

APPENDIX A. SEARCH STRATEGY

TOPIC 1 – SCALING/SPREAD OF HEALTH INTERVENTIONS

TOPIC 2 – IMPROVING LOW-PERFORMING ORGANIZATIONS

TOPIC 3 – LEARNING HEALTHCARE SYSTEMS

SEARCH TOPIC 1 – SCALING/SPREAD:

DATABASE SEARCHED & TIME PERIOD COVERED:

PubMed – From inception to 1/4/2018

LANGUAGE:

English

SEARCH STRATEGY:

scale-out[tiab] OR scaling-out[tiab] OR scaling[ti] OR scaling-up[tiab] OR scale-up[ti] OR spread*[ti] OR spread*[ot] OR scale-out[ot] OR scaling-out[ot] OR scaling[ot] OR scaling-up[ot] OR scale-up[ot] OR large-scale OR "large scale" OR national[ti] OR system-wide OR "system wide" OR multi-institutional system* OR "Multi-Institutional Systems"[Mesh]

AND

"organizational culture"[ti] OR "organisational culture"[ti] OR organizational chang*[ti] OR organisational chang*[ti] OR organizational innovat* OR "diffusion of innovation"

AND

interven*[tiab] OR interven*[ot] OR initiative*[tiab] OR initiative*[ot] OR implement* OR practice[tiab]

DATABASE SEARCHED & TIME PERIOD COVERED:

PubMed – From inception to 1/4/2018

LANGUAGE:

English

SEARCH STRATEGY:

SIMILAR ARTICLE SEARCHES –

Aarons, Gregory A.

"Scaling-out" evidence-based interventions to new populations or new health care delivery systems.

Implement Sci. 2017 Sep 6;12(1):111.

Yano, Elizabeth M

Implementation and spread of interventions into the multilevel context of routine practice and policy: implications for the cancer care continuum.

J Natl Cancer Inst Monogr. 2012 May;2012(44):86-99

DATABASE SEARCHED & TIME PERIOD COVERED:

WorldCat – From inception to 1/3/2018

LANGUAGE:

English

SEARCH STRATEGY:

ti: scale-out OR ti: scaling-out OR ti: scaling OR ti: scaling-up OR ti: scale-up OR ti: spread* OR ti: large-scale OR ti: large w scale OR ti: system-wide OR ti: system w wide OR ti: multi-institutional w system OR ti: multi-institutional w systems)) or (su: scale-out OR su: scaling-out OR su: scaling OR su: scaling-up OR su: scale-up OR su: spread* OR su: large-scale OR su: large w scale OR su: system-wide OR su: system w wide OR su: multi-institutional w system OR su: multi-institutional w systems)) not mt: juv) not mt: fic and (dt= "bks" or dt= "ser" or dt= "url")

AND

ti: medical OR ti: health* OR ti: hospital OR ti: hospitals

AND

ti: chang* OR ti: innovat* OR ti: implement* OR ti: initiative* OR ti: interven* OR ti: cultur* or su: chang* OR su: innovat* OR su: implement* OR su: initiative* OR su: interven* OR su: cultur*

AND

ti: quality OR ti: improv* or su: quality OR su: improv*

DATABASE SEARCHED & TIME PERIOD COVERED:

Web of Science – From inception to 1/3/2018

LANGUAGE:

English

SEARCH STRATEGY:

ti=(scale-out OR scaling-out OR scaling OR scaling-up OR scale-up OR spread* OR large-scale OR large near scale OR system-wide OR system near wide OR multi-institutional near system OR multi-institutional near systems)

AND

ts=(medical OR health* OR hospital OR hospitals)

AND

ts=(chang* OR innovat* OR implement* OR initiative* OR interven* OR culture*)

AND

ti=(quality OR improv*)

Refined by: [excluding] WEB OF SCIENCE CATEGORIES: (FOOD SCIENCE TECHNOLOGY OR GREEN SUSTAINABLE SCIENCE TECHNOLOGY OR URBAN STUDIES OR ENVIRONMENTAL SCIENCES OR VETERINARY SCIENCES OR BIOCHEMICAL RESEARCH METHODS OR BIOCHEMISTRY MOLECULAR BIOLOGY OR BIOLOGY OR EDUCATION SCIENTIFIC DISCIPLINES OR BIOPHYSICS OR ENERGY FUELS OR BUSINESS OR ENVIRONMENTAL STUDIES OR BUSINESS FINANCE OR METEOROLOGY ATMOSPHERIC SCIENCES OR CELL BIOLOGY OR MULTIDISCIPLINARY SCIENCES OR CHEMISTRY MULTIDISCIPLINARY OR COMPUTER SCIENCE ARTIFICIAL INTELLIGENCE OR AGRICULTURE DAIRY ANIMAL SCIENCE OR COMPUTER SCIENCE HARDWARE ARCHITECTURE OR AGRICULTURE MULTIDISCIPLINARY OR COMPUTER SCIENCE INFORMATION SYSTEMS OR AUDIOLOGY SPEECH LANGUAGE PATHOLOGY OR COMPUTER SCIENCE SOFTWARE ENGINEERING OR SPORT SCIENCES OR BIOTECHNOLOGY APPLIED MICROBIOLOGY OR CONSTRUCTION BUILDING TECHNOLOGY OR CHEMISTRY PHYSICAL OR CRYSTALLOGRAPHY OR COMPUTER SCIENCE INTERDISCIPLINARY APPLICATIONS OR EDUCATION SPECIAL OR COMPUTER SCIENCE THEORY METHODS OR ELECTROCHEMISTRY OR DEMOGRAPHY OR ENGINEERING CIVIL OR WATER RESOURCES OR ENGINEERING ELECTRICAL ELECTRONIC OR EDUCATION EDUCATIONAL RESEARCH OR ENGINEERING MANUFACTURING OR ECOLOGY OR ENGINEERING MECHANICAL OR GEOGRAPHY OR

ETHICS OR EVOLUTIONARY BIOLOGY OR MARINE FRESHWATER BIOLOGY OR FORESTRY OR MATHEMATICS INTERDISCIPLINARY APPLICATIONS OR GENETICS HEREDITY)

OR

ts=(implementation science) AND ts=(system* near chang*)

Refined by: WEB OF SCIENCE CATEGORIES: (NEUROSCIENCES OR HEALTH CARE SCIENCES SERVICES OR IMMUNOLOGY OR HEALTH POLICY SERVICES OR MEDICINE GENERAL INTERNAL OR PSYCHOLOGY CLINICAL OR PSYCHOLOGY DEVELOPMENTAL OR PSYCHOLOGY EDUCATIONAL OR PSYCHOLOGY MULTIDISCIPLINARY OR ONCOLOGY OR PHARMACOLOGY PHARMACY OR SOCIAL SCIENCES BIOMEDICAL OR CLINICAL NEUROLOGY OR MEDICAL INFORMATICS OR SOCIAL SCIENCES INTERDISCIPLINARY OR HEMATOLOGY OR INFECTIOUS DISEASES OR SOCIAL ISSUES OR MEDICINE RESEARCH EXPERIMENTAL)

DATABASE SEARCHED & TIME PERIOD COVERED:

Web of Science – From inception to 1/4/2018

LANGUAGE:

English

SEARCH STRATEGY:

“Forward” search on the following article:

Yano, Elizabeth M

Implementation and spread of interventions into the multilevel context of routine practice and policy: implications for the cancer care continuum.

J Natl Cancer Inst Monogr. 2012 May;2012(44):86-99

=====
SEARCH TOPIC 2 – LOW-PERFORMING ORGANIZATIONS

DATABASE SEARCHED & TIME PERIOD COVERED:

PubMed – From inception to 11/21/2017

LANGUAGE:

English

SEARCH STRATEGY #1 (ORIGINAL VERSION)

organization* AND perform*[ti]

AND

low OR lower OR lowest OR low-perform* OR poor* OR substandard

AND

interven* OR improv*

DATABASE SEARCHED & TIME PERIOD COVERED:

PubMed – From inception to 1/3/2018

LANGUAGE:

English

SEARCH STRATEGY #2 (REVISED VERSION)

low perform* OR low-perform* OR lower perform* OR lower-perform* OR lowest perform* OR lowest-perform* OR perform* poor*

AND

"organizational culture"[ti] OR "organizational culture"[mh] OR "organisational culture"[ti] OR organizational chang*[ti] OR organisational chang*[ti] OR organizational innovat* OR "diffusion of innovation"

DATABASE SEARCHED & TIME PERIOD COVERED:

Business Source Complete – From inception to 11/21/2017

LANGUAGE:

English

SEARCH STRATEGY:

SU organizational performance

AND

TI (low OR lower OR lowest OR low-perform* OR poor* OR substandard)

AND

interven* OR improv*

Search modes - Find all search terms

SEARCH TOPIC 3 – LEARNING HEALTHCARE SYSTEMS**DATABASE SEARCHED & TIME PERIOD COVERED:**

PubMed- From inception to 1/10/2018

LANGUAGE:

English

SEARCH STRATEGY:

learning health system* OR learning healthcare system* OR "learn from every patient"

OR

("learn from every patient" OR lfep) AND ("nationwide children's hospital" OR "nationwide childrens hospital")

OR

“SIMILAR ARTICLE” SEARCHES ON THE FOLLOWING ARTICLES:

Grumbach, Kevin, “Transforming from centers of learning to learning health systems: the challenge for academic health centers,” JAMA. 2014 Mar 19;311(11):1109-10.

Lowes, Linda P., “Learn From Every Patient’: implementation and early results of a learning health System,” Dev Med Child Neurol. 2017 Feb;59(2):183-191.

Smoyer, William E., “Creating Local Learning Health Systems: Think Globally, Act Locally,” JAMA. 2016 Dec 20;316(23):2481-2482.

OR

JOURNAL - "Hospitals and Health Networks" for all issues in 2017

DATABASE SEARCHED & TIME PERIOD COVERED:

WorldCat: - From inception to 1/10/2018

LANGUAGE:

English

SEARCH STRATEGY:

kw: learning w health w system* OR kw: learning w healthcare w system* OR kw: learn w1 every w1 patient

AND

DOCUMENT TYPE= BOOKS OR SERIALS OR ARTICLES OR URL

NOT

SUBJECT= education OR MEDIA TYPE=juvenile OR MEDIA TYPE=fiction

DATABASE SEARCHED & TIME PERIOD COVERED:

Web of Science - From inception to 1/10/2018

LANGUAGE:

English

SEARCH STRATEGY #1:

ts=("learning health system" OR "learning health systems" OR "learning healthcare system" OR "learning healthcare systems" OR "learn from every patient")

SEARCH STRATEGY #2:

Forward searches on Grumbach, Lowes, & Smoyer articles

DATABASE SEARCHED & TIME PERIOD COVERED:

Scopus - From inception to 1/10/2018

LANGUAGE:

English

SEARCH STRATEGY #1:

TITLE-ABS-KEY ("learning health system" OR "learning health systems" OR "learning healthcare system" OR "learning healthcare systems" OR "learn from every patient")

SEARCH STRATEGY #2:

Forward searches on Grumbach, Lowes, & Smoyer articles

DATABASE SEARCHED & TIME PERIOD COVERED:

IEEE XPLORE - From inception to 1/10/2018

LANGUAGE:

English

SEARCH STRATEGY:

"learning health system" OR "learning health systems" OR "learning healthcare system" OR "learning healthcare systems" OR "learn from every patient"

DATABASE SEARCHED & TIME PERIOD COVERED:

Embase - From inception to 1/10/2018

LANGUAGE:

English

SEARCH STRATEGY:

'learning health system' OR 'learning health systems' OR 'learning healthcare system' OR 'learning healthcare systems' OR 'learn from every patient'

AND

Humans

DATABASE SEARCHED & TIME PERIOD COVERED:

ACM Digital Library - From inception to 1/10/2018

SEARCH STRATEGY:

"learning health system" OR "learning health systems" OR "learning healthcare system" OR "learning healthcare systems" OR "learn from every patient"

DATABASE SEARCHED & TIME PERIOD COVERED:

CINAHL - From inception to 1/10/2018

LANGUAGE:

English

SEARCH STRATEGY:

TI ("learning health system" OR "learning health systems" OR "learning healthcare system" OR "learning healthcare systems" OR "learn from every patient") OR AB ("learning health system" OR "learning health systems" OR "learning healthcare system" OR "learning healthcare systems" OR "learn from every patient") OR MW ("learning health system" OR "learning health systems" OR "learning healthcare system" OR "learning healthcare systems" OR "learn from every patient")

DATABASE SEARCHED & TIME PERIOD COVERED:

PsycINFO - From inception to 1/10/2018

LANGUAGE:

English

SEARCH STRATEGY:

TI ("learning health system" OR "learning health systems" OR "learning healthcare system" OR "learning healthcare systems" OR "learn from every patient") OR AB ("learning health system" OR "learning health systems" OR "learning healthcare system" OR "learning healthcare systems" OR "learn from every patient") OR ("learning health system" OR "learning health systems" OR "learning healthcare system" OR "learning healthcare systems" OR "learn from every patient")

NOTE: RESULTS OF ORIGINAL PUBMED AND BUSINESS SOURCE COMPLETE SEARCH VERSIONS WERE REVIEWED AND ONLY SELECTED RELEVANT ITEMS WERE INCLUDED IN FINAL SET

APPENDIX B. INTERVIEW GUIDE QUESTIONS

INTERVIEW GUIDE QUESTIONS – QUERI Interviewees

[QUESTIONS FOLLOW INTERVIEW GUIDE INTRODUCTORY SECTION]

We understand you were the Principal Investigator for the QUERI project [PROJECT NAME]. We are particularly interested in this project because it was an example of spreading an existing project.

