Institute *for* Healthcare Improvement

10 IHI Innovations
to Improve Health and Health Care

- Breakthrough Series Collaborative Model
- Framework for Spread and Scale-Up
- Evidence-Based Care Bundles
- Patient Flow
- IHI Global Trigger Tool for Measuring Adverse Events
- 100,000 Lives Campaign
- IHI Triple Aim
- IHI Open School
- A Framework for Achieving Health Equity
- Continuous Value Management

AN IHI RESOURCE

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Foreword

Since its founding, the Institute for Healthcare Improvement (IHI) has regarded discovery and exploration of new ideas as central to our mission to improve health and health care around the world. We believe continuous improvement must be informed by continuous pursuit of learning. Innovation, in many ways, is the natural extension of improvement — sequential tests of change that lead, eventually, to the fundamental shift of an outcome.

A little more than 10 years ago, IHI made a formal commitment to innovation by establishing a Research and Development team and a process to consistently produce new thinking that would challenge the entrenched models that result in low-value, poor-quality care. To do this, we employed a classic innovation technique: Looking outside of health care, we studied the work of leading innovators from the fields of industry, manufacturing, and energy. We borrowed and adapted, and built a systematic approach to creating new knowledge — sequential 90-day "waves" of projects (three to five projects per wave) to tackle vexing questions raised by our partners, our communities, and our patients.

Now, 10 years later, we have completed more than 250 of these 90-day innovation projects, covering a wide range of topics from blood product usage, to detailed studies of reliability, to how to improve the health of whole communities. This curated publication highlights 10 ideas that have reshaped how and what IHI has committed itself to over the years. At the 10-year mark, we pause to reflect on what was impactful about these ideas, where our partners have taken them, and where opportunities for improvement remain.

Within these pages, you will find reflections on the Triple Aim, the concept of a health care Campaign, the Breakthrough Series Collaborative model, and other frameworks and fresh thinking that have been replicated around the world. The leaders behind these concepts reflect on the trajectory of each innovation — where it has been, what challenges it still faces, and what potential it has to improve health and care in the future.

Every innovation project IHI has undertaken relies on the generosity of partners who are willing to take a risk on an idea that may hold promise. Not all of these ideas pan out to be as impactful as we may hope, but we always learn together. Over the years, we've been privileged to have a very active contributing faculty and a number of clinical and non-clinical partner organizations that have willingly put up their hands to test our ideas, however early, in their local environments. We are grateful for these gifts and we hope to pay them forward with many years of innovation to come.

Kedar Mate, MD
Chief Innovation and Education Officer
Institute for Healthcare Improvement

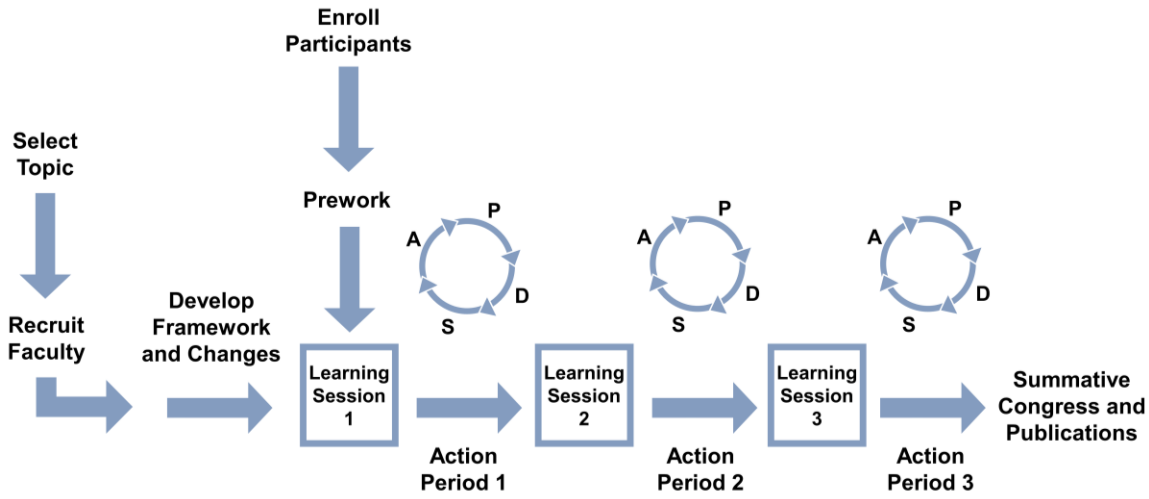
Innovation at a Glance:
Breakthrough Series Collaborative Model

What It Is

A Breakthrough Series Collaborative is IHI's model for collaborative learning and action. Here are the essential ingredients:

- Select a topic that is "ripe for improvement" — that is, evidence exists but is not widely used, and better results have been demonstrated.
- Combine subject matter experts in specific clinical areas with application experts who are skilled in quality improvement.
- Name a chairperson who is a respected expert in the field, and convene expert faculty to create the specific content for the Collaborative, including aims, changes, and measures.
- Convene 20 to 40 health care organizations for a specific period of time (6 to 15 months), setting a collective aim, testing changes, and reporting measures.
    - Teams attend three Learning Sessions, in which they come together to learn about the topic and plan tests of change.
    - During three Action Periods (between Learning Sessions), teams use the Model for Improvement to test changes (using Plan-Do-Study-Act cycles) in their local settings.
- End the Collaborative with a Summative Congress and publication (Breakthrough Series Guide).

IHI Breakthrough Series Collaborative Model



How It Started

The Breakthrough Series was the brainchild of IHI founders Don Berwick, MD, Paul Batalden, MD, and Tom Nolan, PhD. In 1994, they were frustrated with the pace of change. IHI had been successfully training thousands of people from hundreds of health care organizations in the fundamentals of improving quality in health care, but IHI's leaders felt it was time to move from *learning* to *action*: making real, system-level changes that would lead to dramatic improvements in care.

"We were getting a lot of excitement about the QI methods and tools," Berwick says. "But if the mission of IHI was improving care, we weren't getting traction. We knew we'd never make progress unless this learning was tethered to actual health care needs."

Sitting together in the back of a conference room in 1994, Batalden drew a sketch on the back of a paper placemat and showed it to Berwick. It was a model that would combine learning with action, and combine subject matter knowledge with improvement knowledge. It was the first picture of what would become the Breakthrough Series Collaborative model. Nolan provided important feedback on the design, former IHI Vice President Penny Carver figured out how to make the idea a reality, and, within a matter of months, IHI launched the first Breakthrough Series Collaborative.

For each Breakthrough Series Collaborative, "Having an activist chairperson who was highly respected in the field was absolutely key," Berwick says. "None of this would've worked without [C-section Collaborative Chair] Bruce Flamm, or [Cardiac Surgery Collaborative Chair] Bill Nugent. Why? To build confidence that it was responsible and feasible to achieve this 'breakthrough' aim. You could disagree about reducing cesarean sections until you heard from somebody that did it."

How It Evolved

In the past 20 years, IHI has continuously refined the Breakthrough Series Collaborative model. Among the key modifications:

- Conducting more virtual, rather than in-person, Collaboratives;
- A greater number of organizations participating in a Collaborative (e.g., Veterans Health Administration, Bureau of Primary Health Care);
- Successive "waves" of Collaboratives (e.g., in Ghana, Ethiopia), each building on the learning and results from the previous Collaborative; and
- Use of Collaboratives at a national scale (e.g., Hospital Engagement Networks [HENs] in the US, the NHS Modernisation Agency in England).

