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DISSERTATION

How Do Quality Improvement Interventions Succeed?

Archetypes of Success and Failure

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This document was submitted as a dissertation in May 2011 in partial fulfillment of the requirements of the doctoral degree in public policy analysis at the Pardee RAND Graduate School. The faculty committee that supervised and approved the dissertation consisted of Steven Asch (Chair), Gery Ryan, Lisa Rubenstein, and Peter Mendel.



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Summary

The quality of care in the United States is suboptimal [1-8] and needs to be improved as part of increasing the value of costly healthcare services [9]. Achieving broad quality improvements will require reproducing local quality improvement intervention (QII) successes on a larger scale. Such replication has been difficult to come by [10], however, because the complex context- and implementation-related influences on the results of QIIs—influences in addition to the intended changes themselves—are incompletely understood [11]. In other words, we don't understand the “how” of quality improvement very well. When we read a QII result, we have a vague idea of how that result was obtained through efforts “on the ground,” but very little understanding of what those efforts entailed, how critical those various efforts were to obtaining the result, or how we should approach trying to translate those efforts to a new setting. Published evaluations obscure or conceal these ground-level dynamics [14].

Thus, QII evaluations can yield spuriously definitive assessments as to the efficacy of QIIs' intended changes for improving the quality of care. Many complex factors influence the end result of a QII, including the intended changes, the planned actions for enacting those changes, the organizational context within which those changes are effected and the strategy and tactics employed by the QII team during the course of implementation. Models for incorporating these elements into QII evaluations have been suggested [11], but, much like the processes they are intended to explain, require evaluations and project summaries to be equally complex [12-14]. Traditional evaluation designs, such as randomized controlled trials, depend on being able to identify and measure all possible confounders, but in quality improvement, we have an incomplete understanding of what those confounders are, and much less how to measure them [11, 12, 15, 16]. A full picture of the processes that produce a QII's result is lost in publication,

yet understanding and adapting those processes is critical to achieving success in spreading improvements to new settings. Therefore, a translation of the complexities of improvement interventions and their evaluations into practical, useful tools that retain sufficient explanatory power and yield actionable information would benefit QII practitioners and researchers [15-19].

This study sought to develop such a translation. This study's approach involved using a case series of more successful and less successful QIIs to identify common patterns in how interventions progress from inception to their final results. By generating this unique, balanced sample and using a generalizable framework to compare QIIs representing a diverse range of clinical foci and organizational settings, this exploratory multiple case study examined the patterns and dynamic processes that have led to both success and failure in quality improvement. Cases were identified via a unique sampling strategy, where highly-experienced QII leaders were identified and then asked in turn to identify their "most" and "least" successful QIIs. This approach purposely sought to maximize the variation observed across QIIs in order to establish the range of patterns and strategies that influence success or failure over all types of QIIs. Analyses were designed to identify broadly applicable and generalizable trends useful for QII evaluators and practitioners.

The primary result of this research is a set of archetypes of success or failure in QIIs. These can be used both to retrospectively explain the causality underlying a QII result and to prospectively guide the planning and implementation of QIIs at the local level.

Methods

Key Terms

I defined a QII as "an attempt to improve the quality of care delivered within targeted organizations or organizational units" and success as "the extent to which the results at the end of

the intervention achieved the overall consensus goal(s) for the improvement of clinical care, as established by the primary stakeholder(s) at the beginning of the intervention.”

Paradigm for Understanding the Determinants of a QII Result

The traditional biomedical research paradigm includes generalizable scientific knowledge (e.g. HMG-CoA reductase is a critical component of LDL-cholesterol production) and an intervention design (e.g. a HMG-CoA reductase inhibitor packaged as a pill) as the primary factors in understanding an experiment’s result (e.g. the change in average levels of LDL-c in a study population). Applying this paradigm to QII experiments can misattribute both successes and failures to generalizable scientific knowledge (i.e. the changes a QII intends to enact, e.g. more frequent testing of cholesterol levels improves timeliness of treatment) or intervention design (e.g. financial incentives for physicians to test their patients’ LDL-c more frequently) because it omits two major potential influences on a QII’s result. Batalden and Davidoff [11] suggested a more appropriate paradigm for understanding QII results that includes organizational context and implementation strategy (Figure S-1). Each of the four types of causal influences are described below.