1. Please tell us about your experience with this project.
2. Can you describe the strategy for the spread of [INITIATIVE/PRACTICE]?
 - a. Who was involved in making the decision to spread beyond the earlier sites?
 - b. Who was involved in the spread effort itself?
3. What factors [national/regional/local/site specific] facilitated the spread of the project?
4. What factors [national/regional/local/site specific] impeded the spread of the project?
5. Were certain sites more difficult to engage?
 - a. If so, what factors contributed to this?
 - b. *Potential factors to probe: leadership, resources, lines of reporting/authority to make changes, structural factors*
 - i. Was low performance a factor?
 - ii. Were there specific challenges?
 - c. Were there specific strategies used for engaging or working with this group of sites?
6. During spread efforts, was fidelity of implementation monitored?
 - a. If so, how?
 - b. During spread, was fidelity to original model strong?
 - c. Were modifications made to the model or strategy?
 - i. If so, why?
 - ii. What changes to the strategy were most successful?
 - iii. Which were less successful?
7. From the time the idea for [INITIATIVE/PRACTICE] was first conceived, could you briefly describe the key time points in the process?

Eg, initial idea, first piloting/demo, early spread, full/national roll-out

Is there anything else you would like to share with us, particularly about working with hard-to-engage sites? Please feel free to draw on other experience you may have had.

Thank you for your time!



INTERVIEW GUIDE QUESTIONS – SAIL Improvers*[QUESTIONS FOLLOW INTERVIEW GUIDE INTRODUCTORY SECTION]*

The [SITE] facility had improved its overall SAIL score around [YEAR]. We are particularly interested in your site because it was able to make these improvements and maintain them. We understand that you were there during these changes, and would like to hear, from your perspective, more about how this improvement happened.

1. Can you describe your role?
2. From your perspective, what is the story of the improvement during [BEGINNING YEAR] until now? How did the improvement happen?
3. What were one or 2 underlying approaches that were necessary to make the change happen?
4. What factors at your site contributed to the improvement?
Leadership changes, leadership support/engagement, structure, lines of reporting, analytics/data, etc.
5. Did you specifically focus on any particular metrics? Did this change over time?
6. Did you have specific interventions or tools your site used during this improvement process? Where did they come from?
7. When did the SAIL improvement begin and what motivated it?
8. What role has the VISN played over the course of these improvements? What types of SAIL-related resources or interactions have you shared?

Is there anything else you would like to share with us?

Thank you for your time!

APPENDIX C. SAIL DATA EXEMPLARS

Fiscal year	'11				'12				'13				'14				'15				'16				'17								
	Quarter	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Low quintile score examples	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	3	3	3	4				
	4	5	4	5	5	4	5	5	3	4	4	4	4	4	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4				
	5	5	5	5	5	5	4	3	4	3	3	4	4	4	4	5	4	3	4	3	3	3	3	3	3	3	3	3	3				
	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5				
High quintile score examples	1	1	1	2	2	3	3	3	3	2	2	2	2	2	3	3	2	2	2	1	1	1	1	1	1	1	2	2	2				
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	3	3	2	2	3	3				
	2	3	3	3	2	2	3	3	2	1	1	1	1	1	1	1	1	1	1	1	2	2	2	3	3	2	2	3	3				
	2	2	1	1	1	1	1	1	1	1	1	2	2	2	2	2	1	1	1	1	1	2	1	1	1	2	1	1	1				
Improving scores (n=16)	A	4	4	3	3	3	3	3	4	3	4	4	3	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1			
	B	5	4	4	4	5	5	5	4	3	3	4	4	4	4	4	3	2	3	3	3	3	3	3	3	3	3	3	3	3			
	C	4	4	4	4	3	3	4	4	4	4	4	3	4	4	4	3	3	3	2	1	1	1	1	1	1	1	1	1	1			
	D	4	4	5	5	5	5	5	4	5	4	3	2	3	3	3	4	3	3	3	3	3	2	2	2	1	2	2	2	1			
	E	5	4	4	4	4	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
	F	3	3	3	3	4	5	5	5	5	4	5	5	5	5	5	3	3	2	2	2	2	1	2	2	2	1	2	2	2			
	G	4	4	4	4	4	5	4	4	5	4	5	4	4	5	5	5	5	4	4	3	3	3	3	2	3	3	3	2	3			
	H	4	4	4	5	4	4	3	2	2	3	3	4	3	4	4	4	4	4	3	2	2	2	2	3	3	2	2	3	3			
	I	3	4	4	4	4	4	4	4	5	5	5	4	4	3	3	2	3	2	2	2	2	2	2	2	2	2	2	2	2			
	J	4	4	3	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	2	3	3	3	3	2	3	3	3	2	3			
	K	4	4	4	4	3	3	4	3	4	4	4	4	4	4	4	4	4	3	3	2	1	2	1	2	3	2	1	2	3			
	L	3	3	3	2	3	4	4	4	5	5	4	4	5	5	5	5	4	3	3	3	2	2	1	1	1	2	1	1	1			
	M	4	4	4	4	4	4	4	4	4	4	4	3	3	2	3	3	4	4	4	4	4	3	3	2	2	3	3	2	2			
	N	4	3	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	4	3	2	2	2	3	2	2	2			
	O	3	3	3	3	4	4	4	3	3	3	3	3	4	4	3	3	1	1	2	2	2	1	1	1	1	1	1	1	1			
	P	3	3	2	3	3	4	4	4	3	3	3	4	4	4	4	4	3	2	2	2	2	2	2	2	2	2	2	2	2			
Changing score examples, other	1	1	1	1	1	1	2	2	2	3	3	3	3	3	3	4	4	5	4	5	5	5	5	5	5	5	5	5	5				
	2	2	2	2	2	2	2	2	2	1	1	1	1	2	3	2	1	1	1	2	2	3	4	4	3	3	4	4	3				
	2	2	1	1	1	2	4	4	5	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5				
	3	3	3	3	3	2	2	3	4	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2				
	3	4	4	4	4	3	3	3	2	4	4	4	4	5	5	5	5	5	4	4	5	4	5	5	5	4	5	5	5				
	3	2	3	3	2	2	2	2	4	4	5	4	3	3	3	3	4	4	4	4	5	5	5	5	4	5	5	5	4				
	4	3	3	3	2	3	2	2	3	3	3	3	3	3	4	4	4	4	4	4	4	5	4	3	3	5	4	3	3				
	4	4	5	4	4	5	5	5	5	4	3	3	2	3	3	4	3	3	4	4	4	3	4	4	4	5	4	4	4				
	4	4	4	4	3	2	3	3	4	3	3	2	2	3	2	3	4	4	4	4	4	4	4	4	4	4	5	5	5				
	5	5	5	4	4	4	4	4	3	3	2	3	4	4	5	5	5	5	4	4	3	3	4	5	5	3	4	5	5				
5	2	1	2	2	5	5	4	5	5	5	4	4	4	5	5	5	4	5	5	4	5	5	5	5	5	5	5	5					

*Data were only collected once in FY2011



APPENDIX D. QUERI AND SAIL TEMPLATES USED IN ANALYSIS

QUERI

Project/ Transcript ID	What makes sites hard to engage?	Strategies/facilitators to engagement (or lack thereof, include mandates and other external factors, changes over time to implementation strategy)	Description of intervention (how much effort on part of sites, fidelity of practice/changes over time)	Timeline (How long different steps took, and was full scale/spread achieved?)	Other stuff
------------------------------	----------------------------------	--	--	---	-------------

SAIL

Project/ Transcript ID	Why started/what motivated/initial catalyst?	Overall approach over time? <i>Key strategies used, changes over time, specific metrics focused on, where did they find materials or resources (eg homegrown or from a group or person)</i>	How used analytics/data/coding in process	Who is involved? <i>Leadership role/activities, autonomy of people involved to make decisions, stability of personnel</i>	Other stuff/activities
------------------------------	--	--	---	--	------------------------

APPENDIX E. PEER REVIEW COMMENTS/AUTHOR RESPONSES

Reviewer	Comment	Response
Reviewer #1	<p>Multiple objectives, unclear which is highest priority; discussion focuses primarily on the interview data, which does not fully reflect what has been learned from the literature. Mismatch between literature review objectives and interview objectives, not fully addressed or described. I would strongly advise providing clear synthesis of what was learned from the literature before going into the interview data. Primary bias is towards internal VA information, which is not from published literature, but comes from interviews. As I note above, the objectives of the literature review and those of the interviews do not seem well meshed, and the presentation is not very clear as a result.</p> <p>I would strongly recommend dividing into 2 sections: the review of the literature, and the interviews. The 2 seem only somewhat related, with the interviews focusing on issues of hard to engage sites, and other issues which are not well covered in the literature, but not really with the central questions of the literature review.</p>	<p>Both the literature and interview data were used to address the same research aim, which is now broken into 2 sections rather than the 4 original sections. This change was made for clarity and to align with other reviewer comments related to re-organizing the content. We have clarified the objectives of the report and we have described more explicitly how both the literature review and interviews contributed to each section and the relevant findings therein. We also describe the bias towards internal VA information in the limitations section.</p>
Reviewer #2	<p>As indicated by the authors, by nature of the topic, there are potentially projects/studies missed because of either different search terms or simply because of the work, projects of spread may not be reported in the literature. The other bias as indicated by the authors is the VA-centricity of the report which is fine to ensure an appropriate scope, but there may be other lessons/experiences learned that may be beneficial and generalizable to the VA. In general, I would not recommend add anything different to the report, but ensuring these limitations are clear and possibly making some recommendations for future projects on authors should report results regarding disseminating and spreading best practices.</p>	<p>We have revised the limitations section to emphasize these points and ensured that the recommendations for future research describe ways reporting could be strengthened (eg, describing adaptations/tailoring or how efforts work with hard to engage sites specifically).</p>
Reviewer #3	<p>The focus on “late adopters” (or low performing?) sites needs to be more explicitly stated up front – including in the executive summary.</p> <p>The authors present the Rogers Diffusion of Innovations’ curve of adoption and in some places use that language (eg, late adopters, etc)</p>	<p>We have added language to emphasize our focus on hard-to-engage sites in the executive summary and discuss in more detail the late adopter/hard-to-engage site terminology in the introduction.</p>

	<p>but in other places use the term “low performers.” These are not necessarily the same sites or contexts. Late adopters are in this category simply because they are slow to adopt a particular innovation and may be in this category for quite rational reasons, some of which the authors acknowledge (<i>eg</i>, sites have already “invented” a solution in place of the targeted innovation). Low performers, on the other hand, are low performers on a particular quality metric or cluster of metrics (and could be a “high performer” on other metrics) and need “solutions” which a particular innovation may or may not align with; <i>eg</i>, a low performer may need innovations targeted to reducing hospital-acquired infections but a particular innovation may address a topic that is less important for them to address. This distinction needs to be clarified...including both is ok but the authors need to be careful not to conflate the terms. It may be best to focus on the term “late adopter”... where one reason for late adoption may be because the topic that a particular innovation is designed to address is not aligned with quality gaps experienced by “low performers.” Another reason for late adoption might be a general inability or incapacity to implement innovations, often seen in pervasively low performing sites. Who is hard to engage? This question is unclear...is the focus on characterizing ‘late adopters?’</p> <p>“Hard-to-engage” is yet another term for late adopters/low performers</p>	<p>We agree that low performers are a distinct, if potentially overlapping group. We have rephrased all instances where we conflate them with the other group, so that they are more distinct and intentionally described as low performers where applicable, rather than lumping them with the adopter categories.</p>
Reviewer #3	<p>The authors highlight the need to define terms, stating that the terms “scale-up” and “spread” are often used interchangeably (I would go further and say, “conflated”) and then suggest a definition that continues conflation of these terms. In fact, these are distinctly different terms. <i>Eg</i>, Ilot et al 2013 (https://implementationscience.biomedcentral.com/articles/10.1186/1748-5908-8-128) suggest distinct definitions with citations. It is important to distinguish these terms because these topics are a central focus of this synthesis. If the definitions adopted by Ilot et al are used, scale-up typically relies on a planned top-down strategy to diffuse innovation while “spread” is related to horizontal diffusion of innovations. The distinctions are nuanced but important when attempting to identify strategies and moderators of increasing use of an innovation. The authors, in fact, seem to recognize these as</p>	<p>We have reviewed and updated our own use of terminology related to scaling/spreading throughout the report and have added more discussion in the limitations about the conflation and our use of terms in the report.</p>

