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RESEARCH AND EVALUATION REPORT

Towards more effective spread of improvement methods in lower and middle income countries: *A synthesis of the research*

SEPTEMBER 2011

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DISCLAIMER

The views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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ABBREVIATIONS

AIDS	Acquired immune deficiency syndrome
ART	Antiretroviral therapy
ARV	Antiretroviral
BTS	Breakthrough Series
C2C	Collaborative to collaborative
DOTS	Directly observed treatment, short course
HCI	USAID Health Care Improvement Project
HIV	Human immunodeficiency virus
IHI	Institute for Healthcare Improvement
LMICs	Lower and middle income countries
MOH	Ministry of Health
PAI	PharmAccess International
PDSA	Plan-Do-Study-Act cycle
PMTCT	Preventing mother-to-child transmission of HIV
PQI	Partnership for Quality Improvement (Tanzania)
QAP	Quality Assurance Project
QI	Quality improvement
QIC	Quality improvement collaborative
TB	Tuberculosis
TSST	Tanzania Spread Study Team
URC	University Research Co., LLC
USAID	United States Agency for International Development
VAP	Ventilator-associated pneumonia
WHO	World Health Organization

EXECUTIVE SUMMARY

Introduction

This document presents the results of an assignment commissioned by University Research Co., LLC (URC) for the USAID Health Care Improvement Project (HCI). The assignment was to review research to find evidence about how effective collaboratives may be for teaching and enabling health workers to use quality methods to make improvements to their health care services in lower and middle income countries (LMICs) and to spread the use of these methods. The assignment excluded assessing other results of collaboratives, such as their effectiveness for improving health care. Fifteen days were allocated for the assignment, which also included liaison with URC personnel involved in the HCI studies requested to be included in the review.

Method

A search in PubMed was made for research into quality improvement collaboratives (QIC) in LMICs. Other searches were made in Google Scholar and of the indexes of international health and quality journals, and inquiries made to two authors of the primary published studies which were found, as well as to three colleagues in LMICs for their knowledge of studies made or in progress. Other conference oral and poster presentations were also identified.

The studies identified were summarized for any evidence reported about the collaboratives as a method for teaching, enabling, and encouraging health workers to learn and use quality methods. In addition, research into methods for evaluating training was reviewed in order to define the data needed to assess the impact of collaboratives on knowledge of, skills, and use of quality methods by participants. The review also noted evidence and lessons learned about spreading “change ideas” through collaboratives.

Findings

The search found two empirical descriptions and assessments of QICs in LMICs published in refereed scientific journals, and two reports about improvement collaboratives from the USAID Health Care Improvement Project. Three other URC synthesis reports were found which presented collections of previous URC studies of collaboratives. The outcomes reported by most studies were changes in patient care practices, processes or patient outcomes (“improved outcomes”). None of these studies were designed to provide evidence about the use of quality methods by health care personnel participating in the collaboratives.

Use of quality methods

Assumptions were made that the changes in outcomes were a result of the quality teams and that they could not have achieved this without taking part in a collaborative. The use of quality methods cannot be inferred from the improved outcomes reported in these studies. All studies used uncontrolled time series data to attribute improvements to the efforts of the team, so other explanations for the improvements cannot be excluded. In addition, teams may have achieved improved outcomes without using quality methods and by using their own approaches to implement the changes proposed to them by the collaborative. Further, collecting data about indicators is not exclusively a quality method, and this can be taught and learned without a collaborative or without knowing about quality methods.

Other interventions to teach and spread QI methods in LMICs reported in the research include training programs (Øvretveit and Serrouri 2006), training programs with regional visiting facilitators (Bouchet et al. 2002), other approaches used in URC-supported programs (HCI 2008), and the IHI “open school” internet program (IHI Open School 2011).

Spreading change ideas

Although the brief for this assignment was limited to summarizing evidence about the spread of quality methods, the review also noted evidence and lessons learned about spreading “change ideas” through

collaboratives. It found some evidence to suggest that collaboratives in LMICs were effective for spreading change ideas between the teams in one collaborative, and sometimes between teams in successive waves of collaboratives. It was not clear how much visits by experts to the teams between the learning sessions also contributed to this. One study found that such experts were the main medium through which lessons about change from an initial collaborative were spread to teams in later collaboratives.

In summary, the limited and mostly indirect evidence suggests that collaboratives may be effective ways for teaching, enabling and encouraging teams to learn and use quality methods. However, there is insufficient evidence to show whether this aim could be achieved more effectively and more cost-effectively in other ways. There are wider questions which remain about whether teaching and using quality methods is more effective than other ways for implementing proven improvements and about whether improving quality in these or other ways is the best use of resources for improving health in some or all LMICs.

Practical implications and recommendations

Research is needed to compare the effectiveness and cost of collaboratives for different purposes and to measure the sustainability of the changes they achieve. Meanwhile, the rationale for using QICs for both these purposes is strong, and there is also some evidence that QICs can achieve significant process and outcome improvements. The review therefore recommends:

For improvement practitioners:

- More effective ways to ensure that collaboratives which follow an earlier collaborative both receive and use materials developed by the earlier teams, especially if a purpose of the first collaborative was to adapt and test the changes selected for implementation;
- Developing and disseminating over the internet learning packages and materials, possibly in collaboration with the IHI “open school”;
- Continued experimentation and refinement of the collaborative method for different situations, including combining collaboratives with resource reallocation and management-system strengthening strategies, and virtual collaboratives.

For improvement researchers:

- Documentation of and research into these experiments to enable others to learn which modifications might be best for which situations and purposes;
- Research into whether and how health personnel taking part in collaboratives learn and use quality methods, and the barriers and facilitators to this;
- Research to discover and explain variations in results between teams in one collaborative, and which considers both differences in the actions the teams took and differences in the supportive features of the teams’ organizational and wider context;
- Research, informed by theory, about which context factors are necessary for team and collaborative success and about possible pathways through which collaborative and team actions may result in changes, which then result in improved outcomes;
- Research comparing implementation of proven improvements through different approaches, including those not using quality methods, as well as those which do, and also approaches using QICs alone or in combination with other changes;
- Research to establish whether adaptation by teams of proven changes is necessary, or for which changes exact replication is required to achieve improvements.

I. INTRODUCTION

There are good reasons to improve the quality of health care services and there are many ways to do so. One way is to find treatments or care models which are more cost-effective than those being used and enable many more professionals and services to use them. Implementation approaches to achieve this “spread” of more effective care vary in their success. One strategy to carry out such spread is through a quality improvement collaborative. This approach also aims to spread the use of quality methods. Collaboratives can be used to implement specific proven changes or to test promising changes.

The purpose of this document is to present research findings about whether and how collaboratives enable health workers in developing countries to learn and use quality methods. It also presents findings from research about collaboratives as a way to spread change concepts and concludes with a list of the practical and research implications of the findings.

A. Why Improve Health Care in Lower and Middle Income Countries and How to Do It?

Research shows that many health care services are less effective than they could be, sometimes harmful and often inefficient, resulting in unnecessarily high costs and waste (Øvretveit et al. 2009, 2011a). There is evidence of similar underperformance in health care services in lower and middle income countries (LMICs) (Nolan et al. 2001; Hermida and Robalino 2002; Rowe et al. 2005, 2001, 2000; Harvey et al. 2004). The case for improving the quality of health care in these countries has been made in several reports and studies (Nicholas and Heiby 1991, Berwick 2004, USAID HCI 2008, Leatherman et al. 2010).

More LMICs are using different approaches to improve quality in response to public demands and as a way of making better use of resources (Peters et al. 2009). Different approaches have been proposed and are being used, including generic strategies which include increasing the number of health workers, providing more effective financial incentives, and more quality-specific strategies such as accreditation by regulatory bodies (Øvretveit and Klazinga 2008).

One attempt has been made to list these approaches and systematically to assess their comparative effectiveness and appropriateness for different LMICs (Peters et al. 2009). This study did not reach definitive conclusions, but did show the choices available to decision makers wanting to improve the quality of specific services or of many in a country strategy.

1. Implementing specific proven interventions

One way to improve quality is to find more effective treatments, practices, service delivery models, or management methods, and to put them into more widespread use. Different methods have been used to “spread” these “proven improvements,” “strong practices,” or “high-impact interventions.”

For example, directly observed treatment, short-course (DOTS) for tuberculosis was rapidly spread over three years to be available to 450 million people in India. The strategy involved a phased expansion of a combination of actions, including full-time independent technical support and supervision, strengthening infrastructure and supporting staff, and monitoring and feedback (Khatri and Frieden 2002).

There are other “spread approaches” such as a line management hierarchy directing personnel to adopt a new practice or model with accountability. Similar to this is a “vertical program,” which is usually another line management hierarchy for implementation parallel to the main line management. Another is through professional associations providing practice guidelines, or through regulatory bodies such as accreditation agencies requiring implementation of the proven intervention (Peters et al. 2009, Burgers

et al. 2011). These and other studies have shown the limited success of these approaches in bringing about more effective practice or service delivery models.

2. The same “improvement content” can be implemented by different “implementation strategies”

One distinction highlights the possibility that different methods can be used for achieving the same change. This is to distinguish the improvement (the “change content,” e.g., the DOTS concept), from the method for putting the improvement into practice (the “change process,” e.g., the stages and actions, or “implementation strategy” for DOTS) (Pettigrew and Whipp 1991; Øvretveit 2011b). The “change content” is the change to be achieved (e.g., immunization of children under five years of age in a rural area where under young children were not previously immunized). The “change process” could be through improved vaccine logistics and training primary health care workers, or it could be through contracting private health services to deliver immunization.

3. Quality methods

One approach for implementing changes which are known to improve people’s health is to do so through using quality methods. A central idea is for providers to test small-scale changes using a “plan, do, study, act” (PDSA) cycle. This guides providers to plan and carry out a change and collect data to assess the results before revising it or establishing it as the norm. If the change is previously proven to improve health, then the data collection does not need to assess health outcomes but concentrates on collecting data about compliance with the change.