Figure S-1. Causal influences on QII results



- Intended Changes: Represents the changes in care processes that a QII seeks to enact and test, e.g. more frequent monitoring of LDL-c levels. If such changes are proven efficacious by a QII evaluation, the implication is that such changes should be enacted broadly.
- Intervention Design: Represents the planned temporary changes, structures, programs and incentives applied to the targeted care delivery organization(s) in order to achieve the intended changes to care processes, e.g. financial incentives for individual physicians' more appropriate monitoring of LDL-c levels.
- Particular Context: Represents the organizational substrate within which the intervention occurs—including clinicians, patients, other stakeholders, physical locations, organizational structures, established routines and patterns of work.
- Implementation Strategy: Represents the as-implemented temporary changes and decisions made during the course of enacting the intervention design. Comprises the barriers encountered, responses to those barriers and other strategies employed for facilitating the intervention, e.g. the actions taken to secure buy-in from influential payers in order to create a program utilizing financial performance incentives.

- Change in Performance: The result of the QII according to its planned goals, e.g. lowered average LDL-c in a population.

QII implementers or teams have control over three elements: intended changes, intervention design and implementation strategy. QII teams typically only have control over context if they are able to choose the site or location in which to implement the intervention.

Comparative Framework

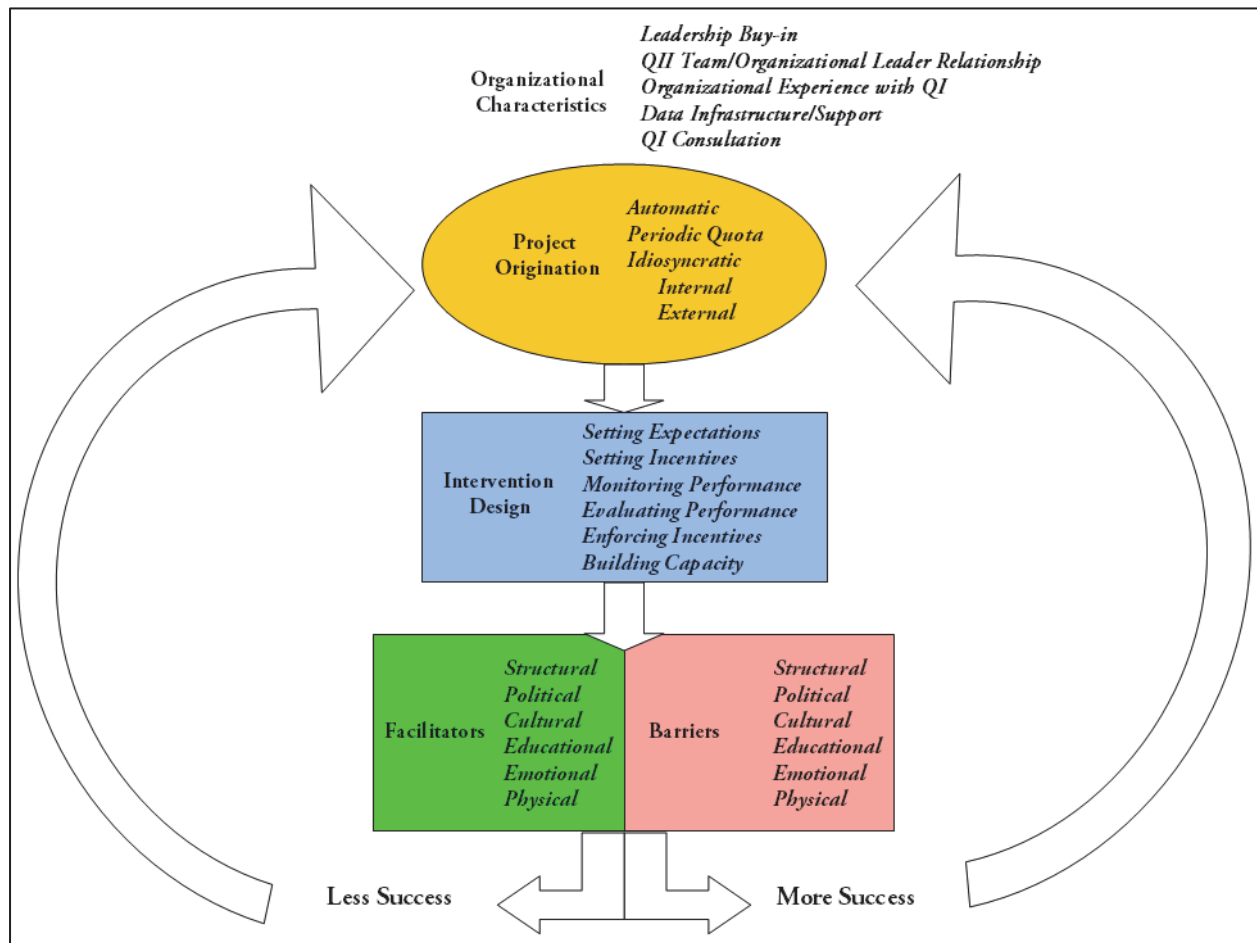
In order to be able to compare very diverse QIIs in a meaningful way, I adapted this paradigm into a generalizable comparative framework (Figure S-2). In addition to assessing context, design and implementation as described above, I explored the role of QII project origination on the degree of success achieved. For each dimension of the framework, I developed subcategories by which to classify different types of phenomena.