	<p>distinct terms on p 11, where they introduce IHI and QUERI frameworks and position that innovations may be first tested for “scale-up before moving to full scale/spread.”</p> <p>The authors “sought to define what forms large magnitude spread take (what do you mean by “forms”) and what should be considered prior to engaging in large magnitude spread take (is this the same as large-scale? scale-up? spread? Be consistent in use of terms), and what should be considered prior to engaging in large magnitude spread ...</p>	
Reviewer #3	<p>Is this a “rapid review?” If so, this needs to be specifically stated. If not, then this synthesis needs a much deeper description of methods and demonstration that the content of the included articles was methodically abstracted using a defined/described process and template (eg, were both qualitative and quantitative findings used? If so, how were they integrated? Also, how was interview data integrated with published articles). As it is, it reads as a “rapid review” meaning that findings are presented as relatively high level with less in-depth and systematic analysis of themes derived from findings.</p>	<p>This is not a rapid review, and we have revised our data abstraction description in the methods section to add more details of our process.</p> <p>We have also revised our description in the methods section of our integration of the interview and literature synthesis findings to provide more clarity here as well.</p>
Reviewer #3	<p>Figure 3 shows “macro models” that “describe the organization...of spread efforts.” This diagram can be simplified by taking out the circle with 52 publications. “Eg,” needs to be added to the examples to make clear that eg, Geisinger Learning Health System is an example</p> <p>The brief bullets describing the 3 models are not clearly described – especially in relation to how successful they are. These seem to be purely descriptive. It would be more useful to characterize success within each type of model with reflections on their applicability as an intentional strategy</p>	<p>We have added “eg” into the figure, but kept the 52 publications circle to provide the denominator for the smaller circles.</p> <p>While we would have liked to include information about how successful these different models are, the original articles often did not provide this information, and we were not able to draw conclusions that compared these models in terms of success.</p>
Reviewer #3	<p>Page 21, 2nd paragraph is quite awkwardly worded with reference to Figure 4 that needs more explanation. I imagine that these preconditions may differ depending on the “macro model” context...or do these principles apply regardless of model?</p>	<p>We have revised this text to be more descriptive, and to clarify that these seemed to be principles that apply regardless of the model.</p>
Reviewer #3	<p>Figure 5 lists “potential benefits” first but the text describes “common challenges first.” Order in text versus figure order needs to be aligned. The characterization of “benefits” is unclear and unexpected. An overall description of the meaning of this term here is needed.</p>	<p>This figure has been updated to reflect the correct order of the text and we provide clarification about the term benefit.</p>

Reviewer #3	<p>It is hard to know what to do with the information offered related to each benefit – can these insights be leveraged intentionally and strategically to turn these into earlier adopting sites?</p> <p>Regarding “challenges” – reflections on how to overcome and/or whether the presence of these challenges means that efforts to force use of an innovation should be abandoned, would be helpful. For example, if a site has created a “local innovation” that addresses a quality gap, should that site be “forced” to use the new innovation?</p>	<p>In the later section with Figure 7 and the corresponding text these benefits are connected to suggested strategies that may help with engagement. 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. More discussion of this has been added to the text in this section to presage the later discussion.</p>
Reviewer #3	<p>Figure 6 would be better understood within the “macro model” section of findings. “re-personalize” is confusing... the authors state it is something used in earlier phases and yet the earlier phases do not discuss “personalization.”</p>	<p>We have moved this Figure earlier in the report.</p> <p>We now emphasize the personalized nature of the early phases to justify our later use of the re-personalize term.</p>
Reviewer #3	<p>Figure 7 is very hard to understand. Linkages are made that do not make sense, nor do the explanations help to make these linkages more clear. <i>Eg</i>, the Figure shows that Low bandwidth is linked to external facilitation. The text refers to “facilitation” (not “external facilitation”) and needs to describe what “low bandwidth” is and how facilitation addresses this. These linkages each need to be described in text.</p>	<p>We have worked to be more consistent with our terminology in this section (<i>eg</i>, using external facilitation throughout) and</p> <p>have clarified the connections between our earlier description of types of hard-to-engage sites and this section.</p> <p>We have also added more language describing how these linkages were made, either by literature or interviewees.</p>
Reviewer #3	<p>What about the “pull” perspective? This question is meaningless on its own. “Pull” must be defined more clearly with explanation about why it is an important question to answer.</p> <p>Figure 8 doesn’t relate to text and needs better explanation. <i>Eg</i>, how does “deep dive- to understand local needs” relate to “pull?”</p>	<p>This has been re-organized to a new section of the report and more language has been added to explain the figure (now “VA preconditions and networks for spread”). The “Pull” terminology has been removed, as we determined it was distracting from the purpose of the content.</p>
Reviewer #3	<p>The Summary should include more concrete recommendations derived from findings presented.</p>	<p>Recommendations for future work have been highlighted with bullets in the abstract and end summary sections.</p>
Reviewer #3	<p>It is not clear how data from interviews were integrated with findings from published literature. Findings from literature (based on the 52 articles) should be presented within each section and then clearly and separately extended or further explicated by the</p>	<p>We have described more explicitly how both the literature review and interviews contributed to each section and the relevant findings therein.</p>

	interviews. Readers need to know the relative strength of evidence for the assertions made in this synthesis – published, peer-reviewed articles provide stronger evidence though the interviews can provide deeper insights or confirmation of published findings.	
Reviewer #3	The QUERI and IHI “models” should be characterized as frameworks – they are high-level, conceptual processes. I’m not sure of the appropriateness of combining these to guide this synthesis. QUERI is very much focused on moving research evidence to practice; characterizing the process as a “pipeline.” This pipeline has a core premise that innovations must be “evidence-based” – a top-down process is then assumed to get that innovation broadly implemented. IHI, on the other hand, is very much focused on grassroots process improvement. Scientific evidence is not germane, rather, local demonstration of improvement is necessary (through piloting and initial testing as the authors state) before scaling up and/or spreading more broadly. It is important to highlight these distinctions and to clarify whether this synthesis truly draws on both scenarios or is focused on a more “QUERI pipeline” approach to identifying evidence-based innovations which then need to be scaled up and spread more broadly.	We have highlighted this key distinction in our discussion of these frameworks and have noted that 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, and that in many cases it was not clear from published reports which approach had been used, so we chose to draw from both scenarios. We also now refer to these as frameworks.
Reviewer #4	Methods section (p.13), included mention of the TEP. Although this was defined earlier, it was not immediately clear who this was. It is recommended that the authors use the full term "Technical Expert Panel," especially since this seems to be the main place that the TEP was references.	This has been updated
Reviewer #4	Methods section (p.13), guiding question #3 (How can you work with hard-to-engage sites?) ends in a question but is a statement.	We have revised our framing of the questions and this question no longer appears here.
Reviewer #4	In Search Strategy (p.13), you reference the "Error! Reference source not found" which I had difficulty locating in the document. Could you perhaps include a page number to help others locate this (and other appendices) more easily? This is especially important when your search approach/search terms are not presented in the body of the document but instead as an appendix. It would be nice to make it easier for readers to access this information while reading the body of the document, perhaps by including page numbers in the text.	We have fixed the error message and also added page numbers for all referenced appendices throughout the report.

Reviewer #4	In Study Selection (p.14), you might consider offering some additional information to support your decisions related to studies that were rejected from your sample. More specifically, why were low-income country settings excluded? What was the basis of excluding studies that spread to less than 10 sites?	We now describe the rationale for excluding low-income countries and studies that spread to less than 10 sites.
Reviewer #4	In the SAIL Improvers section (p.15), you state the some sites were non-responsive and that site interviews were still ongoing. This suggests that data collection and analysis were not complete for the version of this report that was reviewed. Is this a concern? Will there be additional edits/expansions to this report after review by myself and the other reviewers?	<p>At the time of the report drafting, all interviews had been conducted and notes from these interviews were taken into account, but some later interviews were not transcribed and formally analyzed. We have now conducted our process as described in the methods section and found no grounds for changing any of our findings or conclusions. However, we had wanted to be transparent about this issue at the time of draft report.</p> <p>We have also now included more specific information in the methods section, as described by the COREQ guidelines, about the non-responsive sites.</p>
Reviewer #4	The Preconditions for Large Magnitude Spread (p.21) section was a bit confusing. Is the figure presenting a tool to be used by sites hoping to support spread? Areas that need to be assessed prior to beginning a spread effort? The presentation of this information seemed to introduce this topic for later exploration, but then left it without providing findings or recommendations. Again, there seemed to be a lack of continuity, as the topic of "Preconditions for Spread" appears to encompass all sites, while the later discussion mainly focuses on Hard-to-Engage sites. It felt as if there needed to be more exploration of the concept of "Spread Preconditions" and/or more of a transition to a focus on hard-to-engage sites.	The organization of the sections has been updated and more language to help with flow has been added. We have also added language to better contextualize this figure/section.
Reviewer #4	I wonder if it might be helpful to more explicitly link these strategies to challenges in the text by creating some sub-headers within the text that would mirror the organization presented in Figure 7? The current write-up does a nice job of focusing on the strategies but could use more emphasis on the ways that these strategies could be used to address the specific challenges, and build from the benefits, characteristics of hard-to-engage sites.	Sub-headers in this section have been added and brief descriptions have been added to summarize the links between characteristics of sites and strategies.

Reviewer #4	In the "What About the 'Pull' Perspective?" section (p.33), it might be helpful to briefly talk about how these local/"pull" approaches interact/relate to "push" or spread approaches. As this is currently written, it feels a bit too reductionistic and missed opportunities for explanation/big picture views of these 2 forces that I fear would not be available to your average reader naïve to QI methods.	This has been re-organized to a new section of the report and more language has been added to explain the figure (now "VA preconditions and networks for spread"). The "Pull" terminology has been removed, as we determined it was distracting from the purpose of the content.
Reviewer #4	p. 34 - Existing VA Hubs of Information - you do not capitalize "Shark Tank" or the names of the other hubs. Should these be capitalized?	Yes, these are now capitalized.
Reviewer #4	The transition from "hard to engage sites" discussion, which is based on interviews and literature reviews, to the "what about the 'pull' perspective," which is based on interviews alone, is a bit jarring (p.33). Perhaps it would be helpful to provide a bit more framing to explain that you are transitioning from a consideration of the perspectives/lessons learned from research/interviews with persons who support practice spread to sites that are the recipients of these spread efforts? It seems that this is what you were intending - to understand the spread process from both sides, correct? Either way, this section would benefit from more framing and introduction as the tone is very different from the previous sections.	We have re-organized the report, which we hope addresses this concern.
Reviewer #4	p.35 - your summary of your findings related to practice spread were confusingly stated: "... activities described in our data split the final phase of full-scale spread into 2 phases with distinct strategies. The third phase, or first part of the full-scale spread, which we are calling the 'mass broadcast' phase, uses strategies... The fourth phase, or second part of the full-scale spread phase..." Perhaps it would be easier to read/understand if you proposed that the current spread model be expanded or re-labeled, to avoid this confusion related to first/third and second/fourth stages.	We have revised and edited our language for clarity as suggested.
Reviewer #4	p.36 - In the "What about the 'Pull' Perspective?", "Pull" should be capitalized. Also, I would recommend that you drop "in the SAIL interviews" from the end of the first sentence in this section - as it is currently written, it sounds as if sites are seeking out information from the interviews, rather than the sites were discussing their sources of information within the interviews that you conducted.	These updates have been made.
Reviewer #4	You make the distinction between "late adopters" and "low performing" sites in your Summary section (p.37). It may be useful to	We have added more discussion of the late adopter/low performer/hard-to-engage site terminology in the

	<p>provide a little more information about the value of distinguishing between these 2 types of sites. You mention that "while there may (be) substantial overlap, some distinctions were also made, particularly in the QUERI interviews." Can you briefly summarize these distinctions in this section? Keep in mind this may be the only section that some readers read.</p>	<p>introduction to help support this later discussion.</p> <p>We have also now added brief examples to the summary section.</p>
Reviewer #5	<p>I think there are 2 problems with applying the Diffusion of Innovations adopter groups in this setting.</p> <p>The most important problem is that Rogers may have misunderstood the association between innovation adoption and the group characteristics. Instead of those in the early adopter group being generally more innovative and those in the late adopter group being generally skeptical and slow to change, it may be that those found in the early adopter group are generally higher status (<i>eg</i>, more educated, more metropolitan, wealthier) and are more likely to be copied than those in the late adopter group. It calls into question the idea some people are (in many/most aspects of life) generally more innovative and some generally more resistant to change. See John Henrich's paper Henrich, J. (2001). Cultural transmission and the diffusion of innovations: Adoption dynamics indicate that biased cultural transmission is the predominate force in behavioral change. <i>American Anthropologist</i>, 103(4), 992-1013.</p> <p>Another conceptual problem is that Rogers' adopter groups were based on observations about individuals, and many of the defining characteristics of those individuals do not translate or translate imperfectly to organizations, <i>eg</i>, innovators being more metropolitan and educated than late adopters.</p> <p>I don't think this critique is a serious one in terms of the validity of the findings, but as a conceptual guiding model I think it's probably important to point out that it has some potential flaws. The authors might bring this up in the discussion of who is hard to engage (page 22).</p>	<p>We have now incorporated a more thorough discussion about Diffusion of Innovations in the Introduction section, and removed some of the later references to this theory to de-emphasize it.</p>
Reviewer #5	<p>I think there needs to be greater emphasis and discussion about allowing sites to say no to a change initiative. The authors do an excellent job of acknowledging and describing how late adopters were observed to have some beneficial characteristics. But other than the observation about taking the long view (page</p>	<p>This is a key point, and is now included in the discussion section.</p>