"Today, the Breakthrough Series Collaborative is one among many methods of spread," Berwick says. "Back then, when IHI first developed the Collaborative model, it was *the* method — now it's *a* method. Today, anyone interested in spread has a palette of methods, only one of which is the Collaborative model."

Successes and Challenges

What accounts for the enduring effectiveness of the Breakthrough Series Collaborative model? "It's affective," says Berwick. "It's the importance of understanding and then tapping the intrinsic desire of people to learn, and even better to learn together. Collaboratives work with the positive side of intrinsic motivation in a way that few other models do. If you have doubts about the Collaborative methodology, then all you have to do is attend a Learning Session and watch people discover that they're trying to solve the same problem, and can do so better together than they could separately."

What's Next

IHI's Breakthrough Series College recently crossed the 1,000th participant mark, with four offerings of the College in the past year, including a session for 65 participants in Sydney, Australia, in November 2016. We are delighted to have more attendees joining us from industries outside of health care, like education and social service, that are ready to leverage this methodology to spread best-known practices to multiple settings in pursuit of a common aim. Although other methods continue to emerge, the Breakthrough Series Collaborative model has been a dependable tool for maximizing peer-to-peer learning with expert faculty support across many topics in many settings. We look forward to welcoming our next 1,000 change agents to learn more about running effective Collaboratives, and we hope that more organizations inside and outside of health care will avail themselves of these methods to gain learning and enact change together.

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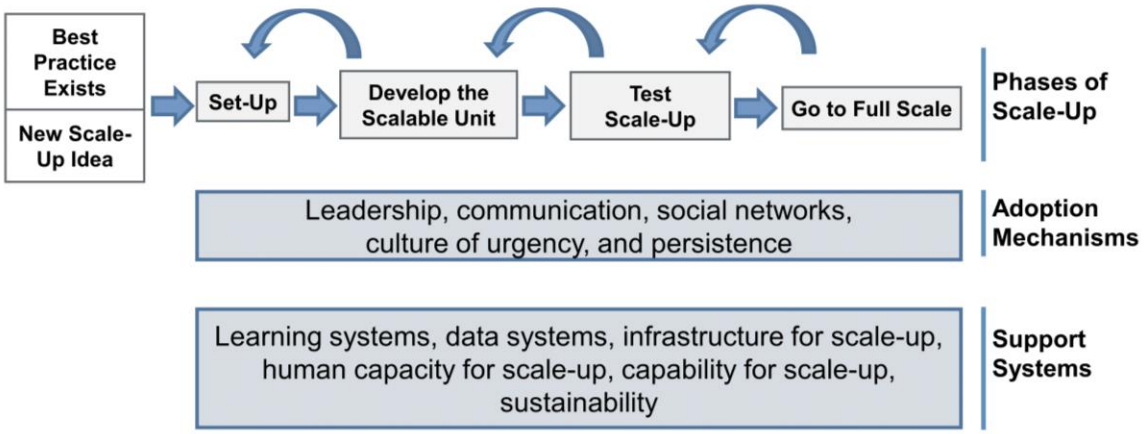
Innovation at a Glance:
Framework for Spread and Scale-Up

What It Is

A key factor in closing the gap between *best* practice and *common* practice is the ability of health care providers, organizations, and community groups to rapidly scale up new ideas and practices. Pockets of excellence may exist in a system, but knowledge of these better ideas and practices often remains isolated and unknown to others. For example, one clinic may develop a new way to ensure that all diabetics have their HbA1c levels checked on a regular basis, or, on a much larger scale, one community may develop a way to prevent mother-to-child transmission of HIV.

IHI's Scale-Up Framework, pictured below, published online in January 2016 in *Implementation Science,* describes three core components of successful scale-up: a sequence of activities that are required to get a program of work to full scale, the mechanisms that are required to facilitate the adoption of interventions, and the underlying support systems required for successful scale-up.

IHI Framework for Going to Full Scale

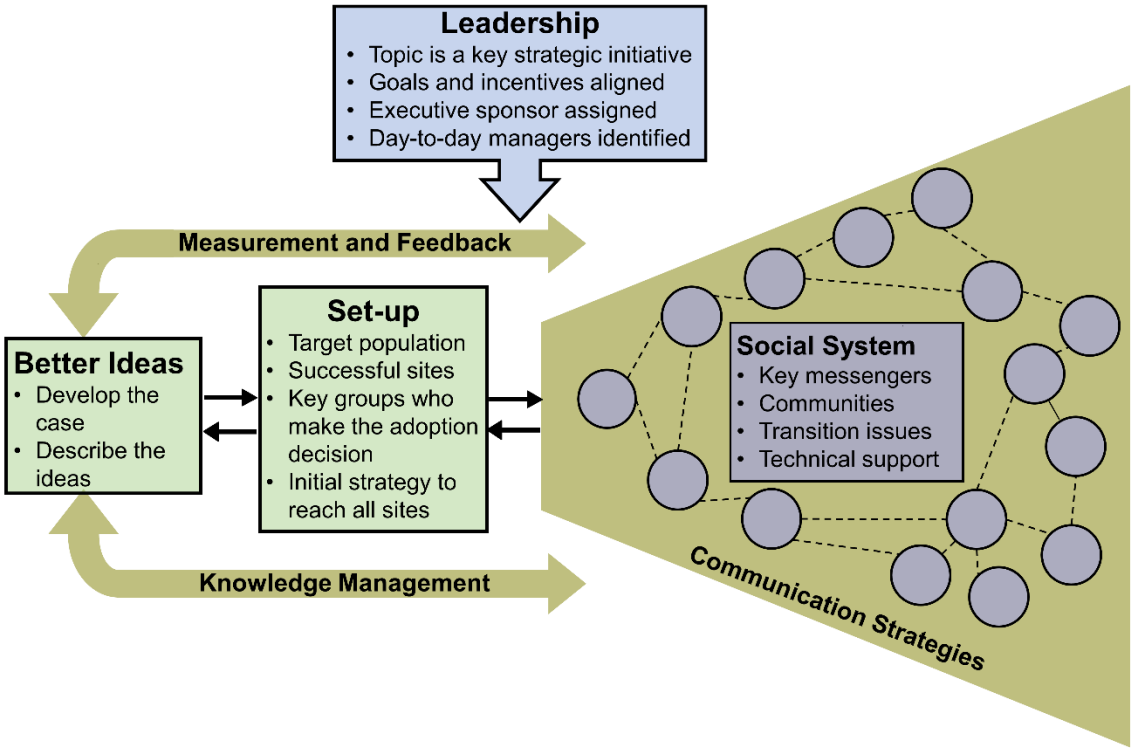


How It Started

In 1999, IHI chartered a team to develop a Framework for Spread. "We had been doing Breakthrough Series Collaboratives and introducing, usually at the last Learning Session, some guidance for organizations about how to expand a pilot improvement project," says Marie Schall, now a Senior Director at IHI. "The guidance was pretty minimal and people were asking for more. That was the impetus for IHI's work to develop a Framework for Spread."

The framework that resulted proved to be a useful starting point. Created by Associates in Process Improvement's Kevin Nolan and IHI's Marie Schall, the IHI Framework for Spread illustrates the strategies and methods shown to contribute to the effective spread of new ideas or operational systems both within and across organizations.