- Project Origination: The source and manner of the QII's inception—where did the impetus for the attempt to effect change come from, and how was the specific area of focus for improvement chosen? Subcategories included automatic (e.g. root cause analysis review), periodic quota (requirement for a certain number of QIIs per year) and idiosyncratic (otherwise unplanned or unpredictable events triggering the QII's inception) processes.
- Organizational Characteristics: Key organizational characteristics that may be influential to the outcome of a QII, as suggested by recent studies [25]. These included the degree of leadership buy-in, organizational experience with QI and the availability of data infrastructure and support.
- Intervention Design: I viewed intervention design features through the lens of levers for change with regard to influencing individual and organizational behavior. I categorized

intervention design features according to six non-mutually exclusive levers: setting expectations, setting incentives, monitoring performance, evaluating performance, enforcing incentives and building capacity [27].

- Implementation Challenges: I viewed the events and actions of the implementation phase through the lens of six common organizational challenges to QI: structural, political, cultural, educational, emotional and physical [28]. I additionally classified these as either barriers to or facilitators of success. The entire framework is illustrated in Figure S-2.

Figure S-2. Comparative framework for QIIs



Case Identification

QII cases were identified through a two-step sampling strategy. Step one involved identifying a diverse sample of experienced QII investigators (EQIs) using the search results of a project that identified QIIs using a variety of PubMed searches, according to the standard definition for a QII shown earlier [20-24]. I ranked lead and senior authors from a sample of QIIs by frequency of publication, and then retrieved and reviewed each author's 20 most recent titles and abstracts in PubMed. Those who had only worked on one QII, whose main area of focus was not quality improvement or who were located outside of the United States, Canada, Western Europe, Australia or Japan were excluded. After re-ranking according to the total number and proportion of QIIs, I recruited EQIs according to the rank order until 20 had agreed to participate. Up to two additional follow-up emails were sent to non-responders.

Step two involved asking each EQI to identify two QII cases—specifically, the “most successful” and “least successful” projects that they had been a part of in their career, using the definitions for “QII” and “success” described earlier. No restrictions were placed on the clinical focus, organizational setting, intervention type or publication status of the QIIs. While largely a practical constraint due to the variability of goals and measures across this diverse sample, allowing EQIs to self-rate the degree of success of their QIIs also allowed me to elicit from the EQIs why they considered each project to be of greater or lesser success.

Data Collection and Coding

Information on each QII was collected through interviews, publications, and other documentation provided by the project team(s). Telephone interviews were conducted with both EQIs and additional QII participants referred by the EQI. The primary purpose of these semi-

structured interviews was to elicit the respondent's story of the QII in as rich detail as possible. The interview process was pilot-tested before subject recruitment began.

The interview guide (Figure S-3) is displayed below. The exact content and direction of the interview was dependent to a degree on the respondent's answers, and the dynamic of the interview was such that a casual observer would likely characterize it as more akin to a conversation about past experiences rather than a structured survey of specific factors. Interviews were scheduled for one hour, but varied depending on the subject's availability. The vast majority of interviews were conducted over the phone, but several were done in person when convenient; all were tape-recorded. Handwritten notes taken during the interview were later typed up, summarized and organized thematically while selectively re-listening to the recordings, with the goal of paraphrasing the content of the interview as completely and parsimoniously as possible. The study protocol was approved by the RAND Human Subjects Protection Committee (HSPC).

