Making Healthcare Safer IV

Making Healthcare Safer IV: Summary of Findings on Patient Safety Practices and Ratings by a Technical Expert Panel, 2023-2024

Prepared for:
Agency for Healthcare Research and Quality
U.S. Department of Health and Human Services
5600 Fishers Lane
Rockville, MD 20857
www.ahrq.gov

Contract No. 75Q80120D00003

Prepared by:
Johns Hopkins University Evidence-based Practice Center
Baltimore, MD

ECRI-Penn Evidence-based Practice Center
Plymouth Meeting, PA

Southern California Evidence-based Practice Center
Los Angeles, CA

Investigators:
Eric B. Bass, M.D., M.P.H.
Paul Shekelle, M.D., Ph.D.
Jonathan Treadwell, Ph.D.
Michael Rosen, M.A., Ph.D.
Nikhil K. Mull, MD
C. Matthew Stewart, M.D., Ph.D.
Aneesa Motala, B.A.
Allen Zhang, B.S.
Ritu Sharma, B.Sc.

AHRQ Pub. No. 23(24)-EHC019-15
May 2024

Agency for Healthcare Research and Quality

PATIENT SAFETY

This report is based on research conducted by the Johns Hopkins University Evidence-based Practice Center, the ECRI-Penn Evidence-based Practice Center, and the Southern California Evidence-based Practice Center under contract to the Agency for Healthcare Research and Quality (AHRQ), Rockville, MD (Contract No. 75Q80120D00003). The findings and conclusions in this document are those of the authors, who are responsible for its contents; the findings and conclusions do not necessarily represent the views of AHRQ. Therefore, no statement in this report should be construed as an official position of AHRQ or of the U.S. Department of Health and Human Services.

None of the investigators have any affiliations or financial involvement that conflicts with the material presented in this report.

The information in this report is intended to help healthcare decision makers—patients and clinicians, health system leaders, and policymakers, among others—make well-informed decisions and thereby improve the quality of healthcare services. This report is not intended to be a substitute for the application of clinical judgment. Anyone who makes decisions concerning the provision of clinical care should consider this report in the same way as any medical reference and in conjunction with all other pertinent information, i.e., in the context of available resources and circumstances presented by individual patients.

Suggested citation: Bass EB, Shekelle P, Treadwell J, Rosen M, Mull NK, Stewart CM, Motala A, Zhang A, Sharma, R. Making Healthcare Safer IV: Summary of Findings on Patient Safety Practices and Ratings by a Technical Expert Panel, 2023-2024. (Prepared by the Johns Hopkins, ECRI-Penn, and Southern California Evidence-based Practice Centers under Contract No. 75Q80120D00003). AHRQ Publication No. 23(24)-EHC019-15. Rockville, MD: Agency for Healthcare Research and Quality. May 2024. DOI: https://doi.org/10.23970/AHRQEPC_MHS4YEAR1. Posted final reports are located on the Effective Health Care Program search page.

Preface

Recognized for excellence in conducting comprehensive systematic reviews, the Agency for Healthcare Research and Quality (AHRQ) is expanding its portfolio to include rapid evidence products. The Evidence-based Practice Center (EPC) Program is developing a range of rapid evidence products to assist end-users in making specific decisions in a limited timeframe. AHRQ is using this format for the fourth edition of its Making Healthcare Safer series of reports, produced by the EPC Program and the General Patient Safety Program. To shorten timelines, reviewers make strategic choices about which processes to abridge. However, the adaptations made for expediency may limit the certainty and generalizability of the findings from the review, particularly in areas with a large literature base. Transparent reporting of the methods used and the resulting limitations of the evidence synthesis are extremely important.

AHRQ expects that these rapid evidence products will be helpful to health plans, providers, purchasers, government programs, and the health care system as a whole. Transparency and stakeholder input are essential to AHRQ. If you have comments on this report, they may be sent by mail to the Task Order Officer named below at: Agency for Healthcare Research and Quality, 5600 Fishers Lane, Rockville, MD 20857, or by email to MHS@ahrq.hhs.gov.

Robert Otto Valdez, Ph.D., M.H.S.A.
Director
Agency for Healthcare Research and Quality

Therese Miller, D.P.H.
Director
Center for Evidence and Practice Improvement
Agency for Healthcare Research and Quality

Christine Chang, M.D., M.P.H.
Director
Evidence-based Practice Center Division
Center for Evidence and Practice Improvement
Agency for Healthcare Research and Quality

David W. Niebuhr, M.D., M.P.H., M.Sc.
Evidence-based Practice Center Division Liaison
Center for Evidence and Practice Improvement
Agency for Healthcare Research and Quality

Craig A. Umscheid, M.D., M.S.
Director
Center for Quality Improvement and Patient Safety
Agency for Healthcare Research and Quality

Margie Shofer, B.S.N., M.B.A.
Director, General Patient Safety Program
Center for Quality Improvement and Patient Safety
Agency for Healthcare Research and Quality

Jennifer Eskandari
Task Order Officer
Center for Quality Improvement and Patient Safety
Agency for Healthcare Research and Quality

Farzana Samad, Pharm.D., FISMP, CPPS
Health Scientist Administrator
Center for Quality Improvement and Patient Safety
Agency for Healthcare Research and Quality

Acknowledgments

The authors gratefully acknowledged the following AHRQ subject matter experts for their review of the reports: Susan Henderson, M.D., M.P.H., Melissa A. Miller, M.D., M.S., Edwin Lomotan, M.D., Leyi Lin, MD, FACP, Ellen Deutsch, M.D., M.S., FACS, FAAP, FSSH, CPPS, Kamila Mistry, Ph.D., M.P.H., and Darryl T. Gray, MD, ScD, FACC, FAHA.

Technical Expert Panel

The list of Technical Experts who provided input to this report follows:

Alyce Adams, Ph.D.
Stanford Medicine Innovation Professor, Professor of Epidemiology and Population Health and of Medicine
Stanford Cancer Institute
Stanford, CA

David Atkins, M.D., M.P.H.
Former Director of Health Services Research and Development (Retired)
Washington, DC

David Bates, M.D., M.Sc.
Medical Director of Clinical and Quality Analysis, Information Systems,
Partners HealthCare System, Inc
Boston, MA

Grace Chai, Pharm.D., M.P.H.
Associate Director for Special Initiatives
U.S. Food and Drug Administration
Silver Spring, MD

Carol Cronin
Executive Director and founder
Informed Patient Institute
Annapolis, MD

Missy Danforth, B.A.
Vice President of Health Care Ratings
The Leapfrog Group
Washington, DC

Mary Dixon-Woods, Ph.D.
Director of The Healthcare Improvement Studies Institute
University of Cambridge
Cambridge, UK

Heidi B. King, M.S., F.A.C.H.E., C.P.P.S., P.C.C.
Director of the Department of Defense Patient Safety Program
Defense Health Agency
Falls Church, VA

Clifford Y. Ko, M.D., M.S., M.S.H.S., F.A.C.S., F.A.S.C.R.S.
Director of the Division of Research and Optimal Patient Care
American College of Surgeons
Los Angeles, CA

Christina Michalek B.Sc. Pharm., R.Ph., F.A.S.H.P.
Director of Membership and Patient Safety Organization
Institute for Safe Medication Practices
Plymouth Meeting, PA

Peter Pronovost, M.D., Ph.D.
Chief Quality & Clinical Transformation Officer
University Hospitals Cleveland Medical Center
Cleveland, OH

Melinda Sawyer, Dr.Ph., M.S.N., R.N.
Vice President of Clinical Quality and Patient Safety
UnitedHealth Group
Baltimore, MD

Nasia Safdar, M.D., Ph.D.
Professor, Division of Infectious Disease
University of Wisconsin School of Medicine and Public Health
Madison, WI

Hardeep Singh, M.D., M.P.H.
Chief of Health Policy, Quality & Informatics Program
Center for Innovations in Quality, Effectiveness and Safety
Michael E. DeBakey VA Medical Center
Houston, TX

Arjun Srinivasan, M.D.
Associate Director for Healthcare-Associated Infection Prevention Programs
Centers for Disease Control and Prevention (CDC)
Atlanta, GA

Contents

Introduction

The fourth installment of the Making Healthcare Safer (MHS) series of reviews marks nearly a quarter century's progress in efforts to meet the challenge of reducing and, ultimately, eliminating preventable patient harm. Throughout this patient safety journey, the MHS series synthesizes and disseminates evidence on the effectiveness of patient safety practices (PSPs).

For this project, we define PSPs as interventions, strategies, or approaches intended to prevent or mitigate unintended consequences of the delivery of health care and to improve the safety of health care for patients.[1] The MHS series guides the field about what works and where more research is needed. The science and practice of patient safety improvement has evolved in the last 20 years and, while certain areas[2-6] have realized improvements, health care continues to struggle with improvement rates that are much lower than desired. A recent report from the National Academies of Sciences, Engineering, and Medicine goes as far as to claim that "the country is at a relative standstill in patient safety progress,"[7] a claim supported by a recent meta-analysis indicating that as many as 1 in 20 patients continue to experience preventable harm.[8] According to a report from the Office of Inspector General (OIG) at the U.S. Department of Health and Human Services, 25 percent of Medicare patients experience harm, with 43 percent of those harm events judged to be preventable.[9] The leading types of harm found in the OIG report (i.e., medication errors, pressure ulcers, surgical procedural errors, and infections) align with the topics in the initial MHS report issued more than 20 years ago. Additionally, the coronavirus disease 2019 (COVID-19) pandemic has eroded some of the hard-won gains in reducing preventable harm, such as central line-associated blood stream infections (CLABSIs).[10] The current state of the patient safety movement heightens the importance of this fourth installment of MHS as an opportunity to renew focus on foundational elements of safe patient care and move the field forward.

In the spring of 2023, the Agency for Healthcare Research and Quality (AHRQ) launched its fourth iteration of the MHS Report (MHS IV). Thirteen topics were prioritized for inclusion in the MHS IV series based on a modified Delphi technique used by a Technical Expert Panel (TEP) that met in December 2022. The TEP included 15 experts in patient safety, with representatives of important stakeholders and perspectives, including governmental agencies (Centers for Disease Control and Prevention, Defense Health Agency, Department of Veterans Affairs, and Food and Drug Administration), health care stakeholders (Leapfrog Group and UnitedHealth Group), clinical specialists (critical care, hospital medicine, nursing, pharmacy, primary care, and surgery), experts in patient safety issues (health equity, information systems, quality improvement, and social science), and a patient/consumer perspective (Informed Patient Institute). The MHS IV Prioritization Report provides further details about how the TEP was engaged in prioritizing topics for inclusion in MHS IV.[11]

The MHS IV series consists of two rapid evidence product types (i.e., rapid reviews and rapid responses) to accommodate providing multiple evidence summaries within a two-year period. The type was determined by considering the preliminary body of evidence. Investigators made strategic choices about which processes to abridge to yield the most relevant search results within the topic scope. However, the adaptations made for expediency may limit the certainty and generalizability of the findings from the review, particularly in areas with a large literature base. In the first year of this project, a total of seven rapid reviews and six rapid responses were completed:

Rapid reviews (which are streamlined systematic reviews):

- Computerized clinical decision support to prevent medication errors and adverse drug events
- Healthcare worker implicit bias training and education
- Engaging family caregivers with structured communication for safe care transitions
- Opioid stewardship
- Patient safety practices focused on sepsis prediction and recognition
- Prevention in adults of transmission of infection with multidrug-resistant organisms
- Failure to rescue - Rapid response systems

Rapid responses (which are brief narrative reviews):

- Fatigue and sleepiness of clinicians due to hours of service
- Reducing adverse drug events related to anticoagulant use in adults
- Use of report cards and outcome measurements to improve the safety of surgical care
- Deprescribing to reduce medication harms in older adults
- Patient and family engagement
- Active surveillance culturing of *Clostridiodes difficile and multidrug-resistant organisms,* methicillin-resistant *Staphylococcus aureus* (MRSA), carbapenem-resistant *Enterobacterales* (CRE), and *Candida auris*

In the first year of this project, we also performed a rapid review to assess the evidence on harms associated with patient-clinician real-time clinical encounters using telehealth and to determine the effectiveness of any related PSPs.[12] We did not find evidence on the effectiveness of any such PSPs, so that topic was not included with those presented to the TEP.

In addition to considering the TEP's guidance on the prioritization of topics for inclusion in MHS IV, we reviewed the list of PSPs that were encouraged or strongly encouraged by the TEP that contributed to the MHS II report (as listed in Table 1). Those PSPs have been widely implemented since then. We also reviewed the list of topics covered in the MHS III report, but that report did not specifically make recommendations about which PSPs should be encouraged.

Table 1. List of patient safety practices encouraged by Making Healthcare Safer II

Strongly Encouraged	Encouraged
• Preoperative and anesthesia checklists to prevent operative and post-operative events • Bundles, including checklists to prevent central line-associated bloodstream infections • Interventions to reduce urinary catheter use • Bundles with head-of-bed elevation, sedation vacations, oral care with chlorhexidine, and subglottic suctioning tubes to prevent ventilator-associated pneumonia • Hand hygiene • "Do Not Use" list for hazardous abbreviations • Multicomponent interventions to reduce pressure ulcers • Barrier precautions to prevent healthcare-associated infections • Use of real-time ultrasound for central line placement • Interventions to improve prophylaxis for venous thromboembolism	• Multicomponent interventions to reduce falls • Use of clinical pharmacists to reduce adverse drug events • Documentation of patient preferences for life-sustaining treatment • Obtaining informed consent to improve patients' understanding of potential risks of procedures • Team training • Medication reconciliation • Practices to reduce radiation exposure from fluoroscopy & computed tomography • Use of surgical outcome measurements & report cards • Rapid response systems • Utilization of complementary methods for detecting adverse events/medical errors to monitor for patient safety problems • Computerized provider order entry • Use of simulation exercises in patient safety efforts

This report provides a summary of the TEP's judgements about which PSPs are ready for widespread implementation and their rationale based on findings from the rapid reviews and rapid responses completed in the first year of MHS IV.

Methods

Led by the Johns Hopkins University (JHU) Evidence-based Practice Center (EPC), we used a modified Delphi technique to obtain Technical Expert Panel (TEP) feedback on which patient safety practices (PSPs) have sufficient evidence to support widespread implementation and the rationale based on the findings of the reports. The TEP feedback form included brief summaries of the reports on the 13 patient safety topics we reviewed, access to the full reports, and questions to capture their preliminary independent assessment of the specific PSPs covered in the reports.

We asked the panel to independently indicate a global judgment about whether health care facilities should adopt the specific PSPs included in our reports, and to indicate priorities for addressing limitations in the evidence on each PSP. By "global judgment," we mean a summary judgment that takes into consideration the following factors:

- importance of the safety problem (frequency & severity)
- rationale for the PSP
- evidence on whether the PSP can improve outcomes
- potential for unintended consequences
- difficulty of implementing the PSP based on reported barriers, facilitators, resources needed, and available toolkits to support implementation
- each expert's experience as a researcher, clinician, policymaker, or patient safety advocate

We offered the following categorical scheme for this judgement.

1. **Strongly Encouraged** for improving patient safety: Evidence is strong enough to be certain that, if we were choosing a hospital for care of loved ones, we would choose a hospital that was implementing this PSP over one which was not. Unless hospitals know their outcomes for this safety problem are already excellent, most organizations should be implementing this PSP.
2. **Encouraged** for improving patient safety: Enough evidence exists to determine that, if we were choosing a hospital for care of loved ones, we would choose a hospital that was implementing this PSP over one which was not, but we have uncertainty about the effectiveness of the practice or concern about implementation barriers or costs that keep us from putting it on the "strongly encouraged" list. Unless hospitals know their outcomes for this safety problem are already excellent, many organizations should be implementing this PSP. Each organization would need to consider whether it has capacity for implementation.
3. **Discouraged** for improving patient safety: Evidence on the effectiveness of this PSP does not justify concerns about potential harms of the PSP, costs, or implementation barriers. The balance of information suggests that harms and costs of implementation may outweigh the potential benefit.
4. **Strongly Discouraged** for improving patient safety: Evidence on this PSP indicates that it is harmful or ineffective, in which case the costs of implementation cannot be justified.
5. I prefer not to rate this practice.

