

---

## Scaling Beyond Early Adopters: A Systematic Review and Key Informant Perspectives

---

January 2019

### Prepared for:

Department of Veterans Affairs  
Veterans Health Administration  
Health Services Research & Development Service  
Washington, DC 20420

### Prepared by:

Evidence Synthesis Program (ESP) Center  
West Los Angeles VA Medical Center  
Los Angeles, CA  
Paul G. Shekelle, MD, PhD, Director

### Authors:

#### Principal Investigators:

Isomi Miake-Lye, PhD  
Paul G. Shekelle, MD, PhD

#### Co-Investigators:

Christine A. Lam, MD, MBA  
Anne C. Lambert-Kerzner, PhD, MSPH

#### Research Associates:

Selene S. Mak, MPH, PhDc  
Deborah M. Delevan, MEd  
Pamela M. Secada, MPH  
Jessica M. Beroes-Severin, BS  
Tanya T. Olmos-Ochoa, PhD



U.S. Department of Veterans Affairs

Veterans Health Administration  
Health Services Research & Development Service

## PREFACE

The VA Evidence Synthesis Program (ESP) was established in 2007 to provide timely and accurate syntheses of targeted healthcare topics of importance to clinicians, managers, and policymakers as they work to improve the health and healthcare of Veterans. These reports help:

- Develop clinical policies informed by evidence;
- Implement effective services to improve patient outcomes and to support VA clinical practice guidelines and performance measures; and
- Set the direction for future research to address gaps in clinical knowledge.

The program is comprised of four ESP Centers across the US and a Coordinating Center located in Portland, Oregon. Center Directors are VA clinicians and recognized leaders in the field of evidence synthesis with close ties to the AHRQ Evidence-based Practice Center Program and Cochrane Collaboration. The Coordinating Center was created to manage program operations, ensure methodological consistency and quality of products, and interface with stakeholders. To ensure responsiveness to the needs of decision-makers, the program is governed by a Steering Committee comprised of health system leadership and researchers. The program solicits nominations for review topics several times a year via the [program website](#).

Comments on this evidence report are welcome and can be sent to Nicole Floyd, Deputy Director, ESP Coordinating Center at [Nicole.Floyd@va.gov](mailto:Nicole.Floyd@va.gov).

**Recommended citation:** Miake-Lye IM, Mak SS, Lambert-Kerzner AC, Lam CA, Delevan DM, Secada PM, Beroes-Severin JM, Olmos-Ochoa TT, Shekelle PG. Scaling Beyond Early Adopters: A Systematic Review and Key Informant Perspectives. VA ESP Project #05-226; 2019. Posted final reports are located on the ESP [search page](#).

This report is based on research conducted by the Evidence Synthesis Program (ESP) Center located at the **West Los Angeles VA Medical Center, Los Angeles, CA**, funded by the Department of Veterans Affairs, Veterans Health Administration, Health Services Research and Development. The findings and conclusions in this document are those of the author(s) who are responsible for its contents; the findings and conclusions do not necessarily represent the views of the Department of Veterans Affairs or the United States government. Therefore, no statement in this article should be construed as an official position of the Department of Veterans Affairs. No investigators have any affiliations or financial involvement (*eg*, employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties) that conflict with material presented in the report.

## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY .....</b>	<b>1</b>
Introduction .....	1
Methods .....	1
Systematic Literature Review.....	1
Key Informant Interviews.....	1
Data Synthesis and Analysis.....	2
Results .....	2
What Does Large Magnitude Scale-up and Spread Look Like? .....	2
Considerations and Strategies for Working with Hard-to-engage Sites.....	3
Conclusions .....	3
<b>ABBREVIATIONS .....</b>	<b>4</b>
<b>ACKNOWLEDGMENTS .....</b>	<b>5</b>
<b>EVIDENCE REPORT .....</b>	<b>7</b>
<b>INTRODUCTION.....</b>	<b>7</b>
<b>METHODS .....</b>	<b>10</b>
Topic Development .....	10
Search Strategy.....	10
Study Selection.....	11
Data Abstraction.....	11
Quality Assessment .....	11
Key Informant Interview Sampling and Data Collection.....	11
QUERI Project Leads .....	12
SAIL Improvers.....	12
Data Synthesis and Analysis .....	13
Literature Review .....	13
Key Informant Interviews.....	13
Peer Review.....	13
<b>RESULTS .....</b>	<b>14</b>
Literature Flow .....	14

What Does Large Magnitude Scale-up and Spread Look Like? .....	16
Breaking Down the National Scale-up or Spread Process .....	16
Macro Models.....	18
Preconditions to Consider in Large Magnitude Scale-up.....	19
VA Preconditions and Existing Networks for Spread.....	20
Considerations and Strategies for Working with Hard-to-engage Sites.....	23
Common Challenges for Spreading to Hard-to-engage Sites.....	24
Potential Benefits of Working with Hard-to-engage Sites .....	25
Useful Strategies for Hard-to-engage Sites .....	26
Strategies Used to Address Common Challenges .....	27
Strategies Used to Maximize Potential Benefits .....	30
<b>SUMMARY AND DISCUSSION .....</b>	<b>33</b>
Summary .....	33
What Does Large Magnitude Scale-up and Spread Look Like? .....	33
Considerations and Strategies for Working with Hard-to-engage Sites.....	33
Limitations.....	34
Research Gaps and recommendations for Future Research .....	35
Recommendations for Future Scale-up/Spread Efforts.....	36
Conclusions .....	36
<b>REFERENCES.....</b>	<b>37</b>
<b>FIGURES</b>	
Figure 1. Adopter Groups and Spread Process.....	9
Figure 2. Literature Flow Chart.....	15
Figure 3. Large Magnitude Spread Process.....	17
Figure 4. Macro Model Distributions and Descriptions.....	18
Figure 5. Preconditions for Scale-up.....	20
Figure 6. Local Preconditions Prior to Engaging in Spread.....	21
Figure 7. Hard-to-engage Site Characteristics .....	24
Figure 8. Strategies Addressing Hard-to-engage Site Needs .....	27
<b>APPENDIX A. SEARCH STRATEGY .....</b>	<b>44</b>

**APPENDIX B. INTERVIEW GUIDE QUESTIONS..... 51**  
**APPENDIX C. SAIL DATA EXEMPLARS ..... 53**  
**APPENDIX D. QUERI AND SAIL TEMPLATES USED IN ANALYSIS..... 54**  
**APPENDIX E. PEER REVIEW COMMENTS/AUTHOR RESPONSES..... 55**  
**APPENDIX F. CITATIONS FOR EXCLUDED STUDIES..... 65**  
**APPENDIX G. EVIDENCE TABLES..... 81**



## ACKNOWLEDGMENTS

This topic was developed in response to a nomination by Dr. Shereef Elnahal from the Office of Organizational Excellence (10E). The scope was further developed with input from the topic nominators (*ie*, Operational Partners, listed below), the ESP Coordinating Center, the review team, and the technical expert panel (TEP, listed below).

In designing the study questions and methodology at the outset of this report, the ESP consulted several technical and content experts. Broad expertise and perspectives were sought. Divergent and conflicting opinions are common and perceived as healthy scientific discourse that results in a thoughtful, relevant systematic review. Therefore, in the end, study questions, design, methodologic approaches, and/or conclusions do not necessarily represent the views of individual technical and content experts.

The authors gratefully acknowledge the following individuals for their contributions to this project:

### Operational Partners

Operational partners are system-level stakeholders who have requested the report to inform decision-making. They can recommend Technical Expert Panel (TEP) participants; assure VA relevance; help develop and approve final project scope and timeframe for completion; provide feedback on draft report; and provide consultation on strategies for dissemination of the report to field and relevant groups.

Ryan Vega, MD  
*Director, Diffusion of Excellence Initiative*  
VA Center for Innovation

Saurabha Bhatnagar, MD  
*Acting Assistant Deputy Under Secretary for Health*  
Office of Quality, Safety, and Value (10E2)

### Technical Expert Panel (TEP)

To ensure robust, scientifically relevant work, the TEP guides topic refinement; provides input on key questions and eligibility criteria, advising on substantive issues or possibly overlooked areas of research; assures VA relevance; and provides feedback on work in progress. TEP members are listed below:

Nick Bowersox, PhD, ABPP  
*Director, QUERI Center for Implementation and Evaluation Resources*

Laura Damschroder, MS, MPH  
*Investigator, HSR&D Center for Clinical Management Research*

Amy Kilbourne, PhD, MPH  
*Director, QUERI*

George Jackson, PhD, MHA

*Healthcare Epidemiologist, HSR&D Center for Health Services Research in Primary Care*

Joe Francis, MD, MPH

*Director, Clinical Analytics and Reporting, Office of Analytics and Business Intelligence*

Peter Almenoff, MD

*Senior Advisor, Office of the Secretary of the VA, Director, Organizational Excellence*

## **Peer Reviewers**

The Coordinating Center sought input from external peer reviewers to review the draft report and provide feedback on the objectives, scope, methods used, perception of bias, and omitted evidence. Peer reviewers must disclose any relevant financial or non-financial conflicts of interest. Because of their unique clinical or content expertise, individuals with potential conflicts may be retained. The Coordinating Center and the ESP Center work to balance, manage, or mitigate any potential nonfinancial conflicts of interest identified.

## **Collaborators**

Dr. Miake-Lye, one of the principal investigators of this project, is the Implementation Core Lead of the Care Coordination QUERI Program. The work for this project was also supported with in-kind effort by other members of the Care Coordination QUERI Program:

Deborah Delevan, MEd, *Program Coordinator, Care Coordination QUERI Program*

David Ganz, MD, PhD, *Corresponding PI, Care Coordination QUERI Program*

# EVIDENCE REPORT

## INTRODUCTION

The process of moving research insights into clinical practice can be slow and a gap often remains between best practices, frequently developed within single sites or small populations, and general practice delivered at a population scale.<sup>1-17</sup> The field of implementation science seeks to mend this gap by promoting the adoption and appropriate use of effective interventions, practices, and programs, which includes the study of scale-up and spread of innovations.<sup>18-21</sup> The terms “scale-up” and “spread” are not well-differentiated and often used together or interchangeably,<sup>19,22</sup> but the key definitional components repeatedly emphasized are the pre-established effectiveness of the innovation; the expansion across systems, sites, or settings; and the intentional process or active effort involved.<sup>1,19,20,22-28</sup> An exemplar definition from the World Health Organization, used by the Conference to Advance the Science and Practice of Scale-up and Spread of Effective Health Programs in Healthcare and Public Health,<sup>19</sup> contains all these elements:<sup>1</sup>

### SCALE-UP/SPREAD:

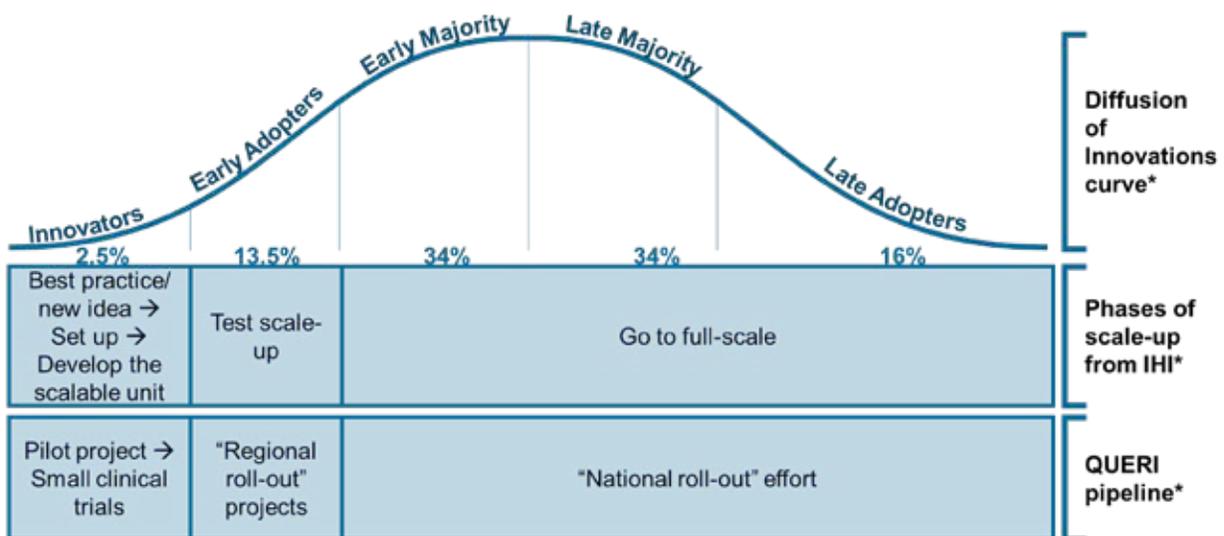
***“Deliberate efforts to increase the impact of innovations successfully tested in pilot or experimental projects so as to benefit more people and to foster policy and program development on a lasting basis.”***

Numerous frameworks and models have been developed for scale-up and spread,<sup>1-6,22,29-33</sup> with a recent review identifying 24 concepts, theories, or models in the public health sector alone.<sup>23</sup> However, many of these are focused on particular settings or health areas (eg, low- and middle-income countries, maternal nutrition), and may not be directly applicable to more general spread efforts.<sup>19,22,23</sup> In large healthcare systems such as the VA, organizations are multi-level and require models flexible enough to adapt to this setting, given that work across these systems “requires explicit attention to the interactions between and among multiple levels,” even for innovations targeting only one piece of the larger organization.<sup>34</sup> For this report, we focus on 2 widely-used frameworks that are general and describe the process of multi-site scale-up and spread: the Institute for Healthcare Improvement’s phases of scale-up<sup>1</sup> and the QUERI pipeline<sup>35</sup> (see **Figure 1** below). These 2 frameworks follow similar general steps in the spread process: piloting and initial testing of some idea or innovation, then testing scale-up before moving to full scale-up or spread. These frameworks are not without key distinctions. The QUERI framework is focused on moving research evidence to practice, characterizing the process as a “pipeline.”<sup>35</sup>

This pipeline has a core premise that innovations must be “evidence-based,” and describes a top-down process that is then assumed to get that innovation broadly implemented. The IHI framework, on the other hand, is focused on grassroots process improvement, and the basis for cultivating an innovation to be spread or scaled up is not necessarily a strong evidence base.<sup>1</sup> Rather, local demonstration of improvement is necessary, through piloting and initial testing as the framework depicts, before scaling up and/or spreading more broadly. While there is a fundamental difference between the evidence-based approach and the grassroots process improvement approach, the similarities in the later stages of these frameworks is the key factor we wanted to emphasize in this report, so we chose to draw from both frameworks to highlight the ways in which they align.

