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ORIGINAL ARTICLE

Organizational Intent, Organizational Structures, and Reviewer Mental Models Influence Mortality Review Processes

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Abstract

Objective: To identify the factors that influence the mortality review process at health systems, including how mortality review is conducted, cases are adjudicated, and results are used.

Methods: We conducted a qualitative analysis of the mortality review processes of 6 US health systems from February 1, 2021 to June 31, 2021. The data sources included individual and small-group semi-structured interviews with mortality review team members and a content analysis of site artifacts (eg, guiding principles, chart abstraction forms, review workflows, and clinical pathways developed from past mortality reviews). We analyzed each site's mortality review process, goals and incentives for mortality review, historical and evolving aspects of mortality review, personnel involved, and post-review use of findings.

Results: Across the 6 systems, we interviewed a total of 24 mortality review experts and analyzed 26 site documents. We identified 3 thematic factors that influence mortality review processes: organizational intent, organizational structures for mortality review, and the mental models of individuals involved in the review process. Two subthemes emerged within organizational intent: (1) identifying preventable deaths to lower (clinical or financial) risk and (2) using death cases to guide system improvement. Sites varied in governance and decision rights concerning mortality review and adjudication, with 2 subthemes within organizational structures: (1) centralized-hierarchical and (2) decentralized or multidisciplinary. The analysis of mental models of participating reviewers revealed 2 themes: (1) confirmation of preventability and (2) identification of patterns or "signals."

Conclusion: Understanding the factors that influence mortality review allows health systems to better leverage mortality review for institutional improvement and to develop training that builds shared mental models to enhance the review process.

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Reports by the Institute of Medicine[1] and The National Quality Forum[2] focused attention on medical errors and mitigating patient safety risks and hazards to reduce preventable deaths. Although long-standing Morbidity and Mortality meetings were established to review deaths for professional learning, considerable variation existed in how these meetings were conducted, which led to the development of standardized mortality review (MR) processes.[3,4]

The Agency for Healthcare Research and Quality (AHRQ) published a 6-step toolkit of best practices for MR[5] detailed in Table 1. The toolkit describes each of the 6 processes at a high level, with a focus on the adjudication decision—algorithmically described to classify a case as an expected or unexpected death. As more hospitals develop or borrow tools and approaches to operationalize MR, little is known about the factors that may influence the overall MR process and the ultimate use of the results. In this paper, we describe findings from a study of MR processes at 6 US hospitals to understand how MR is conducted, cases are adjudicated, and results are used.

METHODS

We conducted a qualitative analysis of MR processes and decision-making across 6 US health systems from February 1, 2021 to

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June 31, 2021. Qualitative methods were guided by the COnsolidated criteria for REporting Qualitative research (COREQ) checklist.[6] Data sources included individual and small-group semi-structured interviews with MR experts from all sites. We also collected site mortality review chart abstraction forms, written descriptions of mortality review principles and processes, clinical pathways informed by MR results, and related materials sites had developed in formalizing mortality review and post-review actions. The Dartmouth Hitchcock Health Human Research Protection Program (IRB) approved this research (IRB ID#STUDY02000670).

Site and Participant Selection

To recruit sites, we contacted health systems involved in 2 historical learning collaboratives: the Dartmouth-convened High Value Healthcare Collaborative and the Mayo-convened Mortality Review Collaborative. One researcher (AEB) e-mailed MR directors at each site with information about the study. On obtaining agreement for site participation at the director level (eg, chief quality officer and medical director), we requested names and contact information for other team members (eg, clinical abstractors and quality improvement [QI] staff) involved with MR. We then used a mix of purposive and snowball sampling to identify and recruit MR team members and additional leaders from each of the sites to participate in individual or small-group interviews.

