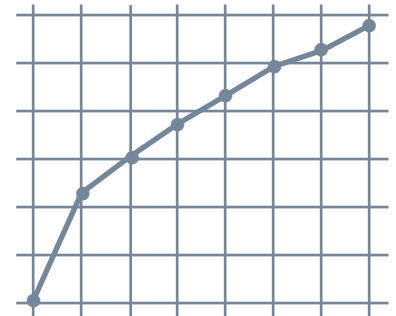


Innovation Series 2003



The Breakthrough Series

IHI's Collaborative Model for Achieving Breakthrough Improvement

We have developed IHI's Innovation Series white papers to further our mission of improving the quality and value of health care. The ideas and findings in these white papers represent innovative work by organizations affiliated with IHI. Our white papers are designed to share with readers the problems IHI is working to address; the ideas, changes, and methods we are developing and testing to help organizations make breakthrough improvements; and early results where they exist.

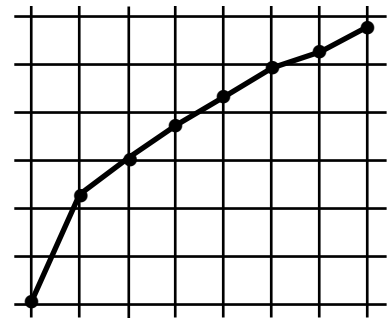
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Innovation Series 2003



The Breakthrough Series

IHI's Collaborative Model for Achieving Breakthrough Improvement

Executive Summary

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

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

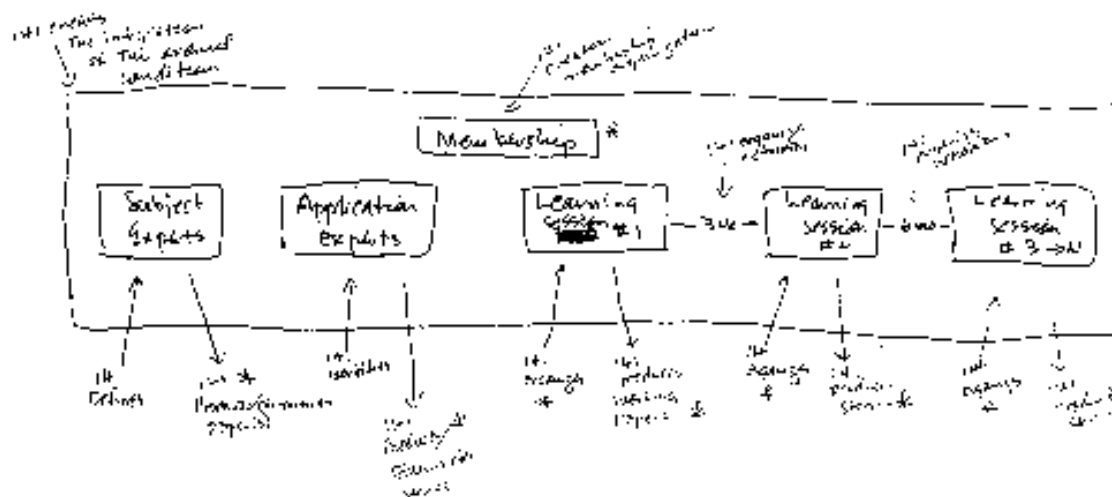
The Institute for Healthcare Improvement developed the Breakthrough Series to help health care organizations make “breakthrough” improvements in quality while reducing costs. The driving vision behind the Breakthrough Series is this: sound science exists on the basis of which the costs and outcomes of current health care practices can be greatly improved, but much of this science lies fallow and unused in daily work. There is a gap between what we know and what we do.

The Breakthrough Series 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 where they want to make improvements. A Breakthrough Series 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 over 50 such Collaborative projects on several dozen topics involving over 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 percent, reducing worker absenteeism by 25 percent, reducing ICU costs by 25 percent, and reducing hospitalizations for patients with congestive heart failure by 50 percent. In addition, IHI has trained over 650 people in the Breakthrough Series methodology, thus spawning hundreds of Collaborative initiatives throughout the health care world, sponsored by organizations other than IHI.

The Birth of the Breakthrough Series: A Sketch on a Napkin

The Breakthrough Series was conceptualized in late 1994 when one of IHI's founders, Paul Batalden, MD, sketched the model (Figure 1) on a napkin at a meeting of IHI's Group Practice Improvement Network and handed it to IHI's CEO, 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 Board of IHI 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.