Twelve TEP members completed the online feedback form, one TEP member completed the form partially, and two TEP members did not complete the form before the TEP meeting.

The JHU EPC collated the results of the initial feedback and prepared a series of slides to present to the TEP at virtual meetings held on January 26 and 31, 2024. The slide presentation included an overview of the purpose of the project and the prioritization process, followed by a listing of topics and the summary of findings of PSPs, and the pre-meeting TEP feedback.

During the TEP meeting, we asked the TEP members to share their thoughts about what to recommend based on the findings from the reports completed in year 1. After the discussion of each topic, we asked the TEP members to independently submit their votes on whether to strongly encourage, encourage, discourage, or strongly discourage PSPs for adoption. At this stage, TEP members could decide to vote neutral, indicating they neither encouraged nor discouraged PSPs for a topic. TEP members who were unable to submit their votes during the meeting were allowed to submit votes after the meeting. We then collated the results of the final voting.

Results

In this report, we present a short summary of our findings on each patient safety practice (PSP) topic, followed by a summary of the ratings and comments from the Making Healthcare Safer (MHS) IV Technical Expert Panel (TEP). The summaries of findings presented here are a condensed version of the summaries shared with the TEP prior to the meeting. For each topic, we also provide a link to the full report that was available to the TEP.

1. Computerized Clinical Decision Support To Prevent Medication Errors and Adverse Drug Events

1a. Findings From Previous MHS Reports

- **MHS I (2001)** reported that Clinical Decision Support Systems (CDSS) improved prescribing quality and safety, but the impact on outcomes such as adverse drug events was limited.
- **MHS II (2013)** concluded that Computerized Physician Order Entry (CPOE) with CDSS remained a valuable PSP.
- **MHS III (2020**) shifted focus to other PSPs for reducing adverse drug events in older adults but did not revisit the evidence on CPOE with CDSS.

1b. MHS IV Rapid Review Findings

- Literature Search
  - Searched PubMed and Cochrane Library for systematic reviews and primary studies (2015–2023)
  - 27 reviews, 1 overview of reviews, 5 primary studies
- Evidence Summary
  - CPOE with CDSS was associated with reduced medication errors (moderate strength of evidence [SOE]) and prevention of adverse drug events (low SOE).
  - Improved medication-related CDSS were associated with reductions of medication errors and adverse drug events (moderate SOE).
- Barriers, Facilitators, and Resources
  - Studies highlight interface, information, and interaction as key categories of CDSS implementation factors.
  - Barriers to greater uptake of medication alerts include irrelevant information, user mistrust, and workflow disruption.
  - Multidisciplinary committees emerge as crucial facilitators for optimizing CDSS medication alerts.
- Conclusions
  - CDSS reduces medication errors and adverse drug events, with moderate and low certainty evidence, respectively.
  - CDSS has several unintended consequences.
  - Studies are varied in context, which makes it hard to estimate the overall benefit.
  - Future research should measure outcomes and unintended consequences in the same study to generate evidence on benefits and harms associated with CDSS in the same context.

- The final report is available at: https://effectivehealthcare.ahrq.gov/sites/default/files/related_files/mhs4-computerized-cds-rapid-research.pdf.

1c. Ratings and Comments From MHS IV TEP

- Figure 1 presents the panel's ratings after discussion, with the majority voting to encourage or strongly encourage the PSP, and two voting to discourage it.
  - Whereas the TEP encouraged implementation of CDSS to reduce medication errors and adverse drug events, the TEP stressed that "CDSS" is a single label for what is in fact a myriad of different interventions, with different CDSS vendors and different enterprise electronic health record (EHR) systems and different organizational contexts.
  - Therefore, efforts must be focused on making the CDSS work better within the specific organizational context in which it is deployed. It is important to address sociotechnical factors related to implementing CDSS to ensure it is effective in improving safety.
  - Furthermore, organizations should not rely solely on CDSS to reduce adverse drug events, as other interventions – such as medication reconciliation, and the use of embedded clinical pharmacists – may be needed, as well.
- Figure 2 presents the TEP's responses about priorities for addressing gaps in the evidence.
  - The TEP's primary future research recommendations focused on the need for enhanced interventions, methods of implementation to overcome barriers, stronger study designs, and better outcome measures.

Figure 1. Panel's post-discussion ratings of computerized clinical decision support system patient safety practices to prevent medication errors and adverse drug events (N=15)

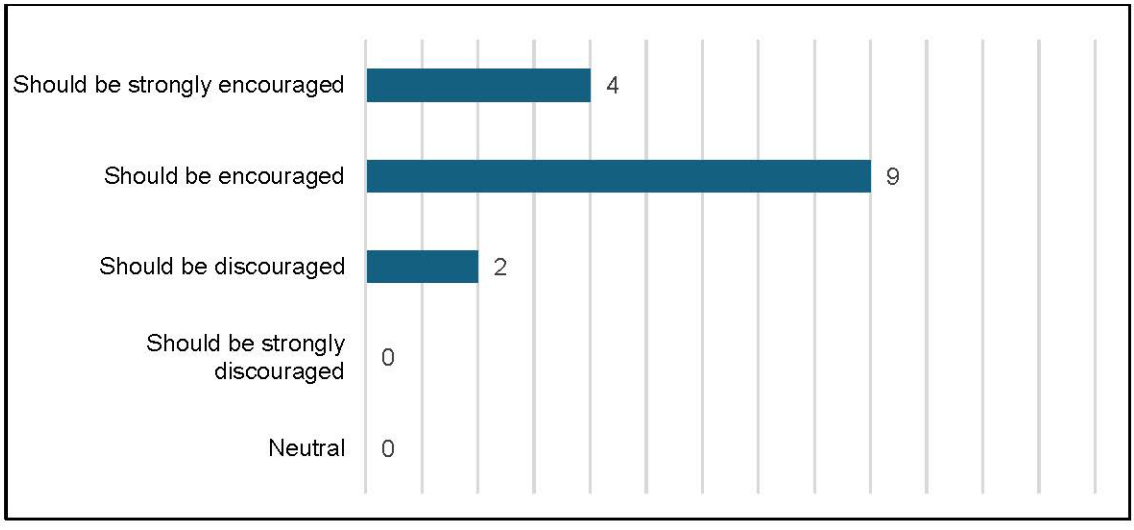
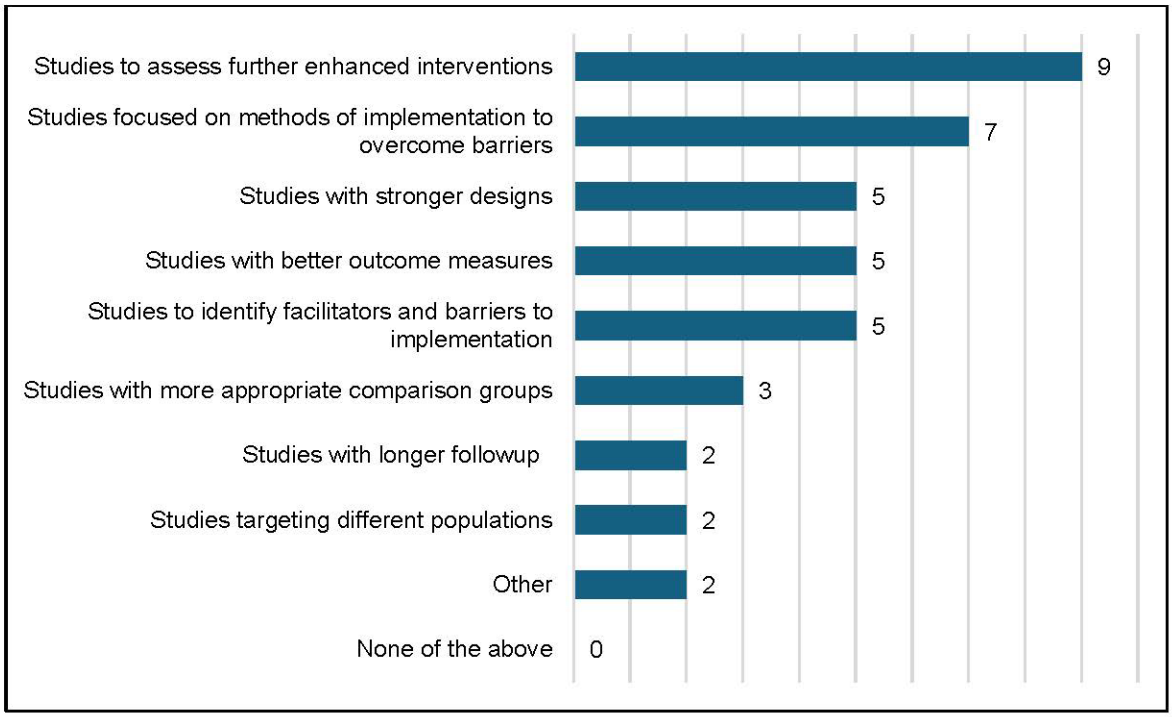


Figure 2. Most important priorities for addressing limitations in the current evidence on the effectiveness of patient safety practices using computerized clinical decision support systems in healthcare facilities or healthcare systems (N=13)



2. Healthcare Worker Implicit Bias Training and Education

2a. Findings From Previous MHS Reports

- The MHS III report highlighted the need for further research on how provider bias and racism contribute to adverse safety events, citing evidence of implicit bias that impacted patient communication and health care outcomes.

2b. MHS IV Rapid Review Findings

- Literature search
  - Searched PubMed, Embase, CINAHL, PsycINFO, and Cochrane Library for systematic reviews and primary studies (2013–2023)
  - No studies were identified that evaluated the direct impact of implicit bias training and education on patient safety outcomes, but 7 reviews and one primary study evaluated indirectly related interventions.
- Evidence Summary
  - Four of the six studies found significant improvement in secondary health care worker (HCW)-related outcomes of interest after completion of the training, such as cultural awareness; only the pre/post study on communication skills found a significant impact on patient outcomes.
- Barriers, Facilitators, and Resources
  - No studies directly addressed the implementation of implicit bias training for HCWs, but some offered context.
  - No specific toolkits were found, but resources that offer tips and training program recommendations exist, though they lack guidance on the measurement of patient safety or care quality.
- Conclusion
  - Only clinically heterogeneous, indirect evidence of PSPs related to implicit bias training were identified for primary outcomes of interest.
  - As no included study evaluated specific safety outcomes as a result of HCW implicit bias training, no conclusions could be drawn regarding the impact of such interventions on patient safety.
- The final report is available at: https://effectivehealthcare.ahrq.gov/sites/default/files/related_files/mhs-IV-rapid-response-implicit-bias.pdf

2c. Ratings and Comments From MHS IV TEP

- Figure 3 presents the panel's ratings after discussion, showing that the majority of the TEP did not encourage specific PSPs for implicit bias training and education of HCWs for the purpose of improving patient safety, citing the current lack of evidence on the effectiveness of implicit bias training used for the purpose of improving patient safety.
  - The TEP acknowledged the importance of implicit bias training for other purposes.
- Figure 4 presents the panel's views on priorities for addressing gaps in the evidence.

- The TEP recommended more research with stronger study designs and better outcome measures to demonstrate benefits related to patient safety. The TEP also recommended evaluation of the utility of specific training and educational components across different settings and populations.

Figure 3. Panel's post-discussion ratings of implicit bias training of healthcare workers used for the purpose of improving patient safety (N=15)

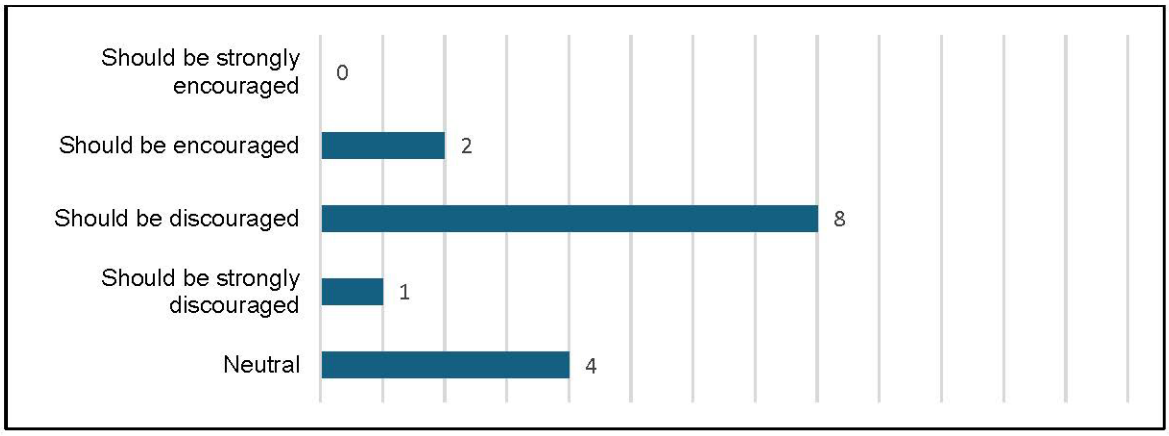
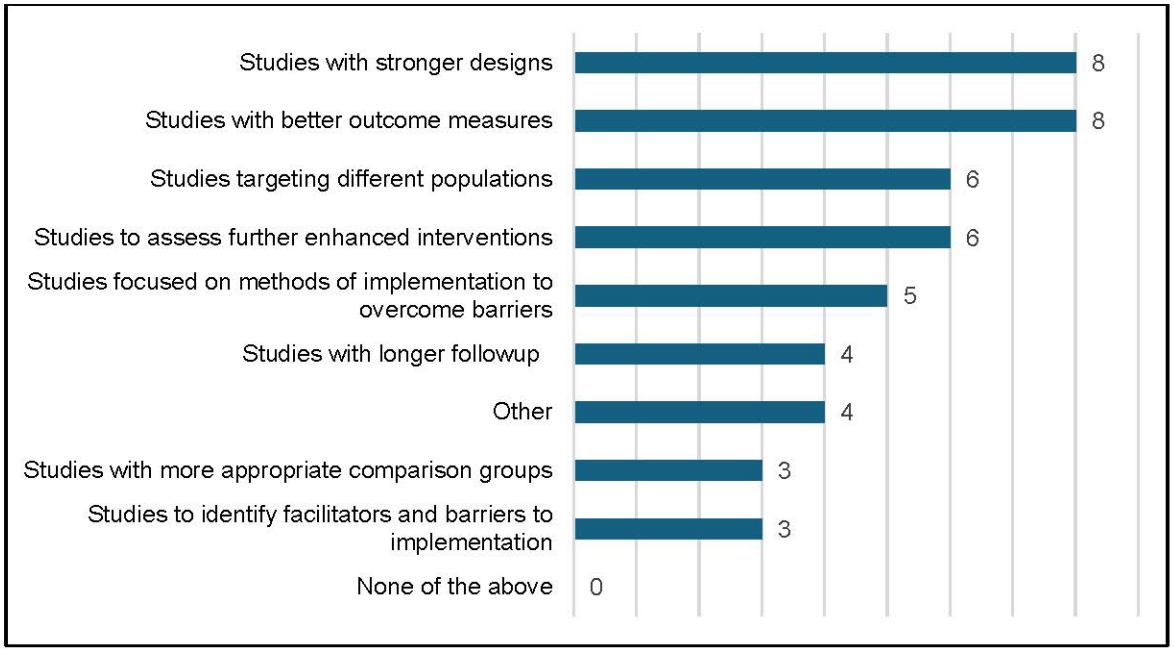


Figure 4. Most important priorities for addressing limitations in the current evidence on the effectiveness of implicit bias training and education of healthcare workers used for the purpose of improving patient safety (N=13)



3. Engaging Family Caregivers With Structured Communication for Safe Care Transitions

3a. Findings From Previous MHS Reports

- The MHS III report did not cover this topic.

