

Original Investigation

Pursuing the Triple Aim: The First 7 Years

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Policy Points:

- In 2008, researchers at the Institute for Healthcare Improvement (IHI) proposed the Triple Aim, strategic organizing principles for health care organizations and geographic communities that seek, simultaneously, to improve the individual experience of care and the health of populations and to reduce the per capita costs of care for populations.
- In 2010, the Triple Aim became part of the US national strategy for tackling health care issues, especially in the implementation of the Patient Protection and Affordable Care Act (ACA) of 2010.
- Since that time, IHI and others have worked together to determine how the implementation of the Triple Aim has progressed. Drawing on our 7 years of experience, we describe 3 major principles that guided the organizations and communities working on this endeavor: creating the right foundation for population management, managing services at scale for the population, and establishing a learning system to drive and sustain the work over time.

Context: In 2008, researchers at the Institute for Healthcare Improvement (IHI) described the Triple Aim as simultaneously “improving the individual experience of care; improving the health of populations; and reducing the per capita costs of care for populations.” IHI and its close colleagues had determined that both individual and societal changes were needed.

Methods: In 2007, IHI began recruiting organizations from around the world to participate in a collaborative to implement what became known as the Triple Aim. The 141 participating organizations included health care systems, hospitals, health care insurance companies, and others closely tied to health care. In addition, key groups outside the health care system were represented, such as public health agencies, social services groups, and community coalitions. This collaborative provided a structure for observational research. By noting the

contrasts between the contexts and structures of those sites in the collaborative that progressed and those that did not, we were able to develop an *ex post* theory of what is needed for an organization or community to successfully pursue the Triple Aim.

Findings: Drawing on our 7 years of experience, we describe the 3 major principles that guided the organizations and communities working on the Triple Aim: creating the right foundation for population management, managing services at scale for the population, and establishing a learning system to drive and sustain the work over time.

Conclusions: The concept of the Triple Aim is now widely used, because of IHI's work with many organizations and also because of the adoption of the Triple Aim as part of the national strategy for US health care, developed during the implementation of the Patient Protection and Affordable Care Act of 2010. Even those organizations working on the Triple Aim before IHI coined the term found our concept to be useful because it helped them think about all 3 dimensions at once and organize their work around them.

Keywords: population management, populations, Triple Aim.

IN AN ARTICLE PUBLISHED IN 2008, RESEARCHERS FROM THE Institute for Healthcare Improvement (IHI) posited that, in order to improve US health care, it was necessary to pursue a system of linked goals called the Triple Aim: “improving the individual experience of care; improving the health of populations; and reducing the per capita costs of care for populations.”¹

The researchers also set out the principles forming the foundation of the work to achieve the Triple Aim: the simultaneous pursuit of the Triple Aim, identification of a population of concern, and designation of an “integrator” with specific roles and functions. Øvretveit and colleagues refer to such principles as “small theory” and propose that a small theory be tested and refined across numerous sites and in different contexts so that it can be adapted and refined.²

In 2007 IHI established a collaborative to begin testing and refining our Triple Aim small theory. The IHI Breakthrough Series Collaborative model, first developed by IHI in the 1990s, provides a forum for multiple sites with the common aim of working collaboratively and exchanging successful and unsuccessful approaches in real time. This process should lead to improvement, and transparently measuring the progress of high-performing teams provides further motivation.³⁻⁵ Such collaborative

efforts provide a structure for observational research. Accordingly, IHI supported organizations in a series of collaboratives to adapt and refine the Triple Aim small theory. The case control study approach that we used was based on the different sites' progress.⁶ Progress here was defined as showing at least some improvement in process measures related to a site's design or in outcome measures related to the Triple Aim. We noted the contrasts in the contexts and structures of those sites that made progress and those that did not. The 141 sites in the collaborative are summarized in Table 1.

After 7 years of working with these different organizations and communities and closely following their work and progress, we developed an *ex post* theory of why some sites made progress and others did not.⁷ We learned that pursuing the Triple Aim requires the execution of 3 core components. These components, which enhance the program theory for achieving the Triple Aim and form a basis for future testing, are

1. Creating the right foundation for population management.
2. Managing services at scale for the population.
3. Establishing a learning system to drive and sustain the work over time.

In this article we describe and provide examples of each of these 3 core components, as well as case examples of 2 organizations (Bellin Health of Green Bay, Wisconsin, and Chinle Service Unit of the US Indian Health Service), to illustrate the execution of all 3 of the Triple Aim's components.

Creating the Right Foundation for Population Management

We identified the 3 main elements for successful population management: identifying the relevant population, creating or identifying a governance structure, and articulating a purpose for this work.

Identifying a Relevant Population

In order to achieve sustainable improvement, organizations were encouraged at the outset to choose a population or populations for which all

Table 1. Classification of Organizations Involved With the Triple Aim Collaborative

Country	Health System	Insurance Company	Community Coalition	Community-Based Organization	Government Health Service	Other ^a	Total
United States	36	12	15	8	13	4	88
Canada	3	—	—	1	11	—	15
England	—	—	—	—	28	—	28
Scotland	—	—	—	—	1	—	1
Northern Ireland	—	—	—	—	2	—	2
Denmark	—	—	—	—	3	—	3
Sweden	—	—	—	—	1	—	1
Singapore	—	—	—	—	1	—	1
New Zealand	—	—	—	—	1	—	1
Australia	—	—	—	—	1	—	1
Total	39	12	15	9	62	4	141

^aOther refers to telehealth companies, employers, medical associations, and independent practice associations.

3 dimensions of the Triple Aim were important. In the early days of our work, organizations often chose a population for which only 2 dimensions of the Triple Aim made sense, with the most likely weakness being per capita cost. Even though these organizations saw the value of improving health and care for the population, their payment model did not reward them for lower per capita cost. In some cases, the payment model actually penalized them when they improved health because it led to less need for health care and, consequently, less revenue.

Some organizations chose their own employees as their relevant population, which improved the employees' health and created a better care experience for them while also reducing health care costs for both employer and employees. For regional coalitions, finding opportunities to improve health and care was typically straightforward, but it often proved more challenging to build a community-wide financing model for this same population. Some community partners, for example, made less money when the population's health improved. In one community, a health care leader (who asked to remain anonymous) described a health system CEO who encouraged his employees to participate in a coalition working on a regional Triple Aim initiative with the goal of slowing down the improvement process. His reason was that the hospital would face financial risk if the Triple Aim succeeded, and he might have been correct, given the existing payment model at that time. This example illustrates the potential political tensions at the community level that need to be considered, along with other issues, when selecting populations of focus for the Triple Aim.

Those sites participating in the IHI collaborative chose populations that we described as either enrolled populations or regional/community populations:

- *Enrolled populations* are typically a group of individuals who are receiving care within a health system or whose care is financed through a specific health insurance plan or entity. Examples of enrolled populations are employees of an organization, members of a health insurance plan, patients in a practice's panel, or enrollees of an accountable care organization (ACO). The members of an enrolled population are known with some certainty.
- *Regional/community populations* are population segments defined geographically. Segments of a community population are often unified by common needs or issues, such as low-birth-weight

babies or older adults with complex needs. These individuals may receive care from a variety of systems or may not be connected to care at all, and they may or may not be insured. It often is difficult to enumerate this type of population with certainty in the United States.

Often sites chose their population of focus based on a particular issue or need. For example, St. Charles Health System in Oregon received 100% capitation payments for all regional hospital services for a population of 50,000 Medicaid enrollees in that state because they saw an opportunity to develop more business expertise related to population management. Two regions in the collaborative, Hamilton County, Ohio, and Shelby County, Tennessee, had high infant mortality rates, which served as a reason for choosing this population.