Figure S-3. Semi-Structured Interview Outline

<p>Grand Tour Question: Can you walk me through how the project played out, from start to finish?</p>
<p>Mini Tour Questions: Could you talk about how the original problem motivating this project was identified? Could you talk about your organization's resources, history and capability, culture, and external influences with respect to quality improvement? Could you talk about how the impetus for this project came about? Could you talk about how the planning and design of the intervention occurred? Could you talk about the challenges faced in implementing the intervention, and the strategies or changes made in trying to overcome them?</p>
<p>Questions to Elicit the Subject's Analysis: What do you think were the key factors that led to the project's outcome? What do you think you ended up putting most of your energy into? During your time working on this project, what did you worry about most initially, and then what did the actual challenges turn out to be? If you had to repeat this project, how do you think you would change what you did? To what degree do you think your experience on this study is portable to other contexts?</p>
<p>Direct Comparison Question (for EQIs): In which ways and to what degree did your successful and unsuccessful projects differ?</p>

Figure S-3 (cont'd). Interviewer Probes and Follow-up Questions

<p>General Probes:</p> <ul style="list-style-type: none">Could you talk a little more about that?Could you speak to that?What do you mean by that?Could you elaborate on how that process occurred?And how did that happen?How did you make that happen?What did it take to make that happen?Why didn't things turn out as you thought?What got in the way?Why did <Event X> happen?In what way did <Event Y> affect <Event Z>?You've brought up <Concept X> several times; could you speak more to that?You mentioned <Phrase Y>. Could you explain what you mean by that?Could you talk about the difficulties in implementing/doing/accomplishing that?
<p>Framework Dimension Probes:</p> <ul style="list-style-type: none">What incentives did you use to get people to change?How did you make it worth their while to participate in the intervention?Could you talk about peoples' emotional engagement with the project?You've mentioned undergoing a "cultural change." Could you talk about that a bit?It sounds like there were a lot of conflicts during that effort. (<i>pause</i>)The focus on transparency—it must have made someone (at your organization) nervous. And how was this work funded?What about the providers' (or organization's) time and personnel?How was it decided to focus on this clinical problem?Has anything been done to maintain the intervention as a routine part of care?

The source documents for each case were thus comprised of typed interview notes, publications, and other documents provided by interview subjects, such as emails, presentation slides, interim reports or implementation tools (e.g. checklists, order sets). I abstracted information regarding project origination, organizational context, intervention design and implementation challenges by reviewing source documents and collating major salient themes for each dimension, and coding those themes according to the conceptual framework. Because intervention design features can address implementation challenges and implementation challenges can reflect shortcomings of intervention design, these elements of the framework

were cross-coded. For example, an educational program geared at teaching how to use an error-reporting system and inculcating an ethos of proactive error-reporting would be coded as both capacity-building (intervention design) and as facilitators for addressing educational and cultural challenges (implementation). Coding was primarily informed by the dimensions and subtypes laid out in the conceptual framework, but the process was left flexible in order to allow the incorporation of emergent themes. The fully coded source material for each case thus yielded a unique data profile for each case (Figure S-4).

Figure S-4. Sample Encoding of QII Case Data

18A		Pain Management Improvement Project					Project Origination	
Unsuccessful	Domain of Care	Acute	Major Themes (Barriers & Facilitators):				* Automatic	
Organizational Integration	High	High	A) outcome measure is not clear cut (family ratings of pain management satisfaction)				* Periodic	
Intervention Design Elements:	B) not clear what good pain management would look like even if they were doing it / not clear what can be done to improve pain management (have tried many things without success; no equivalent of a checklist for pain management)						* Idiosyncratic	
* Multiple single strategies employed iteratively: 1) Numbing cream 2) Distracting patient/family 3) Band aids 4) Different medications/Pain pumps/PCAs 5) Use of glucose solution 6) Therapy dog 7) Phlebotomy machine 8) Pain service	C) no clear leader/champion for pain management institutionally (UPDATE: installation of champion after interview has brought pain scores up!)						- External	
	D) committees have sputtered into extinction due to lack of top-level commitment; resources not an issue, but executive/admin/leadership attention to the problem is (competing priorities)						- Internal	
	E) lack of clear objectives and methods for achieving the objectives makes it difficult to engage frontline providers to participate ("pain isn't as sexy as saving lives")						Organizational Context	
	F) don't have control over all the aspects of care that go into pain management scores (i.e. ER care)							
		Intervention Design						
		Setting Expectations	Setting Incentives	Monitoring Performance	Evaluating Performance	Applying Incentives	Capacity Building	
Barriers and Facilitators to Implementation	Structural	8					8	
		B, C, D	D		A, B, F		C, D, F	
	Political				A, B		C	
		B, C						
	Cultural			E		A, B		E
		B, E						
Educational							B, E	
	B, E							
Emotional			E				C, D, E	
	C, D, E							
Physical		1, 2, 3, 4, 5, 6, 7					1, 2, 3, 4, 5, 6, 7	
					A, F		F	

This approach entailed certain limitations. Because interviews were semi-structured, not all subjects were all asked the same questions, and thus some elements may be underestimated. However, this approach is valuable for exploratory studies, as the goal is to elicit information both broadly and deeply and to generate hypotheses, rather than calculate specific measures with great statistical precision. Another limitation is that intervention design, context and implementation strategy features can be related to different organizational levels (e.g. microsystem, QI team, organization-wide, external environment) [25] and the framework did not systematically incorporate these levels.

