

AGENCY FOR HEALTHCARE RESEARCH AND QUALITY

AHRQ PSNet Webinar

Making Healthcare Safer (MHS) IV:
Rapid Response Systems and Opioid Stewardship

February 10, 2025

Agenda

- Logistics
- Introduction to the Making Healthcare Safer (MHS) IV Reports
- Report 1 – Rapid Response Systems
  - Discussion
  - PSNet Resources
- Report 2 – Opioid Stewardship
  - Discussion
  - PSNet Resources
- Closing remarks

Logistics

- This session will be recorded and available on the AHRQ PSNet website.
- Polling questions will be conducted at the start and conclusion of the presentation – we would appreciate your participation!
- All attendee lines are muted.
- You may submit questions via the Chat Function at any time.
  - Responses to questions will be posted, along with a recording of the presentation, on the PSNet Website.

POLLING QUESTIONS

Making Healthcare Safer (MHS) IV Reports

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Center for Quality Improvement and Patient Safety

Eric Bass, MD, MPH
Johns Hopkins University Evidence-based Practice Center

History of MHS

- 1999 Institute of Medicine: *To Err is Human*
- MHS Reports – collection of evidence reviews of existing and emerging PSPs (interventions)
  - *MHS I: 2001*
  - *MHS II: 2013*
  - *MHS III: 2020*

  total = 109 topics!

MHS: Making Healthcare Safer; PSPs: patient safety practices

MHS IV

Purpose: provide health systems & patient safety leaders with the most current evidence on existing & emerging PSPs

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MHS IV Team

Johns Hopkins Univ.

- Eric Bass **[Lead]**
- Michael Rosen
- Matthew Stewart
- Julie Waldfogel
- Bradford Winters
- Sydney Dy
- Jodi Segal
- Jerald Cherian
- Marissa Clifton
- Vadim Dukhanin
- Molly P. Kilcullen
- Jennifer Milesky
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- Allen Zhang
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- Christopher Xiao

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- Nikhil Mull
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- Christopher Jepson
- Ilya Ivlev
- Hanan Aboumatar
- David A. Pegues
- Shazia Mehmood Siddique
- Jaya Aysola
- Margot E. Cohen
- Evan LeGault

RAND

- Paul Shekelle **[Lead]**
- Sean T. McCarthy
- Ania Syrowatka
- Amy M. Linsky
- Melinda Maggard-Gibbons
- Mariah Blegen
- Haley Tupper
- Mark Girgis
- Alykhan Premji
- Tess Huy
- Aneesa Motala
- Emily Lawson

MHS IV: Technical Expert Panel Prioritization

- 136 topics identified from past MHS reports & horizon scan & rated on:
  - Appropriateness
  - Importance
  - Duplication
  - Impact
  - Feasibility
- TEP included representatives of governmental agencies, healthcare stakeholders, clinical specialists, experts in patient safety issues, & patient/consumer perspective.
- TEP used a modified Delphi technique to obtain consensus about PSPs meriting highest priority for review

What do we want to know about the PSPs?

- How effective are the PSPs, what are their unintended effects, *and what new evidence has been published since the last MHS report (if the topic or PSP was previously covered)*?
- How does the PSP prevent or mitigate harms?
- What are common barriers and facilitators to implementation?
- What resources (e.g., cost, staff, time) are required for implementation?
- What toolkits are available to support implementation?

Rapid Reviews & Rapid Responses

- For rapid reviews, strategic adjustments were made to streamline traditional systematic review processes, including:
  - ► being as specific as possible about the questions,
  - ► limiting the databases searched,
  - ► modifying search strategies to focus on the most valuable studies, &
  - ► restricting search to studies published in English & performed in the US.
- Rapid responses were used for topics with limited recent evidence.

Topics

Option Year 1	Option Year 2
Rapid Reviews • Opioid stewardship • Rapid response systems • Engaging family caregivers • Transmission-based precautions • Clinical decision support • Sepsis prediction & recognition **Rapid Responses** • Patient & family engagement • Infection surveillance • Use of report cards & outcome measurements to improve safety of surgical care • Deprescribing • Reducing adverse drug events related to anticoagulants • Hours of service, fatigue & sleepiness	**Rapid Reviews** • Patient monitoring systems • Supply chain disruptions • High reliability organization principles • Handoff protocols • Post-event communication • Non-ventilator associated pneumonia **Rapid Response** • Nursing staff shortages

Technical Expert Voting

- The purpose was to get input about each PSP on:
  - ► whether hospitals & other healthcare facilities should adopt the PSP, taking into consideration the following factors.
    - importance of the safety problem [frequency & severity]
    - rationale for PSP
    - evidence on whether PSP can improve outcomes
    - potential for unintended consequences
    - how hard it is to implement the PSP based on reported barriers, facilitators, resources needed, & available toolkits to support implementation
    - each expert's experience as a researcher, clinician, policymaker, or patient safety advocate.
  - ► priorities for addressing limitations in the evidence on PSPs.