	<p>24), there doesn't seem to be an acknowledgement that the best decision for a given site might be to say no to the change initiative, particularly in situations where there is low bandwidth, large sets of competing demands, or a homegrown solution that works. Virtually any change initiative is stressful and disruptive. I can understand that it may be that this was not a finding (i.e., the wisdom of declining to adopt/participate did not emerge in interviews or the literature), and therefore it is not appropriate to interject it with empirically-grounded findings. But perhaps the authors could note in the limitations or elsewhere in the discussion that a key assumption here was that a given initiative was broadly desirable or necessary, and we all know that there are initiatives and programs that don't work well for every site.</p>	
Reviewer #5	<p>I would like to see more concrete examples. I like the use of the quotes, but they're often too vague to really illustrate the findings for the reader. For example, page 29, on creating a web of support, it would be helpful to know what the setting was that the quotes come from; who the team leader was; who the other team members in the web were, etc. Another example is on page 31, with the quote about evidence-based quality improvement. It would be very helpful to provide some details about the project and how sites shaped the project to their needs and context.</p>	<p>We have added specific examples to the first quote described, but we went back to the interview and unfortunately we did not have more site-specific information to give about the evidence-based quality improvement work.</p>
Reviewer #5	<p>Page 5, line 38, I'm not sure I understand why findings from low income settings wouldn't be applicable in high-income settings. There may be resource issues, but many of the dynamics in my experience are similar, eg, issues of planning, competing priorities, clarity about roles and goals.</p>	<p>We now describe the rationale for excluding low-income countries.</p>
Reviewer #5	<p>Page 6, line 42. The sentence, "these included spread efforts that were embedded spread within a system of care" is hard to understand. I think I understand after reading it 4 or 5 times.</p>	<p>We have clarified this wording.</p>
Reviewer #5	<p>Page. 6, line 48-49. The sentence, "for sites spread initiators intend to work with," is another very difficult to understand phrase.</p>	<p>We have clarified this wording.</p>
Reviewer #5	<p>Page 13, line 56. There's an error note from citation software (Error! Reference source not found).</p>	<p>This has been corrected.</p>
Reviewer #5	<p>Page 13, line 53-54. The number of non-responsive sites still has the XX placeholder</p>	<p>At the time of the report drafting, all interviews had been conducted and notes from these interviews were</p>

	and there's an editorial note in brackets to fill it in.	taken into account, but some later interviews were not transcribed and formally analyzed, so we wanted to wait to finalize these last parts of the report. We had wanted to be transparent about this issue at the time of draft report.
Reviewer #2	there were terms like 'hard to engage' used that lacked clear operationalizaion	We have added more discussion around several terms as suggested by this and other peer reviewers, including "hard-to-engage."
Reviewer #2	why were articles that evaluated spread in 10 or more used? were there a lot of studies under 10 excluded? did this impact the potential conclusions	We have now added a justification for this exclusion code, we excluded 20 such studies and felt that, when looking at them as a group, they were not discussing large-scale spread, but more focused on a regional or first-iteration scale-up effort. Thus, they did not address the objectives of this report and would not change the conclusions we reached.
Reviewer #2	would recommend considering a section or in the conclusion, some potential recommendations that may be gathered from the review.	We have now added recommendations to the summary section.
Reviewer #2	page 6 - not sure what is meant by similar articles. also would be helpful to confirm if these are mesh term and if not, how were the terms confirmed - that is, where possible terms missed?	"Similar articles" search is a type of search available in several databases. In the appendix that describes the full search strategy those terms that are MeSH terms are noted, however almost none of the terms we used were MeSH terms. As we note in the limitations section, this is definitely an issue with searches of this nature.
Reviewer #2	page 7 - it states that 16 stakeholders were invited to participate, did all agree to participate? if not what percentage? any characteristics you can provide?	We now describe in further detail our interviewees and non-respondents within the methods section.
Reviewer #2	page 16 - how was the one person closely involved in the SAIL improvement activities identified?	This is now described.
Reviewer #2	page 18 - why is discussion of spread not relevant? clarify what constitutes piloting or initial testing and why not included - less than 10 sites?	Both of these exclusion criteria are now discussed further in the report.

APPENDIX F. CITATIONS FOR EXCLUDED STUDIES

Learning health system but not spread (n=62)

1. Errata to: Creating a rapid-learning health system, 2007-13 [Health Affairs, 33, 9 (2014), 1703]. *Health Affairs*. 2014;33(9):1703a.
2. JASON Report Urges Learning Health System. *Journal of AHIMA*. 2015;86(2).
3. Brooks D, Douglas M, Aggarwal N, Prabhakaran S, Holden K, Mack D. Developing a framework for integrating health equity into the learning health system. *Learn Health Sys*. 2017;1:e10029. <https://doi.org/10.1002/lrh2.10029>. [Internet Resource; Article; Computer File]. 2017; 1 online resource. Available at: https://nls.ldls.org.uk/welcome.html?ark:/81055/vdc_100052795475.0x000001
4. Abernethy AP. Demonstrating the learning health system through practical use cases. *Pediatrics*. 2014;134(1):171-172.
5. Anderson GM. Moving from a Learning-Disabled to a Rapid-Learning Healthcare System: Good Governance for Innovation. *HealthcarePapers*. 2016;15(3):4-7.
6. Andersson AC. Managers' Views and Experiences of a Large-Scale County Council Improvement Program: Limitations and Opportunities. *Qual Manag Health Care*. 2013;22(2):152-160.
7. Angus DC. Fusing randomized trials with big data: The key to self-learning health care systems? *JAMA - Journal of the American Medical Association*. 2015;314(8):767-768.
8. Aubry WM. Ways decision makers can use evidence to improve patient outcomes in learning health systems: a message from the guest editor. *EGEMS (Washington, DC)*. 2013;1(2):1050.
9. Barba P, Burns L, Litzow M, et al. Success of an international learning healthcare system in hematopoietic cell transplantation: The American society of blood and marrow transplantation clinical case forum. *Bone Marrow Transplantation*. 2016;51 SUPPL. 1:S553.
10. Bellack JP, Thibault GE. Creating a Continuously Learning Health System Through Technology: A Call to Action. *The Journal of nursing education*. 2016;55(1):3-5.
11. Delaney BC, Curcin V, Andreasson A, et al. Translational Medicine and Patient Safety in Europe: TRANSFoRM--Architecture for the Learning Health System in Europe. *BioMed research international*. 2015;2015:961526.
12. Edwards N. Can quality improvement be used to change the wider healthcare system? *Quality & safety in health care*. 2005;14(2):75-75.
13. Essen A, Lindblad S. Innovation as emergence in healthcare: unpacking change from within. *Social science & medicine (1982)*. 2013;93:203-211.
14. Fagnan LJ, Dolor RJ. PBRNS discuss utilizing big data for research and within a learning health system. *Annals of family medicine*. 2015;13(2):185.
15. Fahey KR. The Pioneering Role of the Vaccine Safety Datalink Project (VSD) to Advance Collaborative Research and Distributed Data Networks. *EGEMS (Washington, DC)*. 2015;3(1):1195.
16. Farrokhi EDEE, degree s. Building a learning healthcare network : the transition of the Vascular Interventional Surgical Care Outcomes Assessment Program to the Comparative Effectiveness Research Translation Network (VI SCOAP to CERTAIN). In:2013: <http://hdl.handle.net/1773/23769>.

17. Finney Rutten LJ, Alexander A, Embi PJ, et al. Patient-Centered Network of Learning Health Systems: Developing a resource for clinical translational research. *Journal of clinical and translational science*. 2017;1(1):40-44.
18. Friedman C, Sullivan K. Introduction to the learning health systems, big data, and socio-technical change minitrack. 2015;2015-March:3104.
19. 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.
20. Harrington RA. Appropriate Use Criteria for Coronary Revascularization and the Learning Health System: A Good Start. *Jama*. 2015;314(19):2029-2031.
21. Huvane K. Linking the chain. Sisters of Mercy's highly successful supply chain is becoming a best practice in the healthcare industry. *Healthcare informatics : the business magazine for information and communication systems*. 2008;25(9):32-35.
22. Kalra A, Adusumalli S, Sinha SS. Cultivating Skills for Success in Learning Health Systems: Learning to Lead. *Journal of the American College of Cardiology*. 2017;70(19):2450-2454.
23. Kelley M, James C, Alessi Kraft S, et al. The Role of Patient Perspectives in Clinical Research Ethics and Policy: Response to Open Peer Commentaries on "Patient Perspectives on the Learning Health System". *The American journal of bioethics : AJOB*. 2016;16(2):W7-9.
24. Kikaya H. Health systems science can learn from medicine's evidence revolution. *South African medical journal = Suid-Afrikaanse tydskrif vir geneeskunde*. 2014;104(7):454.
25. Klein WM. Conducting multilevel intervention research: leveraging and looking beyond methodological advances. *Journal of the National Cancer Institute Monographs*. 2012;2012(44):78-79.
26. Krumholz HM, Terry SF, Waldstreicher J. Data Acquisition, Curation, and Use for a Continuously Learning Health System. *Jama*. 2016;316(16):1669-1670.
27. Kuchinke WOC, Verheij RA, Veen EBv, Delaney BC. Development Towards a Learning Health System - Experiences with the Privacy Protection Model of the TRANSFoRm Project. *Data protection on the move : current developments in ICT and privacy/data protection*, Page. 2016;9789401773751(NL-LeOCL):931544158.
28. Levy AE, Ho PM. Nonadherence in the Learning Healthcare System: Avoiding a Mountain by Seeing the Bumps. *Circulation Cardiovascular quality and outcomes*. 2017;10(10).
29. McElwee NE, Dubois RW. From methods to policy: Enthusiasm for rapid-learning health systems exceeds the current standards for conducting it. *Journal of comparative effectiveness research*. 2013;2(5):425-427.
30. McNolty LA, Payne R. Relying on Trust for Research on Medical Practice in Learning Health Systems. *The American journal of bioethics : AJOB*. 2015;15(9):30-32.
31. Mistry KB, Forrest CB. Applying Evidence From Clinical Trials: Need for Pediatric Learning Health System Research. *Pediatrics*. 2017;140(6).
32. Moser A, van der Weijden T, Steckelberg A. Patient participation - What is it? *Zeitschrift für Evidenz, Fortbildung und Qualität im Gesundheitswesen*. 2016;110-111:12-15.
33. Myers SR, Carr BG, Branas CC. Uniting Big Health Data for a National Learning Health System in the United States. *JAMA pediatrics*. 2016;170(12):1133-1134.
34. Nahm ES. Mental Health Nurses: Are We Ready for a "Learning Health System"?

- Journal of the American Psychiatric Nurses Association*. 2015;21(4):284-286.
35. Park K, Park MD, Longhurst CA. Patient and Family Access to Electronic Health Records: A Key Ingredient for a Pediatric Learning Health System. *Journal of participatory medicine*. 2015;7.
 36. Patel K, Abernethy AP. Rapid learning systems. In: *Oncologic Emergency Medicine: Principles and Practice*. Springer International Publishing; 2016:79-93.
 37. Penley WC. ASCO demonstrates prototype for CancerLinQ[™]: new 'Learning Health System' will transform cancer care. *ASCO Connection*. 2013;4(4).
 38. Pontin D, Temple M. The case for using an evolutionary professional protocol for improving care: act local, think global. *The journal of the Royal College of Physicians of Edinburgh*. 2017;47(1):10-12.
 39. 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.
 40. Raths D. Early Building Blocks of the Learning Health System Falling into Place. *Healthcare Informatics*. 2015;32(1).
 41. Roberts DW. Improving care and practice through learning health systems. *Nursing management*. 2013;44(4):19-22.
 42. Rubin JC, Friedman CP. Weaving together a healthcare improvement tapestry. Learning health system brings together health data stakeholders to share knowledge and improve health. *Journal of AHIMA*. 2014;85(5):38-43.
 43. Seid M, Margolis PA, Opipari-Arrigan L. Engagement, peer production, and the learning healthcare system. *JAMA pediatrics*. 2014;168(3):201-202.
 44. Selby J, . Larson EB, . Kaushal R, . Zirkle M, . Lopez MH, . *Accelerating medical evidence generation and use : summary of a meeting series*. Washington, DC: National Academy of Medicine; 2017.
 45. Sheppard DN. EuroCareCF: working together to improve patient care and therapy development. *Journal of cystic fibrosis : official journal of the European Cystic Fibrosis Society*. 2011;10 Suppl 2:S1-4.
 46. Smoyer WE, Embi PJ, Moffatt-Bruce S. Creating Local Learning Health Systems. *JAMA: Journal of the American Medical Association*. 2016;12(20):23.
 47. Starren JB, Winter AQ, Lloyd-Jones DM. Enabling a Learning Health System through a Unified Enterprise Data Warehouse: The Experience of the Northwestern University Clinical and Translational Sciences (NUCATS) Institute. *Clinical and translational science*. 2015;8(4):269-271.
 48. Stevenson RD. Integration of research and clinical practice: the future is now. *Developmental Medicine and Child Neurology*. 2017;59(2):119-120.
 49. Stoto MA. New analytical methods for a learning healthcare system: a message from the guest editor. *EGEMS (Washington, DC)*. 2013;1(3):1055.
 50. Stucki G, Bickenbach J. The Implementation Challenge and the Learning Health System for SCI Initiative. *American journal of physical medicine & rehabilitation*. 2017;96(2 Suppl 1):S55-s60.
 51. Stucki G, Bickenbach J. The International Spinal Cord Injury Survey and the Learning Health System for Spinal Cord Injury. *American journal of physical medicine & rehabilitation*. 2017;96(2 Suppl 1):S2-s4.
 52. Sullivan K, Ben-Ari AY, Horan T, Chismar W. Introduction to Learning Health Systems Minitrack. 2016;2016-March:3297.