Analysis

Ultimately, the goal of the analysis was to ascertain the predominant themes and patterns likely to be associated with producing successful QIIs. Cases were compared according to each dimension of the framework. The general approach involved establishing the range (the maximally diverse exemplars), the central tendency (the modal example) and the distribution (the pattern of variation) within each dimension and subcategory. I assessed cases first on a univariate basis and then on a multivariate basis by grouping them according to more and less successful cases, different domains of care, and different degrees of organizational integration.

For example, all phenomena coded as intervention design features were pile-sorted [26] to identify common types (e.g. “pocket cards”). Since each component had already been coded as pulling one or more levers for change (e.g. “capacity building”), I mapped each type of intervention design feature to its corresponding lever(s) for change. I constructed a grid, with rows comprised of individual cases, and columns comprised of the different levers for change, which allowed me to look for distinctive patterns across all QIIs’ approaches to intervention design. Because each design component had already been additionally cross-coded as addressing

one or more implementation challenges (e.g. “educational”), each major column of this grid contained six sub-columns representing the six types of implementation challenges. The resulting grid provided a unique visual display of the patterns of intervention design observed in this sample of cases, and allowed stratification by degree of success.

While these frequency counts were employed to screen for potential patterns and themes, an ongoing objective during the analytic stage was to qualitatively translate these counts back into the complex stories underlying each project in a coherent way. Thus, cases were also rated qualitatively according to the relative influence that each causal element—intended changes, context, intervention design and implementation strategy—had had on the eventual result. Cases with similar causal profiles were then grouped to facilitate identification of common patterns and trends.

Results

The total sample included 38 cases, 19 more successful and 19 less successful (Table S-1). Recruitment resulted in 20 total EQIs; however, one EQI identified only one “less” successful case, and another identified only one “more” successful case. As intended, the cases represented a broad range of clinical, organizational and geographical variation (Table S-1). The types of intended changes and performance goals also varied considerably across interventions.

Table S-1. Characteristics of QII Cases

	Total Cases	More Successful Cases	Less Successful Cases	% More Successful
Total	38	19	19	50%
<u>Domain of Care</u>				
Acute	12	6	6	50%
Chronic	11	6	5	55%
Preventive	12	6	6	50%
N/A	3	1	2	33%
<u>Organizational Integration</u>				
More Organizational Integration	26	15	11	58%
Less Organizational Integration	12	4	8	33%
<u>Project Origination</u>				
Idiosyncratic	28	14	14	50%
Internal	13	7	6	54%
External	15	7	8	47%
Periodic Quota	10	5	5	50%
Automatic	0	0	0	-
<u>Contextual Features</u>				
Degree of Buy-in by Local Leadership				
High	25	16	9	64%
Low	13	10	3	77%
Organizational Support for Quality Improvement				
Any (Data or Coaching) QI Support	18	12	6	67%
Data Support	18	12	6	67%
Coaching/Consulting	9	7	2	78%
No QI Support	20	7	13	35%
Organizational Experience with Quality Improvement				
More	13	8	5	62%
Less	25	11	14	44%

Project Origination and Organizational Characteristics

No differences were observed with respect to project origination. Interventions tended to be successful more frequently when the leaders of the targeted organization(s) demonstrated a high degree of buy-in to the intervention or when the targeted organization(s) had recourse to an existing data collection infrastructure (Table S-1).

Intervention Design

The most common QII design elements were educational programs, which were observed in half of QIIs. These were followed by standardized tools (e.g. order sets, checklists, equipment bundles), meetings for review of project performance, outreach to patients, personnel changes and awareness tools (e.g. posters). Each of these design features were employed by between one-fifth and one-third of cases.

Almost all QIIs attempted to induce changes by setting the expectations and building the capacity of providers, organizations and stakeholders (Figure S-5). More successful QIIs, however, set expectations and built capacity in ways that addressed more potential implementation challenges than did less successful QIIs. For example, educational programs addressing political, cultural and emotional issues (e.g. addressing and aiming to change a hierarchical culture to allow nurses equivalent authority as physicians with respect to recognizing errors) in addition to educational issues (e.g. teaching what errors are and how to recognize them) were more common among more successful QIIs. These expectation-setting and capacity-building steps were necessary, but not always sufficient; more successful QIIs more frequently monitored and evaluated performance, while almost no QIIs explicitly set or enforced incentives.