Data Collection

Two researchers (AEB—palliative care provider, researcher, and decision scientist with more than 15 years of experience in qualitative research and ISK—a biomedical and systems engineer and health services researcher) jointly conducted the interviews using a semi-structured interview guide (see Supplemental Appendix 1, available online at http://www.mcpiqojournal.org), with questions and follow-up probes to explore each site's MR process, goals and incentives for mortality review, type of mortality data in use by the site, historical and evolving aspects of mortality review, personnel involved, and post-review use of findings by the site. We also asked participants to provide a recent deidentified mortality case example for exploring site and individual decision-making pertaining to case review and adjudication. Interviews were conducted over Zoom and were audio recorded after participant consent for verbatim transcription (transcripts not returned to participants). Interviews had a mean duration of 54 minutes (range 38-66 minutes). During interviews, when participants identified site policies, workflows, and other MR guidance documents, we requested copies to include in the analysis.

One of the interviewers (ISK) had no previous relationship with any MR team in the study. The other interviewer (AEB) is a staff physician in 1 of the hospitals included in the study. In her role as a researcher at the medical school affiliated with the hospital, she had met with the organization's chief quality officer on several occasions while developing the research proposal in order to establish buy-in for the research. She had never met with any of the MR staff members before the study. She participated as an audience member at the hospital's Department of Medicine Morbidity and Mortality review meetings regularly but has never presented a case. Her judgments, practices, and belief systems as a palliative care physician influenced the development of the original research question and the interview guide used at all sites. During the data collection process, she avoided making assumptions about the meaning of words and phrases—just as she does in clinical palliative care practice—by exploring the meaning of words and phrases "You mentioned "x," can you tell me what you mean by "x"?

Analysis

We deidentified, transcribed, and imported interview data to Dedoose.[7] We used a mixed deductive and inductive approach to code and analyze the data. In this approach, initial codes are established on the basis of the research questions and new codes (at varying levels of the codebook) are generated directly from the narratives through an iterative process of constant comparison and grounded theory.[8,9] Two researchers (RLB, ISK) jointly developed the codebook and, after multiple rounds of preliminary coding, adapted the codebook with input from the full study team. One researcher (RLB) coded all interviews and

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TABLE 1. AHRQ Recommended Mortality Review Process

AHRQ Process Step	Recommended Practice	Description
1	Create a process for identifying cases	100% case review recommended
2	Conduct preliminary case review	To eliminate cases and prepare selected cases for committee review on the basis of an algorithm to classify the case as expected or unexpected death?
3	Present case to mortality review committee	Case is presented to committee if appropriate
4	Conduct systematic review of case	Committee systematically reviews case to determine if any follow-up actions are required
5	Engage in action planning	Action planning may take 2 forms: (1) counseling of staff and (2) performance improvement project to address systemic issues
6	Evaluate effectiveness of actions	Regularly assess actions taken to ensure that processes are being followed

AHRQ, Agency for Healthcare Research and Quality.

provided weekly updates and example excerpts for team review, discussion, and modifications to the codebook. We used structural variables ("Descriptors" in Dedoose) to categorize transcripts by participant and site characteristics to enable further exploration of patterns.

One researcher (RLB) led the analysis with support from CHM and YS by examining code applications, code-occurrences, and code by descriptor analyses to distill the main themes and explore emerging patterns within and between sites. The same 3 study team members reviewed site documents using content analysis methods to further validate and explicate interview narratives. Two forms of triangulation were used throughout the qualitative analysis.[10] We used methodological triangulation by comparing results from interviews with site documents. We used investigator triangulation by always having at least 2 researchers involved in data collection and analyses, and involving other study team members in regular meetings to review and discuss findings across our methods. We reached thematic saturation of the main themes across all data sources.[11]

RESULTS

Sites and Participants

Of 10 contacted sites, 6 responded and agreed to participate. We interviewed 3-6 mortality review team members at all sites except 1, representing most of all MR participants at most sites. Table 2 presents participant characteristics. Study sites represented a diverse mix of multi-hospital health systems and single health care institutions varying in size, type, and geography (Table 3). Data sources included individual (n=16) and small-group (n=3) semi-structured interviews with MR experts (n=24) from all sites and 26 site documents (median 4.5, range 1-8 per site).