Both frameworks differentiate between 3 phases. In both cases the third phase, “go to full-scale” or “national roll-out effort,” describes an effort that includes many organizations. This last phase is depicted as a homogenous process in these frameworks, but often captures a heterogeneous group of organizations and settings. One theory that would suggest that this is not a homogenous group is the Diffusion of Innovations theory, which proposes that adoption of any innovation fits a curved pattern when spreading across a large population, with different groups of adopting individuals or organizations fitting into 5 sequential groups with different adopting habits and characteristics.<sup>36</sup> Innovators and early adopters are seen as more risk-taking and engage more quickly with new innovations. The early and late majority groups tend to observe the actions of these earlier groups before making their adoption choices, and the late adopters are characterized as having the greatest skepticism for change and last to adopt. These descriptions fit with spread activities in the frameworks, where innovators would conduct initial piloting and testing and early adopters would then be the next group to engage with during initial spread efforts. However, while spread frameworks tend to group the rest of the spread process into one category, this is discordant with how Diffusion of Innovation describes the 3 remaining groups, which have unique characteristics. The IHI and QUERI frameworks are not unique in that late and non-adopters are typically not the focus of work published in this area.<sup>37</sup>

As a note, Diffusion of Innovations theory is not perfect in its application to the scale-up and spread process, with observations of individuals rather than organizations as its basis and other issues related to characterizations of those individuals,<sup>36,38</sup> but other work in this area does suggest that adopter characteristics do vary at an organizational level.<sup>39</sup> Given the specific characteristics Rogers ascribed to late adopters, or laggards as he called them,<sup>37</sup> we will be using the term hard-to-engage as a generic term to describe the group of organizations that scale-up and spread efforts have struggled to reach. There is a lack of information about how to tailor approaches to these hard-to-engage sites in scale-up and spread efforts.

**Figure 1. Adopter Groups and Spread Process**

\*Diffusion of Innovations curve,<sup>36</sup> IHI Phases of scale-up,<sup>1</sup> and QUERI pipeline<sup>35</sup>

Going to full scale or completing large magnitude spread requires more than ad hoc connections, and the coordinated effort can be thought of as a macro model driving the infrastructure or organization of a spread effort. Spread initiators may need to tailor their model or apply unique strategies to reach hard-to-engage sites, especially in large magnitude spread efforts where the initial model for going full scale may reach most sites, but not all. Additional, or different, approaches may be required to engage the hard-to-engage sites. For instance, collaboratives that rely on voluntary participation and activated users to engage with the effort may not have strategies or local champions in place to reach sites that do not reach out to join the network themselves.

The objective of this project is to understand strategies available to scale up and spread clinical and administrative practices across large healthcare systems such as the VHA, with a focus on “hard-to-engage” sites.

## METHODS

To fully address our objective, we used both systematic review and semi-structured interview methods to collect relevant data, and synthesized these data through qualitative analysis. Below we describe our process, first developing our approach with our stakeholders, then conducting a systematic review and interviews, and finally integrating themes and findings into a cohesive narrative.

### TOPIC DEVELOPMENT

After discussions with the Technical Expert Panel (TEP) and operational partners, the scope of work was expanded from performing a systematic review to include semi-structured interviews with key informants, given the likely paucity of literature directly addressing the objective of this project: to understand strategies available to scale up and spread clinical and administrative practices across large healthcare systems such as the VHA, with a focus on “hard-to-engage” sites, which could also include low performers. This objective has been refined to 2 key areas of inquiry, described below:

- 1. What does large magnitude spread look like?**

As the QUERI pipeline<sup>35</sup> and IHI Phases of Scale-up suggest,<sup>1</sup> large magnitude spread is a planned and organized effort. As there are different forms that this organization or infrastructure can take, the planning process would involve a consideration of certain factors that may be site-specific. Here we sought to define the process of large magnitude scale-up and spread with consideration of hard-to-engage sites, what forms the large magnitude scale-up and spread can take, what should be considered prior to engaging in large magnitude scale-up, and what preconditions and existing networks for spread look like in the VA.

- 2. Considerations and strategies for working with hard-to-engage sites**

We looked at the commonalities or characteristics of hard-to-engage sites. We defined these in relation to whether the characteristics might have potential benefits in the spread process, or if they cause challenges. We then explored the various strategies that have been used with hard-to-engage sites, since working with hard-to-engage sites as part of a larger spread effort may require tailored approaches.

The review was registered in PROSPERO: CRD42018093380

### SEARCH STRATEGY

To identify relevant literature, we used 3 topical searches with key terms related to scaling or spread of health interventions, improving low-performing organizations, and learning health system(s). We also searched for similar articles for 5 key publications.<sup>20,34,40-42</sup> Our searches included the following databases: PubMed, WorldCat, Web of Science, Business Source Complete, and ROCS. See Appendix A for complete search strategy.

In addition to searching these databases, we searched abstracts within a database of all projects funded by the VA QUERI program from fiscal years (FY) 2008-2012. All potentially relevant

projects were then collated, and the project leads were identified as potential key informants (described below). In addition, our team then accessed the VA Assessment and Research Reporting Tool, a national database program that supports administrative processes and reporting capabilities for a variety of VA research data, to find any publications affiliated with these projects. These publications were included in all screening and abstraction procedures.

## STUDY SELECTION

Three team members independently screened the titles of retrieved citations (IML, DD, PMS). For citations deemed relevant by at least one person, abstracts were then screened independently in duplicate by the same 3 team members. All disagreements were reconciled through group discussion. Full-text review was conducted in duplicate by 2 independent team members (IML, SM), with any disagreements resolved through discussion. Studies were excluded at either the abstract or the full text level if they were: not about a healthcare delivery system (*eg*, spread within schools or community-based non-profits), about low-income country settings, about learning healthcare systems but not spread (*eg* only discussed data infrastructure), discussed spread conceptually without data or a specific example or case study, or studies that did not have a large magnitude of spread (fewer than 10 sites included in the spread effort). Studies in low-income countries were viewed as having infrastructure differences too distinct to draw parallels to a VA setting, since these studies often described efforts by international groups coming from foreign countries or working in systems with very different resource or system constraints. Studies with fewer than 10 spread sites were not describing the stage of large magnitude scale-up or spread that this report is focused on, and were typically much more indicative of testing scale-up or regional roll-out projects, as described by the IHI and QUERI frameworks.

## DATA ABSTRACTION

For each included publication we abstracted data on the following: the macro model the spread followed (collaborative/exchange to support spread of multiple initiatives within a specific topic area, initiative-specific spread, or embedded spread within a system), any specific micro strategies reported as part of the spread effort, the catalyst or rationale for starting the spread effort, focus/topic area of the practice or initiative, the country or countries where spread occurred, if and how the publication described working with hard-to-engage sites, and magnitude of spread. Each publication was subject to dual data abstraction, with any discrepancies resolved through team discussion.

## QUALITY ASSESSMENT

The focus of this review, which is describing scale-up and spread, is not one for which there are existing instruments to assess the quality of studies. With no established criteria for deciding on quality, and because it was beyond the scope of this work to develop such criteria, we did not perform any quality assessment.

## KEY INFORMANT INTERVIEW SAMPLING AND DATA COLLECTION

We used the consolidated criteria for reporting qualitative research (COREQ) to guide our reporting of the qualitative component of this work.<sup>43</sup> We invited a total of 24 key stakeholders to participate in semi-structured interviews. An email invitation to participate in an interview was

sent to each identified individual, and a phone interview was scheduled with those who agreed to participate. The semi-structured interviews were recorded and transcribed. Sample interview guide questions are shown in Appendix B. The average interview duration was 36 minutes and 30 seconds. The interviews were conducted by the MD- or PhD-educated members of the trained qualitative team (IML, ALK, CL), with additional team members in attendance as possible. All 3 interviewers are female researchers who are familiar with implementation science and quality improvement topics. In most cases participants and interviewers were not familiar with one another, the exception being during the pilot interview. The participants were drawn from 2 distinct samples, described below.

### **QUERI Project Leads**

We identified 39 projects in the database of QUERI proposals that described scale or spread activities in their abstracts. Of these, 11 projects described conducting national, multi-regional, or multi-site spread as part of the scope of the project. An additional 14 projects described evaluations of national policy or program spread efforts, with the final 10 projects describing analyses or work with low performing sites. We selected the 2 national spread projects, 2 additional multi-site/multi-region projects, 3 evaluation projects, and one analysis of low performing sites. We chose the projects based on their size and any specific references to spread activities being analyzed or implemented. Contacts from all 8 of the projects agreed to be interviewed, and they shared their perspectives on and experiences with strategies to scale up and spread clinical and administrative practices across healthcare systems, with a focus on “hard to reach” sites, which could also include low performers. In one case a QUERI project lead did not respond to our contact, so we interviewed a different co-investigator from the same project instead.

### **SAIL Improvers**

The VA uses a performance metric system called Strategic Analytics for Improvement and Learning (SAIL),<sup>44</sup> an adapted version of the *Thomson Reuters Top Health Systems Study*, that tracks a multitude of individual metrics and combines them to produce an overall global score for each VA facility which is adjusted for facility complexity. Facilities are sorted into quintiles using this overall score. The perspectives of these sites may reflect how and when sites may engage in spread efforts, and what types of resources these sites used to improve.

We sorted the 146 VA sites with data from all quarters in FY2012 through FY2017. These were categorized into 3 groups: sites whose rank remained in the lower quintiles (quintiles 3 through 5 throughout the reporting period, n=34), sites whose rank remained in the higher quintiles (quintiles 1-3 throughout the reporting period, n=38), and sites that changed ranks (n=75). From this last group, we placed sites in the improver group that had begun with scores in the lower quintiles in the first 3 quarters reported (FY2011 and FY2012) and had made improvements to move up to the top quintiles and had maintained high quintile ranking in the latest fiscal year (n=16). See Appendix C for example data representing these categories. One example for an improver site is site E in the Appendix, which was ranked in the fifth quintile in FY2011, then in the fourth quintile for all 4 quarters in FY2012. In FY2013 site E ranked in the third quintile in quarter one, second quintile in quarters 2 and 3, and first quintile in quarter 4. This first quintile ranking persisted through the rest of the reported fiscal years (FY2017 quarter 4).

We then sampled 7 representative sites from the improver group, based on facility complexity and diversity of location, and invited 2 key informants from each site. Two additional sites were contacted but the original contact did not respond. These key informants represented one person in a leadership position and one person closely involved in SAIL improvement activities at the site, and were identified by TEP members or team members who were familiar with the sites. Once we had contact with a site, our first contact could suggest additional or replacement interviewees if they thought there were other, more appropriate individuals. We invited a total of 20 key stakeholders from these sites with SAIL improvements, of whom 16 shared perspectives on and experiences with strategies their sites used to improve their overall SAIL score, as well as any specific metrics that may have been targeted for improvement. Of the 4 invited stakeholders who did not respond, 2 stakeholders were the initial contacts at the nonresponding sites, one stakeholder was unable to participate due to scheduling conflicts, and one individual referred our team to another colleague at the same site, who we interviewed instead.

## DATA SYNTHESIS AND ANALYSIS

We drew from a combination of both key informant interviews and literature review findings to address the key questions. We first analyzed the literature and interviews separately, as described below, and then synthesized across these data sources by comparing and contrasting findings within sections. Within each results section we describe the sources we drew from for that section.

### Literature Review

Our review is a narrative analysis. We synthesized descriptions of spread efforts from included publications.

### Key Informant Interviews

Drawing primarily on matrix analysis,<sup>45,46</sup> an inductive and deductive team-based analytical approach was performed. A matrix analysis is a tabular format that collects and arranges data for easy viewing in one place, permits detailed analysis, and sets the stage for later cross-case analysis with other comparable sites.<sup>45,46</sup> Based on our interview guides, we developed separate templates for QUERI and SAIL interviews to rapidly organize qualitative data by key themes or questions.<sup>47</sup> Each interview was analyzed by 3 members of the team (IML, DD, SM), and consistency of interpretation was regularly checked through team discussion. See Appendix D for QUERI and SAIL templates used in analysis.