3b. MHS IV Rapid Review Findings

- Literature search
  - Searched PubMed, Embase, and Cochrane Library for systematic reviews and primary studies (2010–2023)
  - 2 randomized controlled trials (RCTs), 6 pre-post studies, 1 single-arm study
- Evidence Summary
  - Interventions targeting family caregivers improved caregiver satisfaction in residential treatment facility discharges (low SOE), but evidence was insufficient to assess their use in other settings (intensive care unit [ICU] care transitions, hospital discharge).
- Barriers, Facilitators, and Resources
  - Implementing structured communication processes for patient discharge presents challenges, such as high workload and competing priorities.
  - Technology, training, and standardized tools can help, but specific resource needs weren't quantified in research.
  - Existing toolkits from the Agency for Healthcare Research and Quality (AHRQ) offer guidance on discharge conversations, medication lists, and patient engagement.
- Conclusion
  - Clear communication with patients and caregivers during care transitions is important, but there is little evidence on effectiveness of these PSPs in reducing adverse safety events.
  - We concluded that structured communication can improve caregiver satisfaction.
  - Future research should identify clinically meaningful outcomes likely to be responsive to this type of intervention, assess potential unintended consequences or harms of structured communications, identify resource requirements, include diverse populations, and provide subgroup analyses based on socioeconomic characteristics.
- The final report is available at: https://effectivehealthcare.ahrq.gov/sites/default/files/related_files/engaging-caregivers-rapid-review.pdf

3c. Ratings and Comments From MHS IV TEP

- Figures 5a, 5b, and 5c present the panel's ratings after discussion and shows that the majority did not encourage these specific PSPs.
  - For PSPs focused on ICU transitions, the TEP did not express a consistent viewpoint: six TEP members encouraged or strongly encouraged adoption, three discouraged or strongly discouraged adoption, and six were neutral (mainly owing to limitations of the evidence).

- For PSPs focused on care transitions from hospital discharge and other care transitions (e.g., residential treatment discharge), the majority of the TEP was neutral, neither encouraging nor discouraging the intervention as a PSP (mainly owing to limitations of the evidence).
- Discussion during the meetings highlighted the relative lack of evidence for this PSP, with the TEP acknowledging that communication is extremely important and, therefore, communication-related PSPs need further development and study.

- Figure 6 presents the TEP's views about priorities for addressing the evidence gaps.
  - The TEP's primary recommendations for future research were studies with stronger designs and better outcome measures, studies targeting different populations, and studies focused on methods of implementation.

Figure 5a. Panel's post-discussion ratings of patient safety practices related to engaging family caregivers with structured communication for *intensive care unit care transitions* (N=15)

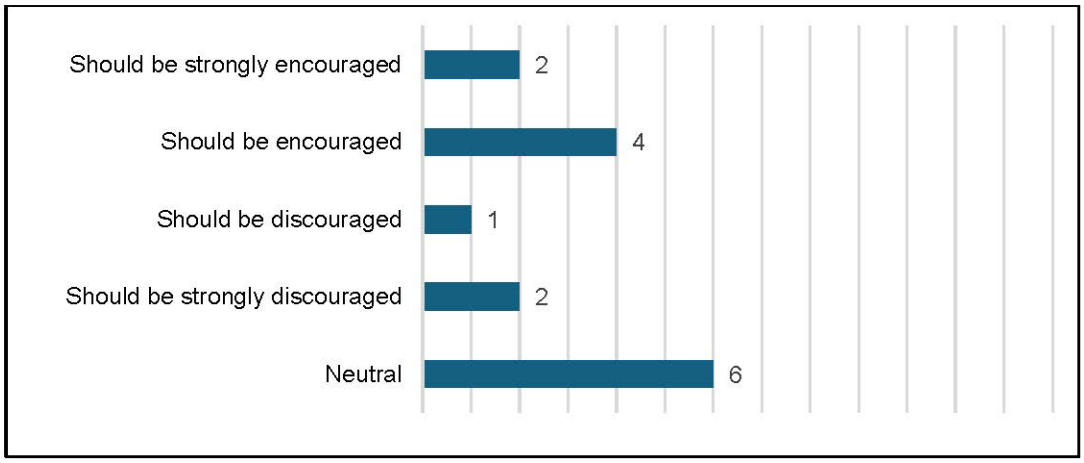


Figure 5b. Panel's post-discussion ratings of patient safety practices related to engaging family caregivers with structured communication for *hospital discharge care transitions* (N=15)

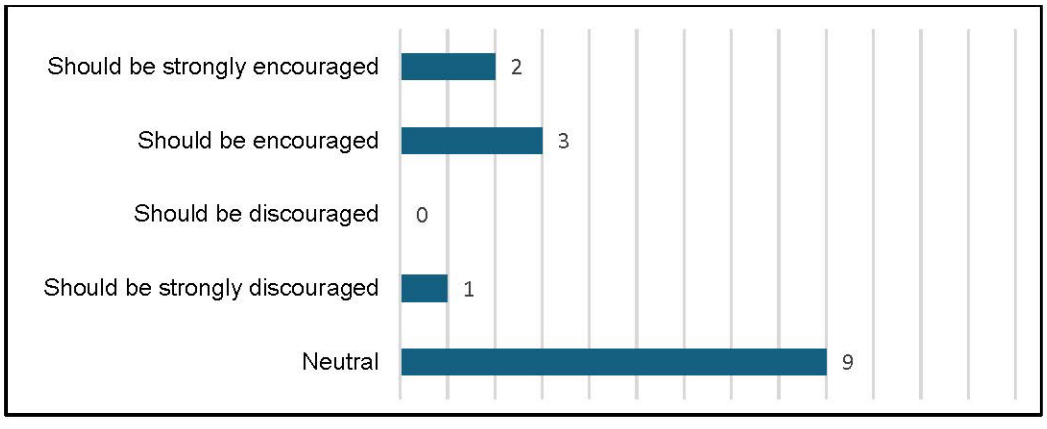


Figure 5c. Panel's post-discussion ratings of patient safety practices related to engaging family caregivers with structured communication for *other care transitions (residential treatment discharge)* (N=15)

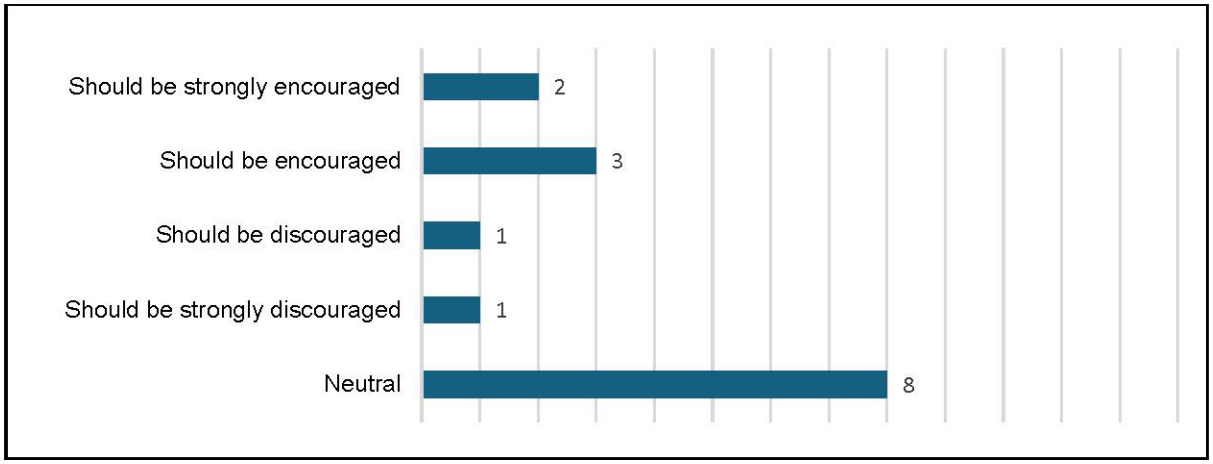
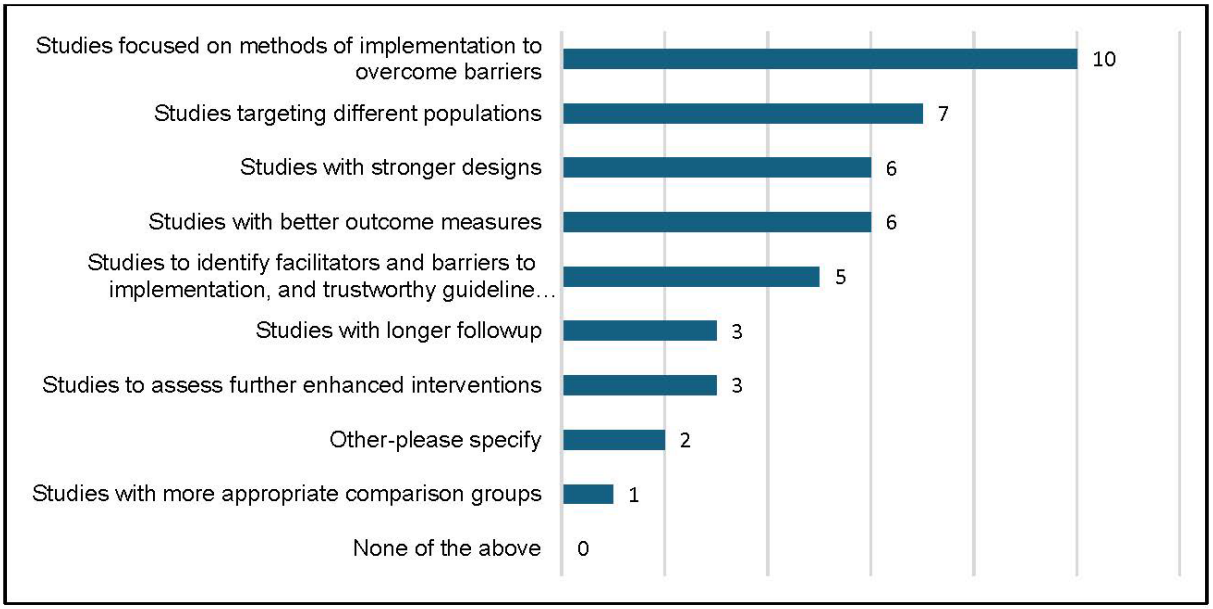


Figure 6. Most important priorities for addressing limitations in the current evidence on the effectiveness of patient safety practices for engaging family caregivers with structured communication for safe care transitions (N=13)



4. Opioid Stewardship

4a. Findings From Previous MHS Reports

- MHS III included a limited review and found moderate evidence for reducing opioid dosages, but it reached no conclusions on the effects on clinical outcomes or impact on pain.

4b. MHS IV Rapid Review Findings

- Literature search
  - Searched PubMed and Cochrane Library for systematic reviews (2019–2023) and primary studies (2016–2023)
  - 14 reviews, 14 RCTs, 6 non-randomized studies
- Evidence Summary
  - Clinical decision support and electronic health record (EHR) interventions decreased opioid prescribing (low SOE)
  - Patient engagement and education had mixed results (insufficient evidence)
  - Multicomponent interventions decreased opioid prescribing (low SOE)
  - No increase in pain, emergency department (ED) visits, or hospitalizations (low SOE)
  - Other interventions (insufficient evidence)
- Barriers, Facilitators, and Resources
  - Barriers include lack of clinician training, workload, communication gaps, and lack of access to nonpharmacological resources.
  - Facilitators include clinician and patient acceptance.
  - Resources include publicly available toolkits (e.g., those from AHRQ, Centers for Disease Control and Prevention [CDC]) and implementation guides.
- Conclusion
  - Opioid stewardship interventions may reduce prescribing without harming clinical outcomes.
  - Interventions to reduce opioid use should monitor unintended consequences and include access to nonpharmacological pain management resources with appropriate patient education and engagement.
  - Unintended consequences were often not measured or not measured rigorously.
- The final report is available at: https://effectivehealthcare.ahrq.gov/sites/default/files/related_files/mhs-IV-rapid-review-opioid-stewardship.pdf

4c. Ratings and Comments From MHS IV TEP

- Figures 7a, 7b, and 7c present the panel's ratings after discussion, showing that the TEP encouraged adoption of each of the three types of opioid stewardship interventions.
  - The TEP highlighted the importance of the topic and evidence of positive effects of a variety of specific PSPs, even though the SOE was low.
- Figure 8 presents the TEP's views about priorities for addressing the evidence gaps.

- The TEP urged future research with stronger studies to strengthen the evidence on specific PSPs.
- The TEP also recommended exploring unintended consequences of opioid stewardship interventions and equity in outcomes, given the documented disparities in pain management.

Figure 7a. Panel's post-discussion ratings of patient safety practices for opioid stewardship involving *clinical decision support or electronic health record interventions* (N=15)

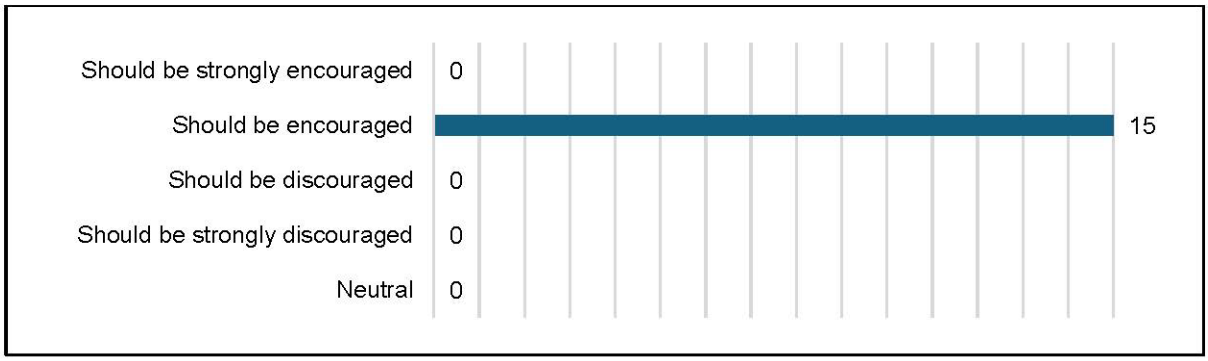


Figure 7b. Panel's post-discussion ratings of patient safety practices for opioid stewardship that involve *patient and family education, or engagement interventions* (N=15)

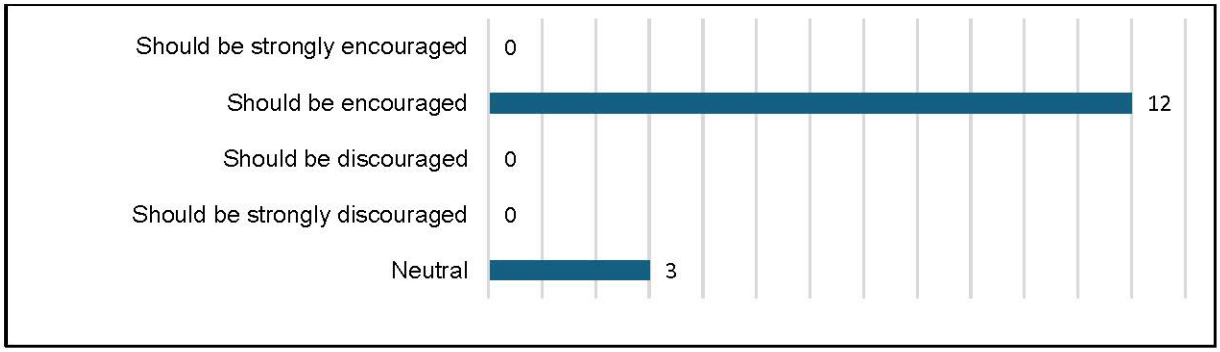


Figure 7c. Panel's post-discussion ratings of patient safety practices for opioid stewardship that *have multicomponent interventions* (N=15)

