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'How are we going to harm the next trauma patient?' Trauma care providers' perspective on potential harm to trauma patients

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ABSTRACT

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To cite: Barmparas G, Robinson BRH, Sarani B, et al. Trauma Surg Acute Care Open 2025;10:e001628. **Background** The question, "How will the next patient be harmed?" is a component of strategies used to identify latent safety risks in healthcare. We sought to survey a broad audience attending the 2023 annual conference of the American College of Surgeons–Trauma Quality Improvement Program to record their perception of the risks that might lead to patient harm at their own trauma centers.

Methods Attendees were surveyed with a single free-text question "How are we going to harm the next patient?" using a quick response code. All responses were categorized into clustered themes. To report the results using a standardized reporting taxonomy, the responses were also classified according to the Joint Commission (JC) patient safety event taxonomy for near misses and adverse events. Results were reported as counts and as proportions of responders.

Results During the 3-day duration of the conference, 64 participants provided 80 responses. Provider-related risk (n=16, 25.0%) was the most commonly reported category, followed closely by practice management guideline related (n=14, 21.9%) and communication gaps or failures (n=12, 18.8%). "Clinical performance" was the most commonly reported subclassification in the main category "type" of the JC patient safety event taxonomy (n=34, 53.1%), followed by patient management (n=30, 46.9%). "Human error" was the most common subclassification in the main category "cause" (n=48, 75.0%).

Conclusions Human failures, rather than systems issues, were perceived to be responsible for the majority of potential harm in trauma patients by a broad audience of trauma care providers. These results require amplified focus on strategies that decrease the impact of the human element while enhancing process standardization and addressing barriers to the implementation of processes and guidelines. It might also suggest an opportunity to bring forward alternative conceptual frameworks to advance safety in trauma care.

INTRODUCTION

The landmark report "To Err Is Human: Building a Safer Health System" by the Institute of Medicine in 1999 estimated that medical errors caused between 44 000 and 98 000 deaths annually.¹ Despite subsequent dedicated efforts to reduce the risk of errors, their estimated incidence has risen to over 250 000 deaths annually.² Although these estimations may be problematic as the methodology in the referred

studies fails to definitively establish causality,³ it is undoubted that medical errors constitute an important patient safety issue. For severely injured trauma patients, over 20% of deaths are preventable or potentially preventable.^{4,5} Reducing the risk of preventable death may be accomplished by identifying latent patient safety threats and developing mitigating strategies.

The Patient Safety and Quality Improvement Act of 2005 provided legal protections for healthcare providers who report medical errors and participate in quality improvement efforts.⁶ A result of this act was the development of the Communication Unit-Based Program (CUSP) by researchers at the Johns Hopkins University Armstrong Institute for Patient Safety and Quality.⁷⁻⁹ This was a multistep program which focused on empowering frontline healthcare workers to identify and recommend solutions related to safety issues or "defects" within their unit. One of the main components in the process of identifying "defects" was asking the question: "How will the next patient be harmed?" and allowing the team involved in patient care to suggest viable solutions. The CUSP approach has resulted in significant decreases in preventable morbidity, especially infection-related complications,10 and is currently recommended by the Agency for Healthcare Research and Quality.¹¹

We sought to use this same approach to survey a broad audience attending a major trauma quality improvement conference to determine what they perceived would "harm the next trauma patient" at their own trauma centers. Our goal was to capture risks for the purposes of identifying and disseminating strategies to reduce potential harm to patients at trauma centers. We hypothesized that human errors, rather than systems, would be perceived as most commonly contributing to potential harm.

METHODS

The American College of Surgeons–Trauma Quality Improvement Program (ACS-TQIP) Annual Conference took place in Louisville, KY (December 1 to December 3, 2023.) The theme of the conference was "Road to Recovery" and focused on best practices and performance improvement (PI) strategies related to trauma survivorship, both, short and long term. The conference was attended by over 1800 participants, spanning the spectrum of trauma care; from trauma surgeons to trauma program