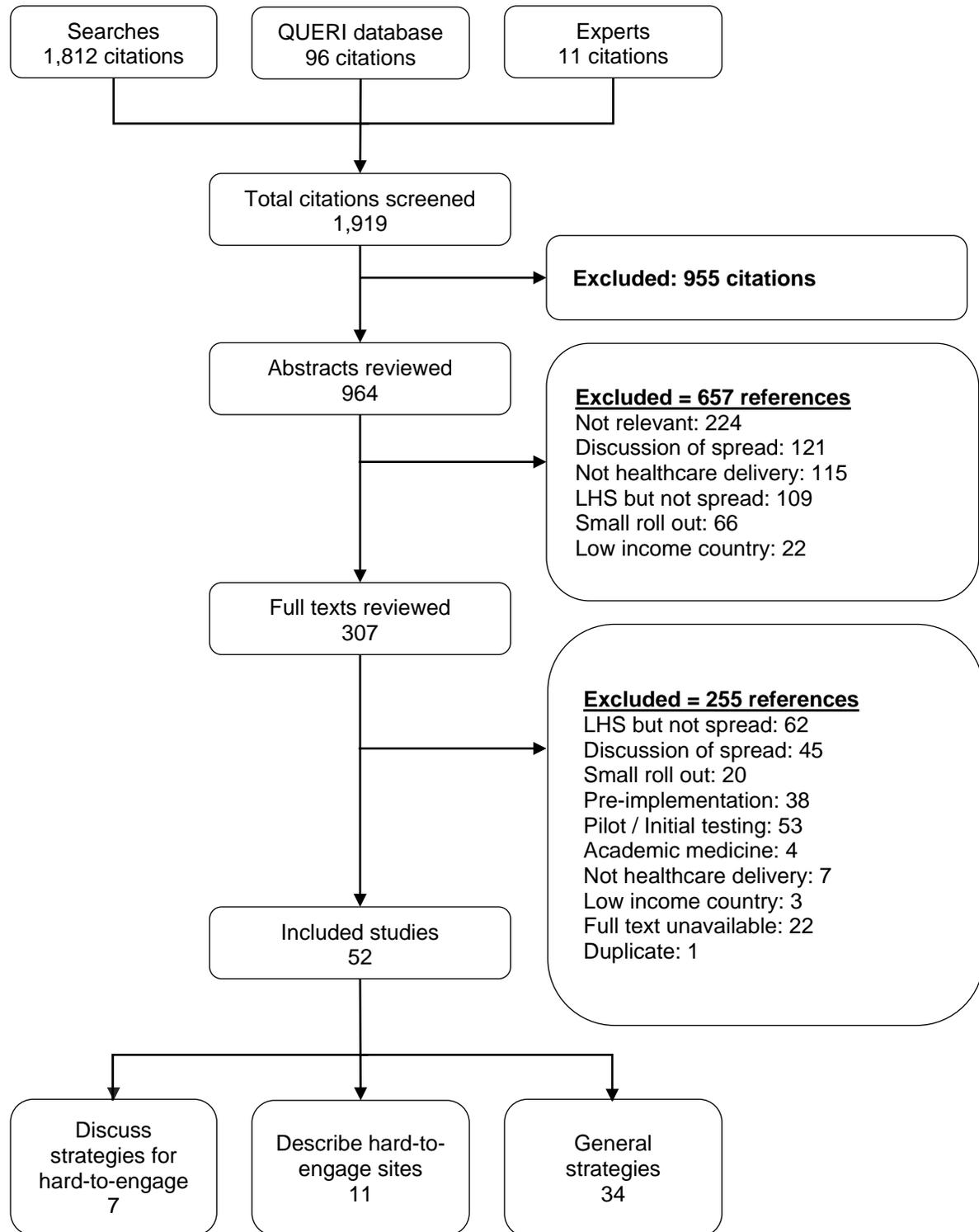
## PEER REVIEW

A draft version of the report was reviewed by technical experts and clinical leadership. Reviewer comments and our response are documented in Appendix E.

## RESULTS

### LITERATURE FLOW

We identified 1,919 potentially relevant citations, of which 964 were included at title screening. From these, a total of 657 abstracts were excluded. Excluded abstracts were categorized as not healthcare delivery (n=115), low income country (n=22), learning health system but not spread (n=109), discussion of spread (n=121), small roll-out (n=66), or otherwise not relevant to the topic of spread (n=224). The other 307 abstracts were included and obtained as full text publications. The 255 publications that were excluded at full-text review were categorized as exclusions for the following reasons: learning health system but not spread (n=62), discussion of spread (n=45), small rollout (n=20), full text unavailable (n=22), not healthcare delivery (n=7), low income country (n=3), duplicate (n=1), or otherwise not relevant to the topic of spread (n=95). This final group included studies of piloting or initial testing of interventions (n=53), pre-implementation analyses with no implementation component (n=38), and other topics not relevant to spread (*eg*, medical education programming, n=4). A full list of excluded studies from the full-text review is included in Appendix F. A total of 52 publications were identified at full-text review as meeting inclusion criteria and contributed to our final sample (See **Figure 2** for literature flow). The included studies discussed spread strategies for hard-to-engage sites (n=7), described hard-to-engage sites but did not discuss specific strategies (n=11), and discussed spread strategies more generally (n=37). Descriptions of publications in this latter group, which are discussed in less detail throughout the report, are available in Evidence Tables (Appendix G).

**Figure 2. Literature Flow Chart**

## WHAT DOES LARGE MAGNITUDE SCALE-UP AND SPREAD LOOK LIKE?

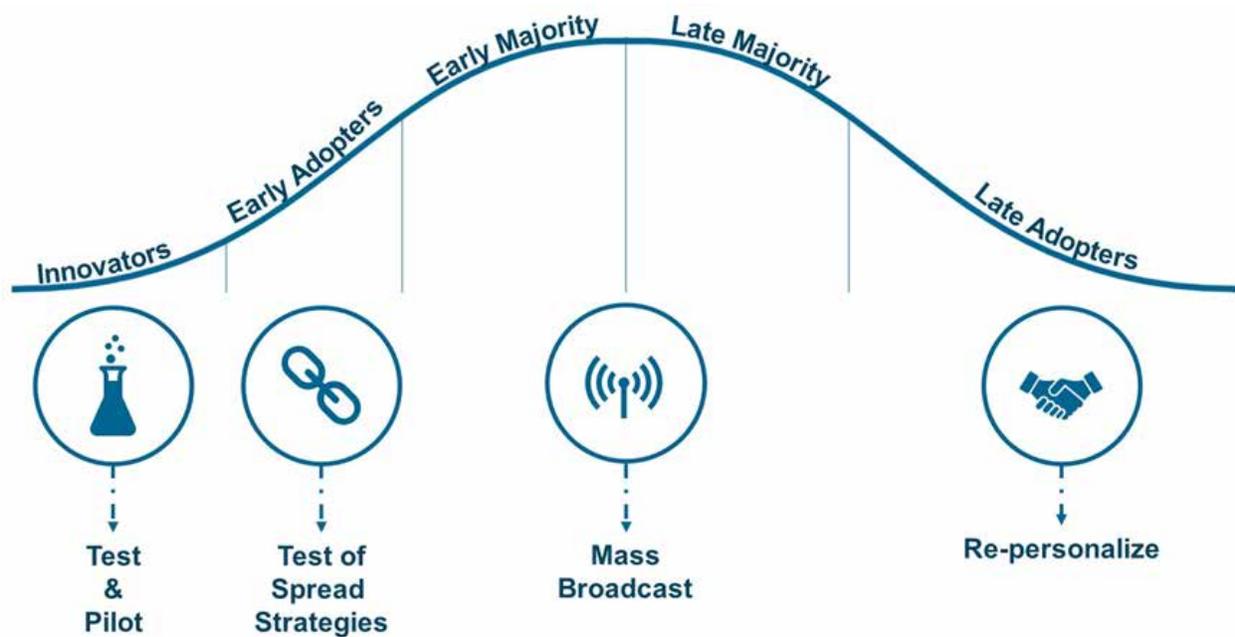
As the QUERI pipeline<sup>35</sup> and IHI Phases of Scale-up suggest,<sup>1</sup> large magnitude scale-up or spread is a planned and organized effort with various phases. We first propose additional specifications to the phases proposed by these frameworks to account for hard-to-engage sites. The organization or infrastructure supporting these efforts can take multiple forms or models, and here we highlight the 3 macro models we identified. We then discuss factors that repeatedly arose throughout the interviews and literature as crucial information to know prior to engaging in large magnitude scale-up. Finally, we discuss VA preconditions and existing networks for spread that currently facilitate diffusion throughout the system.

### Breaking Down the National Scale-up or Spread Process

Of the 52 included publications, 7 publications went beyond discussing their overall spread approach to specifically describe strategies they used to work with hard-to-engage sites. Themes from these publications, as well as themes from the QUERI interviews, were combined into a synthesis related to how hard-to-engage sites relate to the overall process of scale-up or spread (see **Figure 3**).

The first 2 phases have been described by the QUERI pipeline<sup>35</sup> and IHI Phases of Scale-up,<sup>1</sup> and our data support their descriptions of these phases. Whether the earliest stage includes using an evidence-based innovation or developing a new idea, this phase includes small-scale testing or piloting with direct involvement of the team at the initial site or small number of sites. This work requires personalized, first-hand contact and typically builds relationships among those developing, implementing, and evaluating the initiative. As the phases of scale-up and spread progress, the breadth of contact across sites is emphasized over the depth of contact at any individual site.

While our data support much of what these frameworks describe, activities described in our data split the final phase of “going full-scale”<sup>1</sup> or “national roll-out effort”<sup>9</sup> into 2 parts with distinct strategies. The first part of the full-scale spread, which we are calling the “mass broadcast” phase, uses strategies intended to reach maximal audience. This first part seems to align with the breadth of contact suggested by the frameworks. However, the second part of the full-scale spread phase, which we are calling the “re-personalize” phase, returns to using strategies more often employed in the first phase of the spread process. This final part of the scale-up or spread process is focused on those hard-to-engage sites that did not engage with the “mass broadcast” strategies or approach.

**Figure 3. Large Magnitude Spread Process**

The “**mass broadcast**” phase of large magnitude spread, in publications and interviews alike, was nearly always described as beginning with strong top-down support, as one interviewee notes:

“I think having a strong partnership with [national leaders] was a critical factor in making this happen and getting the facilities, the units involved as well because they knew that we had the backing of the National Program Office to make this happen.”

This could take the form of summits with all top-level leadership, for example: “... senior regional leadership identified reducing sepsis mortality as a key performance improvement goal... The effort was launched... at a Sepsis Summit.”<sup>48</sup> Other more formal arrangements like an official mandate or policy change were also used, with mandates present in nearly every QUERI interview like the following: “the... Directive, that was a top-down strategy where the government said everybody must do this.” This was typically effective during the “mass broadcast” phase of a national spread effort, and in garnering this leadership support it was often very important to have evidence of success from the innovators and early adopter groups, as noted by one national spread initiative of inpatient palliative care: “the evidence behind the model, demonstrated by the randomized trial, was an important factor promoting its spread.”<sup>49</sup> While these and other mass-scale approaches were helpful in amplifying the magnitude of spread to the majority audiences, typically additional strategies were needed for the hard-to-engage group, which are discussed as a separate phase below.

