Finding the Effectiveness of Implementation Strategies: Discussion of a systematic review

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Agenda

1. The problem
2. Methods
3. Results
4. Conclusion

Disclosures

LauraEllen Ashcraft

Matt Chinman

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SYSTEMATIC REVIEW   **Open Access**

A systematic review of experimentally tested implementation strategies across health and human service settings: evidence from 2010-2022

Laura Ellen Ashcraft[1,2*], David E. Goodrich[3,4,5], Joachim Hero[6], Angela Phares[3], Rachel L. Bachrach[7,8], Deirdre A. Quinn[3,4], Nabeel Qureshi[6], Natalie C. Ernecoff[6], Lisa G. Lederer[5], Leslie Page Scheunemann[9,10], Shari S. Rogal[3,11†] and Matthew J. Chinman[3,4,6†]

The problem

The problem

- Implementation strategies are methods and techniques that help support evidence-based practices
- Existing evidence for implementation strategies is focused on specific strategies or settings
- Heterogeneity in study design, methods, and measurement has made it challenging to synthesize the literature

Aims

- What implementation strategies have been most commonly and rigorously tested in health and human service settings?

- Which implementation strategies were commonly paired?

- What is the evidence supporting commonly tested implementation strategies?

Methods

Inclusion Criteria

1. Available in English
2. Published between January 1, 2010 and September 20, 2022
3. Based on experimental research
4. Set in a health or human service context

Inclusion Criteria, continued

5. Evaluated the impact of an implementation strategy that could be classified using the ERIC taxonomy
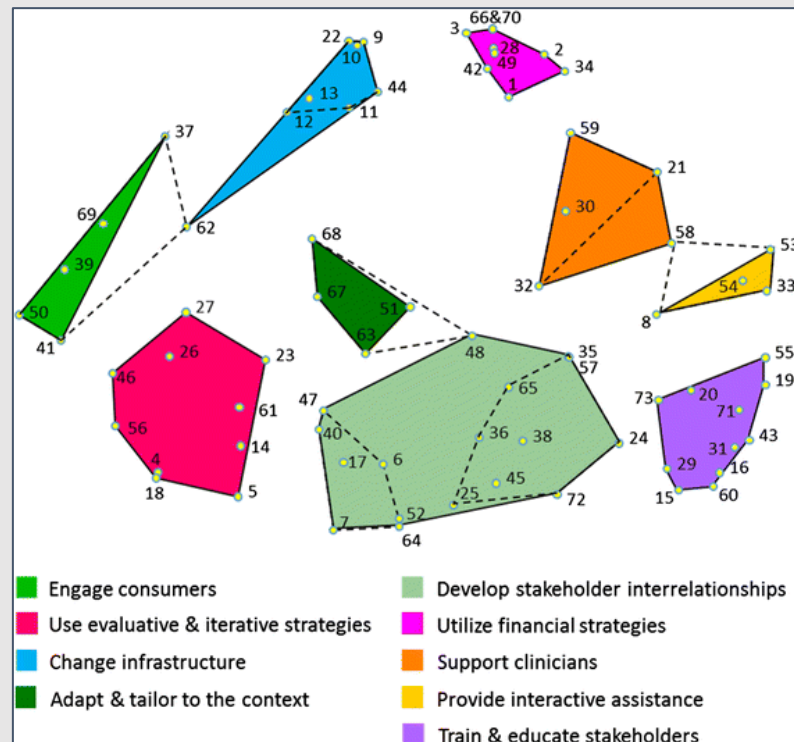
Expert Recommendations for Implementing Change (ERIC) Implementation Strategies

- Powell BJ, Waltz TJ, Chinman MJ, Damschroder LJ, Smith JL, Matthieu MM, Proctor EK, Kirchner JE. A refined compilation of implementation strategies: results from the Expert Recommendations for Implementing Change (ERIC) project. Implementation science. 2015 Dec;10:1-4.

- Waltz TJ, Powell BJ, Matthieu MM, Damschroder LJ, Chinman MJ, Smith JL, Proctor EK, Kirchner JE. Use of concept mapping to characterize relationships among implementation strategies and assess their feasibility and importance: results from the Expert Recommendations for Implementing Change (ERIC) study. Implementation Science. 2015 Dec;10:1-8.

Inclusion Criteria, continued

6. Tested at least one quantitative outcome that could be mapped to the RE-AIM evaluation framework

RE-AIM Outcomes

- Glasgow RE, Vogt TM, Boles SM. Evaluating the public health impact of health promotion interventions: the RE-AIM framework. Am J Public Health. 1999 Sep;89(9):1322-7. doi: 10.2105/ajph.89.9.1322. PMID: 10474547; PMCID: PMC1508772.

- Gaglio B, Shoup JA, Glasgow RE. The RE-AIM framework: a systematic review of use over time. American journal of public health. 2013 Jun;103(6):e38-46.

