In Brief

Based on a collaborative approach, the Breakthrough Series model described in this article is reaping results worldwide, as organizations use it to improve how they deliver care to patients.

The Breakthrough Series: IHI's Collaborative Model for Achieving Breakthrough Improvement

Institute for Healthcare Improvement

The Institute for Healthcare Improvement (IHI) seeks to improve health care by supporting change. One of the major ways IHI does this is via collaborative learning—specifically, using a model for achieving breakthrough improvement that it innovated in 1995 and has been continuously improving ever since, called the Breakthrough Series (BTS).

In American health care, the consequences of low quality are severe: high costs (40% higher than in the next most expensive nation); injuries to patients (between 40,000 and 100,000 Americans die in hospitals each year because of errors in their care); unscientific care (almost half of all clinically correct care is missing, based on reviews of patient records); and poor service.

IHI developed the BTS to help health care organizations make breakthrough improvements in quality while reducing costs. The driving vision behind the series is this: sound science exists on the basis of which the costs and outcomes of current health care practices can be greatly improved, but much of this science lies fallow and unused in daily work. In other words, there is a gap between what we *know* and what we *do*.

The BTS is designed to help organizations close that gap by creating a structure in which interested organizations can easily learn from each other and from recognized experts in topic areas in which they want to make improvements. A BTS Collaborative is a short-term (6- to 15-month) learning system that brings together a large number of teams from hospitals or clinics to seek improvement in a focused topic area. Since 1995, IHI has sponsored more than 50 such collaborative projects on several dozen topics involving more than 2,000 teams from 1,000 health care organizations.

Collaboratives range in size from 12 to 160 teams. Each team typically sends three of its members to attend "learning sessions" (three face-to-face meetings over the course of the collaborative), with additional members working on improvements in the local organization. Teams in such collaboratives have achieved dramatic results, including reducing waiting times by 50%, reducing worker absenteeism by 25%, reducing intensive care unit costs by 25%, and reducing hospitalizations for patients with congestive heart failure by 50%. In addition, IHI has trained more than 650 people in BTS methodology, thus spawning hundreds of collaborative initiatives throughout the health care world, sponsored by organizations other than IHI.

The Birth of the BTS: A Sketch on a Napkin

The BTS was conceptualized in late 1994 when one of IHI's founders, Paul Batalden, MD, sketched the model on a napkin at a meeting of

IHI's Group Practice Improvement Network and handed it to IHI Chief Operating Officer Don Berwick, MD. Batalden and Berwick were seeking ways to accelerate improvement in health care beyond what IHI had achieved using traditional educational approaches.

Since its inception in 1991, IHI had been successful in training thousands of people from hundreds of health care organizations in the fundamentals of improving quality. Berwick, Batalden, and the IHI Board of Directors were eager to move to the next level: to provide a structure for learning and action that would engage organizations in making real, system-level changes that would lead to dramatic improvements in care.

The key to their thinking was to combine subject matter experts in specific clinical areas with application experts who could help organizations select, test, and implement changes on the front lines of care. Moreover, they knew that breakthrough change could not happen in a traditional didactic setting; instead, organizations would commit to working over a period of 6–15 months, alternating between learning sessions, in which teams from all participating organizations would come together to learn about the chosen topic and plan changes, and "action periods," in which the teams would return to their organizations and test those changes in clinical settings.

From this simple sketch, the BTS quickly began to take shape. IHI began by surveying and interviewing national clinical, policy, and administrative leaders to identify a list of specific areas that were ripe for improvement based on the following three criteria:

1. Current prevailing practice deviated from the best scientific knowledge.
2. Improvements would produce clearly positive results by reducing costs and improving quality.
3. The possibility of breakthrough improvement had been demonstrated by at least some "sentinel" organizations.

Based on these standards, along with an agenda of "Eleven Worthy Aims for Clinical Leadership of Health System Reform" recommended by Berwick,[1] IHI selected the initial 10 topics for the BTS: cesarean section rates, physician prescribing practices, adult intensive care, neonatal intensive care, adult cardiac surgery, asthma care, adverse drug events, inventory levels and supplier management, low back pain, and delays and wait times in patient care.