Quality methods are tools and techniques which can be used by health care workers systematically to diagnose quality problems, plan and implement solutions, measure and evaluate the results, and repeat this as necessary (Plsek 1999, Øvretveit 2003). These methods can be used either to formulate the change “content” to be implemented (e.g., “our analysis and assessment of the options leads us to propose distributing impregnated bed nets for preventing malaria”). Alternatively, the methods can be used with an already-formulated “change content” which is given to teams to implement (e.g., “Issuing of Cotrimoxazole in Reproductive and Child Health clinics instead of the routine issuing only at the care centers”), and the methods are used to plan implementation and test whether the change is made and that the new practice or service organization is established.

4. Quality improvement collaboratives

One approach to spreading improvements has been relatively successful in high income countries and has shown some results in LMICs: quality improvement collaboratives (QICs) (Kilo 1998). This method aims not only to spread quality improvement, but also to spread the use of quality improvement (QI) methods and to give many people the skills, attitudes and motivation to use QI methods in a systematic way.

It is thought that improvements are more effectively implemented through using quality methods. Collaboratives spread the use of QI methods by teaching and supporting health service personnel to use the methods to plan, test, and carry out changes to their health service. These methods are often used locally to adapt and test quality improvements or change ideas which are already proven to be effective. However, as noted above, the methods can be used to develop, test, and apply improvements designed by these personnel specifically for the particular problems in their service and which may not have been proposed or used elsewhere. This is termed “local improvement through innovation” using quality methods.

There are many variations of the QIC. Originally a peer learning network approach (Plsek 1997), the collaborative method was formulated as a model (Kilo 1998) and promoted by the Institute for Healthcare Improvement (IHI 2003) and applied in different versions in many high income countries (Wilson et al. 2001). The original model invited between 20-40 different teams from different service-providing organizations to three-day meetings every three months over a nine-month period to learn

the methods, hear about examples, and get advice and support from experts who are available between the learning meetings (Kilo 1998). Variations include:

- More than three learning sessions;
- Extensive use of internet materials and support;
- Use for exactly implementing specific proven improvements or for locally adapting and testing more general change ideas;
- Using QICs as a generic problem-solving approach and way to enable local teams to diagnose and solve their own quality problems, with or without suggestions about which problems to address;
- Multiple collaboratives in a “spread wave program,” where one collaborative is followed by others in other areas or on other subjects. This may involve later collaboratives using materials or learning developed in earlier ones (McCannon et al. 2008) or a “development-then-spread” collaborative approach (Øvretveit and Klazinga 2008).

B. Quality Improvement Methods and Collaboratives in LMICs

This review considers what has been learned about collaboratives and other approaches for spreading the use of QI methods. QI methods are a set of “tools” which a quality improvement project team in a service uses to identify, define, and prioritize quality problems (Plsek et al. 1989). There are also tools which such teams use to plan changes to resolve the problems, test the changes, and decide how to revise and implement changes which are effective. Evidence of the individual effectiveness of these tools and of use in combination, for example in the improvement model (Langley et al. 1996), has been reported in Øvretveit 2005.

URC and IHI taught improvement teams in LMICs to use improvement methods in the 1990s. Both organizations reported success with different programs to carry out this teaching, in terms of the use of the methods by the teams, and the results in improvements in care, patient outcomes and resource savings (Bouchet et al. 2002, Berwick 2004).

In the early 2000s, use of QICs in LMICs was pioneered by these organizations, following experience of effectiveness of QICs in high income countries (IHI 2003). From 2003, USAID funded the Quality Assurance Project (QAP) and its successor, the USAID Health Care Improvement Project (HCI), to carry out collaboratives in LMICs (Franco et al. 2009).

QICs in LMICs show features which are different to some QICs in higher income countries, or which accentuate aspects of the traditional QIC model:

- Extensive pre-collaborative planning, often between collaborative advisors or technical experts (often IHI or URC) and Ministries of Health and collaborative implementing bodies (Catsambas et al. 2009);
- Participation by teams and health care services was often required whereas it was voluntary for most teams in high income countries;
- Often, general “change ideas” requiring interpretation and adaptation to new settings were used rather than “prescribed proven interventions.” This sometimes occurred without local examples at the start of the collaborative;
- Sometimes an initial collaborative was for developing and testing change ideas, which were subsequently spread in later collaboratives (e.g., TSST 2010);

- Sometimes a collaborative was part of a larger program for spreading improvements, combined with visiting expert facilitators (TSST 2010) and/or extra resources or reallocation of resources to strengthen facilities and the health system (Youngleson et al. 2010).

Questions about the cost-effectiveness of QICs in LMICs have been raised, both as a method for achieving and sustaining improved services and outcomes, and as a method for establishing the use of quality methods in routine services in the same way that these questions were raised in high income countries (Mittman 2004). Experiments with modifications which reduce costs have been made, especially learning session costs for participants, including virtual collaboratives (Speroff et al. 2010, Boushon et al. 2006) and these might be usefully tested in LMICs.

Reports from HCI and elsewhere showed that for some purposes QICs were successful in LMICs (Catsambas et al. 2008), although questions about the sustainability of results and use of the methods remain. No systematic comparative effectiveness study has been made of QICs in relation to other approaches, either for enabling the use of quality methods in routine practice, or for implementing improvement changes. However, HCI is undertaking a study comparing the costs and effectiveness of collaboratives to in-service clinical content training, the results of which will be available in 2012.

The purpose of the present review was to find and summarize research about the use of QICs in LMICs to enable service personnel in LMICs to learn and use QI methods.

II. METHODOLOGY

A. Objectives and Questions

The initial aim of this review was to find and summarize research knowledge about QICs as a method for spread which could be used to plan future collaboratives. The principal audience of this review is USAID and HCI personnel and others interested in implementing improvement methods in LMICs. The decisions to be informed were how to plan future collaborative programs and research on the subject in LMICs. The initial task assignment was:

1. *“Review the studies on spread in improvement collaboratives conducted by the USAID HCI Project;*
2. *Review other published literature on spread from improvement interventions;*
3. *Consult with HCI R&E and country teams (facilitated by the R&E team) for background information on the studies and their contexts as needed;*
4. *Summarize the methods and analyze the findings from the spread studies to determine major patterns and themes existing across countries and settings;*
5. *Compare and contrast findings from the HCI studies to spread reports from other settings;*
6. *Describe any gaps in the research done so far in shared learning by HCI and develop concepts for improving the methods for future studies;*
7. *Consult in person with HQ staff on the contents of the synthesis report;*
8. *Compile the above in a written report.”*

In order to conduct the assignment it was necessary to define what was meant by “spread.” Previous research has shown that “spread” can refer to different activities and desired outcomes, and that different methods may be more effective for one type of spread and less effective for another type (Øvretveit et al. 2009; Øvretveit 2011a, 2011c).

Further clarification of the focus of the review with HCI established that the report should focus on lessons about collaboratives as a way of enabling more people to use quality methods, rather than on collaboratives as a way to spread more effective practices and service delivery models.

With regard to task 4 above, only aspects of the reviewed studies relating to spread of the use of quality methods were to be addressed. Similarly, task 6 was to focus only on gaps relating to knowledge about effective methods for enabling and encouraging health personnel to use quality methods.

Although these limits and 15 days were set for the assignment, the author also considered and reported evidence from studies about the spread of “change ideas” and effective practices, as well as the spread of QI methods.

B. Method

Taking into account time and resources available for the review, the steps and methods chosen to find and present research which could answer these questions were as follows:

- ***Step 1: Decide a way to assess use of quality methods and the effectiveness of interventions to enable their use***

The method used was to review evaluation research into training and education and into programs to establish the use of QI methods in health services. The aim was to identify best practice for measuring the extent, appropriateness and effectiveness of use, and for evaluating the effectiveness of training or other interventions for this purpose.

- ***Step 2: Review of reports provided by HCI***

This involved summarizing the HCI studies referred to in the assignment tasks, in terms of: a) methods used to describe and assess the intervention to enable personnel to use improvement methods; b) strengths and limitations of the method for this purpose; c) main findings about use of improvement methods; and d) practical implications for faster, more widespread and effective spread of the use of improvement methods.

- ***Step 3: Search for and review research into other improvement collaboratives in LMICs and compare to the HCI studies in terms of their assessment of the use of improvement methods***

A search was carried out in PubMed using, in various combinations, the terms quality, improvement, collaborative, low income, low resource, and middle income. Two published empirical studies were found, and a search was performed in Google Scholar which did not reveal any other published empirical studies. A search of the IHI web site and of quality and international health journal indexes was performed to identify other studies as well as contacting the authors of the published studies. The results from the search are presented in the findings section. The identified studies were summarized using the same summary items as a)-d) in step 2 above. This summary was then compared with findings from step 2 above.

- ***Step 4: Identify knowledge needed for better spread of improvement methods in LMICs***

This step involved reviewing and summarizing the above findings to identify gaps in knowledge about this subject, research challenges, and solutions and knowledge needed for faster, lower cost and more effective spread of improvement methods.

- ***Step 5: Summarize the practical implications***

This step involved drawing on the summaries above to form recommendations for practitioners seeking to spread improvement methods and for researchers.

For the review in step 3, the research is indexed and stored in many different databases, and uses many different research designs providing different types of evidence about an ill-defined subject. For this review, an iterative management research review method was used. This is described in Øvretveit (2009b, 2005a, 2005b and 2003b) and Greenhalgh et al. (2003).

1. Concepts

A decision about which research and evidence to include and exclude in the review depends on the definitions chosen of “spread,” “scale up,” and “improvement method,” and on criteria for “evidence.” Broad definitions of these terms would lead to many more studies and reviews being included than with more narrow definitions. An initial scan of the research showed that each concept was often not defined in research, or had different definitions in different studies. The general definitions used to guide the initial search and selection of studies were as follows:

Spread: an intentional and systematic approach to improving health care which seeks to apply more widely a change, or a method for making a change, which has already been found elsewhere to result in improved care.

