

IHI Innovation Project Final Report: Learning System Designs for Improvement Wave 36: July-September, 2015

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Executive Summary

Intent & Aim:

Health care continues to experience a gap between evidence-based knowledge and widespread adoption and practice. Improvement science offers an opportunity to reduce these gaps and support wider adoption of better practice that enhances patient experience, improves care quality, and reduces cost. The Breakthrough Series Collaborative model was developed and introduced in 1995 to diffuse knowledge and spread best practices. In its 20 years, BTS has been very successful, and has, as Don Berwick writes in the preface to an upcoming book, "become a mainstay of improvement efforts worldwide for organizations, multi-organizational system, regions, and nations. It has changed with time and with the good thinking and lessons learned from adopters everywhere."¹ Indeed over its 20 year history, the BTS has faced numerous challenges including permutations to structure, uses across a wide variety of needs, and serious challenges to its marketability and cost structure. These challenges have invited IHI's management to commission this innovation project to study the Collaborative model and other prevailing learning system designs for improvement. The goal, as it was when Paul Batalden first drew on the fabled napkin, is to continue to harness the talents of improvers everywhere to improve the speed, fidelity, and effectiveness of spreading actionable knowledge that generates outcomes for patients, families and populations.

Note, in this study, we have focused on efforts on examining learning systems designs *for improvement*. There are learning systems that enable individuals and systems to *act* for improvement.

We define the term "learning system for improvement" in the following ways:

- *Conceptual Definition*: "A learning system for improvement is a set of methods including observation, experimentation, and feedback that is applied to build knowledge for prediction."

¹ Bruce Spurlock's forthcoming book on collaboratives



- *Operational Definition*: "A learning system for improvement involves an aim-driven change (content) that is implemented or spread within a context(s) (participants), using some mechanism of delivery that relies on a reflective system for understanding impact (data and measurement)"

Importantly, in our experience, all learning systems included some form of observation and experimentation and the objective is to build understanding and knowledge to make more successful predictions about system performance. Operationally this involves understanding the change, the context for learning, and includes some form of delivery of the tacit and explicit knowledge that is the currency of the learning system.

The specific aims for this innovation wave were:

- 1. To review the existing BTS collaborative design and its many historical uses and permutations: What is the history of its uses? What designs have been most successful and for what needs and under what conditions?
- 2. To detail the technical specifications based on contextual needs for learning systems for improvement. This includes a limited market assessment to identify the business specifications and a review of other prevailing learning system designs that may have something to offer in the design of a new approach.
- 3. To design an initially "nuclear" family of learning systems for improvement that may serve core business requirements (meant in the widest possible sense of the word "business" as our efforts include both being able to obtain results and attract customers).
- 4. To test one or more of the learning system designs within the context of one of our programs.

Background

1. Review of the BTS:

Twenty years of experience and application of BTS Collaboratives offers significant data and experience to learn about the execution of the process and the results achieved. At the same time, the health care environment and priorities have shifted, technology has greatly changed communication methods and access, and the willingness or ability to travel to convene has fluctuated over time. Many collaboratives have achieved striking success; others have ended without achieving the aims. Wide variation in BTS application can be found around the world.

2. Technical Specifications and Market Assessment:



In the original technical document on BTS, the purpose of a Collaborative was defined as, "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 central specification of the BTS concept was very clear guidance on topic selection which involved three parts: a) prevailing practice must deviate from best available science, b) improvement work could produce clearly positive effects, and c) sentinel examples of major improvement already existed.

Beyond this clear technical description, other specifications were not fully rendered in the IHI White Paper but are referred to in discussion with the authors of the BTS. These included:

- a) Marrying subject matter expertise and improvement experts in a rigorous way
- b) Clear focus on shared *learning* as the priority, employing IHI's All Teach, All Learn approach
- c) Data and information sharing as an explicit "condition" of participation
- d) Transparency of these data to create opportunities for learning and collaboration
- e) Recognition and celebration
- f) Improvement science is the backbone method (Model for Improvement in particular)
- g) Freedom from fear of reprisal, punishment or judgment—the culture of effective collaboratives was set by the facilitators and reinforced by community members through a norming process.

Summary of Primary Research Findings:

Learning System for Improvement Design Principles:

- 1. Freedom from fear of any kind within the system or community of learning.
- 2. Explicit aims are established and shared by the participants.
- 3. Leadership is an active participant and acts to remove barriers to progress
- 4. There is a bias towards action and testing in the learning community
- 5. Explicit and tacit knowledge are shared by members of the community (what & how)
- 6. Data and story-sharing is a condition of participation
- 7. Everyone has something to teach; Everyone has something to learn

Research-based Recommendations:

1. This project confirmed the value of the Breakthrough Series Collaborative model. It has been and continues to be an incredibly powerful approach to learning and getting results. However, the permutations that it has experienced have diluted its impact and its meaning. We propose that IHI return to a much more rigorous design, with attendant design considerations (need for faceto-face community formation, careful selection of topic, data platform) and conditions of



participation (transparency, attendance, time from participants, leadership attention etc.). Participating in an "IHI Collaborative" should mean something important. In our view, it should be tantamount to getting results for and with the population under consideration.

2. If the conditions for an IHI Collaborative are not met by the program requirements or the context, there are a variety of variables that ought to be considered in the selection (and sometimes construction) of an appropriate learning model for improvement. Supportive tools have been created (see Appendix) to guide program planners and designers towards the appropriate learning model components.

3. Program designs may combine elements of multiple designs to generate a more effective approach to learning for improvement. As confidence in the changes that are being implemented increases, the learning model is likely to change as well. For examples, as the evidence to support a particular change becomes more robust, formative learning models may be less necessary (though they may still be needed in some circumstances despite good evidence to support the changes).

4. There are a family of interesting new learning system designs that are at the early stages of their evolution. These models take advantage of network membership models that allow members to both innovate, improve and conduct rigorous scientific research using the same learning community.

Summary of Different Learning System Designs

We have compiled an inventory of different learning system designs – both existing and newer ideas.

Existing Designs

GOAL: Learning & Creating (Innovation) (KP 2)

- Networks: A network is an interconnected group or system established or evolving spontaneously to facilitate the exchange of resources.
 - Collaborative Innovation Network (CoIN): "A cyberteam of self-motivated people with a collective vision, enabled by the Web to collaborate in achieving a common goal by sharing ideas, information, and work."²
 - Collaborative Improvement Network (CIN): *CINs use QI methods to translate evidence into practice and support teams to test and implement strategies that will change outcomes in a highly reliable way. These networks provide a strong*

² Peter Gloor, Swarm Creativity



foundation for research by developing a robust data infrastructure and standardizing care processes that lead to a stable baseline for experimentation.

- Facilitated Network: Commons-based peer production models that allow for a community of value creators, enabled by technology, to work together to solve a vexing problem of interest.
- Community of Practice: Groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly.³
- Expedition: An Expedition is a topic-specific, action-focused program, lasting two to four months. Expeditions are designed to help front-line teams make rapid improvements in the areas of greatest concern to hospitals today. Each program is an intensive virtual support system where expert faculty are serving as your guides. Designed to enable widespread uptake of an important hospital improvement.
- Crowdsourcing approaches / hackathons: An event, typically lasting several days, in which a large number of people meet to engage in collaborative idea generation and innovation.

GOAL: Results; spread of proven changes that improve care (KP 3 + 4) *Getting results*

- Breakthrough (BTS) Collaborative: *An improvement method that relies on spread and adaptation of existing knowledge to multiple settings to accomplish a common aim.*
- Consulting: An intensive, 1:1 engagement with one client to work on a particular issue at their organization.