High-Level Description of Mortality Review Processes

Institutions followed the Agency for Healthcare Research and Quality 6-step MR process, employing a mix of standardized chart abstraction tools, database tracking systems, benchmarking tools (eg, Vizient and Premier), case reviews by various personnel with escalation to clinical experts or peer review as needed, or adjudication by a MR committee. Sites ranged in the maturity of current MR processes from 10+ years for 3 sites, 5-9 years for 2 sites, and <5 years for 1 site (Table 3). Across the 6 sites, data revealed 3 main influences on MR processes: (1) the organization's underlying intent for conducting MRs (organizational intent); (2) the policies, personnel involved, and overall governance for review (organizational structure); and (3) the mental models of the individuals involved (mental models). Themes emerged within each of these main domains of influence, which interacted dynamically to shape the emerging MR process at each site (Figure; Exemplar quotes

TABLE 2. Participant Characteristics

Category	n	%
Role on mortality review committee		
Clinical director	5	24%
Administrative director	2	10%
Abstractor	10	48%
QI/safety officer (non-leader)	4	19%
Clinical role		
MD, DO	7	33%
RN	12	57%
Non-clinical (MS, LCSW)	2	10%
Years in practice		
Less than 4 y	0	0%
5-10 y	2	10%
11-15 y	5	24%
16-20 y	4	19%
>20 y	10	48%
Sex		
Man	9	38%
Woman	15	62%
Race		
White	19	79%
Asian	4	17%
Other	1	4%
Age		
30-39	4	17%
40-49	11	46%
50-59	3	12%
60+	4	17%
Unknown	2	8%

in Supplemental Appendix 2 [available online at http://www.mcpiqojournal.org]).

Organizational Intent Behind Mortality Review

In interviews, organizational intent was characterized as the overarching goals at the institution for conducting MRs and using the results. We triangulated site-specific narratives from interviews with data obtained from the content analysis of site documents (eg, policies and abstraction forms). Two subthemes emerged: (1) identify preventable deaths to lower risk (clinical and financial), and (2) use death cases to guide system improvement. Although secondary goals such as benchmarking against peers and providing feedback to clinical teams were mentioned by the sites, interviews revealed that a dominant intent aligned with 1 subtheme or the other and influenced all other aspects of the process.

At sites with a primary organizational intent of system improvement, death was viewed as an inescapable outcome when treating sick populations and MR was seen as a convenient means to identify patterns and trends. A Site 6 participant explained, "...using death, which is a very crude measure of quality, it's been a great way to identify more system-level issues." Participants emphasized the value of death cases because they often involve complexities that strain the system and reveal opportunities for quality improvement, regardless of whether a death is considered "expected" or "unexpected," focusing instead on with or without opportunity for improvement.

By contrast, sites 1-4 had a primary organizational intent to prevent death to lower risks (clinical and financial). Participants described using the initial review to identify preventable or unexpected deaths to reveal gaps in care or clinical decision-making that could lower performance ratings, increase liability, or revenue loss. Post-review actions often focused on addressing individual actions attributed to the cause of death, such as escalating cases to root cause analysis, risk management, or peer review as "a way for physicians to review each other and make recommendations for improvement if that's indicated (Site 4)." Sites also used MR results to inform targeted training or implement new processes. For example, Site 1 developed new processes for patients identified as more likely to die within 48 hours of admission, which included earlier goals of care discussions and palliative care involvement and leveraging the maximal allowable time for classifying high-risk, unstable patients to observation status—where they are not admitted to inpatient care and therefore do not factor into mortality metric calculations—, "knowing that we can use that as a way to improve our mortality metric in a positive way (Site 1)."