Some sites participating in the Triple Aim collaborative chose populations whose health status had considerable room for improvement, whose complex health care needs presented opportunities to reduce waste for both patients and the health care system, and whose per capita costs were higher than average. For example, St. Charles Health System concentrated on a subpopulation of 1,200 adults with complex needs who were using significant resources for their care.

Some Triple Aim community coalitions selected geographic populations whose poor health was closely linked to the community's broader economic vitality. The Northeast Neighborhood Partnership (NNP), for example, is a multistakeholder coalition in Northeast Hartford, one of the poorest neighborhoods in both the city of Hartford and the state of Connecticut. According to the Connecticut-wide Health Equity Index (HEI), Hartford ranks last in the state for a majority of socioeconomic determinants of health, such as employment, housing, safety, education, economic security, and environmental quality. Hartford also ranks low in the state for many health indicators, including the highest ER usage and the second-highest level of hospitalization for asthma. The NNP implemented the Triple Aim in the northeast neighborhood, since of Hartford's 17 neighborhoods, it has the highest levels of obesity, heart disease, infant and neonatal mortality, preventable infections, and communicable diseases. Poor health is a major factor in people's losing their homes, for when a common chronic disease starts a downward spiral, it often results in eviction. In Northeast Hartford, it is not easy to get to a doctor's clinic because public transportation is limited and all the

primary care clinics are located outside the neighborhood. In 2011, 8,020 different residents (out of a neighborhood population of 10,711) visited the emergency department 13,347 times.

For a geographically defined population such as the Northeast Hartford neighborhood, an organization or coalition sometimes focused on issues for which health care is a significant contributor to the solution, coupled with socioeconomic and behavioral determinants of health. Because health care providers are a powerful economic force in most communities, it is important for them to actively participate in a collaborative effort to address such issues. An example is Healthy Shelby, a collaborative effort based on the Triple Aim in Shelby County, Tennessee, focused on black males with hypertension. It used churches to identify at-risk men and worked with the local health systems to get them into appropriate primary care. Another community, NHS (National Health Service) Kernow, the clinical commissioning group for Cornwall and the Isles of Scilly in southwestern England, decided to focus on adults over the age of 65 with multiple long-term conditions, after calculating that the percentage of their older population with a long-term illness was expected to increase by 59% by 2031.

Identifying and/or Creating Leadership and Governance Structures

Those sites participating in the Triple Aim collaborative also needed to identify leadership structures to oversee the work (ie, leaders at all levels) and a means for governing and integrating the Triple Aim's initiatives and investments (ie, a process for strategic oversight to achieve results). For sites that selected an enrolled population, governance was primarily the management of the health system, business, or insurance plan for that population. If the population represented a community or region, we found that a wider multistakeholder coalition was needed. Both types of governance structures required familiarity with the local and regional policy and economic environments that might affect their work. For both enrolled and regional/community populations, however, the more an organization or coalition concentrated on improving health, the more likely it was to explore the upstream determinants that had a significant impact on health, such as socioeconomic factors,⁸ and, accordingly, to expand the size and scope of its governance structures and partnerships with other stakeholders.

When determining who would participate in the governance structure, the sites considered (1) those who would benefit if the health, health care, and per capita costs improved for the population; (2) those who could directly or indirectly influence the necessary changes; (3) those who would champion the spread of successful changes; and (4) those who had access to the data and measures that would drive Triple Aim results.⁹ For example, Allegiance Health, the local health system in Jackson, Michigan, led the creation of a coalition that it described as a health improvement organization. Allegiance recruited the United Way, the local chamber of commerce, the local public health department, public schools, social services agencies, and major employers to work on the community's health issues. Likewise, Hartford's Northeast Neighborhood Partnership's governance structure had strong participation from community residents, who influenced many of the choices on its portfolio of projects and investments.

The initial conveners of the Triple Aim included health care executives, public health officers, social services executives, elected and nonelected government officials, union leaders, business executives, insurance company executives, and other regional representatives. An organization or community typically started with a small, core group of leaders who understood the needs of a population or populations and were willing to use their personal influence to attract other leaders to initiate the process and then expand. In Shelby County, Tennessee, health and health care leaders appealed to an existing and well-respected coalition of business leaders and county government officials to expand its purpose and portfolio beyond economic development, public safety, effective city and county government, education, and the workforce to include the health of county residents, centered on the Triple Aim. Building on existing governance structures enabled them to attract partners across sectors and helped them design and execute subsequent work together.

Since the early stages of IHI's work on the Triple Aim, the integration of services has been an important component of any Triple Aim enterprise. Berwick, Nolan, and Whittington stressed the importance of a "system integrator" that would accept responsibility for achieving the Triple Aim for the population and pull together the resources to support the work.¹ The IHI team and our Triple Aim partners, however, have not been able to reach a consensus on the ideal structure of such an integrator. Some advocate for an entity like a public health department, a dominant health system, or a commercial payer with a large market

share to lead the integration. Others have argued that in the United States, no single entity is naturally positioned to integrate services and resources to accomplish the Triple Aim.

We identified 3 responsibilities that are required of an integrator, though other responsibilities will likely evolve and be identified over time. The first is establishing purpose: what the coalition intends to do and why. The second is coordinating the work with many stakeholders. The third is fostering intentional testing and learning to build the capability to achieve the Triple Aim. Others have written about the role of the integrator, particularly in a community, and their ideas are similar to the 3 we have noted, but they also include managing funds to support the work, assessing community needs, and determining the priorities.¹⁰⁻¹²

Whether the integrator is a new or existing structure or organization, from this starting point an effective portfolio can be assembled to accomplish short-term results as well as a longer-term investment in infrastructure and capacity building. For organizations and coalitions seeking to build a new governance structure for Triple Aim work, our experience shows that in some cases, the process of engaging stakeholders and building an infrastructure to support collaboration can take as long as 18 to 24 months. We found that those entities committed to establishing the appropriate governance and leadership structures up front were better positioned for long-term Triple Aim results. But work on the Triple Aim can also begin while the leadership and governance structure is still being developed. Stakeholder coordination and collaboration will test even the most skillful leaders, as they require integrator organizations to take into account both the political context of their work and the interests of stakeholders who stand to benefit or lose from work on the Triple Aim. This is what happened in Cedar Rapids, Iowa, where the competition among health systems was simply too much to overcome, so this coalition was unable to succeed in the Triple Aim collaborative.¹³

Articulating a Purpose Around Which Stakeholders Will Coalesce

The IHI team encouraged organizations and coalitions participating in the Triple Aim collaborative to articulate a purpose statement to provide

specific meaning for the Triple Aim in the local setting and to inform the design of a system to accomplish it, in other words, clearly defining “what we are trying to accomplish and why.” For many sites, this process—in some cases, requiring months of discussion and negotiation—was just as important as disseminating the statement among stakeholders and the broader community.

Successfully implementing the Triple Aim for a specific population may lead to reductions in the rate of increase of health care spending, which, under the prevailing business models, would affect the bottom line of some coalition partners. Without a shared purpose, therefore, an organization’s or community’s projects to improve health, reduce per capita cost, or increase investments in infrastructures like health information exchanges may end up serving only a narrow purpose. In such cases, these groups may build trust but may not always be prepared for pushback from potentially threatened stakeholders or may not be able to advance the entire organization, community, or region toward the Triple Aim.

An effective statement of purpose is one that enables each stakeholder to align the Triple Aim goals with its organization or area of responsibility. An example statement of purpose is “Improve the health of the population while maintaining or improving experience of care and lowering costs. We will begin by focusing on high-risk and high-cost members of the population whose care often adversely influences health care revenues.” Some organizations working on the Triple Aim have used impending state budget cuts or other financial imperatives as the reason for bringing relevant stakeholders to the table. Other communities considered the region’s broader economic vitality as a worthwhile purpose.