Scaling rapidly

- Chained BTS Collaborative: A series of successive BTS collaboratives run on the same topic within an organization to continue improvements and spread results throughout the system.
- Campaign: A primarily virtual method of spreading evidence-based practices on a larger scale than a Breakthrough Series Collaborative
- Wave-Sequence Spread Approach: A type of spread that focuses on spreading improved care delivery to other parts of the system. The term "wave" reflects the fact that this method of spread occurs both sequentially and in an increasingly larger section of the same health care system (perhaps the whole system). Wave-sequence spread is used when it is not possible to cover the whole system all at once. These have been deployed in low-resource settings and are conducted in-person.⁴

³ http://wenger-trayner.com/introduction-to-communities-of-practice/

⁴ http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4184307/



• Nodal Systems for Spread: A facilitated approach to spread whereby specific sites are selected (often within designated geographies) to be mentors and coaches to future learning systems composed of participants that are local to each node. These 'nodes' typically initially participate in some form of improvement activity themselves or are selected, as distinguished participants in a BTS or some other results-based learning system. The 'nodes' tend to also form their own learning system with one another to share insights about how to mentor and coach local sites that they are working with.

Newer Designs (detailed descriptions are in the text)

- Using Clinical Registries to power improvement: *Registries have been used for some time to share knowledge and understand performance of one service provider relative to others. Newer efforts are building on clinical registries and data repositories, enabling them with technology, and leveraging them for quality improvement, research and patient-powered clinical improvement.*
- Leverage well-curated repositories (commons-based peer production): *Repositories of* better practices for a wide variety of system challenges are now becoming more widely available. Static, web-based information portals may be converted into living libraries, curated by a community of practitioners and problem-solvers.
- The Collaboratory for innovation & formative learning systems: Collaboratories combine two ideas—collaboration and experimental efforts in laboratory settings. Collaboratories, like research labs have a high level of data fidelity and the emphasis is on discovery and experimentation by a usually small group seeking new answers to challenges that they face.
- Improvement Dash: A learning design that kick-starts an improvement process in situ by gathering teams virtually to conduct (over the course of a day or week) a series of local tests of prediction, observation, and experimentation to achieve a specific aim within a narrowly defined clinical domain (e.g. reducing overuse of antibiotics on a service unit).
- Achieving rapid spread A campaign of kaizen events: *As the confidence or degree of belief in a change idea or intervention increases, the balance in learning systems shifts from formative learning modalities to more normative or prescriptive learning modes. Kaizen events (or rapid improvement events) with a clear set of changes, measures and initial PDSA steps could be conducted over very wide geographic areas in a campaign format to quickly disseminate a well-developed intervention.*



Results of the 90-Day Cycle

Scanning: Review of the BTS Collaborative Methodology

External Scanning – how effective are collaboratives?

In the empirical literature, the evidence on the effectiveness of collaboratives both in the U.S. and internationally is equivocal; there is limited evidence showing significant changes in health outcomes or practice patterns from quality improvement collaboratives. This has not prevented their widespread use for a variety of problems in health care; a PubMed search for "quality improvement collaborative" yielded 2521 results, mostly related to health care delivery. Many individual studies show the effectiveness of collaboratives in multiple settings, both in the U.S. and internationally. A sampling of outcomes improved through collaboratives include antimicrobial prophylaxis in surgical patientsⁱ; quality of care for patients with heart failure;ⁱⁱ pressure ulcers in the PICUⁱⁱⁱ, and diabetes care^{iv}.

Franco and Marquez (2011) examined 135 time series charts from 27 collaboratives across 12 low and middle income countries and concluded that 87% of the charts reviewed achieved 80% performance or higher (performance is a composite measure of degree of improvement), 76% reached at least 90% performance. Two thirds of the charts had a baseline performance below 50%. The average increase was 51.9 percentage points; not surprisingly, the baseline value was the primary factor contributing to the absolute increase in improvement.^v A 2008 systematic review, which included 72 articles, found that the evidence supporting quality improvement collaboratives is "positive but limited" and that future work is needed to identify the effective components, cost effectiveness and success factors.^{vi} Another systematic review by Wells and Gray (2012) built on the 2008 review found generally positive results across a variety of different studies.^{vii} An updated follow-up systematic review is being conducted by Wells and colleagues as we write.

These systematic reviews, while very useful, are limited by variation in adaptations to the collaborative model, and the lack of research on the relative effectiveness/importance of different components of the collaborative approach. As we have seen both at IHI and in the literature, collaboratives may be more effective for certain problems or settings. And, the effectiveness of a collaborative depends heavily on its structure; Wells and Gray (2012) found that many studies mentioned the IHI BTS methodology but the actual methods used may have shown substantial variation from the BTS methodology. When described, these variations included shifts to virtual learning sessions, inadequate description of the subject matter and improvement expertise, and laxness about the data sharing policy. However, most of the studies available do not sufficiently describe what adaptations were made nor whether they were associated with improved effectiveness (or lack thereof) of the program. Additionally, a majority of studies did not use a



controlled study design, so our ability to infer causality or to identify whether the improvement was due to a secular trend or other organizational changes is limited. Publication bias, in which studies with negative results do not get published, may also further bias the results in a positive direction.

Internal Scanning

A good deal of work has been done over the past decade within IHI to elucidate how and when collaboratives are effective. In 2008, Richard Scoville and others led a project – the Results Improvement Collaborative – to increase the percentage of teams making significant progress (80% reaching a "4" on the collaborative scale) by June of 2008. As part of this, they also examined success factors, which are predictors of successful collaborative projects. The driver diagram from this project is below and additional slides from that project are included in Appendix B. The predictors of successful collaborative projects were:

- Teams have selected the aspect(s) of the topic that match their own organization priorities
- Teams are motivated (reporting, active on calls, attend events, listserv sharing), and have sufficient time to work on the project
- Teams can rely on solid and supportive sponsorship for the improvement within their organization: assure with onboarding, informing, and coaching
- Devoted faculty and chair who give time to project and lose sleep over results
- Package of changes with real world experience behind them
- Sequence is known at the project level and the detail level
- Consistent and continuous content delivery, with appropriate teaching methods for each level of participant
- Project Scope is clear, focused, not complex—project mission can be completed in a year
- Measures that work--practical to use and sensitive to changes
- Individualized support when needed to accelerate learning
- Teams have strong execution skills resident in their organization/team



Results Drivers-System Level View



This project led to the creation of a considerable amount of standard work for collaboratives (see Appendix B), though it does not appear that this work was reliably implemented by IHI into the design and execution of new collaboratives that have been proposed and executed over the past several years. This could be related to IHI doing more private collaboratives where proportionately greater compromises are made on design and execution; budget constraints; or a lack of staff training around the new standard work.

When are collaboratives most effective?

Collaboratives are the appropriate delivery mechanism to bring about results under certain conditions. These include:

- Viable model that has worked someplace else that needs to be spread. Ex: chronic care model, reducing C-sections.
- Topic selection: the topic should be focused and measurable. In recent years, IHI has tended towards broader objectives ('system transformation') with increasingly complex change packages and measurement systems. Topics should be complex enough to require shared



learning (i.e. tacit knowledge is important) among organizations but not so complex and challenging that the topics are impossible to realize or measure.