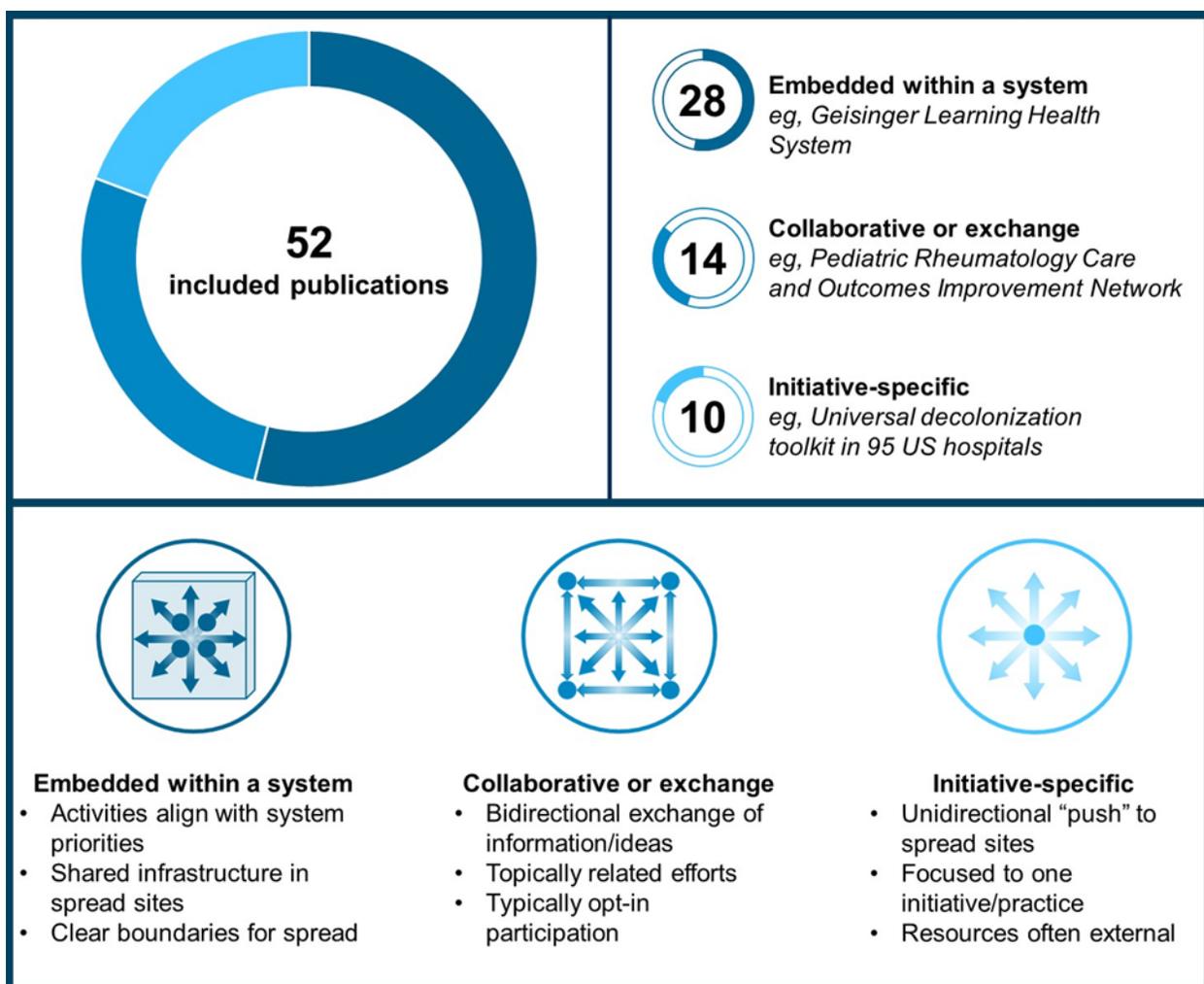
The “**re-personalize**” phase returns to an approach used in earlier phases, which reflects a return to more personalized and intensive engagement. In experimenting with and testing strategies early in the spread process, spread initiators are often engaging sites much more heavily to collect data, refine approaches, and learn from their early experiences. In some ways, the

strategies recommended for hard-to-engage sites tend to reflect a return to this increased connection with sites, and later sections of this report discuss specific strategies for hard-to-engage sites in greater detail.

## Macro Models

We identified 3 distinct macro models to describe the organization or infrastructure of spread efforts in the 52 included publications. These included spread efforts that embedded scale-up or spread within a system of care (n=29), collaboratives or exchanges to support the spread of multiple initiatives within a specific topic area (n=14), and initiative-specific spread efforts (n=9). **Figure 4** displays this distribution of publications, as well as an example for each type of model and key features.

**Figure 4. Macro Model Distributions and Descriptions**



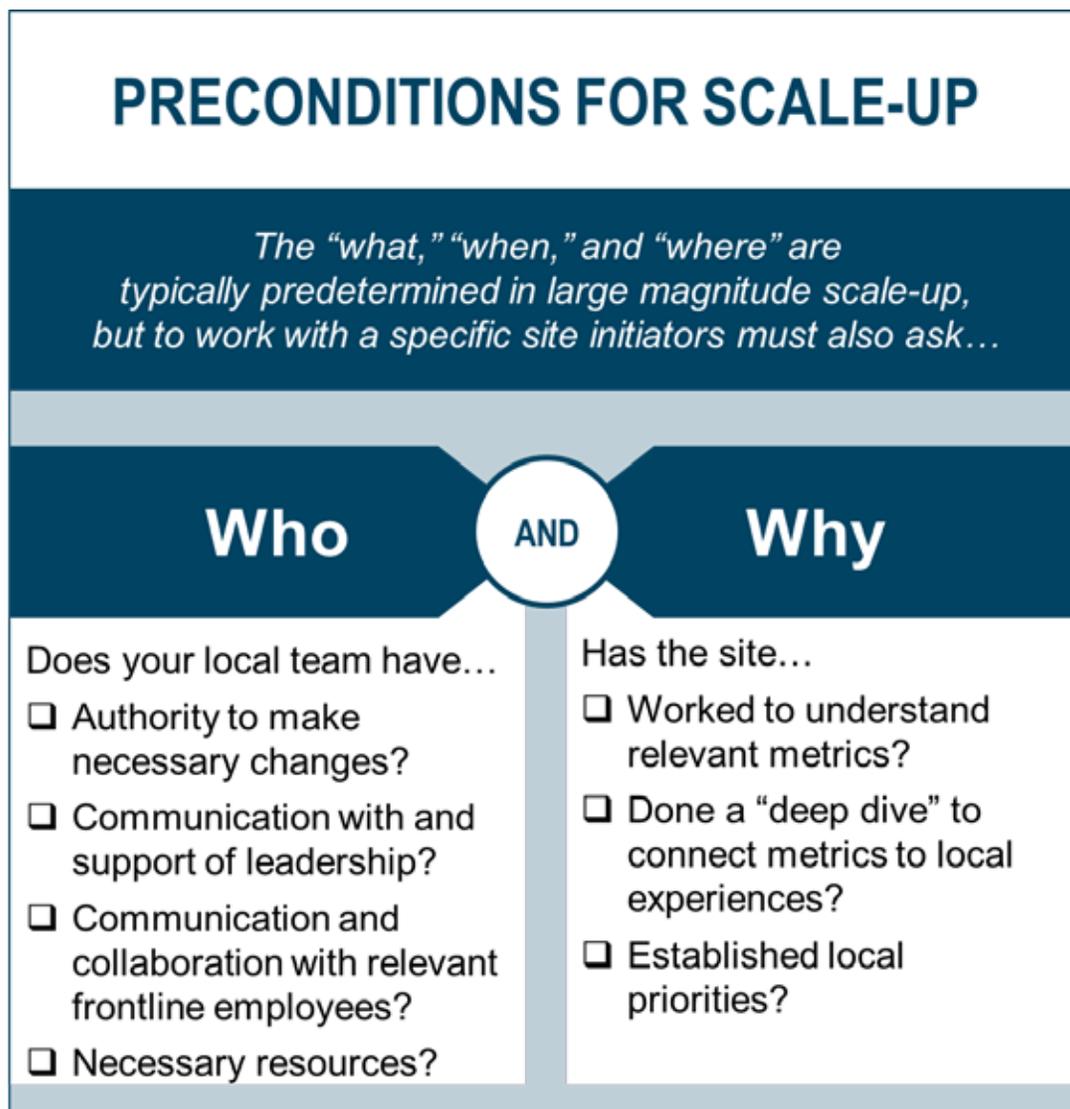
The 29 publications classified as embedded within systems either discussed specific projects within these systems or the system itself, which had spread infrastructure to tackle high priorities within the institution. Some, like Geisinger Learning Health System,<sup>50</sup> specifically use the learning health system term, whereas others describe similar attributes including system-wide infrastructure, shared priorities and agenda setting, and initiatives or practices aimed at supporting the larger system priorities. The VA, Kaiser Permanente Northern California, and the National Health Service in the UK are all examples of systems with publications describing embedded spread efforts. These organizations typically have shared infrastructure, like an electronic health record, and a clear number of sites that fall within the scope of any particular spread effort.

Collaboratives or exchanges, which were described in 14 included publications, span multiple organizations. They share a topic or priority area, such as pediatric rheumatology,<sup>51</sup> or breast health,<sup>52</sup> and may be defined by a particular locality, like the Indianapolis Discovery Network for Dementia.<sup>53</sup> The organizations typically receive little to no incentive to participate, choosing to opt-in voluntarily. The intention of these networks is bi-directional exchange, so organizations could be described as learning together simultaneously.

The final model, initiative-specific spread, most aligns with the classic models described in the frameworks described earlier.<sup>1,35</sup> In this model the initiative or practice in question has been developed and is now moving to new sites. While it may be a bundle or toolkit, there is a defined set or package that is being pushed out. The spread activities are often funded by the origin site or other sources external to the adopter sites. While this model could include smaller spread efforts, this review limited spread magnitude to include 10 or more sites, and the identified publications described spread efforts that were usually regional or national in scope. Examples include the scale-up of a universal decolonization toolkit to 95 hospitals across the United States,<sup>54</sup> as well as a state-wide spread of a clozapine management system in Australia.<sup>55</sup>

### **Preconditions to Consider in Large Magnitude Scale-up**

This section describes factors that repeatedly arose throughout the interviews as crucial information to gather prior to engaging in large magnitude scale-up. This was corroborated by the types of issues raised in the 11 publications that described hard-to-engage sites. Initiators of scale-up should not assume that all sites have similar conditions, and understanding salient preexisting factors was consistently highlighted across both sets of interviews and the included publications. Initiators of scale-up efforts often know what they are scaling, when they would want to scale, and where they would like to scale in order to define their scope of work. But having more knowledge about the sites is also crucial to planning a scale-up effort. Gathering more information on who will need to be involved locally and local reasons why sites may (or may not) align with the goals of the scale-up is central information in the planning stages of large magnitude scale-up (see **Figure 5**). Any effort to engage a site should consider this information-gathering in the early formative stages, regardless of variations in later plans.

**Figure 5. Preconditions for Scale-up**

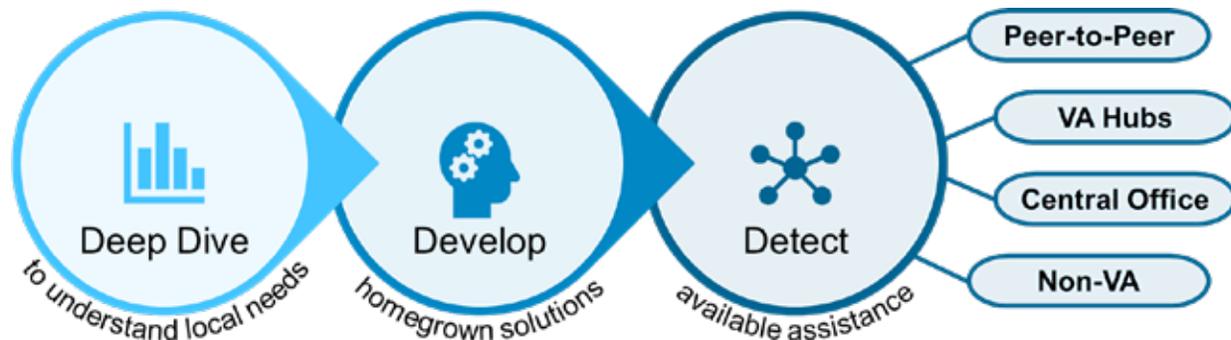
### VA Preconditions and Existing Networks for Spread

In addition to building networks de novo for a specific collaborative or exchange, spread efforts can also leverage existing networks in a similar model to collaboratives or exchanges. To better understand the existing conditions in VA that could facilitate spread efforts, we used data from the SAIL improver interviews. The VA interviewees looking to improve their SAIL measures described several sources from which they sought information on potential improvement methods (see **Figure 6**). We describe here the way participants use these sources of information, which parallels the preconditions discussed for scale-up initiators, in that here we discuss the preconditions individual sites take prior to engaging in spread.

This information-seeking almost always occurred after working on homegrown solutions and analyzing local priorities and challenges. Once specific initiatives or issues had been identified, SAIL improvers sought information related to that particular area of interest. **Figure 6** below

highlights this process, as well as sources of information and assistance, as described by the SAIL improver key informant interviews. These sources of information and assistance all facilitate the spread of ideas, interventions, and information.

**Figure 6. Local Preconditions Prior to Engaging in Spread**



### Peer to Peer Connections

SAIL improvers very often described reaching out to other sites to hear about their peers' experiences. While these connections would sometimes happen on VA Pulse or through cold-calling, the VISNs often facilitated this connection by highlighting sites with interesting or successful approaches and holding VISN-wide meetings or calls: "the VISN was helpful in that they really did organize... forums where best practices can be shared but more importantly it gave key folks in our facility [a venue] to present their work." Sites particularly wanted connections with other sites that seemed similar to their own sites or to "see where those other high performing facilities are and then we need to reach out to them."

***"we have the ability to reach out and get some great best practices from the other sites"***



### Existing VA Hubs of Information

While VA Pulse was most often endorsed, other hubs including the VA Performance Improvement Hub,<sup>56</sup> the VHA Shark Tank Competition,<sup>57</sup> and the VHA Access to Care Initiative Hub<sup>58</sup> were also mentioned by key informants. One site shared the following strategy for staying connected to a variety of hubs:

"We have link to all those [hubs] listed in our ... project repository SharePoint site, so... if somebody wants to get an idea on how to improve patient cancelations, they can go to the VA Performance [Improvement Hub], or they can go to the VHA Access to Care Initiative and search for that. We also use VA

Pulse quite a bit actually, where we'll go on there and we'll do a search and look for specific project assistance".

Another interviewee highlighted a challenge of finding information within the VA:

“It's very hard in this huge healthcare system to find these toolkits... if your computer ever crashes, you're in trouble because once you find the link you've gotta bookmark it. There's no real fully-organized place for that stuff... it shouldn't be that hard to find that stuff. And sometimes I find it and then I can't find it again.”

### *Central Office support*

SAIL improvers would proactively contact national program offices, like the Office of Nursing Services or the Office of Mental Health for specific questions. These often included questions about how a particular metric was constructed, to see if there were best practices or advice that office could share about a particular metric, or to be connected with a site that had best practices.