For example, the Pueblo Triple Aim Coalition in Pueblo, Colorado, decided to pursue the Triple Aim after the regional economy was hit hard by the decline of industry, collaborating on building a thriving community that would attract businesses to the region and create a flourishing environment for young people to raise their families. The coalition described its purpose this way:

Ever-rising health care spending weakens Pueblo’s local economy, threatens jobs, and has failed to deliver improved health of Pueblo County citizens. This combination of increased costs and poor results threatens Pueblo’s future by diverting resources from investment in education and growth. The Pueblo Triple Aim Coalition (PTAC)

formed to respond to these issues. PTAC's goals are to improve health, reduce the per capita cost of care, and improve the experience of care in Pueblo County, otherwise known as the "Triple Aim."

Whether the stated purpose is driven by financial constraints or community benefit, the key is to be explicit about the chosen purpose that will bring stakeholders together to pursue the Triple Aim.

Managing Services at Scale for a Population

After a foundation for population management was built, execution of the Triple Aim involved assessing the population's needs and assets, using that knowledge to create a portfolio of projects, redesigning services to meet the population's needs, and delivering those services to those who needed them. To do this, organizations broadened their view of "services" beyond those available to patients in the health care delivery system to all services that might benefit the particular population, thus casting a wide net across those social services, public health, and other community-based services that best met the needs of those they served.

Identifying a Population Segment on Which to Focus

The IHI team urged organizations and communities to choose a segment of the population on which to focus. In order to design and manage needed services, once an organization chooses the overall population, it must segment the population into subpopulations with similar needs in order to help direct the interventions to those who need them most. The overall population might first be divided into groups, from healthy individuals to those with complex needs. In working with a group of individuals with complex needs, some organizations have used a blend of methods to segment that population even further, including reviewing past utilization and cost data, engaging with frontline providers to gather qualitative information about high-risk patients, and talking directly to individual patients. The same methods can be used with other important segments of the population, such as those with controlled chronic illness, those with substance abuse problems, healthy individuals, or the homeless.

Two specific examples of population segmentation can be found in the experiences of the Alberta Health Services Edmonton Zone in Alberta, Canada, and the NHS (National Health Service) Kernow in the Isles of Scilly. Alberta Health Services' analysis resulted in the following groupings of patients with complex needs: (1) older, tri-morbid adults; (2) frail older adults; (3) young adults with addictions and mental health concerns; (4) child-bearing women; (5) high-needs children; and (6) complex infants and toddlers.

NHS Kernow focused on those over the age of 65 in their community (total population of 555,000), dividing this population according to an increasing risk of needing health care and/or increasing social costs, as follows:

1. People who are successfully managing their health and well-being themselves (84,483).
2. People whose personal choices or circumstances are putting them at risk (279,277).
3. People who are managing long-term conditions well (136,929 to 147,224).
4. People who are frail or have multiple long-term conditions (20,879 to 31,174).
5. People who are at the end of life (4,121).

Conducting a Needs and Assets Assessment

Organizations and communities in the collaborative built a portfolio of work based on their chosen population's identified needs and assets. For example, a "tri-morbid" population with mental health issues, chronic physical illness, and substance abuse issues needs support in all 3 areas. Understanding the needs of a population segment requires data on use of care and outcomes as well as input from patients, families, and community members. The needs and assets assessment serves to clearly articulate the goals in caring for the chosen population.

For example, the St. Charles Health System chose to focus on 1,200 high-risk adults who were a subset of their entire population. Assessing this population revealed needs regarding chronic medical conditions, mental health issues, and some support issues, such as transportation and housing. To meet this population's needs, one goal was to create a unique care plan for patients that was agreed on by the care team,

patient, and family and could be used by the care team to coordinate activities.

Signature Healthcare in Brockton, Massachusetts, selected the frail elderly Medicare segment as its population and explored information from its electronic medical record (EMR), surveys, and conversations with patients. Signature also discussed its patients' needs in care plan meetings and tabulated this information in order to aggregate it. This method was particularly helpful in including data not captured in the EMR. The result was the inclusion of additional data on self-reported health status, activities of daily living (ADLs), and instrumental activities of daily living (IADLs), which enabled Signature to better link these individuals to social services as part of the care plan. Signature Healthcare learned that the individuals in this population segment were better able to gain access to care (eg, time to the next available appointment or percentage of available appointments the next day or same day). It also learned, however, that these individuals' needs were not met within the typical 15-minute appointments. In addition, the team discovered that care was not standardized in such key areas as falls, cognition, functional assessments, social needs, depression, and end-of-life planning. This population also needed social supports like transportation to and from health care appointments and, if hospitalized, postdischarge Meals on Wheels and medication assistance, as well as Alzheimer's disease support and end-of-life planning skills and supports.

Developing a Portfolio of Projects

By segmenting the population and thinking about the subpopulations' needs, organizations and communities gain information they can use to create a portfolio of projects that meet those needs and address all 3 dimensions of the Triple Aim. From the beginning, IHI has pushed organizations to create such a portfolio of projects, although our methods for achieving this portfolio have changed over time. In the initial stages of our work, there was less emphasis on subpopulations and understanding their needs. Instead, we asked groups to choose projects that would improve primary care, involve patients and families more directly in their care, focus on prevention and health promotion, provide cost reduction strategies, and enable the integration of care. As the work evolved, we encouraged sites to identify subpopulations, to look at their specific needs and assets, and to build a portfolio of projects that addressed the

subpopulation's specific needs. The previously described example of the frail elderly Medicare population illustrates this later approach.

Some organizations or coalitions chose more than 1 subpopulation. In those cases, there may be duplicate services that can support both subpopulations, such as integrated clinical support or primary care. Examples of 2 subpopulations are patients with 3 or more chronic medical conditions and patients with significant mental health issues, lower socioeconomic status (SES), and chronic medical conditions. For these 2 subpopulations, a portfolio of Triple Aim projects might include the following projects and investments:

- Integrated clinical data support for population management (both).
- Strong, team-based primary care that can support population medicine (both).
- Training of registered nurse care coordinators in motivation interviewing to be used with individuals with multiple chronic diseases (subpopulation 1).
- Community outreach workers to support lower socioeconomic status individuals with mental health issues (subpopulation 2).

No single project by itself can accomplish the Triple Aim for a population; a set of projects that address all 3 dimensions is needed. The Pueblo Triple Aim Coalition, for example, concentrated on teenage pregnancy, smoking, obesity, and the reduction of avoidable emergency room use and hospital readmissions. It based its projects on local data that identified the community's greatest priorities, along with the availability of community resources and perceived community priorities. Healthy Shelby focused on infant mortality, hypertension in minority males, and end-of-life directives. We encouraged sites not to create an entirely new portfolio of projects but to consider existing projects in their organization or coalition.

Designing or Redesigning Services

It was important that services be designed or redesigned to meet the needs of the relevant populations. Many communities had existing resources that could be used but were not well integrated or available at the necessary scale. Similarly, organizations learned from individuals

why certain interventions did not have a meaningful impact and then, working together, redesigned new approaches that were more likely to succeed. In addition to redesigning primary care services, including reconfiguring the roles of care team members and extending the traditional 15-minute appointment durations, Signature Healthcare engaged in a community service analysis to identify existing resources in the community that could support the frail elderly population. Existing community-based services included visiting nurses who could also conduct home safety evaluations, hospice and palliative programs, the local branch of the Alzheimer's Association, and group self-help chronic disease management classes offered by the local branch of the National Association of Area Agencies on Aging. The health system also engaged social workers and psychiatric nurses from the community's physical therapy and occupational therapy programs. They took advantage of these community resources by partnering with representatives from community organizations in weekly care plan meetings to help match the local resources with the needs of particular patients. This approach provided referrals for community organizations, with many services being free for the patient and the health system.