Spread approach: a structure and set of actions for implementing a proven change beyond a few providers or sites, but one which is distinctive, and definably different from the actions taken in another “approach” to implement either the same change or another type of change. This report focuses on the collaborative approach but there are many other approaches (e.g., Natural diffusion; Extension agents; Emergency mobilization; Grass roots organizing; Wave sequence; Campaign model; Hybrid models, etc. described in McCannon et al. 2008 and Massoud et al. 2010).

Quality Improvement Method: a systematic approach for diagnosing under-performance, and/or to planning and implementing a change intended to improve practice or a service.

Quality Improvement Collaborative (QIC): group of quality improvement teams made up of practitioners from different sites who meet periodically to learn change ideas and quality methods from experts and to exchange their experiences with making changes (Øvretveit 2002a).

Improvement: a change in provider behavior or organization which results in better patient experience, and/or clinical outcomes, and/or a lower cost service, or which results in intermediate outcomes thought likely to lead to better final outcomes (the “content” of the improvement, rather than the method for making or implementing the improvement (the “improvement method”)).

Patient Outcomes: differences before and after an intervention in patient satisfaction, clinical outcomes, and cost per patient measures which can be attributed to the intervention.

Change idea or change concept: *“a general idea—with proven merit and a sound scientific or logical foundation— that can stimulate specific ideas for changes that lead to improvement. Using change concepts and combining them creatively can inspire new ways of thinking about how to improve processes”* (IHI n.d.). Two examples from TSST 2011 are “Organizing the patient filing system for easy retrieval and storage,” “Establishing a mother-child register to link HIV-exposed children with their mothers,” and “change: an organizational arrangement that did not exist at a site before, but was tested to see if it yielded improvement.” Local specification and testing is necessary.

Prescribed change: a closely specified or prescribed way assessing, treating or managing care for a patient, or for carrying out a work process (e.g., administer appropriate prophylactic antibiotics one hour before surgery to reduce post-surgical infection). For already proven prescribed change, adaption may reduce effectiveness and measurement would be needed of implementation rather than of outcomes if these have been proven elsewhere.

The search and review was initially confined to improvement spread approaches in health care services in medium and low income countries, and then supplemented with findings from research on the subject in high income countries.

2. Initial conceptual framework

Two recent overviews of spread research were used to formulate the following framework to summarize the studies to be examined in this review (Øvretveit 2011a, Øvretveit 2011c). These

proposed that a study would need to describe these features of a spread program in order to provide useful information for others who were planning spread programs:

- Type of improvement to be spread (“What” is spread?)
- Receiving person, organization or system (“To whom?” is it spread)
- The method, structure and system (“How” is it spread)
- Responsible spread implementer (“by whom?”)
- Main findings
- Methodological issues in the research (design, data validity, attribution and generalizability (i.e. internal and external validity))

The above framework was used in this review to summarize the above aspects of programs reported in empirical studies of spread, but focusing on the spread of QI methods rather than on improvement.

III. FINDINGS

The review found little research into spread of quality methods. Consequently, the review chose to widen the brief to also present evidence about the spread of “change ideas” which was reported in the research reviewed. The review findings are presented under the following headings:

- How can we measure the use and spread of quality methods?
- Findings about spread from primary empirical studies of collaboratives;
- Findings about spread from synthesis of a number of studies about spread;
- Summary: findings about the spread of quality methods and of change ideas;
- Practical implications and recommendations for improved spread of quality methods and change ideas and for research.

A. How Can We Measure the Use and Spread of Quality Methods?

How can we find out if health care workers use quality improvement methods, and how can we evaluate the effectiveness of an intervention to enable their use of these methods?

A limited review of educational evaluation literature was undertaken to identify good practices in assessing the effectiveness of educational events or programs.

No publications were found in searches in PubMed or Google Scholar which focused on how to measure whether or how well personnel used quality methods, or how to evaluate training or other programs to enable personnel to use quality methods.

Therefore five general publications describing good practices in measuring and evaluating education were used to formulate ways to measure and evaluate use the use of quality methods (Guskey 2000, Freeth et al. 2002, Seifer and Holmes 2002, Bringle et al. 2004, Goldie 2006).

1. Measuring the use of quality methods

Guskey 2000 proposes a model for evaluating learning processes and impact at different levels which is relevant for studying learning and improvement within communities or networks:

- Individual expectations, reactions and learning.
- Individual use of knowledge and skills.

- The extent to which the individual's home organization supports and enables or spreads changes.
- The extent to which the wider network functions to support individual- and organizational-level knowledge and behavior changes.
- Higher level outcomes in terms of how the program influences future policy or other changes.

The categories proposed by Freeth et al. 2002 were selected as best representing a first operationalization of the ideas presented in much of the literature about the different outcomes from an educational intervention. These were modified for this review as shown in Table 1 for education in quality methods.

Table 1: Outcomes from an educational intervention (modified from Freeth et al. 2002)

1	Reaction	Learners' views on the learning experience and its use for enabling them to use quality methods in every-day work
2	Modification of attitudes / perceptions	Changes in perception or attitude towards the value of improving quality and the use of quality methods to do this.
3	Acquisition of knowledge / skills	About quality principles and skills to use quality methods.
4a	Behavioral change – use	Whether participants use the methods in every-day work, especially measurement related to targets set.
4b	Behavioral change – correct and effective use	Whether participants use the methods correctly and effectively in every-day work

Other studies have emphasized features of collaboratives which may be important for achieving improvements in patient outcomes. These were considered as possible measures of the outcomes of a collaborative:

- Motivation: to start using and to overcome obstacles which make difficult the application of quality methods in everyday work, and to achieve measurable improvements.
- Sustained behavioral change: whether participants are using the methods one year or longer after the last meeting with other participants.

There are other possible outcomes apart from changes to individual participant's motivation, attitude, skills and behavior. These are whether as a result of the collaborative:

- Participants teach or pass on their learning and/or materials provided by the collaborative;
- The organization establishes the use of quality methods as a policy and makes arrangements which make it easier to use quality methods. Examples are providing measurement and data support, and making arrangements for personnel to take time from routine work to spend on using QI methods.

Other indirect impacts of a collaborative could include one or more of the following items identified at an expert meeting in 2008 considering QI in LMICs (Leatherman et al. 2010):

- Service delivery: QI closes the gap between actual and achievable practice.
- Health workforce: QI enhances the individual performance, satisfaction and retention.
- Information: QI enhances the development and adoption of information systems.

- Medical products and technology: QI improves the appropriate, evidence-based use of limited resources.
- Financing: QI helps optimize the use of limited resources. QI helps reduce the costs of financial transactions.
- Leadership and governance: QI strengthens measurement capacity, stewardship, accountability and transparency.

2. Evaluating the effectiveness of an intervention to enable health workers to use quality methods

Three approaches to evaluation are described in the literature:

- To assess outcomes in relation to the objectives of the intervention, termed “intervention-objectives evaluation” (e.g., to provide skills to carry out a PDSA cycle).
- To assess outcomes in relation to independent criteria, some of which may be different to the objectives of the intervention, termed “criterion-evaluation” (e.g., to raise motivation to overcome obstacles to applying quality methods, to improve quality of care for patients in care practices, processes and outcomes).
- Comparative effectiveness evaluation: to compare the intervention to another or nothing in relation to its achievement of certain objectives.

As regards the quality of an evaluation, a simple way to assess the quality of an evaluation is in relation to the following questions:

- Was the description of the intervention and its context sufficient to allow replication elsewhere?
- Were data about outcomes collected which were appropriate for the evaluation objectives, and were the data valid and reliable?
- What is the degree of certainty provided by the evaluation design and the report about whether the outcomes were caused mainly or only by the intervention?

3. Assessment criteria

Criteria for assessing effectiveness of an intervention in establishing QI methods in routine practice:

- 1) Reaction by learners (e.g., as measured by answers to questions about satisfaction, and intention to use the methods)
- 2) Modification of attitudes / perceptions about quality and quality methods (e.g., as measured by answers to questions about the value of improving quality and the value of using quality methods for this purpose)
- 3) Acquisition of knowledge / skills (e.g., as measured by testing knowledge or skills)
- 4) A. Behavioral change – use (as measured by self reports of use by participant or other organizational member or observation of use by researcher)
B. Behavioral change – correct and effective use (e.g., as measured by self reports of use by participant or other organizational member or observation of use by researcher)
- 5) Organizational adoption and institutionalization – formal (which is a result of the collaborative; as assessed by formal statements requiring or encouraging the use of quality methods, and by formal arrangements for enabling personnel to use the methods)

Criteria for assessing an evaluation of an intervention in establishing QI methods in routine practice:

- 1) Description of the intervention and its context was sufficient to allow replication elsewhere.
- 2) Appropriate data about outcomes collected (e.g., the data listed earlier), and these data are valid and reliable.
- 3) Degree of certainty the study establishes about the intervention being the main or only explanation for the outcomes.

4. Summary

Criteria and methods for evaluating the effectiveness of interventions to teach, enable and encourage health personnel to use quality methods were derived from literature on good practices in educational evaluation.

These include learners' satisfaction with the learning, their change in knowledge about quality methods, their change in motivation to use the methods, self reports about their use of the methods, observations about their correct use of methods, documentation indicating that the methods are used correctly, and documentation of whether the organization adopts the use of methods or allocates resources to make it easier to use the methods.

The review examined whether studies:

- Described how well teams used quality methods;
- Provided details of how much change ideas were spread to teams through the collaborative;
- Gave any evidence of whether these teams taught and supported other teams to use the methods or to try the change ideas.