- Ideally, everyone is starting around the same place but this can be difficult to do in a public collaborative, especially those that have a short timeline.
- Collaborative objectives (measures) can be achieved within the timeframe of the collaborative. That is, if the collaborative is set for 12 months, the primary aim of the collaborative must be achievable by the majority in that timeframe. 12-18 month collaboratives for very complicated changes like primary care transformation are not likely to succeed.
- Commitment from all or most parties to transparent data sharing between collaborative participants. The level of transparency of data sharing appears to correlate with the achievement of impact and results.
- Freedom from fear of reprisal, punishment or judgment

Critique of Collaboratives in the literature

Don Berwick, in his preface to an upcoming book on collaboratives, identifies four central critiques of collaboratives that have been expressed in the literature and in the public comment about this learning method. These critiques, Berwick framed as 4 doubts:

- "Doubts about the scientific discipline of measurement, inference, and results reporting. Many collaborative projects have been undertaken in settings and under circumstances in which classical forms of experimental control, especially randomization, cannot or should not be used. Evaluations depend more upon pre-post comparisons and time-series analyses, which some find insufficiently convincing.
- Doubts about the data. Collaboratives rely largely upon self-reported data, rather than independent outside inspection. (Although a number of IHI-sponsored collaboratives have been the subjects of serious outside evaluation.) Critics question the validity, objectivity, and reliability of self-reported data. On the other hand, as John Oldham has pointed out, very few, if any, classical experimental studies have the volume of data and participants that collaboratives do. The large amount of data coupled with the use of measurement over time give collaboratives statistical power that is rare in formal experimental designs.
- Doubts about attribution. Collaboratives do their work in the messy, real world of continually changing context and intersections efforts. The world does not stand still, holding its breath for a collaborative to be completed. Rules change; knowledge changes; parallel improvement efforts come and go. Purists who seek certainty in attribution that "A" caused "B" will be unsatisfied by the processes of inference upon which the evaluation of social changes must rely. Furthermore, most collaboratives do not rely on single interventions. Instead, they often teach and test packages of interventions, which



IHI calls "change packages," in which teasing out the effect of each component is not at all the primary agenda. If the bundle of changes helps, that is progress, whether or not we are crystal clear about the contribution of each element of the bundle.

• Doubts about sustainability. The original IHI Breakthrough Series Collaborative model contemplated projects of specific duration – 18 or 24 months, for example. Even if apparently successful, do these results last for the long haul?"

Despite these doubts, the appetite for Collaborative learning has not been diminished by time or critique. The learning method has spread globally and from healthcare to other social sectors. So what have we learned about how Collaboratives are being changed and redesigned?

Alterations to the collaborative methodology

We sought to identify the changes made to the BTS methodology and how collaboratives are run within IHI. To do so, we conducted a survey of Directors and IAs to solicit their input on alterations to the collaborative model (both effective and ineffective) and to prioritize the secondary drivers (success factors) identified in the 2008 results collaborative. We also conducted several interviews with internal experts with deep historical knowledge of collaborative at IHI. Some notable changes identified by IHI Directors and external experts include:

- *Public vs. private collaboratives*: One interviewee noted a branching point with public enrollment collaboratives designed and facilitated by IHI experts where the culture of the collaborative can be controlled by IHI, and private collaboratives run for an external customer through a contract, where the culture of the collaborative is often set by the partner. In general, in their estimation, public collaboratives adhered more closely to the BTS methodology, with the structural set up adhering to the BTS design and often meeting with good results. In private collaboratives, where the culture and design are often affected by the partners' interests, compromises were often made with regards to participation, data sharing, and leadership support. Importantly, the 'freedom from fear' internal culture within the collaborative, may have been compromised.
- *Time Horizon*: Collaboratives traditionally had a discrete time period (e.g. 18 months) to achieve its goals. One big change has been the movement towards ongoing collaboratives/learning communities, such as IMPACT and the work in Scotland. In this format, it is not always clear when one project ended and another began. The learning community stayed intact but was not always re-challenged with new time-bound aims. One interviewee noted that this can remove some of the necessary tension and discipline that are created through a time constraint as it can be challenging to get teams to focus on delivering with an indefinite time period.



- Use of innovative vs. tested content: At times, collaboratives are convened without a tested content theory or a content theory that has led to results elsewhere. In these settings, the learning community uses the collaborative format in a formative manner—as a way of testing and learning their way towards the development of a driver diagram and change package. The end-product of such "innovation" or "developmental" collaboratives, as they are sometimes called, is the theory of change. A challenge of this type of learning community is that the attention is focused on designing a content theory and often measurement is an after-thought, resulting in participants testing ideas with no evidence of improvement.
- *Lack of a results focus, including on data reporting*: A core tenet of the BTS approach is that teams report time series data at least monthly. While one can imagine that all teams have the intention to submit data, it is often not reliably done. And, reporting is difficult to enforce without the use of incentives or penalties. Absence of monthly qualitative and quantitative reporting reduces the feedback loop between participants and faculty and reduces the opportunities for shared learning among the participating sites.
- Using collaboratives as a method to build will vs. to get results: In the BTS model, organizations joining the collaborative already have built the will they have committed to participate in a collaborative and the will needs to be primarily maintained and enhanced. This is not consistently the case in collaboratives, and in some cases the participating team is using their participation as a way of building the will needed back at their home institutions. Lack of leadership buy-in and attention can be a major distractor to collaborative participants.
- *Virtual vs. in-person learning sessions*: With tightening travel budgets, many collaboratives have moved to one or more virtual learning sessions. This change happened quite early on in the evolution of the BTS and many variants of these virtual designs are now available. What this mainly affects is the development of strong cultural mores within the learning community (trust in one another, safety from reprisal, freedom from judgment, all teach/all learn) and lack of relationship development which is often the conduit for tacit understanding of how to implement a change in a practice environment. Lack of personal connections limits not only the peer-to-peer connectivity but also compromises the faculty-team relationship as well.
 - *Case study: Adios Bacteremias* one of the most successful recent examples of virtual 'collaboratives' is Adios Bacteremia—a Latin American effort across 11 countries and 278 ICUs to reduce CLABSI. Using essentially monthly "learning sessions" conducted virtually as well as intermittent face-to-face technical workshops in central line insertion methods and QI methods and local "nodal" meetings, they have driven down CLABSI rates substantially. IHI provided extranet and change packages and tools. Resources for the collaborative were very sparse and no funds were required of participating sites.





Activities

- 10 learning sessions
 - Average of 28 hospitals per session
- 3 QI workshops
- 1 Local node meeting in Mexico City (10 hospitals: 36 attendees)
- 1 Central line insertion workshop (30 participants)







Outcome measure: Rate of CLABSI



• Unsupported action periods: Action periods or the time between learning sessions where teams ought to be actively supported by content specific coaching calls and WebEx's facilitated by improvement advisors and subject matter experts. These action period activities are not standard work in all collaborative leaving the learning session as the only avenue for learning and sharing.

The prioritized drivers of success from the survey were:

- Ensure connection: Collaborative objectives and organizational priorities must be strongly connected and team's specific aims should match these priorities.
- Bias towards testing: Teams test and learn from multiple changes based on a customized plan and report key measures over time
- Right team members: Trusted staff are working on the collaborative team. Staff who can convey the work of the collaborative back to their home organization.
- Appropriate sponsor support: Leaders within the delivery system are supportive of the collaborative and have the ability to clear obstacles that impede progress towards improvement.
- Day to day leader devotes time: This demonstrates real commitment on-the-ground from the delivery system to make changes.

Finally, there were some alterations that appear to have made the original BTS design more effective, such as alterations that increased interactions between faculty and teams (more one on



one coaching); getting sharper around data reporting, annotating run charts, and run chart rules; and using shorter change packages with simpler roadmaps and more intentional sequencing of changes for teams to follow.

In addition to the literature scan and survey of Directors and IAs, we conducted 21 expert interviews with the following individuals:

Name	Organization
Pierre Barker	IHI
Paul Batalden	Dartmouth
Don Berwick	IHI
Rob Cross	University of Virginia
Don Goldmann	IHI
Jeffrey Horbar	Vermont Oxford Network
Andrea Kabcenell	IHI
Prasad Kaipa	Kaipa Group, former Apple University
David Langford	Langford Learning
Jason Leitch	Scottish Government
Peter Margolis	Cincinnati Children's Hospital Medical Center
Joe McCannon	Billions Institute
Gene Nelson	Dartmouth
Tom Nolan	API
Lloyd Provost	API
Huggy Rao	Stanford University
Julie Reed	Former Health Foundation Fellow
Marie Schall	IHI
Bruce Spurlock	Convergence Health
Corrinne Thomas	NHS South of England
Sue Wells	Ko Awatea

Market and Trends for Collaboratives

Macro:

Several macro-environmental trends have affected the market and interest in Collaboratives. The first is that there is a broad trend toward 'in-sourcing' Collaboratives. IHI has successfully taught hundreds of individuals and organizations how to run Collaboratives and many are now doing this either internally within their organizations or as consultant providers. This trend has



accelerated in recent years with many big organizations now offering collaborative programs (Premier, VHA/UHS, many state hospitals associations and state QIOs).