The First Collaboratives

By fall of 1996, 28 health care organizations had joined IHI's collaborative to reduce cesarean section rates, 12 had joined an outpatient asthma care collaborative, and 23 had entered into a collaborative to reduce delays and wait times. Each organization made a commitment to participate for the duration of the collaborative, sending a team of at least three people to attend three 2-day learning sessions.

Each learning session provided guidance and instruction in the theory and practice of improving performance in the collaborative's specific topic area and functioned as a milestone along each organization's own individual path to improvement—with each team reporting on their methods and results, collectively reflecting on lessons learned, and providing social support and encouragement for making further changes. Participants received the benefit of direct access to each other and to senior experts in the field at these meetings, as well as through regular conference calls, Internet dialogue, frequent written updates, and on-site mentoring visits.

Initial Results

The aim of the first collaborative, chaired by Bruce Flamm, MD, was ambitious: reduce cesarean section rates by 30% or more within 12 months. The results were encouraging: within 12 months, 15% of the organizations reduced their cesarean section rates by 25% or more, and 50% of the organizations achieved reductions of 10–25%.

The second collaborative, on reducing delays and wait times, chaired by Tom Nolan, PhD, also set a stretch goal: reduce delays and waiting times by 50% within 12 months. One organization, Sewickley Valley Hospital in Sewickley, Pa., began in June 1995 with a median delay of 55 minutes for operation start times for patients scheduled for surgery. By June 1996, Sewickley reduced that delay to 25 minutes. In August 1995, another organization in the collaborative, MetroHealth in Indianapolis, Ind., had been offering a routine pediatric appointment within 7 days to only 42% of patients. By November 1995, that figure had reached 100%—and remained there.

The asthma care collaborative, chaired by Kevin Weiss, MD, MPH, and Guillermo Mendoza, MD, set aims in several areas, including reducing hospital admissions for asthma, reducing repeat hospitalizations by 100% over a 12-month period, reducing pediatric admissions to the emergency department to < 10%, and reducing hospital lengths of stay from 3.5 to 2 days or less. Sample results from this collaborative include the following:

- From September 1995 to September 1996, the Mayo Clinic in Rochester, Minn., reduced the percentage of asthma patients who used the emergency department and urgent care center by 22%;
- From October 1995 to December 1996, Blue Cross and Blue Shield of Massachusetts, Medical West Associates in Springfield, Mass., increased the percentage of asthma patients receiving prescriptions for anti-inflammatory inhalers from 30 to 58%; and
- From December 1995 to November 1996, HealthEast in St. Paul, Minn., reduced the number of patients treated in the emergency department (ED) for asthma who then returned to the ED within 7 days for additional treatment by 50% from the previous year.

Key Elements of the BTS

After testing the BTS model (Figure 1) in the first three collaboratives, IHI had the key elements in place. These elements have remained fundamentally unchanged, even as the model has been continuously refined as hundreds of organizations around the world have participated in collaboratives.

Key elements of the BTS include the following:

1. Topic selection. IHI leaders identify a particular area or issue in health care that is ripe for improvement based on three criteria: *1*) existing knowledge is sound but not widely used; *2*) better results have been demonstrated in real-world settings; and *3*) current defect rates affect many patients somewhat, or at least a few patients profoundly.

2. Faculty recruitment. IHI identifies five to fifteen experts in the relevant disciplines, including international subject matter experts and application experts, individual clinicians who have demonstrated breakthrough per-

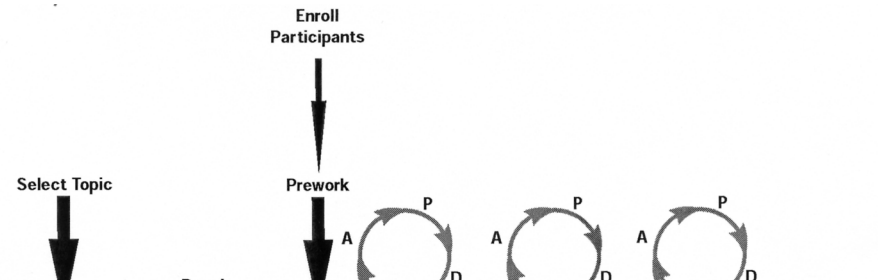

Figure 1. Institute for Healthcare Improvement BTS model.

formance in their own practice. One expert is asked to chair the collaborative and is responsible for establishing the vision of a new system of care, providing faculty leadership, and teaching and coaching the participating teams.