B. Findings about Spread from Primary Empirical Studies of Collaboratives

A search on PubMed and Google Scholar identified two studies of single collaboratives published in peer-reviewed scientific journals (Unahalekhaka et al. 2007; Youngleson et al. 2010). Two recent studies of single collaboratives in the HCI Project were provided by URC for inclusion in the review (TSST 2011 (Tanzania) and Hurtado et al. 2011 (Guatemala).

1. Tanzania: Spread of PMTCT and ART (TSST 2011)

Summary

The purpose of this study was to examine the spread of better care practices and how change ideas were shared between teams in the collaboratives and with others (TSST 2011). The program aimed to implement better care practices for HIV and AIDS services through regional collaboratives carried out in sequence, including visits by coaches. The first in Tanga region began in May 2008 with teams in six hospitals and two health centers. The second began in March 2009 with teams in six hospitals and five health centers. The third began in June 2009 with teams in five hospitals and four health centers, and the fourth began November 2009 with teams in five Hospitals and five health centers. Collaborative activities in each region included pre-work, learning sessions, coaching visits (five visits over 22 months were carried out for the first collaborative), action planning, and agreements with QI teams on indicators to be monitored. Changes and ideas from the previous collaboratives were introduced to the new regions during the pre-work, learning sessions, and coaching visits. The aim was that experience from the previous collaborative would inform the next collaborative in a different region.

Both qualitative and quantitative data were collected from 25 sites in three regions to discover exposure to and sharing of change ideas, the changes implemented, and factors that facilitated or hindered sharing and uptake of change ideas. A "change" was defined as "an organizational arrangement that did not exist at a site before, but was tested to see if it yielded improvement."

Findings

No evidence was reported about the extent to which the collaborative enabled participants to learn and use quality methods or about how methods were spread. However, this study did provide evidence of the spread of change ideas within and between collaboratives.

Pre-collaborative national meetings between the HCI support team and the implementing partners who ran the collaboratives were held to develop the improvement objectives, change packages and indicators for the collaborative. The study reports that, *“the change package was added to significantly over the course of the collaborative, as teams tried changes to see whether they yielded results.”*

Sixteen effective changes were formulated from the experience of the first collaborative, but the study reports that only four were implemented in all 25 sites in the three regions studied. These included:

- Issuing a two-month supply of ARV for clients living far from Care Centers;
- Organizing a patient filing system for easy retrieval and storage;
- Establishing a mother-child register to link HIV-exposed children with their mothers;
- Issuing of Cotrimoxazole in Reproductive and Child Health clinics instead of the routine issuing only at the care centers.

On average 12.6 of the 16 changes were tried in each facility.

Reviewer’s conclusions from this study about spread of QI methods or change concepts

The learning through collaboratives reported by the study was as follows:

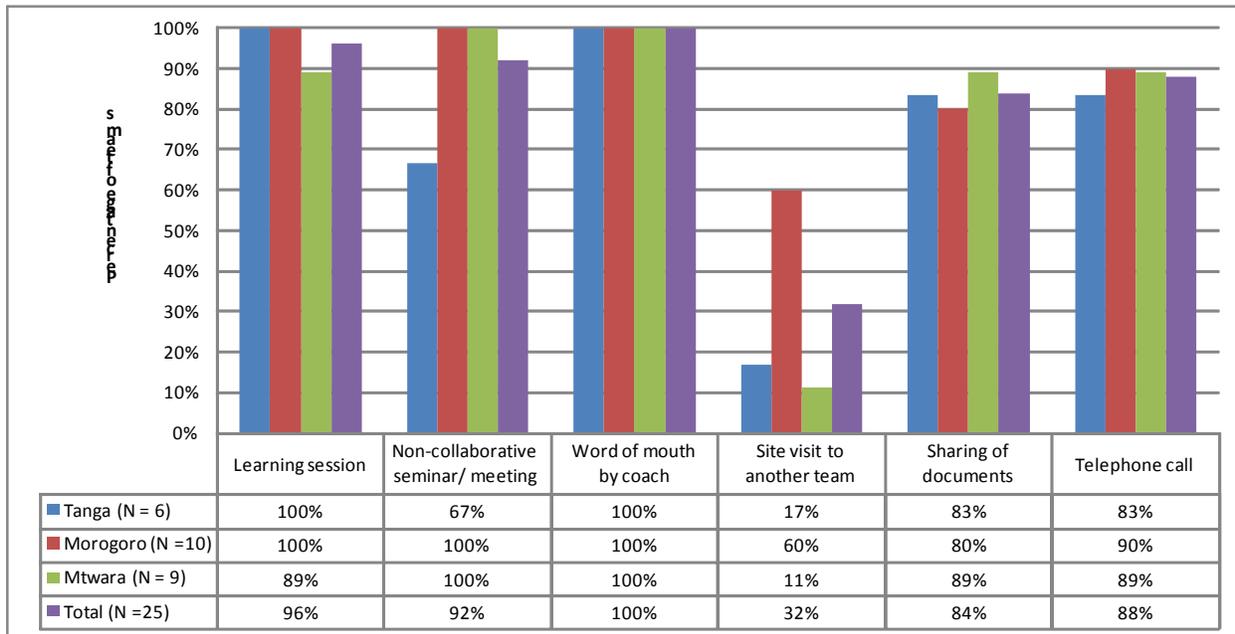
“During learning sessions each team presents its achievement or failures in the past quarter and there is a robust discussion and suggestions on how to improve the approach. Teams tend to come prepared to defend their work thereby improving team work, and other teams considering taking up the idea into their program can learn how to avoid the earlier mistakes committed by the original team. The information shared usually includes run charts showing the trend, sequence of events, examples and case studies. As the learning session organizers included the PQI leadership team of HCI and PAI, learning sessions were also an opportunity to share ideas that came from other regions (such as Tanga to Morogoro). Coaching visits was another collaborative mechanism used to expose teams to ideas and results of other teams. The coaches travel with laptops and projectors so they can share process maps and run charts for other teams and other regions.”

There was learning between collaboratives (“C2C spread”), one example being:

“For Morogoro, five indicators out of the eight tracked in Tanga were chosen, and the Tanga change package was adapted to guide implementation in Morogoro. The “better care practices” from Tanga were introduced to Morogoro during the first learning session, and into the training manual that HCI developed. These experiences were shared as examples, but did not include all the details. In most cases, the Morogoro teams were given the change concepts and if they thought it would work then they were encouraged to tailor it to their situation. Run charts from Tanga were used to illustrate issues. Teams from the 11 sites in Morogoro meet quarterly to share and discuss changes in health outcomes as benchmarked by the specific indicator.”

Overall the study found that teams reported wanting detailed information about “how to carry out” the changes proposed in the collaborative. The most commonly used (and also the most favored methods) of presenting information about changes were oral presentations with visuals, written descriptions, provision of tool/materials, evidence on effectiveness and warnings to avoid failures. Learning sessions and coaching were reported by participants to be the main ways in which they learned about or shared changes with other teams. Other meetings, site visits, and phone calls were also used.

Figure 1: Ways in which change ideas were reported to be spread in three regions (TSST 2011)



The study reports that the changes most often tried were those which were simple and “straight-forward in implementation,” and whether teams possessed the authority or resources to implement the activity. It noted that, “Changes that required use of community or home-based care workers, or that required moving out of the clinic were less frequently implemented,” and, “effective changes that were being spread were already being implemented in many sites in Mtwara before the start of the collaborative.”

Changes which were successfully spread also were those for which there was evidence that it could be implemented in many settings and that it resulted in improvements. External support was the most important factor favoring implementation while lack of technical support was the top hindering factor. Staff engagement and staff resistance were also cited as important factors impacting the implementation of a change.

The study also reported that the teams in the first collaborative learned mostly from each other, while teams in the later collaboratives used change ideas provided during coaching visits, or learned in the first learning session and mostly generated by and tested in the first collaborative. In addition, improvements also appeared to be achieved more rapidly in these later “spread” collaboratives. The latter two findings are contrary to the findings from the study of the Guatemala collaboratives summarized below: that there was no difference between the first and later spread collaboratives in time to achieve results, and that teams in spread collaboratives made little use of change ideas and materials produced in the initial collaborative.

The study reported that the HCI/PharmAccess team was the main way of enabling the sharing across collaboratives and that “additional mechanisms for sharing learning across a network of regions are needed, as well as mechanisms for sharing learning within a region that build on existing structures and opportunities.” No evidence was presented about spread of changes beyond the teams in the collaborative as this was not investigated in the study.

2. Guatemala collaborative for improvements to newborn and maternal service (Hurtado et al. 2011)

Summary

This study assessed how much the best practices developed in a collaborative were then adopted by other health centers in Guatemala. The collaborative involved 25 health centers in one region which tested best practices in maternal and newborn care. A document describing successful practices was produced and presented at the “second meeting” in a spread program of a wider group involving 122 additional health centers in seven other regions. It was not clear from the English summary if the “spread program” was organized as one or more collaboratives, or as another type of program, but the assumption in this summary is that it was a single program. The 122 teams participating were expected to document the changes they implemented, monitor indicators of the quality of care to track improvement, and share what they learned with other sites.

Reviewer’s conclusions from this study about spread of QI methods or change concepts

The study did not assess the use of QI methods by the teams, but did assess in certain ways how much the team used the practices recommended by the first collaborative (spread of change ideas). Thirty eight percent of the teams reported making use of the best practices document, but those without the document implemented roughly the same number of improvements, reportedly because of the information and advice given in visits by technical assistance personnel, which “*may have been decisive in orienting the spread teams to implement new changes.*” Other findings included:

“While the teams were very active in implementing changes, they were not systematic, thorough, or diligent about recording these changes...”

48% acquired information on other teams’ activities through coaching visits from the technical assistance personnel in the health area...”