Market consolidation has increased competition in many local markets and payment models form CMS and others that provide incentives to 'top-decile' performers may de-incentivize organizations to share their success stories as it raises all boats making their program less distinct and reducing the likelihood of receiving what incentives may be present. Yet another pernicious effect of incentives and P4P programs—the elimination of the incentive to collaborate and share ideas that could improve care widely.

The prevalence of providers of collaborative learning methods has led to market saturation with 'collaborative' learning products and services which has led to market confusion and fragmentation. In addition, as these providers and collaboratives are of highly heterogeneous quality, one bad experience may start to erode confidence in the overall methodology. In essence, market saturation with low-quality, low-effectiveness collaboratives is starting to create some disaffection with the idea of collaboratives. One interviewee likened the term "collaborative" to the term "workout"—we all know there are a variety of 'workouts' and they vary substantially in rigor and effectiveness.

Collaboratives also suffer an inherent instability in their design, which relies on the social capital of participating team members in order to spread ideas back home (after the learning sessions). The wrong messenger may compromise the effectiveness of the collaborative and the impact seen back home. A final threat is that we've begun to ask collaborative learning platforms to achieve too many different and increasingly more complex results. These expectations often cannot be realistically met within the constraints of collaboratives again reinforcing the view that 'collaboratives don't work.'

IHI-specific:

Over the first few years when the BTS model was first developed, IHI ran dozens of collaboratives, but that has dropped off over the last 10 years with fewer collaboratives being offered publically. Many of our public collaboratives have had enrollment challenges, and those that continue into additional years have had even lower engagement (see graph from Marketing). From the existing data we reach the following conclusions:

- Enrolment challenges are not new but have been persistent for at least the last 7-8 years.
- Novelty appears to matter as initial years of a program have good enrolment but subsequent years suffer.
- Optional (add-on) years result in declining enrolment



Despite this, enrollment in the BTS College has been consistently high, indicating that organizations are interested in collaboratives but are seeking to develop their own internal capability to run collaboratives rather than participate in an IHI-run collaborative. This desire to in-source collaborative methods is reflected in Bruce Spurlock's upcoming book and by some of our expert interviewees



A Framework for Approaching Design of Learning Models

The review process we undertook including literature review, results from previous collaboratives, and expert interviews, resulted in several important elements that we have drawn together into a conceptual framework for how to design learning systems in the future at IHI. First we start with a conceptual and operational definition of learning systems for improvement, then a set of key operating principles for any IHI learning system model, and finally a three part framework that has guided our subsequent analysis and key recommendations.

Definition of Learning Systems for Improvement

In our review of the literature, we arrived at the following way of defining learning systems *for improvement*. Note this is not a generic definition for any and all learning systems which may have varied and different goals, this is a specific definition as it pertains to those learning systems that are specifically constructed to enable improvement work to occur. Our efforts to define the term resulted in both a conceptual and operational definition.

Conceptual Definition: "A learning system for improvement is a set of methods including observation, experimentation, and feedback that is applied to build knowledge for prediction."

Operational Definition: "A learning system involves an aim-driven change (content) that is implemented or spread within a social-behavioral context(s) (participants), using some



mechanism of delivery that relies on a reflective system for understanding impact (data and measurement)."

A prediction is the starting point for any reflective learning process for improvement, the specific goal of a learning system for improvement is aimed at developing the knowledge to improve the ability to predict system performance, and then to test strategies that will improve our ability to predict performance over time.

Learning System for Improvement Design Principles:

In our work, we found a handful of key design principles for learning systems for improvement. Regardless of the specific purpose, knowledge sharing compact or structural elements of the learning system, these principles are important to any future learning system that aims to improve how individuals and systems generate results:

- 1. Freedom from fear of any kind within the system or community of learning.
- 2. Explicit aims are established and shared by the participants.
- 3. Leadership is an active participant and acts to remove barriers to progress
- 4. There is a bias towards action and testing in the learning community
- 5. Explicit and tacit knowledge are shared by members of the community (what & how)
- 6. Data and story-sharing (exchange of knowledge) is a condition of participation
- 7. Everyone has something to teach; Everyone has something to learn

Framework for Learning Systems for Improvement

Our framework for building learning systems for improvement includes three central elements. *Shared purpose* is the idea that all learning system for improvement must identify some opportunity for improvement. In collective impact models, this is called, "Common agenda", and in BTS collaboratives, it is the shared aim of the collaborative. The shared purpose is explicitly acknowledged by all participants in the learning system for improvement.

Shared knowledge takes two primary forms: explicit knowledge in the form of data that allows participants in the learning community to understand their performance relative to their peers and other similar institutions, and tacit knowledge in the form of stories and experiences that really allow a qualitative understanding of how a change works, how and improvement is created and how an impact is sustained in a system. The will and motivation of teams to commit to sharing knowledge is directly related to Design principle #1—the degree to which they trust the learning system organizers to create an environment that is free of fear and judgment. Early evidence suggests that the effectiveness of the learning system to produce results may relate to the ease with which knowledge is exchanged in learning systems for improvement.



Shared organization again takes two forms: structures that anchor learning systems including the role of facilitators, face-to-face participant meetings, coaching conference calls, site visits, self-forming workgroups, coaching visits, among others, and processes like the periodic self-audit of performance, n of 1 learning, passive data collection, use of social media for peer to peer knowledge and content creation, social media (what's app) for data reporting, coaching and encouragement among others. We have a tendency to over-emphasize the structural elements of learning system design and under-emphasize the process elements of shared organization.

Key Recommendation 1: The BTS is an excellent design, but needs to be used for specific purposes

Raise the Bar on Collaboratives

As described above, the BTS methodology, when executed correctly and with topics that are fit for its original purpose and intent, can bring significant results. Collaborative methods have been and continue to be an incredibly powerful approach to learning and getting results. However, the permutations that it has experienced has diluted its impact and its meaning. We propose that IHI return to a much more rigorous design, with attendant structural considerations (need for face-toface community formation, careful selection of topic, data platform) and more stringent conditions of participation (transparency, attendance, time from participants, leadership attention etc.). Participating in an "IHI Collaborative" should mean something important. In our view, consistent with IHI's brand and reputation, it should be tantamount to getting results for and with the population under consideration.

In order to do that we would recommend revisiting the work done in the "Results Improvement Collaborative" which identified multiple areas for standardization and improvement of collaborative methods. Some factors that contribute to success in project <u>set up</u>:

- Ripe topic with at least moderate degree of belief that theory will lead to improvement
- Use of clear Charter for recruiting teams
 - Clear numeric breakthrough goals
 - Clear expectations
- Teams have will and resources
 - Aim is customized and aligns with org. strategy
 - Team composition is appropriate
 - Team resources appropriate
 - Day-to-day team leader with adequate time
- Sponsors involved
- Change ideas with a pedigree (Change Package developed from ideas supplied by experts in the topic)
 - Ideas most powerful
 - Ideas sequenced

And factors that contribute to success in project execution:

- Action Oriented: Use of Model for Improvement-lots of testing
- Measurement system that connects testing to tracking progress
 - Each team has goals with measures to match
 - Required monthly reporting with measurement tracked monthly
- Great Learning sessions
- Robust Action Periods
 - Good communication system (listserv/extranet/ great calls)
- Oversight
 - Tracking progress, participation, connecting teams, fostering shared learning
- A culture is established with specific values:
 - Everybody learns, everybody teaches
 - A sense of "family" and support
 - Urgency-need results now!

There were numerous suggestions of standard work at each point in the collaborative process – set up, recruitment, engagement of sponsors and teams, at meetings, and between meetings. While many of these seem straightforward, they are not always adhered to rigorously. The full list of different standard work components can be found in Appendix B. Additionally, many collaboratives, including those that achieve results, have no plan for how to end or transition to another type of learning system. Raising the bar on collaboratives should include a provision on when to sun set, or end, a collaborative.

