

**The effects of the process, determinants, and interventions of implementation
and provider adherence on implementation and adherence outcomes:
a meta-review**

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Key points:

- **Question:** This meta-review asks: what are the process and determinants of implementation and adherence and the interventions that improve these in health systems compared with usual care or an active comparator.
- **Findings:** There are no systematic reviews or meta-analyses of the process, determinants, and interventions that effect implementation at the system level or provider adherence to guidelines at the provider level; there are only scoping reviews or systematic reviews that assess clinical outcomes.
- **Meaning:** Work is also needed to evaluate the quality of primary and scoping review evidence on processes and determinants of implementation and adherence and understand how to best use the evidence to optimize implementation and adherence outcomes.

Abstract

Importance: Implementation is the adoption, use, and sustained use of interventions in healthcare systems and is the starting point for action. It facilitates provider initiation, use, and sustained use of evidence, guidelines, and interventions in practice (i.e. provider adherence).

Objective: This meta-review seeks to optimize the effects of implementation and provider adherence by delineating the process and determinants of implementation and adherence and the interventions that improve these in health systems compared with usual care or an active comparator.

Evidence Review: We searched Medline 1966-2026 using search terms for implementation, sustainability, and guideline adherence with limits or keywords to identify processes, determinants, and interventions. We included systematic reviews and meta-analyses that included the outcomes of implementation and adherence. We dually reviewed articles for inclusion and dually abstracted data for analysis. We did not conduct meta-analysis given the paucity of data, including quantitative data on the strength of association of determinants and interventions on implementation and adherence outcomes.

Findings: We found no studies that met our inclusion criteria on the process, determinants, or interventions of implementation or provider adherence to guidelines. We identified, but did not include two systematic reviews of provider adherence to guidelines (one because it addressed only clinical outcomes and did not allow direct assessment of effects on provider adherence and the other because the majority of included studies were poor quality). We also did not include several scoping reviews of implementation determinants (given their lack of quality assessments).

Conclusions and Relevance : This review conceptually distinguishes implementation and provider adherence and provides insight that most work in implementation and provider adherence has not been summarized in ways that allow assessment of the strength of evidence. Additional work is needed to optimize evidence for best effect.

Registration: Prospero #819055532

Keywords: implementation science, sustainability, guideline adherence

Background

Implementation is the adoption, use, and sustained use of interventions in healthcare systems and is the starting point for action. It facilitates provider adherence to evidence, guidelines, and interventions in practice.

To be most effective, researchers need to have a high degree of clarity about what implementation is and how to optimize its effects. Researchers need to distinguish between system level adoption and use of evidence, guidelines, and interventions at the system level and physician adherence to (i.e. initiation, use, and sustained use of) guidelines at the provider level ¹. They also need to choose and use the best evidence, including evidence that optimizes the process, determinants, and interventions for implementation and adherence. (see Figure 1)

This meta-review seeks to optimize the effects of implementation and provider adherence to guidelines by delineating the process and determinants of implementation and adherence and the interventions that improve implementation and adherence compared with usual care or another active intervention in healthcare settings. It is registered at Prospero (id #819055532).

Methods

Searches

To identify a search strategy, we reviewed the MESH indexing of key articles identified by our research team.

To identify articles on implementation, we searched Medline from 1966 to 2-16-2026 using MESH terms including implementation science, sustainability, and provider adherence to guidelines. For processes, we examined the intersection of MESH searches and keyword searches including process, barriers, and facilitators. For interventions, we limited MESH searches to systematic reviews and meta-analyses. A single reviewer (DJ) hand-searched included articles.

Inclusion/exclusion

Three reviewers (DJ, GGB, and SLS) reviewed titles, abstracts, and articles for inclusion.

Articles were included based on a priori, differential criteria for processes, determinants, and intervention (see online supplement). Briefly, we included English-language systematic reviews and meta-analyses that addressed system level implementation of any type of healthcare evidence or intervention and provider adherence to these. Articles had to include the outcomes of implementation and/or adherence.

Data extraction

For all articles, we abstracted a core set of information including the research question, study design and included studies, and the study setting. We then abstracted additional data that specially addressed processes, determinants, or interventions (see online supplement).

Risk of bias/strength of evidence

We assessed risk of bias using AMSTAR criteria ² using reviewer assessments rather than a specific threshold for assessing the risk of bias of studies. We planned to assess strength of evidence ³ based on risk of bias, directness of evidence, precision, and consistency.

Synthesis

We planned to synthesize results quantitatively if possible, and narratively if not.