IHI Framework for Spread



How It Evolved

As IHI continued to use the original spread framework in Collaboratives in the early 2000s, Schall and others at IHI used it to help inform the design of the 100,000 Lives Campaign, which began at the 2004 IHI National Forum. Meanwhile, IHI's Africa team, led by Pierre Barker, MD, who is now IHI's Chief Global Partnerships and Programs Officer, was testing an expanded version of the spread framework. "The challenge here was to take improvements in priority programs in African countries to full scale in a short period of time," Barker says. "The breakthrough was to first undertake innovation in the 'scalable unit' — the smallest administrative unit that could be replicated across a country — then pilot test those innovations in similar administrative units (e.g., districts) in different parts of the system before rapidly going to full scale. This systematic phasing allowed for an explosive pace of scale-up."

Barker adds, "Building on previous IHI frameworks that were focused more on the psychology of change, the new spread and scale-up model provided guidance on how to prepare the environment ahead of planned scale-up, and the infrastructure that is needed to support the work as it moves through each step in the sequence."

Successes and Challenges

Early examples of successful scale-up projects include IHI's work with the US Bureau of Primary Health Care, IHI's IMPACT Network, and Project JOINTS, which replicated the 100,000 Lives Campaign model. Two examples of implementing the most recent iteration of IHI's scale-up framework, as featured in the 2016 *Implementation Science* article, are taken from IHI's work in Africa:

- Improving perinatal prevention of mother-to-child transmission of HIV in South Africa. The South African government used a change package developed in IHI-supported pilot-testing sites to scale up effective care for HIV-infected mothers, contributing to a dramatic decline in HIV transmission rates from 19 percent in 2005 to less than 5 percent in 2010.
- In Ghana, IHI supported the National Catholic Health Service to test, pilot, and scale up effective maternal and child health programs to improve outcomes for children under 5 years. Project Fives Alive! scaled up from 35 sub-districts to 554 sub-districts in six years and reached 80 percent of all public and faith-based hospitals in the country, achieving significant reductions in under-5 mortality.

"In terms of challenges," Schall says, "I would say it's for an organization to understand where they are in the scale-up sequence. You need to know where you are. If you haven't fully developed your change and then try to scale up prematurely, that's an issue."

What's Next

IHI's Results and Evaluation team is developing an assessment tool, a "Readiness for Scale-Up Assessment," that mirrors the scale-up framework and will help organizations and communities understand whether they are ready for the next phase of scale-up. "This tool has already demonstrated its value in helping organizations better understand where they are on their journey, and the work that lies ahead in getting them to full scale," Barker says. "We plan to learn with our partners how an assessment of readiness for scale-up could help organizations better prepare for and address the challenges they run up against during scale-up."

IHI plans to refine the framework and associated tools with initiatives like 100 Million Healthier Lives and ongoing work in Africa, including helping to reduce maternal and newborn mortality in Ethiopia. "We'll continue to apply the framework and learn about how it needs to be adapted and used in different contexts and different settings," Schall says.

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Innovation at a Glance:
Evidence-Based Care Bundles

What It Is

A bundle is a small set of evidence-based interventions for a defined patient segment/population and care setting that, when implemented together and reliably, will result in significantly better outcomes than when implemented individually. The power of a bundle comes from implementing a small set of evidence-based interventions with 100 percent reliability — for every patient, every time.

A bundle has the following key characteristics:

- **Three to five evidence-based interventions (elements).** The interventions in a bundle are all based on randomized controlled trials. They've been proven in scientific tests and are well established. A bundle focuses on *how* to deliver the best care — not *what* the care should be.
- **Used on a defined patient population, in one care setting.** Bundle elements occur in the same time and space continuum: at a specific time and in a specific place, no matter what — for example, patients on ventilators in the ICU. Involving care teams that physically work together in the same location with a defined patient population allows for strategies to achieve all-or-none bundle compliance that are not always transferable when multiple teams across multiple locations are involved.
- **All-or-none measurement.** Compliance with bundles is measured by documentation of adherence to all elements of the bundle, using a simple "yes" or "no." If all elements have been accomplished, or if an element was documented as medically contraindicated (with the goal that all care team members know the rationale for exceptions, which may change over time), the bundle is counted as complete ("yes") for that patient. If any of the elements are absent in the documentation, the bundle is incomplete ("no"). In other words, no "partial credit" is given.

How It Started

In 2001, IHI developed the bundle concept in the context of an IHI and Voluntary Hospital Association (VHA) joint initiative, Idealized Design of the Intensive Care Unit, which involved 13 VHA hospitals focused on improving critical care. The goal of the initiative was to improve critical care processes to the highest levels of reliability, which would result in vastly improved outcomes. The initiative found that by using a small set of evidence-based interventions for a defined patient population and care setting (i.e., a bundle), the improvements in patient outcomes exceeded expectations of both teams and faculty.

IHI Ventilator Bundle
1. Elevation of the head of the bed to between 30 and 45 degrees
2. Daily "sedation vacations" and assessment of readiness to extubate
3. Peptic ulcer disease (PUD) prophylaxis
4. Deep venous thrombosis (DVT) prophylaxis
(Note: A fifth bundle element, "Daily oral care with chlorhexidine," was added in 2010.)

IHI Central Line Bundle
1. Hand hygiene
2. Maximal barrier precautions
3. Chlorhexidine skin antisepsis
4. Optimal catheter site selection, with avoidance of using the femoral vein for central venous access in adult patients
5. Daily review of line necessity, with prompt removal of unnecessary lines

How It Evolved

Both the Ventilator Bundle and the Central Line Bundle were included as key interventions in IHI's 100,000 Lives Campaign and 5 Million Lives Campaign. More than 4,000 US hospitals participated in the Campaigns between 2004 and 2008. Those hospitals were surveyed in 2007 about results following bundle implementation. The results: 65 hospitals reported going one year or more without a case of ventilator-associated pneumonia in an ICU setting, and 35 hospitals reported six months or more without a central line-associated bloodstream infection in at least one intensive care unit.

Successes and Challenges

The bundle concept had so much traction that people began using the term for any intervention — any checklist involving patient care procedures, for example. But a bundle isn't a checklist; it must include the key criteria listed above. People also began to add changes to an existing bundle. Bundles began to get bigger and bigger — to the point that they were unworkable and no longer effective.

"A bundle is a specific tool with clear parameters," says Carol Haraden, PhD, former IHI Vice President and patient safety expert. "It has a small number of elements that are all scientifically robust, and that when taken together create much improved outcomes. Don't feel compelled to convert helpful checklists into overloaded bundles. If the concept of a bundle becomes so broad and loose in meaning, its power will start to diminish."

What's Next

Over the years, IHI has developed additional bundles, most notably for sepsis and obstetrics. Organizations continue to find the bundle concept a powerful one for achieving high reliability in care processes, leading to significantly improved outcomes. Project JOINTS once again deployed the bundle concept within a campaign structure, demonstrating that a campaign approach facilitated the adoption of an evidence-based bundle designed to reduce surgical site infection rates after orthopedic surgery (hip and knee arthroplasty).

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Innovation at a Glance:
Patient Flow

What It Is

Optimizing hospital-wide patient flow, and ultimately improving outcomes and the experience of care for patients, requires an appreciation for the entire system of care. A hospital is an interconnected, interdependent system, meaning that improvements in one department affect the operations of other departments. A 2003 IHI White Paper explained, "Providing patients with timely access to appropriate care is an essential element of high-quality care, because *when* care is provided is often as important as *what* care is provided."

What are IHI's recommended strategies for achieving hospital-wide patient flow?