We strongly recommend that IHI double-down on BTS Collaborative methodology in specific areas in which we know we can bring about results, and raise the bar so that the IHI BTS Collaborative is seen as the gold standard of collaboratives around the world. We invented this idea and popularized it and we think it should remain something special to be in an IHI-BTS. IHI collaboratives should be seen as a step above all other collaboratives run by organizations internally or by competitors. Since the term "collaborative" has been adopted widely to mean a variety of things, from a webinar to a multi-year program, IHI needs to reinforce and execute the BTS Collaborative as the gold standard.

Collaborative Enhancements - "Collaborative-PLUS":

While the original collaborative design with the reinforcements suggested above will be successful in many circumstances, we can already predict that there will be some situations that may merit 'enhancements' to the collaborative model. These are not violations of the principles and guidelines that were just suggested, but compliments to the more rigorous design advocated



for in the previous section. We believe that these "enhancements" to the collaborative model ought to be implemented in a learning environment that allows us to test and reflect on the changes to the design so that the effect of these enhancements are well understood by Collaborative implementers.

Some preliminary ideas for Collaborative enhancements suggestions include:

- *Platform thinking*: Technology will be a wild card and best-in-class will have a big advantage (both communication & data). The new effort with Project Cecilia will help with this and these new design considerations should be taken into account during the design process for Cecelia.
- *Test virtual designs*: As travel budgets continue to tighten and with an increase in interest in virtual learning, there has been a push to transfer the BTS model to a completely virtual engagement, which is an entirely different environment. Additional work is needed to develop a virtual BTS design and test our methods of collaboration and instruction virtually.
- *Powering collaboratives*: Leverage subject matter expertise (SME) that is not clinical (finance, design, tech, patients)
- *Increasing prestige*: Partnerships with different organizations and expert faculty to increase prestige and power of collaboratives, such as the recent experience we had partnering with Robert Kaplan and HBS for the Joint Replacement Learning Community
- *Complementary deep coaching*: For collaboratives focused on harder to solve problems, or for organizations that just want more help with a challenge, options to add on one-on-one consulting/coaching services could be built in as additional support. This could be done for those that wish to do more innovative work as well (support to testing/prototyping new ideas) within an existing collaborative learning system.
- *Enable leadership:* When conducting private collaboratives with single organizations (governmental or private entities), in addition to the usual Collaborative teams from the front-line delivery microsystems, there might be a leadership team that participated and conducts its own work to remove barriers to collaborative progress. This was first formally done in Lima, Peru in a MDR-TB collaborative where 41 teams from clinics around the city sought to spread evidence-based better practice. A Team 42 was added as a way of ensuring that problems that could not be solved at a single clinic level (problems like drug supply, policy issues, nursing and community health worker workforce regulations etc.) could be proactively addressed by leadership.
- *Scale-up:* Scale-up has been tested in a variety of circumstances using two different collaborative enhancements. In Africa, a "wedge and spread" wave sequence has been used to take advantage of the naturally occurring administrative relationships between regional, district and local health service units. These are organized into collaboratives representing a



"wedge" of the system. Improvement work is conducted within the wedge and at the appointment time, these improvements are then spread to adjacent 'wedges' of the system. In the UK in the early 2000s, Sir John Oldham, used a different technique to help spread improvements: the "chained collaboratives" model whereby collaboratives were run in successive series bringing in new actors in different geographic locations to come and learn and the spread the improvements to their home environments.

• *Improvement Capability Instructional Methods*: BTS Collaboratives use traditional lectures and experiential games in learning sessions to teach the Model for Improvement, PDSA testing, and run chart measurement. Add-on supports that leverage technology could improve team adoption of improvement methods benefit from flipping how we develop capability. Is MFI, PDSA, and run charts sufficient or should participants be provided insight into tools and methods that support understanding the system and systematically building change ideas for testing?

In summary, in the area of Collaborative enhancements we recommend the following steps:

- *Rebrand the so-called "developmental/innovation collaborative" and separate it from the IHI-BTS.* Many collaboratives are now launched without a results focus, with change package development occurring within the program. These collaboratives need to be rebranded and separated out from BTS Collaboratives so that the "reputation" of BTS collaboratives at achieving results is not diluted by collaboratives whose intention was not to bring about results. This design focused collaborative should include an articulated execution and product theory like the BTS methodology.
- *Build a formal Collaborative-PLUS model and charge for the PLUS*. Build in one or more of the design enhancements described above, at a fee. These should not mar the original design of the collaborative (principles and design ideas stated above), but should be viewed as complementary of that design. When a Collaborative-PLUS model is being used, IHI's R&E team should monitor the impact of the PLUS to ensure that we derive maximum learning from the enhancement and learn whether it should be replicated in the future. Performance metrics would include both accomplishment of expected results as well as revenue/financial goals attainment.
- *Win the technology battle*. While some of this work is already underway with Project Cecelia, the Extranet has become outdated as a technology platform for participants to report data and share learning with each other. We need to develop new technology to better support collaborative learning. This is going to be one of the most important investments that IHI makes in the coming years as it is likely to be costly and extremely important to our success at becoming the "gold standard" for Collaborative design.



• *Develop standardized support materials*. Support materials are mainly PowerPoint slides and miscellaneous planning/PDSA forms. Developing standardized and branded support materials including participant workbooks, recommend form sets, and tools/methods guides may increase the value impression and IHI profile and further adoption of the methods.

Key Recommendation 2: Match learning requirements better to learning system designs.

Collaboratives are the default learning system design for new programs that are results-oriented and in which peer to peer learning is desired. As described above, this is not always appropriate and can adversely affect whether the program achieves its aim. It turns out that we actually have and use a lot of learning system designs, but often do not match the learning requirements of the audience to the learning system design in an evidence-informed way. We currently do not formally consider the full range of options to match program needs with program designs. To facilitate this, we have developed a decision support tool that provides guidance on how to select from different learning system designs based on core learning requirements and conditions within which the learning effort is being facilitated. While it is not an exhaustive list of potential designs, it is intended to guide the project team in decision-making about the appropriate learning system design for new programs. The spectrum of design considerations / different variables to consider is below. Note that different components of designs may be selected to create a learning system that works for each particular situation.

The process that should be undertaken here is as follows:

- 1. Complete pre-work define program aim, objective, theory of change, and target audience.
- 2. Understand the nature of the change.
- 3. Understand the context for implementation.
- 4. Identify appropriate delivery mechanisms given aim, content, and market.
- 5. Identify desired learning system design elements which can be combined differently to construct a learning system to meet the program's needs. See table below for different variables and design features to consider.

Sharing/learning oriented (KP 1,2)	Results/spread oriented (KP 3, 4)
Data sharing not required	Data sharing required
Measurable aims not required	Explicit, measurable aims
Complex or broad topics	Simple to medium, less complex topics
No change package – needs innovation	Evidence-based, tested change package
Unlimited number of participants	Limited number of participants
Virtual learning	In-person



Heterogeneous organizations (type,	More homogeneous organizations (type,
experience)	experience)
Unlimited time frame	Limited time frame
Lower cost	Higher cost
No individual faculty coaching	Individual faculty coaching (if desired)

- 6. Discuss and select best design features with Improvement Capability Focus Area and Results and Evaluation team.
- 7. Build learning system design around the desired elements.

Below are brief descriptions of different types of learning systems that we currently know about, divided by Kirkpatrick level. This is not an exhaustive list, and elements of these different designs may be selected based on the pre-work and desired impact, content, participants, and delivery mechanism. But it should serve as a guide for different design options and for different features that can be included in a learning system.