Figure 1. Sketch of the Breakthrough Series Model by Paul Batalden, MD (1994)



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 couldn't happen in a traditional didactic setting; instead, organizations would commit to working over a period of 6 to 15 months, alternating between Learning Sessions in which teams from all participating organizations would come together to learn about the chosen topic and to 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 Breakthrough Series quickly began to take shape. IHI began by surveying and interviewing national clinical, policy, and administrative leaders to identify a list of specific areas “ripe for improvement,” based on the following criteria:

- Current prevailing practice deviates from the best scientific knowledge;
- Improvements would produce clearly positive results by reducing costs and improving quality; and
- 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 (JAMA, September 1994), IHI selected the initial ten topics for the Breakthrough Series:

- Cesarean Section Rates
- Physician Prescribing Practices
- Adult Intensive Care
- Neonatal Intensive Care
- Adult Cardiac Surgery
- Asthma Care
- Low Back Pain
- Adverse Drug Events
- Inventory Levels and Supplier Management
- Reducing Delays and Wait Times

The First Breakthrough Series Collaboratives

By the 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 persons to attend three two-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 senior experts in the field at these meetings, as well as through regular conference calls, online 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 percent or more within 12 months. The results were encouraging: within 12 months, 15 percent of the organizations reduced their cesarean section rates by 25 percent or more, and 50 percent of the organizations achieved reductions of 10 to 25 percent.

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 percent within 12 months. One organization, Sewickley Valley Hospital in Sewickley, Pennsylvania, 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, Indiana, had been offering a routine pediatric appointment within seven days to only 42 percent of patients. By November 1995, that percentage had reached 100—and remained there.

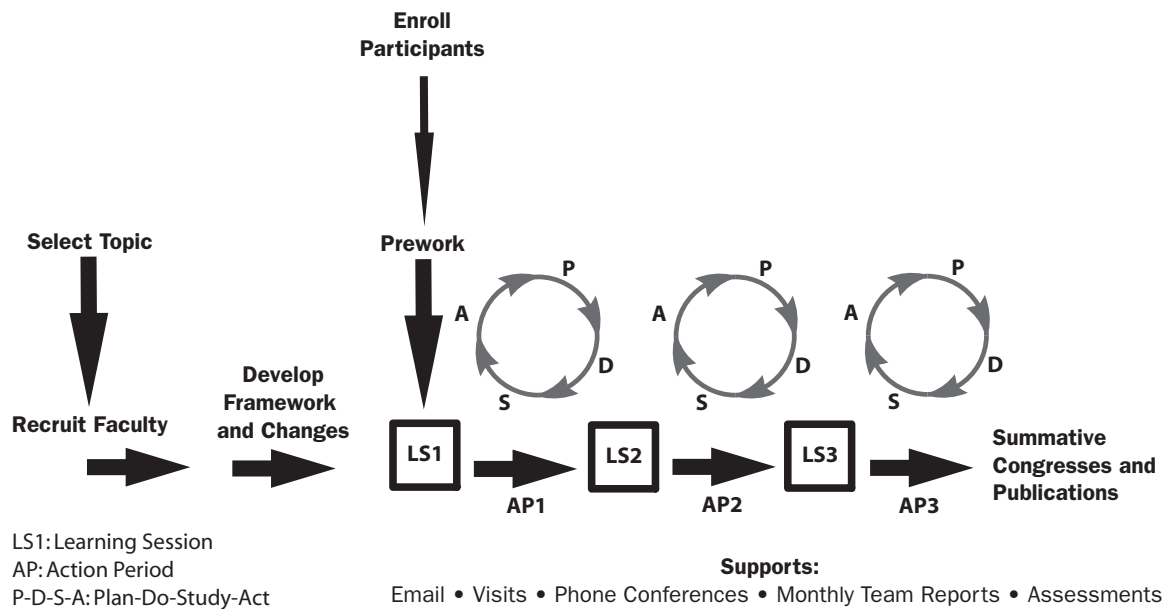
The Asthma Care Collaborative, chaired by Drs. Kevin Weiss and Guillermo Mendoza, set aims in several areas, including reducing hospital admissions for asthma, reducing repeat hospitalizations by 100 percent over a 12-month period, reducing pediatric admissions to the emergency department to less than 10 percent, and reducing hospital length of stay from 3.5 days to 2 days or less. Sample results from this Collaborative include the following:

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

Key Elements of the Breakthrough Series

After testing the Breakthrough Series model (Figure 2) 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.