53. Sullivan T. Improving quality and performance in Ontario's cancer services: lessons for constructing a learning healthcare system. *Healthcare quarterly (Toronto, Ont)*. 2015;17 Spec No:5-9.
54. Tavazzi L. Observational research as a platform for evidence-based public health policies and learning health systems. *European heart journal*. 2017;38(24):1891-1894.
55. Tchong JE, . *Optimizing strategies for clinical decision support : summary of a meeting series*. Washington, DC: National Academy of Medicine; 2017.
56. Tepas JJ, 3rd. Injury prevention in a self-learning health system. *The journal of trauma and acute care surgery*. 2015;79(3 Suppl 1):S1.
57. Weinberg M. Developing a learning healthcare system. *American Journal of Pharmacy Benefits*. 2012;4(2):78-79.
58. Yoder-Wise PS. The Continuously Learning Health System: Recommendations From the Josiah Macy Jr. Foundation. *Journal of continuing education in nursing*. 2015;46(9):379-380.
59. Young PJ. Learning Healthcare Systems Will Protect Patients from Unscientific Practice Variation. *Annals of the American Thoracic Society*. 2017.
60. Yu PP. Perspectives on the Implementation of an Ethical Rapid Learning Health System. *Journal of oncology practice*. 2017;13(3):151-153.
61. Yu PP, Hoffman MA, Hayes DF. Biomarkers and oncology: the path forward to a learning health system. *Archives of pathology & laboratory medicine*. 2015;139(4):451-456.
62. Zalon ML. Technology and Continuously Learning Health Systems. *Journal of continuing education in nursing*. 2016;47(6):243-245.

Discussion of spread (n=45)

1. Bailey JE. EHR initiatives in the Mid-South. *Tennessee medicine : journal of the Tennessee Medical Association*. 2008;101(7):27-28.
2. Bindman AB. A Shared Responsibility for Developing a Learning Health System. *Journal of nursing care quality*. 2017;32(2):95-98.
3. Budrionis A, Bellika JG. The Learning Healthcare System: Where are we now? A systematic review. *Journal of biomedical informatics*. 2016;64:87-92.
4. Campion TR, Jr., Gadd CS. Peers, regulators, and professions: the influence of organizations in intensive insulin therapy adoption. *Quality management in health care*. 2009;18(2):115-119.
5. Chantler T, Lwembe S, Saliba V, et al. "It's a complex mesh"- how large-scale health system reorganisation affected the delivery of the immunisation programme in England: a qualitative study. *BMC health services research*. 2016;16:489.
6. Chatwood S, Parkinson A, Johnson R. Circumpolar health collaborations: a description of players and a call for further dialogue. *International journal of circumpolar health*. 2011;70(5):576-583.
7. Clancy CM, Margolis PA, Miller M. Collaborative networks for both improvement and research. *Pediatrics*. 2013;131 Suppl 4:S210-214.
8. 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.

9. Clay-Williams R, Nosrati H, Cunningham FC, Hillman K, Braithwaite J. Do large-scale hospital- and system-wide interventions improve patient outcomes: a systematic review. *BMC health services research*. 2014;14:369.
10. Crabtree BF, Nutting PA, Miller WL, et al. Primary care practice transformation is hard work: insights from a 15-year developmental program of research. *Medical care*. 2011;49 Suppl:S28-35.
11. Evans T, Nishtar S, Atun R, Etienne C. Scaling up research and learning for health systems: time to act. *Lancet*. 2008;372(9649):1529-1531.
12. Finnell D. Screening, brief intervention, and referral to treatment (SBIRT): moving from passive spread to widespread adoption. *Journal of addictions nursing*. 2013;24(3):195-198.
13. Fulop N, Boaden R, Hunter R, et al. Innovations in major system reconfiguration in England: a study of the effectiveness, acceptability and processes of implementation of 2 models of stroke care. *Implementation Science*. 2013;8.
14. Greene SM, Reid RJ, Larson EB. Implementing the learning health system: from concept to action. *Annals of internal medicine*. 2012;157(3):207-210.
15. Greenhalgh T, Wherton J, Papoutsi C, et al. Beyond Adoption: A New Framework for Theorizing and Evaluating Nonadoption, Abandonment, and Challenges to the Scale-Up, Spread, and Sustainability of Health and Care Technologies. *Journal of medical Internet research*. 2017;19(11):e367.
16. Hamilton JD. Concluding the series on evidence-based practice: the spread of excellence in child and adolescent psychiatry. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2008;47(11):1222-1227.
17. Herbert I, de Lusignan S. Further changes are needed if the National Care Record Service (NCRS) implementation is to succeed. *Informatics in primary care*. 2009;17(3):161-164.
18. 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.
19. Jacobsen PB. New Challenges in Psycho-Oncology Research II: A health care delivery, dissemination, and implementation research model to promote psychosocial care in routine cancer care. *Psycho-oncology*. 2017;26(4):419-423.
20. Kolodner R. At the helm. ONCHIT's chief talks about his plans for spreading the HIT gospel, as well as plans for the organization's future. Interview by Anthony Guerra. *Healthcare informatics : the business magazine for information and communication systems*. 2007;24(9):26-28, 30.
21. Korsen N, Pietruszewski P. Translating evidence to practice: 2 stories from the field. *Journal of clinical psychology in medical settings*. 2009;16(1):47-57.
22. Laycock A, Bailie J, Matthews V, Bailie R. Interactive Dissemination: Engaging Stakeholders in the Use of Aggregated Quality Improvement Data for System-Wide Change in Australian Indigenous Primary Health Care. *Front Public Health*. 2016;4.
23. Leigh JA, Long PW, Barraclough BH. The clinical support systems program: supporting system-wide improvement. *Med J Aust*. 2004;180(10):S101-S103.
24. Lewis RQ, Fletcher M. Implementing a national strategy for patient safety: lessons from the National Health Service in England. *Quality & safety in health care*. 2005;14(2):135-139.
25. Malcarney MB, Horton K, Seiler N, Hastings D. Advancing the Public's Health by

- Scaling Innovations in Clinical Quality. *Public Health Rep.* 2017;132(4):512-517.
26. Mandel KE. Aligning Rewards With Large-Scale Improvement. *JAMA-J Am Med Assoc.* 2010;303(7):663-664.
 27. Mendel P, Siegel S, Leuschner KJ, Gall EM, Weinberg DA, Kahn KL. The national response for preventing healthcare-associated infections: infrastructure development. *Medical care.* 2014;52(2 Suppl 1):S17-24.
 28. Moloney RM, Tambor ES, Tunis SR. Patient and clinician support for the learning healthcare system: recommendations for enhancing value. *Journal of comparative effectiveness research.* 2016;5(2):123-128.
 29. Noseworthy JH. What is ahead for Mayo Clinic? *Mayo Clinic proceedings.* 2014;89(4):440-443.
 30. Patel MR, Jones WS. Peripheral Artery Disease Therapies May Perform Differently in Practice Than in Randomized Trials: The Need for Learning Health Systems. *JACC Cardiovascular interventions.* 2016;9(7):725-727.
 31. Paulsell D, Del Grosso P, Supplee L. Supporting replication and scale-up of evidence-based home visiting programs: assessing the implementation knowledge base. *American journal of public health.* 2014;104(9):1624-1632.
 32. Perla RJ, Bradbury E, Gunther-Murphy C. Large-scale improvement initiatives in healthcare: a scan of the literature. *Journal for healthcare quality : official publication of the National Association for Healthcare Quality.* 2013;35(1):30-40.
 33. Powell BJ, Beidas RS. Advancing Implementation Research and Practice in Behavioral Health Systems. *Administration and policy in mental health.* 2016;43(6):825-833.
 34. Prins M, Bruneau J. Estimates are not enough: scaling-up interventions to improve the health of people who inject drug. *Lancet Glob Health.* 2017;5(12):E1162-E1163.
 35. Pronovost PJ, Berenholtz SM, Needham DM. Translating evidence into practice: a model for large scale knowledge translation. *BMJ (Clinical research ed).* 2008;337:a1714.
 36. Roy DA, Candas B, Litvak E, Boileau L. The necessary - but not sufficient - Leadership of research to transform the health systems. *Healthcare Papers.* 2016;16:21-25.
 37. Rycroft-Malone J, Wilkinson JE, Burton CR, et al. Implementing health research through academic and clinical partnerships: a realistic evaluation of the Collaborations for Leadership in Applied Health Research and Care (CLAHRC). *Implementation science : IS.* 2011;6:74.
 38. Strite S, Stuart ME. What is an evidence-based, value-based health care system? (Part 1). *Physician executive.* 2005;31(1):50-54.
 39. Waterman H, Boaden R, Burey L, et al. Facilitating large-scale implementation of evidence based health care: insider accounts from a co-operative inquiry. *BMC health services research.* 2015;15:60.
 40. Westbrook JI, Braithwaite J, Gibson K, et al. Use of information and communication technologies to support effective work practice innovation in the health sector: a multi-site study. *BMC health services research.* 2009;9:201.
 41. White M, Wells JSG, Butterworth T. The transition of a large-scale quality improvement initiative: a bibliometric analysis of the Productive Ward: Releasing Time to Care Programme. *J Clin Nurs.* 2014;23(17-18):2414-2423.
 42. Wutzke S, Benton M, Verma R. Towards the implementation of large scale innovations in complex health care systems: views of managers and frontline personnel. *BMC research notes.* 2016;9:327.

43. 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.
44. Young GJ, Charns MP, Barbour GL. Quality improvement in the US Veterans Health Administration. *International journal for quality in health care : journal of the International Society for Quality in Health Care*. 1997;9(3):183-188.
45. Zephyrin LC, Katon JG, Yano EM. Strategies for transforming reproductive healthcare delivery in an integrated healthcare system: a national model with system-wide implications. *Current opinion in obstetrics & gynecology*. 2014;26(6):503-510.