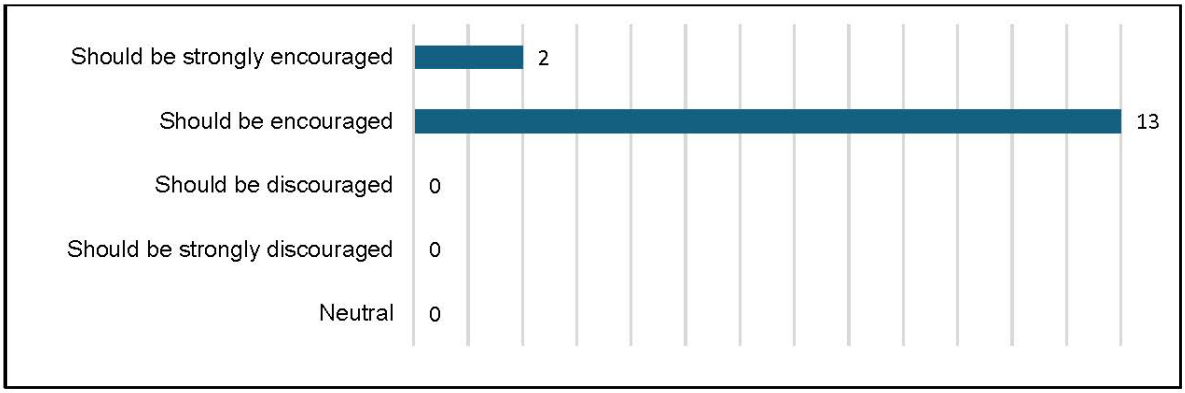
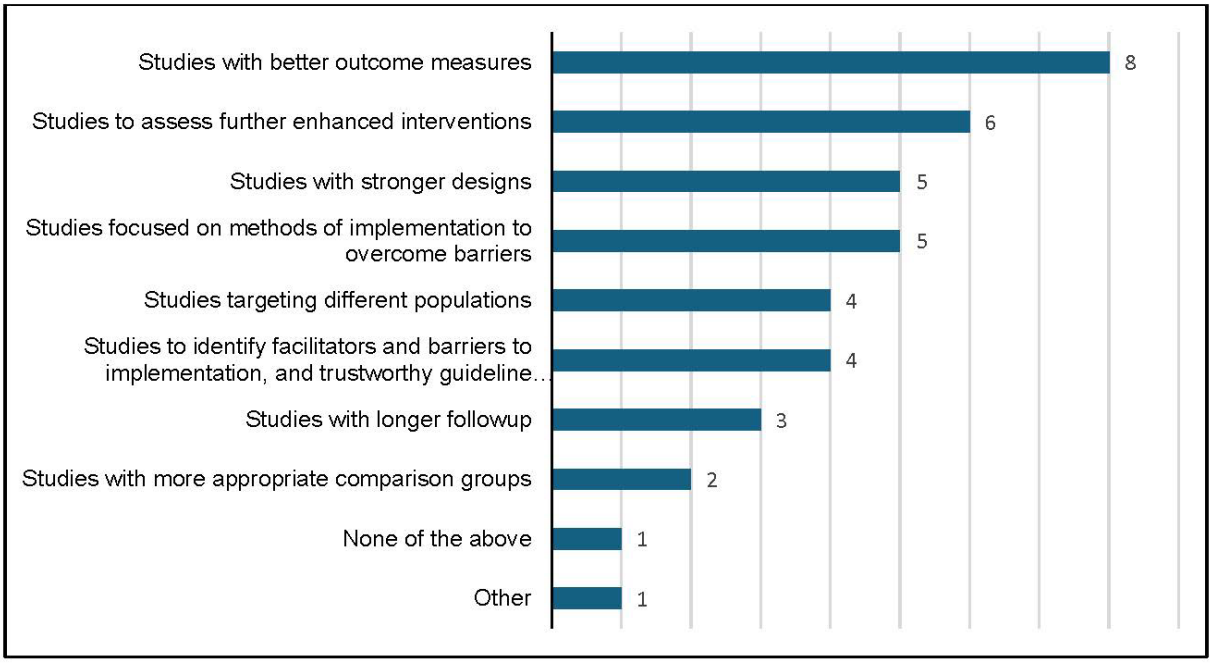


Figure 8. Most important priorities for addressing limitations in the current evidence on the effectiveness of patient safety practices for opioid stewardship(N=13)



5. Patient Safety Practices Focused on Sepsis Prediction and Recognition

5a. Findings From Previous MHS Reports

- MHS III found that (1) manual sepsis screening tools had variable sensitivity and specificity across settings and poor performance in the pre-hospital setting; (2) SOE was moderate for linking use of automated systems to improved process and outcome measures; and (3) multicomponent sepsis interventions showed improvement in at least one process measure, but only two studies showed improvement in outcome measures.

5b. MHS IV Rapid Review Findings

- Literature search
  - Searched PubMed and Cochrane Library for systematic reviews and primary studies (2018–2023)
  - 7 reviews, 8 primary studies
- Evidence Summary
  - All PSPs in included studies were multicomponent interventions, occurring across pediatric and adult populations in pre-hospital, ED, ICU, and hospital ward settings.
  - For adults, systematic reviews and primary studies reported that sepsis prediction and recognition PSPs did not demonstrate an effect on clinical process, hospital length of stay, or mortality outcomes.
  - For adults, SOE was insufficient in the pre-hospital setting across outcome categories owing to the existence of only one study.
- Barriers, Facilitators, and Resources
  - Sepsis alert systems struggle with alert overload, delays, mistrust, software limitations, and low accuracy.
  - Frequent communication, iterative improvement, clinician involvement, and training with test versions can overcome these challenges.
  - No included studies reported specific information regarding resources.
- Conclusion
  - Recent studies and systematic reviews do not support that specific PSPs for sepsis prediction and recognition are effective at reducing mortality or length of stay or improve clinical processes in adults in pre-hospital, ED, or hospital-wide settings.
  - Sepsis prediction and recognition PSPs may improve clinical process outcomes in neonatal ICUs.
- The final report will be available at: https://www.ahrq.gov/research/findings/making-healthcare-safer/mhs4/index.html.

5c. Ratings and Comments From the MHS IV TEP

- Figure 9 presents the panel's ratings after discussion.
  - The TEP discouraged adoption of specific sepsis prediction and recognition PSPs, citing the lack of evidence of their benefit as well as the relative resource intensity of implementation of these PSPs.

- Figure 10 presents the TEP's views about priorities for addressing the evidence gaps.
  - The TEP acknowledged that this remains an area of active development and recommended further study to demonstrate benefit.
  - The TEP's primary future research recommendations focused on stronger designs, studies to identify facilitators and barriers to implementation, better outcome measures, studies targeting different populations, enhanced interventions, and studies focused on methods of implementation.

Figure 9. Panel's post-discussion ratings of patient safety practices related to sepsis prediction and recognition (N=15)

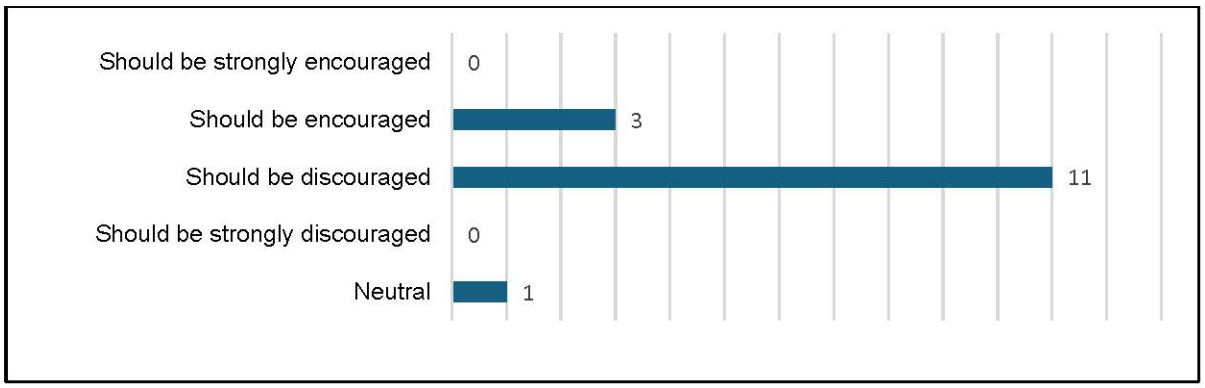
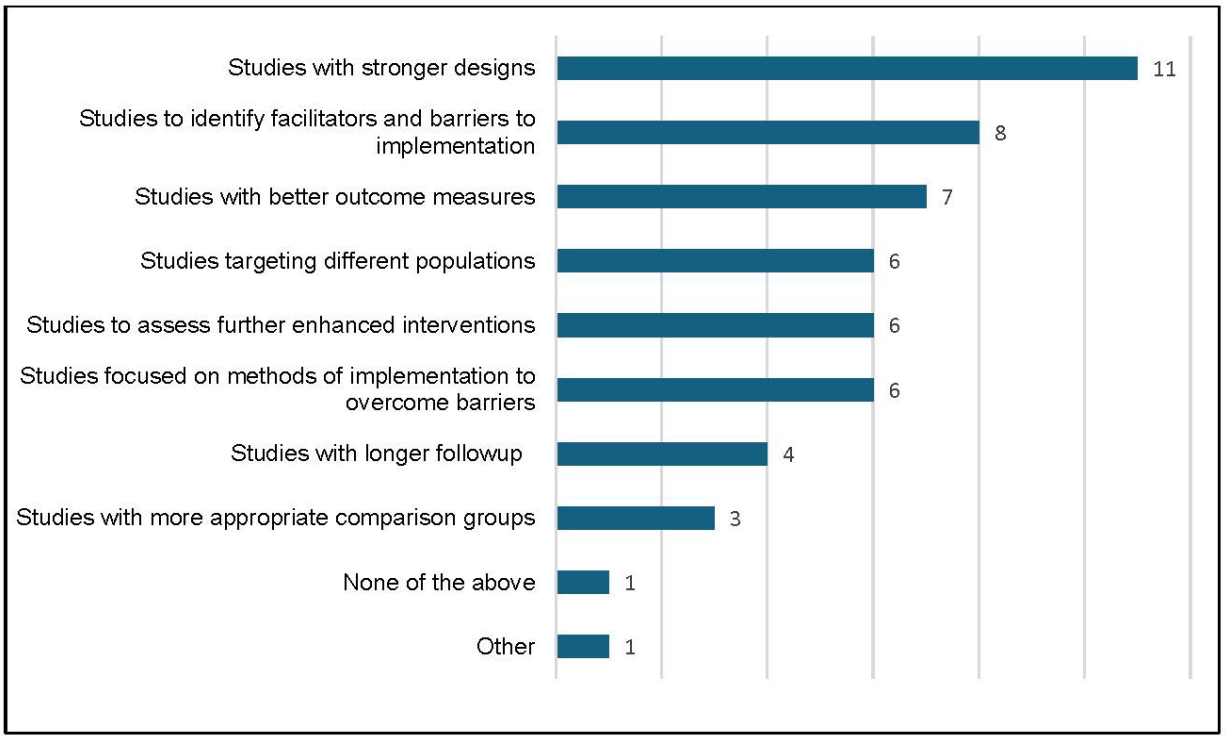


Figure 10. Most important priorities for addressing limitations in the current evidence on the effectiveness of patient safety practices focused on sepsis prediction and recognition (N=13)



6. Prevention in Adults of Transmission of Infection With Multidrug-Resistant Organisms

6a. Findings From Previous MHS reports

- MHS I and II highlighted the effectiveness of barrier precautions in reducing healthcare-acquired infections (HAI).
- MHS III showed environmental cleaning with hydrogen peroxide or ultraviolet (UV) light and multicomponent interventions reduced *Clostridioides difficile* infections. Chlorhexidine bathing was effective for preventing/decolonizing multidrug-resistant organisms (MDROs), particularly for methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant *Enterococcus* (VRE). Contact isolation for carbapenem-resistant *Enterobacterales* (CRE) was supported. Evidence was inconclusive about active surveillance and isolation duration.

6b. MHS IV Rapid Review Findings

- Literature search
  - Searched PubMed and Cochrane Library for systematic reviews and primary studies (2011–2023)
  - 46 articles, including systematic reviews of mainly observational studies
- Evidence Summary
  - Universal gloving has a small effect in reducing MDRO infections, mostly in ICUs (low SOE).
  - Contact precautions have mixed evidence in the endemic setting at reducing MDRO infections (low SOE).
  - Cohorting may be part of an effective strategy to reduce MDRO infections in an outbreak (low SOE).
  - Environmental decontamination may reduce MDRO infections (low SOE).
  - Patient decolonization can reduce MDRO infections in certain populations (moderate SOE).
  - Bundled infection prevention and control (IPC) practices in long-term care facilities have at most a small effect on MDRO infections in the endemic setting (low SOE).
  - Isolation makes little difference to psychological outcomes, but when it makes a difference, it is primarily negative (low SOE).
  - Non-infectious adverse events may be higher for patients isolated for infection than without isolation (very low SOE).
- Barriers, Facilitators, and Resources
  - Barriers include high workload and long work hours.
  - Facilitators include an IPC program with nurses, dedicated physician, and data management support; staff ratio of at least one for every 250 beds; electronic reminders; multidisciplinary groups; audits/checklists; champions; and organizational culture.
  - A relevant resource is the 2022 AHRQ toolkit for decolonization of non-ICU inpatients with indwelling devices.
- Conclusion

- IPC interventions had mixed evidence for reducing HAI and colonization by MDROs.
- Where PSPs did show benefit, they often had evidence which applied only to subpopulations (such as ICU patients).

- The final report is available at: https://effectivehealthcare.ahrq.gov/sites/default/files/related_files/mhs4-infection-prevention-mdro-rapid-research.pdf

6c. Ratings and Comments From the MHS IV TEP

- Figure 11 presents the panel's ratings after discussion.
  - The panel believes that preventing the spread of MDROs in health care is important to protecting patients and health care personnel. However, the evidence on preventing MDRO spread in health care has many variables to account for, including different organisms; different health care settings; and many safety practices are implemented as part of multicomponent interventions, which makes the independent contribution of any particular safety practice difficult to determine. At this point in time, the panel was reluctant to put forward one or more specific practices for preventing transmission of MDROs. Facilities may wish to consult the compendium of strategies to prevent HAIs that was released by the Society for Healthcare Epidemiology of America in 2023 (https://shea-online.org/compendium-of-strategies-to-prevent-healthcare-associated-infections-in-acute-care-hospitals/) and the CDC's Healthcare Infection Control Practices Advisory Committee guidelines, which are updated on an ongoing basis (https://www.cdc.gov/infectioncontrol/index.html).
- Figure 12 presents the TEP's views about priorities for addressing the evidence gaps.
  - The TEP's primary recommendations for future research were studies with stronger designs and longer followup, enhanced interventions, and studies focused on methods of implementation.