Key informants also highlighted the usefulness of having a site visit or “deep dive” into the statistics and measures of the SAIL program with Dr. Almenoff, Director of Organizational Excellence in the VA Secretary's Office. There were also multiple sites who used the SAIL mini-series lectures, which were so popular that “things actually started to get to the point where you need to register the moment that they came out and they ran out of spots... we kept all of the information, kept good records.”

### *Non-VA entities*

To a lesser extent, informants named organizations including the Institute for Healthcare Improvement (IHI), National Institutes for Health (NIH), or other non-VA resources like professional societies or private sector organizations as potential sources for guideline information, protocols, toolkits, and other topic-specific or skill-specific guidance. These informants described wanting evidence to support their work:

“IHI, NIH, and some of the things that are out there that already have synthesized the evidence-based practice and kind of put it all together. I mean you can do a big lit search and that kind of stuff, but if it's already put together and it's already proven and it has like toolkits and those kind of things... [these groups] would synthesize the data, they would look at best practices, then they would develop a toolkit and they would give you all of that”.

## CONSIDERATIONS AND STRATEGIES FOR WORKING WITH HARD-TO-ENGAGE SITES

*“I give you a whole bunch of N-of-1s, but there’s a lot of experience there”*



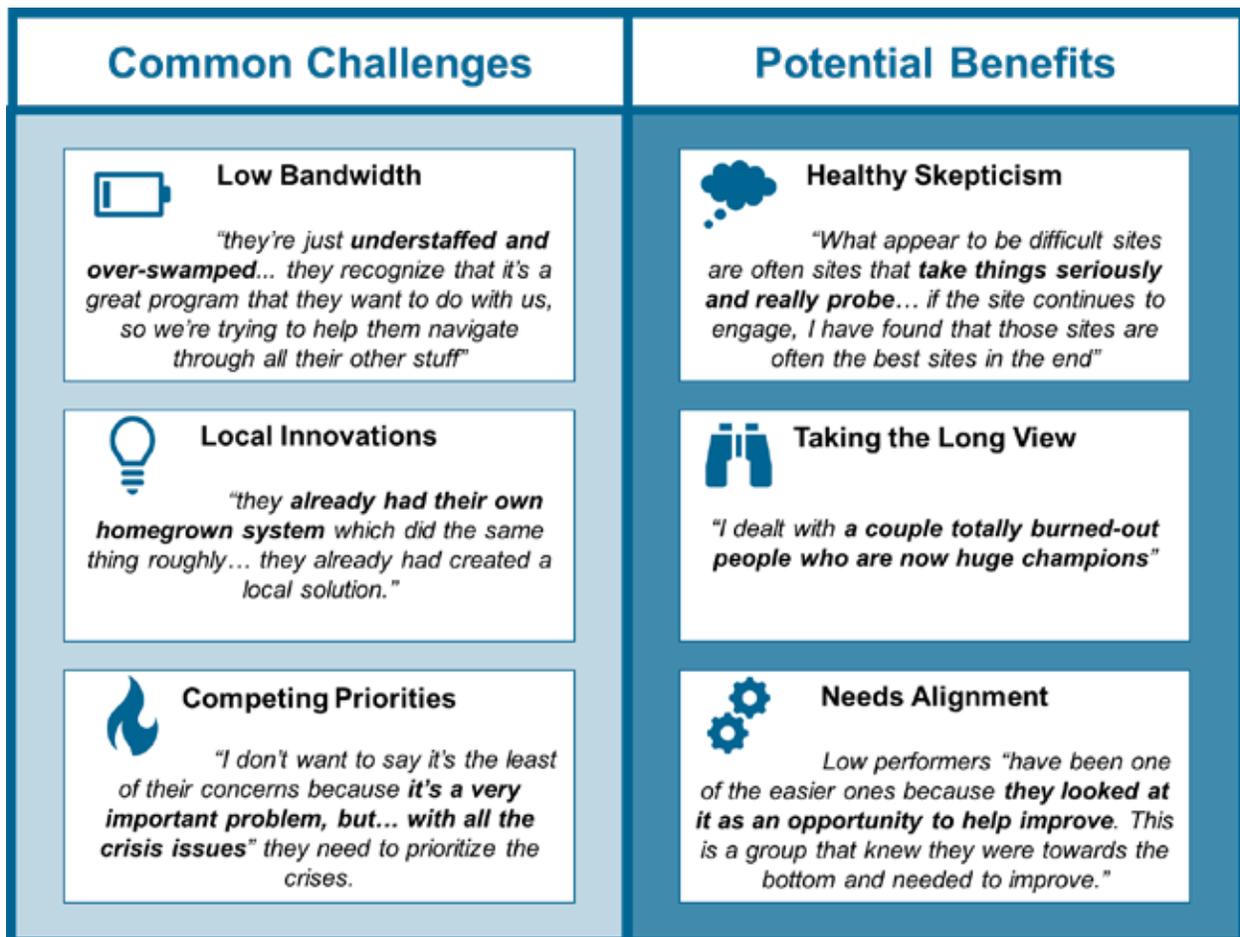
Hard-to-engage sites were described both in the interviews and systematic review findings. We drew from the QUERI spread project papers and interviews, as well as from the 18 publications we identified as either providing descriptions of hard-to-engage sites (n=11) or additionally providing descriptions of strategies used with these hard-to-engage sites after identifying/describing them (n=7).

Generally speaking, hard-to-engage sites had issues meeting the preconditions for scale-up, as described in an earlier section. Common challenges are described below, but the preconditions may not be met for a number of reasons, and interviewees and publications alike supported the highly context-specific nature of challenges faced by hard-to-engage sites, whose “problems vary tremendously” with a “myriad of individual reasons.” The phrase “N-of-1” was used repeatedly throughout the interviews to describe experiences working with hard-to-engage sites.

Similar to the distribution of the Diffusion of Innovation curve,<sup>36</sup> the proportion of hard-to-engage sites was described as small, with one interviewee directly acknowledging that their spread effort followed “a classic diffusion curve.” Other descriptions were comparable, with proportions of hard-to-engage described as “only a handful” and “up to about 80 to 90 percent adoption went very smoothly,” with the final 10 to 20 percent as hard-to-engage.

While descriptions of hard-to-engage sites often portrayed challenges, a number of beneficial characteristics also warrant mention due to their repeated appearance. The image of the hard-to-engage site is nuanced, and **Figure 7** highlights quotes from the interviews that supported the themes that emerged from both literature and interview sources. While these sites may not become early adopters, a better understanding of the variety of hard-to-engage sites may help with tailoring strategies and approaches, rather than treating all hard-to-engage sites the same. What follows is more discussion of these themes.

Figure 7. Hard-to-engage Site Characteristics



### Common Challenges for Spreading to Hard-to-engage Sites

Certain challenges, summarized in the figure above, that sites themselves and/or spread initiators may face when working with hard-to-engage sites are described in greater detail below.

**Limited bandwidth or resources** to devote to engaging with a particular spread effort was mentioned in nearly every source for this section. Turnover, lack of funding or implementation as an added duty without additional compensation,<sup>59</sup> and burnout were common in hard-to-engage sites. In one typical description, an effort within VA found that “sites often encountered resource shortages... lack of administrative support, time constraints, [and] departure of key team members.”<sup>60</sup> No system or model of spread seemed to be immune, as “lack of resources” was frequently mentioned as a factor impeding spread in a non-VA spread effort that was national in scope as well.<sup>49</sup> Because of a lack of resources or reliance on volunteer effort, potential site personnel would often feel like they “can’t take one more thing” on top of their existing responsibilities, which would often lead to burnout as well.

**Local innovations** or homegrown solutions to the same problem can present competition that impedes spread, since “there was no expressed need for the program.”<sup>61</sup> Because their needs are already met locally, “sites with pre-existing [programs] tended to move more slowly to adopt.”<sup>49</sup>

This group can look more like innovators than late adopters in the Diffusions of Innovations model,<sup>36</sup> as one interviewee noted:

“It doesn’t mean they were low quality sites, though, but that they’re just last sites to adopt. In some ways they were often high-quality, forward-thinking sites that had already tried to solve the solution... they were laggards in terms of adopting [our practice].”

**Competing priorities** were another challenge for spread efforts, with potential spread sites often very busy addressing local priorities that may not overlap with the aims of a particular spread initiative. “Low implementation facilities were struggling to respond to other higher priority initiatives,”<sup>61</sup> and “sites often encountered resource shortages because of competing organizational initiatives and a lack of prioritization... at the level of the executive suite.”<sup>60</sup> While some sites may be low performing sites “in extremis” that are “falling apart... they’re concerned with getting through the day,” the opposite can be true as well: “some of the [hard-to-engage sites] that are otherwise big academic places... they’re focused on something for themselves.”

### Potential Benefits of Working with Hard-to-engage Sites

*“Many sites are difficult. I don’t think that makes them bad sites”*



In juxtaposition with the challenges, spread initiators raised several ways that they viewed hard-to-engage sites as benefitting their projects, or that the eventual implementation, while slower to start, reaped unique benefits for the sites themselves.

**Healthy skepticism** was described by interviewees in situations where sites or people initially displayed skepticism, but that this led to collaboration and, in some cases, improvement of the practice or initiative being spread. Rather than being skeptical and slowing spread with malintent, spread initiators distinguished slow-for-slow sake from this group with healthy skepticism, saying they are seeking to understand and appraise the added value of any proposed change: “they are activated and I think in it to win it for their patients.” This initial skepticism is actually a form of engagement, but may be categorized by spread initiators as hard-to-engage if initiators do not continue the conversation. Rather than framing skepticism as opposition, “it can be a way to engage a site by letting them in on what you find and getting their perspectives on what might help”.

**Taking the long view** was another way to view the potential benefits of working with hard-to-engage sites, as some spread initiators noted that early adoption could lead to superficial engagement and, consequently, abandonment. Conversely, hard-to-engage sites can be signaling

that once they are engaged, their hard-won adoption could lead to more sustainable successes in the long-term. One description captured this sentiment well: <sup>59</sup>

“the region that decided to postpone implementation benefitted from the experience of the other regions in working out issues... [they] joined the monthly conference calls and asked many clarifying questions regarding the issues being discussed... [this region] waited and then built a strong base of support for the program... chose to take time to build organizational readiness... when they implemented the program...they were successful”.

Additionally, a late start can proffer other benefits to adopters: “the advantage of later joiners... was that they could draw on and gain support from the experience of early enrollees.”<sup>62</sup>

**Alignment with needs** between what a spread effort offers and local priorities can be a boon for low performing sites. This underscores the distinction between hard-to-engage sites like late adopters and low performers. These 2 groups may or may not always overlap, and the interviews with spread leads provided a balanced perspective regarding how low performing sites can be easier to work with in regards to aligned priorities:

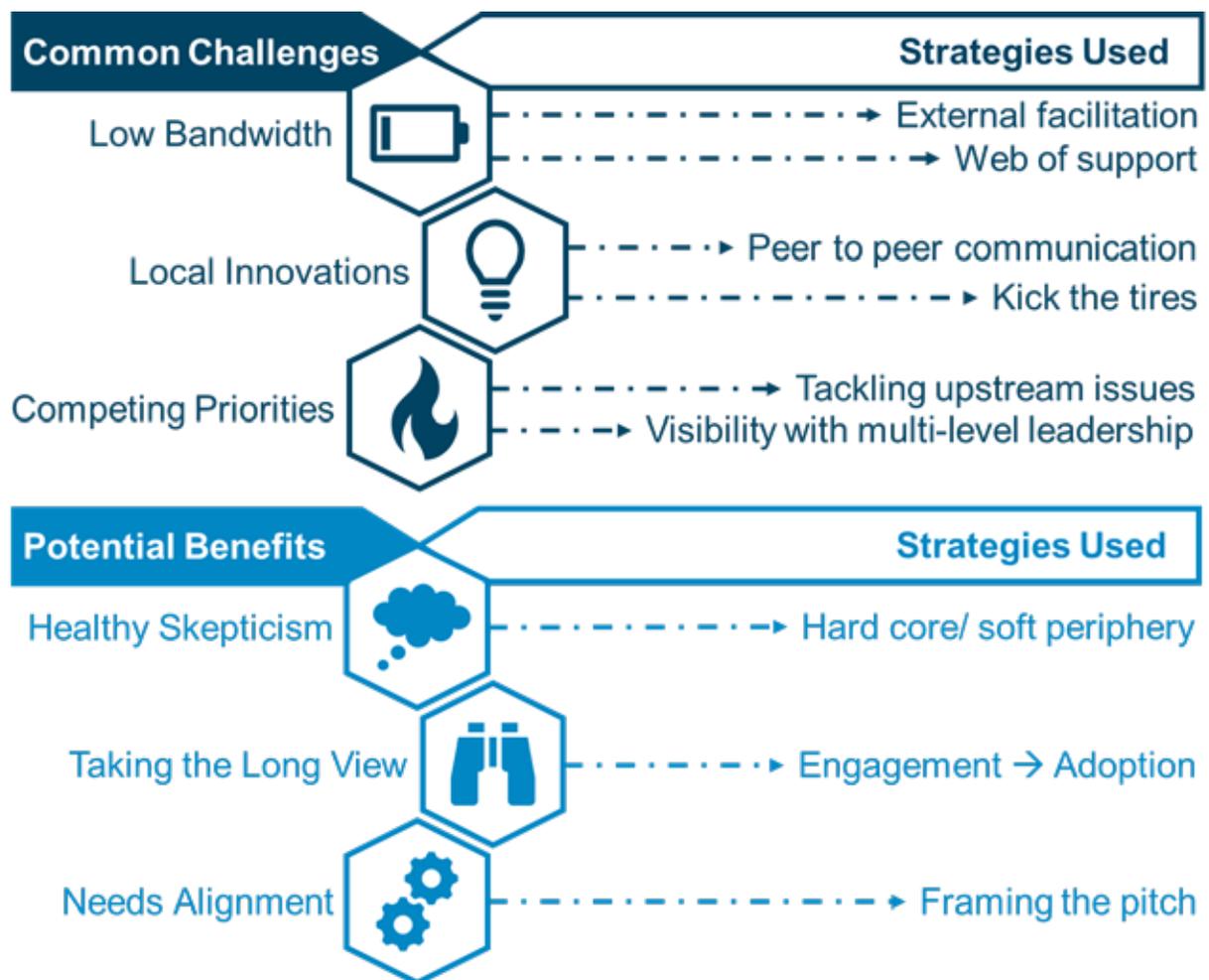
“there are some [low performers] who want to hide their low-performance status and there are others who want to really get better and take advantage of a learning community and work on it and improve.”