Small rollout (n=20)

1. Booth BJ, Zwar N, Harris MF. Healthcare improvement as planned system change or complex responsive processes? a longitudinal case study in general practice. *BMC family practice*. 2013;14.
2. Contandriopoulos D, Brousselle A, Dubois CA, et al. A process-based framework to guide nurse practitioners integration into primary healthcare teams: results from a logic analysis. *BMC health services research*. 2015;15:78.
3. Cresswell KM, Worth A, Sheikh A. Comparative case study investigating sociotechnical processes of change in the context of a national electronic health record implementation. *Health informatics journal*. 2012;18(4):251-270.
4. D'Andreta D, Scarbrough H, Evans S. The enactment of knowledge translation: a study of the Collaborations for Leadership in Applied Health Research and Care initiative within the English National Health Service. *Journal of health services research & policy*. 2013;18(3 Suppl):40-52.
5. DiGiorgio K, Anderson WG, Cannesson M, Gleason N, O'Neill-Page E, Ong MK. University of California Center for Health Quality and Innovation: experiences from a system approach to scaling up effective interventions. [Internet Resource; Article]. 2015; <http://www.implementationscience.com/content/10/S1/A16>
6. Dlugacz YD, Stier L, Lustbader D, Jacobs MC, Hussain E, Greenwood A. Expanding a performance improvement initiative in critical care from hospital to system. *The Joint Commission journal on quality improvement*. 2002;28(8):419-434.
7. Fulop NJ, Ramsay AIG, Perry C, et al. Explaining outcomes in major system change: a qualitative study of implementing centralised acute stroke services in 2 large metropolitan regions in England. *Implementation Science*. 2016;11.
8. Hirsch MD. How a 'Learning Health System' Lowered the Cost of Care. 2017.
9. Lamont SS. "See and Treat": spreading like wildfire? A qualitative study into factors affecting its introduction and spread. *Emergency medicine journal : EMJ*. 2005;22(8):548-552.
10. Leclerc E, Lavoie-Tremblay M. Implementation of a nursing professional practice model. *Healthcare management forum*. 2007;20(3):24-29.
11. Mathews S, Golden S, Demski R, Pronovost P, Ishii L. Advancing health care quality and safety through action learning. *Leadership in health services (Bradford, England)*. 2017;30(2):148-158.
12. Morgenthaler TI, Lovely JK, Cima RR, et al. Using a framework for spread of best practices to implement successful venous thromboembolism prophylaxis throughout a

- large hospital system. *American journal of medical quality : the official journal of the American College of Medical Quality*. 2012;27(1):30-38.
13. Radnor Z, Lovell B. Success factors for implementation of the balanced scorecard in a NHS multi-agency setting. *International journal of health care quality assurance incorporating Leadership in health services*. 2003;16(2-3):99-108.
 14. Rosen M, Mueller BU, Milstone AM, et al. Creating a Pediatric Joint Council to Promote Patient Safety and Quality, Governance, and Accountability Across Johns Hopkins Medicine. *Joint Commission Journal on Quality and Patient Safety*. 2017;43(5):224-231.
 15. Rosenman MB, Decker B, Levy KD, Holmes AM, Pratt VM, Eadon MT. Lessons Learned When Introducing Pharmacogenomic Panel Testing into Clinical Practice. *Value in Health*. 2017;20(1):54-59.
 16. Schuller KA, Kash BA, Gamm LD. Studer Group(R) 's evidence-based leadership initiatives. *Journal of health organization and management*. 2015;29(6):684-700.
 17. Simon TD, Starmer AJ, Conway PH, et al. Quality improvement research in pediatric hospital medicine and the role of the Pediatric Research in Inpatient Settings (PRIS) network. *Academic pediatrics*. 2013;13(6 Suppl):S54-60.
 18. Smoyer WE, Embi PJ, Moffatt-Bruce S. Creating Local Learning Health Systems: Think Globally, Act Locally. *Jama*. 2016;316(23):2481-2482.
 19. Tonges M, McCann M, Strickler J. Translating caring theory across the continuum from inpatient to ambulatory care. *The Journal of nursing administration*. 2014;44(6):326-332.
 20. Velanovich V, Rubinfeld I, Patton JH, Jr., Ritz J, Jordan J, Dulchavsky S. Implementation of the National Surgical Quality Improvement Program: critical steps to success for surgeons and hospitals. *American journal of medical quality : the official journal of the American College of Medical Quality*. 2009;24(6):474-479.

Full text unavailable (n=22)

1. Grant Furthers Quest for 'Learning Health System Model'. *Journal of AHIMA*. 2013;84(4).
2. Abernethy AP. Aahpm scientific research award winner: A learning system to optimize care for people with advanced illness. *Journal of Pain and Symptom Management*. 2016;51(2):389.
3. Bermel R, Jones S, Izbudak I, et al. Multicenter MRI standardization to allow quantitative metrics in routine care of multiple sclerosis patients: The Multiple Sclerosis Partners Advancing Technology and Health Solutions (MS PATHS) initiative. *Neurology*. 2017;88(16):2017-2004.
4. Bermel R, Mowry E, Krupp L, et al. Multiple sclerosis partners advancing technology and health solutions (MS PATHS): Initial launch experience. *Neurology*. 2017;88(16):2017-2004.
5. Bingham CA, Pratt J, Yildirim-Toruner C, et al. Pediatric rheumatology care and outcomes improvement network demonstrates improvement on quality measures for children with juvenile idiopathic arthritis. *Arthritis and Rheumatology*. 2017;69 Supplement 4:6-7.
6. Carmona JM, Howe E, Zapata R, Stevens D, Murphy JK. The Teen Health Improvement Program: A System-Wide Initiative to Improve the Quality of Care for Adolescents Served by the Country's Largest Public Hospital System. *J Adolesc Health*. 2015;56(2):S108-S109.

7. Colletti RB. A learning health system to transform the health, care and cost of IBD. *Journal of Crohn's and Colitis*. 2014;8 SUPPL. 2:S425-S426.
8. Duda MA, Riopelle RJ, Brown J. From theory to practice: an illustrative case for selecting evidence-based practices and building implementation capacity in 3 Canadian health jurisdictions. *Evid Polciy*. 2014;10(4):565-577.
9. Han DP. How a manufacturing process transformed healthcare delivery. *Medical economics*. 2013;90(14):31-34.
10. Heinssen R, McGorry P, Nordentoft M. RAISE 2.0 - Establishing a national early psychosis intervention network in the u.S. *Early Intervention in Psychiatry*. 2016;10 Supplement 1:4.
11. Hou JXAWJSJKMGIGJCGWAVSLMJMTQCJCDM. P-129 CCFA Quality of Care Breakthrough Series Collaborative. [Internet Resource; Article; Computer File]. 2017; 1 online resource. Available at:
https://nls.ldls.org.uk/welcome.html?ark:/81055/vdc_100048835393.0x000008
12. 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.
13. McIntosh B. Developing a national learning health system. *British Journal of Health Care Management*. 2017;23(7):304-305.
14. Melmed GMAKBHCJDJHGJMLMLDRDSSHJTATQYZ. P-043 Feasibility of a Multicenter, Collaborative, Longitudinal, Quality Improvement Learning Health System for Adult IBD Care. [Internet Resource; Article; Computer File]. 2017; 1 online resource. Available at:
https://nls.ldls.org.uk/welcome.html?ark:/81055/vdc_100048835340.0x00003b
15. Moore SM. Exploring Systems Thinking as an Underlying Mechanism in Improving Healthy Lifestyles of Overw8 and Obese Adolescents: Psychometrics of the Systems Thinking Scale for Adolescent Behavior Change. *Circulation*. 2016;133.
16. Mowry E, Krupp L, Bermel R, et al. The multiple sclerosis partners advancing technology and health solutions (MS PATHS) patient cohort. *Multiple Sclerosis Journal*. 2017;23(3 Supplement 1):120-121.
17. Nolan KMSMW. *Spreading improvement across your health care organization*. Oak Brook, Ill. : Joint Commission Resources: Cambridge, MA; 2007.
18. Powell DS, R. Leading System-Wide Change: Reducing Door-To-Provider Time for Emergency Room Patients. *Healthcare Systems Process Improvement*. 2015.
19. Ramirez E. Connected Health Care. In: *Health Care in Transition; Variation: Health Care in Transition*.: Nova Science Publishers, Inc; 2016:
<http://public.eblib.com/choice/publicfullrecord.aspx?p=4591548>
20. Rocque GB, Partridge EE. Sustainability of patient navigation programs: Lessons learned from a Medicare innovation project. *Cancer Epidemiology Biomarkers and Prevention*. 2015;24(10):2014-2011.
21. Sale T, Melton R, Hayden-Lewis K, Usher C. Integrating coordinated specialty care in the U.S.: Oregon's experience. *Early Intervention in Psychiatry*. 2016;10 Supplement 1:58.
22. Williams MS. Implementation Science and Integration into Healthcare Systems. In: *Genomic and Precision Medicine: Foundations, Translation, and Implementation: Third Edition*. Elsevier Inc.; 2016:217-232.

Not healthcare delivery (n=7)

1. 2. Abrams JS, Mooney M, Zwiebel J, Friedman S. Improving the protocol implementation process: the National Cancer Institute's response. *Journal of clinical oncology : official journal of the American Society of Clinical Oncology*. 2014;32(23):2515-2516.
2. Bennett GG, Shelton RC. Extending Our Reach for Greater Impact. *Health education & behavior : the official publication of the Society for Public Health Education*. 2017;44(6):835-838.
3. Doshi JA, Willke RJ. Advancing High-Quality Value Assessments of Health Care Interventions. *Value in health : the journal of the International Society for Pharmacoeconomics and Outcomes Research*. 2017;20(2):181-184.
4. Lin SY, Schillinger E, Irby DM. Value-Added Medical Education: Engaging Future Doctors to Transform Health Care Delivery Today. *Journal of General Internal Medicine*. 2015;30(2):150-151.
5. 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.
6. Rosas LG, Lv N, Azar K, Xiao L, Yank V, Ma J. Applying the Pragmatic-Explanatory Continuum Indicator Summary Model in a Primary Care-Based Lifestyle Intervention Trial. *American journal of preventive medicine*. 2015;49(3 Suppl 2):S208-214.
7. Sanchez MA, Vinson CA, Porta ML, Viswanath K, Kerner JF, Glasgow RE. Evolution of Cancer Control P.L.A.N.E.T.: moving research into practice. *Cancer causes & control : CCC*. 2012;23(7):1205-1212.

Low income country (n=3)

1. Bjorkman J, Schulz R. On the implementation of change in national health delivery systems: a model and an application. *Journal of health and human resources administration*. 1981;4(2):195-227.
2. Peterson S. Assessing the scale-up of child survival interventions. *Lancet*. 2010;375(9714):530-531.
3. Renju J. *A detailed review of how scaling-up a sexual and reproductive health intervention to improve young people's health can affect the coverage and quality of its implementation*. Amsterdam: Rozenberg; 2011.

Duplicate (n=1)

Smoyer W, Embi PJ, Moffatt-Bruce S. Creating Local Learning Health Systems Think Globally, Act Locally. *JAMA - Journal of the American Medical Association*. 2016;316(23):2481-2482.

Otherwise not relevant to the topic of spread (n=95)Piloting or initial testing of interventions (n=53)

1. Balbale SN, Hill JN, Guihan M, et al. Evaluating implementation of methicillin-resistant

- Staphylococcus aureus (MRSA) prevention guidelines in spinal cord injury centers using the PARIHS framework: a mixed methods study. *Implementation science : IS*. 2015;10:130.
2. Barber JA, Rosenheck RA, Armstrong M, Resnick SG. Monitoring the dissemination of peer support in the VA Healthcare System. *Community mental health journal*. 2008;44(6):433-441.
 3. Benn J, Burnett S, Parand A, Pinto A, Iskander S, Vincent C. Perceptions of the impact of a large-scale collaborative improvement programme: experience in the UK Safer Patients Initiative. *Journal of evaluation in clinical practice*. 2009;15(3):524-540.
 4. Benning AD-W, M.; Nwulu, U.; Ghaleb, M.; Dawson, J.; Barber, N.; Franklin, B.D.; Girling, A.; Hemming, K.; Carmalt, M.; Rudge, G.; Naicker, T.; Kotecha, A.; Derrington, M.C.; Lilford, R. Multiple component patient safety intervention in English hospitals: controlled evaluation of second phase. *BMJ Innovations*. 2011;342.
 5. Blake SC, Kohler S, Rask K, Davis A, Naylor DV. Facilitators and barriers to 10 National Quality Forum safe practices. *American journal of medical quality : the official journal of the American College of Medical Quality*. 2006;21(5):323-334.
 6. Bölenius K, Söderberg J, Hultdin J, Lindkvist M, Brulin C, Grankvist K. Minor improvement of venous blood specimen collection practices in primary health care after a large-scale educational intervention. [Internet Resource; Archival Material]. 2013; <http://urn.kb.se/resolve?urn=urn:nbn:se:umu:diva-61551>
 7. Chen JY, Kang N, Juarez DT, Hodges KA, Chung RS, Legorreta AP. Impact of a pay-for-performance program on low performing physicians. *Journal for healthcare quality : official publication of the National Association for Healthcare Quality*. 2010;32(1):13-21; quiz 21-12.
 8. Crabtree BF, Nutting PA, Miller WL, Stange KC, Stewart EE, Jaen CR. Summary of the National Demonstration Project and recommendations for the patient-centered medical home. *Annals of family medicine*. 2010;8 Suppl 1:S80-90; s92.
 9. Dainty KN, Scales DC, Sinuff T, Zwarenstein M. Competition in collaborative clothing: a qualitative case study of influences on collaborative quality improvement in the ICU. *BMJ quality & safety*. 2013;22(4):317-323.
 10. Damush TM, Miller KK, Plue L, et al. National implementation of acute stroke care centers in the Veterans Health Administration (VHA): formative evaluation of the field response. *Journal of general internal medicine*. 2014;29 Suppl 4:845-852.
 11. Evans ME, Kralovic SM, Simbartl LA, et al. Prevention of methicillin-resistant Staphylococcus aureus infections in spinal cord injury units. *American journal of infection control*. 2013;41(5):422-426.
 12. Foster GL, Kenward K, Hines S, Joshi MS. The Relationship of Engagement in Improvement Practices to Outcome Measures in Large-Scale Quality Improvement Initiatives. *Am J Med Qual*. 2017;32(4):361-368.
 13. Greene J, Hibbard JH, Overton V. Large performance incentives had the greatest impact on providers whose quality metrics were lowest at baseline. *Health affairs (Project Hope)*. 2015;34(4):673-680.
 14. Hagedorn HJ, Rettmann N, Dieperink E, Knott A, Landon BE. A Training Model for Implementing Hepatitis Prevention Services in Substance Use Disorder Clinics: A Qualitative Evaluation. *Journal of general internal medicine*. 2015;30(8):1215-1221.
 15. Ignatowicz A, Greenfield G, Pappas Y, Car J, Majeed A, Harris M. Achieving provider