Technical Expert Panel Response Options

- **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 implementing this PSP over one which was not. Unless hospitals know outcomes for this problem are already excellent, most organizations should be implementing this PSP.
- **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 implementing this PSP over one which was not, but we have uncertainty about the effectiveness or concern about barriers or costs that keep us from putting it on the "strongly encouraged" list. Unless hospitals know outcomes for this problem are excellent, many organizations should be implementing this PSP. Each organization would need to consider its capacity for implementation.
- **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. Harms & costs of implementation may outweigh the potential benefit.
- **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.
- **Neutral/Prefer not to rate**.

Today's Topics

- Two patient safety practices:
  - Rapid Response Systems
  - Opioid Stewardship
- Encouraged by the majority of the MHS Technical Expert Panel
- Represent very different types of interventions

Objectives

- Describe the essential components of a rapid response system and explain how it can help detect and respond to clinical deterioration, leading to improved patient outcomes.
- Identify key elements of effective opioid stewardship interventions that can improve patient safety in healthcare settings.
- Identify resources to support implementation of recommended patient safety practices in these areas.

Failure to Rescue – Rapid Response Systems

Rapid Review

Failure to Rescue – Rapid Response Systems: Rapid Review

Bradford Winters, MD, PhD (Author & Presenter)

Professor of Critical Care Medicine, Anesthesiology, Surgery, Neurosurgery and Neurology – Johns Hopkins University
Core Faculty – The Armstrong Institute for Patient Safety and Quality, and the Johns Hopkins University Evidence-based Practice Center

Garth Utter, MD, MSc (Discussant)

Professor of Surgery, University of California Davis

Rapid Response Systems: Background

- Rapid Response Systems are a patient safety intervention developed to address the problem of unrecognized clinical deterioration (failure to rescue) on general hospital floors.
- RRSs typically include 4 components: Recognition & Activation (afferent limb); Response Team (efferent limb); Administrative limb; and QI limb.
- Common metrics for effectiveness include: incidence of cardiorespiratory arrest, hospital mortality, transfer to higher level of care, ICU & hospital length of stay.

Rapid Response Systems that Aim to Mitigate Failure to Rescue in General Hospital Wards

- 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 & intensive care unit (ICU) transfers.
- MHS IV Methods
  - Searched PubMed & Cochrane Library for systematic reviews & primary studies (2018-2023)
  - 4 reviews, 19 primary studies

RRS versus no RRS: Mortality

Study	Study Type	Outcome	Result	Population
Rocha et al.	Systematic review & meta-analysis	Hospital mortality	Reduced mortality {RR=0.85; 95% CI, 0.76-0.94}	Adults
Teuma-Custo et al.	Systematic review	Hospital mortality	7 of 13 studies showed improvement	Adults
McGaughey et al.	Systematic review	Hospital mortality	No improvement	Adults
Girotra et al.	Primary study	Hospital mortality	No improvement	Adults
Winterbottom et al.	Primary study	Hospital mortality	27% reduction	Adults
Factora	Primary study	Hospital mortality	4% average decrease per year over several years	Adults
Young et al.	Primary study	Unexpected mortality	nearly 50%, p<0.001	Adults post cardiac surgery
McKeta et al.	Primary study	Hospital mortality	4 deaths to 1 death	Children post cardiac surgery
Kovolos et al.	Primary study	Hospital mortality	Significant reduction	Children
Kutty et al.	Primary study	Hospital mortality	Significant reduction (4-9%)	Children

RRS versus No RRS: Cardiorespiratory Arrest

Study	Study Type	Outcome	Result	Population
Rocha et al.	Systematic review with meta-analysis	Incidence of cardiorespiratory arrest	Significant reduction (RR 0.65; 95% CI, 0.49- 0.87)	Adults
Teuma-Custo et al.	Systematic review	Incidence of cardiorespiratory arrest	8 of 13 studies found significant reductions	Adults
McGaughey et al.	Systematic review	Incidence of cardiorespiratory arrest	No improvement	Adults
Winterbottom et al.	Primary study	Incidence of cardiorespiratory arrest	65% reduction	Adults
Young et al.	Primary study	Incidence of cardiorespiratory arrest	No improvement	Adults post cardiac surgery
Kolovos et al.	Primary study	Incidence of cardiorespiratory arrest post arrival in PICU	Significant decrease	Children