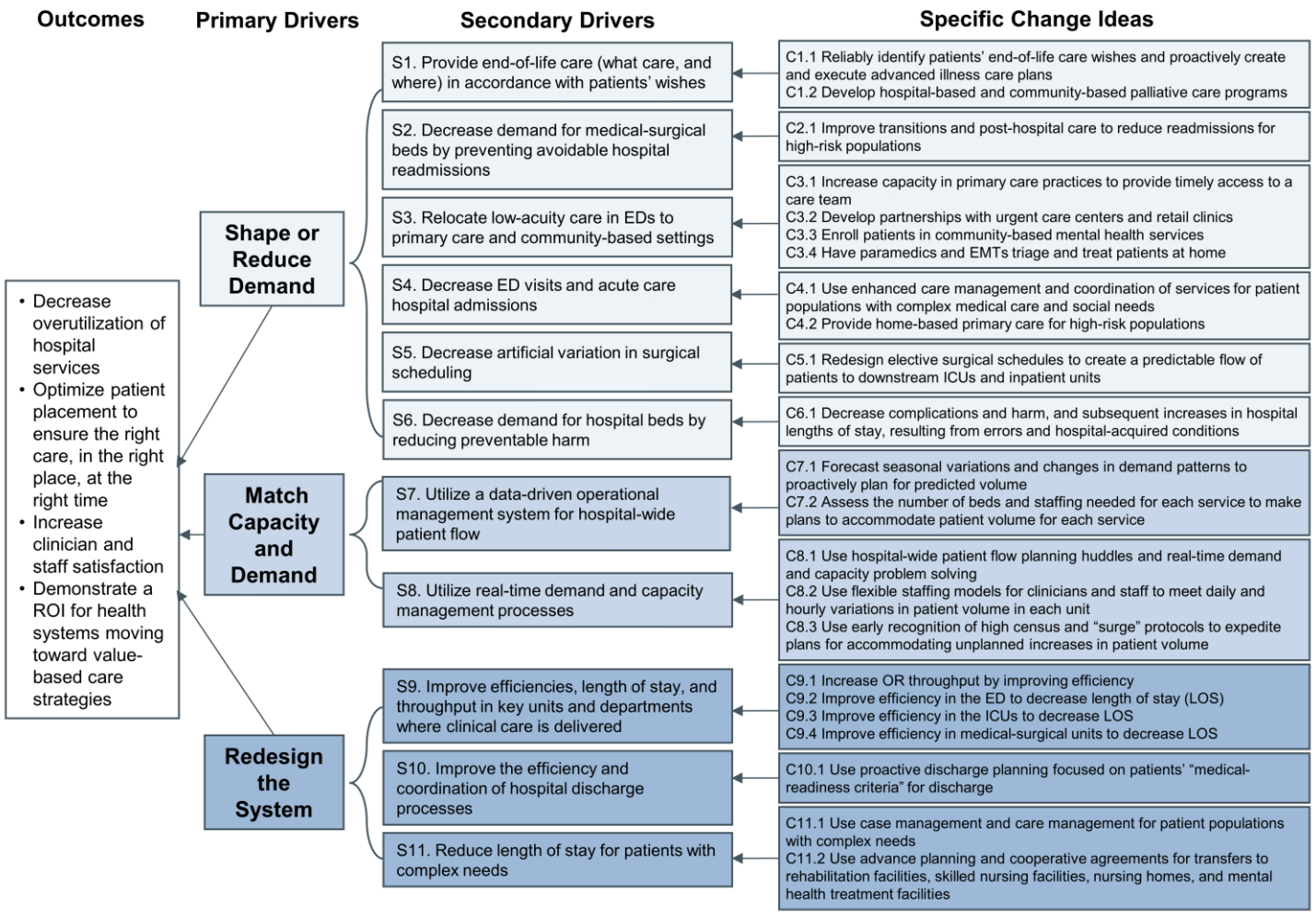
- The integration of various approaches (e.g., quality improvement, Lean management, operational engineering, complex systems analysis, operations research) to create hospital-wide patient flow.
- The utilization of advanced data analytics to reduce artificial variation in elective surgical scheduling, forecast patient demand patterns, and match capacity and demand.
- A focus on reducing demand, with change ideas to reduce hospital utilization by relocating care to less costly and, in many cases, higher-quality care; and on shaping demand by expansion of operating room scheduling system capabilities to predict and plan for patients who need intensive care and care in other inpatient units.
- A system-wide approach to patient flow, with a few "simple rules" to govern complex systems. Simple rules are design principles to guide system-wide improvement (e.g., no delay greater than two hours in patient progression, based on clinical readiness, from clinical areas/units throughout the hospital; available capacity on each unit or clinical area at the beginning of each day).
- A learning system that utilizes the science of improvement to understand and prioritize solutions to mitigate "flow failures."

Below is a driver diagram depicting primary and secondary drivers that influence flow within a hospital, along with specific change ideas for each driver.

How It Started

Since early 2001, IHI has partnered with subject-matter experts to explore effective strategies to improve patient flow in hospitals. Based on work with hospitals to evaluate what influences the smooth and timely flow of patients through hospital departments, and to develop and implement methods for improving flow, IHI published a white paper in 2003 on its earliest learning that informed a framework for optimizing patient flow. In IHI's IMPACT Flow Community (2004 to 2009), many participating hospitals demonstrated improvements on specific aspects of flow (e.g., decreasing ED delays and wait times, decreasing variation in elective surgical scheduling, improving administrative systems for bed management), but only a few teams achieved sustained interventions to improve hospital-wide patient flow.

Driver Diagram for Achieving Hospital-wide Patient Flow



How It Evolved

In the last two decades, health care has become better at adapting complex theories and approaches from other industries and academic disciplines to improve patient flow. Some examples of such approaches from other industries include Lean manufacturing, operational management, and the use of advanced data analytics. The pioneering efforts of Eugene Litvak, PhD, longtime IHI faculty and now President and CEO of the Institute for Healthcare Optimization, and his colleagues described the importance of developing systems to address variation in scheduling of elective surgical procedures, and to separate the flows of planned surgical cases from unexpected or emergent cases.

Following on the work of the IMPACT Flow Community, IHI continued to collaborate with expert faculty to promote specific strategies to improve hospital flow. Real-time demand capacity (RTDC), for example, a method piloted at the University of Pittsburgh Medical Center, aims to improve hospital-wide patient flow through better prediction and planning each day, identifying capacity and demand mismatches, and initiating specific improvement projects to address obstacles to efficient patient flow.

In the past two years, IHI's Innovation team has intensified its focus — through research, interviews, site visits, and the creation of a professional development program — to learn more about persistent challenges and breakthrough strategies to optimize hospital-wide patient flow. The 2017 IHI White Paper, *Achieving Hospital-wide Patient Flow*, is a culmination of approximately two decades of IHI's research, innovation, and learning about hospital-wide patient flow.

Successes and Challenges

The main success, according to Pat Rutherford, RN, MS, Vice President at IHI, has been the evolution of the work itself. "There are strategies and high-leverage change ideas that combine to achieve hospital-wide flow," she says.

As for challenges, Rutherford says, "[Optimizing flow] requires will at all levels of the organization, the implementation of most of the high-leverage change ideas, and widespread implementation capabilities."

What's Next

IHI plans to continue to offer the Hospital Flow Professional Development Program twice yearly, create a network among participants who have attended the program, and potentially offer seminars for more in-depth learning about the IHI framework. "We may adapt the program for other regions, too," says Rutherford.