- Holtrop JS, Estabrooks PA, Gaglio B, et al. Understanding and applying the RE-AIM framework: Clarifications and resources. *Journal of Clinical and Translational Science*. 2021;5(1):e126. doi:10.1017/cts.2021.789

Information Sources

- Academic databases (i.e., CINAHL, PubMed, and Web of Science for replicability and transparency)

- Recommendations from expert implementation scientists

- Assessing existing, relevant systematic reviews and meta-analyses

Assessment of Study Rigor

Rigor scores ranged from 0-8

1. Presence of a concurrent comparison or control group
    *   =2 for traditional randomized controlled trial or stepped wedge cluster randomized trial
    *   =1 for pseudo-randomized and other studies with concurrent control

2. EBP standardization by protocol or manual

3. EBP fidelity tracking

4. Implementation strategy standardization by operational description, standard training, or manual

5. Length of follow-up from full implementation of intervention
    *   =2 for twelve months or longer
    *   =1 for six to eleven months,
    *   =0 for less than six months

6. Number of sites
    *   =1 for more than one site

1. Miller WR, Wilbourne PL. Mesa Grande: a methodological analysis of clinical trials of treatments for alcohol use disorders. Addict Abingdon Engl. 2002;97:265–77.
2. Miller WR, Brown JM, Simpson TL, Handmaker NS, Bien TH, Luckie LF, et al. What works? A methodological analysis of the alcohol treatment outcome literature. Handb Alcohol Treat Approaches Eff Altern 2nd Ed. Needham Heights, MA, US: Allyn & Bacon; 1995:12–44.
3. Wells S, Tamir O, Gray J, Naidoo D, Bekhit M, Goldmann D. Are quality improvement collaboratives effective? A systematic review BMJ Qual Saf. 2018;27:226–40.
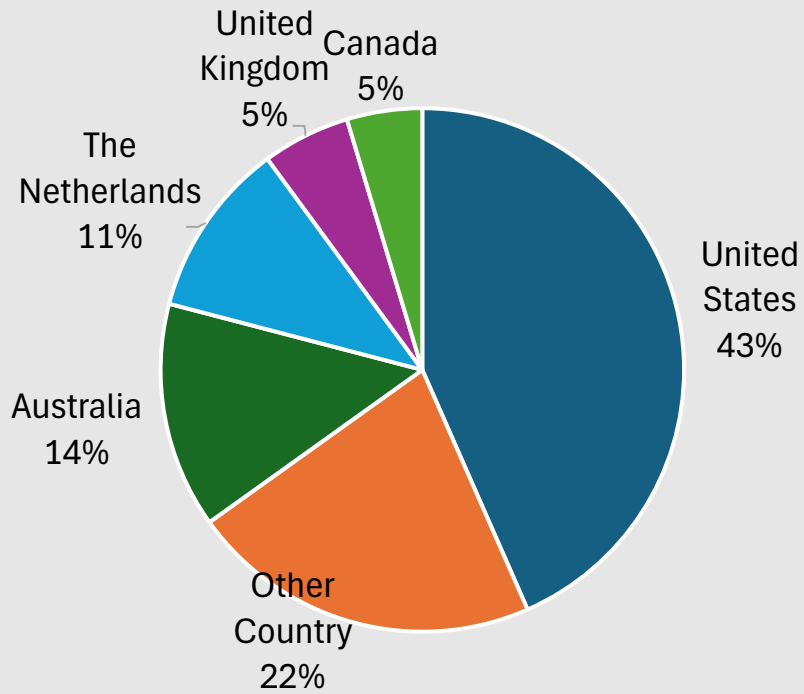
Updated Implementation Strategies

#	ERIC Implementation Strategies	2024 Implementation Strategies
Use evaluative and iterative strategies		
27	Develop and organize quality monitoring systems	Included in Develop Implementation tools for Quality Monitoring
New		Assess and redesign workflows
Provide interactive assistance		
33	Provide Implementation Facilitation	Broken into Internal Facilitation and External Facilitation
New		Internal Facilitation
New		External Facilitation
New		Create an online learning community
Develop stakeholder interrelationships		
25	Develop an implementation glossary	Included in Distribute Educational Materials
65	Use an implementation advisor	Included in Implementation Facilitation (Internal & External)
New		Engage community resources outside the practice
Train and educate stakeholders		
29	Develop educational materials	Included in either Conduct Educational Meetings or Distribute Educational Materials
73	Work with educational institutions	Included in Develop Academic Partnerships
Change infrastructure		
11	Change physical structure and equipment	Included in Change Record Systems
22	Create or change credentialing and/or licensure standards	Included in Change Record Systems

Results

Study Characteristics

Study Countries

Area of health or healthcare
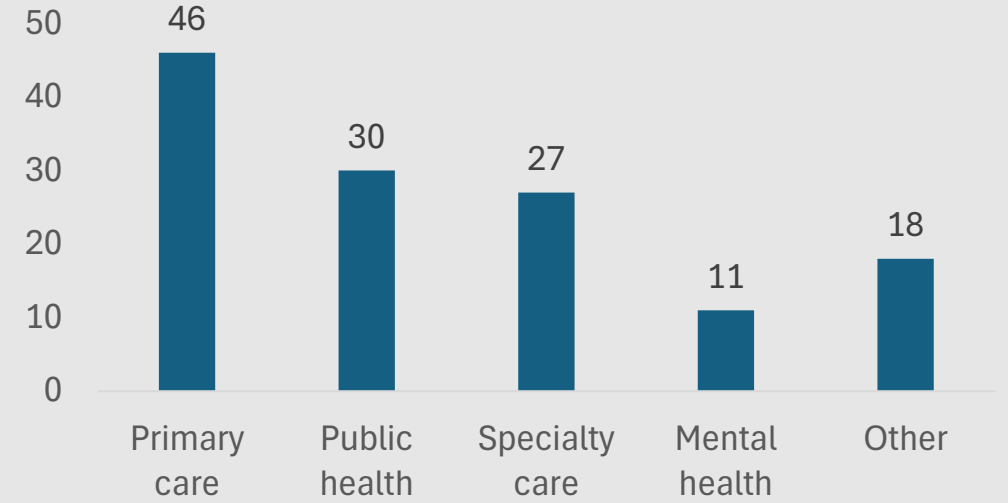
Pie chart — Study Countries:
- United States 43%
- Other Country 22%
- Australia 14%
- The Netherlands 11%
- United Kingdom 5%
- Canada 5%