Afferent Limb Failure

- Many studies demonstrate that despite RRS implementation, the intervention fails to activate in a timely manner or activate at all. (Chua 2017; Reardon 2018; Boniatti 2013; Calzavacca 2008; Simmes 2012; Bucknall 2013; Oglesby 2011; Adelstein 2011)
- This is associated with increased morbidity & mortality as compared to timely activation. (Boniatti 2013; Bucknall 2013)
- Afferent limb RRS modifications have been implemented to address this persistent problem.

Afferent Arm Modification: Mortality

Study	Study type	Modifications	Outcome	Results	Population
Vandergrift et al.	Primary	EWS, stressing early shock states	Hospital mortality	Significant reduction (p<0.001)	Adult
Weller et al.	Primary	Wearable sensors to improve recognition	Hospital mortality	40 & 30% reduction (NS)	Adult neurosurgical & neurology patients
Sebat et al.	Primary	Multi-pronged intervention to improve recognition and activation	Hospital mortality, O/E mortality	Significant reduction (p<0.001) for both	Adult
Escobar et al.	Primary	Real time deterioration score monitoring	30 day mortality; Hospital mortality	Significant reduction (p<0.001); Decrease from 14.4 to 9.8%	Adult
Dean et al.	Primary	EWSs, score automation, huddles, learning collaboratives, policy changes	Hospital mortality	4 deaths to 0 deaths	Children
Bavare et al.	Primary	Family activation	Mortality	None in experimental group, no data for control	Children

Afferent Arm Modification: Cardiorespiratory arrest

Study	Study Type	Modifications	Outcome	Results	Population
Dean et al.	Primary	EWSs, score automation, huddles, learning collaboratives, policy changes	Incidence of cardiorespiratory arrest	Decrease from 0.31/1000 patient days to 0.11	Children
Bavare et al.	Primary	Family activation	Progression to arrest during RRS activation	Less likely with family activation	Children

Efferent Limb Modifications

- While the core problem of persistent failure to rescue likely resides with the afferent limb failure problem, attempts have been made to address possible weaknesses in the efferent limb as well.

- These weaknesses may include lack of care protocols & algorithms, less than optimal team membership and/or skill sets, & inadequate hospital policies.

Efferent Arm Modification: Mortality

Study	Study Type	Modifications	Outcome	Results	Population
Sebat et al.	Primary	Treatment protocols, enhanced data collection/ analysis	Hospital mortality, O/E mortality	Significant decrease in both outcomes (p<0.001)	Adults
Hatlem et al.	Primary	Removed hospitalist physician, added critical care nurse	Hospital Standardized Mortality Ratio,	Decreased by 31.2%	Adults
Vandergrift et al.	Primary	Patient management protocols	Hospital mortality	Significant mortality reductions	Adults
Factora et al.	Primary	Anesthesiology leadership and policy changes	Hospital mortality	Mortality improved (p<0.001)	Adults

Efferent Arm Modification: Cardiorespiratory Arrest

Study	Study Type	Modification	Outcome	Results	Population
Sebat et al.	Primary	RRS Treatment protocols, enhanced data collection and analysis	Incidence of cardiorespiratory arrest	Significant improvement (p=0.04)	Adults
Mankidy et al.	Primary	Changed from nurse led team to physician led	Incidence of cardiorespiratory arrest	2.2 to 0.8/1000 patient days (p<0.01	Adults
Sawicki et al.	Primary	Care algorithms	Incidence of cardiorespiratory arrest	No improvement	Children

Rapid Response Systems that Aim to Mitigate Failure to Rescue in General Hospital Wards

- **Evidence Summary**
  - Mortality: May significantly reduce in-hospital mortality in adults & children (low SOE).
  - Cardiorespiratory Arrest: Significantly reduces arrest incidence in adults (low SOE), unclear in children (insufficient SOE)
  - ICU Admissions: Unclear impact on unplanned ICU admissions in both adults & children (insufficient SOE)
  - Modifying RRS can reduce mortality & arrest incidence in adults (low SOE); unclear in children (insufficient SOE)
  - Serious adverse events related to RRS are infrequent in both adults & children (insufficient SOE)

- Barriers, Facilitators & Resources: Implementing RRS faces challenges like miscommunication, poor staff collaboration, & inadequate monitoring systems. While resource requirements are unclear, a consensus identified key components for an effective system, & a basic toolkit exists.

