Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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RESEARCH LETTER

Rapid-Cycle Improvement During the COVID-19 Pandemic: Using Safety Reports to Inform Incident Command

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TO THE EDITOR

Hospital incident command (IC) systems provide an organized, hierarchical framework for hospitals to conduct emergency preparedness and response and are essential in emergencies such as COVID-19.[1] During large-scale emergencies, health care providers face increased patient demand and depleted resources and medical staff; they are challenged with making operational changes to deliver population-based care, rather than individual-level care.[2,3] Thus, the focus of IC is largely on hospital operations and not specifically on quality-of-care and patient safety issues.

Electronic safety reporting systems are used by many hospitals as a way for frontline staff and managers to file safety reports (SRs) on near misses and adverse events.[4] Local leaders, such as nursing and medical directors, and risk managers review and follow up on SRs, while the patient safety team uses SR data to drive systematic improvement efforts. Our IC system had been in place for months in advance of COVID-19.[5] Risk management and patient safety used the existing IC structure and developed a streamlined process for identification, communication, and resolution of issues raised through COVID-19–related SRs.

METHODS

Setting and Safety Reporting System

Our hospital is an academic tertiary care referral center with 753 inpatient beds and more than 135 ambulatory practices and was a primary site for managing our local COVID-19 patient surge. The Department of Quality and Safety (DQS) oversees both patient safety and risk management, under the leadership of the executive director of patient safety. The hospital uses an electronic, vendor-based safety reporting system to capture SRs filed by frontline staff and managers, with approximately 12,000 SRs filed annually. SRs are automatically routed to risk management and local leadership for review and follow-up.

At the start of the COVID-19 pandemic, DQS developed a report to capture SRs pertaining to COVID-19 consisting of reports in which (1) the terms *COVID-19* and *coronavirus* were used in the report, or (2) the risk manager reviewing the file placed a COVID-19 designation on the SR.

COVID-19 SR Identification, Notification, Escalation, Communication, and Resolution Process

SRs were typically reviewed by risk management and local leadership, but there was concern about a lack of a consistent and reliable follow-up process due to a confluence of events: Our hospitalwide daily safety huddle was disbanded during the hospital IC system for COVID-19, leadership structures were altered as units and were repurposed to serve COVID-19 patients, and staff and managers could have reduced capacity to focus on SRs follow-up during the pandemic.

We established a new process for addressing COVID-19 SRs with risk management and patient safety whereby all COVID-19–related SRs that were submitted the prior day and captured in the COVID-19 report were reviewed at a daily huddle. Risk managers then proactively reached out to local leadership to ensure that they were aware of issues on their units, could speak to solutions that were being put into place, and could identify gaps that existed and needed hospitalwide solutions, which could be escalated back to hospital IC.

Figure 1 depicts the process we designed to streamline COVID-19 SRs. Each morning, the medical directors of quality and safety and the patient safety team program managers received a PDF report containing COVID-19 SRs from the day prior. A concise single-page report, in which volume, themes, locations, and critical issues were identified, was sent to IC leadership each day by 1:00 P.M. and presented at the IC huddle, allowing for near real-time review and follow-up when necessary.

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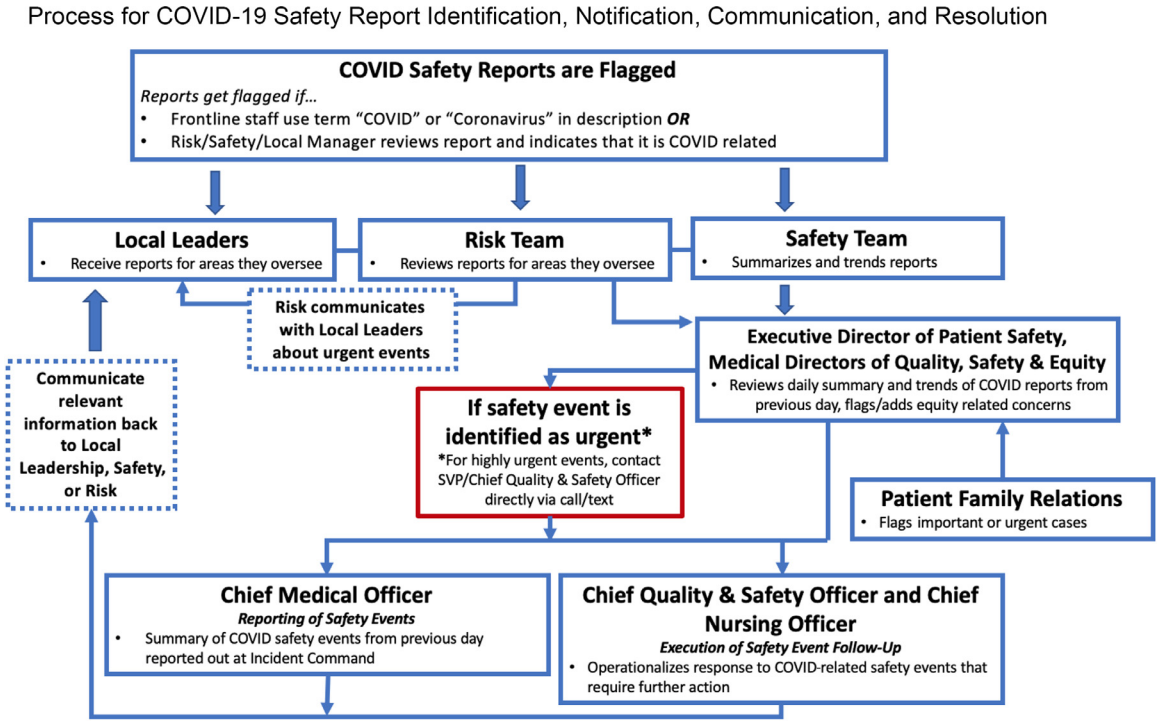