Figure 11. Panel's post-discussion ratings of patient safety practices related to transmission of infection with multidrug-resistant organisms (N=15)

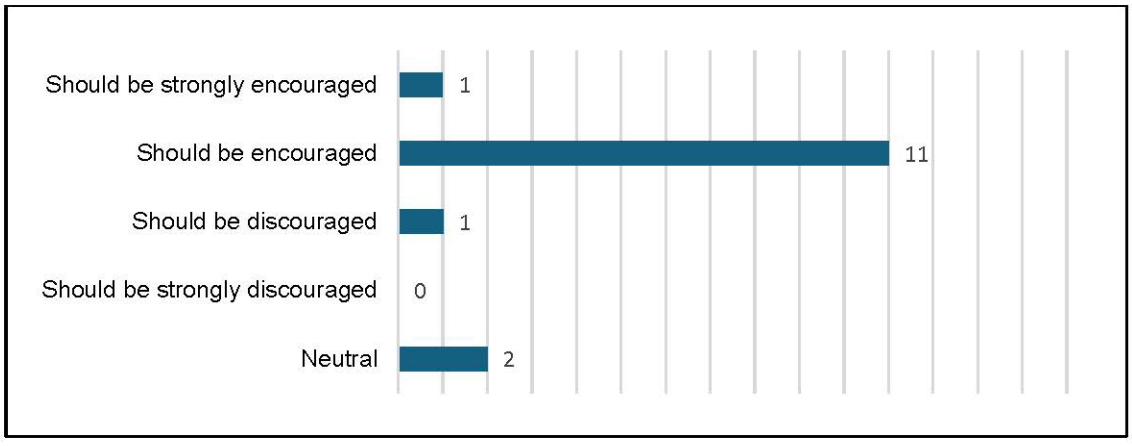
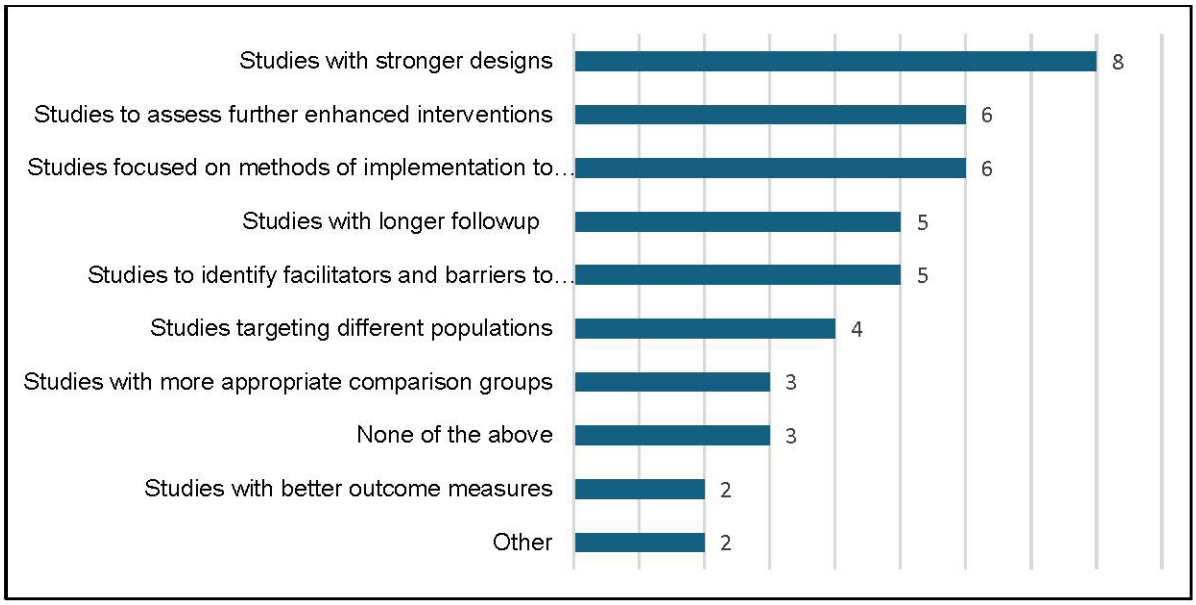


Figure 12. Most important priorities for addressing limitations in the current evidence on the effectiveness of patient safety practices to prevent transmission of infection with multidrug-resistant organisms in adults (N=13)



7. Failure To Rescue – Rapid Response Systems

7a. Findings From Previous MHS Reports

- The MHS III report found moderate evidence that rapid response systems (RRS) are effective in reducing cardiorespiratory arrest, but evidence was inconclusive as to how they reduce hospital mortality and ICU transfers.

7b. MHS IV Rapid Review Findings

- Literature search
  - Searched PubMed and Cochrane Library for systematic reviews and primary studies (2018–2023)
  - 4 reviews, 19 primary studies
- Evidence Summary
  - RRS may significantly reduce in-hospital mortality in adults and children (low SOE).
  - RRS significantly reduces cardiorespiratory arrest incidence in adults (low SOE), but the effect is unclear in children (insufficient SOE).
  - RRS has an unclear impact on unplanned ICU admissions in both adults and children (insufficient SOE).
  - Modifying RRS can reduce mortality and arrest incidence in adults (low SOE), but effects are unclear in children (insufficient SOE).
  - Serious adverse events related to RRS are infrequent in both adults and children (insufficient SOE).
- Barriers, Facilitators, and Resources
  - The implementation of RRS presents challenges, such as miscommunication, poor staff collaboration, and inadequate monitoring systems.
  - Whereas resource requirements are unclear, a consensus identified key components for an effective system, and a basic toolkit still exists.
- Conclusion
  - Overall, RRS may have a large beneficial effect on the outcomes of hospital mortality and incidence of in-hospital cardiorespiratory arrest, but the SOE is low owing to methodological weaknesses of the studies.
  - Innovations in afferent (alert) and efferent (response) limb structures show promise for increased benefit.
- The final report is available at: https://effectivehealthcare.ahrq.gov/sites/default/files/related_files/mhs4-failure-rescue-rapid-research.pdf

7c. Ratings and Comments From the MHS IV TEP

- Figure 13 presents the panel's ratings after discussion.
  - The TEP encouraged adoption of RRS interventions given the importance of the topic and evidence of reduction of mortality.
  - The TEP noted the low SOE suggesting a large effect in saving lives and improving outcomes as well as the wide adoption of these practices.
  - The TEP noted the consistent albeit low SOE for a benefit in adult populations.
- Figure 14 presents the TEP's views about priorities for addressing the evidence gaps.
  - The TEP highlighted the need for additional evidence for pediatric populations as well as additional populations and settings.
  - The TEP's primary future research recommendations focused on enhanced interventions, studies targeting different populations, stronger study designs, methods of implementation to overcome barriers, and studies to identify facilitators and barriers to implementation.

Figure 13. Panel's post-discussion ratings of rapid response systems as a patient safety practice (N=15)

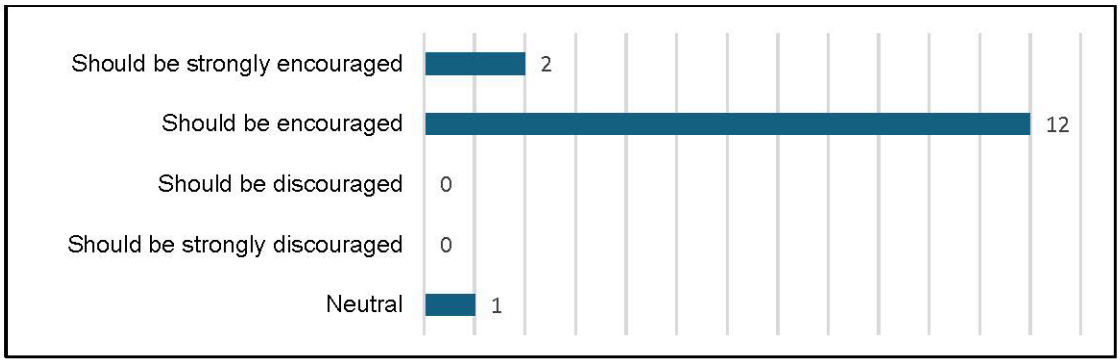
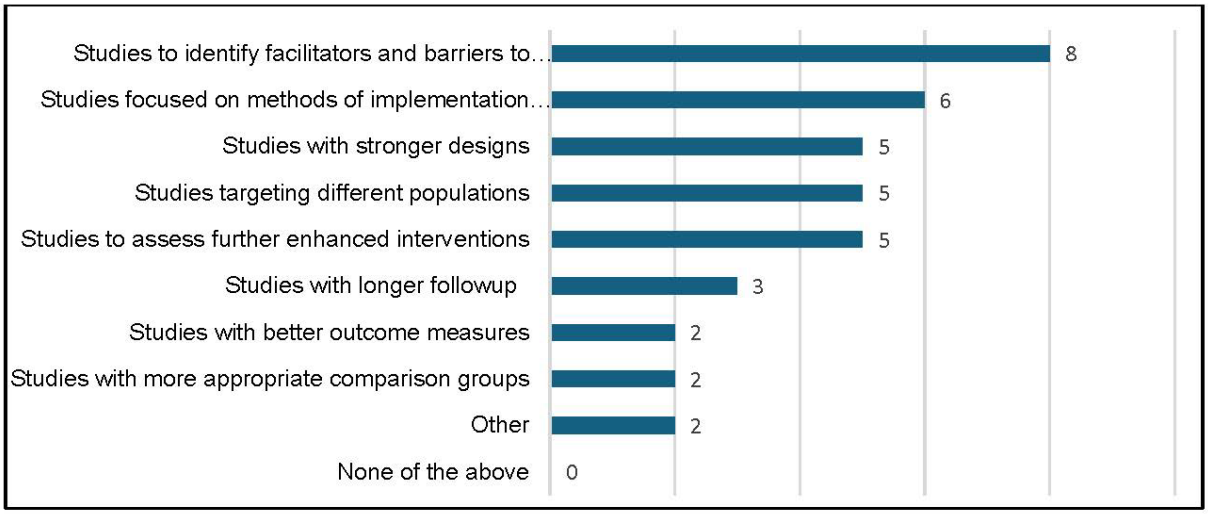


Figure 14. Most important priorities for addressing limitations in the current evidence on the effectiveness of patient safety practices related to the afferent and efferent limbs of rapid response systems (N=13)



Rapid Response Summaries

In contrast to rapid reviews, which used streamlined systematic review methods, the rapid responses were narrowly focused based on preliminary search results and consisted of a descriptive summary of a small number of recent relevant studies and systematic reviews.

8. Fatigue and Sleepiness of Clinicians Due to Hours of Service

8a. Findings From Previous MHS Reports

- MHS I provided a broad review of workplace fatigue, including studies across industries, as very little research had been conducted within health care settings at the time of the report.
- The hours of service and fatigue topic received a brief update in MHS II, with a focus on evaluations of regulatory limitations on resident work hours.

8b. MHS IV Rapid Response Findings

- Literature search
  - Searched PubMed and Cochrane for systematic reviews and primary studies (2013–2023)
  - 12 systematic reviews, 20 studies
- Evidence Summary
  - Interventions to reduce clinician fatigue and sleepiness owing to long work hours had mixed effects on the incidence of medical errors and patient mortality and morbidity.
- Barriers, Facilitators, and Resources
  - Barriers include concerns about continuity of care and increased faculty clinical responsibilities arising from changes in resident duty hour limitations.
  - Facilitators include handoff training and hiring mid-level providers.
  - No systematic reviews included information about toolkits.
- Conclusion
  - Current evidence on fatigue management for health care workers is inconclusive regarding its impact on patient safety and outcomes.
- The final report will be available at: https://www.ahrq.gov/research/findings/making-healthcare-safer/mhs4/index.html

8c. Ratings and Comments From the MHS IV TEP

- Figure 15 presents the panel's ratings after discussion.
  - The TEP was neutral toward adoption of PSPs focused on fatigue and sleepiness of clinicians, citing the absence of strong evidence of benefit or harm with high variability in approaches across settings that may require more adaptive research strategies.
  - Some interventions had merit, but it was unclear what might be effective or impactful.
- Figure 16 presents the TEP's views about priorities for addressing the evidence gaps.

- The TEP noted a lack of rigor to determine safety improvements and some ethical and methodological issues.
- The TEP believed this topic continues to be important and stressed the importance of developing and validating specific PSPs to address harm.
- The TEP's primary recommendations for future research were studies with stronger designs and better outcome measures, enhanced interventions, studies targeting different populations, and studies focused on methods of implementation.

Figure 15. Panel's post-discussion ratings of patient safety practices focused on fatigue and sleepiness of clinicians due to hours of service (N=15)

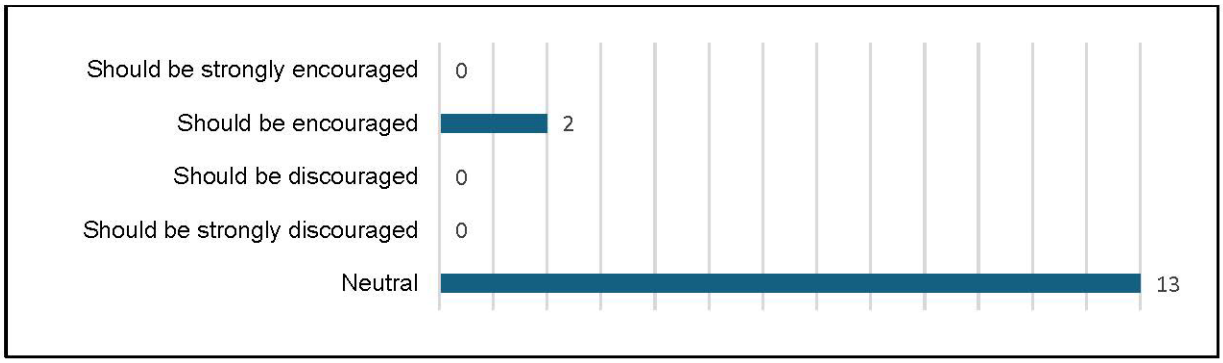
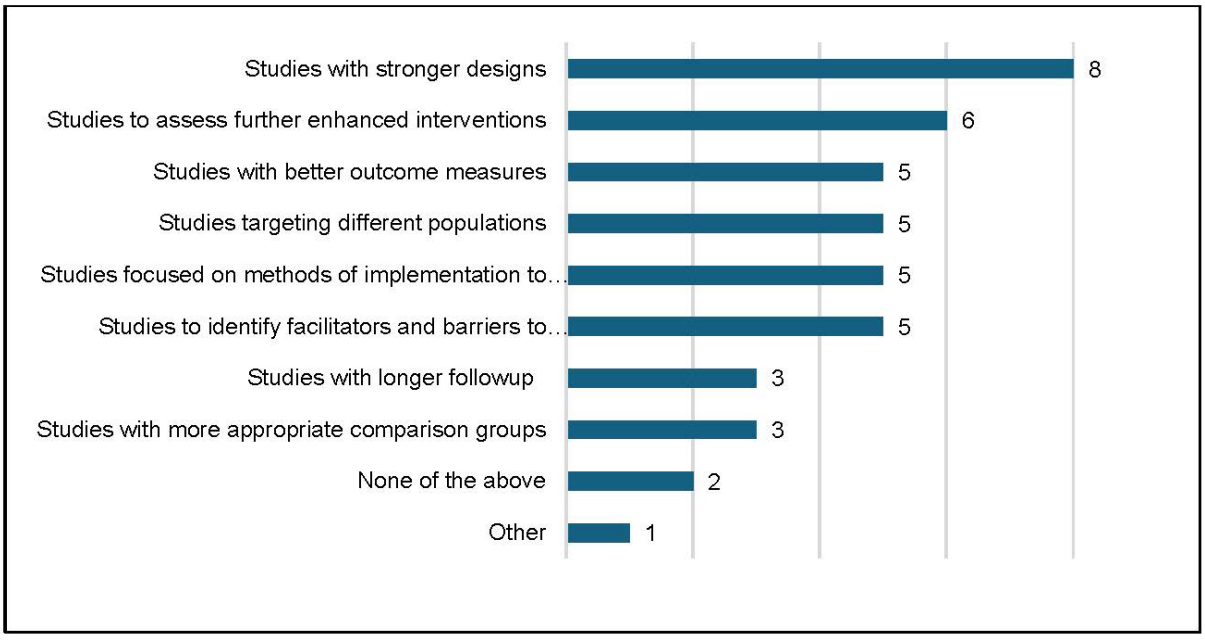


Figure 16. Most important priorities for addressing limitations in the current evidence on the effectiveness of patient safety practices focused on fatigue and sleepiness of clinicians due to hours of service (N=12)



9. Reducing Adverse Drug Events Related to Anticoagulant Use in Adults

9a. Findings From Previous MHS Reports

- MHS III found "moderately positive" evidence for the benefit of outpatient anticoagulation services on time to therapeutic range, and low or mixed evidence on bleeding events and thromboembolic events. The report found insufficient evidence on covered dosing protocols and nomograms for newer anticoagulants.