Bar chart — Area of health or healthcare (Setting):
- Primary care: 46
- Public health: 30
- Specialty care: 27
- Mental health: 11
- Other: 18
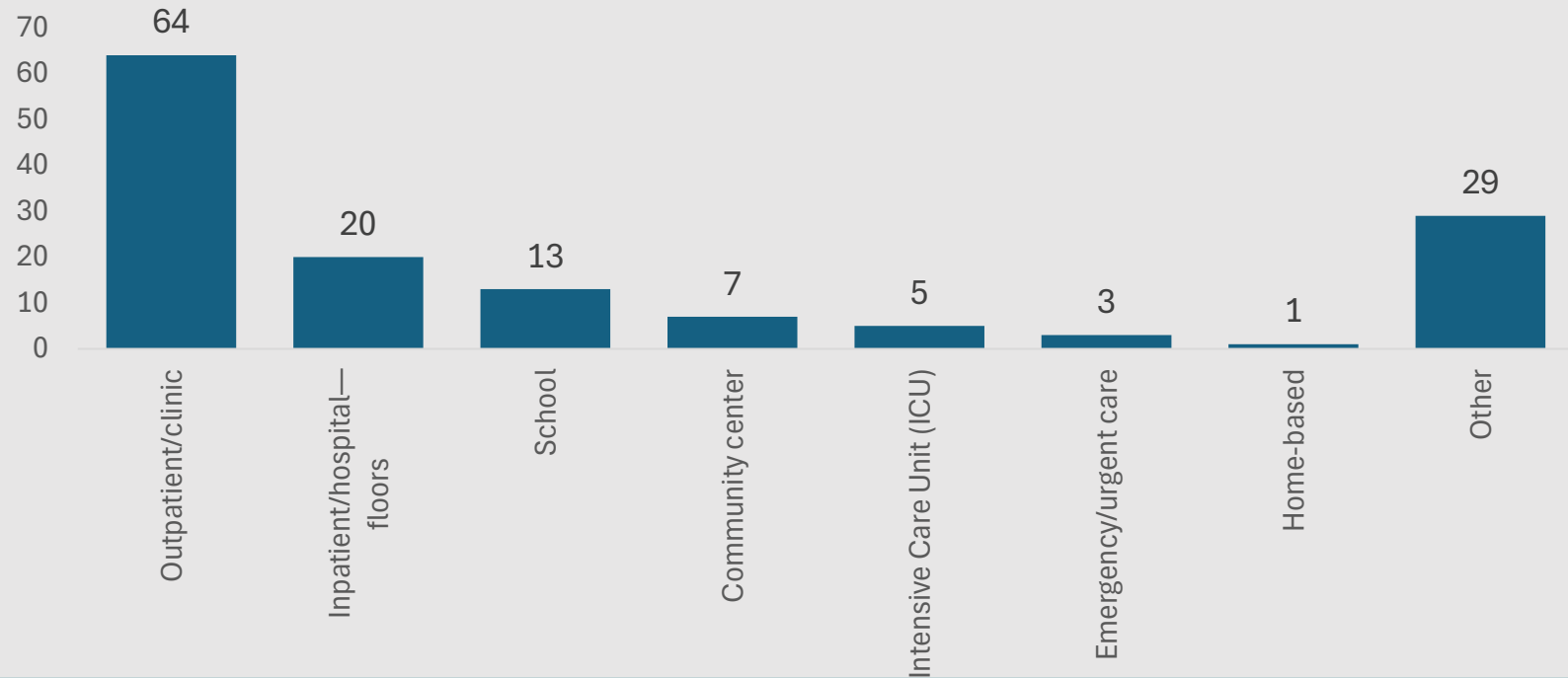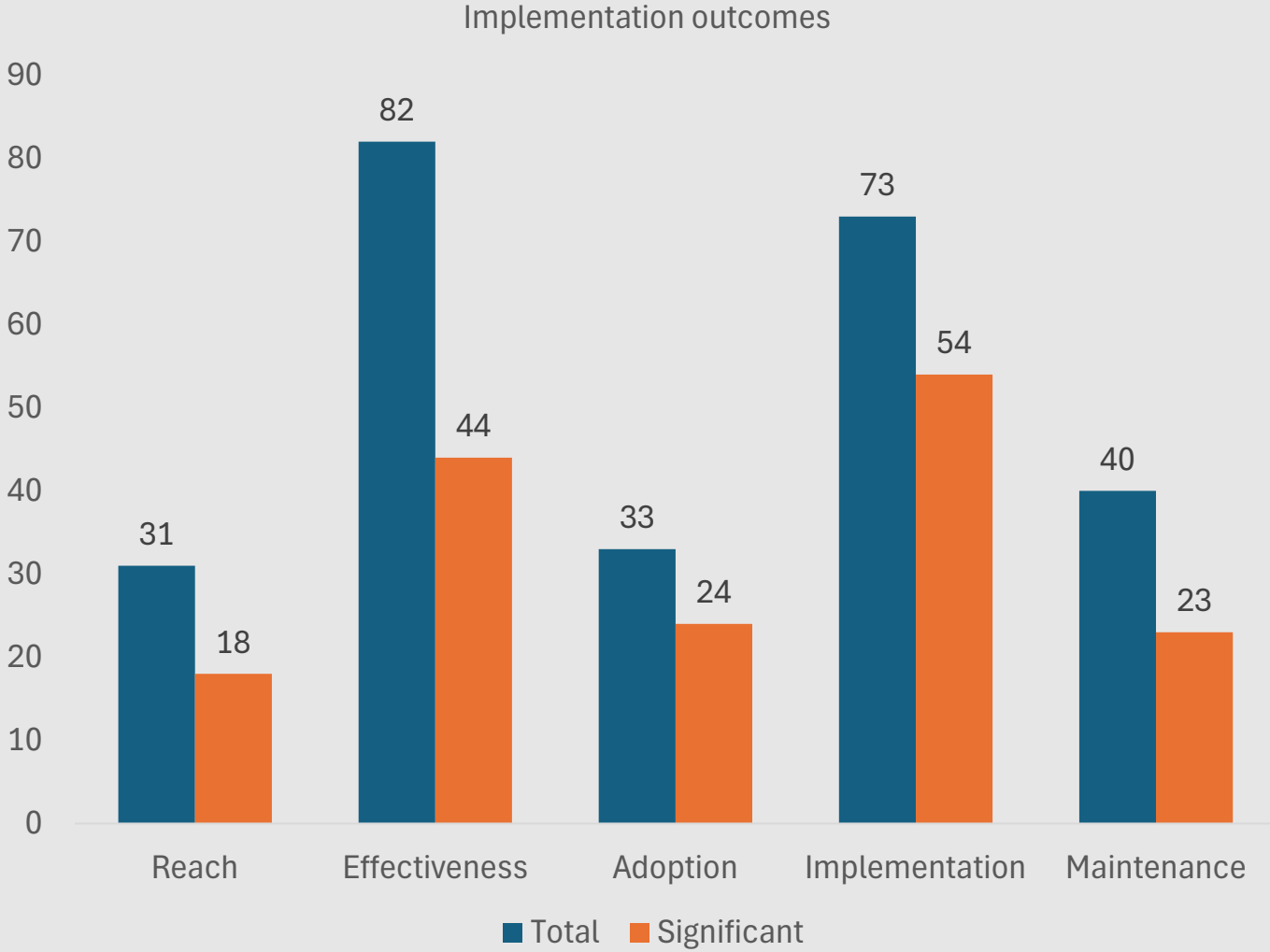
Bar chart — Setting:
- Outpatient/clinic: 64
- Inpatient/hospital—floors: 20
- School: 13
- Community center: 7
- Intensive Care Unit (ICU): 5
- Emergency/urgent care: 3
- Home-based: 1
- Other: 29