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Innovation at a Glance:

IHI Global Trigger Tool for Measuring Adverse Events

What It Is

The IHI Global Trigger Tool (GTT) for Measuring Adverse Events is a simple tool that has revolutionized the ability of health care organizations to identify adverse events and track their improvement over time. The GTT has provided health care organizations around the world with an easy-to-use method for accurately identifying and learning from patient harm to improve safety and reduce patient suffering.

To start, a team reviews a sample of closed inpatient records for positive triggers as indicated in the tool. The identification of a positive trigger is not necessarily an indication that an adverse event has taken place, but rather a prompt to check other relevant portions of the record to determine if the patient experienced harm. If harm is found, reviewers then assign a category of harm to each adverse event identified during record review.

This is the process at its most basic. The GTT provides guidance on selecting the review team, sampling patient records, the review process, the time spent per record, categorization of harm, how often to conduct record review, and how to collect and use data for improvement.

IHI Global Trigger Tool for Measuring Adverse Events Review Summary Sheet

Record #	Length of Stay	Triggers	Events (Note trigger identifying event)	Event present on admission?
Totals				

How It Started

Developed by IHI in 2003 as part of the Idealized Design of Medication Systems project, the Global Trigger Tool allows organizations to quantify actual harm to patients. Because adverse events that lead to patient harm have a clear impact on clinical outcomes, such events are particularly likely to engage both clinicians and administrators in a thorough review of the system factors that led to the adverse event, with a clear focus on improving patient outcomes. By concentrating on harmful events actually experienced by patients, a hospital can begin to foster a culture of safety that shifts from individual blame for errors to comprehensive system redesign that reduces patient suffering and the potential for future occurrence of such events.

How It Evolved

Since the GTT was first introduced, various additional Trigger Tools have evolved, all based on the GTT methodology at their core. Some organizations have used the GTT to focus on specific patient populations (e.g., perinatal, surgical, ICU, ambulatory, oncology) or to focus on specific processes of care (e.g., high-alert medications). Electronic versions of the Trigger Tools have been developed to use along with the electronic medical record. In addition, there is work underway to move to proactive (rather than retrospective) review to prevent or mitigate harm.

Since its development in late 2003, the IHI Global Trigger Tool has spread from collaborative projects to large-scale improvement efforts, including IHI's 5 Million Lives Campaign. Hundreds of hospitals in multiple countries now use the IHI Global Trigger Tool to monitor adverse event rates while working to improve patient safety. The tool has been adapted for use in the pediatric care setting, the NICU, dentistry, mental health, outpatient care, surgical care, skilled nursing facilities, and ambulance service. It has been translated into at least four languages (Danish, German, Swedish, and Italian) and has been used in the United Kingdom, Sweden, Norway, Belgium, Finland, Brazil, New Zealand, China, Korea, Australia, and Palestine.

Successes and Challenges

The key strengths of the GTT are that it 1) does not rely on other methods of reporting, which may not be used reliably or may be time consuming; 2) focuses on harm from the patient's point of view; and 3) provides a method to measure the overall safety of the organization.

"The Trigger Tool methodology was the first to examine all-cause harm," says Frank Federico, RPh, Vice President at IHI and patient safety expert. "Unlike other measures that focused on specific harm, the Trigger Tool examined harm from the patient's point of view. In addition, the Global Trigger Tool included both preventable and non-preventable harm — and all levels of harm, from minor (which were not included in other harm studies) to death."

Two key challenges associated with the use of the GTT method are that it requires a commitment of resources and must be used over time to provide a reliable measure of the rate of harm in a hospital or other health care organization. In addition, many are not comfortable with the higher rate of harm identified using the GTT method than the rate typically found using other methods.

What's Next

Use of the GTT has also facilitated new estimates of patient harm in the United States, bringing renewed urgency to develop new interventions and reliably implement known interventions to improve inpatient safety. A 2011 study by Classen and colleagues published in *Health Affairs* found that adverse events in US hospitals are as much as ten times more common than previous estimates. A 2012 study by Kirkendall and colleagues published in *Pediatrics* found a rate of harm in the pediatric inpatient setting to be as much as three times higher than previously published rates. In a 2013 literature review by James published in the *Journal of Patient Safety*, which looked at four studies that used the GTT, the author estimates that 400,000 deaths in the United States each year are due to preventable harm.

Looking to the future, IHI welcomes other innovations that enhance the use of the GTT as a measure and as a method to identify risk and potential harm before it occurs, or to mitigate harm before it becomes more severe.

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Innovation at a Glance:
100,000 Lives Campaign

What It Is

In 2004, IHI launched the 100,000 Lives Campaign, an 18-month initiative that aimed to significantly reduce morbidity and mortality in American health care. The Campaign introduced six straightforward, evidence-based interventions targeting infection, surgical complication, and medication error. The plan was for IHI to work together with willing hospitals in the US to reduce needless deaths by 100,000 over 18 months. A phrase borrowed from political campaigns that became our rallying cry was, "Some is not a number, soon is not a time." The Campaign set June 14, 2006, as a deadline.

100,000 Lives Campaign's Six Interventions

- **Deploy Rapid Response Teams** at the first sign of patient decline
- **Deliver Reliable, Evidence-Based Care for Acute Myocardial Infarction** to prevent deaths from heart attack
- **Prevent Adverse Drug Events (ADEs)** by implementing medication reconciliation
- **Prevent Central Line Infections** by implementing a series of interdependent, scientifically grounded steps called the "Central Line Bundle"
- **Prevent Surgical Site Infections** by reliably delivering the correct perioperative antibiotics at the proper time
- **Prevent Ventilator-Associated Pneumonia** by implementing a series of interdependent, scientifically grounded steps called the "Ventilator Bundle"

How It Started

About 3,100 US hospitals enrolled in the 100,000 Lives Campaign — approximately three-quarters of all hospitals in the United States at the time. With the help of quality improvement organizations, hospital associations, and others, IHI built a national infrastructure for change, which included:

- A "node" in every state (i.e., a coalition of organizations to support change locally);
- A network of 155 "mentor hospitals" that had success on the Campaign interventions and offered to help others; and
- Facilitated affinity groups, such as rural hospitals and academic medical centers, which came together to share ideas and best practices.

On June 14, 2006, IHI celebrated more than 122,000 fewer needless deaths over the 18-month period, with the Campaign as a significant driver of those outcomes (though not the only one).

How It Evolved

The 100,000 Lives Campaign's impact rippled throughout IHI and the world. Some of the lasting effects:

- IHI followed with the 5 Million Lives Campaign, launched in 2006 with the goal of avoiding 5 million instances of harm.
- Canada, Australia, Sweden, Denmark, Northern Ireland, Wales, England, and Japan launched related campaigns.
- WIHI, IHI's free audio program, was born out of the audio program, *Campaign Live!*
- How-to Guides, which IHI developed for each of the Campaign's six interventions, are now a standard format for IHI.
- The national infrastructure developed during the Campaign informs IHI's work with The Conversation Project.
- Don Berwick and Joe McCannon brought lessons from leading the 100,000 Lives and 5 Million Lives Campaigns to the US Centers for Medicare & Medicaid Services (CMS) and the Partnership for Patients.
- The Scottish Patient Safety Programme, which was linked to 20,000 deaths avoided, drew inspiration from the 100,000 Lives Campaign along with other spread methods.
- The 100,000 Homes Campaign, an initiative to help end homelessness in the US, was modeled on IHI's Campaign.