Results

The PRISMA diagram in Figure 2 shows search results. On implementation, we identified 0 articles on process, 0 on determinants, and 0 interventions. On physician adherence to guidelines, we identified 0 articles on process, 0 on determinants, and 0 on interventions that met our inclusion criteria. We identified, but did not include two systematic reviews of provider adherence to guidelines (one because it addressed only clinical outcomes and did not allow direct assessment of effects on provider adherence and the other because the majority of included studies were poor quality)^{4,5}. We also did not include several scoping reviews of implementation determinants (given their lack of quality assessments).

Risk of bias and Strength of evidence

No studies were included, thus we report no risk of bias.

Implementation effectiveness

We identified no systematic reviews or meta-analyses of the process, determinants, or interventions affecting adoption, use, and sustained use of evidence, guidelines, tools, and processes.

Provider adherence to guidelines effectiveness

We identified no systematic reviews of the process of physician adherence to guidelines or systematic reviews or meta-analyses of the determinants or interventions of physician adherence to guidelines.

Discussion

In this meta-review of the process, determinants, and interventions addressing implementation and provider adherence to guidelines, we found no studies meeting our inclusion criteria that addressed system and clinical level implementation or the process, determinants, and interventions of provider guideline adherence.

177 These findings must be interpreted in the broader context of the literature, which based on our searches
178 includes primary evidence⁶, multiple scoping reviews⁷⁻¹², and a systematic review focused on clinical
179 rather implementation and adherence outcomes⁴. Our brief review of this literature suggests that there
180 is a complex interplay of processes, determinants, and interventions that need to be used to effect
181 implementation and adherence outcomes. For instance, an expert-developed process model for
182 implementation suggests a process of strategizing about the goals and potential challenges of
183 implementation, selecting interventions, developing an implementation plan, engaging stakeholders, and
184 implementing interventions⁶. Further, scoping reviews of implementation determinants suggest the
185 need to intervene on innovation, system, provider and patient characteristics; processes; resources; and
186 the wider environment to effect optimal outcomes. Additionally, a review of adherence determinants
187 suggest the need to reconcile conflicting guidelines^{7,8}; raise awareness of guidelines; provide knowledge,
188 attitudes, self-efficacy, and habits for guideline use and adherence; reconcile patient preferences; and
189 address environmental factors, if any¹³. Interventions then need to be targeted at both implementation
190 and adherence processes and determinants to effect outcomes.

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192 Moving forward, there are major gaps and methodological issues that should be addressed to optimize
193 outcomes. Perhaps the most important gap is a lack of systematic reviews and meta-analyses on system
194 and clinic level implementation. Other key considerations as the literature is developed include
195 optimizing the design of evidence (Figure 3), comparing interventions to each other, focusing on a
196 complete set of outcomes (e.g. implementation, adherence, clinical outcomes), and replicating studies to
197 ensure there are a sufficient number to ascertain consistency of effect. Other critical challenges will
198 include identifying effects in sufficiently representative samples, understanding the quantitative effects
199 of determinants on outcomes, and understanding the full set of interventions necessary to get to
200 adequate (>80%) implementation and adherence.

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202 Key steps moving forward include 1) defining the ideal processes for implementation and adherence in
203 representative settings and samples using insights from both process models and intervention
204 taxonomies; 2) quantifying the relative importance and explanatory power of determinants of
205 interventions and adherence, 3) aligning interventions with processes and determinants, and 4) testing
206 the comparative and additive effects of interventions on implementation and adherence on a full
207 spectrum of outcomes that might optimize care (e.g. implementation, behavioral intermediates,
208 adherence, clinical outcomes). Taking these steps is likely not only to optimize interventions, but also to
209 optimize the effects of interventions in practice, particularly if optimized interventions tested in
210 representative samples obviate the need for adaption.

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213 **Limitations**

214 In considering this information, it is important to consider the limitations of this work. These include 1)
215 searches in a single database; 2) inclusion of only systematic reviews and meta-analyses; 3) lack of
216 examination of potential implementation harms, and 4) lack of a specific threshold criteria for determining
217 the degree of bias in synthesized evidence using AMSTAR criteria. Given the negative results of this
218 review, we considered broadening our inclusion criteria to include scoping reviews. However, we decided
219 to honor registration, reporting, and appraisal guidelines that suggest that the quality of scientific work
220 is, in part, dependent on a priori specification of the work.

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Conclusions

Despite limitations, we believe this review contributes important information by improving the conceptual clarity of implementation and its relationship to provider adherence to guidelines and by identifying and highlighting key gaps for optimized evidence. More work is needed to generate evidence on the effects of system level implementation and provider adherence to these. Further, work is needed to ensure that conclusions are drawn from representative samples with optimal methods. At present, the evidence is insufficient. The most efficient route forward would be secondary analyses of scoping reviews to determine the quality of included studies.