The teams identified challenges in implementing the changes and in using QI methods: “...*difficulty in procuring materials and drugs to provide quality health care; and the “all or none” methodology for reporting quality indicators – i.e., requiring compliance with all the criteria in each indicator to report it as “fulfilled.”*”

The conclusions of this review are that:

- 1) A collaborative is useful for testing “change ideas” and formulating relevant effective changes which are more precisely described and which can then be spread, as well as descriptions of implementation examples.
- 2) The findings that many “spread teams” did not use documentation or measurement suggests that these teams were not using some essential quality methods.
- 3) It is not clear from the English summary how much the team’s implementation of good practices was assisted by or required quality methods.
- 4) It is not know whether a spread program with visiting expert facilitators could be less costly and could be sufficient to enable other teams to implement the practices designed in the first collaborative for local use, if the facilitators also have materials and web resources which teams can use. Such an approach could be supplemented by regionally-based training for the teams.

3. Thailand collaborative for VAP prevention (Unahalekhaka et al. 2007)

Summary

This was the first of two empirical studies published to date in a peer reviewed scientific journal about a single collaborative.

The study did not describe in any detail how well teams used quality methods, how change ideas spread to teams through the collaborative, or give any details of how much these teams taught and supported other teams to use the methods or to try the change ideas. The study did give some limited information about the team's use of methods.

The study reported a collaborative in Thailand for 18 hospital teams to reduce ventilator-associated pneumonia (VAP). Four team members from each hospital attended three face-to-face meetings of all teams: a national workshop conducted twice for all 18 hospitals and two regional workshops, each attended by 5–8 hospitals in each region. Summary time series data showed a reduction in two years of the overall VAP rate from 13.3 to 8.3 per 1,000 ventilator-days as well as other care process improvements.

Reviewer's conclusions from this study about spread of QI methods or change concepts

There is evidence from this study, mostly from descriptions of the reports which teams made at the workshops, that team members learned and applied quality methods as a result of the collaborative and also taught others in their hospitals about the methods. It was not reported how many methods were used, how appropriate they were or how well they taught. The personal observations of the lead author of this review and discussions as a PhD supervisor of the program's leader were that the methods were enthusiastically and mostly appropriately applied.

The collaborative resulted in the formulation of an effective package of interventions for measuring and reducing VAP in Thai hospitals, as well as a model which was followed for future collaboratives. The study reports that two critical factors for improvement were resources for medical equipment and protective barrier supplied, and also that, *"The QI tools and VAP prevention actions not only were explained by the collaborative organizers and experts at the workshops but were also reinforced by the team leaders throughout the project."*

The study also reports lessons learned about the spread of QI methods and change ideas:

- 1) Concentrate on problems perceived as serious and for which generalizable, effective and evidence-based interventions already exist. This develops motivation, which will be maintained with implementation and achievement of results. The experiences gained can then be applied to solve other problems.
- 2) Multidisciplinary teams should include representatives from all relevant departments who are committed to the project and have good team skills.
- 3) Heads of all relevant departments should participate in the first workshop to obtain information on the project's objectives, methodology, and planned activities.
- 4) Workshops need to create a friendly atmosphere that encourages participants to share their ideas and opinions widely, and to facilitate networking after the project's end.
- 5) Organizer should raise problems or frequently asked questions to promote discussion and experience-sharing at the workshops, and enable hospitals to solve problems they might be embarrassed to ask about.
- 6) Supervision and monitoring are needed between workshops to ensure that the teams apply the ideas.
- 7) Continuing staff training and education, monitoring, feedback, and evaluation are necessary for sustaining the use of the methods and for further improvements.

4. South Africa: collaborative, protocol adjustment and resource addition for improved PMTCT services (Youngleson et al. 2010)

Summary

This was the second empirical study published in a peer-reviewed journal which was identified in the search. One of the features was the planned combination of waves of collaboratives with additional resources and changes to treatment policies for PMTCT services.

After preparations, the first implementation stage was the testing and refining of the changes in the sub-district system of seven primacy care clinics and two birthing units. The report implies that this was through a collaborative of teams from these facilities over 21 months, with a second spread phase of 18 months involving 17 PMTCT-linked health facilities. The study reports the learning provided to the teams about QI methods as, “...*Setting aims, process mapping of the PMTCT care pathway, using routine data to identify of gaps in care, root cause analysis of these gaps, selection of change ideas to close specific gaps, and use of rapid-cycle change iterative methods to test improvement ideas...*”

In addition to the learning sessions, “project staff” were reported to provide guidance on the use of the methods by visits every two weeks in the first phase and then through monthly district meetings, “as managers became familiar with the methodology.”

Reviewer’s conclusions from this study about spread of QI methods or change concepts

The local solutions that were developed were reportedly spread not only through the learning sessions but also by the “project staff,” by the department of health managers and by “routine monthly meetings.”

The study reports significantly reduced transmission rates and other positive outcomes. It attributed success in part to already existing features and supportive host capabilities:

“A culture of reflective data analysis, and was able to effectively introduce protocol changes and add strategic resources... The health system leadership used PMTCT process data feedback to encourage participation in District-wide learning opportunities, and supported the testing of new ideas and the spread of successful interventions. A responsive District leadership deployed additional strategic resources when needed.”

A conclusion relevant to the subject of this review was that, “*the Breakthrough Series (BTS) Collaborative learning system used in this project was a central mechanism for engaging front line health care providers in local innovation that led to improvements and facilitated rapid diffusion of successful changes.*”

C. Findings about Spread from Synthesis Studies of a Number of Collaboratives

Three relevant synthesis studies were identified in the search (Massoud et al. 2010, Catsambas et al. 2008, and Franco et al. 2009, the latter summarized in Franco and Marquez 2011). Other non-empirical conceptual papers were also identified, including one describing a scale-up approach for HIV/AIDS services with collaboratives as one element (WHO 2004).

1. Review of QAP Collaboratives 2003–2007 (Catsambas et al. 2008)

Summary

This study is an evaluation of 35 collaboratives conducted in 14 LMICs between 2003-2007 which focuses on modifications to the model, lessons learned, and the “value-added of collaboratives as a rapid, health care improvement methodology.” Data were collected from documentation and interviews made in 10 countries between 2006-2007.

Challenges in using the original model in these settings reported were: weak centralized health systems with limited resources, non-participatory management styles, and weak performance measurement capacity among public health care providers who had been asked to participate in collaboratives by the countries’ Ministries of Health (MOH).

The report noted that the collaborative model needed to be adapted, but does not describe in detail which adaptations were made in which countries and the effects this had on results. It appears that the pre-collaborative work was more extensive in identifying gaps in health care, defining the change for improvement, developing a consensus about standards of care, establishing an organizational structure to ensure commitment and shared responsibility with stakeholders, and selecting sites for participation. After this, there appeared to be more between-learning session support, “coaching or mentoring to support quality improvement teams, and ongoing training and capacity building in the use of indicators to track progress,” but details are not provided.

Reviewer’s conclusions from this study about spread of QI methods or change concepts

Some challenges identified are similar to those in high income countries, but some show the assumptions about the host system which need to be met before a collaborative can be carried out or be successful, such as assumptions about management processes, education levels, motivation and morale, and ability to collect and analyze data.

The focus of the collaboratives appears to have been on teaching and ensuring compliance with standards, which were developed with country experts and the MOH before the collaborative. Many of the proposed changes to care processes were not evaluated and it is possible some may have been ineffective. This emphasizes the need to evaluate outcomes including health impact, and the latter is difficult for improvement teams to do without controlled research designs.

The study describes many different types of “change packages” spread by collaboratives. It is possible that the collaborative method is more or less effective for spreading some types of changes than others, compared to other methods. One theory is that a determinant of the effectiveness of a spread method is the type of change to be spread: for example how complex the change is (e.g., Rogers 1995). It is questionable whether a general assessment of the collaborative method as an effective approach for spreading all types of change is useful. It may be more useful to assess effectiveness of spread in relation to each type of change package being propagated, informed by theory about which changes can be spread more easily.

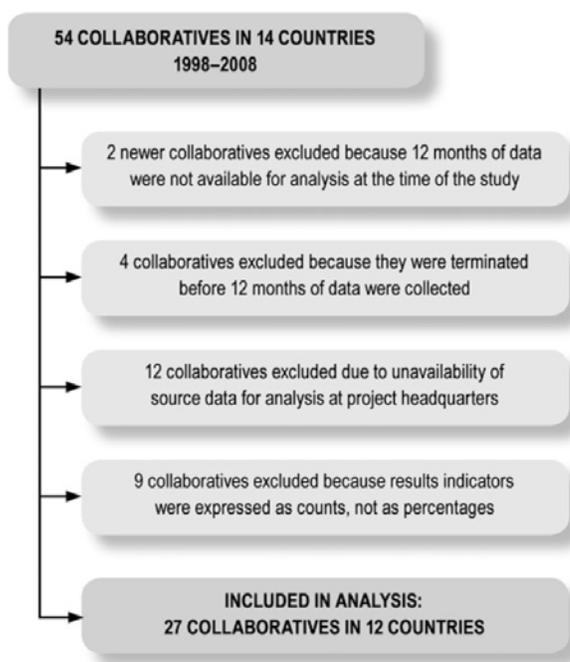
2. Analysis of USAID-funded Collaboratives 1998-2008 (Franco et al. 2009; Franco and Marquez 2011)

Summary

This analysis used innovative methods to summarize the results of 27 collaboratives in 12 LMICs between 1998-2008 in terms of compliance with evidence-based standards and effects on health outcomes. It provides limited details of the spread of quality methods or of change ideas because that was not its primary purpose. The collaboratives sought to implement the proven improvements for essential obstetric and immediate newborn care, obstetric complications, paediatric hospital care, family planning, prevention of mother-to-child transmission of HIV, HIV/AIDS, HIV/TB, malaria and primary health care.

Of the original 54 collaborative interventions for which documentation was available, half were excluded because outcome data were not included (see Figure 2).