Organizational Structure for Mortality Review

Organizational structure refers to the roles of individuals and the governance and decision rights of those involved in the MR process. Sites varied in governance and decision rights

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TABLE 3. Site Data and Characteristics

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6
Site Data						
Number of participants	4	3	1	6	4	3
Number of interviews	4	3	1	3	4	3
Number of site artifacts	6	4	1	3	3	6
Site Characteristics						
Geographical location	Mountain West	Northeast	Northeast	Pacific West	Midwest	Southeast
Type	Not-for-profit health system	Academic teaching and tertiary care hospital	Not-for-profit health system	Not-for-profit health system	Academic teaching and tertiary care hospital	Academic teaching and tertiary care hospital
Number of beds	>2500	<750	>2500	<750	1500-2500	750-1500
Deaths per year	>1500	<750	>1500	<750	1000-1500	1000-1500
Selection of hospital deaths reviewed	50% on the basis of trigger tool	100% of unexpected	100%	100% of unexpected	100% deaths in high-risk settings, 50% random sample other	100%
Duration of current MR program	<5 y	5-9 y	5-9	>10	>10	>10
Development of mortality review process	Mix: internal incident and national guidelines	Adapted from other health system	Internally developed	Internally developed	Mix: internal and national guidelines	Adapted from other health system

related to MR and adjudication. Sites 1-4 exhibited centralized, hierarchical review structures where a dedicated MR team of leaders and staff initiated and conducted the MRs. The review process was managed by a primary reviewer following a linear process and, if needed, escalated to the MR leader to decide about seeking additional clinical 'expert' review or presentation to a MR committee. After the review phase, decisions were passed on to different committees or leaders at the institution for post-review actions, with little to no coordination back to the initial reviewers.

In contrast, Sites 5 and 6 exhibited decentralized, multidisciplinary review structures, where provider(s) directly involved with delivering care to the decedent contributed to the initial review, often within 24-48 hours of death. A main benefit cited in this approach was that "frontline providers have a much better view... the documentation probably doesn't capture some of the issues and struggles that providers encounter when taking care of patients (Site 6)." In addition, assessments made by the initial review team were shared and integrated with later reviews to inform action planning, including both local (departmental/unit) and system-level actions on the basis of the findings. At these sites, multidisciplinary committees engaged in identifying opportunities for system or process improvement and providing training for personnel.

Mental Models of Individuals Conducting Mortality Review

Mental models emerged thematically as an individual's perception of their role in conducting death reviews, their interpretation of the organizational intent for MR, and their prior clinical experiences and training (eg, safety or QI training). The mental models of abstractors, clinicians, quality staff, and MR directors played a role in influencing how