There are some late adopter, low performer sites similar to popular conceptions: “they close themselves off from the outside world because they know they’re not doing well and they can’t take on” a new project. But because a spread effort has so much to offer in addressing a priority need and perceived benefits, this is a group where the strategy or approach to engagement can make a difference in framing the issues as compatibility with existing priorities and support, rather than a punitive situation.

### **Useful Strategies for Hard-to-engage Sites**

Here we define useful strategies for hard-to-engage sites mapped to hard-to-engage characteristics as shown in **Figure 8**. The interviews with QUERI project leads and their corresponding publications provided valuable insights for this topic, as most publications did not provide any specific strategies for hard-to-engage sites, and those that did spent no more than a few sentences at most discussing the topic. Thus, the following section is a synthesis of the 7 publications discussing spread strategies for hard-to-engage sites and the QUERI interviews.

Since hard-to-engage sites are highly variable in their needs, QUERI interviewees recommended “a flexible, tailored approach to one [site] at a time,” with another saying, “There’s not just one strategy, but I do think it is a bundle of strategies and some probably work better than others depending on the situation.” The following list (**Figure 8**) is not exhaustive of all strategies mentioned, but rather highlights the most salient themes from the literature and interviews in how to tailor approaches based on the characteristics described in the last section. To draw linkages between characteristics and strategies, we relied on the descriptions in interviews and literature of both the hard-to-engage sites and the strategies used for those sites.

**Figure 8. Strategies Addressing Hard-to-engage Site Needs**

### Strategies Used to Address Common Challenges

Spread initiators described a variety of approaches tailored to hard-to-engage sites that faced common challenges. While these linkages between site challenges and strategies do not imply that these are the only strategies that would be helpful in working with hard-to-engage sites, these serve as examples of successful strategies used by spread initiators.

**External facilitation** is a “multi-faceted process of enabling and supporting individuals, groups and organizations in their efforts to adopt and incorporate clinical innovations into routine practices,”<sup>38</sup> which includes “interactive problem solving and support.”<sup>39</sup> The strategy of providing additional supports to those sites with low bandwidth, or who may need extra support for other reasons, was described repeatedly, as in a publication where “iterative quality improvement processes were supported by... the national team”,<sup>49</sup> where the national team refers to a team of researchers and support staff dedicated to the scale-up of the program. External facilitation often included phone calls where spread initiators helped with “troubleshooting to make sure that things were moving forward.”

QUERI interviewees describe “the sites have said just having regular calls was critical to them just kind of keeping one foot in front of the other,” with sites showing gratitude for the external facilitation: “Thank you for giving me the space. Even though it was squeezed in the margins, you were willing to spend a half-hour call at the end of my day.”

Creating a “**web of support**,” or working with multiple local people, reduces the burden on any individual and strengthens overall linkages to that site for a spread initiative: “you kind of have to create a web of support around trying to work these things through. So it's never good to have a single person be your point person in many of these places.” By fostering connections with multiple site contacts, “other team members were able to step in and ... they got to know us and [they] were comfortable talking with us as much as the team leaders.” Because that QUERI interviewee, who was the project lead, and their team “did go on site for the big kickoff,” they were able to meet additional site contacts and start relationship-building. This included frontline staff who were to be involved in the work, as well as middle management and even site leadership. The web of support created a redundancy so that if, for instance, a nurse champion was moved out of the initiative, other potential nurse champions were already known to the QUERI team.

**Peer to peer communication** is important for spread generally, but especially key for sites where local champions are very engaged with the topic and likely have expertise in the area. While this could apply to innovator sites, it also applies to hard-to-engage sites that have homegrown solutions, or who are skeptical about the innovation. This peer to peer communication can be used in a few different scenarios that were highlighted in the literature and interviews. Initially during the buy-in or introductory period, innovations “benefited from champions in each respective practice and specialty to ensure that buy-in was achieved in all facets of the organization.”<sup>63</sup> Peers with influence may have personal relationships or credibility off which a spread effort can capitalize, as one QUERI interviewee noted:

“it may have given her many contacts throughout the field at local facilities as she worked for several years prior to joining us... thus giving us both our entrée into sites which facilitated and giving us, shall we say, a better contextual knowledge to customize our interventions to the needs of the sites... her credibility in the field was an exceptional part here”.

The peer to peer communication can also be a powerful tool during implementation, with sites working together to learn from one another: “The best part of it is really when teams talk to each other.”

*“they kind of stole from each other, which was great”*



A variation on this theme included “a system where they had the high-performing sites working with the low-performing sites... to communicate directly with each other. And I think that was really helpful to people.” However, another QUERI interviewee warned that power dynamics needed to be carefully considered: “let me emphasize the words ‘peer-to-peer,’ they have to be on the same exact level and view those people as peers.”

Trialability,<sup>36</sup> or letting them “**kick the tires**,” gives local innovators a chance to test against local innovations and can improve the innovation in the process. Spread initiators recommended highlighting the exploratory nature of trying out the innovation: “and if you don't like it, you can walk away.” One spread initiator had a consistent pitch he used throughout his effort when approaching new sites:

“It's not perfect, but let's walk you through it. Here's how to use it. Hopefully it's pretty straightforward. Give me any feedback you have... so what we're asking you to do is take it, use it, either on test cases, just practice with it, or start to deploy it in real reporting. But kick the tires”.

In this case the spread initiator was also a peer to the contacts at the spread sites, which amplified his message by combining the trialability with peer to peer communication. His introduction went on to describe how the innovation was “being used by and for clinicians who developed it.”

Another key to having this strategy be effective is to incorporate feedback received from the spread sites, thereby closing the loop between sites and spread initiators:

“over many years [the team had] a mechanism of feedback from the field, from the users... we had a workgroup of peers for the community... and we rotated them, by the way, every couple years so that lots of people could get experience across the system in this... these small iterative version of the changes that would then get implemented nationally”.

**Tackling upstream issues** can give a local team an early win related to local priorities, while simultaneously solving issues slowing adoption. Sometimes it is building competencies: “some units didn't know how to download ... a mailing list with labels ... so we had to help them work through how to be able to do those types of activities.” Other times it may be building local relationships: “some places had some issues ... getting their [IT] to work with them.” For other sites that may “not have as much of a quality improvement or system redesign infrastructure” that was needed for an innovation's implementation, spread initiators described working on these competencies first. As one QUERI interviewee described, this is particularly important for sites with competing priorities:

“we're trying to help them navigate through all their other stuff. And they are making an effort... So among all their other activities and other requirements, we're trying to help them participate and do the work.”

***“we'll go fight the battles for you”***



**Increasing visibility with multiple levels of leadership**, such as engaging the regional leadership, national program offices or policy makers, and local leadership, can help protect the initiative and demonstrate success for those sites involved. As one publication described: “having the involvement of multiple levels of leadership creates a snowball effect throughout an organization and is a significant contributor to Measure Up/Pressure Down’s success”<sup>63</sup> QUERI interviewees helped build this visibility by giving materials to “our clinical champions to share with their leadership to show that look at the good work we’re doing” and by ensuring that those materials are aligned with the leaders’ interests, the sites have “gotten great direct feedback from the administration.” By also including from the national leadership “a letter congratulating the local team for taking this work on and kudos to them for putting the effort in,” this spread initiator found many ways to connect multiple levels of leadership. Other QUERI interviewees described having national leadership representation as “part of a very engaged executive steering committee, and so we would be feeding results back to them on quite a regular basis.” One QUERI interviewee summed this strategy up as:

“We also give them a voice with leadership above...so I think what we're kind of referring to as the multilevel stakeholder engagement piece becomes really important, and then having a communications plan from the local folks on up to the [regional] level and up to the medical center level, and in some cases all the way up to [national] levels, becomes really important.”

### **Strategies Used to Maximize Potential Benefits**

In working with hard-to-engage sites that demonstrated the potential benefits these sites offer during implementation, spread initiators described using a few strategies that maximized engagement and, in turn, potential benefits.

Many spread initiators described using the “**hard core and a soft periphery**”<sup>64</sup> model of intervention where the core model is adaptable to local context. This is helpful to get local compatibility and fit with needs that may be different from innovator sites where the intervention was originally tested. In this way a “core provides a standardized method... the soft periphery...adapted by organizations in different ways to maximize fit in the local context and to build acceptability among staff”.<sup>62</sup>

***“It’s not one size fits all. They have room to adapt.”***



Nearly every QUERI interviewee described using this type of approach, although using different terminology or theoretical support: “we called it a multipronged intervention, but everyone didn’t do the same thing” and another where there was “a small bit of customization, but all the core” pieces were standardized. The final example described a theoretical approach to intervention development with this strategy as a central tenant:

“this whole sort of Evidence-Based Quality Improvement approach is to be responsive to the time and the situation... it was really designed to get a lot of input both at the [regional] level and at the site level in how to adapt or tailor. And it sort of started with an agreement that the ultimate models at the sites would reflect the key elements of the literature in areas that the literature addressed, but that outside of those kind of pillars, the project model would be shaped by the sites themselves.”

**Maintaining engagement** with sites that are involved in spread activities but not yet adopters, even for prolonged periods of time, gives opportunities for slower adopters to build commitment and find avenues to adoption within their local contexts. In some cases, addressing the concerns of those with negative views by incorporating discussions of their concerns “built up a community of people who could further advocate for the use of the vaccine”<sup>65</sup> among former skeptics. Other times it may be as simple as allowing non-adopters to continue to participate: when “the region that did not initially start the [program] with other regions... [had a] regional representative joined the study’s monthly conference calls,”<sup>59</sup> this region later became an adopter.

**Framing the message** when talking to potential adopter sites is a key consideration, and with hard-to-engage sites, QUERI interviewees described a few approaches that they found to be helpful. In-person initial visits, when possible, had the added benefit of building the “web of support” as described above. QUERI interviewees consistently described focusing on being seen as helpful, rather than punitive or authoritarian – as one interviewee lamented: “I get the sense often that people feel blamed for their problems rather than being made to feel part of the solution.” Another agreed, saying authoritarian styles of engagement “always come across as punishment.” This was counter to what interviewees believed worked well, which included using local baseline data and tying to local priorities in a customized way, as well as using shared learning approaches or an “education focus ... [which] resulted in relationships” being built. These all align with the peer to peer communication strategy above as well, by building collaborative relationships:

“somebody there locally recognizes, hey, wait a minute, this might be something that could actually help us. So it’s a little bit of social marketing. And whether you

can do that, again, with numbers, definitely trying to communicate to the administration what your intentions are because they get very—nobody wants to be pointed out again that they're not doing well. So then you actually might be able there to help”.

## SUMMARY AND DISCUSSION

### SUMMARY

#### What Does Large Magnitude Scale-up and Spread Look Like?

##### *Breaking down the national spread process*

After working with innovators to test and pilot the initiative and then working with early adopters to test scale-up and spread strategies, activities described in our data split the final phase of full-scale spread into 2 parts with distinct strategies. The first part of the full-scale spread, which we are calling the “mass broadcast” phase, uses strategies intended to reach a maximal audience. The second part of the full-scale spread phase, which we are calling the “re-personalize” phase, returns to using strategies more often employed in the first 2 phases of the spread process.

##### *Macro models*

We identified 3 distinct macro models to describe the organization or infrastructure of spread efforts in the 52 included publications. These included spread efforts that embedded scale-up or spread within a system of care (n=29), collaboratives or exchanges to support the spread of multiple initiatives within a specific topic area (n=14), and initiative-specific spread efforts (n=9).

##### *Preconditions to consider in large-magnitude scale-up*

Several factors repeatedly arose throughout the QUERI interviews, SAIL interviews, and literature as crucial information to gather prior to engaging in large magnitude scale-up. It is crucial that scale-up initiators gather information on who will need to be involved at each site and identify context-specific that will be align with the goals of the spread.

##### *VA preconditions and existing networks for spread*

In addition to building networks de novo for a specific collaborative or exchange, spread efforts can also leverage existing networks in a similar model to collaboratives or exchanges. To better understand the existing conditions in VA that could facilitate spread efforts, we used data from the SAIL improver interviews. This information-seeking almost always occurred after working on homegrown solutions and analyzing local priorities and challenges. Once specific initiatives or issues had been identified, SAIL improvers sought information related to that particular area of interest. Existing sources of spread in the VA include peer to peer connections, existing VA hubs of information, central office expertise, and some non-VA entities.