GOAL: Learning & Creating (Innovation) (KP 2)

- Networks: *A network is an interconnected group or system established or evolving spontaneously to facilitate the exchange of resources.*
 - Collaborative Innovation Network (CoIN): "A cyberteam of self-motivated people with a collective vision, enabled by the Web to collaborate in achieving a common goal by sharing ideas, information, and work."⁵
 - Collaborative Improvement Network (CIN): *CINs use QI methods to translate evidence into practice and support teams to test and implement strategies that will change outcomes in a highly reliable way. These networks provide a strong foundation for research by developing a robust data infrastructure and standardizing care processes that lead to a stable baseline for experimentation.*
 - Facilitated Network: Commons-based peer production models that allow for a community of value creators, enabled by technology, to work together to solve a vexing problem of interest.
 - Community of Practice: Groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly.⁶
- Expedition: An Expedition is a topic-specific, action-focused program, lasting two to four months. Expeditions are designed to help front-line teams make rapid improvements in the areas of greatest concern to hospitals today. Each program is an intensive virtual

⁵ Peter Gloor, Swarm Creativity

⁶ http://wenger-trayner.com/introduction-to-communities-of-practice/



support system where expert faculty are serving as your guides. Designed to enable widespread uptake of an important hospital improvement.

- Improvement Dash: A learning design that kick-starts an improvement process in situ by gathering teams virtually to conduct (over the course of a day or week) a series of local tests of prediction, observation, and experimentation to achieve a specific aim within a narrowly defined clinical domain (e.g. reducing overuse of antibiotics on a service unit).
- Crowdsourcing approaches / hackathons: An event, typically lasting several days, in which a large number of people meet to engage in collaborative idea generation and innovation.

GOAL: Results; spread of proven changes that improve care (KP 3 + 4) *Getting results*

- Breakthrough (BTS) Collaborative: *An improvement method that relies on spread and adaptation of existing knowledge to multiple settings to accomplish a common aim.*
- Consulting: An intensive, 1:1 engagement with one client to work on a particular issue at their organization.

Scaling rapidly

- Chained BTS Collaborative: A series of successive BTS collaboratives run on the same topic within an organization to continue improvements and spread results throughout the system.
- Campaign: A primarily virtual method of spreading evidence-based practices on a larger scale than a Breakthrough Series Collaborative
- Wave-Sequence Spread Approach: *A type of spread that focuses on spreading improved care delivery to other parts of the system. The term "wave" reflects the fact that this method of spread occurs both sequentially and in an increasingly larger section of the same health care system (perhaps the whole system). Wave-sequence spread is used when it is not possible to cover the whole system all at once. These have been deployed in low-resource settings and are conducted in-person.⁷*
- Nodal Systems for Spread: A facilitated approach to spread whereby specific sites are selected (often within designated geographies) to be mentors and coaches to future learning systems composed of participants that are local to each node. These 'nodes' typically initially participate in some form of improvement activity themselves or are selected, as distinguished participants in a BTS or some other results-based learning system. The "nodes" tend to also form their own learning system with one another to share insights about how to mentor and coach local sites that they are working with.

⁷ http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4184307/



Key Recommendation 3: Specific use-cases require different learning models for different design challenges

Vermont Oxford Network:

The collaborative model, its "PLUS" enhancements and some of the other learning systems described above may be successful at driving changes in certain environments. There are, however, a few newer designs that have been building momentum over the past few years that may warrant further exploration. Each of these designs respond to specific challenges that are present that are important to consider.

The first learning system design that is worth exploring further is the Vermont Oxford Network—started nearly 25 years ago by neonatologists seeking to learn from one another, VON now has over 500 member NICUs in all US states and in several countries. VON members submit their data to a commons and VON analysts automatically generate reports that benchmark one unit's performance against local NICUs, other similar NICUs in the state, and nationally. The VON data system contains information on over 2 million patients and 63 million patient encounters. VON members select areas where they demonstrate room for improvement and form "homerooms" around these topics (with somewhere between 8-10 NICUs in a homeroom). VON staff bring expert faculty to these "homerooms"-often the world's experts in a clinical topic of interest. These homerooms are designed to really build relationship between the organizations who are working towards a common goal. They most often share their data and results with one another, but VON does not make this a condition of participation. The data are their own and they are given the freedom to share it if they desire. Some homerooms will sign formal data sharing agreements with one another but this is optional for the participating sites. They visit each other on sites visits and often stay together for as long as two years. VON staff does not always participate in the site visits, but they provide logistical support and faculty to make the visit successful. Faculty for the homerooms were described by VON leadership as intensive with at least one clinic expert, a nursing expert, an improvement coach and a family member (as paid faculty). VON leadership feels the size of these are important as they allow a level of intimacy that creates social relationship, friendship and obligation between the participating groups.

In addition to the general membership and the homeroom concept, VON runs year-long face-toface and virtual collaboratives for its members on topics of interest (neonatal abstinence syndrome was last year's topic and this year's will be about antibiotic stewardship). These collaboratives are seeing incredible interest and VON has no trouble recruiting over 100 teams to participate in these collaboratives. They mirror IHI's traditional format 3 LSs and action periods in between over the course of a year. One important difference is that the data for the collaborative is usually already submitted by the team to the VON database and VON



administrators can use this very high quality data to benchmark performance and even conduct rigorous research studies within the VON membership on topics of interest. Resources from older VON collaboratives are available in perpetuity for all VON members to reference, look back at and participate in. It's essentially a benefit of being a VON member and since there is a new collaborative annually the library is always getting larger and this asset develops more and more depth.

The virtual collaborative has another very interesting feature that they call the VON day audit. On a pre-specified day in the virtual collaborative, all participating sites conduct a guided selfaudit. The audit is built around some key measures pertinent to whatever the topic of interest is and a sampling methodology that VON pre-determines. Teams are led to look through charts or make observations in their NICU on a given day. This allows teams to gain insight into how their unit is performing on measures of interest. One section of the VON day audit is about policies, procedures and guidelines (which may be gathered at the daily improvement meeting for example) and another section is an audit of actual patients in the unit on that day (or could be patients in the unit on that week depending on the nature of the change they are trying to implement). They do this VON day audit once in Feb (collaborative begins in January) and again in May and August to see how their performance changes over the duration of the collaborative.

VON utilizes a leveraged membership model to design its learning systems. Anchored on the VON database and the membership model, VON's architects use user-submitted data to benchmark performance among peers and then builds two dynamic learning models to help members respond to gaps: homerooms for more intense support needs, and collaboratives for more general interests (lighter touch). In this way VON is able to capitalize on its membership model with additional products and services that develop deeper relationships and build better results for their members. These build good will among VON members and has made it one of the most durable improvement and research communities we studied.

Using Clinical Registries to power improvement:

Eugene Nelson, Paul Batalden and Peter Margolis have all been working with Norwegian Business School professor Oystein Fjeldstad who has written eloquently about three different models for producing value in business: value shops (places where people go to receive worldclass service—Mayo clinic or MGH), value chains (value is maximized by making the process of providing care more efficient—Aravind eye care), or networks (value is produced by a network of actors working together, either tacitly or explicitly, towards a common purpose—Wikipedia or Improve Care Now).



Fee-for-service healthcare is rendered effectively as a set of products that one goes to the clinic to 'buy.' In the product-dominant logic of FFS systems, going to the best "shop" makes sense if you can afford it (Mayo Clinic or MGH) and if you cannot, going to the most efficient and yet most effective chain would be the next best option (imagine the home depot of clinical medicine). The problem with these are obvious, the first is overly reliant on the notion of craftsmanship and takes us back a generation in medicine, the latter often compromises on either efficiency or effectiveness to render a product that is cheaper but 'good enough.' Both suffer an additional problem, which is that health care is not really a product to be bought and sold, but rather an experience that is co-produced.

The most obvious example of 'co-production' in a service industry is going to a restaurant to eat. How often have you gone to the same restaurant and had two very different experiences. Part of that is attributable to the food itself and the wait staff etc., but a lot of it has to do with how you as a consumer approach the dining experience (lower expectations, unknown the first time; higher expectations the second). The outcome (a good dining experience) is, in the end, coproduced by those cooking dinner and those consuming it.