9b. MHS IV Rapid Response Findings

- Literature search
  - Searched PubMed and Cochrane for systematic reviews and primary studies (2019–2023)
  - 8 systematic reviews, 6 studies
- Evidence Summary
  - The balance of evidence suggests that the care transition interventions did not improve safety.
  - Most telemedicine interventions improved time in therapeutic range relative to usual care, which should reduce the risk of more serious events.
  - Evidence on the impact of educational programs and remote monitoring devices on clinical outcomes was mixed.
  - Anti-Xa monitoring lowered the rate of thromboembolic events without affecting major bleeding rates.
- Barriers, Facilitators, and Resources
  - Facilitators include portable coagulometers and telemedicine for drug monitoring.
  - Barriers include patient perception of lower quality of care at ambulatory clinics, resistance from clinicians, costs, and staffing.
  - Five cost studies either concluded that anticoagulation ambulatory clinics were cost-saving or had a low net cost (e.g., $625 per patient per year).
  - Resources include two toolkits to aid implementation: one relevant to care transitions and one relevant to ambulatory care.
- Conclusion
  - The time immediately after discharge is particularly important, but the limited evidence on interventions that target this period generally did not find reduced risk of adverse events.
  - For general ambulatory care, several systematic reviews found benefits of telemedicine interventions or anti-Xa monitoring in increasing patients' time in therapeutic range or reducing rates of bleeding, hospitalization, and thromboembolic events.
- The final report is available at: https://effectivehealthcare.ahrq.gov/sites/default/files/related_files/mhs-IV-high-risk-drugs-rapid-response.pdf.

9c. Ratings and Comments From the MHS IV TEP

- Figures 17a and 17b present the panel's ratings after discussion.
  - Regarding anticoagulation strategies for care transitions, the TEP did not express a consistent viewpoint. Seven of 15 TEP members voted to encourage, five voted to discourage, and three were neutral.
  - For anticoagulation strategies in ambulatory care, there was good agreement among the TEP, with 13 of 15 voting to encourage.
  - The TEP discussed the lack of evidence on benefits of the care transition PSPs for safety outcomes (e.g., thromboembolic events), the consistent evidence of benefit of two ambulatory PSPs (telemedicine interventions and anti-Xa monitoring), the likely lack of harm of any PSPs in this topic area, whether the positive studies tended to use some form of patient monitoring, and intervention fidelity.
- Figure 18 presents the TEP's views about priorities for addressing the evidence gaps.
  - The TEP's primary future research recommendations focused on better study designs, longer followup, and enhanced interventions.

Figure 17a. Panel's post-discussion ratings of patient safety practices for reducing adverse drug events related to anticoagulant use in *care transition* to support safe anticoagulation (N=15)

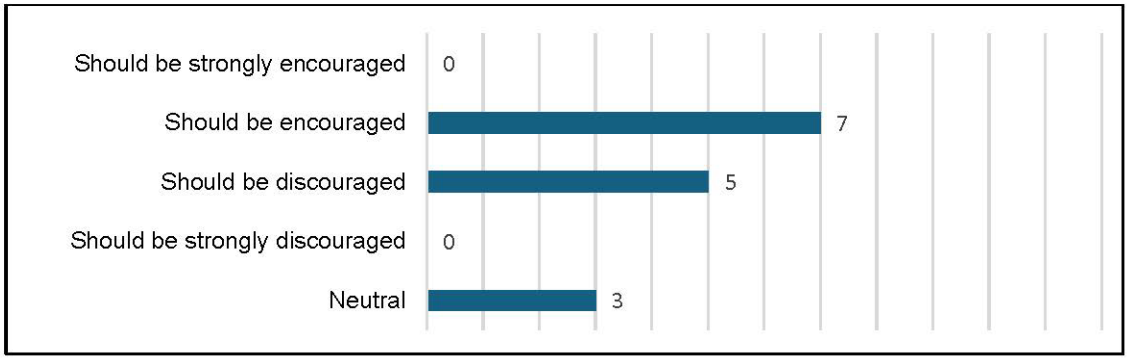


Figure 17b. Panel's post-discussion ratings of patient safety practices for reducing adverse drug events related to anticoagulant use in *ambulatory care* to support safe anticoagulation (N=15)

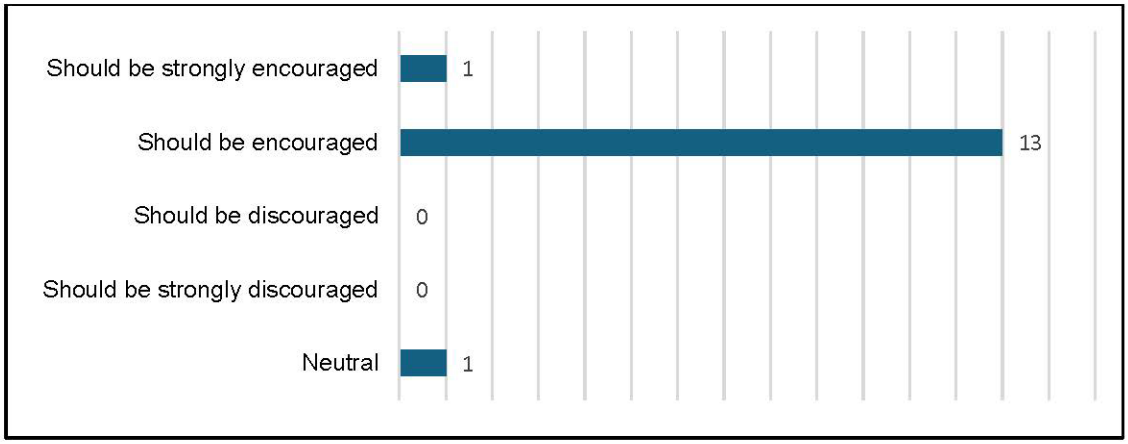
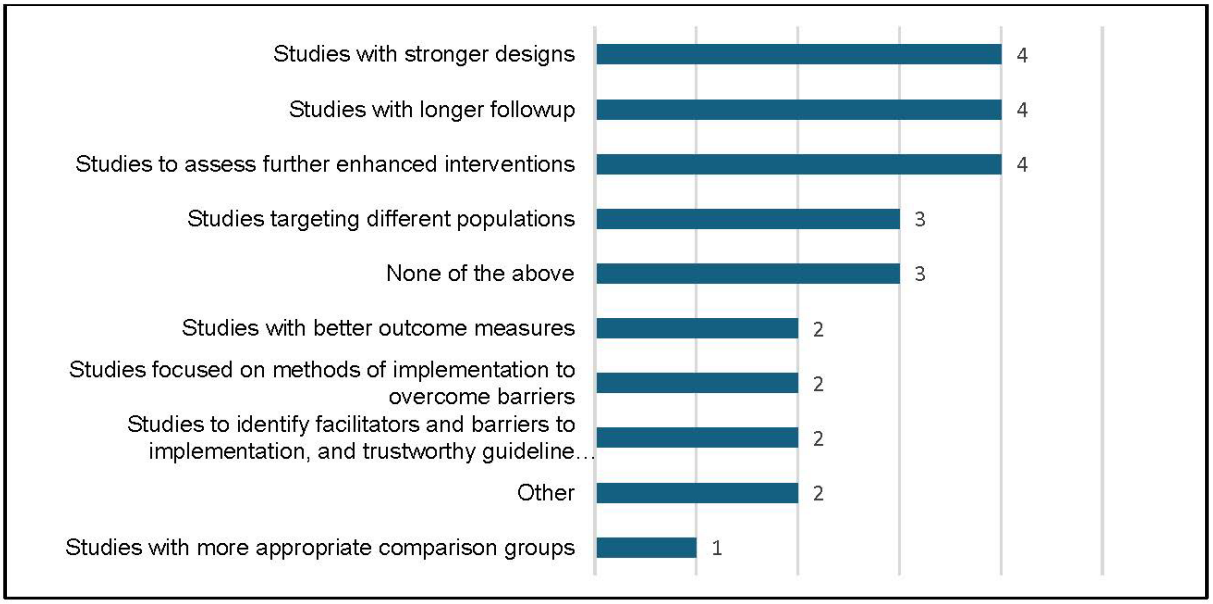


Figure 18. Most important priorities for addressing limitations in the current evidence on the effectiveness of care transition patient safety practices to support safe anticoagulation (N=12)



10. Use of Report Cards and Outcome Measurements To Improve the Safety of Surgical Care

10a. Findings From Previous MHS Reports

- Despite lacking randomized trials, MHS II found strong evidence for using outcome measurements and report cards to improve surgical safety. The theoretical basis, positive results in other settings, and observed improvements in National Surgical Quality Improvement Program (NSQIP) sites led to classifying this as a "to be encouraged" PSP.
- MHS III did not address this topic.

10b. MHS IV Rapid Response Findings

- Literature search
  - Searched PubMed, Web of Science, Scopus, and Cochrane for systematic reviews and primary studies (2011–2023)
  - 1 systematic review, 20 studies
- Evidence Summary
  - Findings were consistent with the previous MHS II report.
  - Pre-post studies of report card-prompted quality improvement programs yielded improvements, sometimes dramatic, in outcomes.
  - Studies with higher internal validity but without clear links to quality improvement programs were more mixed, mostly showing no statistically significant benefit.
- Barriers, Facilitators, and Resources
  - One study found technical and cultural barriers to adoption. Technical barriers included concerns about data accuracy and lack of statistical understanding. Cultural barriers included lack of buy-in from specific departments and waning interest from well-performing institutions.
  - A separate study found that surgeons reviewed their individual reports briefly and perceived both benefits (personal performance knowledge) and limitations (data accuracy, sample size, external factors).
- Conclusion
  - Studies which use report card data to implement a quality improvement initiative demonstrate a trend toward showing decreased morbidity and/or mortality, whereas those studies which longitudinally follow hospitals participating in report cards trend toward showing no change in morbidity or mortality.
- The final report is available at: https://effectivehealthcare.ahrq.gov/sites/default/files/related_files/mhs-IV-rapid-response-surgical-report-cards.pdf.

10c. Ratings and Comments From MHS IV TEP

- Figure 19 presents the panel's ratings after discussion.

- All but one member of the TEP voted to encourage or strongly encourage the use of report cards and outcomes measurements in surgical care.
- The TEP recognized that surgical report cards by themselves cannot produce improvements in patient safety.
- Only when used to trigger contextually specific improvement interventions can the report cards contribute to making patient care safer.

- Figure 20 presents the TEP's views about priorities for addressing the evidence gaps.
  - The TEP's primary future research recommendations focused on enhanced interventions, methods of implementation to overcome barriers, and studies targeting different populations.

Figure 19. Panel's post-discussion ratings of patient safety practices related to use of report cards and outcome measurements to improve the safety of surgical care (N=15)

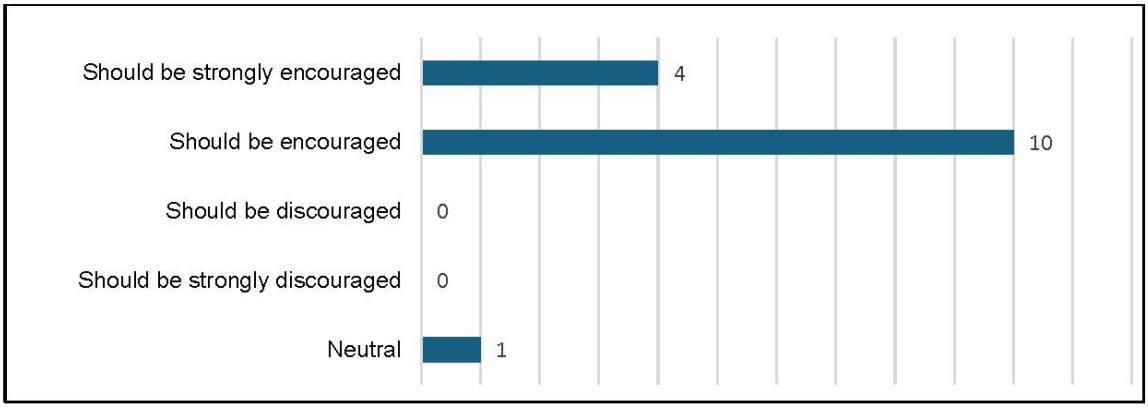
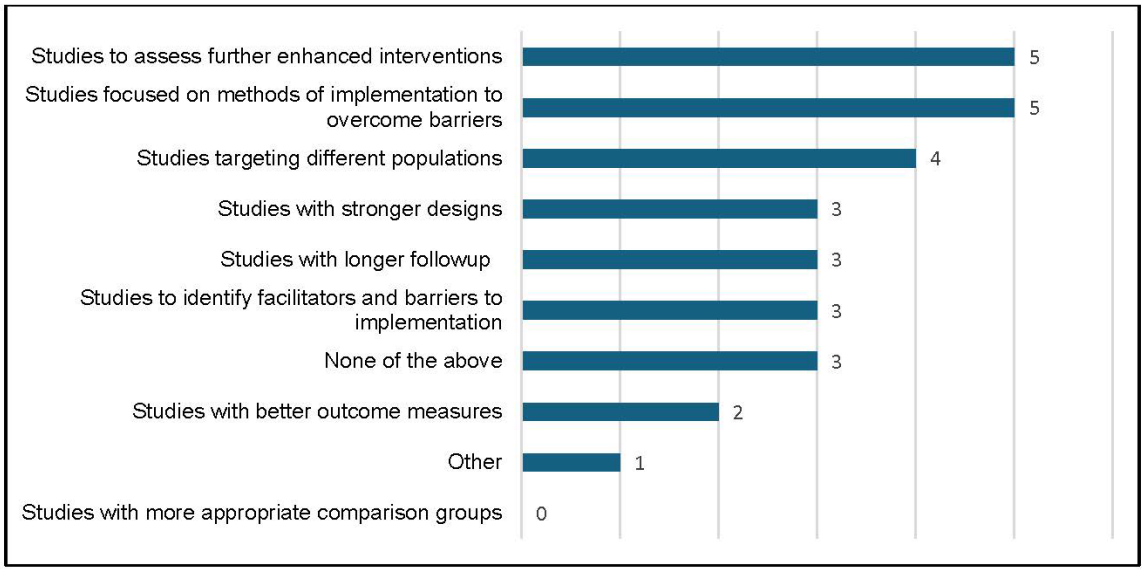


Figure 20. Most important priorities for addressing limitations in the current evidence on the effectiveness of patient safety practices focused on the use of report cards and outcome measurements to improve the safety of surgical care (N=12)



11. Deprescribing To Reduce Medication Harms in Older Adults

11a. Findings From Previous MHS Reports

- MHS III covered 14 studies on deprescribing and found that reviews by clinical pharmacists and geriatricians could reduce use of potentially inappropriate medications (PIMs), that deprescribing reduced medication-related costs for patients and health care systems, and that patient/family education led to better communication about medication use.