#### Considerations and Strategies for Working with Hard-to-engage Sites

We drew from the QUERI spread project papers and interviews, as well as from the 18 publications we identified as either providing descriptions of hard-to-engage sites (n=11) or additionally providing descriptions of strategies used with these hard-to-engage sites after identifying/describing them (n=7). The proportion of hard-to-engage sites was small, and the phrase “N-of-1” was used repeatedly throughout the QUERI interviews to describe experiences working with hard-to-engage sites. While descriptions of hard-to-engage sites often portrayed

challenges, a number of beneficial characteristics also warrant mention due to their repeated appearance. Hard-to-engage sites may have low bandwidth or limited resources, local innovations or homegrown solutions that present competition for an innovation, or competing priorities that do not overlap with the priorities of a spread initiative. While these were among the common challenges hard-to-engage-sites might face, a number of potential benefits were also highlighted: a healthy skepticism can lead to collaboration and potential innovation improvement, hard-won engagement that is slow to come may be more durable in the long-term, and low performing sites can sometimes be easier to engage since their priorities are in alignment with a spread initiative's goals.

Since hard-to-engage sites are highly variable in their needs, QUERI interviewees recommended “a flexible, tailored approach to one [site] at a time.” Useful strategies for hard-to-engage sites, as highlighted in the most salient themes from the literature and interviews, include facilitation, creating a web of support, establishing peer to peer communication, allowing sites to kick the tires of an innovation, tackling upstream issues, increasing visibility with multiple levels of leadership, utilizing a hard core with soft periphery model of innovation, maintaining engagement with non-adopter sites, and framing the message to initiate positive and helpful working relationships.

## LIMITATIONS

The primary challenge for topics without a specific disease or therapy is identifying relevant literature. Because terminology related to scale and spread is evolving, there are no reliable, standardized terms for systematically searching databases for literature related to this topic, so relevant literature might have been missed. In addition, our use of key informant interviews was limited to informants discussing experiences within the VA system. For the scope of this report we limited to VA-relevant experiences because the findings are intended to be applied in VA settings. However, lessons from stakeholders outside the VA may have provided more diverse lessons which could be applicable, especially from other large healthcare systems such as the National Health Service in the UK.

There are several challenges common in literature synthesis studies that also affect this review. Studies often do not describe the types of details needed for a particular review. Such is the case here for studies that have conducted large magnitude scale initiatives, especially related to hard-to-engage sites. While data limitations prevent us from performing a statistical test of publication bias, such bias is almost certainly present, as less-than-successful spread efforts are unlikely to be written up for publication. Even successful spread may not be written into reports or materials that would be identified by literature synthesis techniques, and these would also be missed in our process. We would expect that there have been more than the 52 spread efforts we identified in our review, and we do not have information about the contexts or success of these unpublished spread efforts. For instance, multiple VA QUERI projects we identified through our search of the QUERI database did not have any publications associated with their entries.

A key assumption in this report and in much of the scale-up and spread work included was that a given initiative was broadly desirable or necessary, but there are initiatives and programs that don't work well for every site. It is worth noting that the best decision for a given site might be to say no to a change initiative, particularly in situations where there is low bandwidth, a large

set of competing demands, or a homegrown solution that works. Virtually any change initiative is stressful and disruptive, and there are certainly circumstances where the work would not be beneficial in the broader context of a site.

While scale-up and spread are often used interchangeably, they are distinct, as Ilott and colleagues differentiate in describing “scale-up” as typically relying on a planned top-down strategy to diffuse innovation, while “spread” is related to horizontal diffusion of innovations.<sup>66</sup> The distinctions are nuanced but important when attempting to identify strategies and moderators of increasing use of an innovation. In the context of this report, we use these definitions when possible. However, because the original sources often did not distinguish between these terms, or necessarily provide details that would allow us to distinguish which of these terms best fit, our resulting language also lacks definitional clarity between scale-up and spread.

## RESEARCH GAPS AND RECOMMENDATIONS FOR FUTURE RESEARCH

Expanding upon the study of scale-up and spread in implementation science, future work moving from the early stages of scale-up and spread into a more detailed description of the full spread phase could focus on testing different strategies for large magnitude spread and for reaching hard-to-engage sites in particular. This effort could also include better documentation of tailoring or adaptations that occur towards later stages of spread efforts, including specific approaches and strategies used to engage hard-to-engage sites.

The relationship between the 3 macro models described in this report, or the organization of spread efforts more generally, and particular strategies and target audiences was difficult to describe with the literature we identified. For instance, no collaboratives described strategies for hard-to-engage-sites, so it is unknown how hard-to-engage sites might fit into this model. While theoretically any macro model could use strategies to work with hard-to-engage groups, embedded system spread efforts may have more incentive to do so, since they were most often describing their work with hard-to-engage sites.

In addition, defining the overlap between low performing and late adopting or hard-to-engage adopters would aid in better tailoring strategies for both groups. While there may be substantial overlap, some distinctions were also made, particularly in the QUERI interviews. For instance, high performing sites may be hard to engage if they do not have a need for the intervention, and low performing sites, in contrast, may have needs that align with an intervention and thus may be eager to engage. This work could be done both empirically, but also conceptually.

## RECOMMENDATIONS FOR FUTURE SCALE-UP/SPREAD EFFORTS

Here we highlight some recommendations for future work in implementing scale-up or spread efforts.

- Before engaging sites, take time to understand the salient local factors (see **Figure 5**) and determine if there are existing networks that could be leveraged (see **Figure 6**).
- In organizing a spread or scale-up effort, consider the various models infrastructure could take and how these may impact the effort.
- Using the knowledge of local sites that has been gathered, identify potential challenges or characteristics of these sites that might make them hard-to-engage and tailor strategies appropriately.

## CONCLUSIONS

Low performers and hard-to-engage audiences are most in need of engagement when spreading innovations intended to standardize practice or improve quality of care, but they were understudied in the identified literature on large magnitude spread efforts, which can be embedded spread within a system of care, collaboratives or exchanges, or initiative-specific spread efforts. Variations in care delivery will require a better understanding of how to work with low performer and hard-to-engage groups. Hard-to-engage sites can be highly variable in terms of the challenges or barriers they face, which can include low bandwidth, different priorities from a spread effort's intended goals, and homegrown solutions that compete with innovations being spread. For the myriad of individual factors these sites face, bundles of engagement strategies that are more personalized and intensive can help spread initiators reach these groups. More testing of strategies to use with these groups, as well as documentation of adaptations or tailoring large magnitude spread efforts make in engaging different groups of adopters, is needed.

## REFERENCES

1. Simmons RF, P; Ghiron, L. *Scaling up health services delivery: From pilot innovations to policies and programmes*. World Health Organization;2008.
2. McCannon CJS, M. W.; Perla, R. J. . Planning for scale: A guide for designing large-scale improvement initiatives. . 2008.
3. OVretveit J, Bate P, Cleary P, et al. Quality collaboratives: lessons from research. *Quality & safety in health care*. 2002;11(4):345-351.
4. Nolan K, Schall MW, Erb F, Nolan T. Using a framework for spread: The case of patient access in the Veterans Health Administration. *Joint Commission journal on quality and patient safety*. 2005;31(6):339-347.
5. McCannon CJ, Perla RJ. Learning networks for sustainable, large-scale improvement. *Joint Commission journal on quality and patient safety*. 2009;35(5):286-291.
6. McCannon CJ, Berwick DM, Massoud MR. The science of large-scale change in global health. *Jama*. 2007;298(16):1937-1939.
7. Becher EC, Chassin MR. Improving the quality of health care: who will lead? *Health affairs (Project Hope)*. 2001;20(5):164-179.
8. Arora S, Thornton K, Murata G, et al. Outcomes of treatment for hepatitis C virus infection by primary care providers. *The New England journal of medicine*. 2011;364(23):2199-2207.
9. Asch SM, Kerr EA. Measuring What Matters in Health: Lessons from the Veterans Health Administration State of the Art Conference. *Journal of general internal medicine*. 2016;31 Suppl 1:1-2.
10. Organization WH. *Bridging the “know–do” gap meeting on knowledge translation in global health*. . Geneva: WHO;2006.
11. Commission P. *Strengthening evidence-based policy in the Australian Federation, volume 2: background paper*. Canberra: Productivity Commission;2010.
12. Zwarenstein M, Goldman J, Reeves S. Interprofessional collaboration: effects of practice-based interventions on professional practice and healthcare outcomes. *The Cochrane database of systematic reviews*. 2009(3):CD000072.
13. In: Shojania KG, McDonald KM, Wachter RM, Owens DK, eds. *Closing the Quality Gap: A Critical Analysis of Quality Improvement Strategies (Vol. 1: Series Overview and Methodology)*. Rockville (MD)2004.
14. French SD, Green S, Buchbinder R, Barnes H. Interventions for improving the appropriate use of imaging in people with musculoskeletal conditions. *The Cochrane database of systematic reviews*. 2010(1):CD006094.
15. Schouten LM, Hulscher ME, van Everdingen JJ, Huijsman R, Grol RP. Evidence for the impact of quality improvement collaboratives: systematic review. *BMJ (Clinical research ed)*. 2008;336(7659):1491-1494.
16. Bradley EH, Webster TR, Baker D, et al. Translating research into practice: speeding the adoption of innovative health care programs. *Issue brief (Commonwealth Fund)*. 2004(724):1-12.
17. Steinbrook R. The potential of human papillomavirus vaccines. *The New England journal of medicine*. 2006;354(11):1109-1112.
18. Berwick D. The science of improvement. *JAMA - Journal of the American Medical Association*. 2008;299(10):1182-1184.

19. Norton WE, McCannon C, Schall MW, Mittman BS. A stakeholder-driven agenda for advancing the science and practice of scale-up and spread in health. [Internet Resource; Article]. 2012; <http://www.implementationscience.com/content/7/1/118>  
<http://www.implementationscience.com/content/7/1/118> Materials specified: Item Resolution URL Instruction: Put this Resolution URL in a web browser to view this item.
20. Aarons GA, Sklar M, Mustanski B, Benbow N, Brown CH. "Scaling-out" evidence-based interventions to new populations or new health care delivery systems. *Implementation science : IS*. 2017;12(1):111.
21. Services DoHaH. Dissemination and implementation research in health (R01) NIH funding opportunity: PAR-16-238. In: NIH grant funding opportunities; 2016:2017.
22. Lanham HJ, Leykum LK, Taylor BS, McCannon CJ, Lindberg C, Lester RT. How complexity science can inform scale-up and spread in health care: understanding the role of self-organization in variation across local contexts. *Social science & medicine (1982)*. 2013;93:194-202.
23. Milat AJ, Bauman A, Redman S. Narrative review of models and success factors for scaling up public health interventions. *Implementation science : IS*. 2015;10:113.
24. Milat AJ, King L, Newson R, et al. Increasing the scale and adoption of population health interventions: experiences and perspectives of policy makers, practitioners, and researchers. *Health research policy and systems*. 2014;12:18.
25. Mangham LJ, Hanson K. Scaling up in international health: what are the key issues? *Health policy and planning*. 2010;25(2):85-96.
26. Cooley LK, R. *Scaling Up-From Vision to Large-Scale Change: A Management Framework for Practitioners*. Washington D.C.: Management Systems International;2006.
27. Hanson K, Cleary S, Schneider H, Tantivess S, Gilson L. Scaling up health policies and services in low- and middle-income settings. *BMC health services research*. 2010;10 Suppl 1:I1.
28. Organization WH. *ExpandNet: nine steps for developing a scaling-up strategy*. Geneva: WHO;2010.
29. Massoud MRN, G.A.; Nolan, K.; Schall, M.W.; Sevin, C. A Framework for Spread: From Local Improvements to System-Wide Change. *IHI Innovation Series White Paper Institute for Healthcare Improvement*. 2006.
30. Hanson K, Ranson, M. K., Oliveira-Cruz, V., Mills, A. Expanding access to priority health interventions: a framework for understanding the constraints to scaling-up. . *Journal of International Development: The Journal of the Development Studies Association*. 2003;15(1):1-14.
31. Simmons RS, J. Scaling up health service innovations: a framework for action. . *Scaling up health service delivery*. 2007;1(30).
32. Subramanian S, Naimoli J, Matsubayashi T, Peters DH. Do we have the right models for scaling up health services to achieve the Millennium Development Goals? *BMC health services research*. 2011;11:336.
33. Yamey G. Scaling up global health interventions: a proposed framework for success. *PLoS medicine*. 2011;8(6):e1001049.
34. Yano EM, Green LW, Glanz K, et al. Implementation and spread of interventions into the multilevel context of routine practice and policy: implications for the cancer care continuum. *Journal of the National Cancer Institute Monographs*. 2012;2012(44):86-99.