lable 1 The Joint Commission patient safety event taxonomy							
Root nodes or primary			Percentage (%) of				
classifications	Explanation	Subclassifications	Includes	Count	responders		
Impact	The outcome or effects of medical error and systems failure, commonly referred to as harm to the patient.	Psychological (medical)					
		Physical (medical)					
		Legal (non-medical)					
		Social (non-medical)					
		Economic (non-medical)					
Туре	The implied or visible processes that were faulty or failed.	Communication (level 1)	Inaccurate information or questionable documentation	12	18.8		
		Patient management (level 2)	Questionable consultation or use of resources	30	46.9		
		Clinical performance (level 3)	Inaccurate diagnosis, omission of essential procedure, or inaccurate prognosis	34	53.1		
Domain	The characteristics of the setting in which an incident occurred and the type of individuals involved.	Setting	Emergency department, interventional radiology, operating room	25	39.1		
		Staff	Physician, nurse, pharmacist	48	75.0		
		Patient	Age, gender, coexisting conditions, race	2	3.1		
		Target	Therapeutic, diagnostic, preventive	52	81.3		
Cause	The factors and agents that led to an incident.	Systems (structure/process)— organizational	External (beyond control of organization,) supervision, training	0	0.0		
		Systems (structure/process)— technical	Facilities (equipment design or availability,) external (beyond control of organization)	0	0.0		
		Human (error)	Practitioner (skill-based, rule-based, or knowledge-based,) patient factors	48	75.0		
Prevention	The measures taken or proposed to reduce incidence and effects of adverse occurrences.	Universal					
		Selective					
		Indicated					

The total in each classification exceeds 100% as some responses were included in more than one category.

managers, PI coordinators, trauma registrars, trauma nurses, physical therapists, social workers, case managers, and health-care administrators.¹²

Attendees had access to the ACS-TQIP Conference smartphone application (Cadmium, City, State) which included a Quick Response (QR) code and a link to an anonymous survey with a single free-form text question: "How are we going to harm the next patient?" The platform for the survey was Qualtrics XM, hosted by the ACS website. The QR code was introduced at various sessions throughout the conference intended for the entire TQIP audience and starting with the session "Could it Happen at Your Center, Lessons from the TQIP Mortality Reporting System," during which emblematic themes from cases with unanticipated mortality submitted to an online anonymous case reporting system were reviewed.¹³ The survey was open for the 3-day duration of the conference.

This was a convenience sample survey with voluntary participation. All responses were reviewed by two reviewers (GB and ABN) and categorized into novel clustered themes. The generated clustered themes were further grouped into a total of nine categories: (1) provider related, including inexperience, errors in clinical judgment, negligence, burnout, unfamiliarity with setting, etc; (2) practice management guideline (PMG) related, including lack of or non-adherence to; (3) communication gaps or failures; (4) environment; (5) inadequate staffing or excessive workload; (6) systems issues, including delays in care, appropriate disposition, etc; (7) technical or procedural issues; (8) lack of a PI process; and (9) miscellaneous.

In order to report the results using a standardized reporting taxonomy, the survey responses were also classified according to the Joint Commission (JC) patient safety event taxonomy for near misses and adverse events (table 1).¹⁴ This taxonomy was

proposed to promote consistency in reporting and to facilitate root cause analyses. It includes 5 primary classifications and 21 subclassifications. We reported the results based on the primary classifications "type," "domain," and "cause." The primary classification "impact", which refers to the effect of the medical error (medical vs non-medical), was omitted, as that could not be parsed out from the responses. In addition, "prevention" was omitted as the responses were referring to "harm," rather than prevention.

Results were reported as counts and as proportions of respondents. The totals could exceed 100% as some responses were classified into more than one category.

RESULTS

A total of 64 participants provided 80 responses. The most common cluster theme was provider related (n=22, 34.4%), followed by PMG related (n=14, 21.9%) and communication gaps or failures (n=12, 18.8%) (table 2.)

Clinical performance, which relates to the clinician's adherence to expected practices was the most commonly reported subclassification in the main category "type" of the JC patient safety event taxonomy (n=34, 53.1%). This was followed by patient management (n=30, 46.9%), which relates to the clinician's knowledge and skill, and communication (n=12, 18.8%). Target was the most common subclassification in the category "domain" (n=52, 81.3%), and that is related to therapeutic, diagnostic, or other interventions. This was followed closely by staff (n=48, 75.0%) and setting (n=25, 39.1%). Human error was the most common subclassification in the main category "cause" (n=48, 75.0%).
 Table 2
 Responses categorized in cluster themes