Top 10 most frequently used ERIC implementation strategies
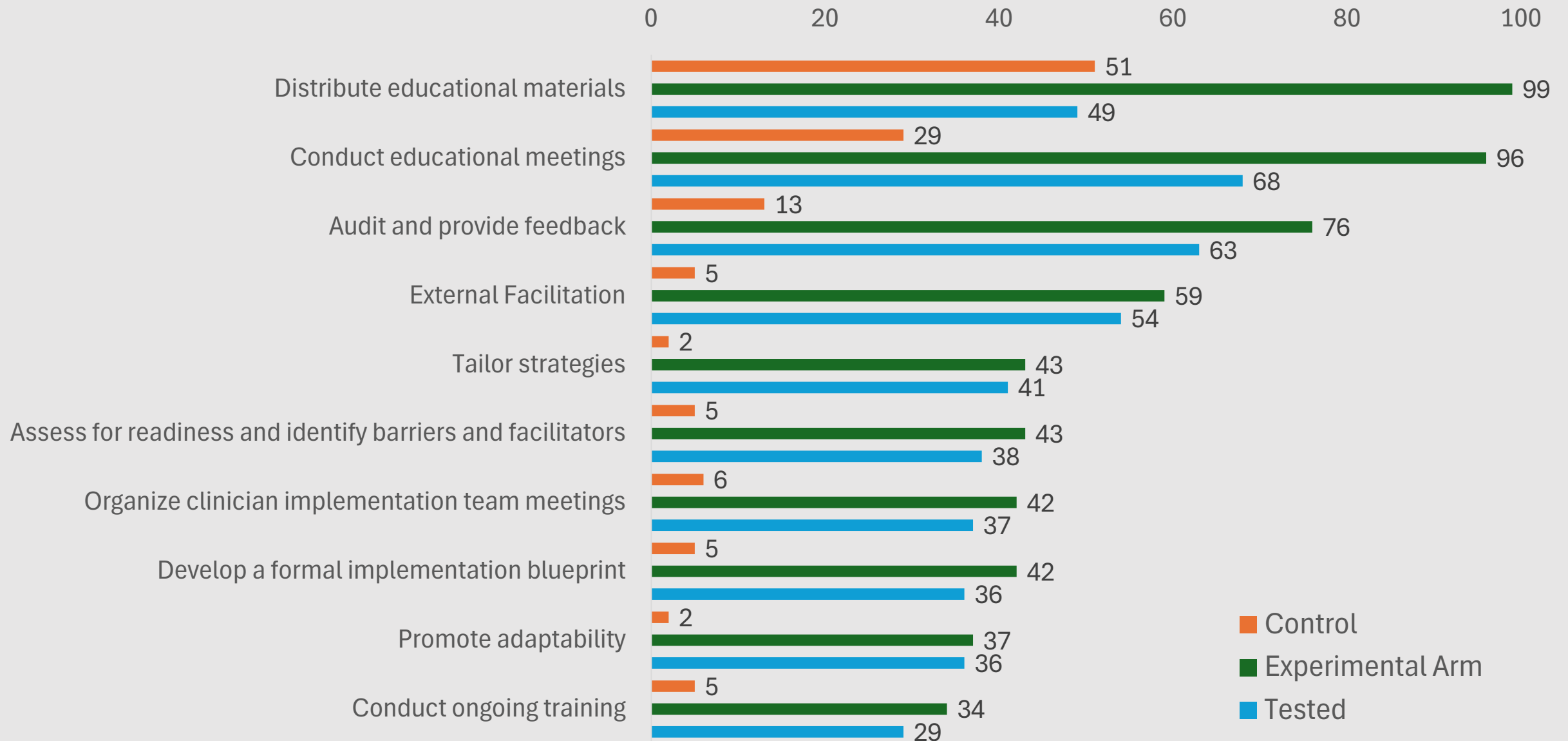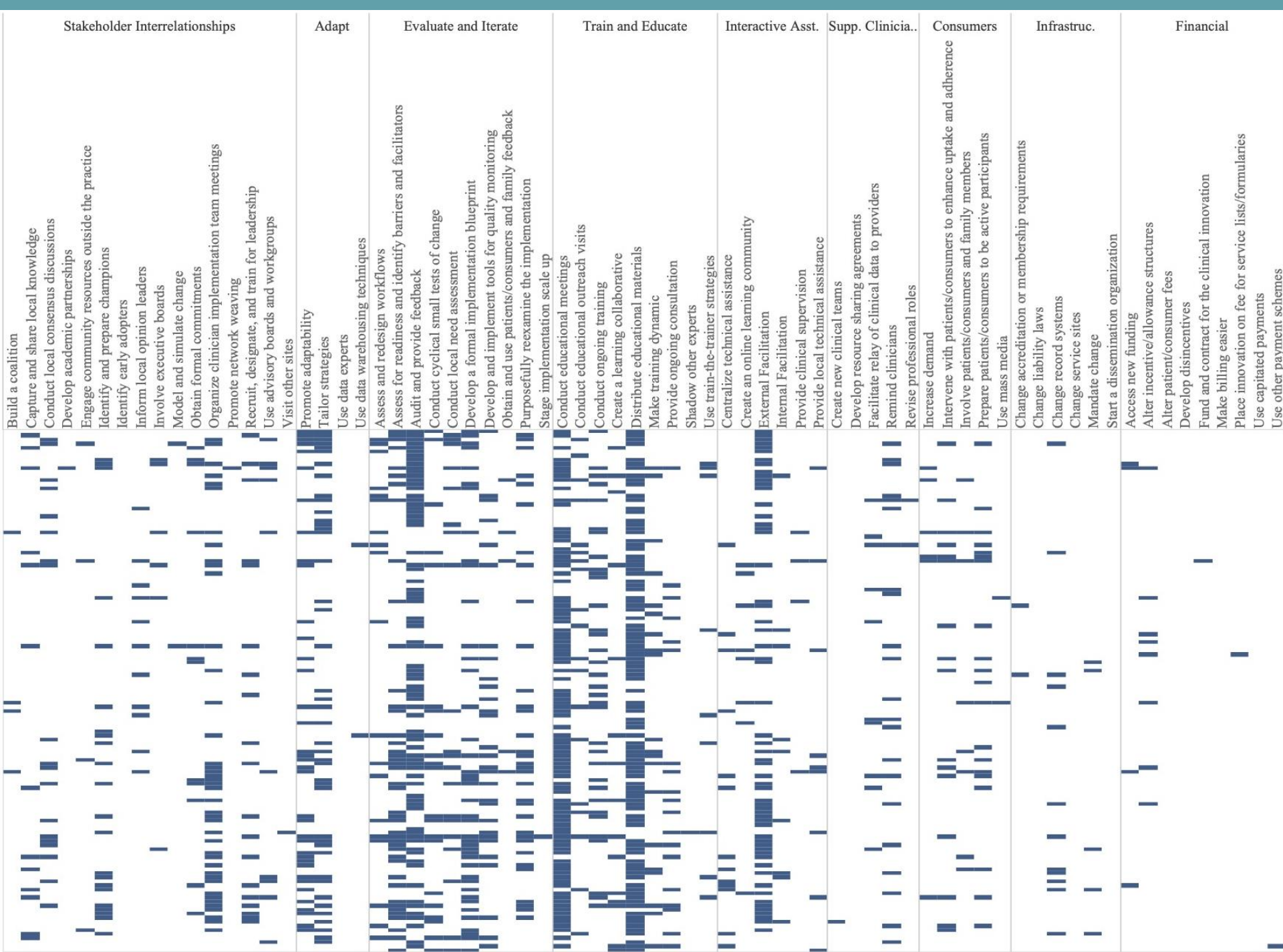
Strategy clusters of Train & Educate and Evaluate & Iterate were most common.