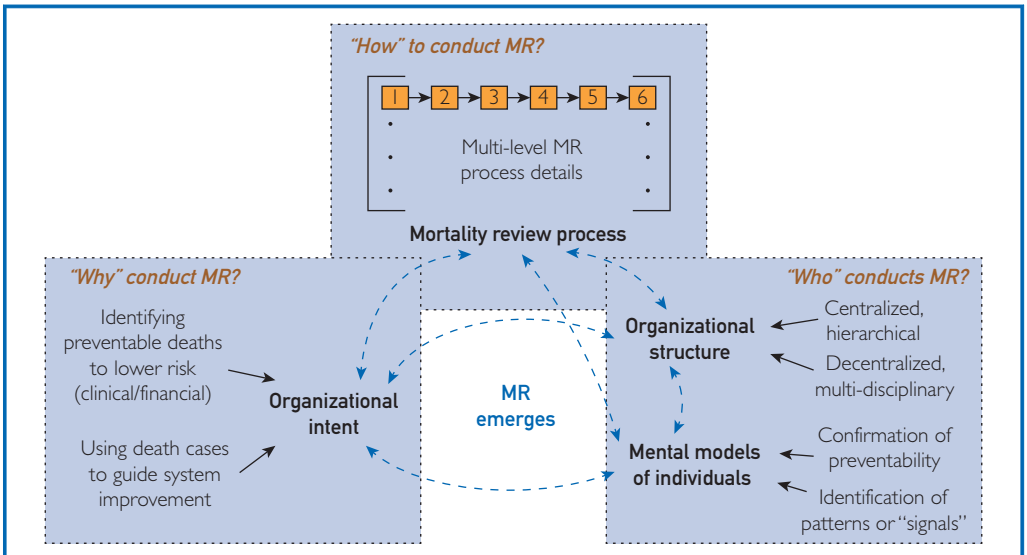

FIGURE. The mortality review process details emerge dynamically from the interaction of 3 (theme) influences: organizational intent, organizational structure, and mental models. *Agency for Healthcare Research and Quality Toolkit 6-step (high-level) mortality review process.[5]

reviews were conducted and how results were used. The data revealed 2 themes in the mental models of individuals: (1) confirmation of preventability and (2) identification of patterns or "signals." MR leaders (with their own mental models) played a role in shaping the orientation of reviewers through specific training and in the abstraction tools and forms they had developed (or adapted) at their site.

At Sites 1, 2, and 4, reviewers exhibited a mental model focused on confirmation of preventability, taking an "individualistic" case-by-case approach, constructing detailed timelines, and searching for evidence in the clinical record of where a sentinel event may have occurred: "We're looking for preventable cause of deaths when we're reviewing, we're looking for something that may have been missed." (Site 2). These reviewers gave extra scrutiny to determine if the death could be considered "expected." The mental model of confirmation of preventability relied heavily on clinical judgment during chart reviews, even when standardized review criteria were in place. This approach led to a higher degree of subjectivity in determining which case details were relevant or suggestive of the cause of death. In multiple interviews, abstractors described this as cognitively burdensome: "The hard part for us [abstractors] is we're not experts. We all have strong clinical backgrounds, but we've all also been out of the clinical arena at the bedside for a while" (Site 2). Cases at these sites were reviewed with such a level of scrutiny that "gaps in care" were primarily viewed through the lens of individual provider actions and case-by-case outcomes rather than at the system or process level where overall patterns or trends would emerge.

In comparison, reviewers at sites 5 and 6 were more likely to be characterized as using an identification of patterns or signals mental model. This approach focused more on identifying system or process issues associated with the cases. Reviewers, often members of the decedent's clinical team or unit, were encouraged to avoid nitpicky details in case reviews and instead reflect on types of process or system breakdowns, such as communication issues (eg, with hand-offs of care), supervision issues, timing (eg, delays in tests result), and other workflow issues. Abstraction forms used at these sites were designed to extract this kind of system or process information rather than collect detailed timelines leading up to the death. In contrast to the confirmation of

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preventability mental model, reviewers with a mental model focused on identifying patterns did not remove "expected" deaths from consideration, to identify process improvement opportunities that could still exist in cases involving patients with terminal diseases or do not resuscitate orders. Limited data was available regarding the mental models of reviewers at Site 3, but interviews and artifacts indicated a trend toward identifying patterns in death data largely through reliance on a system-wide database.

DISCUSSION

In this qualitative study of MR processes at 6 US health systems, we ascertained that despite the existence of a recommended MR process,[5] how mortality review was conducted at the institutional level was largely dependent on 3 interconnected influences: organizational intent, organizational structures for MR, and the mental models of those involved in the review process. Although MR processes traditionally focus on distinguishing between expected and unexpected deaths, this analysis suggests that these 3 influences may be more important in shaping the review process and post-review actions. Understanding these influences may help sites better design MR for institutional improvement and develop training for those involved to build shared models for conducting MR.

An organization's intent to improve quality is "why" it develops a MR process. Although the question of "why do you perform MR" elicited an "isn't it obvious" response, explicitly enumerating organizational intent clarified the relative importance and underlying incentives. On one end, with a more literal interpretation of MR commensurate with identifying expected vs unexpected death, organizational intent focused on "reducing future risk of death" and appeared to be driven primarily by incentives to reduce harm, improve safety, and optimize ratings and revenue by closing gaps in care, generating MR decisions that penalized clinical decision-making failures. On the other end, MR aimed at identifying any possible learning from every death[12] yields incentives to improve patient experience and systems of care using results to create or improve care pathways, standards, and protocols. Organizational intent guides and clarifies specific goals and objectives that shape the review details of how, when, where, and by whom processes are performed. Not surprisingly, "why" you design a process will shape "how" you design the process, which consequently affects decisions for action.