At a high level, the service design phase helped organizations address system-level challenges related to mobilizing the support of leadership, using reliability science to improve processes, promoting effective teamwork across care settings, engaging the nontraditional health workforce, employing patient-centered care designs, and developing an understanding of the social determinants of health. The Healthy Shelby coalition in Tennessee realized that more than 41 organizations were working on reducing infant mortality. Without a good service design, it was highly unlikely that a woman in that community would receive all the available services to help her with her pregnancy. Therefore, the organizations providing services needed to create an integration plan so that no matter which "door or service" she entered first, she would receive help in obtaining all the services she needed.

Developing a Plan for Delivering Services at Scale

As the sites selected their subpopulations and built project portfolios, we asked them to describe what full-scale implementation looked like to

them. “Full scale” is the total number of individuals who would benefit from the services. Our intention was to start preparing teams to think about moving from testing the delivery of services to a pilot population to delivering these services efficiently at full scale to all individuals in the population segment. For example, the St. Charles Health System, which was working with 1,200 high-risk Medicaid patients, defined full scale as meeting the needs of all 1,200 individuals. To accomplish the goal of full-scale implementation, the health system must identify all these individuals and provide a workforce that could manage their care.

Organizations struggled to move successfully from pilot to full scale. We thus recommended that organizations and coalitions increase the scale of testing and learning in 5-fold increments; that is, start with 5 patients, then 25 patients, then 125 patients, and so forth. This enabled teams to discover and address previously unknown system constraints at each level; gain an understanding of needs from the patient, clinician, and data; and spot opportunities for efficiency. Organizations created a care plan for 5 individuals and did whatever it took to help those patients implement the care plan. This approach helped these groups think through a more formal care team design that could then be implemented for 25 individuals. As testing expanded, from 25 individuals to 125 to 625, and so on, the organizations considered structural issues like physical space, personnel and training, information technology, and business models to support the work at scale. They repeated this process until they had designed a system that served the target population’s needs.

Cincinnati Children’s Hospital Medical Center in Cincinnati, Ohio, worked in collaboration with neighborhood partners on community-based interventions to reduce childhood injury, which included direct-to-family child injury prevention education and the installation of stair gates, smoke/carbon monoxide detectors, cabinet locks, and outlet covers. The collaborative planned ahead for its 5-fold scale-up, predicting the problems it might encounter at each level of scale. For its tests with 5 to 25 families, the collaborative used internal experts to train volunteers and tested the interventions in a small number of homes. When it expanded its tests from 25 to 125 families, it created a training video for all volunteers and standardized the intervention package after observing early successes from iterative testing. Along with predicting which problems might arise in the collaborative’s scale-up to 625 families and beyond, the health system planned for the transition to complete

community ownership, the establishment of one location from which it could deploy volunteers, and the creation of an “intervention bundle” with components adaptable to different contexts.

Expanding the Capabilities of “Integrator” Organizations

Developing a portfolio of projects to deliver services at scale for a population segment requires organizations and communities to (1) coordinate the efforts of many stakeholders that are working together to improve outcomes for the population; (2) articulate a persuasive strategic rationale and business plan for redesigning care for a specific population; and (3) build effective multidisciplinary and multistakeholder teams. As part of its scale-up effort, Cincinnati Children’s Hospital Medical Center engaged the local fire department and emergency medical services (EMS) as key partners to help implement the interventions. Leaders at the Cincinnati Children’s Hospital successfully made the case that this project was an excellent community volunteer opportunity for EMS workers that they could engage in during “downtime” from their emergency duties because they were such a trusted resource among families in the community.

Developing a Learning System for Population Management

The third component of an effective system for pursuing the Triple Aim is building a learning system to drive and sustain the work over time. A comprehensive learning system fosters intentional testing and learning, provides feedback loops to compare performance with specific aims and measures for the designated population, and integrates the assets of leaders and organizations. Throughout the IHI’s collaboratives, we worked with organizations and communities to help them develop such learning systems. The following are elements we considered when building a learning system for the Triple Aim:

- Using population-level measures.
- Developing an explicit theory or rationale for system changes.

- Learning by iterative testing (eg, Plan-Do-Study-Act [PDSA] cycles, sequential testing of changes, Shewhart time series charts).¹⁴
- Using informative cases to “act with the individual; learn for the population.”
- Selecting leaders to manage and oversee the learning system.

Using Population-Level Measures

Identifying population-level measures for the Triple Aim’s goals of health, experience of care, and per capita cost is necessary to help organizations and coalitions evaluate their progress. Table 2 lists a few of the suggested measures,¹⁵ based on a combination of analytic frameworks and the practical experience of the participating organizations in the IHI Triple Aim collaborative. Organizations selected measures based on data availability, resource constraints, and overall objectives.

Most of the population health measures in Table 2 are based on Evans and Stoddart’s framework.¹⁶ Mortality, health/functional status, and their combination—healthy life expectancy—are essential outcome measures of health. Measures of disease burden are considered intermediate outcomes,¹⁷ and behavioral and physiological factors are included as well since they are determinants of health outcomes. Some organizations and coalitions in the collaborative initially used disease burden or a combination of behavioral and physiological factors as measures of population health since these data were more readily available. They were aware, however, that these measures were only surrogate measures for downstream health outcomes.

To measure experience of care, the sites considered 2 perspectives, shown in Table 2. First is the perspective of the individual as he or she interacts with the health care system (ie, patient experience surveys), and second is the perspective of the health care system that is designing a high-quality experience for patients as defined by the Institute of Medicine’s (IOM) 6 aims of safe, effective, patient-centered, timely, efficient, and equitable care.¹⁸ IHI encouraged sites to develop a dashboard of measures based on all 6 IOM aims rather than using just 1 or 2. The preferred measure for cost in the collaboratives was the total cost per member of the population per month, but many organizations at first used high-cost services (eg, inpatient utilization/costs), which accounted for a substantial share of health care expenditures. A more

Table 2. Potential Triple Aim Outcomes Measures

Triple Aim Dimension	Outcomes Measures
Population health	<ol style="list-style-type: none"> 1. Health outcomes: <ul style="list-style-type: none"> ● Mortality: years of potential life lost, life expectancy, standardized mortality rates ● Health/functional status: single question (eg, from CDC HRQOL-4) or multidomain (eg, VR-12, PROMIS Global-10) ● Healthy life expectancy (HLE): combines life expectancy and health status into a single measure, reflecting remaining years of life in good health 2. Disease burden: incidence (yearly rate of onset, average age of onset) and/or prevalence of major chronic conditions 3. Behavioral and physiological factors: smoking, alcohol, physical activity, diet, etc. (behavioral); blood pressure, BMI, cholesterol, blood glucose, etc. (physiological) (Possible measure: composite health risk appraisal [HRA] score)
Experience of care	<ol style="list-style-type: none"> 1. Examples of standard questions from patient surveys: <ul style="list-style-type: none"> ● Global questions from Consumer Assessment of Healthcare Providers and Systems (CAHPS) or “How’s Your Health” surveys ● Likelihood to recommend 2. Set of measures based on key dimensions (eg, Institute of Medicine’s aims for improvement: safe, effective, timely, efficient, equitable, and patient-centered)
Per capita cost	<ol style="list-style-type: none"> 1. Total cost per member of the population per month 2. Hospital and emergency department utilization rate and/or cost