Successes and Challenges

The Campaign's clear goal and aggressive deadline drew the attention of hospitals and set the pace of the work. The voluntary nature of the Campaign created a positive environment, with participants proactively driving change within their organizations rather than responding to mandates from federal or regulatory sources. The Campaign focused on the disciplined development of a national infrastructure for supporting the spread of improvement and the assignment of clear roles and responsibilities for regional nodes and participants. The Campaign also benefited from a range of tools to support different subpopulations (such as a conference call to discuss the unique needs of rural hospitals) and a commitment to test new tools and approaches early and often.

The Campaign's inclusive approach led to various challenges. The regional nodes participated voluntarily, making it difficult to standardize support to participating hospitals. These regional field "offices" had different amounts of time and resources for Campaign activities, although clear expectations and toolkits helped limit variation in performance. In addition, the Campaign did not enforce a deadline for enrolling hospitals, resulting in a constant stream of new participants. And because it was not compulsory for hospitals to submit process and outcomes data for the six interventions, and because the calculations of lives saved are imprecise at the hospital level, the Campaign could provide only limited information about the performance of individual facilities.

After the 100,000 Lives Campaign announced the "lives saved" number in June 2006, some challenged whether this number could be directly attributed to the Campaign. IHI has emphasized, clearly and repeatedly, that while the 100,000 Lives Campaign was a significant driver of those outcomes, it is by no means the only one. "The Campaign's power stemmed mainly from its

combination of a compelling call to action and a concrete set of interventions that participants could pursue; either of these things, alone, would have been insufficient," says Joe McCannon, a former IHI Vice President and Campaign manager. "As it was, Don [Berwick] issued an invitation for people to do something challenging and historic, which attracted so many (and always does), *and* IHI offered people a way to get started immediately in reducing harm. The Campaign's operation also lived in the field with four full-time field staff and countless faculty, thereby removing us from the terrible waste of analysis and speculation, and giving us the profound knowledge and ability to deliver value that comes through continuous interaction with the customer."

What's Next

The influence of the 100,000 Lives Campaign has spread far beyond IHI. And within IHI's current work, the most direct descendant is 100 Million Healthier Lives, a global initiative whose goal — 100 million people living healthier lives by 2020 — brings health to the forefront and reflects the original Campaign's spirit of "Some is not a number, soon is not a time."

IHI is serving as a convener for 100 Million Healthier Lives, helping to bring people together across sectors to achieve a goal no single organization could ever achieve alone. IHI is also providing operational support to the global initiative and partnering with leaders and experts from hundreds of other organizations to improve health.

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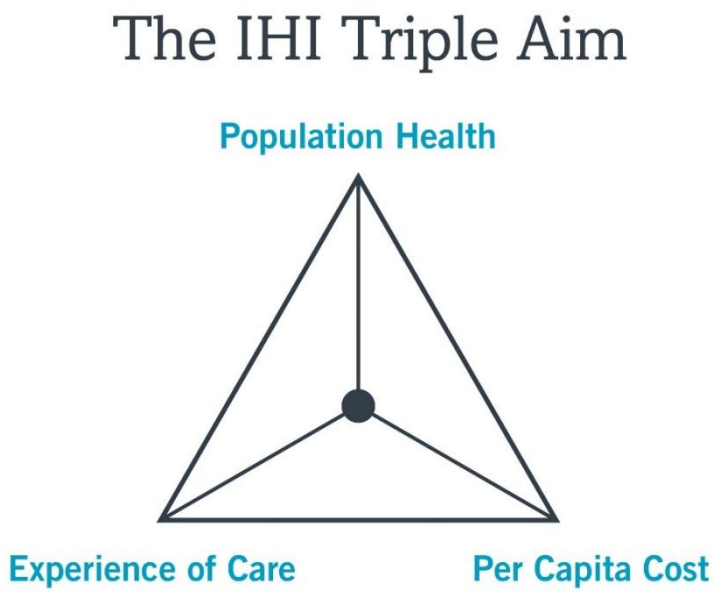
Innovation at a Glance:
IHI Triple Aim

What It Is

The IHI Triple Aim is a framework that describes an approach to optimizing health system performance. It is IHI's belief that organizations and communities must develop new designs to simultaneously pursue three dimensions, which we call the Triple Aim:

- Improving the patient experience of care (including quality and satisfaction);
- Improving the health of populations; and
- Reducing the per capita cost of health care.



How It Started

The concept of the Triple Aim began in 2005 with IHI's Tom Nolan, PhD, and John Whittington, MD. Like many IHI innovations, it was born out of impatience with the pace of change: Many health care organizations had embarked on efforts to improve quality and safety, but weren't achieving the results IHI envisioned — in particular, improvement in the health of populations. In December 2007, Don Berwick, MD, then CEO of IHI, outlined the Triple Aim in his keynote address at the IHI National Forum. In 2008, Berwick, Nolan, and Whittington published an article in *Health Affairs* titled "The Triple Aim: Care, Health, and Cost," in which they defined and made a case for the approach. Noting that improvement efforts up to that point had been focused somewhat narrowly and most often on site-specific efforts to reduce defects in patient care, they proposed the Triple Aim as a way to achieve high-value health care by means of a broad system of linked goals.

How It Evolved

Over the next seven years, IHI worked on the Triple Aim with 141 organizations, including health care systems, hospitals, health care insurance companies, and others closely tied to health care. In addition, key groups outside of the health care system — including public health agencies, social services groups, and community coalitions — also joined in the work.

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. In September 2010, Berwick, then Administrator of the Centers for Medicare & Medicaid Services (CMS), announced at a conference, "I plan to direct CMS toward the Triple Aim as our highest-level goal." In 2011, the Agency for Healthcare Research and Quality incorporated the Triple Aim into the National Strategy for Quality Improvement in Health Care.

Since that time, IHI and others have worked together to determine how to implement the Triple Aim. IHI has identified three 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.

Dozens of governments, systems, leaders, and organizations now use the concept of the Triple Aim as an organizing framework for achieving high-value health care — both in the United States and around the world.

Successes and Challenges

"The Triple Aim has proven to be one of the most widely accepted frameworks developed in IHI's 25-year history," Don Berwick noted in a 2015 *Milbank Quarterly* article. "Health care leaders, organizations, and even governments apparently feel that it is valuable and relevant as a guide to their detailed priorities. 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."

Berwick also noted that actual, system-wide progress on all three aims simultaneously has proven elusive. "If the past five years have witnessed the embrace of the Triple Aim as the proper wayfinder, the next five years ought to be the time of real implementation and spread of 'Triple-Aim-Capable' delivery system designs."

What's Next

In the midst of market challenges such as accountability for transforming costs and the burning platform to address social determinants of health, IHI continues to support health and health care organizations in their pursuit of the Triple Aim. Working across North America, Europe, the Middle East, and Latin America, IHI is engaging in key sensemaking activities to chart the pathways toward population health; partnering with organizations as they better understand their role as anchor institutions within their communities; addressing waste and inefficiencies at the point of care within health systems; and developing practical approaches to achieve Triple Aim outcomes in high-leverage change areas, such as better health and lower cost for complex needs populations, and strategies for better care for individuals with opioid addictions.

"We'll never achieve the Triple Aim with our present payment model in the US," says John Whittington, IHI Senior Fellow and IHI's lead faculty for the Triple Aim. "The obvious payment model is full capitation — that's where the Triple Aim makes business sense. Because under the current payment model, there's no incentive to improve the health of a population. And little incentive to manage the per capita cost."