- engagement: providers' perceptions of implementing and delivering integrated care. *Qualitative health research*. 2014;24(12):1711-1720.
16. Jaen CR, Ferrer RL, Miller WL, et al. Patient outcomes at 26 months in the patient-centered medical home National Demonstration Project. *Annals of family medicine*. 2010;8 Suppl 1:S57-67; s92.
 17. Kauth MR, Sullivan G, Blevins D, et al. Employing external facilitation to implement cognitive behavioral therapy in VA clinics: a pilot study. *Implementation science : IS*. 2010;5:75.
 18. Krein SL, Bernstein SJ, Fletcher CE, et al. Improving eye care for veterans with diabetes: an example of using the QUERI steps to move from evidence to implementation: QUERI Series. *Implementation science : IS*. 2008;3:18.
 19. Larson ELE, E.; Cloonan, P. Sugrue, S.; Parides, M. An organizational climate intervention associated with increased handwashing and decreased nosocomial infections. *Behav Med*. 2000;26:14-22.
 20. Li P, Bahensky JA, Jaana M, Ward MM. Role of multihospital system membership in electronic medical record adoption. *Health care management review*. 2008;33(2):169-177.
 21. Lourenco T, Grant AM, Burr JM, Vale L. The introduction of new interventional procedures in the British National Health Service--a qualitative study. *Health policy (Amsterdam, Netherlands)*. 2011;100(1):35-42.
 22. 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.
 23. Mannion R, Goddard M, Kuhn M, Bate A. Decentralization strategies and provider incentives in healthcare: evidence from the english national health service. *Applied health economics and health policy*. 2005;4(1):47-54.
 24. Mansell S, Harris M. A double act: implementing the National Service Framework. *RCM midwives : the official journal of the Royal College of Midwives*. 2006;9(10):402-403.
 25. Marsteller JA, Woodward P, Underwood WS, Hsiao CJ, Barr MS. Design of a quality and performance improvement project for small primary care practices: reflections on the Center for Practice Innovation. *Quality in primary care*. 2011;19(1):49-57.
 26. McAlearney AS, Hefner J, Robbins J, Garman AN. Toward a high-performance management system in health care, part 4: Using high-performance work practices to prevent central line-associated blood stream infections-a comparative case study. *Health care management review*. 2016;41(3):233-243.
 27. McGinnis JMLODA. Learning Healthcare System : Workshop Summary, IOM Roundtable on Evidence-Based Medicine. In: *Variation: Online access: National Academy of Sciences National Academies Press.*: National Academies Press; 2007: <http://www.nap.edu/11903>
 28. McKnight W. For Nationwide Children's Hospital, a Local Learning Health System Shows Global Promise. *Industry Edge*. 2017(April 2017).
 29. Metlay JP, Camargo CA, Jr., MacKenzie T, et al. Cluster-randomized trial to improve antibiotic use for adults with acute respiratory infections treated in emergency departments. *Annals of emergency medicine*. 2007;50(3):221-230.
 30. Mezey M, Kobayashi M, Grossman S, Firpo A, Fulmer T, Mitty E. Nurses Improving Care to Health System Elders (NICHE): implementation of best practice models. *The*

- Journal of nursing administration*. 2004;34(10):451-457.
31. Nutting PA, Crabtree BF, Miller WL, Stange KC, Stewart E, Jaen C. Transforming physician practices to patient-centered medical homes: lessons from the national demonstration project. *Health affairs (Project Hope)*. 2011;30(3):439-445.
 32. Nutting PA, Crabtree BF, Miller WL, Stewart EE, Stange KC, Jaen CR. Journey to the patient-centered medical home: a qualitative analysis of the experiences of practices in the National Demonstration Project. *Annals of family medicine*. 2010;8 Suppl 1:S45-56; s92.
 33. Nutting PA, Crabtree BF, Stewart EE, et al. Effect of facilitation on practice outcomes in the National Demonstration Project model of the patient-centered medical home. *Annals of family medicine*. 2010;8 Suppl 1:S33-44; s92.
 34. Nutting PA, Miller WL, Crabtree BF, Jaen CR, Stewart EE, Stange KC. Initial lessons from the first national demonstration project on practice transformation to a patient-centered medical home. *Annals of family medicine*. 2009;7(3):254-260.
 35. O'Connell TJ, Bassham JE, Bishop RO, et al. Clinical process redesign for unplanned arrivals in hospitals. *The Medical journal of Australia*. 2008;188(6 Suppl):S18-22.
 36. Ovretveit J, Klazinga N. Learning from large-scale quality improvement through comparisons. *International Journal for Quality in Health Care*. 2012;24(5):463-469.
 37. Parekh AK, Kronick R, Tavenner M. Optimizing health for persons with multiple chronic conditions. *Jama*. 2014;312(12):1199-1200.
 38. Porteous JM, Stewart-Wynne EG, Connolly M, Crommelin PF. iSoBAR--a concept and handover checklist: the National Clinical Handover Initiative. *The Medical journal of Australia*. 2009;190(11 Suppl):S152-156.
 39. Power M, Brewster L, Parry G, et al. Multimethod study of a large-scale programme to improve patient safety using a harm-free care approach. *BMJ open*. 2016;6(9).
 40. Rattray NA, Damush TM, Luckhurst C, Bauer-Martinez CJ, Homoya BJ, Miech EJ. Prime movers: Advanced practice professionals in the role of stroke coordinator. *Journal of the American Association of Nurse Practitioners*. 2017;29(7):392-402.
 41. Rhee JJ, Zwar NA, Kemp LA. Uptake and implementation of Advance Care Planning in Australia: findings of key informant interviews. *Australian health review : a publication of the Australian Hospital Association*. 2012;36(1):98-104.
 42. Rhodes P, Giles SJ, Cook GA, et al. Assessment of the implementation of a national patient safety alert to reduce wrong site surgery. *Quality & safety in health care*. 2008;17(6):409-415.
 43. Rittenhouse DR, Ramsay PP, Casalino LP, McClellan S, Kandel ZK, Shortell SM. Increased Health Information Technology Adoption and Use Among Small Primary Care Physician Practices Over Time: A National Cohort Study. *Annals of family medicine*. 2017;15(1):56-62.
 44. Rosenberg KZ, J. A Simple Intervention Reduces Contamination Risk In Healthcare. *American Journal of Nursing*. 2016;116:64-65.
 45. Ryan AM, Blustein J, Casalino LP. Medicare's Flagship Test Of Pay-For-Performance Did Not Spur More Rapid Quality Improvement Among Low-Performing Hospitals. *Health Affairs*. 2012;31(4):797-805.
 46. Salowe RJ, O'Brien JM. NEI's audacious goals initiative. *Ophthalmology*. 2014;121(3):615-616.
 47. Schifalacqua MM, Shepard A, Kelley W. Evidence-based practice: cost-benefit of large

- system implementation. *Quality management in health care*. 2012;21(2):74-80.
48. Solomon J, Day C, Worrall A, Thompson P. Does sustained involvement in a quality network lead to improved performance? *International journal of health care quality assurance*. 2015;28(3):228-233.
 49. Stewart EE, Nutting PA, Crabtree BF, Stange KC, Miller WL, Jaen CR. Implementing the patient-centered medical home: observation and description of the national demonstration project. *Annals of family medicine*. 2010;8 Suppl 1:S21-32; s92.
 50. Walley P, Silvester K, Steyn R. Knowledge and behaviour for a sustainable improvement culture. *HealthcarePapers*. 2006;7(1):26-33; discussion 74-27.
 51. Wang L, Kuntz-Melcavage K, Forrest CB, et al. Development and applications of an outcomes assessment framework for care management programs in learning health systems. *EGEMS (Washington, DC)*. 2015;3(1):1119.
 52. Wise J. Hospitals and GPs are offered incentives to reduce antibiotic prescribing. *BMJ (Clinical research ed)*. 2016;352:i1499.
 53. Zanaboni P, Wootton R. Adoption of routine telemedicine in Norwegian hospitals: progress over 5 years. *BMC health services research*. 2016;16:496.

Pre-implementation analyses with no implementation component (n=38)

1. New star system for the NHS and style of handling poor performance--a significant step forward for improving the NHS. *Journal of nursing management*. 2002;10(1):55-56.
2. Aarons GA, Green AE, Willging CE, et al. Mixed-method study of a conceptual model of evidence-based intervention sustainment across multiple public-sector service settings. *Implementation science : IS*. 2014;9:183.
3. Bailie J, Laycock A, Matthews V, Bailie R. System-Level Action Required for Wide-Scale Improvement in Quality of Primary Health Care: Synthesis of Feedback from an Interactive Process to Promote Dissemination and Use of Aggregated Quality of Care Data. *Front Public Health*. 2016;4.
4. Barengolts EI, Burke BV, Duckworth WC, Kaminsky R, Miller DR, Swislocki AL. Adoption of a new technology in a Veterans Affairs national formulary system with local implementation: the insulin glargine example. *Managed care interface*. 2007;20(3):37-44, 57.
5. Bashshur RL, Shannon GW, Krupinski EA, et al. National telemedicine initiatives: essential to healthcare reform. *Telemedicine journal and e-health : the official journal of the American Telemedicine Association*. 2009;15(6):600-610.
6. Bhavnani SP, Parakh K, Atreja A, et al. 2017 Roadmap for Innovation-ACC Health Policy Statement on Healthcare Transformation in the Era of Digital Health, Big Data, and Precision Health A Report of the American College of Cardiology Task Force on Health Policy Statements and Systems of Care. *J Am Coll Cardiol*. 2017;70(21):2696-2718.
7. Charns MP, Egede LE, Rumsfeld JS, McGlynn GC, Yano EM. Advancing Partnered Research in the VA Healthcare System: The Pursuit of Increased Research Engagement, Responsiveness, and Impact. *Journal of General Internal Medicine*. 2014;29:S811-S813.
8. Charns MP, Foster MK, Alligood EC, et al. Multilevel interventions: measurement and measures. *Journal of the National Cancer Institute Monographs*. 2012;2012(44):67-77.
9. Cherry JC. Focus less on technology, more on workflow and people. Intel-GE care innovations has developed a four-phase approach to help healthcare organizations prepare

- for and implement new technology. *Health management technology*. 2012;33(3):26-27.
10. Clancy CM. Physician leadership for high-quality care. *Chest*. 2009;136(6):1452-1454.
 11. Fischer MA. The National e-Prescribing Patient Safety Initiative: removing one hurdle, confronting others. *Drug safety*. 2007;30(6):461-464.
 12. Fortney JC, Owen RR. Increasing treatment engagement for persons with serious mental illness using personal health records. *The American journal of psychiatry*. 2014;171(3):259-261.
 13. Gifford E, Tavakoli S, Wisdom J, Hamlett-Berry K. Implementation of smoking cessation treatment in VHA substance use disorder residential treatment programs. *Psychiatric services (Washington, DC)*. 2015;66(3):295-302.
 14. Gonnering RS. Fostering innovation. *Ophthalmic plastic and reconstructive surgery*. 2014;30(6):449.
 15. Goodrich GL, Lueck AH. Vision rehabilitation services at a crossroads. *Journal of Visual Impairment & Blindness*. 2010;104(10):593.
 16. Grant RW, Uratsu CS, Estacio KR, et al. Pre-Visit Prioritization for complex patients with diabetes: Randomized trial design and implementation within an integrated health care system. *Contemporary clinical trials*. 2016;47:196-201.
 17. Ham C. Supporting poorly performing NHS hospitals to improve. *BMJ (Clinical research ed)*. 2013;347:f5830.
 18. Ho PM, Maynard C, Starks H, Sun H, Sloan K, Sales A. Outcomes in patients with coronary heart disease who do not undergo lipid testing. *The American journal of cardiology*. 2003;91(8):986-988, a987.
 19. Holly TA. A world view of nuclear cardiology practices: Think globally, act locally. *Journal of nuclear cardiology : official publication of the American Society of Nuclear Cardiology*. 2017;24(3):860-861.
 20. Husk J. Achieving changes in practice from national audit: national audit of the organization of services for falls and bone health in older people. *Journal of evaluation in clinical practice*. 2008;14(6):974-978.
 21. Kent TA. Predicting outcome of IV thrombolysis-treated ischemic stroke patients: the DRAGON score. *Neurology*. 2012;78(17):1368.
 22. Kent TA, Rutherford DG, Breier JI, Papanicolaou AC. What is the evidence for use dependent learning after stroke? *Stroke*. 2009;40(3 Suppl):S139-140.
 23. Khuri SF, Henderson WG, Daley J, et al. Successful implementation of the Department of Veterans Affairs' National Surgical Quality Improvement Program in the private sector: the Patient Safety in Surgery study. *Annals of surgery*. 2008;248(2):329-336.
 24. Kingston J, Katsaros J, Vu Y, Goodrich GL. Neurological vision rehabilitation: description and case study. *Journal of Visual Impairment & Blindness*. 2010;104(10):603.
 25. Kopjar B, Sales AE, Pineros SL, Sun H, Li YF, Hedeem AN. Comparison of characteristics of patients with coronary heart disease receiving lipid-lowering therapy versus those not receiving such therapy. *The American journal of cardiology*. 2003;91(11):1352-1354.
 26. Lopez L. Integrated delivery systems ... managed care organizations, hospitals, doctors, and insurers are developing new entities to compete for business. *The state of health care in America*. 1995:31-35.
 27. McIntyre K, Shojania KG. The challenges of quality improvement reports and the urgent