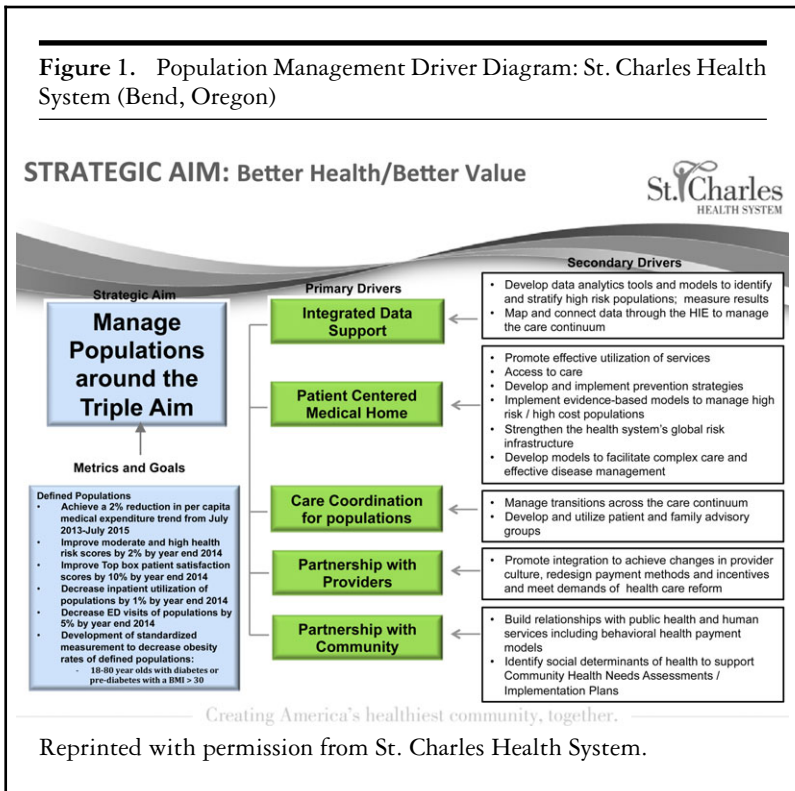
detailed description of measurement strategies and data sources for the Triple Aim is available on the IHI website.¹⁵

Developing an Explicit Theory or Rationale for System Changes

To achieve the Triple Aim, we encouraged organizations and coalitions to begin with, and then refine, a theory about how to manage the health of a population. The determinants of health model,¹⁹ mentioned earlier as a framework for measurement, may also serve as a theoretical framework for improving population health. St. Charles Health System in Bend, Oregon, theorized that to achieve the Triple Aim, it would need to intervene in 5 key areas: integrated data support, a patient-centered medical home model for team-based care, care coordination for populations, partnership with providers, and partnership with the community. These areas are listed in the center of the driver diagram shown in Figure 1. Organizations may also need more detailed theory regarding specific interventions, such as the patient-centered medical home model.²⁰

Learning by Iterative Testing

Because this work is complex, we encouraged organizations and communities to “learn their way” into the design of new services through testing rather than immediately moving to full-scale implementation. Testing starts out on a small scale, perhaps trying a new idea with a few individuals over a short time period. For example, CareOregon, a Medicaid managed care organization in the tricity region surrounding Portland, Oregon, developed the Health Resilience Program, which deployed community outreach workers to support high-acuity patients with complex needs. To test the Health Resilience Program, CareOregon started with 1 volunteer outreach worker supporting a few patients with complex needs. After some success, it expanded the test by allocating staff from other areas, and then, only after further testing, did CareOregon hire new staff and formalize workforce training and orientation programs. Before running Plan-Do-Study-Act (PDSA) cycles to test specific ideas, CareOregon put in place the foundation of a learning



system: population-level outcome measures, a portfolio of projects, and measures specifically tied to each project.

Using Informative Cases to “Act With the Individual; Learn for the Population”

As the first step, work on the Triple Aim is directed to what is best for an individual member of the selected population. Acting on what is best for the individual helps identify generalizable principles that can inform the work for meeting the needs of the broader population. For example, one organization learned that a woman in its care had visited the emergency room approximately 20 times in 1 month. The organization discovered that because she did not have transportation to her primary care doctor, she was using emergency services to meet her health needs. But when the

team bought her a monthly bus ticket, her visits to the emergency room stopped. How many other people like her have similar transportation issues? In many instances, acting with an individual can help identify generalizable principles that apply to the rest of the population.

Selecting Leaders to Manage and Oversee the Learning System

Leaders were needed to oversee and manage the Triple Aim portfolio with a structured approach to oversight. IHI encouraged organizations to establish an executive sponsor or coalition oversight structure for an entire region or community. Further, the IHI team strongly encouraged senior leaders to appoint a high-level portfolio manager to orchestrate the Triple Aim work toward a successful end. For each project in the portfolio, we recommended designating a project leader with the time, resources, and accountability to oversee the day-to-day activities. Because of the challenges in securing population-level data, we advised organizations to designate a data expert on the team. We also suggested appointing a person skilled in improvement methods (eg, experience with PDSA testing, scaling up interventions) to support this work. Those with oversight responsibilities should regularly monitor the progress of the work portfolio (at least every 90 to 120 days) and determine whether improvement in the local project measures is affecting the population-level outcomes measures. If these outcomes measures do not improve along with the project measures, the senior leadership team should consider rebalancing the portfolio of projects and investments.

Two Case Examples: Executing All 3 Components of the Triple Aim

We have offered examples illustrating specific aspects of the 3 core components needed to pursue the Triple Aim: creating the right foundation for population management, managing services at scale for the population, and establishing a learning system. The 2 case examples we describe next demonstrate how all 3 components come together in pursuit of the Triple Aim for populations. The first example is a not-for-profit health system, Bellin Health of Green Bay, Wisconsin. This

illustrates the evolution of a health system that began working with an enrolled population, built skills over time, expanded its Triple Aim work to include more populations, and eventually became involved with a multistakeholder group focused on a regional population. The Indian Health Service (IHS) Chinle Service Unit (CSU) is the second case example, which demonstrates how an organization funded and directed by the US government can take on the challenge of the Triple Aim for a Native American population.

Bellin Health: Green Bay, Wisconsin

In 2007, IHI invited Bellin Health, an integrated health care delivery system based in Green Bay, Wisconsin, to participate in the Triple Aim initiative. At that time, Bellin had been working for several years on the 3 dimensions of the Triple Aim, albeit without labeling it as such.

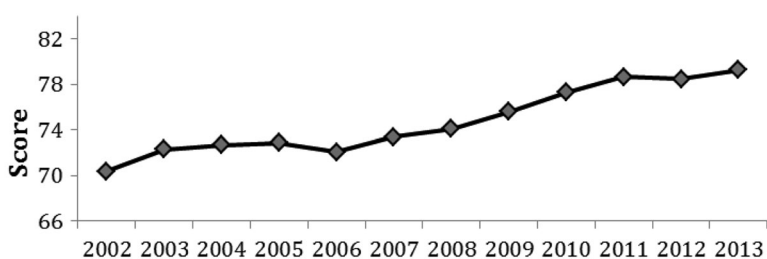
- Population of focus: Employees of a health system and their spouses as an enrolled subpopulation.
- Governance structure: Bellin Health organizational leadership.
- Challenge and purpose: Bellin's transformation began in the early 2000s, when the health system faced a growing competitive and financial challenge as insurance costs to cover its own employees were projected to rise by 30%. At the time, Bellin's health benefit cost was approximately \$10 million, but the organization did not have a clear sense of how those costs were incurred. For Bellin, achieving the Triple Aim for this population was imperative for keeping costs under control.
- Portfolio of projects and investments to address the challenge: These were health insurance benefit design, health care coaching, high participation in an annual health risk appraisal (HRA), supportive primary care, and population segmentation in order to redesign services for high-cost patients with complex needs.