Figure 2. Breakthrough Series Model



Key elements of the Breakthrough Series include the following:

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

Faculty Recruitment: IHI identifies 5 to 15 experts in the relevant disciplines, including international subject matter experts as well as application experts, individual clinicians who have demonstrated breakthrough performance 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 the 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.

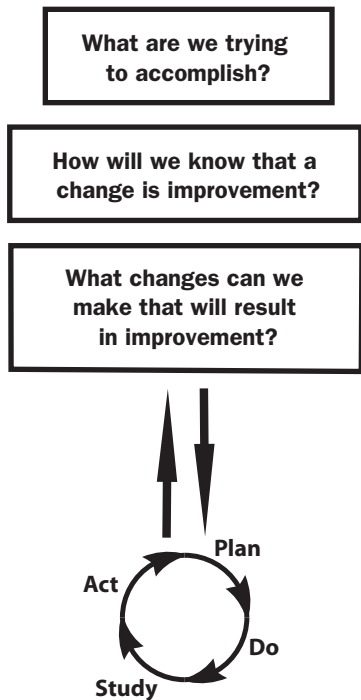
Enrollment of Participating Organizations and Teams: Organizations elect to join a Collaborative through an application process, appointing multidisciplinary teams within the organization charged to learn from the Collaborative process, conduct small-scale tests of change, and help successful changes 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 prework 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.

Learning Sessions: Traditional Learning Sessions are face-to-face meetings, usually three of which 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, that when applied locally will improve significantly 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 one another 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."

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 the 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.

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 3). This model, developed by Associates in Process Improvement (*The Improvement Guide*, Jossey-Bass, 1996), 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.

Figure 3. Model for Improvement

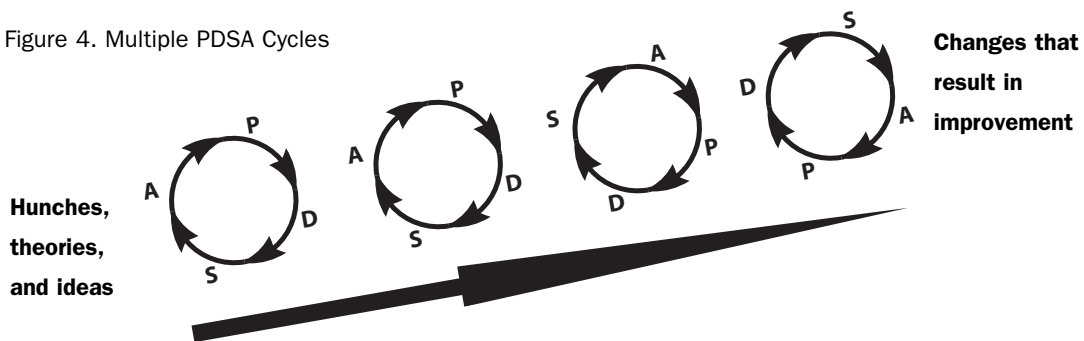


The Model for Improvement requires Collaborative teams to ask three questions:

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 changes that need more work. This process continues serially over time and refinement is added with each cycle; these are known as “Plan-Do-Study-Act” (PDSA) cycles of learning (Figure 4).

Figure 4. Multiple PDSA Cycles



Summative Congresses and Publications: Once the Collaborative is complete, the work is documented and teams present their results and lessons learned to individuals from non-participating organizations at national and international conferences and meetings.

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

Evolution and Spread of the Breakthrough Series Model

The Breakthrough Series 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 prework 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 three 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 summarization 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 the Group Health Cooperative of Puget Sound, and colleagues with support from The Robert Wood Johnson Foundation. Combining IHI's Breakthrough Series methodology and Wagner's Chronic Care Model 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 Breakthrough Series methodology and the Chronic Care Model was immediately apparent, as evidenced by dramatic results. One organization, La Clinica Campesina, a community-based health center with three locations in Colorado that has 15,000 medically underserved patients, reduced their diabetic patients' HbA1c levels from an average of 10.5 to 8.5. In IHI's second Chronic Care Collaborative, Christus Shumpert Health System in Shreveport, Louisiana, decreased hospital admissions in the pilot group of patients with congestive heart failure (CHF) by 50 percent and increased to 90 percent the rate of patients self-monitoring their weight, diet, medications, and activities.