Typically, chairs devote one or two days per week for the duration of the collaborative. The chair and expert faculty assist IHI in creating the specific content for the collaborative, including appropriate aims, measurement strategies, and a list of evidence-based changes. An "improvement advisor" teaches and coaches teams on improvement methods and how to apply them in local settings.

3. Enrollment of participating organizations and teams. Organizations elect to join a collaborative through an application process, appoint multidisciplinary teams within the organization charged to learn from the collaborative process, conduct small-scale tests of change, and help successful changes become standard practices. Senior leaders from participating organizations are expected to guide, support, and encourage the improvement teams and to bear responsibility for the sustainability of the teams' effective changes. To help teams prepare for the start of the collaborative, IHI conducts pre-work conference calls to clarify the collaborative processes, roles, and expectations of organization leaders and team members. IHI traditionally accepts all applicants who agree to commit to these expectations.

4. Learning sessions. Traditional learning sessions are face-to-face meetings. Usually three such meetings are conducted during a typical collaborative, bringing together multidisciplinary teams from each organization and the expert faculty to exchange ideas. At the first learning session, expert faculty present a vision for ideal care in the topic area and specific changes, called a "change package," which, when applied locally, will significantly improve the system's performance. Teams learn from an improvement advisor the "Model for Improvement" (described below) that enables teams to test these powerful change ideas locally, and then reflect, learn, and refine these tests. At the second and third learning sessions, team members learn even more from each other as they report on successes, barriers, and lessons learned in general sessions, workshops, storyboard presentations, and informal dialogue and exchange. Formal academic knowledge is bolstered by the practical voices of peers who can say, "I had the same problem; let me tell you how I solved it."

5. Action periods. During action periods between the learning sessions, teams test and implement changes in their local settings and collect data to measure the impact of those changes. They submit monthly progress reports for the entire collaborative to review and are supported by conference calls, peer site visits, and Web-based discussions that enable them to share information and learn from national experts and other health care organizations. The aim is to build collaboration and support the organizations as they try out new ideas, even at a distance.

6. The Model for Improvement. To apply changes in their local settings, collaborative participants learn an approach for organizing and carrying out their improvement work, called the Model for Improvement (Figure 2). This model, developed by Langley et al.,[2] identifies four key elements of successful process improvement: specific and measurable aims, measures of improvement that are tracked over time, key changes that will result in the desired improvement, and a series of testing "cycles," during which teams learn how to apply key change ideas to their own organizations.

The Model for Improvement requires collaborative teams to ask three questions:

1. What are we trying to accomplish (aim)? Here, participants determine which specific outcomes they are trying to change through their work.
2. How will we know that a change is an improvement (measures)? Here, team members identify appropriate measures to track their success.
3. What changes can we make that will result in improvement (changes)? Here, teams identify key changes that they will actually test.

Key changes are then implemented in a cyclical fashion: teams thoroughly *plan* to test the change, taking into account cultural and organizational characteristics. They *do* the work to make the change in their standard procedures, tracking their progress using quantitative measures. They closely *study* the results of their work for insight on how to do better. And, they *act* to make the successful changes permanent or to adjust the

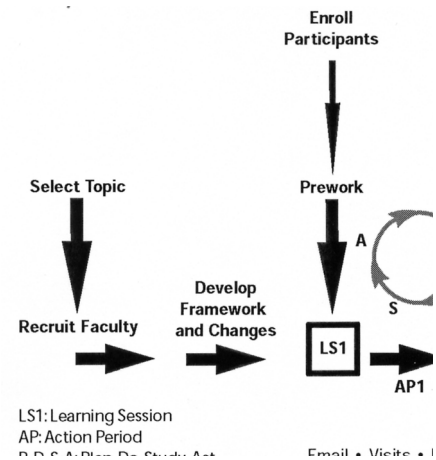

Figure 2. The Model for Improvement.

changes that need more work. This process continues serially over time, and refinement is added with each cycle. These cycles are known as "plan-do-study-act" (PDSA) cycles of learning (Figure 3).

