from 1,115 to 2,104 (1,646 within the Central Indiana Beacon region). In parallel, the QHF® Program has spread from 34 to 77 communities. This expansion in provider participation translates into an increased reliance on data to support the management of patients with chronic conditions and to monitor health and wellness. As a result of these efforts, the community has observed changes in key health process, outcome, and utilization measures among patients managed via the QHF® Program. Since June 2010, colorectal cancer screenings increased 3.7 percent, cervical cancer screenings increased 1.8 percent, and the proportion of diabetics with controlled blood sugar increased by 3.9 percent.

Additionally, the rates of hospital admission, readmission and emergency department visits improved significantly in the Central Indiana Beacon region during the 12 month period between July 2009 and June 2010. When compared to the previous year (July 2008 – June 2009), and based on data in the nine county Indianapolis metro area, Medicare patient hospital admissions decreased 12 percent, readmissions 17.3 percent, and emergency department visits 10 percent.

7,175 practices receive patient health results via the Docs4Docs® Service and over 20 million messages are delivered annually.

Through the Beacon Community Collaborative, leaders of the Central Indiana Beacon Community anticipated enrolling 1,552 primary care providers in the QHF® Program. With one year remaining in the Beacon Community Program, that goal has already been met and exceeded; nearly half of all primary care providers now participate in QHF®. Once fully deployed, many more providers will be able to use the QHF® Program to identify, manage, and, in some cases alleviate, conditions such as asthma and heart disease.

Southeast Minnesota Lays a New Foundation for Information Sharing

Not all Beacon Communities started with a robust health information exchange (HIE) infrastructure like Central Indiana, and some spent a considerable amount of time and resources early in the program to devise and deploy an exchange strategy to fulfill their near-term objectives and establish infrastructure for the future. The Southeast Minnesota Beacon Community organized and convened public health departments, all 47 public school districts, long-term care facilities, and several health care providers including Mayo Clinic Health System, Mayo Clinic, Olmsted Medical Center, Winona Health and recently Allina Health, and developed a standing governance committee to consider options for exchange of health information. Based on governance deliberations, state legal and regulatory considerations and a variety of technical options, the community ultimately decided on a design with several component parts, including: an expansion of electronic health record (EHR) penetration among providers in public health department partners, the development of a standard mechanism for capturing and sending clinical information (i.e., Continuity of Care Document), the deployment of a regionwide peer-to-peer HIE network and aggregation of information to facilitate a variety of population management and business intelligence functions.

By April 2011, the entire Mayo Clinic Health System network of clinics and hospitals was live on a centralized EHR system, serving the health care needs of people in 70 communities throughout Iowa, Minnesota, and Wisconsin. In addition, at the start of the Beacon Community Program three of the 11 public health entities in the catchment area lacked the public health EHR equivalent. This system has since been successfully deployed, adding roughly 90 more public health employees including nurses and other clinical care givers, and supporting the care of nearly 2,000 patients. In parallel, Minnesota providers worked with their respective vendors to create and

generate Continuity of Care Documents (CCD) consistent with Meaningful Use guidelines. Public health entities are also in the process of establishing a version of Clinical Document Architecture (CDA)/Care plan, which will be relevant and portable to other counties. The community has demonstrated a scalable peer-to-peer model to support exchange CCD & asthma action plans among the organizations through the Nationwide Health Information Network (NwHIN)¹³ compliant protocols. Twenty-five hundred providers and 500,000 patients in the region have benefited from this peer-to-peer HIE network. Public health serves as a secondary care provider, demonstrating the consumption and parsing of the CCD into EHR systems for medication reconciliation.

Security is a high priority in this region's exchange of health information strategy. Safeguards and protections are put into place with the latest technologies and processes to ensure all health care information involved in any exchange is only conducted with the informed and signed consent of the patient or their guardian.

To fully and securely use the data newly available through these systems, the Southeast Minnesota Beacon Community also considered options for a clinical data repository that would support the following functions:

- Development of standardized Quality Assurance metrics and query sets on Asthma and Diabetes
- Development of site specific query sets¹⁴
- Results reporting
- Error handling
- Workflow support

Based on the needs of the community and input from the governance committee, it was determined that the best option would be to leverage a well-established Clinical Data Repository managed by the Regenstrief Institute in Central Indiana. Following a legal review of the Regenstrief licensing agreement, data specifications, and data extraction and aggregation policies, the Southeast Minnesota Beacon Community worked with Regenstrief to establish connectivity, work through legal and technical issues, and finally

¹³ The Nationwide Health Information Network (NwHIN) is being developed to provide a secure, nationwide, interoperable health information infrastructure that will connect providers, consumers, and others involved in supporting health and healthcare by facilitating the exchange of health information. This critical part of the national health IT agenda will enable health information to follow the consumer, be available for clinical decision making, and support appropriate use of healthcare information beyond direct patient care so as to improve health.