According to Whittington, one of the key contributions of the Triple Aim has been to raise awareness within the health care world of the impact of social determinants on health — and to spur action to address these issues. "We won't achieve the Triple Aim until the US makes health equity a serious focus," he says. "The Triple Aim has always included equity — closing gaps in health disparities — at its core. As we say in the last sentence of the IHI White Paper, *Achieving Health Equity*, 'The Triple Aim will not be achieved until it is achieved for all.'"

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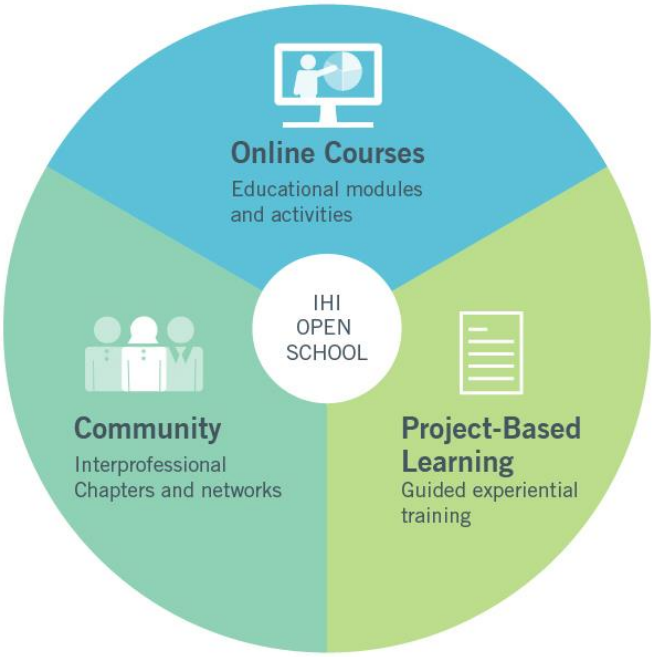
Innovation at a Glance:
IHI Open School

What It Is

The IHI Open School includes a collection of more than 30 online courses, more than 870 face-to-face Chapters, and a growing array of experiential learning opportunities for students, residents, and health professionals. More than 500,000 students and residents are registered on IHI's website, where the Open School resides. Three pillars comprise the Open School: online courses, community, and project-based learning.

Three Pillars of the IHI Open School



How It Started

In 2008, with seed funding from the Rx Foundation, Kaiser Permanente Community Benefit, and the MacArthur Foundation, IHI launched the Open School as an ambitious effort to transform the way students in the health professions (doctors, nurses, pharmacists, etc.) are trained. The Open School was born from a sense of urgency to equip new health professionals with quality improvement and patient safety knowledge, which was generally missing from most health professions educational curricula, and to support learning and application of that knowledge in interprofessional settings. IHI created an initial set of six online courses and offered them free of charge to all students, residents, and faculty in academic institutions throughout the world.

How It Evolved

The online courses remain freely available to individual students, residents, and faculty worldwide. IHI plans to continue this in perpetuity. In 2010, after looking at two years of data, IHI observed

that professionals were taking the online courses just as much as students. To develop a sustainable business model for expanded availability to the professional audience, IHI began offering access to the online courses for an annual subscription fee, available to both individuals and organizations. Organizational subscriptions continue to grow in popularity, with health systems recognizing the benefit of offering the Open School's online courses on improvement and safety to their teams and staff. "While educating themselves about quality and safety, these professionals are also 'paying it forward' to the next generation of health care," says Carly Strang, Executive Director of the IHI Open School.

Successes and Challenges

Observers, both inside and outside IHI, point to the Open School's growth as the biggest success. As of August 1, 2017:

- **561,265** students and residents have registered on IHI's website.
- **440,659** students and residents have completed an IHI Open School online course.
- **104,228** students and residents have earned the IHI Open School Basic Certificate in Quality & Safety.
- **874** Chapters have been started in **89** countries.
- More than **1,000** organizations (academic and professional) around the world use the Open School as part of their training programs. Some use the entire course catalog, while others choose specific courses to meet their immediate needs.

One of the biggest challenges has been expanding the Open School beyond English-speaking audiences. While several courses have been translated into Spanish, Portuguese, and French, several groups and organizations from around the world have requested translated materials and local examples to improve the learning. Constrained resources, inability to provide adequate customer service to non-English-speaking customers, and concerns about branding and the integrity of the content are current challenges to further translation of Open School courses.

What's Next

The Open School has set an audacious goal to reach 1 million students and residents by 2020. "The Open School is considering new ways to activate our audience and catalyze action around urgent health challenges, such as campaigns that tackle the opioid crisis, focus on obesity, or improve health equity for all," Strang says.

The Open School is considering new ways to teach the content beyond asynchronous and semi-synchronous online courses. In continuous conversation with the students and professionals it serves, the Open School is always experimenting to learn the best way to deliver practical, useful content about improvement science and safety within exceedingly busy health professional schedules.

Where to Learn More

IHI Open School website. http://www.ihi.org/OpenSchool

Innovation at a Glance:
A Framework for Achieving Health Equity

What It Is

In its work with health care organizations seeking to improve health equity, IHI uses an approach that considers the multiple determinants of health, as reflected in the framework published in the 2016 IHI White Paper, *Achieving Health Equity*, and described below. Most health systems are designed to produce inequitable outcomes. Any organization that wants to improve health equity must be prepared to fundamentally change the current system that is producing disparities in health outcomes.

Based on months of research, IHI developed a framework with five core ideas for making health equity a system property. For those health care organizations that are ready to begin or accelerate their work to improve health equity, this framework serves as a guide.

IHI Framework for Achieving Health Equity

1. Make health equity a strategic priority	• Demonstrate leadership commitment to improving equity at all levels of the organization • Secure sustainable funding through new payment models
2. Develop structure and processes to support health equity work	• Establish a governance committee to oversee and manage equity work across the organization • Dedicate resources in the budget to support equity work
3. Deploy specific strategies to address the multiple determinants of health on which health care organizations can have a direct impact	• Health care services • Socioeconomic status • Physical environment • Healthy behaviors
4. Decrease institutional racism within the organization	• Physical space: Buildings and design • Health insurance plans accepted by the organization • Reduce implicit bias within organizational policies, structures, and norms, and in patient care
5. Develop partnerships with community organizations	• Leverage community assets to work together on community issues related to improving health and equity

How It Started

In 2015, IHI began studying 23 health systems (21 located throughout the US and two in Canada) that have taken a comprehensive approach to improving health equity. These systems ranged from academic institutions to community hospitals, both for-profit and not-for-profit; five were safety-net health systems and two were children's hospitals.

"That same year, we brought equity experts together and asked them, 'Does IHI have a role to play in equity?' They told us, 'Yes, you do,'" says Amy Reid, MPH, a Director and leader of IHI's health equity work. "They told us to create a sense of urgency, to get people together, to create practical tools."

Reid also served for three years as a co-chair of IHI's Diversity and Inclusion Council, which IHI's Board of Directors urged IHI to form in 2011 to advance its internal equity goals. The Council is now called Reaching for Inclusion, Social Justice, and Equity (RISE).

How It Evolved

After the release of the *Achieving Health Equity* IHI White Paper in 2016, IHI launched a two-year initiative called Pursuing Equity, with the aim to reduce inequities in health and health care access, treatment, and outcomes. The white paper and the framework above are serving as foundations for the work. In April 2017, eight health care organizations — diverse in size, geography, and patient populations served — began working with IHI and learning from one another as part of this initiative.