- need for more of them. *Thorax*. 2011;66(12):1020-1022.
28. Miller RR, Li YF, Sun H, et al. Underuse of cardioprotective medications in patients prior to acute myocardial infarction. *The American journal of cardiology*. 2003;92(2):209-211.
 29. Pines JM, Hollander JE, Lee H, Everett WW, Uscher-Pines L, Metlay JP. Emergency department operational changes in response to pay-for-performance and antibiotic timing in pneumonia. *Academic emergency medicine : official journal of the Society for Academic Emergency Medicine*. 2007;14(6):545-548.
 30. Raleigh VS, Frosini F, Sizmur S, Graham C. Do some trusts deliver a consistently better experience for patients? An analysis of patient experience across acute care surveys in English NHS trusts. *BMJ quality & safety*. 2012;21(5):381-390.
 31. Resnick SG, Rosenheck RA, Drebing CE. What makes vocational rehabilitation effective? Program characteristics versus employment outcomes nationally in VA. *Psychol Serv*. 2006;3(4):239.
 32. Rose AJ, Petrakis BA, Callahan P, et al. Organizational characteristics of high- and low-performing anticoagulation clinics in the Veterans Health Administration. *Health services research*. 2012;47(4):1541-1560.
 33. Scott WR. Embedding the examination of multilevel factors in an organization field context. *Journal of the National Cancer Institute Monographs*. 2012;2012(44):32-33.
 34. Shneiderman B. A national initiative for social participation. *Science (New York, NY)*. 2009;323(5920):1426-1427.
 35. Slonim AD, Maraccini AM. Necessities for the Assessment and Delivery of Value-Based Critical Care: Empirical Evidence and Systemic Considerations. *Critical care medicine*. 2018;46(1):155-156.
 36. Terry KD. Clinical integration sets the stage for positive change. Goal is to promote higher-quality, more cost-efficient patient services by better coordinating care across a continuum of conditions, providers, settings and time. *Health management technology*. 2012;33(9):16-17.
 37. Venes D. The evolving science of translating research evidence into clinical practice. *Evidence-based medicine*. 2007;12(4):102.
 38. Yano EM. Teaching Commentary on "A Primary Care-Based Multidisciplinary Readmission Prevention Program": Essential Aspects of Comparability and Context in Practice-Based Program Evaluation. *Journal of General Internal Medicine*. 2014;29(5):805-807.

Other topics not relevant to spread (eg, medical education programming, n=4)

1. Harris A, Tallia A, Tallia A, et al. Health system change and academic departments. *Annals of family medicine*. 2014;12(2):180-181.
2. Theile DE, Scott IA, Martin JH, Gavrilidis A. Enabling the success of academic health science centres in Australia: where is the leadership? *Med J Aust*. 2014;201(11):636-638.
3. Washington AE, Coye MJ, Feinberg DT. Academic health centers and the evolution of the health care system. *Jama*. 2013;310(18):1929-1930.
4. Yu H. On academic health system. *Journal of evidence-based medicine*. 2013;6(2):71-73.

APPENDIX G. EVIDENCE TABLES

Author, year	Focus area/topic	Size of rollout Setting	Described hard-to- engage sites?	Hard-to- engage strategies?
SYSTEM (n=29)				
VA				
Blue-Howells 2013 ⁶⁷	Veterans Justice Programs (VJP) to address the needs of justice-involved veterans by offering services to veterans at multiple points in their involvement in the criminal justice system	National VA	No	No
Box 2009 ⁶⁸	Implementation of EMR for cardiac catheterization procedures called the Cardiovascular Assessment, Reporting and Tracking (CART) system	77 hospitals, national VA	No	No
Damschroder 2013 ⁶¹	MOVE! w8 management program	55 medical centers & 872 community-based outpatient clinics VA	Yes	No
Goetz 2008 ⁶⁹	A system-wide intervention to improve HIV-testing in the Veterans Health Administration	18 sites within southern Nevada, California VA	No	No
Mills 2003 ⁷⁰	Quality Interagency Coordination Task Force (QuIC) initiative to reduce medical errors	22 hospitals VA	No	No
Resnick 2007 ⁷¹	Supported employment for veterans	21 sites across the VA VA	No	No
Resnick 2009 ⁷²		166 VA medical centers VA	No	No
Rubenstein 2010 ⁷³	Implementation of Translating Initiatives in Depression into Effective Solution (TIDES) aimed to translate research-based collaborative care for depression	Medium-sized primary care practices within the VA VA	No	No

Author, year	Focus area/topic	Size of rollout Setting	Described hard-to-engage sites?	Hard-to-engage strategies?
Curran 2011 ⁷⁴	Implementation of collaborative care for depression in HIV clinics (HIV Translating Initiatives for Depression into Effective Solutions, HITIDES)	3 sites VA	No	No
Luck 2009 ⁷⁵	Implementation of Translating Initiatives in Depression into Effective Solution (TIDES) aimed to translate research-based collaborative care for depression	National VA	No	No
Sherman 2007 ⁷⁶	Implementation of Translating Initiatives in Depression into Effective Solution (TIDES) aimed to translate research-based collaborative care for depression	National VA	Yes	No
Smith 2008 ⁷⁷	Development of a national dissemination plan for collaborative care for depression	National VA	No	No
Yano 2015 ⁷⁶	The Collaborative Research to Advance Transformation and Excellence (CREATE) Initiative for comprehensive care for women veterans	National VA	No	No
Non-VA				
Best 2016 ⁷⁷	British Columbia Ministry of Health's Clinical Care Management (CCM) initiative, with particular focus on sepsis; surgical checklist and surgical site infection; and venous thromboembolism (VTE)	British Columbia National	No	No
Cheyne 2013 ⁷⁸	Keeping Childbirth Natural and Dynamic (KCND), a maternity care program that aimed to support normal birth by implementing multi-professional care pathways and making midwife-led care for healthy pregnant women the national norm	NHS, Scotland Scotland	Yes	Yes
Clarke 2014 ⁷⁹	The National Dementia Strategy for England	40 NHS sites UK	Yes	No

Author, year	Focus area/topic	Size of rollout Setting	Described hard-to-engage sites?	Hard-to-engage strategies?
Hendrich 2007 ⁸⁰	Ascension Health's "Healthcare That Works, Healthcare That is Safe, and Healthcare That Leaves No One Behind" with goal of zero preventable injuries or deaths	Ascension Health hospitals (65 sites) USA	No	No
Hung 2017 ⁸¹	LEAN redesign in clinic	All primary care in Sutter Health (13 sites) USA	Yes	No
Kellogg 2017 ⁸²	Tested a new method of intra-organizational process development and spread of quality improvement innovations	10 sites within North Shore Physicians Group USA	No	No
Lennon 2017 ⁸³	Delivering Assisted Living Lifestyles at Scale (dallas), a national digital health program	NHS UK	No	No
Liu 2016 ⁴⁸	Quality of sepsis care	Kaiser Permanente Northern California (21 hospitals) USA	No	No
Lorig 2004 ⁵⁹	The six-week peer-led Chronic Disease Self-Management Program	10 of 12 regions within Kaiser Permanente USA	Yes	Yes
Marshall 2014 ⁸⁴	Chronic obstructive pulmonary disease (COPD) quality improvement program	189 general practices in 4 Northeast London boroughs UK	Yes	No
Noyes 2014 ⁸⁵	Nurse-led implementation, optimization, and evaluation of a complex children's continuing-care policy	12 sites within the NHS UK	Yes	No
Ovseiko 2014 ⁸⁶	Health Innovation and Education Clusters (HIECS)	NHS UK	No	No

Author, year	Focus area/topic	Size of rollout Setting	Described hard-to-engage sites?	Hard-to-engage strategies?
Penna 2009 ⁴⁹	Implementation of a consultative model of interdisciplinary, inpatient-based palliative care (IPT)	7 of 8 regions, Kaiser Permanente USA	Yes	Yes
Psek 2015 ⁵⁰	Operationalizing the learning health care system (LHCS) in an integrated delivery system	Geisinger Health System (8 hospitals) USA	No	No
Robert 2011 ³⁷	The “Productive Ward,” a national quality improvement program	10 strategic health authorities (SHA), NHS UK	Yes	Yes
Schmittiel 2017 ⁸⁷	The Delivery Science Rapid Analysis Program (RAP)	Kaiser Permanente in Northern California USA	No	No
COLLABORATIVE (n=14)				
Azar 2015 ⁸⁸	Indiana University Center for Healthcare Innovation and Implementation Science (IU-CHIIS)	Indiana Clinical and Translational Sciences Institute, Regenstrief Institute, Inc., Indiana University School of Medicine, and their clinical healthcare partners USA	No	No
Boustani 2012 ⁵³	Indianapolis Discovery Network for Dementia (IDND)	5 health care systems in Indiana, including Regenstrief Institute, Inc., and Indiana University School of Medicine USA	No	No

Author, year	Focus area/topic	Size of rollout Setting	Described hard-to-engage sites?	Hard-to-engage strategies?
Cyr 2009 ⁸⁹	Intervention to reduce door-to-balloon (D2B) time for myocardial infarction	12 community hospitals within University of Massachusetts Memorial Health Care's service area USA	No	No
Duckers 2014 ⁹⁰	Quality improvement collaboratives (QIC) involvement to predict dissemination of projects within hospitals	24 hospitals the Netherlands	No	No
Elson 2013 ⁵²	Athena Breast Health Network	5 University of California health systems and cancer centers USA	No	No
Harris 2016 ⁵¹	Pediatric Rheumatology Care and Outcomes Improvement Network	17 sites USA & Canada	No	No
Johnson 2017 ⁹¹	Inflammatory Bowel Disease (IBD) Qorus learning health system	20 adult IBD care USA	No	No
Kwon 2012 ⁹²	Washington State's Surgical Care and Outcomes Assessment Program (SCOAP)	60 of 65 hospitals in State of Washington USA	No	No
Lannon 2013 ⁹³	Pediatric Collaborative Improvement Networks to improve pediatric subspecialty care	Multi-institution USA	No	No
Nolan 2005 ⁴	Advanced Clinic Access (ACA) initiative to reduce waiting times for patients	National VA	Yes	No
Ramsey 2017 ⁹⁴	ImproveCareNow Network to facilitate personalized medicine for children and adolescents with inflammatory bowel disease (IBD)	92 care centers USA, England, Qatar	No	No

Author, year	Focus area/topic	Size of rollout Setting	Described hard-to-engage sites?	Hard-to-engage strategies?
Rocker 2017 ⁹⁵	INSPIRED COPD outreach program	19 teams in 10 provinces Canada	No	No
Rogers 2014 ⁶⁰	The Society of Hospital Medicine's Glycemic Control Mentored Implementation (GCMI)	114 sites within Society of Hospital Medicine's network USA	Yes	No
van Schendel 2017 ⁹⁶	Non-invasive prenatal testing (NIPT) for aneuploidy in prenatal healthcare	National (8 medical centers) the Netherlands	Yes	No
INITIATIVE-SPECIFIC (n=9)				
Clark 2014 ⁵⁵	State-wide clozapine management system	Adelaide metropolitan area South Australia	No	No
Gardner 2010 ⁶²	The Audit and Best Practice for Chronic Disease (ABCD) project	12 indigenous primary health care services in the Northern Territory of Western Australia	Yes	Yes
Grayson 2011 ⁹⁷	Australian National Hand Hygiene Initiative (NHHI); infection control initiatives	521 hospitals Australia	No	No
Lustig 2016 ⁶³	Measure Up/Pressure Down hypertension control campaign	Summit Medical Group (SMG) and Cornerstone Health Care (CHC) USA	Yes	Yes
McMullen 2015 ⁹⁸	HIV testing	40 of 45 practices in a London borough the UK	Yes	No

Author, year	Focus area/topic	Size of rollout Setting	Described hard-to-engage sites?	Hard-to-engage strategies?
Parv 2016 ⁹⁹	A national e-prescription service	National Estonia	Yes	No
Patel 2016 ⁶⁵	HPV vaccination program	23 provinces Argentina	Yes	Yes
Pearce 2014 ¹⁰⁰	Personally controlled electronic health record (PCEHR)	74 practices across metro Melbourne Australia	Yes	No
Septimus 2016 ⁵⁴	Implementation of universal decolonization to reduce healthcare associated Central line-associated bloodstream infections (CLABSI)	136 ICUs in 95 hospitals affiliated with Hospital Corporation of America USA	No	No