¹⁴ As applicable; this may not be fully complete by the end of the award period.

in December 2011 to demonstrate a “proof of functional” repository including infrastructure to report and validate clinical metrics. The repository has been designed to include information about admissions discharge transfers (ADT), laboratory, diagnostic codes and procedures and expected to go live in 2012.

Improving Health and Health Care While Reducing Costs

Beacon Community interventions, technical or otherwise, have been devised to help attain the ultimate goal of improving patient and population health at equal or lower cost. Interventions are aimed at improving specific, measurable outcomes within defined populations (e.g., children with asthma or diabetic adults).

Pharmacists in the Mississippi Delta Target High Risk Diabetes

In the Delta BLUES population prevalence of diabetes has reached 13 percent, and more than 70 percent of all adults are overweight or obese. One inpatient hospital day costs \$1,853 for a patient with diabetes. An office visit where diabetes is the primary diagnosis costs \$132.

For example, the Delta BLUES Beacon Community—in partnership with the University of Mississippi School of Pharmacy—is supporting primary care providers by calling diabetic patients monthly to see if they have questions about their medications or how to take them.¹⁵ This Medication Adherence & Medication Therapy Management (MTM) pharmacy intervention integrates technology with patient education and care, and embeds pharmacists in local clinics to assist patients in managing medications. The embedded pharmacist becomes part of the core treatment team and works directly with patients to provide medication-specific education, offer screenings and medication management services, and recommend medication adjustments to the primary care provider. In some

instances, the pharmacist is authorized to adjust patient medications and order lab work following a standardized protocol. To maximize adherence, bi-monthly telephonic

¹⁵ Fox K, Whitt AL, Bloodworth L. The Beacon Communities At One Year: The Mississippi Delta Experience. Health Affairs Blog. <http://healthaffairs.org/blog/2011/07/27/the-beacon-communities-at-one-year-the-mississippi-delta-experience/>. Published July 27, 2011. Accessed August 22, 2011.

sessions are conducted to assess and document adherence, which is recorded in the EHR. Pharmacists receive an e-referral for high-risk patients and follow a prescribed template of care while individualizing it to each patient's unique situation.

This MTM model is scalable and will expand to more patients in a larger geographic region. The goal is to improve outcomes for the highest risk diabetic patients by integrating patient care within the provider community, and increasing screenings and education opportunities for those diabetic patients. The community is on track to achieve this goal within the Beacon Community award period. It is also anticipated that this program will help reduce the negative impact—including hospital and nursing home admissions—of misused or un-used prescription medications.

Bangor Shares Data to Support Care Management

The Bangor Beacon Community also has implemented a multi-faceted program that aims to improve care coordination and reduce unnecessary utilization in the region. Through coordinated data sharing and reporting on common measures, the community is working to support improvements in patient care, particularly among subpopulations identified as the most in need (i.e., high risk/high cost patients).

This project includes the Performance Improvement (PI) initiative, which is a collaborative venture involving 136 providers from nine primary care practices within the Bangor Beacon Community, representing 65 percent of all primary care providers in the region. The aim is to ensure that patients receive all elements of evidence-based care, every time. To accomplish this, the leadership of Eastern Maine Medical Center, St. Joseph Hospital, Penobscot Community Health Care and other partners committed to a transparent improvement process based on sharing clinical performance data and operational processes.

The community deployed a common data registry and reporting tool package to facilitate baseline and post-intervention measures on performance and quality indicators for diabetes, cardiovascular disease, chronic obstructive pulmonary disease, and asthma. The tool abstracts information directly from participating provider EHRs, and produces reports stratified by region, health care system, primary care practice, individual provider, and care managers. This level of reporting detail permits an analysis across organizations using standardized indicators and a consistent reporting format including tracking of 51 metrics where more than 76 percent of those metrics have improved. Shared results provide an opportunity for participating providers to learn from one another and take corrective action.

In addition to performance measurement and health information exchange, Maine has engaged nurse care managers in each primary care practice to work with high risk/high cost patients. The framework for improvement includes: 1) developing individualized plans of care; 2) helping high risk/high cost patients navigate through all care transitions; 3) using standardized treatment protocols for high risk/high cost patients; 4) sharing information and working with inpatient care management teams; 5) working closely with mental health care management teams; 6) working with the home health services team; and 7) working with primary care practices to reach target goals for quality and performance indicators. As a result they are able to demonstrate a reduction of high-end health care utilization including Emergency Department and Walk In Care visits.