"The idea was that we have this initial theory [i.e., the framework described in the IHI White Paper] — what it was going to take for health care to make an impact in equity — and we wanted a small group of systems that are already committed, at the cutting edge, and want to push on the role of health care in pursuing equity," says Reid. "We can all learn from each other, test some new ideas, and, at the end of these two years, we want an updated theory on what it takes for health care to improve equity."

At the same time, IHI is advancing its internal equity strategy. "A main connection is this idea that we have to be willing to have tough conversations and willing to be uncomfortable in order to create more equitable systems," says Reid. "There's no other way to do it."

Successes and Challenges

In terms of successes, Reid points out that the Pursuing Equity initiative is already generating some creative testing. "We already have some specific, actionable things that health care can do to advance equity — across the five pillars of our theory," she says. "That's been the main success so far." For example:

- One team looked at their hiring practices, noted 60 open positions, and wondered why the surrounding community couldn't fill those jobs. They identified that applicants needed a CNA 2 certification, which was cost prohibitive. They set about lowering the barrier to employment, testing whether CNA 1 certification plus five years of experience could help fill the positions.
- Another team is partnering with the Lyft transportation service to remove one barrier (transportation to medical appointments) that exists for patients within their community.

"In terms of challenges, it's the existing structural and institutional racism," Reid says. "It's a challenge because this work involves so many difficult, emotionally charged conversations. And that the work doesn't stop at having conversations. What can we change about our systems, structures, norms, policies, and regulations to undo barriers within these systems that we didn't intend to set up? The only way to do this work is to go through it."

What's Next

The Pursuing Equity initiative hopes to break new ground by explicitly addressing institutional racism, and by identifying ways health care organizations can impact equity in areas like employee wellness and social determinants of health, in addition to reducing clinical disparities at the point of care.

"We've started with this group of eight health systems and ultimately we want to set the direction, to show what's possible, to the rest of health care in the US," says Reid. "We want to move to 100, then to 500, then to thousands. To reach our mission and achieve our vision, we have to pursue equity. We're in this for the long haul."

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Innovation at a Glance:
Continuous Value Management

What It Is

In 2016, IHI partnered with the Scottish National Health Service (NHS) to design and test a new approach to manage and improve cost and quality, together, at the point of care. Adapted from a set of methods known as "Lean Accounting," this approach to continuous value management brings together three fundamental concepts: a simplified and timely method to understand quality, costs, and workforce capacity (i.e., a "box score"); a visual management system to understand and react to these data over time; and a management approach that ensures timely action in response to this analysis, including weekly huddles in front of the visual management system.

"This approach makes the problems very, very clear. It crystallizes the things managers may have been vaguely worried about for years," says Jeff Rakover, Senior Research Associate at IHI. "It's not a silver bullet; the work will always be hard. But the tools clarify where to put your attention."

The combination of visual management, including the box score (see example below), and the management approach that integrates the tools into daily work engages the local team in continuously tracking performance and implementing improvements to reduce costs and increase quality.

Value Management Box Score

			METRIC	WEEK 1	WEEK 2	WEEK 3	WEEK 4
	Performance Measures		% On-time Discharges	38%	41%	42%	45%
			Average Number of Discharges per Day	2.87	2.96	3.27	3.34
			28-day Readmission Rate	9.4%	9.7%	9.2%	8.9%
			Patient Satisfaction (1-5 scale)	4.4	4.5	4.6	4.6
			Pressure Ulcers (raw numbers)	1	1	0	0
			Falls (raw numbers)	0	1	1	0
	Staff Capacity	Day	Direct Care	46%	45%	47%	48%
			Indirect Care	38%	36%	38%	39%
			Available Time %	16%	19%	15%	13%
		Night	Direct Care	38%	36%	40%	39%
			Indirect Care	39%	36%	35%	32%
			Available Time %	23%	28%	25%	29%
	Financial Measures		Medical Staff	$20,284	$20,111	$19,383	$19,320
			Establishment Nursing Staff	$24,445	$22,110	$21,850	$20,998
			Bank Nursing Staff	$2,667	$2,724	$2,525	$2,694
			Drugs	$9,200	$8,998	$8,527	$8,656
			Surgical Supplies	$2,417	$2,822	$2,010	$2,045
			Other	$1,376	$1,212	$1,568	$1,445
			Total COSTS	$60,389	$57,977	$55,863	$55,158
			Costs per patient seen	$3,005.92	$2,798.12	$2,440.50	$2,359.20

How It Started

In 2015, IHI interviewed 13 system leaders from institutions such as UCLA Health, Yale New Haven Health System, Bellin Health, Johns Hopkins University, and Intermountain Healthcare to understand their approaches to value improvement — especially with respect to cost. Reflecting on the experiences of its research partners and learning from the 2016 IHI White Paper, *Sustaining Improvement*, IHI then partnered with Lean consultant Brian Maskell to introduce Lean Accounting into health care. "This work helps demonstrate the close relationship between the improvement methods IHI has used for years and the Lean methods many health care organizations use," says Rakover. "They are really the same set of ideas, expressed in different ways."

How It Evolved

In 2016, Highlands Regional Board CEO, Elaine Mead, invited IHI to test the methods at its largest hospital, Raigmore Regional Hospital, in Inverness, Scotland. Mead and her director of finance, Nick Kenton, identified the Respiratory ward for initial testing. That testing yielded seven key steps necessary to implement the value-driven methodology:

- Step 1: Select the relevant "value stream" or unit.
- Step 2: Assemble a multidisciplinary team.
- Step 3: Develop a set of frontline performance measures that align with the organization's strategic goals.
- Step 4: Conduct staff capacity and financial analysis.
- Step 5: Compile the box score and visual management board.
- Step 6: Adopt a management approach to value improvement, including huddles at multiple management levels.
- Step 7: Spread the method and maintain the gains.

IHI has subsequently helped Raigmore spread the continuous value management method to four cardiac units.

Successes and Challenges

Early results from Raigmore's Respiratory ward include:

- 15.1 percent weekly cost savings per patient seen;
- Primary categories of waste reduction include staff (focused on per diem nursing), drugs, and other surgical "sundries" (consumable costs); and
- Additional cost reduction opportunities, including an improvement project to reduce spending on bank nursing (per diem) and an exploration of weekly readmission rates.

The cardiac value stream has seen similar results, including hundreds of pounds (Sterling) in savings from reduced waste in drugs and supplies.

In terms of challenges for the continuous value management approach:

- This method requires strong engagement from senior leaders, since it represents a radical change in how point-of-care teams are managed.
- Teams must have strong improvement capability knowledge and skills, since the method relies on continuous and iterative Plan-Do-Study-Act (PDSA) cycles.

"The approach is quite disruptive — it has a positive dimension and a challenging dimension," says Rakover. "The positive is that this creates transparency, a weekly rhythm of measuring what matters and problem solving that links to measurement. But for a hospital that's used to working a certain way, this is really threatening. Now the data, the problems, are there for everyone to see so it's clear when something has to change."

What's Next

Buoyed by early successes, IHI plans to expand the scope of ongoing work at Raigmore — and with other health systems around the world. The continuous value management methods tested in the Scotland NHS have created sustainable systems that engage clinical staff and could help other health care organizations' work to deliver better value. At Raigmore, frontline staff feel a new sense of empowerment since the introduction of this approach. According to senior charge nurse Kay Cordiner, "Without the value improvement system and these processes, I would never have had a clear understanding of how money is spent or an opportunity to do anything about it. We need to remember how amazing and revolutionary this is!"

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