				Percentge (%)				
Cluster theme or category	Includes	Example(s)	Count	of responders				
Provider related	Inexperience, lack of clinical judgment, negligence, burnout, travelers, unfamiliar with setting, etc.	"Inexperienced staff taking care of trauma patients during the golden hour." "There are more and more rogue practitioners." "Under-resuscitation leading to complications."	22	34.4				
Practice management guideline related	Non-adherence or lack of practice management guidelines	"Lack of standardization of best practices." "Deviating from guideline in ATLS."	14	21.9				
Communication gaps or failures	Inadequate or lack of communication between providers at all levels	"Services operating in silo (providers and units.)" "Failure of communication. Communication between multidisciplinary team members that don't occur on a regular basis. Also, communication may go through many people and might change over time."	12	18.8				
Environment	Environmental factors contributing to patient harm	"Significant social harm of allowing police into trauma bay for identification of suspects." "Poor screening for human trafficking resulting in more patients at risk."	10	15.6				
Inadequate staffing or excessive workload	Inadequate coverage with appropriate level staff and lack of adequate support with ancillary staff	"Not supporting the services that are needed for the patient. Correct providers, social work, post-discharge support." "Budget/ FTE crunch—do more with less."	9	14.1				
Systems issues	Delays in care, labs, and imaging; lack of appropriate disposition or monitoring	"Holding ICU patients in an over-crowded ER." "Un-monitored elderly patients in bed in hallway in the ER after a fall."	9	14.1				
Technical or procedural issues	Procedure-based complications	"REBOA misadventure—high risk low volume procedure."	7	10.9				
Lack of performance improvement	Absence or problematic performance improvement process	"If we don't look at our practice of what we did good and what we can do better." "Not learning from our prior mistakes."	4	6.3				
Miscellaneous	Miscellaneous factors that could not be included in any other category	"Early prognostication for traumatic brain injury." "Effect of delirium."	4	6.3				
The total exceeds 100% as some responses were included in more than one category. ATLS, Advanced Trauma Life Support; ER, emergency room; FTE, full-time equivalent; ICU, Intensive Care Unti; REBOA, Resuscitative Endovascular Balloon Occlusion of the Aorta.								

DISCUSSION

In this convenience sample survey of participants at a major quality improvement conference for trauma care, attendees identified the providers themselves as being the most likely to cause harm to patients, followed by lack of or non-adherence to PMGs, and communication gaps or failures. In addition, based on the JC taxonomy for patient safety events, human error, staff, and clinical performance were the perceived most likely possible causes of harm. These results demonstrate that trauma care providers perceive the human element, rather than systems issues, as responsible for the greatest risk for patient safety at their own trauma centers.

The advancement of PI and quality care has closely mirrored the evolution of trauma centers and systems. This alignment began early on, with significant milestones focusing on standardization, such as the inception of the Advanced Trauma Life Support (ATLS) course, the establishment of the ACS Verification, Review and Consultation Program, the development of trauma systems, and the implementation of PI through audit filters. The use of trauma registries to guide local PI, and most recently TQIP, which provides risk-adjusted and benchmarked quality data, further exemplifies the pioneering efforts of trauma centers in championing patient safety and quality care.15 The process of PI, particularly through peer review, has a far-reaching impact, engaging a diverse range of healthcare providers involved in trauma patient care. This involvement fosters a mindset that not only recognizes the value of continuous improvement, but also encourages active contribution to the process. Consequently, surveying these providers on their perceptions regarding factors that could potentially harm trauma patients at their own trauma centers aligns seamlessly with their commitment to enhancing patient safety and quality care.

The complexity, hemodynamic instability of patients, limited available data during the initial resuscitation, requirement for time-sensitive decisions, and involvement of a large multidisciplinary team, along with the need for concurrent tasks, often during after-hours, make trauma care prone to errors.¹⁶ The prominence of the "provider-related" category in our results underscores the significance of factors such as inexperience, lack of clinical judgment, negligence, unfamiliarity with the setting (traveler nursing or other staff), and even burnout. The COVID-19 pandemic may have given these factors precedence in this survey, particularly due to its recent impact on trauma care and the providers themselves who felt the consequences and the challenges of decreased staffing, high turnover, limited resource availability, and the requirement to adapt to new norms to ensure staff safety.^{17 18} These aspects align with the complexities of trauma care, where rapid decision-making, team management, and multidisciplinary collaborations are paramount.

A comprehensive analysis of approximately 400 preventable and potentially preventable deaths submitted by trauma centers participating in TQIP over a 2-year period through an anonymous reporting template based on the JC taxonomy found that human failures were cited in the majority of cases (61%).¹⁹ These were related to knowledge, negligence, or were rule or skill-based errors. System-level failures were significantly less common. The results from our single-question survey corroborate the findings from this comprehensive analysis and highlight the human element as the most likely to be responsible for harm to a trauma patient at the participant's own trauma centers. One could easily assume that person-focused interventions could mitigate recurrent errors; however, these are known to be low-impact and largely insufficient to improve patient safety.²⁰ System-focused interventions, which are infrequently used to address patient harm, are significantly more effective as they usually result in a more widespread protocol development and adherence and have an impact on institutional culture and memory. Process standardization and automation-along with forcing functions, barriers, and fail-safes-rank highest in the hierarchy of mitigation strategies that are most effective in preventing harm.¹⁹ Our challenge lies in ingeniously addressing human failures with system-based interventions and relegating the contribution of human factors to trauma patient harm.

