JOHNS HOPKINS MEDICINE

Next-Gen Event Reporting Through Hero: A Surveillance System Designed for Culture Transformation and Improvement

Eileen Kasda, DrPH, MHS; Christine Robson, MSN, RN; Lori Paine, DrPH, RN

INTRODUCTION

After the influential 1999 Institute of Medicine Report, *To Err Is Human*, electronic patient safety event reporting systems became a popular means for health care organizations to identify and mitigate harm. Event reports are a critical data source in high-risk industries. However, current software-based reporting applications provide a poor user experience for both reporters and reviewers of events that lack necessary workflows and analytics to implement meaningful improvements.

BURDENS OF EVENT REPORTING

Health care workers have historically complained about completing lengthy reporting forms, entering data already documented in the medical record, and not having expertise to categorize events using cumbersome event taxonomies and harm scores. Further, poor experience can lead to a lack of reporting in the future and as it is, most staff who report only do so a couple of times per year. Thus, it is imperative that event reporting be efficient and intuitive to create positive perceptions of reporting and to encourage organizational learning.

Reporters typically have no way to inquire about their event or correspond with reviewers providing additional information, and rarely receive feedback about events other than a progression or closed status, leading to the perception that submitted events are discarded or ignored. In the absence of collaborative workflows within an application, reviewers investigate and follow up on reports outside of the reporting system. Subsequently, this promotes inefficient communication processes and loss of valuable learning opportunities not recorded within reporting applications.

Current applications lack robust analytics necessary to turn the qualitative data contained in these event reports into actionable insights that ultimately can be used to improve patient safety. In the absence of these analytics, and inundated with data, many organizations are using popular data visualization tools to create quantitative dashboards to derive insights from their data. Event reporting data are qualitative and often do not lend themselves well to quantitative summarization, which may lead to unintended consequences if incorrect conclusions about patient safety are made. Health care needs advanced analytics to identify patterns and emerging areas of risk.

INNOVATIONS IN EVENT REPORTING SYSTEMS

Inspired by the science of high reliability, experts at Johns Hopkins Armstrong Institute have reimagined patient safety event reporting for quality and patient safety and built a new and innovative software application known as "Hero." With a deep understanding of the limitations of current tools and the need to continue our quest to eliminate preventable harm, the team sought to design a modern event reporting application with 5 simple goals:

1. Make it easier to report a safety concern.
2. Create event workflows relevant in all care settings.
3. Increase action on events that are reported.
4. Increase transparency and feedback about events with reporters.
5. Improve organizational reporting and learning culture.

To accomplish these goals with diverse input informing the design of the application, we conducted focus groups of frontline clinicians, patient safety and risk management officials, and user experience experts from across the country. A set of specific design principles guided the creation of unique features of the Hero event reporting system:

- A single submission form focused on free-text event description.
- Frontline reporters are not required to select an event category or harm score.
- Events are categorized with the assistance of machine learning after submission.
- Event review workflows are both transparent and collaborative.
- Users utilize available technology in a meaningful and modern way; using personal email preferences, @ mentioning and event organizing folders.

Author Affiliation: *Johns Hopkins University, Baltimore, Maryland.*

Correspondence: *Lori Paine, DrPH, RN, Johns Hopkins University, Baltimore, MD 21210 (lori.paine@gmail.com).*

The authors declare no conflicts of interest.

Q Manage Health Care
Vol. 32, No. 3, pp. 211–212

DOI: 10.1097/QMH.0000000000000429

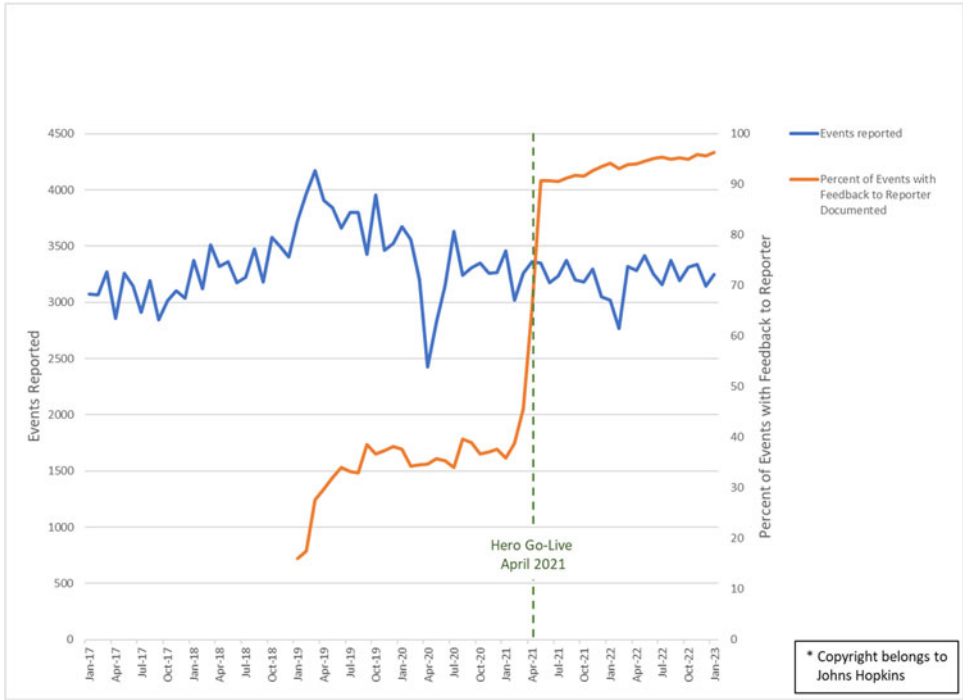

Figure. Improvement in feedback to reporter after Hero implementation. This figure is available in color online (www.qmhcjournal.com).

- Insights are derived from qualitative data using advanced analytics and machine learning methodologies.

RESULTS

The new software application went live April 2021 across all Johns Hopkins Medicine (JHM) locations including 6 hospitals, ambulatory surgery centers, a home care group, and over 525 physician practice clinics. In addition to developing the software application, the Hero design team also standardized workflows across JHM, formalized education modules, and implemented a new event reporting policy. The impact of this new application has already been realized: the median time to submit an event has decreased by 17%, events reported by physicians have increased by 37%, and documented feedback to the reporters has substantially increased (Figure). Further, user satisfaction increased significantly in 5 domains: entering events; analyzing events; event review; feedback; and culture.

LIMITATIONS

The number of events reported did not increase with the new application, likely because this application was implemented during the COVID-19 pandemic when reporting was lower while some operations were scaled back.

NEXT STEPS

While these are promising preliminary results, we are conducting a rigorous evaluation of design and implementation outcomes. Additional features are being integrated into a comprehensive safety surveillance system that provides continuity across the event management cycle (eg, root cause analysis workflow, mortality review, disclosure, and patient feedback).

CONCLUSION

Technology alone will not transform culture. However, event reporting systems are tools that can help facilitate meaningful improvements, and with thoughtful design of these tools we have reduced barriers to transforming our reporting culture. By making it easier to report and review events, we have seen greater diversity of reporter perspectives, increased quantity of follow-up, and improved satisfaction of system users. The Hero event reporting application supports identifying patterns the human eye alone cannot see and allows event reports to serve as signals of current and emerging risk, leading to better resource allocation, identification of organizational blind spots, preservation of effective defenses, and proactive risk mitigation.