Figure 2: Inclusion and exclusion of collaboratives in the analysis (Franco and Marquez 2011)

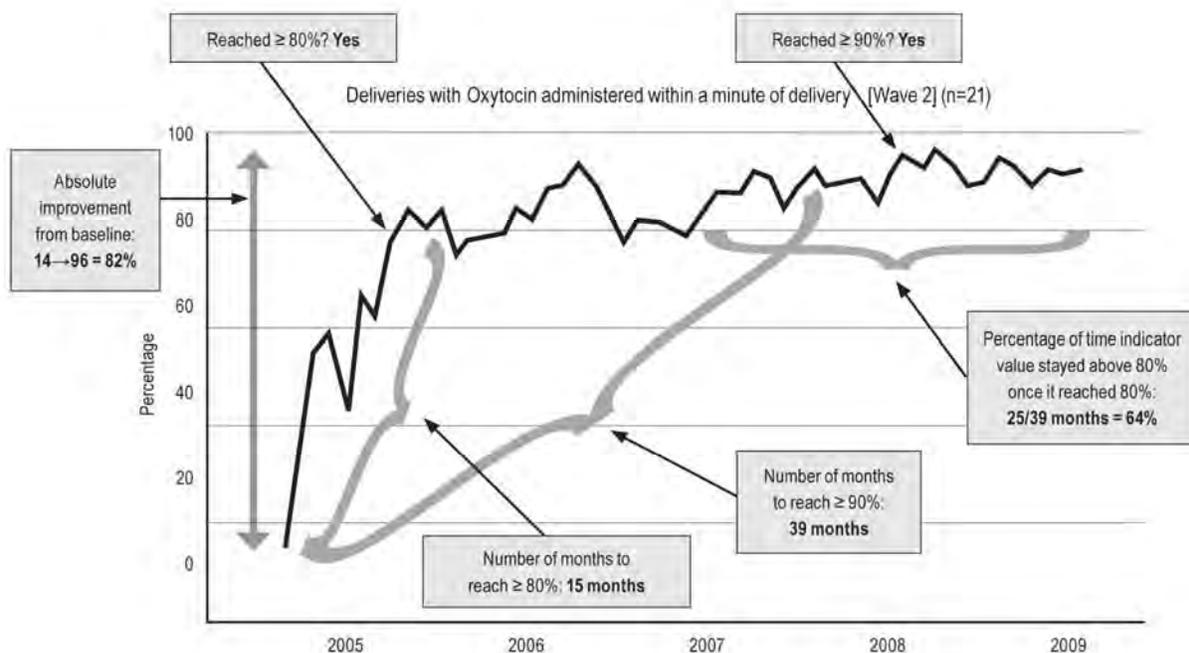


Twenty of the 27 collaboratives were “single-wave” collaboratives (i.e., one collaborative of three-four learning sessions, typically of 20-40 teams) whereas seven were multiple-wave teams, where new “spread teams” joined the collaborative (or a new collaborative) before the initial teams (demonstration sites) had finished their collaborative.

The data examined were mostly 135 time series charts showing one indicator from groups of teams which had time series charts longer than 12 months. The indicator showed compliance with standards thought to be related to improved health outcomes and which were related to the improvements implemented. Most of the data for the time series charts were collected by the teams from a sample of clinical records. On average each team tracked about four indicators of compliance with standards. Examples of effective changes are listed below, and for each there are standards and indicators of compliance which can be ascertained by examining clinical records.

The study assessed the size of the improvements achieved compared to the baseline compliance with the standard, expressed as a percentage. Thus, those teams starting with a low compliance (5%) might find it easier to improve their performance by 100% (to 10% compliance) than those starting with a higher compliance (e.g., increase 40% compliance to achieve 80%). Speed and duration of improvements were also assessed, using the method depicted in Figure 3.

Figure 3: Analysis of team improvement performance (Franco and Marquez 2011)



Analysis of a) size of improvements made by teams; b) speed of improvement to 80% of baseline; and c) duration of improvement after achieving 80% improvement.

The findings from the 135 time series charts were that:

Size of improvements

- An 80% improvement over baseline performance on the indicator of the care standard was shown by 87% of the time series charts;
- Teams with a lower base line compliance achieved much higher percent improvement than those which started with a higher compliance;

- No other variables assessed appeared to be related to the size of the improvement: neither subject of improvement or indicator, nor whether the team was a demonstration or later spread team, nor type of facility.

Speed of improvements

- The average time taken to reach 80% improvement was 9.2 months. There was no significant difference between teams in first and later wave collaboratives, or in speed to improvement depending on type of indicator.

Duration of improvement

- Data show that where 80% improvement was achieved this level was maintained for at least 13 months after for all the indicators.

Reviewer's conclusions from this study about spread of QI methods or change concepts

This study reported limited data about the use of quality methods or of change concepts. It is possible that some outcomes were not caused wholly or partially by the use of QI methods by teams. It is possible that the collaboratives included achieved greater results than the other 27 collaboratives which were excluded. These were excluded because they had insufficient data. It is possible that their lack of data was because the teams did not have a supportive data infrastructure, culture or leadership, or because they were not using quality methods. If so, then their improvements, if any, may have been less.

3. Synthesis and guidelines for spread of effective improvements (Massoud et al. 2010)

Summary

This document is a synthesis of experience and research about spreading of simple, high-impact interventions, like the WHO safe surgery checklist. It describes some of the theories behind spread and draws on URC and IHI experience to differentiate and summarize 11 “approaches” to or strategies for spread:

- Natural diffusion (adoption of an idea or intervention by members of a social system without a formal dissemination programs)
- Executive mandates (orders or instructions within a hierarchy)
- Extension agents (health care workers or community leaders – often peers – spread ideas and best practices through visits and talks)
- Emergency mobilization (for crises where plans, materials, and supplies are mobilized to respond quickly and efficiently)
- The affinity group (a small number of facilities are selected to develop solution or superior model for a priority care area. Once the innovation is developed and confirmed, a large conference-style meeting informs other sites in the system of its use based on an Ascension Health approach)
- Collaborative (teams from independent facilities meet for structured learning and exchange around shared aims, measures, and goals)
- Virtual collaborative (participants meet via phone, internet or WebEx)
- Wave sequence (“a systematic approach to rapidly spread to a large, nested system in which care is provided at multiple levels (tertiary, secondary, primary), often in a hierarchical structure”)

- Campaigns (a targeted social system takes up a shared, defined aim, using a proven intervention to be spread, a simple measurement system, broad communications, and distributed field operations)
- Hybrid approaches (combining elements from the above to form a new approach)

The report describes what the authors consider to be critical factors for success in spreading improvements, which are *“leadership at the executive level, certain factors that influence spread, and understanding a social system and the interactions of its parts while learning to work within the appropriate communication channels.”*

The report was commissioned to describe ways in which implementers could spread the use of the checklist, and therefore describes in more detail three approaches which the authors think are most suited to spreading this and similar improvements: the collaborative, wave sequence, and campaign approaches. It describes nine *“lessons learned from large scale spread:*

- *Recognize that impressive results from pilots will drive spread.*
- *Take the successful elements from the pilots and incorporate them in the spread strategy.*
- *Enable people in health systems to make changes in their work.*
- *Provide them with normative and regulatory resources, leadership, and other forms of support.*
- *Accumulate evidence of success.*
- *Foster shared learning for the development of better models in a shorter period.*
- *Energize staff by providing additional assistance to teams through site visits: Role modeling and leadership behaviors affect the functioning and hence success of the teams.*
- *Understand technology’s role within the culture and current practice.*
- *Leverage existing networks and identify partners to supply crucial resources to ensure rapid growth at a low cost.”*

The theoretical approach to explaining effective spread is in terms of factors at different levels:

- Ideas about why individuals change behavior;
- Features of the innovation: Relative advantage, Compatibility, Simplicity, Trialability, Observability (Rogers 1995);
- Features of the social system (such as resources, skills, and also who makes the decisions).

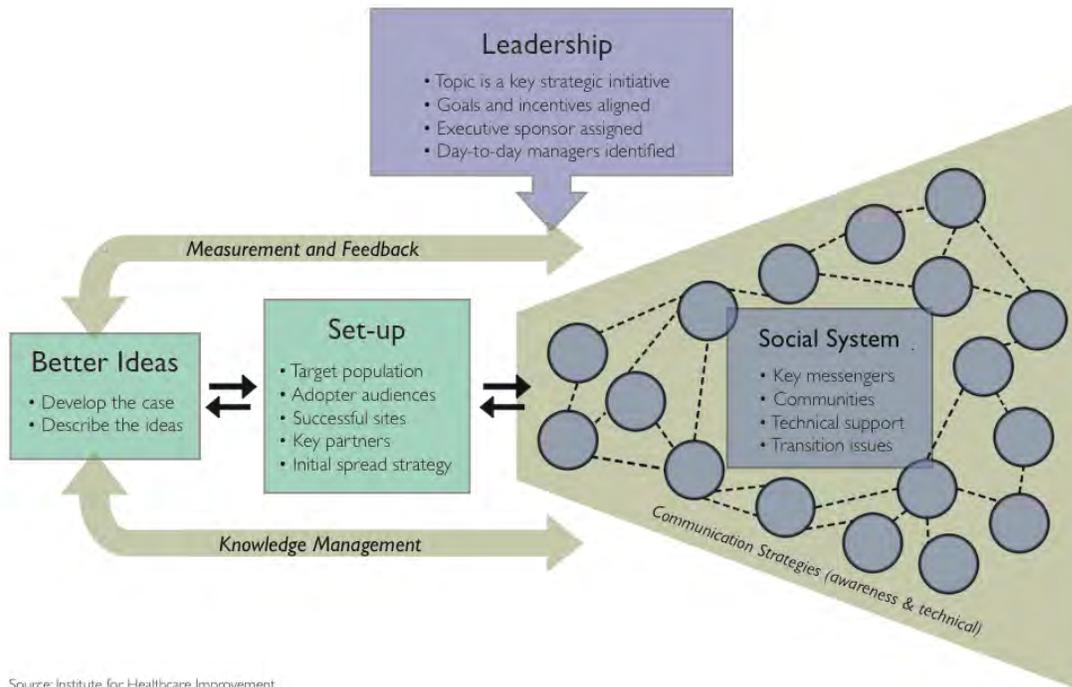
These and other ideas are summarized in a “framework for spread,” shown in Figure 4.