Figure S-5. Intervention Design Profiles of Less and More Successful QIIs

Levers	Setting Expectations						Setting Incentives					Monitoring Performance					Assessing Performance					Enforcing Incentives					Building Capacity													
	Structural	Political	Cultural	Education	Emotion	Physical	Structural	Political	Cultural	Education	Emotion	Physical	Structural	Political	Cultural	Education	Emotion	Physical	Structural	Political	Cultural	Education	Emotion	Physical	Structural	Political	Cultural	Education	Emotion	Physical	Structural	Political	Cultural	Education	Emotion	Physical				
Less Successful Cases	02A																																							
	04A																																							
	08A																																							
	14A																																							
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Implementation Challenges

In facing implementation challenges, “less” successful projects encountered more barriers, and “more” successful projects made use of more facilitators (Figure S-6; red cells represent barriers, and green cells represent facilitators).

Figure S-6. Implementation Profiles of Less and More Successful QIIs

Challenges	Structural	Political	Cultural	Educational	Emotional	Physical	
Levers	Setting Exp Incentives Monitoring Applicating Enforcing Building Cap. Setting Exp Incentives Monitoring Applicating Enforcing Building Cap.	Setting Exp Incentives Monitoring Applicating Enforcing Building Cap. Setting Exp Incentives Monitoring Applicating Enforcing Building Cap.	Setting Exp Incentives Monitoring Applicating Enforcing Building Cap. Setting Exp Incentives Monitoring Applicating Enforcing Building Cap.	Setting Exp Incentives Monitoring Applicating Enforcing Building Cap. Setting Exp Incentives Monitoring Applicating Enforcing Building Cap.	Setting Exp Incentives Monitoring Applicating Enforcing Building Cap. Setting Exp Incentives Monitoring Applicating Enforcing Building Cap.	Setting Exp Incentives Monitoring Applicating Enforcing Building Cap. Setting Exp Incentives Monitoring Applicating Enforcing Building Cap.	Setting Exp Incentives Monitoring Applicating Enforcing Building Cap. Setting Exp Incentives Monitoring Applicating Enforcing Building Cap.
Less Successful Cases	13B						
	18A						
	16A						
	20A						
	10B						
	03A						
	11A						
	17A						
	09A						
	06B						
	08A						
	19A						
	04A						
	15A						
	14A						
01A							
12A							
07A							
02A							
More Successful Cases	12B						
	11B						
	07B						
	09B						
	03B						
	13A						
	01B						
	02B						
	18B						
	14B						
	06A						
	17B						
	05B						
	20B						
	10A						
08B							
16B							
19B							
15B							

Facilitators were most often related to structural, political, cultural or emotional challenges, and barriers were most often related to structural and cultural challenges. Certain facilitators of implementation, particularly seeking out partnerships and securing buy-in from key stakeholders, were employed frequently to overcome or cancel out common barriers, such as a lack of influence or opposition by leadership. These strategies were most successful when

employed before problems arose, but mid-course changes to implementation strategies also helped to generate success in several cases.

Archetypes

When cases were grouped according to the relative influence of intended changes, intervention design, context and implementation strategy on the QII's result, nine archetypal storylines emerged (Tables S-2 and S-3). Five of these were archetypes of failure, including four of design failure (The Squelched Idea, The Bad Idea, "The Best and the Brightest," The Tragic Hero) and one of implementation failure (Couldn't Roll with the Punches). For the more successful QIIs, four archetypes emerged, including one of implementation success (Pounding the Pavement), one of context or circumstance (The Lucky Strike), and two of design success (The Great Idea, The Complete Package). Tables S-2 and S-3 illustrate the relative influence of each factor, describe the archetype briefly, and display a quote from an actual case that epitomizes the storyline.