Interactive visualization linked here!

Educational strategies are very often paired with other implementation strategies.

Interactive visualization linked here!

Implementation Strategy	Audit and provide feedback^ [76 studies]	External Facilitation^ [59 studies]	Tailor Strategies [43 studies]	Assess for readiness and identify barriers and facilitators^ [43 studies]	Organize clinician implementation team meetings [42 studies]
Distribute educational materials^	57	48	36	36	35
Conduct educational meetings^	55	52	33	39	36
Audit and provide feedback^	0	38	27	28	22
External Facilitation^	38	0	27	30	31
Tailor strategies	27	27	0	25	19
Assess for readiness and identify barriers and facilitators^	28	30	25	0	22
Organize clinician implementation team meetings	22	31	19	22	0
Develop a formal implementation blueprint	24	27	20	25	26
Promote adaptability	22	22	19	22	19
Conduct ongoing training	15	20	15	15	15
Purposefully reexamine the implementation^	27	24	15	24	20
Develop and implement tools for quality monitoring^	22	13	10	14	13
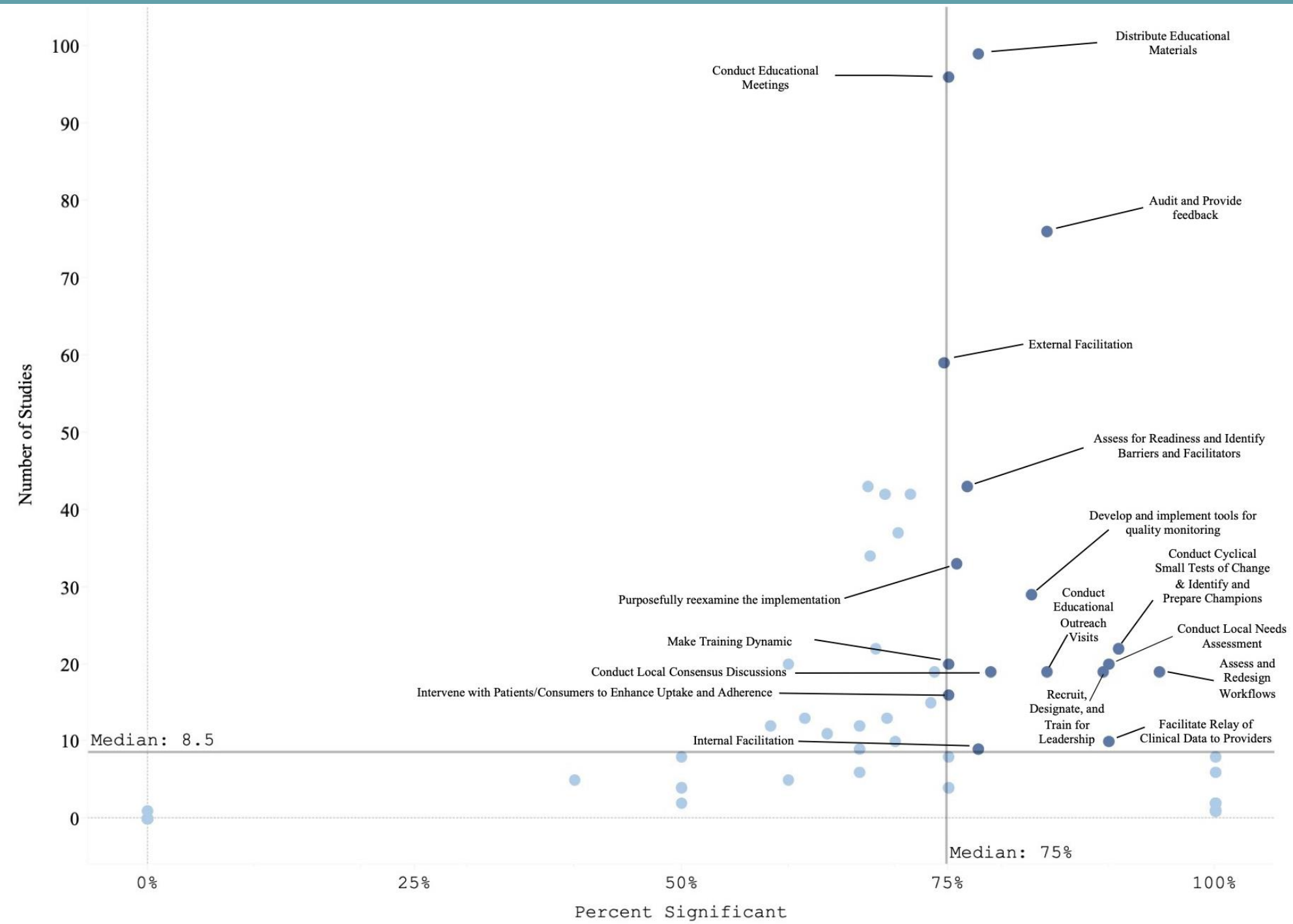
Educational, evaluative, and infrastructure-based strategies had the most evidence of impact.

Interactive visualization linked here!

The number of significant outcomes (dark blue) and non-significant outcomes (teal) among the 19 top-right strategies.