The Breakthrough Series College

Many organizations have expressed interest in using the Breakthrough Series approach to improve care in their health care system or local setting. To meet this demand, IHI now offers the Breakthrough Series College to train individuals and organizations how to run their own Collaboratives. Over 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 Breakthrough Series model.

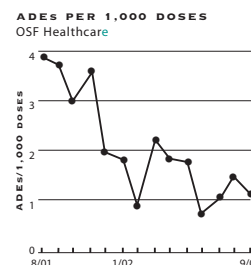
The IMPACT of the Breakthrough Series

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 Breakthrough Series, 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 Breakthrough Series: A Sampler

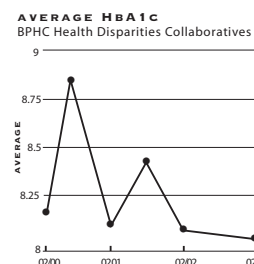
The Breakthrough Series methodology, combined with the philosophy of “All Teach, All Learn,” has led to impressive results in several large health care systems in the US, Canada, and Europe, and has now been adopted and locally improved by many organizations beyond the IHI. These sample results are representative of hundreds more like them:

- Quantum Leaps in Patient Safety, 2001: OSF Healthcare, with six hospitals in Illinois and Michigan, reduced adverse drug events (ADEs) from four ADEs per 1,000 doses to less than one.

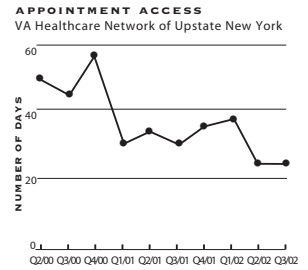


- In 1998, the Health Committee of the United States—Russian Federation Joint Commission for Economic and Technological Cooperation decided to embark on a joint project entitled “Quality Assurance Project—Russia.” Based on the Breakthrough Series model, the Project is successfully tackling the issue of scale-up, spreading improvements from a few pilot sites to 40 to 300 sites covering a population of about two million people. The scale-up focused on improving care for women with pregnancy-induced hypertension, children with neonatal respiratory distress syndrome, and patients with arterial hypertension. The Project is presently managing five Collaboratives covering 16 clinical areas in 23 administrative territories of the Russian Federation.

- In 1999, the Bureau of Primary Health Care (BPHC) sponsored a series of Health Disparities Collaboratives 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 HbA1C tests per year was 300 percent of what it was before the Collaboratives, and 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 percent, from 60.4 days to 28.2 days. As the United States' largest integrated delivery system, caring for over six 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.



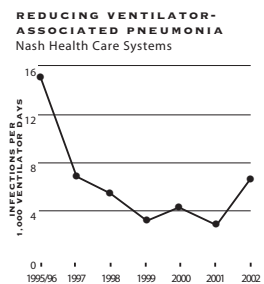
- The UK's National Health Service (NHS) launched its National Primary Care Collaborative in the year 2000, now perhaps the world's largest health care improvement project. Encompassing nearly 2,000 practices nationwide and covering almost 18.2 million patients, the Collaborative has helped to reduce by an average of 60 percent the waiting time for an appointment with a general practitioner—amounting to a total of over 400 patient years.



- The National Health Services' Modernisation Agency in the UK formed the Cancer Services Collaborative in 1999 to improve access and care for cancer patients. The project teams tested 4,400 changes between September 1999 and August 2000, involving about 1,000 patients. Sixty-five percent of the projects showed at least a 50 percent reduction in the time to first treatment. The percentage of patients achieving booked admission was 56 percent for the first outpatient appointment, 56 percent for the first diagnostic test, and 62 percent for the first definitive treatment.

- Partners in Health (PIH) has adapted the Breakthrough Series model to improve care for people in poor and developing nations. In Peru, where 9 out of 10 people with tuberculosis die, PIH's patients are seeing an 80 percent cure rate. The program's success persuaded the World Health Organization to add medicines for this disease on their list of essential drugs.

- Adult Intensive Care I, 1996: Nash Health Care Systems in North Carolina, reduced the average number of days on a ventilator by 34 percent and the average length of stay by 25 percent for ventilator patients. Cases of ventilator-associated pneumonia (VAP) dropped by more than 50 percent during the Collaborative. Patients in the protocol group averaged more than \$35,000 savings in hospital charges, compared to patients in the baseline group.