Bellin established a portfolio of Triple Aim projects with the overall goal of delivering services at scale to meet the needs of its own employees, and it also created an organizational learning system to support the work. Bellin tracked its progress on the Triple Aim and revised its work as needed by plotting data over time on the 3 dimensions of the

Table 3. Triple Aim Measures: Bellin Health (Green Bay, Wisconsin)

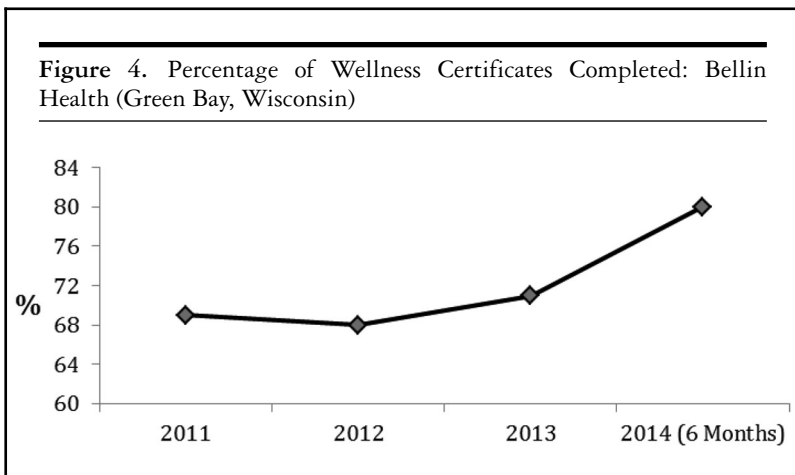
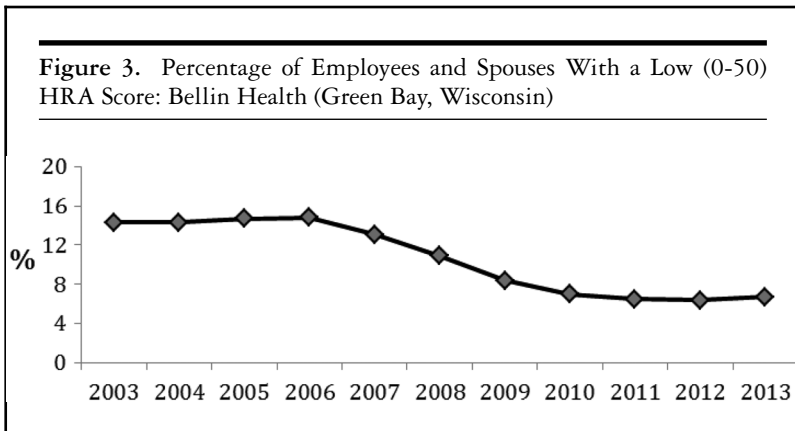
Triple Aim Dimension	Measure
Population health	Health risk appraisal (HRA) scores based on biometrics: <ul style="list-style-type: none"> • Average HRA score for employees and spouses • Percentage of employees and spouses with a low (0-50) HRA score
Experience of care	Percentage of wellness certificates completed
Per capita cost	Percent increase in cost per employee plan per year (PEPY)

Figure 2. Average HRA Score for Employees and Spouses: Bellin Health (Green Bay, Wisconsin)



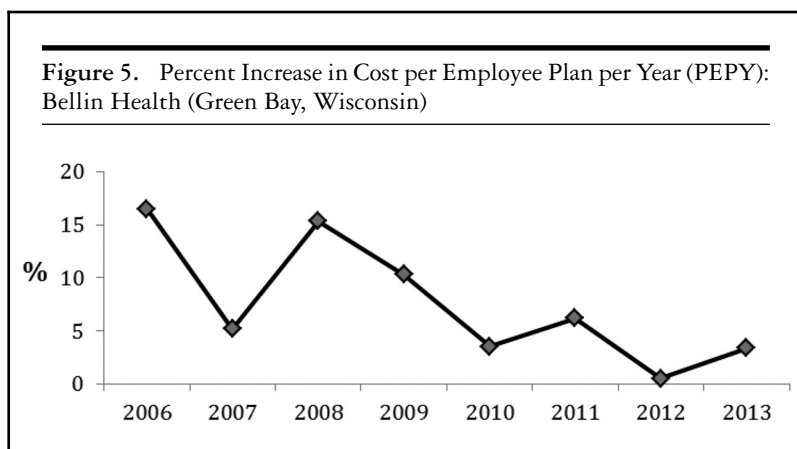
Triple Aim: population health, experience of care, and per capita cost (Table 3).

Bellin measured improvements in population health by combining the population's biometric HRA scores into 1 summary measure on a scale from 0 to 100 (Figure 2). It also measured specific improvements in its highest-risk and most costly employees by using the same HRA and tried to lower the percentage of high-risk individuals (HRA score less than 50), as shown in Figure 3.



The percentage of wellness certificates that were completed, which Bellin used as a measure for experience of care, is shown in Figure 4. A wellness certificate is a form filled out by a primary health care provider's office that indicates whether an individual is up-to-date with wellness and prevention services and has completed an HRA.

Figure 5 shows Bellin's percent increase in cost per employee plan per year (PEPY). Although the increase averaged more than 10% from 2006 to 2009, it has averaged only 3% since 2010.



Expanding to Other Population Segments

Based on the success of this work with its own employee population, Bellin Health launched a successful new business line that provides these services to employers throughout the community. For those who engage Bellin at the highest level, Bellin's services include a consumer-driven health plan, HRA, on-site services, incentives for wellness, and prevention coverage. Bellin reduced total health care costs by 21% for other employers using its services.

Using these skills, Bellin expanded its work on the Triple Aim to include other enrolled populations, such as its Medicare population. Bellin Health is one of the Pioneer Accountable Care Organizations (ACOs), along with its partner, ThedaCare. Working with patients enrolled in its Medicare product, the Bellin-ThedaCare partnership was able to save \$389 per participant in the first year, for a total savings of \$7.6 million. In the second year it had a total savings of \$3.2 million, as well as reached the Pioneer ACOs' highest overall score for quality of care indicators.

In addition to its work supporting these enrolled populations, Bellin Health understands that it has a role to play in improving the health of the community and thus must partner with other organizations to address the broader determinants of health. For a number of years, Bellin Health has been working with the school systems on a project called "Thrive."²¹ More recently, together with many community partners, it has been working on a comprehensive plan to help children and young

Table 4. Portfolio of Work for Triple Aim: Chinle Service Unit

Project	Triple Aim Dimensions	Project Measures
Improving patient care medical home	Population health Experience of care Per capita cost	Outcome: emergency department / urgent care visits, child immunizations, outcome bundle, primary care access Process: continuity rates, supply/demand ratio
Diabetes health coach model of care	Population health Experience of care Per capita cost	Outcome: A1c, low-density lipoprotein (LDL), blood pressure (BP) under control, rate of hospitalization Process: active diabetics current on comprehensive care measure, percentage of patients with a health coach visit
Chinle Hospital engagement network	Experience of care Per capita cost	Outcome: inpatient satisfaction, inpatient safety index Process: measures of team function
Community health improvement councils	Population health	Outcome: coalition development score Process: attendance at council meetings by sector

Table 5. Population Outcome Measures: Chinle Service Unit	
Population health	Self-reported health status Injury-related emergency room visits Childhood healthy weight Diabetes incidence Diabetes prevalence
Experience of care	Ambulatory care patient satisfaction Patient confidence Diabetes outcome bundle 30-day readmission rate
Per capita cost	Emergency room utilization Urgent care utilization Internal/external costs Hospital bed days

adults in their community that is connected to a larger national movement called “Strive.”²² The coalition’s plan is to create a comprehensive program from “cradle to career.” It starts with a core of community engagement partners that make up the Community Leadership Council, which provides overall governance for the program. A small core team assists in the ongoing work and measurement of all the various age segment initiatives. Under the guidance of the Community Leadership Council, a working group oversees the age-segmented initiatives. The 6 age segments have 8 goals, with a supporting team for each goal. Bellin Health is a good example of how to progress from improving health care to addressing the broader upstream determinants of health.