Table S-2. Archetypes of Failure as Explanatory Guides to QII Results

<i>Archetype</i>	<i>Relative Impact on Result</i>				<i>Result</i>	<i>Description</i>	<i>Exemplary Quote(s)</i>
	<i>Context</i>	<i>Intended Changes</i>	<i>Intervention Design</i>	<i>Implementation Strategy</i>			
The Squelched Idea	≈	≈	≈	≈	-	Project never saw the light of day.	“That’s a great idea, and someday we should focus on that.”; “[It was] hard to convince people that it was worth doing.”
The Bad Idea	≈	↓↓↓	≈	≈	-	Project implemented the intervention faithfully enough to allow a clear, unconfounded demonstration that the intended changes are ineffective. This was relatively rare among 19 cases studied.	“[The project was] useful, because it showed that [mailed educational cards] are rarely worth doing.”
“The Best and the Brightest”	↓	≈	↓↓↓	↓↓↓	-	Project overemphasized sophisticated intervention design at the cost of a hands-on, practically-minded implementation strategy.	“...we just sat back and waited for the data to accrue. There wasn’t an effect... and that was pretty much it.”
The Tragic Hero	↓	≈	↓	≈	-	Previously successful project failed to generalize or adapt to a new setting because of a failure to account for a critical feature of the new context (the tragic hero's fatal flaw).	“We were really naïve when we tried to take on heart failure... Designing an intervention to reach all of those places is much more complicated.”
Couldn't Roll with the Punches	↓	≈	↑	↓↓↓	-	Project encountered practical barriers to implementation during the course of the project and failed to respond to them effectively.	“[The lead nurse] retired, and that probably played a big role in the project drying up.”

Legend (Tables S-2 through S-5)	
Positive influence (slight / strong)	↑ / ↑↑↑
Negative influence (slight / strong)	↓ / ↓↓↓
Neutral influence	≈

* Refers to the title of journalist David Halberstam’s 1972 account of the mismanagement of the Vietnam War by America’s “best and brightest” strategists and planners [29].

Table S-3. Archetypes of Success as Explanatory Guides to QII Results

<i>Archetype</i>	<i>Relative Impact on Result</i>				<i>Result</i>	<i>Description</i>	<i>Exemplary Quote(s)</i>
	<i>Context</i>	<i>Intended Changes</i>	<i>Intervention Design</i>	<i>Implementation Strategy</i>			
Pounding the Pavement	↓	↑	↑	↑↑↑	+	Project encountered practical barriers to implementation during the course of the project and responded to them effectively, or proactively instituted a "full-court press"-type implementation strategy to address contextual barriers.	"The key to this was getting the information out... I don't want to say inundating, but maybe I did inundate... [in] August I did 35 meetings. I was dead."; "When I'd talk to people and they'd scrunch up their faces, I'd go back and have to say, 'Ok, how do I angle this to these people so they can see that there's some benefit in it for them?'"
The Lucky Strike	↑↑↑	↑	≈	≈	+	Project likely would have produced improvements no matter the design or implementation because the context was conducive to effecting positive change on its own.	"[The practices] were just intrinsically motivated and wired to improve care. They ... will persevere in a difficult situation to make things right..."
The Great Idea	≈	↑↑↑	≈	≈	+	Project succeeded largely on the strength of the intended changes--the benefits to providers are self-evident, or so great relative to the costs, that it induced providers to work through any contextual barriers in order to ensure the project got implemented.	"[With group appointments] we were starting to influence [patients] who were resistant to change... that had a lot of impact outside just the data."; "When you have unbelievable successes, you feel good to share success with everybody else."
The Complete Package	≈ to ↓↓↓	↑ to ↑↑↑	↑↑↑	↑↑↑	+	Project devoted time and energy to both design and implementation; barriers were frequently encountered and overcome.	"Lever as far and wide as possible."; "I designed a program to pull as many of those levers as possible..."

General Recommendations

Three overarching recommendations for producing successful quality improvement follow from this study's exploration of 19 more and 19 less successful QIIs using a generalizable framework:

1. Set the expectations for and build the capacity of targeted organizations and individuals to achieve the desired improvements in care, but understand that these steps alone are not sufficient.
2. Make explicit plans for measuring and evaluating the performance of the intervention. Systematically evaluating the project's status and having a structured process for working through barriers on an ongoing basis helps steer QIIs toward success.
3. Make explicit and address the incentives—particularly internal motivational incentives—for all key stakeholders in the outcome of the intervention. Although few QIIs utilized explicit financial incentives, a predominant theme emerged among successful cases of seeking to address the motivation of individual providers or stakeholders for improving quality. One EQI expressed this idea by saying, “If at the end of the day, you don't unleash the inherent motivation that people have, the projects will not be as successful as they could be, because people have to live and breathe this kind of stuff.”

Using the Archetypes of Success and Failure to Improve Quality

The archetypes suggested by this study should be useful for explaining how quality improvement results are generated and for strategizing for success when implementing interventions in different settings (Tables S-4 and S-5). For authors, editors, evaluators and practitioners, these archetypes can be used retrospectively to more fully understand and express how the results of previous improvement projects were generated.