35. Stetler CB, Mittman BS, Francis J. Overview of the VA Quality Enhancement Research Initiative (QUERI) and QUERI theme articles: QUERI Series. *Implementation science : IS*. 2008;3:8.
36. Rogers EM. *Diffusion of Innovations*. Simon and Schuster; 2010.
37. Robert G, Morrow E, Maben J, Griffiths P, Callard L. The adoption, local implementation and assimilation into routine nursing practice of a national quality improvement programme: the Productive Ward in England. *Journal of clinical nursing*. 2011;20(7-8):1196-1207.
38. Heinrich j. Cultural transmission and the diffusion of innovations: Adoption dynamics indicate that biased cultural transmission is the predominate force in behavioral change. *American Anthropologist*. 2001;103(4):992-1013.
39. Greenhalgh T, Robert G, Macfarlane F, Bate P, Kyriakidou O. Diffusion of innovations in service organizations: systematic review and recommendations. *The Milbank quarterly*. 2004;82(4):581-629.
40. Grumbach K, Lucey CR, Johnston SC. Transforming from centers of learning to learning health systems: the challenge for academic health centers. *Jama*. 2014;311(11):1109-1110.
41. Lowes LPH, G.; Newmeyer, A.; Embi, P.; Yin, H.; Smoyer, W. Learn From Every Patient: implementation and early results of a learning health system. *Developmental Medicine and Child Neurology*. 2016.
42. Smoyer WE, Embi PJ, Moffatt-Bruce S. Creating Local Learning Health Systems: Think Globally, Act Locally. *Jama*. 2016;316(23):2481-2482.
43. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International journal for quality in health care : journal of the International Society for Quality in Health Care*. 2007;19(6):349-357.
44. (VSSC) VSSC. The Strategic Analytics for Improvement and Learning (SAIL) Value Model (a.k.a VA-TR) Documentation. In: Department of Veterans Affairs.
45. Averill JB. Matrix analysis as a complementary analytic strategy in qualitative inquiry. *Qualitative health research*. 2002;12(6):855-866.
46. Miles MBH, A.M.; Saldana, J. *Qualitative Data Analysis. A Methods Sourcebook*. 3rd ed. Thousand Oaks, CA: Sage Publications Ltd; 2014.
47. Hamilton A. Qualitative Methods in Rapid Turn-Around Health Services Research. In: VA HSR&D National Cyberseminar Series: Spotlight on Women's Health; 2013.
48. Liu VX, Morehouse JW, Baker JM, Greene JD, Kipnis P, Escobar GJ. Data that drive: Closing the loop in the learning hospital system. *Journal of hospital medicine*. 2016;11 Suppl 1:S11-s17.
49. Della Penna R, Martel H, Neuwirth EB, et al. Rapid spread of complex change: a case study in inpatient palliative care. *BMC health services research*. 2009;9:245.
50. Psek WA, Stametz RA, Bailey-Davis LD, et al. Operationalizing the learning health care system in an integrated delivery system. *EGEMS (Washington, DC)*. 2015;3(1):1122.
51. Harris JG, Bingham CA, Morgan EM. Improving care delivery and outcomes in pediatric rheumatic diseases. *Current opinion in rheumatology*. 2016;28(2):110-116.
52. Elson SL, Hiatt RA, Anton-Culver H, et al. The athena breast health network: Developing a rapid learning system in breast cancer prevention, screening, treatment, and care. *Breast Cancer Research and Treatment*. 2013;140(2):417-425.

53. Boustani MA, Frame A, Munger S, et al. Connecting research discovery with care delivery in dementia: the development of the Indianapolis Discovery Network for Dementia. *Clinical interventions in aging*. 2012;7:509-516.
54. Septimus E, Hickok J, Moody J, et al. Closing the Translation Gap: Toolkit-based Implementation of Universal Decolonization in Adult Intensive Care Units Reduces Central Line-associated Bloodstream Infections in 95 Community Hospitals. *Clinical infectious diseases : an official publication of the Infectious Diseases Society of America*. 2016;63(2):172-177.
55. Clark SR, Wilton L, Baune BT, Procter N, Hustig H. A state-wide quality improvement system utilising nurse-led clinics for clozapine management. *Australas Psychiatry*. 2014;22(3):254-259.
56. Hub VPI. <http://vhaindwebsim.v11.med.va.gov/hub2/pi/>.
57. Elnahal SML, Patrick; Ippolito, Andrea. VA creates a "Shark Tank" to identify ideas to better serve Veterans. In. *VAntage Point*2016.
58. VHA Access to Care Initiative. <http://vhaindwebsim.v11.med.va.gov/hub2/atc/>.
59. Lorig KR, Hurwicz ML, Sobel D, Hobbs M, Ritter PL. A national dissemination of an evidence-based self-management program: a process evaluation study. *Patient education and counseling*. 2005;59(1):69-79.
60. Rogers KM, Childers DJ, Messler J, Nolan A, Nickel WK, Maynard GA. Glycemic control mentored implementation: creating a national network of shared information. *Joint Commission journal on quality and patient safety*. 2014;40(3):111-118.
61. Damschroder LJ, Lowery JC. Evaluation of a large-scale weight management program using the consolidated framework for implementation research (CFIR). *Implementation science : IS*. 2013;8:51.
62. Gardner KL, Dowden M, Togni S, Bailie R. Understanding uptake of continuous quality improvement in Indigenous primary health care: lessons from a multi-site case study of the Audit and Best Practice for Chronic Disease project. *Implementation science : IS*. 2010;5:21.
63. Lustig A, Ogden M, Brenner RW, Penso J, Westrich KD, Dubois RW. The Central Role of Physician Leadership for Driving Change in Value-Based Care Environments. *Journal of managed care & specialty pharmacy*. 2016;22(10):1116-1122.
64. Denis JL, Hebert Y, Langley A, Lozeau D, Trottier LH. Explaining diffusion patterns for complex health care innovations. *Health care management review*. 2002;27(3):60-73.
65. Patel H, Wilson E, Vizzotti C, Parston G, Prestt J, Darzi A. Argentina's Successful Implementation Of A National Human Papillomavirus Vaccination Program. *Health affairs (Project Hope)*. 2016;35(2):301-308.
66. Ilott I, Gerrish K, Pownall S, Eltringham S, Booth A. Exploring scale-up, spread, and sustainability: an instrumental case study tracing an innovation to enhance dysphagia care. *Implementation science : IS*. 2013;8:128.
67. Blue-Howells JH, Clark SC, van den Berk-Clark C, McGuire JF. The U.S. Department of Veterans Affairs Veterans Justice programs and the sequential intercept model: case examples in national dissemination of intervention for justice-involved veterans. *Psychological services*. 2013;10(1):48-53.
68. Box TL, McDonnell M, Helfrich CD, Jesse RL, Fihn SD, Rumsfeld JS. Strategies from a nationwide health information technology implementation: the VA CART story. *Journal of general internal medicine*. 2010;25 Suppl 1:72-76.

69. Goetz MB, Hoang T, Bowman C, et al. A System-wide Intervention to Improve HIV Testing in the Veterans Health Administration. *J Gen Intern Med* 2008;23(8):1200–1207.
70. Mills PD, Weeks WB, Surott-Kimberly BC. A multihospital safety improvement effort and the dissemination of new knowledge. *Joint Commission journal on quality and safety*. 2003;29(3):124-133.
71. Resnick SG, Rosenheck R. Dissemination of supported employment in Department of Veterans Affairs. *Journal of rehabilitation research and development*. 2007;44(6):867-877.
72. Resnick SG, Rosenheck RA. Scaling up the dissemination of evidence-based mental health practice to large systems and long-term time frames. *Psychiatric services (Washington, DC)*. 2009;60(5):682-685.
73. Rubenstein LV, Chaney EF, Ober S, et al. Using evidence-based quality improvement methods for translating depression collaborative care research into practice. *Families, systems & health : the journal of collaborative family healthcare*. 2010;28(2):91-113.
74. Curran GM, Pyne J, Fortney JC, et al. Development and implementation of collaborative care for depression in HIV clinics. *AIDS care*. 2011;23(12):1626-1636.
75. Luck J, Hagigi F, Parker LE, Yano EM, Rubenstein LV, Kirchner JE. A social marketing approach to implementing evidence-based practice in VHA QUERI: the TIDES depression collaborative care model. *Implementation science : IS*. 2009;4:64.
76. Yano EM. A Partnered Research Initiative to Accelerate Implementation of Comprehensive Care for Women Veterans The VA Women's Health CREATE. *Medical Care*. 2015;53(4):S10-S14.
77. Best A, Berland A, Herbert C, et al. Using systems thinking to support clinical system transformation. *Journal of health organization and management*. 2016;30(3):302-323.
78. Cheyne H, Abhyankar P, McCourt C. Empowering change: realist evaluation of a Scottish Government programme to support normal birth. *Midwifery*. 2013;29(10):1110-1121.
79. Clarke CL, Keyes SE, Wilkinson H, et al. Organisational space for partnership and sustainability: lessons from the implementation of the National Dementia Strategy for England. *Health & social care in the community*. 2014;22(6):634-645.
80. Hendrich A, Tersigni AR, Jeffcoat S, Barnett CJ, Brideau LP, Pryor D. The Ascension Health journey to zero: lessons learned and leadership. *Joint Commission journal on quality and patient safety*. 2007;33(12):739-749.
81. Hung D, Gray C, Martinez M, Schmittiel J, Harrison MI. Acceptance of lean redesigns in primary care: A contextual analysis. *Health care management review*. 2017;42(3):203-212.
82. Kellogg KC, Gainer LA, Allen AS, Sullivan TO, Singer SJ. An intraorganizational model for developing and spreading quality improvement innovations. *Health care management review*. 2017;42(4):292-302.
83. Lennon MR, Bouamrane MM, Devlin AM, et al. Readiness for Delivering Digital Health at Scale: Lessons From a Longitudinal Qualitative Evaluation of a National Digital Health Innovation Program in the United Kingdom. *Journal of medical Internet research*. 2017;19(2):e42.
84. Marshall M, Mountford J, Gamet K, et al. Understanding quality improvement at scale in general practice: a qualitative evaluation of a COPD improvement programme. *Br J Gen Pract*. 2014;64(629):E745-E751.

85. Noyes J, Lewis M, Bennett V, Widdas D, Brombley K. Realistic nurse-led policy implementation, optimization and evaluation: novel methodological exemplar. *Journal of advanced nursing*. 2014;70(1):220-237.
86. Ovseiko PV, O'Sullivan C, Powell SC, Davies SM, Buchan AM. Implementation of collaborative governance in cross-sector innovation and education networks: evidence from the National Health Service in England. *BMC health services research*. 2014;14:552.
87. Schmittiel JA, Dlott R, Young JD, Rothmann MB, Dyer W, Adams AS. The Delivery Science Rapid Analysis Program: A Research and Operational Partnership at Kaiser Permanente Northern California. *Learning health systems*. 2017;1(4).
88. Azar J, Adams N, Boustani M. The Indiana University Center for Healthcare Innovation and Implementation Science: Bridging healthcare research and delivery to build a learning healthcare system. *Zeitschrift fur Evidenz, Fortbildung und Qualitat im Gesundheitswesen*. 2015;109(2):138-143.
89. Cyr J, Paige P, Paige P, Fisher D. Sustaining and spreading reduced door-to-balloon times for ST-segment elevation myocardial infarction patients. *Joint Commission journal on quality and patient safety*. 2009;35(6):297-306.
90. Duckers ML, Groenewegen PP, Wagner C. Quality improvement collaboratives and the wisdom of crowds: spread explained by perceived success at group level. *Implementation science : IS*. 2014;9:91.
91. Johnson LC, Melmed GY, Nelson EC, et al. Fostering Collaboration Through Creation of an IBD Learning Health System. *The American journal of gastroenterology*. 2017;112(3):406-408.
92. Kwon S, Florence M, Grigas P, et al. Creating a learning healthcare system in surgery: Washington State's Surgical Care and Outcomes Assessment Program (SCOAP) at 5 years. *Surgery*. 2012;151(2):146-152.
93. Lannon CM, Peterson LE. Pediatric collaborative improvement networks: background and overview. *Pediatrics*. 2013;131 Suppl 4:S189-195.
94. Ramsey LB, Mizuno T, Vinks AA, Margolis PA. Learning Health Systems as Facilitators of Precision Medicine. *Clinical pharmacology and therapeutics*. 2017;101(3):359-367.
95. Rocker GM, Amar C, Laframboise WL, Burns J, Verma JY. Spreading improvements for advanced COPD care through a Canadian Collaborative. *Int J Chronic Obstr Pulm Dis*. 2017;12:2157-2164.
96. van Schendel RV, van El CG, Pajkrt E, Henneman L, Cornel MC. Implementing non-invasive prenatal testing for aneuploidy in a national healthcare system: global challenges and national solutions. *BMC health services research*. 2017;17(1):670.
97. Grayson MLR, P.L.; Cruickshank, M.; Bear, J.L.; Gee, C.A.; Hughes, C.F.; Johnson, P.D.; McCann, R.; McMillan, A.J. Outcomes from the first 2 years of the Australian National Hand Hygiene Initiative. *The Medical journal of Australia*. 2011;195:615-619.
98. McMullen H, Griffiths C, Leber W, Greenhalgh T. Explaining high and low performers in complex intervention trials: a new model based on diffusion of innovations theory. *Trials*. 2015;16:242.
99. Parv L, Kruus P, Motte K, Ross P. An evaluation of e-prescribing at a national level. *Informatics for health & social care*. 2016;41(1):78-95.

100. Pearce C, Bartlett J, McLeod A, Eustace P, Amos R, Shearer M. Effectiveness of local support for the adoption of a national programme--a descriptive study. *Informatics in primary care*. 2014;21(4):171-178.