Indian Health Service: Chinle Service Unit

The Chinle Service Unit (CSU) is part of the Indian Health Service (IHS), a federal agency in the US Department of Health and Human Services (DHHS). Chinle serves 31 Navajo communities in the central region of the Navajo Nation.

- Population of focus: IHS beneficiaries who live in one of the 31 communities in the Chinle Service Unit who have been seen at least once in the past 3 years. This comprises 35,000 primarily Native Americans in the central region of the Navajo Nation.

Figure 6. Patient Survey: "Usually My Health Is Good," Clinle Service Unit Ambulatory Care Patients, July 2012 to June 2014 (Adjusted for Age and Sex)

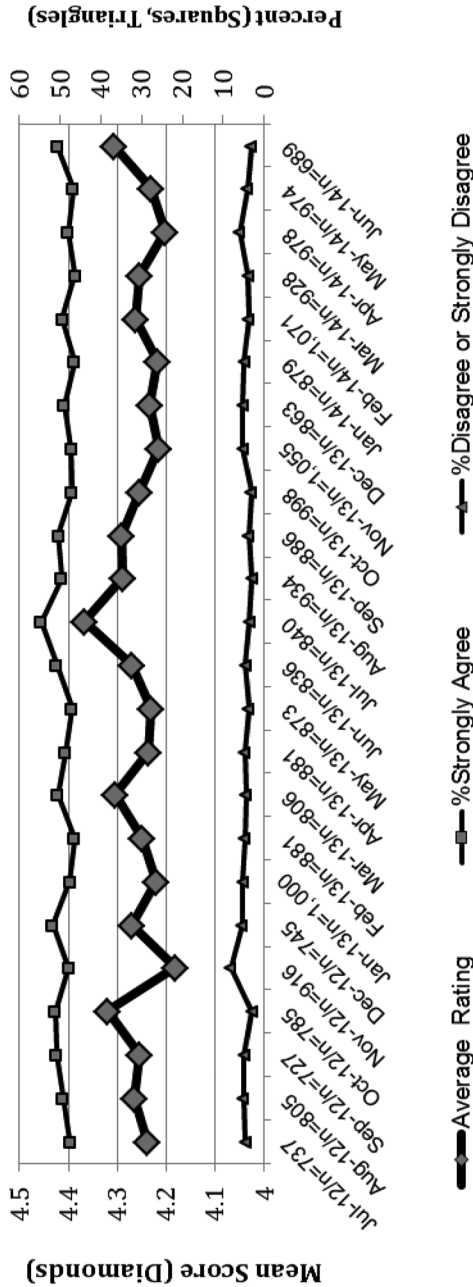
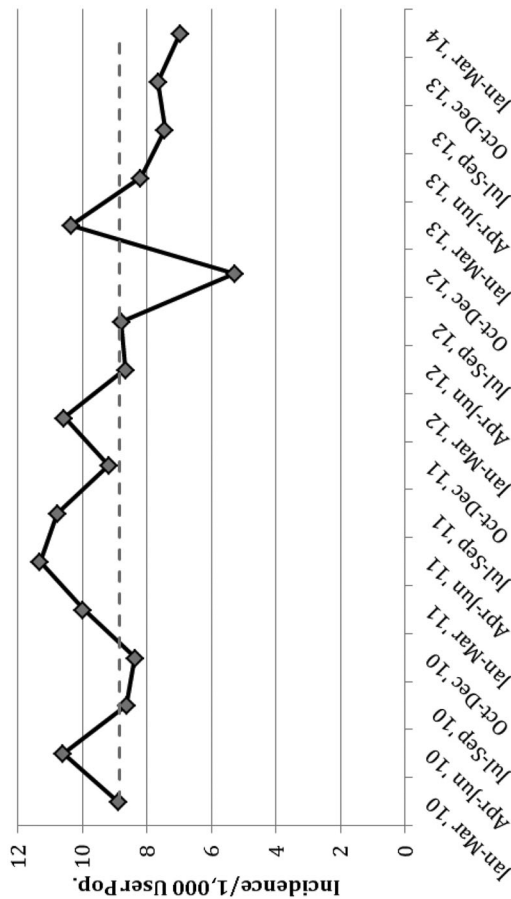
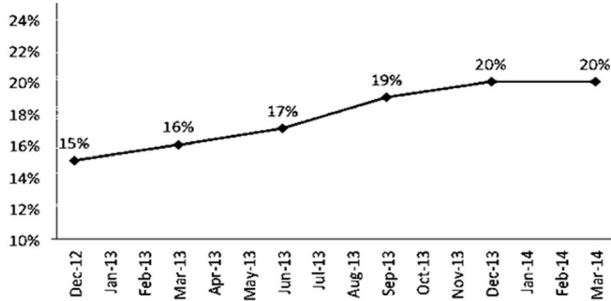


Figure 7. Incidence of Diabetes per 1,000 User Population^a by Quarter, Chinle Service Unit, January 2010 to March 2014



^aUser population: any patient residing in Chinle Service Unit communities with at least 1 visit in the 3 years before the end of the reporting period, regardless of the clinic type.

Figure 8. Diabetes Outcome Bundle: Hemoglobin A1c, Blood Pressure, and LDL in Control, Chinle Primary Care Active Diabetic Patients,^a December 2012 to March 2014



^a Active diabetic patients are active clinical patients diagnosed with diabetes before the reporting period, with at least 2 visits during the reporting period and 2 diabetes-related visits in total.

- Governance structure: Senior and midlevel organizational leadership, supported by a quality management team.
- Challenge and purpose: After developing a culturally focused improvement model in 2005 and engaging in intensive primary care transformation work as part of the Improving Patient Care (IPC) Collaborative since 2007,^{23,24} the CSU faced a changing landscape of health care both across the United States and within the IHS. The CSU thus decided to build on its primary care transformation improvements and pursue the Triple Aim in order to generate new ideas and implementation strategies to better control health care costs while improving population health, patient experience, and quality of care. The CSU was committed to a community-focused improvement process that respected and incorporated the local culture.
- Portfolio of projects and investments to address the challenge: These were medical home implementation, including access to care, childhood immunizations, and emergency department visits; diabetes health coaching model; inpatient safety; inpatient

Figure 9. Urgent Care Utilization: Urgent Care Visits per 100 User Population, Chinle Service Unit, January 2010 to March 2014