Figures:

Figure 1: The process, determinants, and interventions of implementation and adherence

Figure 2: Prisma diagram

Figure 3: Optimizing the evidence for process, determinants, and interventions

241 **Declarations**

- 242 • **Ethics approval and consent to participate**
- 243 • **Consent for publication**
- 244 • **Availability of data and materials**
- 245 • **Competing interests**
- 246 • **Funding**
- 247 • **Authors' contributions**
 - 248 ○ **Conceptualization:** S. Sheridan
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 - 254 ○ **Supervision (alphabetical order):** Jonas, S. Sheridan,
 - 255 ○ **Funding acquisition (alphabetical order):** S. Sheridan, Vetter
- 256 • **Acknowledgements**
- 257 • **Authors' information (optional)**

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259 **Ethics approval:** Not applicable

260 **Consent for publication:** Not applicable

261 **Availability of data and materials:** review materials and tables are available in appendix

Competing interests: Mike Pignone is an editor at Implementation Science. This team works for Reaching for High Value Care, a for-profit business focused on high value health care that includes work on implementation.

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Figure 1. The process, determinants, and interventions for implementation and adherence

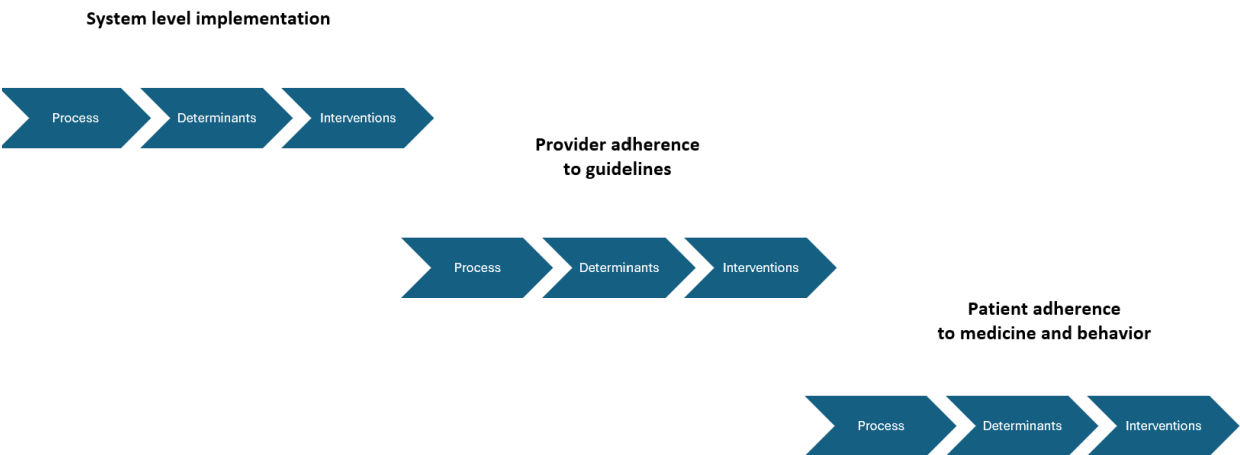


Figure 2: Articles reviewed for inclusion/exclusion

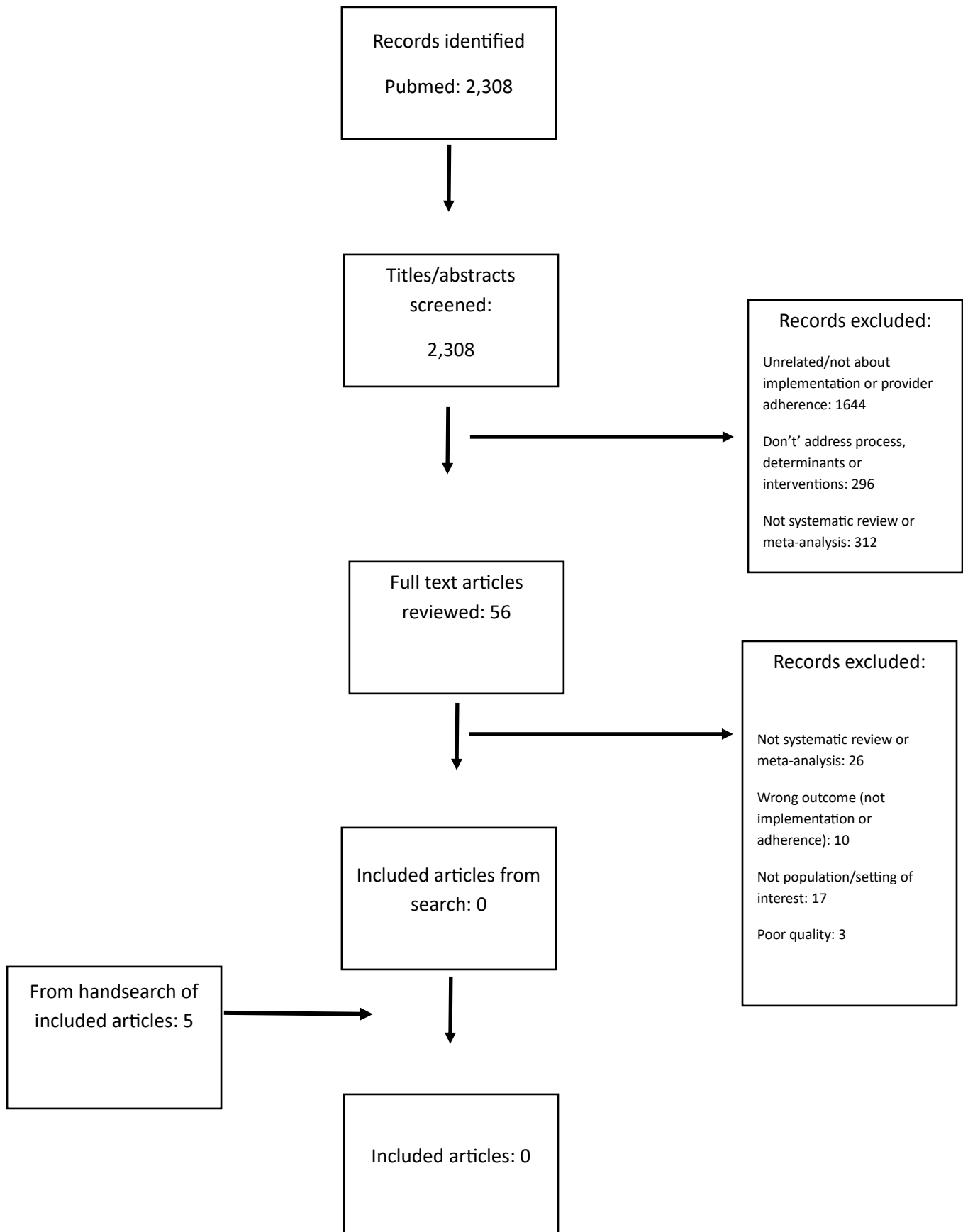
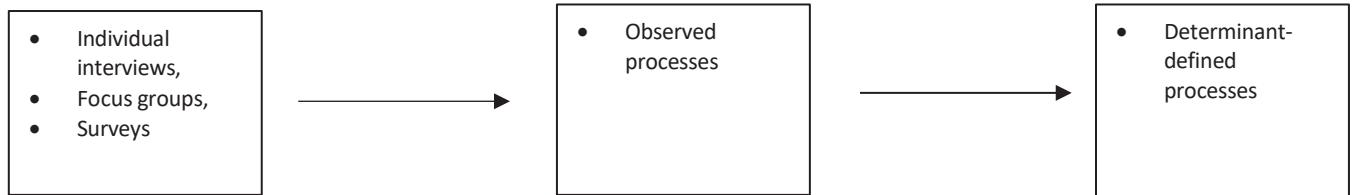
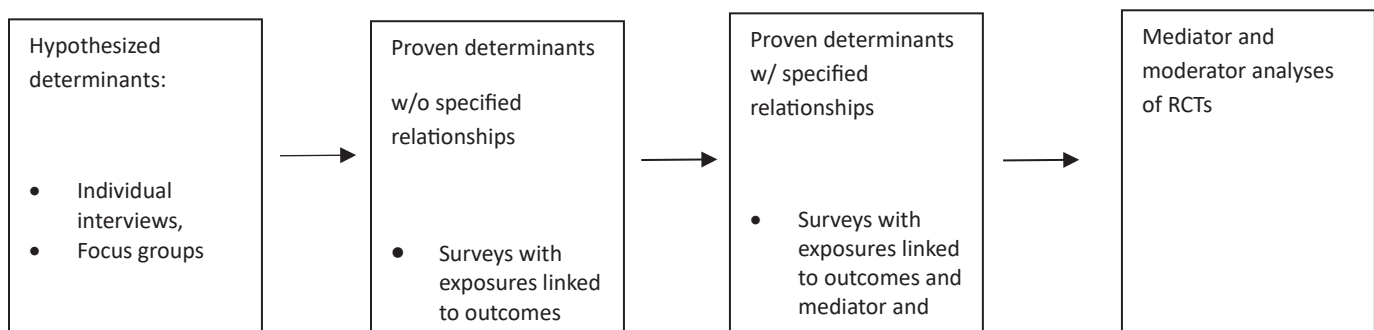


Figure. Optimizing the evidence on process, determinants, and interventions

a. Optimizing processes



b. Optimizing determinants



c. Optimizing interventions