Reviewer’s conclusions from this study about spread of QI methods or change concepts

This study did not report data about the use of quality methods or of change concepts, and it was not its purpose to do so. It did highlight the importance of teams collecting data to test the effectiveness of their changes when they were developing prototypes. But also for subsequent teams to test any local adaptations of care processes which they may need to make to implement the proven practices. One example of an adaptation was how a team made it possible for oxytocin to be available at night for inducing labor. Normally it was kept in a locked refrigerator. The change to the care process which was made was rather than calling-in the pharmacist, a syringe was pre-filled with oxytocin and kept chilled on an ice-pack so as to be available as needed.

Figure 4: Framework for spread (Massoud et al. 2010)

Figure 1: Framework for spread



IV. DISCUSSION

A. Questions which Need Answers

To improve health care and health in LMICs, advisors and decision makers would be helped by information to answer these questions:

- Would more health gain in LMICs be achieved by improving quality, or by using resources for other approaches for strengthening the health system, or for non-health care developments (water, food security, education)?
- Are QICs and QI methods more effective or cost effective for improving quality in LMICs than other approaches?
- What are other methods for enabling and encouraging health personnel to use QI methods, and how do collaboratives compare to these methods?

As regards “spreading improvement,” some questions are:

- How do we choose the improvements which provide the most health gain for the least cost to implement?
- How certain can we be that this change can be implemented in many situations here and will result in improved health, especially if it is a broad “change idea”?
- How much will it cost, and could these resources be used in other ways which would result in greater health improvement?

- Is there a less expensive way of achieving this improvement than using collaboratives?
- Is using quality methods necessary to put this improvement into everyday practice?

B. Towards Evidence-based Spread and a Theory of Spread

At one extreme there is the view that evidence about effective approaches to spread can be produced, and that this should inform decision-makers. At the other extreme there is the view that we can never be certain about why one approach was more successful than another, but there might be lessons or principles for future action which can be derived from reflection on experience.

It is possible that practice and science would be advanced by developing concepts and theories which enable a more penetrating analysis of approaches to spread. A more analytical approach would seek to examine each spread program in terms of:

1. Objectives – intermediate and ultimate, health care and health?

Some programs seek to achieve intermediate objectives such as introducing a new care practice or model. Other programs focus on specific health improvements and provide a menu of possible changes and ways to implement the changes that could result in these improvements.

2. “What” is spread?

There are many types of “evidence based interventions” with different strengths of evidence of effectiveness, which may or may not be effective in different settings, and which are more or less precisely specified. These and other characteristics of the change to be spread may be associated with success. Possible characteristics or dimensions of the change to be spread are those proposed in different studies of innovation, implementation or spread, as well as the following:

Strength of evidence of effectiveness: how certain are we that improvements were produced by the intervention in the study/test side, and not due to something else?

Context-sensitivity of effectiveness: has the change been tested in many situations and how certain are we that the change would produce certain improvements in our situation?

Adaption latitude: which aspects of the change content or of the implementation actions can be modified by local implementers and which have to be reproduced exactly?

Level of the health system: the change can be to

- Professional clinical or work practice (e.g., more limited prescribing of antibiotics, more frequent and consistent hand hygiene). This also includes clinical bundles: a number of prescribed clinical treatments or practices, but with choice of which to adopt, even though the best outcomes are likely to result adopting all (“adaption of number” not “adaption of content”);
- Service delivery model (e.g., from separate specialists and primary care professionals providing care to people with chronic diseases, to a care management model with patient education);
- Work organization (e.g., closer coordination of patients in a team, redesigning patient pathway or work processes);
- Methods for managing or regulating services (e.g. new supervision arrangements);
- Public health interventions (from no education about HIV/AIDS prevention to providing drama groups and volunteer educators);
- Public policies (e.g., no smoking in public buildings or increasing tax on alcohol sales).

The complexity of change: number of changes and other dimensions of complexity.

3. To Whom?

The following features of the person, group or organization which is expected to change may affect whether a change is achieved by the spread program and sustained:

- Previous experience with change like the one proposed or of quality methods (individual or organizational);
- Skills to be able to make change or to adapt to change like the one proposed;
- Resources which are directly required for the change if the change needs extra resources, and resources to support the change process such as help with data collection and analysis;
- Time to work on making the change;
- The number of persons or professions or units which will need to make changes.

4. By whom?

Features of the spread leaders, leadership system and spread organization may influence success in spread.

5. In which contexts?

Aspect of the host organization and of the wider “environment” which help and hinder the spread actions and the changes which teams try to make.

6. How spread?

The definition of an “approach” to spread is mostly about how the change is spread. This can be defined in terms of phases over time and the activities (process), and by the structure of responsibilities and accountability for spread (structure), and the support systems helping the activities, as well as in terms of the type of incentives and motivation for change.

Theory-informed research using the above categories and others to describe and compare spread programs would help discover different approaches to spread and of the possible factors which explain their success or otherwise. This then could inform the choice of which approach might be most suited to the spread of which changes in different circumstances.

C. Theory about Why Collaboratives Might Be Successful

The studies reviewed above suggest that it is possible that quality collaboratives are more effective than other methods, both for enabling personnel to use quality methods, and for making improvements. The different reasons to believe this is possible and the possible explanations for some successes are:

- Proven changes: the changes which teams make are effective proven prescribed improvements, or based on general “change concepts” which have proven useful for designing specific improvements. (However, this “ingredient” is not specific to collaboratives);
- Generalizable: research or experience shows that the changes are likely to improve outcomes in many different situations, and a collaborative tests this assumption;
- Implementable: only changes which can be implemented with the resources and skills available are selected for collaborative;
- Adaptation testing: if the change does need to be modified and tested for the team’s local setting, then the collaborative teaches personnel how to check if the modification is effective. It also provides ways for teams to share how they have modified the change to their settings – for other teams this gives ideas and stimulates them to make changes;

- Systematic methods for implementation: personnel are taught how to use a systematic approach to planning and implementing the improvement-change;
- Feedback: the collaborative provides methods for gathering data to check progress in making improvements. Collecting such data gives teams feedback about how effective their changes are. This can be motivating if positive results are not otherwise visible or take some time to achieve. If no improvement is shown, this may be de-motivating in the short term but it stimulates the team to change their approach and avoids wasting time on the wrong change or on a poorly implemented one;
- Motivation and accountability: participants are expected to present results to peers or organizers and this expectation can be more motivating than expectations set by local management. In addition, the atmosphere of the learning meetings and the feeling of being involved with a pioneering and national special program can be more motivating than being one team without links to others who are working on similar issues.

D. Final Comment

Most evaluations of collaboratives evaluate compliance with standards or the “proven change,” as if the main value of a collaborative is to increase compliance. But often the evidence for the proven change is weak, and the effects uncertain in many different situations, especially situations with few resources to put the change into practice.

The value of collaboratives may be more to enable health care providers in teams to make promising changes, and to find out if the change has been achieved and is an improvement. The value may be in bringing forward good ideas for change, making it safe to experiment with practice and work organization, and giving the skills to find out if the change is an improvement.

V. CONCLUSIONS AND RECOMMENDATIONS

1. There are methods for assessing learning and the use of quality methods

Observation

Good practices in educational evaluation which were reviewed above suggest that learning in collaboratives could be assessed by identifying intermediate outcomes, which could lead to the later outcome of the use of knowledge or methods learned. Evaluations could include assessing: the modification of attitudes / perceptions; acquisition of knowledge / skills; behavioral change – use of skills; behavioral change - correct and effective use; sustained behavioral change; participants teach or pass on their learning and/or materials provided by the collaborative; and, the organization establishes the use of quality methods as a policy, and makes arrangements which make it easier to use quality methods.

Recommendation

That studies examining learning about and spread of quality methods and change concepts using this evaluation framework to find whether different types of learning and use occur, and explore the links between learning and use of methods. This could lead to improvements in the learning methods used in collaboratives between or within learning sessions, and allows testing of lower cost virtual methods.

2. There is limited evidence about the spread of quality methods

Observation

There is limited evidence about the effectiveness of collaboratives as a method for spreading the use of quality methods, or about how they might achieve this. No studies in LMICs were designed specifically to discover whether collaboratives led to the use of QI methods during or after the collaborative, or how much other factors influenced participants to use the methods. No studies have assessed steps

before this outcome, such as knowledge or skills acquisition noted above. Some studies report a lack of data from teams about improvements, but do not assess whether this was because teams were not using data gathering methods, or because of other explanations for lack of data.

Recommendation

Research should be undertaken to compare the effectiveness of quality collaboratives to other methods for enabling the use of quality methods in health care, either as a project or as part of “normal work.” The research should seek to identify context factors before or during collaboratives which help and hinder teams use of quality methods and ability to make changes which could result in improvements.

3. There is some evidence about the spread of change ideas

Observation

One study suggested that there was little transfer of lessons from teams in the first collaborative to teams in subsequent collaboratives (Hurtado et al 2010). This was observed even though the aim of the first collaborative was to specify and test changes that others would then implement, and that these changes were documented in learning materials. Also the first and later spread collaboratives took the same time to achieve results. Another study reported different findings: that later collaboratives achieved changes more quickly and that there was spread between collaboratives (TSST 2010).

Recommendation

To ensure later teams benefit from the learning of earlier teams, specific arrangements are made to formulate and transfer such learning, as suggested in Table 2.