7. Summative congresses and publications. Once the collaborative is complete, the work is documented, and teams present their results and lessons learned to individuals from nonparticipating organizations at national and international conferences and meetings.

8. Measurement and evaluation. Collaboratives involve regular measurement and assessment. All teams are required to maintain run charts tracking their system measures over time. Key faculty members review each team's monthly report to assess the overall progress of the collaborative.

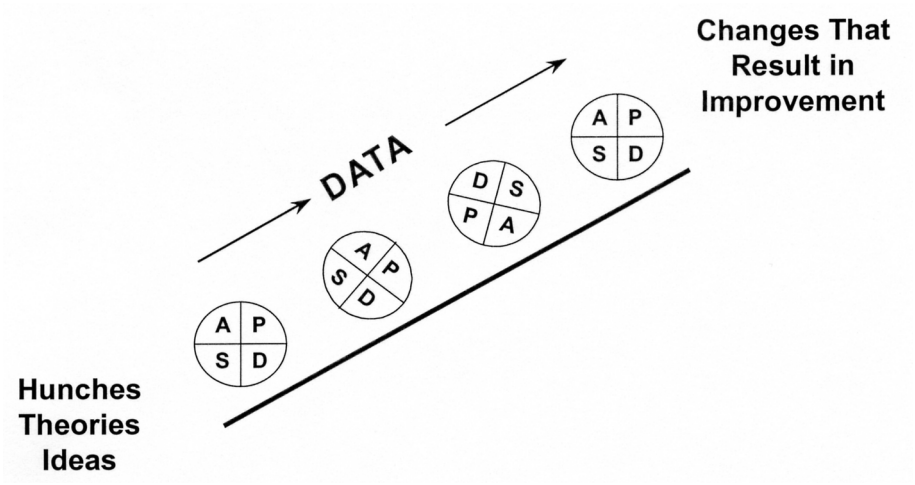

Figure 3. Multiple PDSA cycles result in improvement.

Evolution and Spread of the BTS Model

The BTS model has been continuously refined, as more and more organizations have participated in collaboratives, to accelerate participant teams' progress and help them achieve better outcomes. Key modifications to the model include the following:

- First, IHI enhanced the collaborative pre-work by asking participants to do more work to prepare for the first learning session. This way, the work starts before the first learning session, and teams come prepared with strong aims, some baseline data, the elements of a measurement system, and the right team members.
- Next, IHI began to prioritize the change package according to which changes were the most effective in producing results. This prioritization helped teams select and try changes that would lead to the best results.
- IHI realized that senior leaders of the organizations needed to be even more engaged to eliminate some of the barriers teams were facing institutionally. IHI began to periodically write to these leaders, sharing results and inviting them to attend learning sessions. At the same time, IHI taught teams how to communicate effectively with their senior leaders about improvement.
- In some cases, especially when repeating work on a topic for the second or third time, IHI reduced the length of the collaborative. Shortening the time by 3 months or more helped to accelerate the pace. Setting monthly targets for team progress and tracking this progress visibly was also key to keeping focus, pace, and peer pressure. Today, teams continue to present monthly reports, which have evolved from pages of process description to a single, pithy one-page summary of the team's aim, measures (run charts), changes, and results.

Breakthrough Improvement in Chronic Care: Combining Two Models

In 1998, IHI embarked on a collaboration to improve chronic care by incorporating a model for delivering chronic illness care developed by Ed Wagner, MD, MPH, Director of the MacColl Institute for Healthcare Innovation at Group Health Cooperative in Seattle, Wash., and his colleagues with support from the Robert Wood Johnson Foundation. Combining IHI's BTS methodology and Wagner's Chronic Care Model (CCM),[3,4] which is described in this issue (p. 92), led to the initiation of a series of collaboratives focused on an evidence-based change package that addressed major areas of chronic illness care.

The synergy between the BTS methodology and the CCM was immediately apparent, as evidenced by dramatic results. One organization, La Clinica Campesina, a community-based health center with three locations in Colorado and 15,000 medically underserved patients, reduced their diabetic patients' hemoglobin A_{1c} (A1C) results from an average of 10.5 to 8.5%. In IHI's second chronic care collaborative, Christus Shumpert Health System in Shreveport, La., decreased hospital admissions in the pilot group of patients with congestive heart failure by 50% and increased to 90% the rate of patients self-monitoring their weight, diet, medications, and activities.