Trauma care providers rely on PMGs that are rooted in the best available scientific evidence. In trauma centers, these guidelines often serve as the foundation for the development of protocols, which define the standard by which care should be administered in that center. Standardization is often an important element in assuring quality care as it defines the best way to deliver care, serves as a baseline for quality improvement efforts, and facilitates training. Most importantly, it decreases human variability, which is linked to increased risk for an error.²¹ Our findings underscore the belief in the intrinsic value of these guidelines and the standardization that is then enabled, with a distinct perception that non-adherence to them ranks among the most critical factors potentially contributing to patient harm. This may be related to easier recognition of non-adherence when standards of care exist, as the providers know what to expect. While the theme "non-adherence to guidelines" could have been categorized under "provider-related," we opted to include it within the broader category of "lack of guidelines." This overlap highlights the importance, not only of crafting and disseminating guidelines, but also of ensuring adherence to them. Continuous loop of feedback and education may have limited impact on adherence.²⁰ It is imperative that the implementation of guidelines evolves into process standardization or even automation and eventually into a forcing function with cultural change that mitigates harm to patients.¹⁹ This may be accomplished by exploring and addressing barriers to implementation and incorporating theories and theoretical frameworks that may enhance adherence to guidelines.²²

We acknowledge that this study has several limitations. First, the context—a PI conference and a convenience sample of attendees introduce potential biases, including contraction and cognitive biases, which may have affected the responses or even the decision to participate in the survey. We did not collect demographics and/or other participant-related data to allow for better evaluation and correlation of the results. Additionally, the open-ended nature of the survey may have led to varied response lengths and depths. The content of the conference sessions and/ or the speakers may have affected the responses or the decision to participate in the survey.

We also recognize that the overall response rate was relatively low, likely due to several factors: participation was voluntary during a busy conference, so many attendees may have opted out of engaging in additional activities; the open-ended nature of the survey required extra time and reflection, meaning that those who responded were probably more actively involved in patient safety and PI. Nonetheless, the qualitative data appear robust, demonstrating thematic saturation across diverse responses and highlighting critical concerns and potential vulnerabilities that warrant further investigation. While we acknowledge that the data represent subjective perceptions rather than objective harm metrics, several aspects suggest that these responses are both valid and potentially actionable. Most participants are actively engaged in PI at their trauma centers, offering them a unique perspective on failures that traditional metrics might overlook. The consistent clustering of themes across respondents indicates a shared recognition of underlying risks, potentially pointing to common vulnerabilities.

Ultimately, our approach is intended as a hypothesis-generating exercise to flag areas of concern, thereby prompting further empirical inquiry and targeted system-based interventions. It is important to emphasize that these findings are complementary to objective safety data, serving as a catalyst for more detailed investigation and quality improvement initiatives. Lastly, although the single-question approach was originally designed for teams providing shared care, its application to a conference setting, however, may yield unique advantages. The diversity of backgrounds may allow for capturing a broader range of experiences and perceptions, which may ultimately reveal universal safety concerns that are common across different trauma centers. Moreover, this approach allows us to generate hypotheses that can inform broader patient safety initiatives and sharing of ideas among interdisciplinary teams. We believe that this has the potential to lead to innovative strategies and interventions that may be adaptable to different settings.

Despite these limitations, the results of this survey provided insight on trauma care providers' perspectives on factors potentially associated with harm to trauma patients at their own trauma centers, emphasizing the role of human failures in patient safety. The identified clustered themes offer the basis for developing targeted interventions to enhance communication, adherence to PMGs, and provider-related factors, ultimately improving patient outcomes in trauma care. The findings underscore the need for a comprehensive, multifaceted approach to patient safety that addresses both systemic and individual factors. This may start by increasing awareness of common patterns that result in patient harm and continue with the development of more effective and efficient frameworks to guide PI at trauma centers, along with institutional and system-level changes to support and permanently secure these changes.

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Contributors Study conception and design: ABN and GB. Acquisition of data: GB and ABN. Analysis and interpretation of data: GB and ABN. Literature review: GB and ABN. Drafting of manuscript: GB and ABN. Critical revision: GB, ABN, BR, BS, ARJ and TWC. Guarantor: GB.

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Competing interests None declared.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants but was not approved by an Ethics Committee(s) or Institutional Board. This was a survey of attendees at a major conference and the intent of the survey was not a systematic investigation. At the same time, the privacy of the subjects was protected, the confidentiality of individual responses was maintained, and survey participation was voluntary. The methodology does not meet criteria for a "research study" and, therefore, ethics approval is not required.

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