Figure 1: This chart outlines the process for identifying COVID-19–related safety reports and Patient Family Relations complaints by the patient safety team: notifying risk management, local leadership, and hospital incident command; communicating to hospital incident command leadership; and resolving safety concerns through rapid-cycle process improvement. SVP, senior vice president.

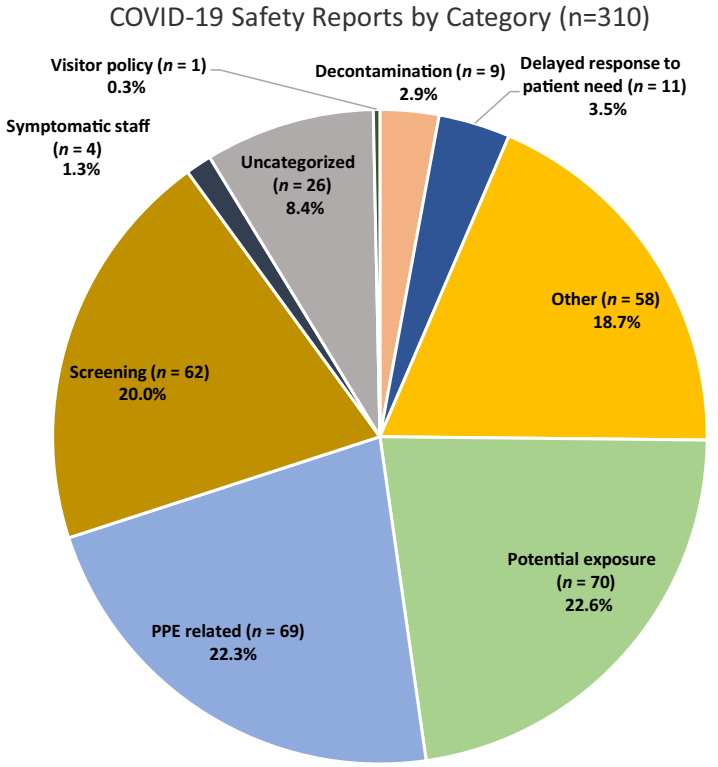

Figure 2: This chart demonstrates the percentage of COVID-19 safety reports by category, showing that 22.6% of reports were on potential exposures to COVID-positive employees or patients, 22.3% were related to personal protective equipment (PPE), and 20.0% were associated with screening procedures.

Table 1. Sample of COVID-19–Related Safety Reports by Hospital Unit with Local and Systematic Improvement Efforts Implemented