Capturing the user side of the health care experience has been particularly challenging for clinic records and therefore makes improving a co-produced service challenging. The Swedish Rheumatologic Association has collaborated with Gene Nelson and others to create an electronic system that can capture patient-reported symptoms and combines it with clinical data (labs and medication regimens) to effectively enable "n of 1" trials that can improve patient care and patient experience.

Figure 4 shows that there are multiple benefits of these efforts most obviously to patients and providers, but these data can be aggregated to allow for facility-level benchmarking to power quality improvement activities. In addition, aggregated clinically-enriched data can be used by researchers to understand trends in real-life therapeutic impact at a population level. Payers may be interested to use clinical data alongside claims data to better understand how to improve high value care delivery.

Clinical registries that receive either clinician or patient-submitted data can be leveraged not only for individual patient care improvement, but for organizational and system-wide learning. This kind of learning can be used to conduct improvement activities if registry-operators include the development of improvement capability as a core requirement of participation in the registry. There are several registries that have approached IHI in recent months to try to maximize the impact of the data collection they are doing for local improvement work.



An extension of this idea of using registry data to power improvement is something that Cincinnati Children's Hospital has been developing for the past several years: a co-produced data set on inflammatory bowel disease. This has had phenomenal results leading to IBD remission rates of 79% across all participating sites. Improve Care Now is a network model facilitated by CCHMC and developed in partnership with the care sites and the patients and families themselves.

Participating sites gain access to a vibrant learning platform that is constantly generating new insights and useful methods of caring for children with IBD (see figure). Some of these ideas are



from the care teams and others are coming directly from patients and families themselves.

The information in the ICN database is 'research-grade' so it can be used for both quality improvement purposes and for clinical trials and formal research. Improve Care Now is now utilizing this common data architecture to conduct several research studies and more will come down the line. Membership fees cover ICN costs and research studies

can be done for a fraction of the costs of a normally conducted RCT because high-grade clinical data are readily available through the ICN platform which has attracted attention from research organizations, universities and pharmaceutical companies.

Demand for these kind of network-based learning models are rising and CCHMC has established similar networks for cystic fibrosis, juvenile RA, patient safety and others. However, each of these is being developed as a new separate network and there are attendant challenges to the research infrastructure (common data standards, IRB, contracting, expertise etc.), technology and cost.

A different way might be to join forces with organizations like CCHMC to establish a network model for learning with a common learning system platform (technology and operations) that allows many (hundreds) of condition-specific or population-specific networks to grow. The architecture of this learning platform would have the following components:



LHS Platform

A resource to cultivate and grow networks

A Shared Services Organization

- Orchestration/network cultivation ٠
 - Design, implementation, support and community building services to facilitate network start-up and operations
- Technology to support
 - Use of clinical data (enhanced registry, QI analytics, data collection tools, data interchange)
 - "Commons" Repository (a learning exchange) to share member knowledge and know-how across the community to enhance implementation
 - Community engagement (patient/clinician engagement tools, innovation platform, others)
 - Personalized care (self-tracking, N of 1/precision medicine, more continuous communication)
- ٠ **Business Services**
 - Business development, legal, marketing and economic expertise to help each network maximize revenue and drive desired goals (better outcomes, better care, faster cures, lower costs)

LHS Consortium Value to Stakeholders

Patients

- · More reliable, effective care that drives better outcomes
- · Accelerates cures and treatments
- · Strong voice in care and research priorities · Opportunities to participate in their care and to contribute to health system transformation

Clinicians

- Tools, training and support for better care · Career development
- Shape care system and research priorities · Access to innovations and resources for
- innovation
- MOC, CME, CNE credit
- · Opportunities to participate in research

Researchers

- · Large-scale, comprehensive, data
- · Network of expertise and collaborations
- Engaged patients and clinicians New research funding opportunities
- · More competitive applications
- Career development opportunities

Pavers

- · Improved quality of care and outcomes · More predictable riskrepresentative
- research
- Better patient engagement
- · Engaged, aligned cliincians and researchers

LHS Consortium

- · Shared purpose impacting health
- · Highly engaged patients, clinicians, researchers and institutions
- · Pooled assets and innovations open
- to all Ongoing source of innovations
- · Demonstrated results in driving change in care at scale
- Training capability and opportunities for networking
- · Size and scale necessary for rare disease studies
- · Interoperable, federated, curated clinical data from millions of patients
- · Access to biorepository and genomic data
- Streamlined IRB and regulatory infrastructure

Disease Advocacy Groups

- · More value to patients faster impact on outcomes and care. Faster progress towards cures.
- More research per dollar of funding · Access to institutional expertise and
- capabilities
- · Reduced technology development and maintenance costs
- · Access to innovations at lower cost

Institutions · Realize core mission faster, cheaper and better

- · Faster learning about best practices by drawing on experience across institutions
- Access to best practice (clinical and research) tools at a fraction of the cost Builds improvement capability as part of
- daily work (cheaper than courses)
- · Increased opportunities for researchers
- More competitive research applications
 Access to new funding streams
- · Network performance drives local, state and national advocacy Fulfill MOC, CME, US News Requirements

Industry

- Larger studies, more representative
- populations, more valid answers Access to engaged patients and clinicians
- Access to expertise
- · Streamlined study infrastructure
- · Real world data from millions of patients across varied settings Speed to application of findings

Federal and Foundation Sponsors

- Speed, efficiency and impact. More research per dollar of funding. · More representative research
- · Ability to demonstrate impact on outcomes

30



Leverage well-curated repositories (commons-based peer production):

Increasingly, IHI is being asked to developed 'how-to-guides' with practical tips and tools for organizations to execute new service designs that lead to improvements for populations. For example, recently the Commonwealth Fund agreed to fund IHI to produce a Guide for improving care to high-risk, high-cost individuals as part of our work on the Better Health, Lower Cost collaboratives.

Our view of this is that similar compendia of better practices exist, but a continuously curated and evergreen Guide would be useful. The problems of complex needs patients will not be resolved in the next 18 months to 5 years. This will be a problem for some time and a continuously updated and well managed set of guidance to teams tackling these challenges will be worthwhile. Such guides could be updated regularly (bi-annually), pulling in new knowledge from the field and IHI's ongoing work, with new tools and resources added as they become available.

With some relatively minimal investment to continuously scan on this topic and bring in new and evolving better practices, the Guide could become the go-to place for knowledge about complex needs patients. Thus the Guide becomes a "repository" that evolves with time and new knowledge. IHI might select a few areas of focus for developing these kinds of knowledge repositories.

IHI can then leverage this Guide by querying it periodically for interesting ideas that are generating greater evidence of impact and hosting meetings/conferences or augmenting open enrolment programs with the key actors in the stories that are having an impact.

Another similar effort is the International Innovators Network—between the CMWF which has about 150 innovations, the network which generated another 105 ideas, IHI's innovation team with easily another 100 innovative ideas, a critical mass of interesting new ideas is being captured. Partnering with AHRQ's innovation exchange, UCLA's global innovation lab, Duke's global lab, and/or HBS's healthcare innovation competition might yield additional results. Putting these together (if it were possible to do so) would build an impressive library, metatagged with themes of importance, which could be periodically queried for the latest innovative thinking on "x". A meeting, conference or other 'product' that deepens understanding could be easily be developed on this theme.

The Collaboratory: Innovation & formative learning systems:



Many current collaboratives are 'formative' in nature—that is, the object of the collaborative is to establish the change package, measurement system and specific aims of the effort. A recent collaborative in New Zealand on improving opioid safety is a good example. The idea in this collaborative was to get teams from around the country together to share their best thinking about what works to improve opioid safety in the inpatient setting. The idea was that at the end of the collaborative, a theory of change would have been constructed, a driver diagram and a 'bundle' of best practices that could reduce harm from opioids in the inpatient setting.