For example, a successful QII result may be assumed by default to be of the “Great Idea” archetype. This leads to the assumption that the intended changes to the targeted care process are inherently self-generative of their own success, and will remain so across all contexts and

implementation approaches. However, the knowledge that the QII result actually fit the “Pounding the Pavement” archetype better than the “Great Idea” will help guide those attempting to replicate the intervention by highlighting the critical role of persisting through implementation as contextual barriers arise. Thus, for practitioners, understanding the key drivers of success from prior cases will allow for more optimal strategic planning when spreading improvements to new settings. Correctly identifying the different components that played a role in success or failure will allow evaluators, authors and editors to report QII results in concise, but useful and actionable terms.

For practitioners mid-way through implementation, these archetypes can serve as a diagnostic and prescriptive tool for maximizing of the probability of success. Tables S-4 and S-5 illustrate the potential for these archetypes to be used in such a manner during the course of a QII. For QIIs that seem to be failing or struggling, Table S-4 suggests approaches to correcting the course. For QIIs that seem to be succeeding, Table S-5 suggests approaches to preparing for successful replication in new contexts. Making relative assessments of the four key causal influences and re-investing time and energy into areas of relative need will help improve QIIs’ chances of success.

This study has several limitations. Because the units of analysis in this study were single QIIs, broader movements that are supportive and generative of quality improvement were not studied, nor were situations in which multiple cases competed for the same finite resources. Because EQIs were identified through published articles, they were disproportionately likely to be from academic clinical settings. The sample size was small, which means that findings could not be tested for statistical significance. The coding process remains to be operationalized and validated using multiple coders. Finally, this was a retrospective study, and a prospective

analysis may have yielded additional insights concerning QII teams' real-time implementation strategies.

The strengths of this study include its comparative case study design as well as its unique investigator-based sampling strategy, which sought to maximize the observed variation across cases while achieving an equal balance of “more” and “less” successful cases. Future research endeavors should attempt to operationalize and validate the archetypes suggested by this study. Doing so will produce broadly generalizable and practical tools for explaining how quality improvement results are generated, and for strategizing for success when implementing interventions in different settings.

Table S-4. QII Failure Diagnoses, with Prescriptions for Success

<i>Assessment of Relative Influence on QII Performance to Date</i>				<i>Likely Result</i>	<i>Diagnosis</i>	<i>Prescription for Achieving Success Now</i>
<i>Context</i>	<i>Intended Changes</i>	<i>Intervention Design</i>	<i>Implementation Strategy</i>			
≈	≈	≈	≈	-	The Squelched Idea	Try again, by seeking to build partnerships between key stakeholders; patience and persistence are key in this situation.
≈	↓↓↓	≈	≈	-	The Bad Idea	Try another approach.
↓	≈	↓↓↓	↓↓↓	-	The "Best and the Brightest"	Adapt both the design and implementation strategy to address the apparent barriers discovered in the specific context, and re-implement the intervention.
↓	≈	↓	≈	-	The Tragic Hero	Tweak the intervention design to address the specific barrier(s) that are causing the project to struggle.
↓	≈	↑	↓↓↓	-	Couldn't Roll with the Punches	Re-invest more effort and energy into working through or around problems. The most common successful strategy involved brokering partnerships and obtaining buy-in from key stakeholders.

Table S-5. QII Success Diagnoses, with Prescriptions for Successful Replication

<i>Assessment of Relative Influence on QII Performance to Date</i>				<i>Likely Result</i>	<i>Diagnosis</i>	<i>Prescription for Spread/Replication</i>
<i>Context</i>	<i>Intended Changes</i>	<i>Intervention Design</i>	<i>Implementation Strategy</i>			
↓	↑	↑	↑↑↑	+	Pounding the Pavement	Prepare to spread this intervention by emphasizing and describing in detail the importance of ongoing review and implementation-phase strategies to the project's success.
↑↑↑	↑	≈	≈	+	The Lucky Strike	Prepare to spread this intervention by first understanding that spreading and replicating this intervention will be difficult, as new barriers will be encountered in new settings.
≈	↑↑↑	≈	≈	+	The Great Idea	Unexpected barriers may be encountered in new settings, so continue to formulate an implementation strategy for overcoming them.
≈ to ↓↓↓	↑ to ↑↑↑	↑↑↑	↑↑↑	+	The Complete Package	Prepare for spreading this intervention by emphasizing the importance of the intervention design and implementation strategies that helped to achieve the success in the first place.