Interactive visualization linked here!
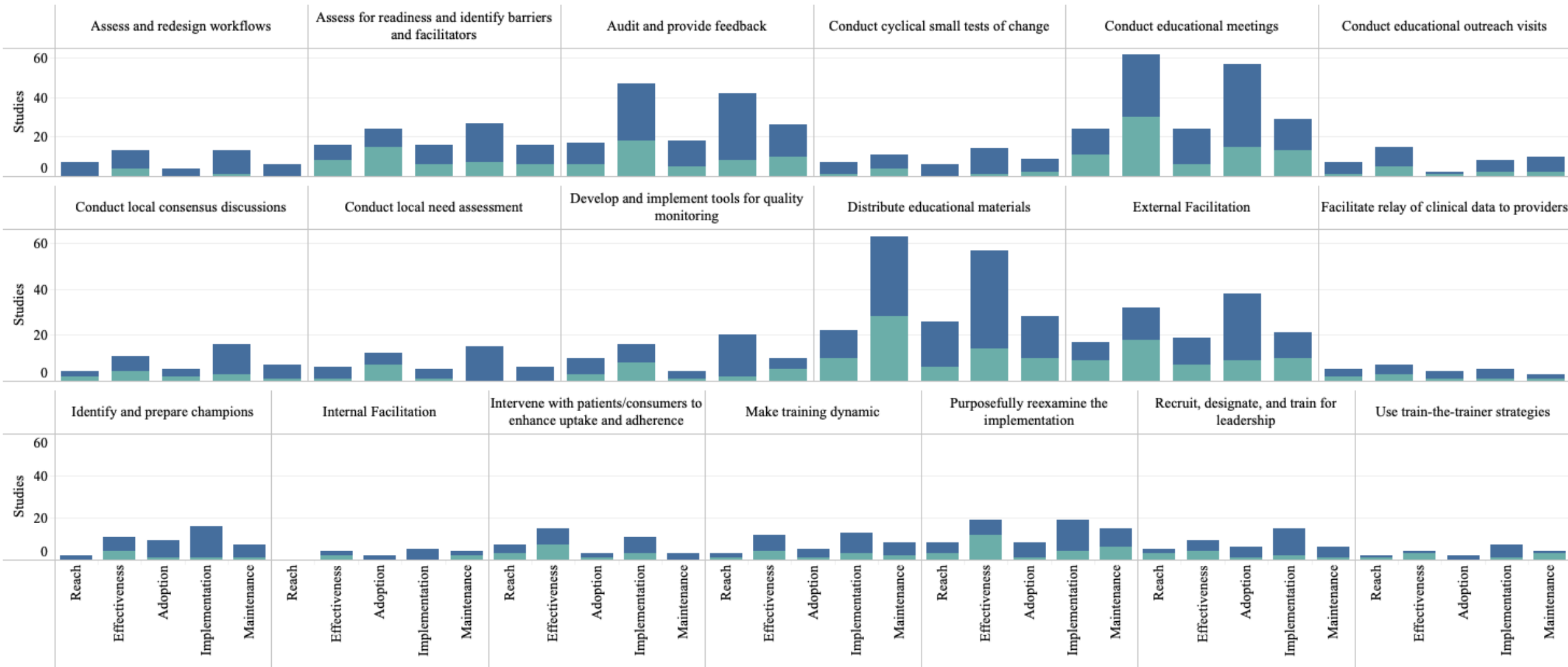
Discussion

Summary of results

- We identified 129 studies (143 articles) that assessed the effectiveness of implementation strategies

- Most implementation strategies lack evidence

- Definitions and operationalization of strategies vary widely

- 19 strategies were in more than 8 studies and co-occurred with positive results in at least 75% of those studies

Limitations

- We only included experimental studies
- Time frame around that of *Implementation Science*
- Used ERIC as an anchor
- Search terms may have missed some studies
- Unable to assess bias due to heterogeneity

Observations

- Preparatory or pre-implementation strategies and strategies for site assessment had strong evidence
  - Educational Meetings, Educational Materials, Outreach visits, Training for Leadership, Use Train the Trainer Strategies
  - Assess for Readiness, Identify Barriers and Facilitators, Conduct Local Needs Assessment, Identify and Prepare Champions, and Assess and Redesign Workflows

- Implementation phase strategies also had strong evidence
  - External and Internal Facilitation, Intervene with Patients to Enhance Uptake and Adherence, Audit and Provide Feedback, Facilitate the Relay of Clinical Data to Providers, Purposefully Reexamine the Implementation, Conduct Cyclical Small Tests of Change, Develop and Implement Tools for Quality Monitoring

Observations, cont.

- 10 strategies were not used in any studies
- Lack of distinction between intervention/ "the thing" and the strategies likely excluded some studies
- Many combinations of strategies used in the Experimental Arm
- Implementation strategy bundles made assessing the effectiveness of individual strategies impossible

Recommendations

1. Prespecify strategies using standard nomenclature
2. Ensure that standards for measuring and reporting implementation outcomes are consistently applied and account for the complexity of implementation studies.
3. Develop infrastructure to learn cross-study lessons in implementation science.
4. Develop and apply methods to rigorously study common strategies and bundles.

Thank you!

Extra slides

Search Strategy

Databases: PubMed and CINAHL
Fields: Title or Abstract fields
Language: English
Dates 2010-2022
"implementation strateg*" OR "implementation interventio*" OR "implementation bundl*" OR "implementation support*"

Database: Web of Science
Language: English
Dates: 2010-2022
Indexes: SCI-EXPANDED, SSCI, A&HCI, ESCI.
TOPIC: ("implementation strategies") OR **TOPIC:** ("implementation strategy") OR **TOPIC:** ("implementation intervention") OR **TOPIC:** ("implementation interventions") OR **TOPIC:** ("implementation bundles") OR **TOPIC:** ("implementation bundle") OR **TOPIC:** ("implementation support") OR **TOPIC:**("implementation supports")

PRISMA Flow Chart

Search & Identification of articles
Search of academic databases
Web of Science= 6,506
CINAHL= 3,032
PubMed= 5,108
Total = 14,646

Outside Expert Recommendations
Solicit recommended publications from international experts

Expert Recommendations: 17

Systematic Reviews
Review references included in systematic reviews for eligible publications

Systematic Reviews: 1,942

Total = 1,959

Total before duplicates removed= 16,605

Records removed before screening:
Duplicate records (=n = 7,206)

Title and Abstract Screening process
Review each title and abstract against eligibility criteria in pairs with conflicts reviewed by senior team member
Records screened: (n = 9,399)

Excluded in abstract review: (n = 7,973)