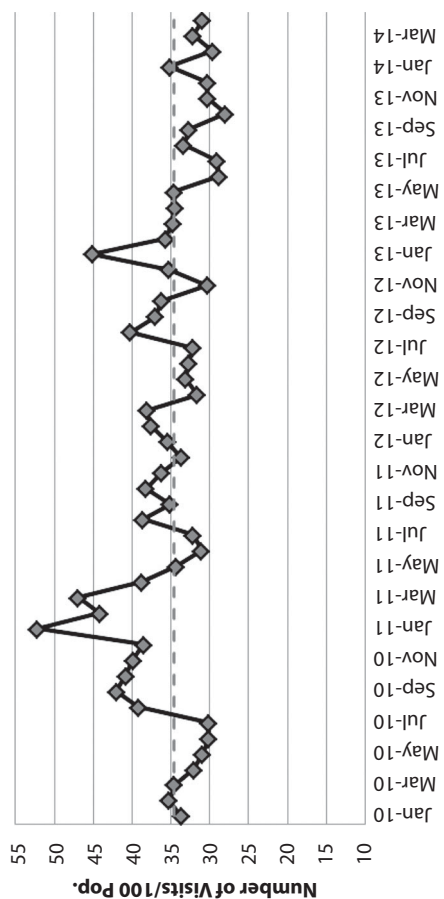
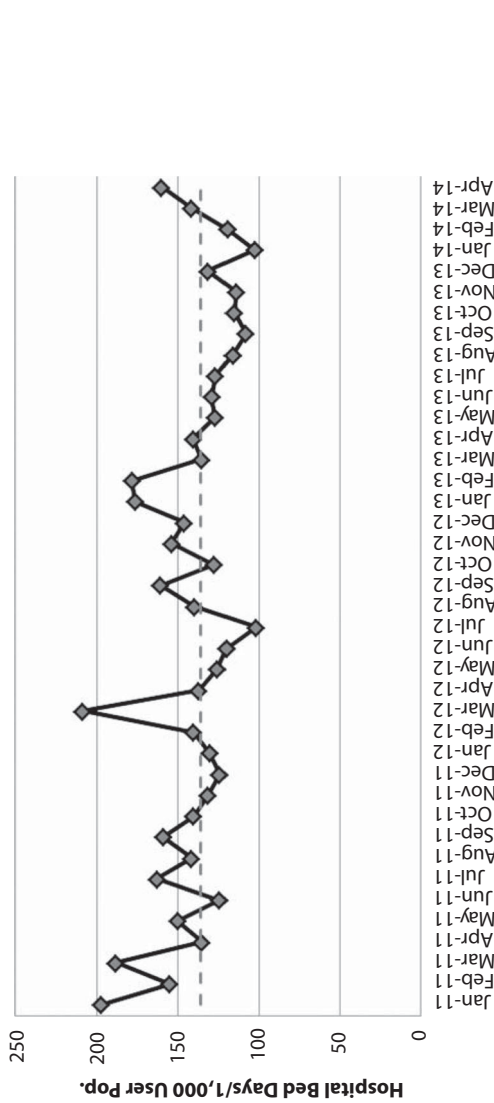


Figure 10. Hospital Bed Days per 1,000 User Population: Years by Month, Chinle Service Unit Active Clinical Population,^a January 2011 to April 2014



^a Active clinical population refers to any patient residing in Chinle Service Unit communities with 2 visits in the 3 years before the end of the reporting period and at least 1 visit to a primary or urgent care clinic.

satisfaction; and collaboration of the IHS's Community Health Improvement Councils.

The CSU structured its organizational strategy, as well as new and existing work, into a portfolio of Triple Aim projects. As shown in Table 4, it decided which of the Triple Aim dimensions would be impacted by each project. The CSU next settled on the outcomes and process measures for assessing the progress of the work. In addition to measuring the projects' progress over time, the CSU chose a set of population-level outcomes measures, shown in Table 5, to monitor the impact of the projects on its overall population. As the work progressed, the CSU refined changes through iterative testing.

Figures 6 and 7 are high-level population measures of health. Figure 6 is a self-rated health status questionnaire in which the CSU asks patients to respond to the statement "Usually my health is good." Figure 7 shows the incidence of diabetes in the CSU population over time. Figure 8 depicts data for a measure of compliance, with the diabetes outcome bundle (hemoglobin A1c, blood pressure, and low-density lipids) representing the patient experience of care. The CSU does not have the ability to directly measure per capita cost for its populations, so instead it has chosen some utilization-of-care measurements as an indirect measure of cost. The data for 2 of those measures are displayed in Figures 9 and 10. Figure 9 shows urgent care utilization, and Figure 10 includes data on hospital bed days per 1,000 persons.

Conclusion

During the past 7 years, IHI worked with 141 organizations and communities to develop and refine a set of ideas to achieve the Triple Aim for populations. In this article we described the 3 core components: developing a foundation for population management, managing services at scale for a population, and building a learning system to support the work. We will continue to refine this approach as we learn more in pursuit of the Triple Aim.

Bellin Health and the Chinle Service Unit are examples of identifying enrolled populations as the focus of the Triple Aim work. Moreover, identifying such populations makes financial sense, as seen in the cases of Bellin Health's employees and spouses and Chinle Service Unit's Indian Health Service beneficiaries. Although we found other examples of

success for enrolled populations, there are fewer examples of communities that have successfully pursued all 3 components of the Triple Aim simultaneously. Although several communities have made improvements for their populations for a particular health issue, few have been able to address the difficult challenge of obtaining the health care cooperation needed to improve per capita spending in a competitive health care environment in their community. This will continue to be a challenge.

A significant contribution of this work was testing a simple idea: Could we get organizations to work with us on the Triple Aim for populations? When the Triple Aim concept originated, our starting point was the US health system. We saw a real need to help health systems and physicians think beyond health care and their own internal costs to the broader needs of society, including per capita cost and the health of populations. Because our starting point was the US health system, we did not initially concentrate on regional or community populations. However, as IHI's work progressed, we learned that the Triple Aim attracted a wide variety of groups, coalitions, and health systems outside the United States, as shown in Table 1.

The Triple Aim was not confined to the 141 organizations participating in the IHI collaboratives. Rather, it was spread even more widely when Donald Berwick, one author of the 2008 article, was serving as the administrator of the Centers for Medicare and Medicaid Services (CMS) from July 2010 until December 2011. As he announced at a conference in September 2010, "I plan to direct CMS toward the Triple Aim as our highest-level goal."²⁵ In 2011, the Agency for Healthcare Research and Quality incorporated the Triple Aim into the National Strategy for Quality Improvement in Health Care.²⁶ The concept of the Triple Aim is now widely used, both in the United States, where it has become a national model for implementing health care, and around the world.

Looking back over the past several years, Berwick reflected on the successes and challenges of the Triple Aim:

The Triple Aim has proven to be one of the most widely accepted frameworks developed in IHI's 25-year history. Health care leaders, organizations, and even governments apparently feel that it is valuable and relevant as a guide to their detailed priorities. Of particular significance, the framework unites the pursuit of lower cost with the pursuit of better health and care, which is totally consistent with the modern definitions of "quality" in most sectors of the economy. This is a welcome reorientation of goals, energized by the progress health care

has made in understanding how to reduce defects (especially patient injuries), documenting the level of waste in care, and the urgency of the social need for health care to reduce the level of its confiscation of public and private money. That said, actual, systemwide, progress on all 3 aims simultaneously has proven elusive. If the past 5 years have witnessed the embrace of the Triple Aim as the proper way-finder, the next 5 years ought to be the time of real implementation and spread of “Triple-Aim-Capable” delivery system designs. (personal communication, Donald Berwick, February 19, 2015)

The collective learning of the many organizations and community coalitions with which IHI has interacted over the past 7 years has taught us valuable lessons and created a framework for others pursuing the Triple Aim. When applying the framework, organizations will encounter a variety of other dilemmas and challenges not addressed in this article, including workforce, new care designs, access to and analysis of population data, cross-sector collaboration, population-level payment models, and sustainable funding for community coalitions. The continuing work of organizations and communities pursuing the Triple Aim will, we hope, help inform these issues.

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