Beyond the Statistics: Voices from the Breakthrough Series

The Breakthrough Series has had an impact well beyond these demonstrable improvements in care. Perhaps the best way to convey its impact is simply to “listen to the voice of the customer.” Here are some things Breakthrough Series team members had to say about their experience. Again, these voices are a just a sample, representing many more:

“We went into the first Learning Session fairly cynical that anyone could teach us how to improve things without additional resources. But through the Collaborative we met clinicians from the field who demonstrated good outcomes. The faculty was excellent. Within 24 hours, we were convinced.”

– Cory Sevin, RN, MSN, Vice President, La Clinica Campesina Family Health Services, Lafayette, Colorado

“Put simply, there are people walking around now who wouldn't have been if these teams had not done this work.”

– Sir John Oldham, OBE, MB, ChB, Head, National Primary Care Development Team, NHS, UK

“It's easy to get caught up in the day-to-day routines and not recognize how much progress you're actually making. But when you talk with other organizations and find out how far out in front you are in terms of safety, it feels really great.”

– Tina Spector, Director of Organizational Effectiveness, Alexian Brothers Medical Center, Elk Grove Village, Illinois

“Things that were once barriers to change are not today. People know they have the ability to make changes at the work level and show the trends associated with them. People feel empowered.”

– Lee Vanderpool, Vice President, Dominican Hospital, Santa Cruz, California

“Improving our system of care is the most invigorating thing I've ever done in my career. If this is my legacy to health care, I will be very happy.”

– Linda Caissie, RN, Director of Emergency Care Services, Bon Secours Venice Hospital, Venice, Florida

“I feel like a missionary. I want to tell everyone that it can be so much better. You just have to do it. The improvement work we've done has put the fun back in health care.”

– Ann Lewis, MPH, CEO, CareSouth Carolina, Inc., Hartsville, South Carolina

“Once you start this, you can't stop it. People want to keep on changing things, improving things. After every success, they just keep asking, ‘What can we do next?’”

– Suzanne Horton, RN, MBA, Director of Emergency Services and Pediatrics, Baptist Memorial Hospital, Memphis, Tennessee

What Lies Ahead

Since 1995, thousands of patients have reaped the benefits of the Breakthrough Series and similar Collaborative improvement approaches. Asthma patients who receive their health care at community health centers in the US 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 the debilitating and sometimes fatal complications of diabetes. 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 Breakthrough Series offers a framework for bringing about dramatic and lasting change. The rapid spread of the Breakthrough Series 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.

References

Breakthrough Series Guides

- Flamm B, Kabcenell A, Berwick DM, Roessner J. *Reducing Cesarean Section Rates While Maintaining Maternal and Infant Outcomes*. Boston: Institute for Healthcare Improvement, 1997.
- Leape LL, Kabcenell A, Berwick DM, Roessner J. *Reducing Adverse Drug Events*. Boston: Institute for Healthcare Improvement, 1998.
- Nolan T, Schall M, Berwick DM, Roessner J. *Reducing Delays and Waiting Times Throughout the Healthcare System*. Boston: Institute for Healthcare Improvement, 1996.
- Nugent WC, Kilo CM, Ross CS, Marrin AS, Berwick DM, Roessner J. *Improving Outcomes and Reducing Costs in Adult Cardiac Surgery*. Boston: Institute for Healthcare Improvement, 1999.
- Rainey TG, Kabcenell A, Berwick DM, Roessner J. *Reducing Costs and Improving Outcomes in Adult Intensive Care*. Boston: Institute for Healthcare Improvement, 1998.
- Weiss KB, Medoza G, Schall M, Berwick DM, Roessner J. *Improving Asthma Care in Children and Adults*. Boston: Institute for Healthcare Improvement, 1997.