Rapid Response Systems that Aim to Mitigate Failure to Rescue in General Hospital Wards

Conclusions

- Overall, RRS may have a large beneficial effect on the outcomes of hospital mortality & incidence of in-hospital cardiorespiratory arrest but the strength of the evidence is low due to methodological weaknesses of the studies.
- Innovations in afferent & efferent limb structures show promise for increased benefit.

Discussion with Garth Utter, MD, MSc

PSNet Resources: Rapid Response Systems

- Toolkit to Support Implementation
  - Institute for Healthcare Improvement - How-to Guide: Deploy Rapid Response Teams
- Perspective
  - Surveillance Monitoring to Improve Patient Safety in Acute Hospital Care Units
- WebM&M
  - Hemorrhagic Shock after Elective Spine Surgery: Failure to Rescue after Limited Response to Nursing Concerns [CME/MOC]
- Innovations
  - Advance Alert Monitor Program: An Automated Early Warning System for Adults At Risk for In-Hospital Clinical Deterioration
- Primer
  - Rapid Response Systems
- Other Resources
  - Original research, commentaries, etc.

Opioid Stewardship

Rapid Review

Opioid Stewardship: Rapid Review

Julie Waldfogel, PharmD, BCGP (Author & Presenter)

Clinical Pharmacy Specialist – Johns Hopkins Hospital
Johns Hopkins University Evidence-based Practice Center

Tanya J. Uritsky, PharmD, BCPP (Discussant)

Opioid Stewardship Coordinator
Co-Chair Penn Medicine Opioid Task Force
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Opioid Stewardship

- Can be defined as “rational prescribing, use & deprescribing of opioids…” through “maximizing clinical benefits for patients & the wider society & minimizing adverse consequences.”
- The purpose of this review was to determine the effectiveness of opioid stewardship interventions in healthcare facilities on key prescribing & clinical outcomes

Shrestha S et al. Journal of Pain Research 2023;16:383-394

Opioid Stewardship Interventions in Healthcare Facilities or Systems

- MHS III Report
  - ► Included a limited review & found moderate evidence for reducing opioid dosages, but no conclusions on clinical outcomes or impact on pain

- MHS IV Methods
  - ► Searched PubMed & Cochrane Library for systematic reviews (2019-2023) & primary studies (2016-2023)

Opioid Stewardship Interventions

- Organizational leadership & policies
- Clinical knowledge, expertise & behavior
- Patient & family education or engagement
- Tracking, monitoring, & reporting performance data
- Clinical accountability
- Multicomponent interventions

Opioid Stewardship Interventions

- Did not include
  - Interventions focused on treatment of opioid use disorder
  - Interventions or policies established by entities other than healthcare providers, such as:
    - Insurance company restrictions
    - Government restrictions or regulations
    - Naloxone distribution outside healthcare settings

Opioid Stewardship Outcomes

- Clinical
  - Healthcare utilization
  - Overdose rates
  - Adverse consequences (changes in pain intensity or distress, rates of opioid refill requests, patient satisfaction)
- Opioid prescribing or ordering
- Implementation
  - Barriers & facilitators
  - Cost, staffing, time
- Process
  - Urine drug screen ordering or administration
  - Treatment agreement use
  - Risk assessment screening tool use
  - Use of PDMP reports
  - Other referrals to pain management
  - Pain management documentation

Opioid Stewardship Rapid Review: Results

Included 14 systematic reviews,
13 RCTs (reported in 14 articles) &
6 non-randomized studies

Opioid Stewardship Interventions: Overview of Primary Studies

Intervention Category	Intervention	Number of Primary Studies
Organizational leadership & policies within a healthcare facility or healthcare system	Clinical decision support or electronic health record interventions	2 RCTs 1 non-randomized study
Patient & family education, or engagement	Patient & family education, or engagement	6 RCTs
Multicomponent	Multicomponent	4 RCTs (in 5 articles) 4 non-randomized studies
Clinical knowledge, expertise, & behavior	Healthcare organization guidelines	1 non-randomized study
Clinical accountability	Peer comparison	1 RCT