Hospital Unit	Safety Report Issue Identified	Local and Systematic Improvement Efforts Implemented
Emergency Department	• To conserve PPE, nursing staff were remaining in rooms of their COVID-19 patients during X-rays.	• Local: Risk management and ED nursing leadership instructed ED nurses that they were not required to remain in the room during X-rays. • Systematic: Hospitalwide reuse policy for masks and face shields
Obstetrics & Gynecology	• Several patients were not screened for COVID-19 symptoms ahead of their scheduled appointments.	• Local: Risk management and obstetrics leadership followed up directly with staff to ensure that screening was completed and correctly documented.
Non-COVID Hospital Units	• Employees were exposed to patients prior to the patient being suspected of having and tested for COVID-19.	• Systematic: ○ Hospital lowered the threshold for ordering COVID-19 testing so that any patient presenting with respiratory symptoms could be tested. ○ Requirement for discontinuing contact or droplet precautions was made more rigid and had to first be discussed with infection control. ○ Universal masking of all staff, patients, and eventually all hospital visitors required.
COVID-Specific Hospital Units	• An employee was unfamiliar with the proper way to don a new type of powered air-purifying respirator (PAPR).	• Local: Risk Manager ensured that training was occurring for staff during fit testing, the nurse director on unit followed up with the employee to be refit tested and trained.
	• Staff experienced difficulty obtaining N95 masks.	• Systematic: Hospital Leadership, including SVP of clinical services and CNO, reviewed process for ensuring that staff had access to necessary PPE.
	• Concerns about PPE requirements during emergency event responses	• Systematic: An observer with training on appropriate PPE donning/doffing procedures was added to code teams to increase adherence to procedure, extra PPE was provided for code teams, and the number of staff was limited to essential members of the code team.
	• COVID-19 patient required emergent intubation, a required medication was not available on the code cart.	• Local: The issue was brought to an Emergency Response Committee; medications were added to Omnicells on COVID-19 units within 24 hours.
	• Emergent intubations were resulting in greater potential for staff exposure to virus.	• Systematic: COVID-19 airway team was created so more patients could be nonemergently intubated.
	• The demand for observers on COVID-19 units exceeded the number of observers available.	• Systematic: hospital leadership coordinated with access services to train additional observers and ensure that observers are present on all SPUs for donning and doffing.
Health Equity	• Nonclinical staff were possibly being discouraged by clinical staff from accessing PPE.	• Systematic: Development of a universal PPE policy for all frontline workers, including clinical and nonclinical staff
	• Suboptimal communication on COVID-19 policies and procedures to historically disadvantaged groups • Differential enforcement of COVID-19 policies and practices, particularly concerning visitors	• Systematic: Improved ambulatory and inpatient communication, and more consistent enforcement, related to COVID-19 policies and procedures for all patients
	• Inadequate shuttles for low-income workers to maintain social distancing	• Systematic: Increase in number of shuttles for clinical staff commuting to the hospital to facilitate social distancing

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Table 1. (*continued*)

Hospital Unit	Safety Report Issue Identified	Local and Systematic Improvement Efforts Implemented
Operating Rooms/ Postoperative Recovery Units	• Confusion during emergency OR case involving potential COVID-19 patient regarding appropriate booking of case and PPE requirements	• Local: Debrief conducted by risk manager with involved staff; OR leadership planned daily drills with OR staff; an updated manual was circulated in the Department of Surgery weekly e-mail.
Ancillary Services (for example, Transportation, Environmental Services)	• Transport staff did not wait for patients while in CT; as a result, nurses had to transport their patients, touch elevator buttons and doors while in PPE.	• Systematic: Transport services leadership reeducated transport staff to accompany nurses on transports of all COVID-19 patients.

PPE, personal protective equipment; ED, emergency department; SVP, senior vice president; CNO, chief nursing officer; SPU, Special Pathogens Unit; OR, operating room; CT, computed tomography.

RESULTS

From March 10, 2020, to April 10, 2020, we identified 310 COVID-19–related SRs. The total volume of reports by day varied from a low of 1 report per day to a high of 30 reports per day. Figure 2 demonstrates themes that were identified within SRs, including potential COVID-19 exposures, concerns related to PPE, and issues associated with screening procedures. Some examples of issues identified, and local solutions, are summarized in Table 1.

DISCUSSION

We have demonstrated that during the first four weeks of the COVID-19 pandemic, a simple process for identification, notification, escalation, communication, and resolution of SRs can be developed and deployed successfully. We found that the huddle provided a more collaborative response to SRs and allowed for broader insights in comparison to the traditional follow-up process we used prior to the COVID-19 pandemic. Timely follow-up to emerging safety concerns was crucial as the institution continuously adapted in response to the COVID-19 pandemic. Limitations of this study include incomplete capture of SRs pertaining to COVID-19 and the single-center experience.

CONCLUSION

Electronic SRs offer unique insights from frontline staff and managers during emergencies, which can be thematically grouped and escalated to hospital IC. This model can be applied to other health care systems and emergencies to provide leadership with insights on quality and safety—a component that is lacking from the typical IC structure.

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Conflicts of Interest. All authors report no conflicts of interest.

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