The design and implementation of a MR process also requires identifying "who" will conduct the MR. The number of individuals, their roles, and the rules governing how they interact—on the basis of institutional culture, governance, power dynamics, and information flow across personnel, departmental entities, and leadership—describe a social system that influences the many levels and details of the MR process. Although organizational structures are unique to each institution, 4 sites relied on centralized, hierarchical structures, and 2 sites employed decentralized, multidisciplinary structures. Given the importance of organizational structure,[13,14] adopting another institution's MR process without having the same organizational structure may not lead to the same end result. Indeed, 1 of the sites had adopted another site's MR tool, and yet the organizational structure for MRs at the adopting site was considerably different. Rather than reviews by clinical teams proximate to the care of the decedent, the adopting site used a centralized, hierarchical review structure that lacked the ability to gather important process-level information from providers close to the case. This implementation phenomenon is not unique to MR. Most models or processes in healthcare tend to be described at a high level,[15] leaving the details to the adopting institution, which likely contributes to the variation in clinical outcomes for the same model (eg, behavioral health integration into primary care).

Even deeper into the details of the MR process and at the core of MR is the adjudication decision for a case. We identified that this decision is heavily influenced by an individual reviewer's mental model. We found evidence that mental models of individuals affect and are affected by organizational intent and organizational structure. The dynamic nature of these interactions made it difficult to decipher which of these elements comes first. Furthermore, the mental model influence was typically implicit. Only in a few instances did participants explicitly invoke mental models

as a construct affecting their own or others' MR decisions. However, shared mental models among team members have been suggested as a powerful means to explain team decision-making, understand complex performance, and solve applied problems.[16] Manges et al[17] found that the quality and agreement of shared mental models of interprofessional teams improved inpatient care at hospital discharge.[17] We posit that harnessing disparate implicit mental models into a shared mental model can improve the design and conduct of MR processes. Together, different patterns across the 3 factors appear to track together by site. So closely, that it is possible there is 1 organizing factor. We hypothesize that organizational intent is likely the driving factor around which the other factors organize to support and uphold intent. In that case, the alignment of organizational intent, organizational structures, and mental models of individuals optimizes the MR process. Future research will explore this pattern further.

The strengths of this study include the ability to understand the context and details of MR processes within a hospital and the ability to discern influences on the review process by examining different organizations. However, our study has limitations. Our sample had a wide range of site experience in MR; therefore, we did not necessarily interview the original implementers of current processes and consequently, we could not discern whether mental models, or the mental model of an influential review leader led to the specific review processes. Future studies will explore this question further. Our observations are on the basis of a sample of 6 institutions. This limitation is partially alleviated because this sample is not random and included review processes from at least 2 leading institutions.

CONCLUSION

In conclusion, we identified organizational intent, organizational structures, and the mental models of those involved in the review process as 3 interconnected influences on how MR was conducted. The findings reveal potential avenues for improving system processes to better leverage MR for institutional improvement and for designing training for those involved in MR to build shared models for conducting MR.

POTENTIAL COMPETING INTERESTS

The authors have no conflict of interest to disclose.

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SUPPLEMENTAL ONLINE MATERIAL

Supplemental material can be found online at http://www.mcpiqojournal.org. Supplemental material attached to journal articles has not been edited, and the authors take responsibility for the accuracy of all data.

Abbreviations and Acronyms: **AHRQ,** Agency for Healthcare Research and Quality; **COREQ,** COnsolidated criteria for REporting Qualitative research; **MR,** mortality review; **QI,** quality improvement

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