Keystone Provides Better Information to Care Managers

Another improvement example is found in the Keystone Beacon Community, which is led by the Geisinger Health System and serves five counties in central and northeastern Pennsylvania. An early adopter of health IT, Geisinger has used EHRs since 1996 to link facilities and coordinate care for three million patients throughout the region. As part of its Beacon strategy, Keystone is engaging a broader community of providers (beyond Geisinger) to work together to proactively identify individuals with chronic obstructive pulmonary disease or congestive heart failure, for enrollment in evidence-base care processes shared by hospitals, practices, nursing homes, and home-health agencies across the entire service area.

The program uses elements of Geisinger's Proven Care^{®16} and ProvenHealth Navigator[®], the outpatient advanced medical home model. One key element of the outpatient model is the use of specially trained community-based care managers to conduct comprehensive assessments and coordinate care of the sickest patients.¹⁷ Care managers work in collaboration with the patient and the rest of the patient's care team to design patient-specific care plans, using a host of health IT tools and data sources to help them efficiently manage a defined cohort of patients. Tools are also available to help patients learn about their medications and at-home treatments after discharge from hospitals across the Keystone Beacon Community's service area.

¹⁶ Gilfillan RJ, Tomcavage JF, Rosenthal MD, et al. Value of the medical home: Improving health care for Medicare beneficiaries. *American Journal of Managed Care*. 2010; 16 (8):607-615.

¹⁷ Berry A, Doll MC, McKinley KE, et al. ProvenCare: quality improvement model for designing highly reliable care in cardiac surgery. *BMJ Quality and Safety*. 2009;18(5); 360-368.

Based on prior efforts, Geisinger has found that placing care managers in clinics significantly improves care coordination as measured by a number of key process, outcome, and utilization indicators. This design provides patients with a consistent contact who is available around the clock, and who can facilitate the appropriate triage of questions and concerns. Within Geisinger, use of care management has been shown to improve care and patient wellness, reducing all-cause hospital admissions by more than 20 percent for patients with chronic disease, with resulting cost savings.¹⁸ The Keystone Beacon plans to extend these care coordination benefits to additional Pennsylvania counties and to other states through the expansion and extension of both the care coordination program and supporting health IT infrastructure.

The issues Beacon Communities face are not unique. Problems of poorly coordinated care, the high burden of chronic disease, and escalating health care costs are universal realities common to communities across the United States. What is unusual is the focused attention of a broad array of community stakeholders on a specific set of well-defined improvement goals, and an accompanying set of strategies to address them. Improvement strategies tested in the Beacon Community Program will be applicable to other communities, and spreading these experiences and lessons learned is a key priority for ONC.

Testing Innovations in Care

In addition to building and strengthening local IT infrastructure and demonstrating measurable improvement through IT-enabled interventions, the Beacon Communities also serve as a proving ground for novel technology applications. Innovative projects range from simple to complex and include electronic capture of patient reported outcomes, new mobile health applications, remote patient monitoring, and advanced analytics and predictive modeling techniques.

Texting Campaign Draws Attention to Undiagnosed Diabetics

For example, last year three Beacon Communities worked with the American Diabetes Association, the Centers for Disease Control and Prevention, the Office of the National Coordinator for Health IT and Voxiva (a mobile technology company) to design an innovative mobile health application called *txt4health*. This year, large-scale *txt4health*

¹⁸ Gilfillan RJ, Tomcavage JF, Rosenthal MD, et al. Value of the medical home: Improving health care for Medicare beneficiaries. *American Journal of Managed Care*. 2010; 16 (8):607-615.

campaigns were launched in Detroit, New Orleans, and Cincinnati involving text messages deployed to anyone with a cell phone.¹⁹ The program is designed to:

1. Encourage individuals to engage with and manage their health, starting with them texting “health” to 300400,
2. Help individuals assess their diabetes risk levels, and
3. Connect individuals with physicians and other diabetes wellness resources available today in their cities, to help them manage their risk for diabetes more effectively.

Participants in the three communities are asked brief questions to assess their risk for diabetes. Based on their responses via text messaging, they are connected with local resources and enrolled in a simple care plan. These resources vary, and could include connections to local providers, an introduction to an online social forum, or a discount for a check-up at a local pharmacy. Beacon Communities involved in the new initiative hope that this innovation in communication with community members will facilitate better consumer engagement, and ultimately improve the health of diabetics in their communities.

San Diego Pilot Connects Emergency Medical Services with Hospitals

Another example of innovation is found in the San Diego Beacon Community, which is equipping all 127 paramedic emergency vehicles with technology to forward patient information to the receiving hospital’s emergency department electronically before the ambulance arrives.

A 2008 CDC report indicates that, “approximately half of cardiac deaths occur within 1 hour of symptom onset, before patients reach a hospital.”