Table 2: Spread of change ideas

“What” is to be spread?	First collaborative	Linking method between first and later collaboratives	Later collaboratives	Linking method between teams in collaboratives and other teams/facilities
Spread a “change concept”	<i>Tries different applications of the change concept, tests and refines, makes descriptions of changes found to be effective in different situations</i>	<i>Distribute the written descriptions Persons appointed and held responsible to make links between first and later collaboratives. Presentations of examples of implementation from first collaborative at later collaborative learning session Experts visit teams, and give examples and written materials developed by the first collaborative</i>	<i>Use descriptions formulated by first collaborative about specific effective changes and how to implement them. Enable teams to share experiences in learning sessions and between sessions and with other teams outside the collaborative</i>	<i>Teams are expected to train other facilities and teams about the changes and methods. Collaboratives include training for teams are trained in how to do this and how to get and use the learning materials to supply to others. Management provide support to enable teams to teach and advise others</i>
Spread a “prescribed change”	<i>Focuses on implementation fidelity and on measuring this.</i>	<i>Written guidance about how to achieve implementation fidelity and measure compliance. Presentations and visits as noted above</i>	<i>Uses experience from the first collaborative of how to ensure precise implementation of prescribed change. Enables teams to share experiences.</i>	<i>As above</i>

“What” is to be spread?	First collaborative	Linking method between first and later collaboratives	Later collaboratives	Linking method between teams in collaboratives and other teams/facilities
Spread a method for making change	<i>Teaches quality or other methods and documents barriers and solutions to using the methods.</i>	<i>Written lessons from first collaborative are distributed. A document summarizes the methods and examples found most effective in the first collaborative, and experience of barriers to using the methods and solutions. Presentations and visits as noted above</i>	<i>Uses experience from the first collaborative of how use the methods to make the change. Enables teams to share experiences.</i>	<i>As above</i>

4. It is possible that quality methods are best spread by collaboratives

Observation

Approaches other than collaboratives have been used to teach and encourage the use of quality methods. There is some evidence of limited use of the methods resulting from these programs, and of a number of challenges to using quality methods to make improvements, and of the use of the methods being continued afterwards (Bouchet et al. 2002, Peters et al. 2009). In contrast, there is some evidence that collaboratives provide motivation and support to start using methods which is otherwise absent, although there is little evidence of whether the use of the methods are sustained after the collaborative has ended. There is evidence that some collaboratives include technical expert or supervision visits, and that these are a significant influence on teams use of the methods and implement improvements (e.g. TSST 2010). Whether these visits of the results of the collaboratives are continued two or more years after was not reported in any studies.

Collaboratives are temporary organizations which provide support which single services or whole health systems have not provided in the past, and possibly may find difficult to provide in the future. They provide the initiative to get single services involved in an improvement, a framework for improvement, details of changes which could be effective, and skills to help teams learn methods and plan and test improvement. They also provide a social setting separate from the work setting which is motivating, and which connects participants with peers whom they may not otherwise meet. How much this stimulation and network contributes to improvement compared to use of the methods is unknown, and possibly this social aspect and learning of methods are best combined.

Recommendation

Research should be undertaken to ascertain how much the use of QI methods and implementation of changes depends on visiting experts. Theresearch should compare costs, use of methods and results using a collaborative with a program only using training sessions and visiting experts seeking to implement the same changes.

5. It is possible that some improvements are best implemented and spread using quality methods

Observation

There is evidence that proven treatments or changes are slow to be taken up when spread using traditional guideline implementation strategies or other conventional implementation methods (Rowe et al. 2005). There is evidence from the studies reviewed above which show that quality methods are

useful for analyzing barriers to improvement changes, and in some cases, for planning and making changes to overcome barriers.

As regards more general “change concepts,” quality methods are necessary not only to formulate and implement specific local changes, but also to test whether these changes result in improvements.

The studies above show that some collaboratives were used to implement specific proven prescribed changes, and some were used to implement more general change concepts. For example, some reports refer to “developing a consensus about standards of care” to be implemented by the collaborative, rather than taking proven specific changes (Catsambas et al. 2008).

Some collaboratives were used for both prescribed and “open” changes (e.g., TSST 2011). For the former, the change content is highly specified (e.g., WHO 2008 safe surgery checklist). The steps to implement the change provide some latitude to teams as to how implement changes to ensure compliance. Teams used quality methods to assess barriers, plan implementation, and to check compliance. If the change is already proven then measurement of health outcomes is not necessary.

Some collaboratives were used to implement broader “change ideas,” which give greater latitude to teams about the specific change content to be implemented. In these collaboratives, quality methods are necessary to assess whether the locally-specified change content does result in improved care processes or outcome.

It is possible that quality methods are more important for spreading “change ideas” than for more specified “proven prescribed change,” because the former require local specification and testing, whereas the latter do not – rather they require fidelity of implementation. In these two cases, quality methods are used for different purposes and quality collaboratives may be more or less effective for deploying the methods for these different purposes.

Recommendations

In selecting changes, an assessment should be made about whether exact copies of the change content are required and how much latitude is open to teams to modify change content. If the change is a general change concept, greater emphasis should be given to different specifications of the change which teams could make, and to the importance of testing the change in their setting.

If the change content is prescribed and needs to be implemented precisely, then more emphasis to how to measure compliance should be given.

Research should identify which changes were tried and not taken up or implemented and compared to predictive theories in order to develop theory which would assist future selection and implementation of changes.

6. Different meanings of “spread”

Observation

“Spread” is generally used in the literature to refer to different activities or changes being transferred from one person or place to another by different methods. The term is used to refer both to activities, and to outcomes of the activities, and to many different types of activities and outcomes.

As regards outcomes, the intermediate outcomes spread can refer to people gaining knowledge from other people about change ideas, or about proven prescribed interventions, or about change methods or quality methods, or to people gaining skills or motivation from other people. Spread can also refer to taking a change achieved in one service which improved patient outcomes, and reproducing this change in many services.

Statements can be misleading when the particular type of activity and outcomes are not specified: “*collaboratives are effective for spreading improvements*” implies that all types of collaboratives are effective for spreading all types of improvement in all situations.

Recommendation

Studies of spread should define clearly which type of spread are being investigated and why, which criteria are being used to assess effectiveness, and how this type of spread might relate to improved health or resource use. Studies of methods for spreading improvement should describe or theorize the steps through which the improvements were achieved. Spread studies should be made more accessible and useful by summarizing what was spread (“content”), by which method (“spread process”), to whom (“uptake customer”), for which purpose (“outcome”), and in which context (what helps and hinders the spread process).

7. Better design and reporting of evaluations of spread

Observation

Many evaluation reports are poorly presented and it is not easy for non-researchers to use to make better informed decisions. Research designs could be improved to give better descriptions of the spread intervention, and of features of the pre- and concurrent- context which may have been necessary for implementation and which may have contributed to outcomes.

Evaluations often do not make use of good practices in program evaluation for uncontrolled studies (Potter 2006, Rossi et al. 2004). Studies often does not define the type of spread evaluated, or use models to evaluate intermediate and later outcomes in order to increase the certainty of attribution in uncontrolled studies. Evaluations which assess a wide range of outcomes can provide a balanced assessment of the different possible benefits of collaboratives.

Recommendation

Evaluation reports should clearly describe the context which helped establish the collaborative and later collaborative actions, and the main components and activities of the collaborative at different times (with a diagram).

Previous research or theory should be drawn on to decide which data to gather about context features which may assist the spread activities and that the program theory is formulated before the study (Bickman 1996).

8. Variations within and between collaborative programs

Observation

Most reports presented results as an average of all the team’s results, and none analyzed the variation between teams in their results. Similarly, no analysis of the variation in results between collaboratives has been made. Such variation analysis studies could be used to test theories about factors explaining success of teams or collaboratives.

Recommendation

Research should be undertaken to explain why some teams achieve greater results than others and whether the explanation applies across collaboratives. This research should be used to provide guidance to increase the effectiveness of teams and of collaboratives by showing which conditions and activities are associated with success.

9. A method effective for one type of spread might not be effective or another type

Observation

Decision makers would be helped if they knew which types of change were best spread by collaboratives or by other approaches, or whether spread success depends more on factors other than the spread approach.

Theory suggests some changes may be easier to spread than others. It is possible that a simple prescribed change, such as antibiotic prophylaxis 1 hour before surgery, is easier to spread than a combination of changes which involve many different professions and organizations, such as a community-based model for HIV/AIDS prevention and care. It is also possible that collaboratives are more cost effective than other approaches to spread for some types of changes than for others.

No systematic comparison of collaboratives has been made to test theories about how much the success of a collaborative might depend on the type of change attempted, or to discover if there are some types of changes which consistently have proved difficult to spread using a collaborative. Neither has there been any systematic comparison of collaboratives with other approaches to spread, or even a classification produced of different approaches to spread which might be used as a basis for research.

Recommendation

Research should develop the existing lists of approaches to spread to provide a categorization or more detailed descriptions of spread approaches which show different dimensions on which the approaches are similar and different. Different approaches to spread should be given operational definitions which allow research to determine which approaches have succeeded for which types of changes in which situations.

10. Language and attitudes

Observation

“Implementation” suggests a “push” approach through which experts select proven or promising changes and persuade and enable others (“targets”) to make the changes. Similarly, “spread” highlights the action by an “implementer,” rather than the actions by the “receiver.” Words both reflect and form an approach to change: one which is linear, directive and does not involve the “targets” in adapting the change they are intended to make, or develop their capacity and motivation to do so.

More recent collaboratives have emphasized participating teams taking ideas and creating and sharing their own specific changes. In such case, the testing of the change is more important than if the change is already proven. Newer participatory approaches to change use different language. Attention to terms is needed not only as a basis for scientific progress but to change thinking to make more use of evidence about the more effective participatory and adaptive approaches.

Recommendation

Collaborative organizers should clarify how much adaptation latitude is required by teams and how much the change testing aspect of the methods is emphasized. Organizer should consider using prescribed changes and not using broad change ideas if data collection and testing may be different as the teams may be spending time on changes which they cannot tell are ineffective.

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