Full Text Screening
Review each full text manuscript against eligibility criteria in pairs with conflicts reviewed by senior team member
Full text review (n = 1,426)

Excluded in full text review: (n = 809)

Reports assessed for eligibility: (n=617)

Review of Study Rigor

1. Presence of a concurrent comparison or control group
   2 points for traditional randomized controlled trial or stepped wedge cluster randomized trial
   1 point for pseudo-randomized and other studies with concurrent control

2. EBP standardization by protocol or manual
   1 point if present

3. EBP fidelity tracking
   1 point if present

4. Implementation strategy standardization by operational description, standard training, or manual
   1 point if present

5. Length of follow-up from full implementation of intervention
   2 points for twelve months or longer
   1 point for six to eleven months
   0 points for less than six months

6. Number of sites
   1 point for more than one site

Reports excluded:
   Study rigor (n = 385)
   Other reasons (n=86)

Study Rigor Scores of Excluded Studies.[1]

Six	148
Five	128
Four	2
Three	73
Two	30
One	4

[1] *All studies were rated for rigor on an 8-point-scale with 8 equaling most rigorous that considered presence of a concurrent comparison or control group, adequate standardization of the EBP and implementation strategy, sufficient length of follow-up, implementation at >1 site. Studies with a rigor score of 7 or 8 were included.*

Studies included in review: (n = 129)
Published articles included in review: (n=143)

Data Abstraction & Coding

Abstracted each included study in pairs with conflicts reviewed and resolved by senior member of the team

Analysis

Frequency of ERIC implementation strategy use

Implementation Strategy	Overall	Control Arm (Least intensive arm)	Experimental Arm (Most intensive arm)	Tested
Use evaluative and iterative strategies				
Assess for readiness and identify barriers and facilitators	43	5	43	38
Audit and provide feedback	76	13	76	63
Conduct cyclical small tests of change	22	1	22	21
Conduct local need assessment	20	4	20	16
Develop a formal implementation blueprint	41	5	42	36
Develop and implement tools for quality monitoring	29	4	29	25
Obtain and use patients/consumers and family feedback	5	0	5	5
Purposefully reexamine the implementation	33	3	33	30
Stage implementation scale up	1	1	1	0
Assess and redesign workflows*	19	2	19	17
Provide interactive assistance				
Centralize technical assistance	16	8	13	8
Internal Facilitation*	10	1	9	9
External Facilitation*	59	5	59	54
Provide clinical supervision	4	0	4	4
Provide local technical assistance	9	2	9	7
Create an online learning community*	8	1	8	7
Adapt and tailor to context				
Promote adaptability	38	2	37	36
Tailor strategies	43	2	43	41
Use data experts	0	0	0	0
Use data warehousing techniques	2	0	2	2
*Indicates implementation strategies new to ERIC				

Frequency of ERIC implementation strategy use, cont.

Implementation Strategy	Overall	Control Arm (Least intensive arm)	Experimental Arm (Most intensive arm)	Tested[1]
Develop stakeholder interrelationships				
Build a coalition	4	1	4	3
Capture and share local knowledge	13	2	13	11
Conduct local consensus discussions	19	2	19	17
Develop academic partnerships	1	0	1	1
Identify and prepare champions	22	1	22	21
Identify early adopters	0	0	0	0
Inform local opinion leaders	11	1	11	10
Involve executive boards	6	0	6	6
Model and simulate change	2	0	2	2
Obtain formal commitments	12	4	12	8
Organize clinician implementation team meetings	43	6	42	37
Promote network weaving	1	0	1	1
Recruit, designate, and train for leadership	19	2	19	17
Use advisory boards and workgroups	11	1	10	10
Visit other sites	1	0	1	1
Engage community resources outside the practice*	4	0	4	4
Train and educate stakeholders				
Conduct educational meetings	97	29	96	68
Conduct educational outreach visits	20	2	19	18
Conduct ongoing training	34	5	34	29
Create a learning collaborative	15	4	15	11
Distribute educational materials	100	51	99	49
Make training dynamic	20	3	20	17
Provide ongoing consultation	19	3	19	16
Shadow other experts	1	0	1	1
Use train-the-trainer strategies	10	2	9	8

Frequency of ERIC implementation strategy use, cont.

Implementation Strategy	Overall	Control Arm (Least intensive arm)	Experimental Arm (Most intensive arm)	Tested[1]
Support clinicians				
Create new clinical teams	1	0	1	1
Develop resource sharing agreements	0	0	0	0
Facilitate relay of clinical data to providers	10	2	10	8
Remind clinicians	22	5	22	17
Revise professional roles	2	0	2	2
Engage consumers				
Increase demand	6	1	6	5
Intervene with patients/consumers to enhance uptake and adherence	18	8	16	10
Involve patients/consumers and family members	8	1	8	7
Prepare patients/consumers to be active participants	20	5	20	15
Use mass media	2	2	2	0
Utilize financial strategies				
Access new funding	4	0	4	4
Alter incentive/allowance structures	9	4	8	5
Alter patient/consumer fees	0	0	0	0
Develop disincentives	0	0	0	0
Fund and contract for the clinical innovation	1	1	1	0
Make billing easier	0	0	0	0
Place innovation on fee for service lists/formularies	1	0	1	1
Use capitated payments	0	0	0	0
Use other payment schemes	1	0	1	1
Change infrastructure				
Change accreditation or membership requirements	2	0	2	2
Change liability laws	0	0	0	0
Change record systems	12	3	12	9
Change service sites	0	0	0	0
Mandate change	5	1	5	4
Start a dissemination organization	0	0	0	0