Clinical Decision Support or Electronic Health Record Interventions

2 RCTs

- Compared modifying opioid prescribing defaults (to 5 tablets and/or 10 tablets) in the EHR to no change
- No differences in healthcare utilization
- Both RCTs found the 10 tablet default to have fewer tablets prescribed at baseline & at 30 days. No difference for the 5 tablet default.
- 1 RCT found increased opioid prescription reordering in both intervention (5 tablet & 10 tablet) groups compared to control

One NRCT

- Evaluated a treatment algorithm for headache in the ED comparing 2 post-implementation periods to historical controls
- Post-implementation, patients were less likely to be treated with opioids compared to control
- No difference in pain or imaging.
- The second time point saw an increase in neurology consults & admissions compared to control

Patient & Family Education or Engagement

- Six RCTs
  - ► Ambulatory surgery setting
  - ► Opioid education and/or pain education compared to standard of care perioperative education

Outcomes				
Pain - 5 of 6 RCTs	Opioid Refills - 4 of 6 RCTs	Patient Satisfaction - 3 of 6 RCTs	Opioid Prescribing/Ordering - 5 of 6 RCTs	Healthcare Utilization - 2 of 6 RCTs
• One RCT with lower pain scores in the study group compared to control	• One RCT higher refills in study group • One RCT higher refills in control group	• One RCT with intervention group more likely to be satisfied with pain management	• Two RCTs with reduced opioids filled/prescribed	• No differences between groups

Multicomponent Interventions

- 4 RCTs (in 5 articles)
- 4 non-randomized studies
- Combination of opioid education to prescribers, academic detailing, nurse care management & facilitated access to specialists
- No difference in pain outcomes (3 studies), early refill requests (3 studies) or patient satisfaction (2 studies)

Multicomponent Interventions
4 RCTs, 4 NRCTs

- Healthcare utilization (1 RCT, 3 NRCT)
  - ► 1 RCT with reduced ED visits
  - ► 1 NRCT with increased ED visits
- Opioid prescribing/ordering (3 RCTs, 3 NRCT)
  - ► 1 RCT & 2 NRCTs with reduced prescribing
  - ► 2 RCTs with no change in MME but higher opioid discontinuation rates
  - ► 1 NRCT with no change in prescribing
- Process outcomes (2 RCTs, 1 NRCT)
  - ► 2 RCTs with increased urine drug testing, opioid agreement documentation, guideline concordant care
  - ► 1 NRCT with increased urine drug testing, no change in PDMP use

RCT: randomized controlled trial
NRCT: non-randomized controlled trial

MME: morphine milligram equivalents
PDMP: prescription drug monitoring program

Opioid Stewardship Interventions: Evidence Overview

Intervention	Number of Primary Studies	Key Findings	Strength of Evidence
Clinical decision support or electronic health record interventions	2 RCTs 1 non-randomized study	• No change in healthcare utilization • Decreased opioid prescribing	Low
Patient & family education or engagement	6 RCTs	• No change in pain • Mixed results for opioid prescribing	Low
Multicomponent	4 RCTs (in 5 articles) 4 non-randomized studies	• Unchanged or improved pain • Decreased opioid prescribing	Low
Healthcare organization guidelines	1 non-randomized study		Insufficient
Peer comparison	1 RCT		Insufficient

Barriers and Facilitators

Barriers

- Lack of training & confidence
- High volume of workload
- Gaps in communication
- Inadequate monitoring
- Patient reluctance & expectations
- Lack of a comprehensive approach
- Inadequate access to alternative treatments
- Lack of clear roles or policies

Facilitators

- High engagement
- Clear & frequent communication
- Clear expectations
- Explicit instructions for implementation tools
- Flexibility with clinic constraints & preferences
- Familiarity with organizational policies, values & context

Opioid Stewardship Interventions in Healthcare Facilities or Systems

- Opioid stewardship interventions may reduce opioid prescribing without harming clinical outcomes.
- RCTs primarily for patient education or multicomponent interventions in the ambulatory setting.
- Future studies should consider evaluating other common opioid stewardship interventions as well as optimizing clinical outcome reporting.

Discussion with
Tanya Uritsky, PharmD, BCGP

PSNet Resources: Opioid Stewardship

- Toolkits
  - Several toolkits to support implementation
- Perspectives
  - Antibiotics and Opioid Stewardship in Dentistry
- WebM&Ms
  - From Pain Relief to Risk: A Case of Suspected Opioid Overdose in a Pediatric Patient.
  - Patient Safety Events Involving Opioid Dose Stacking [CME/MOC]
- Other Resources
  - Original research, commentaries, etc.

POLLING QUESTIONS

THANK YOU!