11b. MHS IV Rapid Response Findings

- Literature search
  - Searched PubMed and Cochrane for systematic reviews and primary studies (January 1, 2019, through July 31, 2023)
  - 21 systematic reviews, 11 studies
- Evidence Summary
  - Most reviews and original research on deprescribing demonstrated reductions in medication counts, PIMs, or both.
  - Most studies found no reduction in falls, but a systematic review reported that half of the included studies reduced falls.
  - Systematic reviews most often reported no reduction in hospitalizations.
  - Two systematic reviews found no impact on mortality. However, a meta-analysis reported reduced mortality and in another systematic review, one of two included studies reporting a mortality outcome showed a benefit.
  - Many interventions reduced pharmacy-related costs, but it was difficult to draw conclusions about overall health care costs.
- Barriers, Facilitators, and Resources
  - There is a large literature about barriers and facilitators of deprescribing interventions.
  - Several toolkits offer practical guidance, including operational plans, protocols, and workflow advice.
- Conclusion
  - Deprescribing reduces medication counts, inappropriate medication use, and pharmacy costs with minimal risk of adverse events.
  - Further research is needed to determine the full benefits of deprescribing.
- The final report is available at: https://effectivehealthcare.ahrq.gov/sites/default/files/related_files/mhs-IV-rapid-response-deprescribing.pdf.

11c. Ratings and Comments From the MHS IV TEP

- Figure 21 presents the panel's ratings after discussion.
  - The TEP considered the reduction of potentially inappropriate medication use to be a worthwhile patient safety outcome in and of itself and unanimously encouraged

adoption of deprescribing interventions, with four members of the TEP strongly encouraging such interventions.

- Figure 22 presents the TEP's views about priorities for addressing the evidence gaps.
  - The TEP's primary future research recommendations focused on methods of implementation to overcome barriers, studies with stronger designs and better outcome measures, and studies to identify facilitators and barriers to implementation.

Figure 21. Panel's post-discussion ratings of patient safety practices related to deprescribing to reduce medication harms in older adults (N=15)

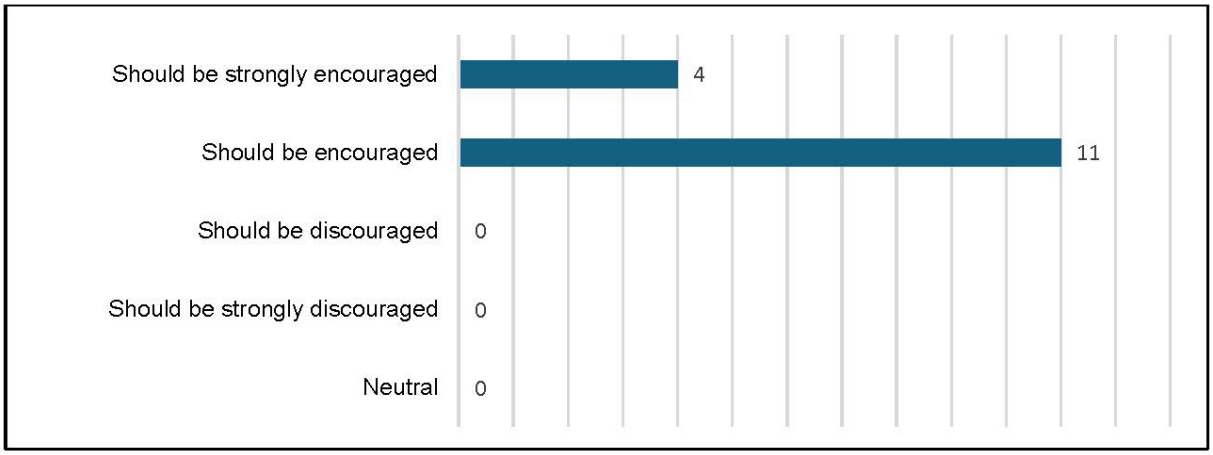
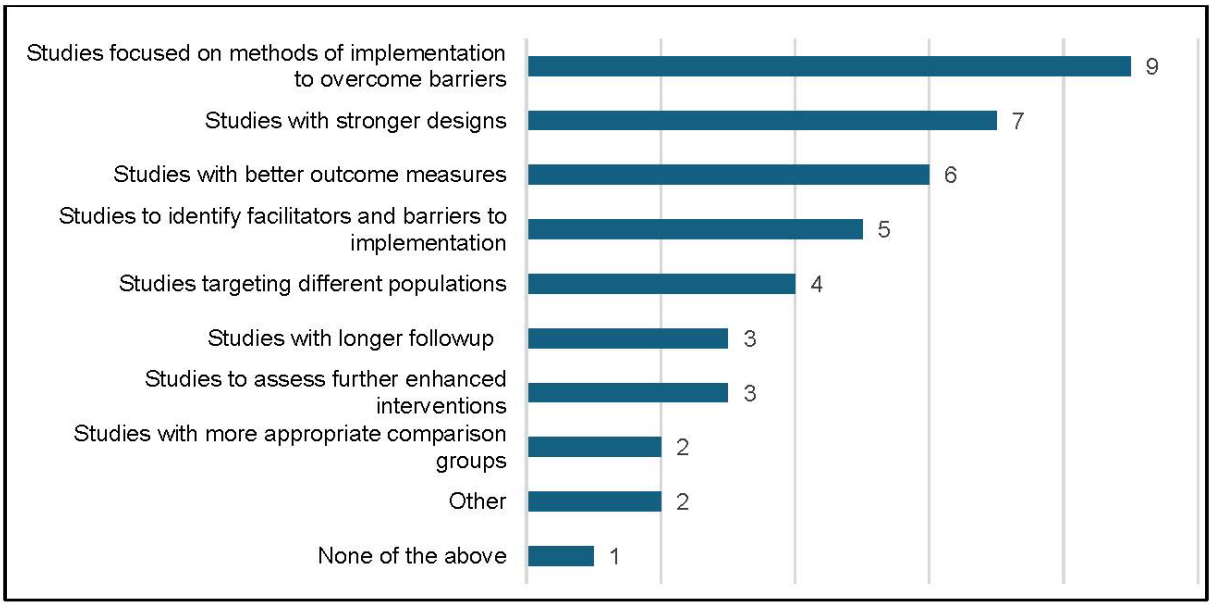


Figure 22. Most important priorities for addressing limitations in the current evidence on the effectiveness of deprescribing interventions to reduce medication harms in older adults (N=13)



12. Patient and Family Engagement

12a. Findings From Previous MHS Reports

- MHS III identified limited evidence on patient and family engagement (PFE) as a PSP and called for more research.

12b. MHS IV Rapid Response Findings

- Literature search
  - Searched PubMed and Cochrane for systematic reviews and primary studies (January 1, 2019 through April 30, 2023)
  - 1 systematic review, 5 studies
- Evidence Summary
  - 3 studies examined PFE in fall prevention programs and found reduced falls.
  - 3 studies examined PFE with patient portals and found reduced hospital length of stay (2 studies) and readmissions (2 studies)
- Barriers, Facilitators, and Resources
  - Barriers and facilitators stem from staff attitudes, patient perceptions, and organizational resources.
  - Resources include toolkits on Fall Tailoring Interventions and Patient-Centered Discharge and multiple resources from AHRQ and other organizations to support PFE implementation.
- Conclusion
  - Consistent with previous MHS reviews, we found insufficient evidence to guide broad implementation of PFE as a PSP.
- The final report is available at: https://effectivehealthcare.ahrq.gov/sites/default/files/related_files/mhs-IV-rapid-response-patient-family-engagement.pdf.

12c. Ratings and Comments From the MHS IV TEP

- Figure 23 presents the panel's ratings after discussion.
  - The TEP acknowledged that communication with patients and their families was important. Seven of the 15 TEP members encouraged adoption of PFE interventions as a PSP given the importance of the topic and the evidence of positive effects despite a limited number of studies. Eight members of the TEP voted to neither encourage nor discourage PFE interventions as a PSP owing to the limited evidence of impact.
- Figure 24 presents the TEP's views about the priorities for addressing the evidence gaps.
  - The TEP's primary recommendations for future research were studies with stronger designs, studies targeting different populations, better outcome measures, longer followup, enhanced interventions, and studies focused on methods of implementation.

Figure 23. Panel's post-discussion ratings of patient safety practices for promoting patent and family engagement (N=15)

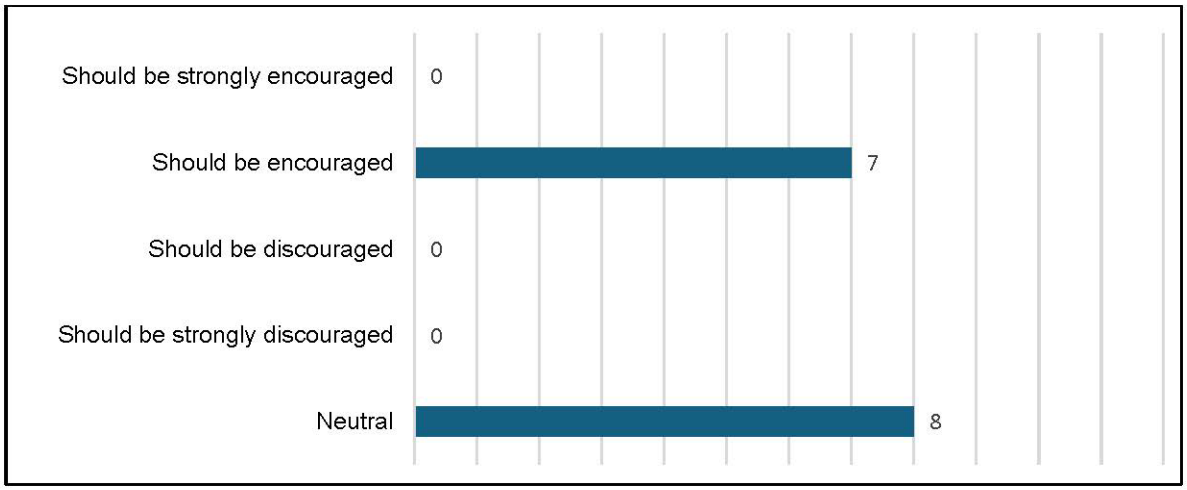
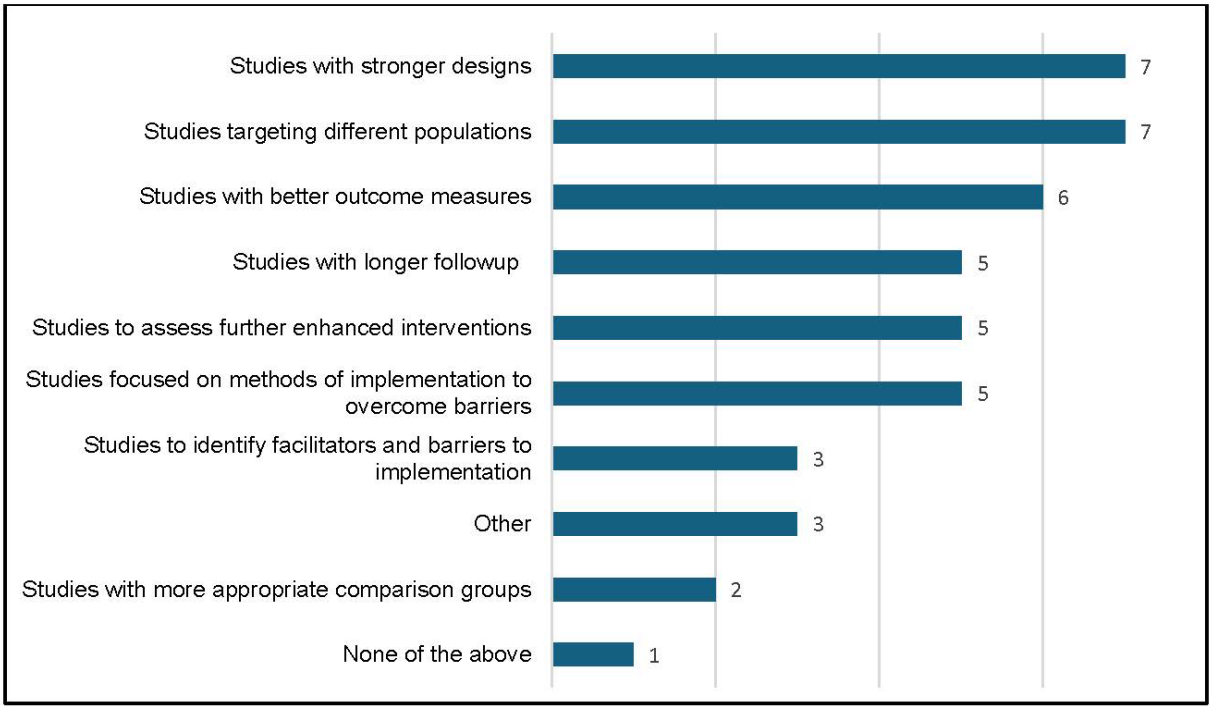


Figure 24. Most important priorities for addressing limitations in the current evidence on the effectiveness of patient safety practices for promoting patient and family engagement systems (N=12)



13. Active Surveillance Culturing of *Clostridioides difficile* and Multidrug-Resistant Organisms: Methicillin-Resistant *Staphylococcus aureus*, Carbapenem-Resistant *Enterobacterales*, and *Candida auris*

13a. Findings From Previous MHS Reports

- MHS III examined active surveillance (ASC) as a PSP within the larger topic of MDROs. The report noted a lack of consensus regarding surveillance for *Candida auris*.

13b. MHS IV Rapid Response Findings

- Literature search
  - Searched PubMed and Cochrane for systematic reviews and primary studies (2019–2023)
  - 6 studies
- Evidence Summary
  - Studies usually compared targeted surveillance to no surveillance, whereas direct comparisons of targeted surveillance to universal surveillance would be optimal.
  - One study highlighted a growing interest in de-implementing active surveillance, but additional research on the safety of discontinuing ASC PSPs is needed.
- Barriers, Facilitators, and Resources
  - Implementing ASC programs can be resource-intensive; staff time, lab costs, and long turnaround times are major considerations.
  - Targeting specific populations, while reducing resource burden, lacks strong evidence of cost impact.
  - No recent toolkits are available to support program implementation.
- Conclusion
  - Four recent studies confirm that ASC for *Clostridioides difficile* and carbapenem-resistant *Enterobacterales* (CRE) can lower infection rates.
  - The evidence also suggests that both universal and targeted surveillance can be effective.
  - Substantial gaps and limitations of the evidence base remain largely unaddressed by recent research, especially regarding surveillance of *Candida auris*.
- The final report will be available at : https://www.ahrq.gov/research/findings/making-healthcare-safer/mhs4/index.html.

13c. Ratings and Comments From the MHS IV TEP

- Figure 25 presents the panel's ratings after discussion.
  - The majority of the TEP encouraged use of ASC based on a small evidence base suggesting a benefit.
  - The TEP noted that surveillance strategies are often included in broader, multi-component infection control programs.
  - None of the TEP members discouraged ASC as a PSP.

- Figure 26 presents the TEP's views about priorities for addressing the evidence gaps.
  - The TEP's primary recommendations for future research were studies with stronger designs, better outcome measures, and longer followup.
  - Future research should address the value of targeted versus universal ASC, the costs of implementing surveillance programs, and the effectiveness of surveillance for *Candida auris*.