Given what we've said above about collaboratives, this really was not the original intent of collaboratives which were supposed to have a theory of change, evidence-based change package and measurement system before launch. That said, we have seen many examples of precisely the kind of thing that NZ is working on actually having the intended effect.

Collaboratives allow for the socialization of knowledge amongst a group of peers working on a common purpose. This sharing of deeper understanding often does result in theory development and deeper understanding of what works. However, the terminology is confusing. Our proposal is that we use a different term for this 'innovation' or 'creativity' oriented learning system and that we build the learning system with intention to develop a theory of change.

One term might be "collaboratory"—a term that was popularized by William Wulf (a computer scientist)—and defined as a "center without walls, in which the nation's researchers can perform their research without regard to physical location, interacting with colleagues, accessing instrumentation, sharing data and computational resources, and accessing information in digital libraries." Over the years, collabortories have come to mean "an open space, creative process where a group of people work together to generate solutions to complex problems."

Built into the term is the notion of sharing knowledge (collaboration) and the idea that the purpose of this knowledge sharing is really about *generating new knowledge* (laboratory). This is in contrast to a collaborative in which participants share tacit and explicit knowledge for the purpose of generating a *result for patients*.

Methods may differ in a "healthcare innovation collaboratory" as they may focus on ideation exercises, creativity, human-centered design, lead-user design, lean start-up, ethnography, in addition to traditional research methods. The approach to learning is experimental and may be rapid-cycle. Ideally, in a collaboratory, data requirements and ethical requirements are more stringent as they would need to withstand investigational scrutiny and review. Authorship of new ideas is shared by all who contribute.



The Dash: Kick starting change in-situ

In our expert interviews, Professor Huggy Rao from Stanford named a design challenge of collaboratives that has far-reaching consequences: people must go home from learning sessions. And when they do, the energy built during the LS might dissipate as the realities of the day-to-day reasserts itself. We describe this at IHI as the "voltage drop" that participants in IHI courses, programs and Forums experience when they return home and we try to offset this known challenge with coaching calls and continued connection to IHI. But Professor Rao pointed out another reason for the voltage drop phenomenon—the messenger. Only a handful of people can go to the Collaborative Learning sessions and if the wrong people are selected without the requisite social and political capital (within the organization), the ideas they come back with may be met with skepticism and scorn.

So how can we potentially overcome this issue? Applying one of our Radical Redesign principles, "move knowledge, not people," we have developed an in-situ improvement kickstarter called the Improvement Dash. The idea behind the Dash is to engage a small, interdisciplinary, unit-based team (clinic, ward, community center etc.) to test and implement proven strategies to deliver safer, more effective, patient centered care. The participating team will virtually connect with subject matter experts and an IHI improvement advisor as they learn strategies to improve care, design innovative methods to try those strategies out in their local environment and receive on-going coaching and feedback to make their efforts successful.

Problem	Program addresses by
Difficulty in engaging clinicians in	Engaging participants for small amounts of
improvement work as part of a	time over a 2-week period, focusing on
multidisciplinary team	clinical innovation, testing and
	implementation, not heavy on improvement
	language until they have already done the
	work.
Provide a roadmap for engaging residents in	The program is designed to approach a short-
improvement work	term improvement project sequentially and
	gives explicit instructions for what
	participants will do and when they should do
	it.
Integrating QI education and application of	"Learn by doing": Leads participants through
QI into daily work.	testing changes as a part of their daily work.
	The program will not focus on teaching QI
	with QI language, but more about the process
	and benefits.



Participants desire shared learning from other	At scale, the program will engage multiple
organizations	organizations on the same topic and facilitate
	shared learning during the calls as well as
	through a web-based platform.
Seeing tangible results from employee	Program is designed to see tangible process
training on QI.	level improvement results within a very short
	period of time during the program.

Program Aim: To engage a group of multidisciplinary clinicians through distance learning technology to rapidly test and implement innovative solution to a local issue.

Program Format: 30 - 60 minute webinars with teams based in a care facility 3 times a week for 2 weeks total. Webinars would include limited didactic content, time for team planning and the team to report out on what they plan to test, as well as feedback and coaching from faculty and improvement experts.

Potential Topics: ADE (opioids), Pressure ulcer, VTE, Severe Sepsis, Iatrogenic delirium, c-diff, Choosing Wisely ABIM guidelines, HCAHPS measures – Knowing your doctor.

Guidance on Topic Selection: Prior to participating in the program, the Key Contact at a participating organization will be required to obtain sign-off from a leader signifying this is an issue that aligns with organizational priorities. The Key Contact will be encouraged to complete a priority matrix for the topic to gauge the importance, their ability to influence change, the length of the project, the expense of the issue prevented as well as the frequency with which it occurs.

Achieving rapid spread: A campaign of kaizen events in Malawi

IHI's new scale-up model involves initial prototype testing in the 'scalable' unit, followed by a test of scale (say to a State) and then "going to full scale." A lot of the specifics of the theory of change and detailed design will be worked out in the prototype stage. At the 'test of scale' level, the goal is to solve systems problems that come up at the larger system level. Also at this stage, there is an increased level of standardization to the changes as they reach larger numbers of health facilities and beneficiaries.

When going to full scale, there are several models that have been tried in the past: the wedge and spread concept and the chained collaboratives described earlier in the report. A newer design might be to take a handful of now standardized concepts and run a national or sub-national 'campaign' of rapid improvement events (kaizen events) at each health facility.

The idea here would be to take a relatively narrow set of clinical changes (this is being imagined for antenatal corticosteroid delivery to pregnant women in Malawi), standardize the process as



much as possible, develop a clear and simplified measurement system and then 'implement' the change at scale using a small team that circulates around the country and runs one-day kaizen events at every relevant clinical setting in the country.

Prior to the kaizen event, pre-work would be given to the sites that allow them to address the necessary workforce issues, information system challenges and supply chain defects. These should be well on the way to being solved before the team arrives for the kaizen event. On the appointed day, the kaizen change agents would work with the hospital/unit's teams to reorganize care, implement standard tools/checklists etc., and deploy the measurement strategy.

In the Malawian example, the kaizen events would take place at every labor & delivery ward in the country. Measurement infrastructure would be created and after the kaizen event national campaign supervisors would monitor the performance on the key measures that are being submitted by the facilities.

Key Recommendation 4: There appears to be a useful sequence to learning systems for improvement

Three factors appear to influence how and when to move from one type of learning system to another:

- Degree of belief in the change. As confidence in the change rises, this increases the ability to move from a more formative learning system to one that is more normative.
- Improvement infrastructure in the host environment. As understanding of technical improvement methods deepens, organizations can shift their learning systems as they will be able to adjust and adapt more readily.
- Macro-environmental changes. As the wider policy, payment and social environment shifts, the ability to leverage more normative models increases.

Consider several infection control improvement initiatives that in 2000 were quite formative and were being tested by a small group of innovative organization in what might have been known as a Collaboratory. The network expanded as DOB increased in the key changes and as social pressure mounted to reduce nosocomial infection rates. Collaboratives with sound evidence-based change packages were launch. IHI ran a national Campaign on some of the most mature and well described change ideas and ultimately as policy and payment changes occurred several of these were built into national initiatives like Partnership for Patients.



Key Recommendation 4

There may be a sequence to this...

- Degree of Belief
- Improvement infrastructure
- Macro-system support
- Move from innovation learning system to a testing/prototyping system to a spread system:

 $\mathsf{Collaboratory} \rightarrow \mathsf{COIN} \rightarrow \mathsf{Collaborative} \rightarrow \mathsf{Campaign}_{_{\mathsf{DOB}}} \rightarrow \mathsf{National\ initiative}$

Improvement infrastructure Macrosystem support

Open Questions:

- What is the proper use of enabling technology to accelerate learning?
- How do we stay focused on the bigger question of building knowledge and creating and spreading results?
- How do we increase the rigor of testing and measurement related to the change package?

Appendix: Standard Work for Collaboratives (from 2008 Results Collaborative Study)









Standard Work-Content Customized Learning



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