¹⁹ 3 Beacon communities to kick off Txt4health. GovernmentHealthIT. <http://www.govhealthit.com/news/3-beacon-communities-kick-txt4health>. Published January 27, 2012. Txt4Health Campaign Launches in Three Communities. Healthcare Informatics. <http://www.healthcare-informatics.com/news-item/txt4health-campaign-launches-three-communities> Txt4health. Published January 30, 2012. Free Mobile Education Service To Fight Diabetes, Launches In Detroit. Huffington Post. http://www.huffingtonpost.com/2012/02/22/txt4health-free-mobile-ed_n_1295106.html. Published February 22, 2012.

When patients suffer acute coronary events, even seconds can have a significant impact on patient outcomes.²⁰ If a patient is having electrocardiographic changes consistent with active heart damage, the paramedics can forward the electrocardiogram to the emergency department who can then compare the tracing with a patient's prior electrocardiograms. If there are new findings, the emergency department physician can notify the cardiologist on-call who may activate the cardiac catheterization team. All of these actions can occur before the patient arrives in the emergency department. By connecting providers through health IT, life-saving therapy can be deployed faster than ever.

Yet a third example of innovative technology is underway in the Colorado Beacon Consortium and Greater Tulsa Health Access Network Beacon Communities. Both are using Archimedes, a risk stratification tool, to assist in the management of patients at risk for heart attack/stroke, diabetes/diabetes complications, lung cancer, colon cancer, and breast cancer.

Communities Test Advanced Tools

The Colorado Beacon Consortium is deploying the Archimedes tool, and plans to engage seven to ten practices and complete modeling for 55,000 patients by the end of 2012. To calculate risk profiles, they combine Rocky Mountain Health Plan claims data with data from the HIE and EHR systems in a data aggregation solution implemented by the Quality Health Network HIE. In Tulsa, Archimedes is part of the community information exchange and relies on data captured in a standardized CCD. Unlike Colorado, Tulsa is not directly extracting data from the EHR because more than 50 different EHR vendors and installations serve providers in Tulsa's catchment area. Building a scalable interface for so many systems was infeasible. Using standardized CCDs, however, may permit all participating partners to access the Archimedes tool. And, though still early in the roll-out process, initial anecdotes from patients suggest that the tool will be of great use. As physicians use the tool to help individuals understand their personalized risk profile, patients are engaging and responding by more actively participating in their treatment plans.

²⁰ Center for Disease Control. Disparities in Adult Awareness of Heart Attack Warning Signs and Symptoms-14 States, 2005. Morbidity and Mortality Weekly Report. <http://www.medscape.com/viewarticle/571487> . Published February 22, 2008. Accessed August 23, 2011.

Putting It All Together

Beacon Communities are moving quickly to deploy interventions designed to increase care coordination, improve population health, and reduce costs. Their collective goal is to generate a base of evidence which is relevant, robust and timely. This evidence goes beyond measuring the degree to which care has improved, and includes a focus on how the communities achieved their outcomes. It addresses questions such as: How was the infrastructure designed and deployed? How were communities able to unite multiple stakeholders, align disparate interests, and establish collaborative strategies to achieve common goals? What are the technical challenges providers and other stakeholders face in using technology in pursuit of specific goals, and how were they overcome?

These are ambitious goals for a three-year investment. These communities are working aggressively to achieve a level of coordination and stakeholder cooperation that typically requires greater alignment of incentives than currently exists. The capacity to coherently and consistently define and track measures of progress is hampered by the multiplicity of data sources and lack of consensus on specifications across sites. And the ability to demonstrate real impact is hindered by the fact that many of the benefits associated with the applied interventions will likely accrue in a timeframe that extends well beyond the program. It is therefore likely that many of the returns from this effort will be realized over a several year period, well beyond ONC's initial investment.

However, between now and the program's end, a host of lessons will be learned about what works, what does not, and the conditions necessary to make forward progress. These lessons will help inform the exciting work underway in numerous other communities across the country, where leaders are actively working to improve health, improve care and control costs. In the years ahead, the Beacon Communities will be offering insights that leaders can apply in their own complex and vibrant health care environments.

Special thanks to the awardees and partners of the Beacon Community Cooperative Agreement for their work and contributions.

[Bangor Beacon Community, Brewer, ME](#)

[Beacon Community of the Inland Northwest, Spokane, WA](#)

[Central Indiana Beacon Community, Indianapolis, IN](#)

[Colorado Beacon Community, Grand Junction, CO](#)

[Crescent City Beacon Community, New Orleans, LA](#)

[Delta BLUES Beacon Community, Stoneville, MS](#)

[Greater Cincinnati Beacon Community, Cincinnati, OH](#)

[Greater Tulsa Health Access Network Beacon Community, Tulsa, OK](#)

[Hawaii County Beacon Community, Hilo, HI](#)

[Keystone Beacon Community, Danville, PA](#)

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