Figure 25. Panel's post-discussion ratings of patient safety practices related to active surveillance culturing for multidrug-resistant organisms (N=15)

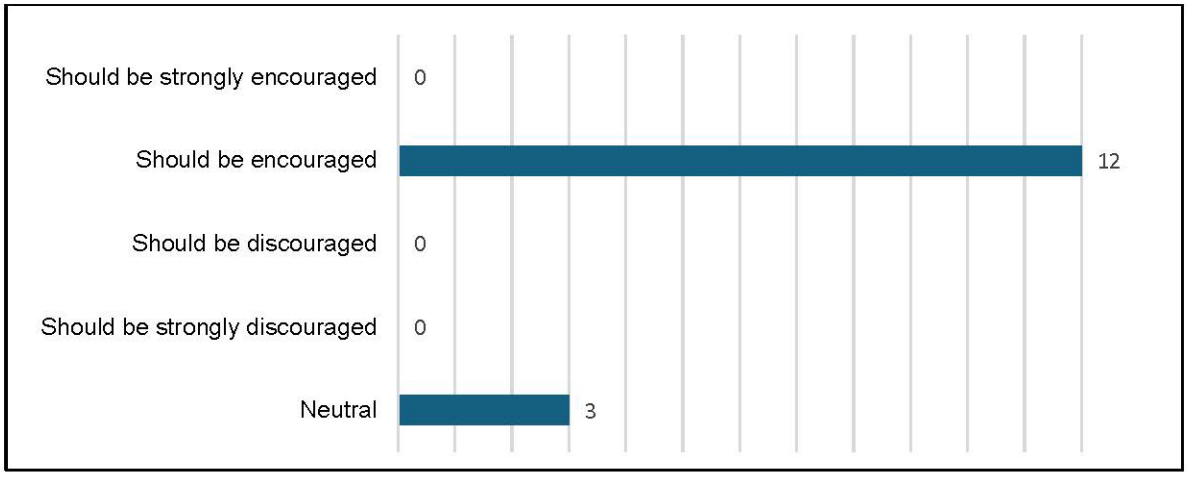
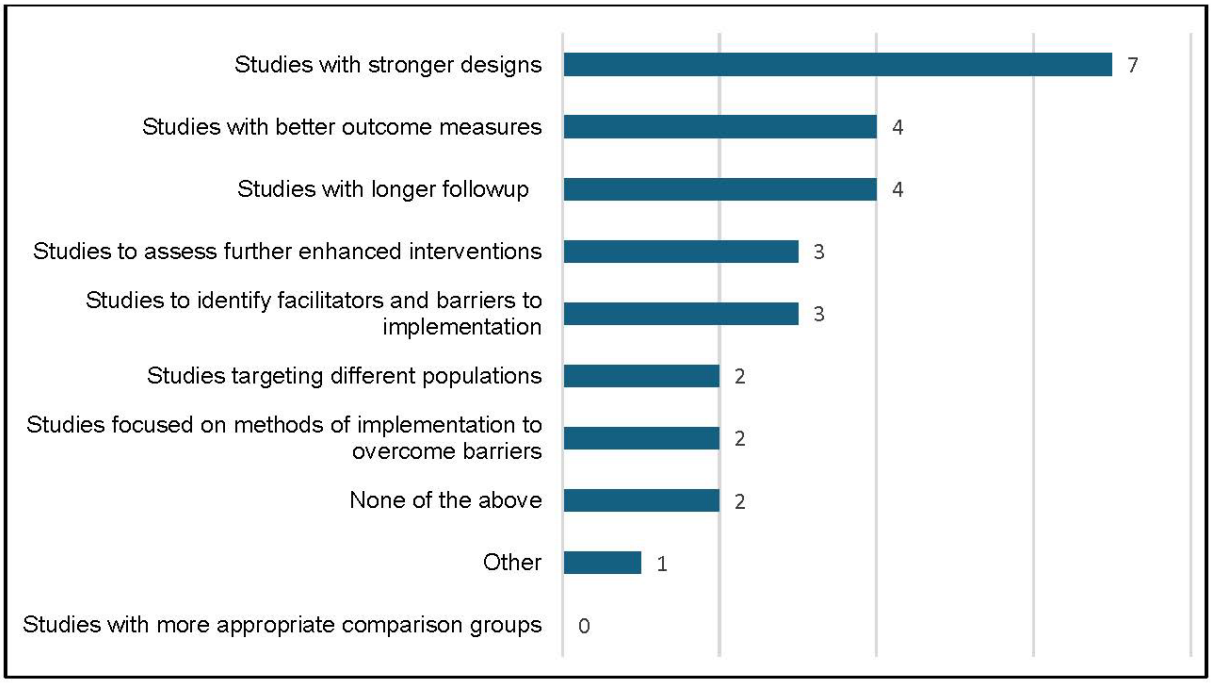


Figure 26. Most important priorities for addressing limitations in the current evidence on the effectiveness of patient safety practices for active surveillance culturing for *Clostridioides difficile* and multidrug-resistant organisms (N=12)



Discussion

Table 2 presents a summary of the advice from the Technical Expert Panel (TEP) about whether to encourage or discourage widespread use of the patient safety practices (PSPs) covered in our reports. The table includes categorization of the advice in terms of whether the TEP encouraged, discouraged, or was neutral about each PSP. Although the TEP had mixed advice about two of the PSPs, the TEP reached consensus about encouraging eight of the PSPs.

Table 2. Overall summary and categorization of the Technical Expert Panel's advice on whether to encourage or discourage widespread use of the patient safety practices

Patient Safety Practice	Summary of Final Advice	Categorization of Final Advice
1. CDSS to Prevent Medication Errors and Adverse Drug Events	• The TEP encouraged implementation of PSPs involving CDSS to reduce medication errors and adverse drug events. They also stressed that "CDSS" is a single label for what is a myriad of interventions with different vendors, different electronic health record systems, and different organizational contexts.	Encouraged
2. Opioid Stewardship	• The TEP encouraged adoption of three types of PSPs for opioid stewardship: o Clinical decision support or electronic health record interventions; o Patient and family education, or engagement interventions; and o Multicomponent interventions.	Encouraged
3. Prevention in Adults of Transmission of Infection with Multidrug-Resistant Organisms	• The TEP encouraged efforts to prevent the spread of multi-drug resistant organisms to protect patients and healthcare personnel but was reluctant to put forward one or more specific practices for preventing transmission of multi-drug resistant organisms.	Encouraged
4. Failure To Rescue – Rapid Response Systems	• The TEP encouraged adoption of rapid response system interventions because of the importance of the topic and evidence of reduction of mortality.	Encouraged
5. Reducing Adverse Drug Events Related to Anticoagulant Use in Adults - *In Ambulatory Care*	• The TEP encouraged patient safety practices for reducing drug events related to anticoagulant use in ambulatory care	Encouraged
6. Use of Report Cards and Outcome Measurements to Improve the Safety of Surgical Care	• The TEP encouraged the use of report cards and outcomes measurements in surgical care.	Encouraged
7. Deprescribing to Reduce Medication Harms in Older Adults	• The TEP encouraged adoption of deprescribing interventions.	Encouraged
8. Active Surveillance Culturing of *Clostridiodes difficile* and Multidrug-Resistant Organisms: Methicillin-Resistant *Staphylococcus aureus,* Carbapenem-Resistant *Enterobacterales*, and *Candida auris*	• The TEP encouraged the use of active surveillance culturing of multidrug-resistant organisms based on a small evidence base suggesting a benefit.	Encouraged
9. Healthcare Worker Implicit Bias Training and Education	• The TEP did not encourage the use of implicit bias training and education of healthcare workers for the purpose of improving patient safety due to the lack of evidence on its effectiveness for this purpose but acknowledged the importance of implicit bias training for other purposes.	Discouraged
10. Patient Safety Practices Focused on Sepsis Prediction and Recognition	• The TEP discouraged adoption of specific PSPs for sepsis prediction and recognition due to the lack of evidence of their benefit and relative resource intensity of their implementation.	Discouraged

Patient Safety Practice	Summary of Final Advice	Categorization of Final Advice
11. Engaging Family Caregivers with Structured Communication for Safe Care Transitions - *Hospital Discharge and Other Care Transitions*	• The TEP was mostly neutral about whether to encourage or discourage engaging family caregivers in care transitions from hospital discharge and other care transitions.	Neutral
12. Fatigue and Sleepiness of Clinicians Due to Hours of Services	• The TEP was mostly neutral about whether to encourage or discourage adoption of specific patient safety practices focused on fatigue and sleepiness of clinicians.	Neutral
13. Patient and Family Engagement	• The TEP was mostly neutral about whether to encourage or discourage PSPs for promoting patient and family engagement interventions because of the limited evidence of impact.	Neutral
14. Engaging Family Caregivers with Structured Communication for Safe Care Transitions - *Intensive Care Unit*	• The TEP did not express a consistent viewpoint on engaging family caregivers in structured communication for intensive care unit care transitions.	Mixed advice
15. Reducing Adverse Drug Events Related to Anticoagulant Use in Adults -*Care Transitions*	• The TEP did not express a consistent viewpoint on patient safety practices for reducing drug events related to anticoagulant use during transitions from hospital care.	Mixed advice

CDSS =clinical decision support systems; PSPs = patient safety practices; TEP =Technical Expert Panel

Limitations Across All Topics

Across the topics of this report, PSP interventions face several barriers to implementation that affect study design quality and may limit the evidence for positive impact on patient safety and quality outcomes. At the PSP level, studies that vary in context make it difficult to estimate overall benefit. PSPs identified by a single label, such as computerized clinical decision support systems, may represent a myriad of different interventions, with differing vendors of electronic health records, limiting the strength of evidence about improving outcomes. The evidence is also limited by the difficulty in performing rigorous studies of PSPs associated with high costs, high workload, or high resource intensity. PSP interventions that have cultural barriers or require acceptance by providers or patients may have limited evidence of overall benefit because of problems with implementation. PSPs for targeted population groups, such as adults in intensive care units, may have evidence of impact, but lack the strength of evidence to endorse widespread adoption across other acute care settings or other subgroups. PSP interventions such as fatigue mitigation or opioid stewardship may have unintended adverse consequences that require further study.

Overall, evaluation of the effectiveness of PSP interventions often was limited by weaknesses of study design, lack of standardized outcome measures, heterogeneity of the interventions, variation in the targeted clinical populations, and insufficient attention to methods of implementation.

Implications for Future Research Across All Topics

TEP ratings of future research needs varied widely across PSPs reviewed in this report. However, several trends are apparent in the TEP's recommendations. The most commonly cited high priorities for future research included: (1) conducting expanded or higher quality studies (i.e., with stronger designs, better outcome measures, longer follow-up periods, and different populations); (2) evaluation of implementation processes (either identifying barriers and

facilitators or evaluating processes to overcome barriers); and (3) studies about how to further improve the effectiveness of PSP interventions. All PSPs had at least one of these three topics in their highest rated research priorities. Two long-standing topics reviewed in several past MHS reports and having broad adoption in some form (clinical decision support systems and surgical report cards) emphasized evaluation of enhancements to the PSP as well as studies of implementation. TEP members rated improved study quality (i.e., most commonly stronger design, but also better outcome measures, longer follow ups) as the primary research priority for four topics (i.e., reducing adverse drug events related to anticoagulant use in adults, patient and family engagement, active surveillance culturing of *Clostridioides difficile* and multidrug-resistant organisms, and implicit bias training). An additional three topics had higher study quality and evaluations of further PSP enhancements as top priorities (opioid stewardship, fatigue and sleepiness, and prevention of transmission of multidrug-resistant organisms). Additionally, one topic (sepsis prediction and recognition systems) had higher study quality and implementation evaluation as top research priorities. Two topics had PSP implementation related concerns as top research priorities (rapid response systems, and engaging family caregivers) and an additional topic (deprescribing) had PSP implementation and higher quality studies as top priorities.

The PSPs reviewed here are diverse, and the state of the literature for each is complex. However, the cross-cutting themes in research priorities are reasonably clear. Higher quality studies are needed to expand the evidence-base for many PSPs, particularly less established practices. Implementation studies are needed to better understand how to efficiently integrate. PSPs into practice. Studies of enhanced versions of PSPs are needed to improve the impact of existing PSPs.

References

1. Agency for Health Care Research and Quality. Assessing the Evidence Base for Context-Sensitive Effectiveness and Safety of Patient Safety Practices: Developing Criteria. Solicitation Number: AHRQ-2009–10001. https://www.fbo.gov (accessed Sep 2010).
2. Bates DW, Singh H. Two decades since to err is human: an assessment of progress and emerging priorities in patient safety. Health Aff. 2018 Nov;37(11):1736-43. DOI: https://doi.org/10.1377/hlthaff.2018.0738. PMID: 30395508.
3. Clancy CM. Ten years after to err is human. American J Med Qual. 2009 Nov-Dec;24(6):525-8. Epub 2009 Oct 13. DOI: https://doi.org/10.1177/1062860609349728. PMID: 19826077.
4. Dzau VJ, Shine KI. Two Decades Since To Err Is Human: Progress, but Still a "Chasm." JAMA. 2020 Dec 22;324(24):2489-90. https://doi.org/10.1001/jama.202023151. PMID: 33351025.
5. Leape LL, Berwick DM. Five years after To Err Is Human: what have we learned? JAMA. 2005 May 18;293(19):2384-90. https://doi.org/10.1001/jama.293.19.2384. PMID: 15900009.
6. Wachter RM. The end of the beginning: patient safety five years after 'To Err Is Human' amid signs of progress, there is still a long way to go. Health Aff. 2004 Jul-Dec;23(Suppl1):W4-534-45. https://doi.org/10.1377/hlthaff.w4.534. PMID: 15572380.
7. Tang PC, Kearney M, eds. Peer Review of a Report on Strategies To Improve Patient Safety. National Academies of Science, Engineering, and Medicine. 2021. DOI: https://doi.org/10.17226/26136.
8. Panagioti M, Khan K, Keers RN, et al. Prevalence, severity, and nature of preventable patient harm across medical care settings: systematic review and meta-analysis. BMJ. 2019 Jul 17;366:l4185. doi: 10.1136/bmj.l4185. PMID: 31315828.
9. Grimm, CA. Adverse Events in Hospitals: A Quarter of Medicare Patients Experienced Harm in October 2018. U.S. Department of Health and Human Services Office of Inspector General. May 2022. https://oig.hhs.gov/oei/reports/OEI-06-18-00400.pdf.
10. Patel PR, Weiner-Lastinger LM, Dudeck MA, et al. Impact of COVID-19 pandemic on central-line–associated bloodstream infections during the early months of 2020, National Healthcare Safety Network. Infect Control Hospital Epidemiol. 2022 Jun;43(6):790-3. Epub 2021 Mar 15. doi: 10.1017/ice.2021.108. PMID: 33719981.
11. Rosen M, Dy SM, Stewart CM, Shekelle P, Tsou A, Treadwell J, Sharma R, Zhang A, Vass M, Motala A, Bass EB. Final Report on Prioritization of Patient Safety Practices for a New Rapid Review or Rapid Response. Making Healthcare Safer IV. (Prepared by the Johns Hopkins, ECRI, and Southern California Evidence-based Practice Centers under Contract No. 75Q80120D00003). AHRQ Publication No. 23-EHC019-1. Rockville, MD: Agency for Healthcare Research and Quality. July 2023. DOI: https://doi.org/10.23970/AHRQEPC_MHS4PRIORITIZATION.
12. Rosen M, Stewart CM, Kharrazi H, Sharma R, Vass M, Zhang A, Bass EB. Potential Harms Resulting From Patient-Clinician Real-Time Clinical Encounters Using Video-based Telehealth: A Rapid Evidence Review (Prepared by the Johns Hopkins University Evidence-based Practice Center under Contract No. 75Q80120D00003.). AHRQ Publication No. 23-EHC019-2. Rockville, MD: Agency for Healthcare Research and Quality; September 2023. DOI: https://doi.org/10.23970/AHRQEPC_MHS4TELEHEALTH.