The BTS College

Many organizations have expressed interest in using the BTS approach to improve care in their health care system or local setting. To meet this demand, IHI now offers the BTS College to train individuals and organizations how to run their own collaboratives. More than 650 individuals from more than 150 organizations have graduated from the College and are now running their own local collaboratives. The local collaboratives produce even more lessons on creating successful improvement, and learning from these has allowed IHI to continue to improve the BTS model.

The IMPACT of the BTS

In 2002, IHI formed IMPACT, a network of organizations that work together to achieve unprecedented levels of performance and bring about systemic change. IMPACT participants work in collaboration, using the same methods as the BTS, but for an indefinite period of time, in multiple topic areas, and with built-in senior leadership involvement. This structure is designed to promote not only breakthrough improvement in specific areas, but also the capacity to transform an entire organization.

Results from the BTS: A Sampler

The BTS methodology, combined with the philosophy of "all teach, all learn," has led to impressive results in several large health care systems in the United States, Canada, and Europe,

and has now been adopted and locally improved by many organizations beyond the IHI. The following sample results are representative of hundreds more like them:

- In 1999, the Bureau of Primary Health Care (BPHC) sponsored a series of Health Disparities Collaboratives (described in this issue on articles starting on p. 102 and p. 107) to eliminate health disparities for 12 million underserved Americans. At the end of the first collaborative on diabetes care, the number of patients meeting the national goal of two A1C tests per year was 300% of what it was before the collaboratives. By January 2001, more than 30,000 patients were enrolled in active care registries.
- The Veterans Health Administration (VHA) reduced waiting times in primary care clinics by 53%, from 60.4 to 28.2 days. As the United States' largest integrated delivery system, caring for more than 6 million patients, the VHA continued to work with IHI to spread "advanced access" to health services across its entire system. From July 2002 to October 2003, the total number of veterans waiting has decreased from more than 300,000 to less than 50,000.
- OSF Healthcare, with six hospitals in Illinois and Michigan, reduced adverse drug events from four to less than one per 1,000 doses.
- Nash Health Care Systems in North Carolina reduced the average number of days on a ventilator by 34% and the average length of hospital stay by 25% for ventilator patients. Cases of ventilator-associated pneumonia dropped by more than 50% during the collaborative. Patients in the protocol group averaged more than $35,000 in savings in hospital charges, compared to patients in the baseline group.
- In 2000, the United Kingdom's National Health Service (NHS) launched its National Primary Care Collaborative—now perhaps the world's largest health care improvement project. Encompassing nearly 2,000 practices nationwide and covering almost 18.2 million patients, the collaborative has helped to reduce by an average of 60% the waiting time for an appointment with a general practitioner, a time savings amounting to more than 400 patient-years.
- Partners in Health (PIH), a nonprofit organization based in Boston, Mass., has adapted the BTS model to improve care for people in poor and developing nations. In Peru, where 9 of 10 people with tuberculosis die, PIH's patients are seeing an 80% cure rate. The program's success persuaded the World Health Organization to add medicines for this disease to their list of essential drugs.

What Lies Ahead

Since 1995, thousands of patients have reaped the benefits of the BTS and similar collaborative improvement approaches. Asthma patients who receive their health care at community health centers in the United States can maintain their health at home instead of visiting the emergency room or the hospital. More cardiac patients in Sweden are alive and enjoying a higher quality of life. Cancer patients in England are able to see their doctors sooner, increasing the likelihood of early detection. People with diabetes experience better control of their disease, thus preventing debilitating and sometimes fatal complications. Patients in intensive care units are going home sooner and healthier. And the list goes on.

The health care community is hungry for ways to improve patient care. The BTS offers a framework for bringing about dramatic and lasting change. The rapid spread of the BTS model has shown that health care organizations around the world will avidly embrace effective methods for improving all aspects of their patients' care. Their results prove that it is indeed possible to overcome barriers and dramatically improve the delivery of health care—everywhere.

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Additional Suggested Readings

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The Institute for Healthcare Improvement is a non-profit quality improvement organization based in Boston, Mass.