Articles

- Baker GR. Collaborating for improvement: The Institute for Healthcare Improvement's Breakthrough Series. *New Medicine*. September 1997.
- Bate P, Robert G, McLeod H. Report on the 'Breakthrough' Collaborative approach to quality and service improvement within four regions of the NHS. Research Report No. 42, Health Services Management Centre School of Public Policy. University of Birmingham, UK, 2002.
- Berwick DM. Developing and testing changes in delivery of care. *Annals of Internal Medicine*. 1998;128(8):651-656.
- Berwick DM. Eleven worthy aims for clinical leadership of health system reform. *Journal of the American Medical Association*. 1994;272(10):797-802.
- Bevan H, Penny J, Layton A. Management issues in health care: A "Breakthrough" approach to reducing delays and patient waiting times. *Clinician in Management*. 2000;9:27-31.
- Flamm B, Berwick DM, Kabcenell A. Reducing cesarean section rates safely: Lessons from a "Breakthrough Series" Collaborative. *Birth*. 1998;25(2):117-124.
- Kilo CM. Improving care through collaboration. *Pediatrics*. 1999;103(1, supplement):384-393.

Kilo CM, Kabcenell A, Berwick DM. Beyond survival: Toward continuous improvement in medical care. *New Horizons*. 1998;6(1):3-11.

Leape LL, Kabcenell AI, Gandhi TK, Carver P, Nolan TW, Berwick DM. Reducing adverse drug events: Lessons from a Breakthrough Series Collaborative. *Journal on Quality Improvement*. 2000;26(6):321-331.

Lynn J, Schall MW, Milne C, Nolan KM, Kabcenell A. Quality improvements in end of life care: Insights from two collaboratives. *Journal on Quality Improvement*. 2000;26(5):254-267.

Mosser G. Clinical process improvement: Engage first, measure later. *Quality Management in Health Care*. 1996;4(4):11-20.

Ovretveit J, Bate P, Cleary P, Cretin S, Gustafson D, McInnes K, McLeod H, Molfenter T, Plsek P, Robert G, Shortell S, Wilson T. Quality collaboratives: Lessons from research. *Quality and Safety in Health Care*. 2002;11(4):345-351.

Plsek PE. Collaborating across organizational boundaries to improve the quality of care. *American Journal of Infection Control*. 1997;25(2):85-95.

Sperl-Hillen J, O'Connor PJ, Carlson RR, Lawson TB, Halstenson C, Crowson T, Wuorenma J. Improving diabetes care in a large system: An enhanced primary care approach. *Journal on Quality Improvement*. 2000;26(11):615-622.

Wilson T, Berwick DM, Cleary PD. What do collaborative improvement projects do? Experience from seven countries. *Joint Commission Journal on Quality and Safety*. 2003;29(2):85-93.

IHI Breakthrough Series Collaboratives

	Topic	Number of teams
1995	Improving Asthma Care for Children and Adults	12
	Reducing Cesarean Section Rates I	28
	Reducing Delays and Waiting Times I	27
1996	Reducing Adverse Drug Events and Medical Errors I	40
	Reducing Costs and Improving Outcomes in Adult Cardiac Surgery	41
	Reducing Costs and Improving Outcomes in Adult Intensive Care I	37
1997	Reducing Cesarean Section Rates II	27
	Reducing Delays and Waiting Times II	67
	Improving Care at the End of Life	48
	Improving Prescribing Practices	36
	Providing More Effective Care for Low Back Pain	22
1998	Reducing Adverse Drug Events and Medical Errors II	25
	Improving Access and Efficiency in Clinical Office Practices I	19
	Reducing Costs and Improving Outcomes in Adult Intensive Care II	30
	Reducing Delays and Waiting Times in the Emergency Department II	32
	Improving Care for People with Chronic Conditions I	31
	Improving Service Quality I	27
1999	Improving Service Quality II	21
	Reducing Delays and Waiting Times in the Emergency Department II	19
	Improving Care for Patients Approaching the End of Life with COPD and CHF	36
2000	Improving Care for People Infected with HIV	80
	Improving Care for People with Chronic Conditions II	22
	Improving Care for People with Chronic Conditions III	46
	Improving Safety in High-hazard Areas	45
2001	Improving Access and Efficiency in Clinical Office Practices II	26
	Quantum Leaps in Patient Safety	47
Total teams involved in IHI Collaboratives 1995-2001		891

White Papers in IHI's Innovation Series

- 1 Move Your Dot™: Measuring, Evaluating, and Reducing Hospital Mortality Rates
- 2 Optimizing Patient Flow: Moving Patients Smoothly Through Acute Care Settings
- 3 The Breakthrough Series: IHI's Collaborative Model for Achieving Breakthrough Improvement
- 4 Improving the Reliability of Health Care
- 5 Transforming Care at the Bedside
- 6 Seven Leadership Leverage Points for Organization-Level Improvement in Health Care

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