"GAPPS" in Patient Safety

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Nearly 2 decades after the pervasive issue of iatrogenic harm was thrust into the public sphere by the landmark publication of *To Err is Human* by the National Academy of Medicine (formerly the Institute of Medicine),[1] collective efforts to improve patient safety have become ubiquitous, particularly in the inpatient setting. Although researchers in several pediatric-focused multi-institutional collaboratives have begun to address this issue and have made laudable gains,[2,3] there is concern that patient harm may still be a significant and underestimated reality.[4–6] One potential factor behind underreporting of adverse events (AEs) is the reality that most reporting systems rely on voluntary or passive error reporting.[7] Tools that use "triggers," including some that are pediatric-specific, are used to actively detect AEs via automated processes and have been found to detect errors at a higher rate than the usual passive methods.[8–10]

In this issue of *Pediatrics*, Stockwell et al[11] report the use of their Global Assessment of Pediatric Patient Safety (GAPPS) trigger tool used to measure trends in AEs over a 5-year period (from January 2007 to December 2012). The authors randomly selected and retrospectively reviewed 3790 individual patient admissions and used GAPPS to filter out AEs from 16 teaching and nonteaching children's institutions. Their findings are sobering. A total of 414 AEs representing 19.1 out of 1000 patient days were found, with 210 of these AEs deemed as preventable (9.5 out of 1000 patient days). There was no change in the rate of AEs over the 5-year period.

These results are contrary to other more encouraging recent findings. One such large-scale effort, the Children's Hospitals' Solutions for Patient Safety (SPS), was used to report significant reductions in hospital-acquired conditions (HACs), presumably as a result of wide-scale adoption of best practice prevention bundles.[2] Several factors may have influenced these discordant findings. First, different hospitals were involved in the 2 efforts, although there was some overlap. Second, the SPS time period was slightly later (2011–2015 instead of 2007–2012). Finally, the measured safety events were different; the types of safety events measured by GAPPS are more inclusive, whereas SPS was specifically focused on HACs. If the latter explanation is indeed correct, it serves as a cautionary reminder that patient safety extends well beyond HACs and that improvements in specific safety events do not necessarily translate to improvements in overall hospital safety.

Even if authors of a more updated analysis of patient safety using GAPPS were to demonstrate more encouraging findings, we must be mindful that, although GAPPS can be used to capture a wide variety of harm, these harms are still discrete, readily evident, and easily quantifiable. GAPPS uses triggers that suggest an AE occurred (eg, naloxone administration).[12] However, children in the hospital setting are exposed to other more insidious harms. The harm from unnecessary care delivered to children may not be as easy to detect, because the effects may be subtle or may only be apparent through long-term outcomes. An unnecessary computed tomographic scan, for

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example, increases the lifetime risk of leukemia[13] and may unleash a prolonged diagnostic cascade when subtle abnormalities are detected, but would not be considered an AE.

Stockwell et al[11] report that children in nonteaching institutions experienced a lower rate of AEs. Given that >70% of hospitalized children may receive care outside of large freestanding children's hospitals,[14] often in a nonteaching setting, this finding has some potential relevance. The authors speculate that differences in complexity and severity of patients may account for this finding. Although an adjusted analysis for chronic conditions revealed that the difference still remained, the authors appropriately recognize that their adjustment cannot fully account for the differences in patient population or severity and that 1 possible explanation for this finding is that children at nonteaching institutions receive safer care.

If hospitalized children are indeed safer at nonteaching institutions, 1 potential explanation is that they simply receive less care. A previous single-center study revealed that a staff-only model for care of children who are medically complex had lower costs and length of stay than a teaching service in which similar children were admitted.[15] Presumably, the lower costs seen in this study were driven, at least in part, by more efficient, less interventional care. Authors of a larger national database study evaluated staff-only visits versus supervised resident-staff emergency department visits.[16] After adjusting for severity and acuity, supervised encounters had an increased number of admissions, longer median emergency department length of stay, and higher rates of advanced imaging. The possibility that supply-sensitive care in larger teaching institutions could drive care that is less safe merits further study.

Stockwell et al's[11] work is a significant addition to the patient safety literature. It adds an important pediatric contribution to a number of publications in which suboptimal results in preventing harm in the hospital setting are suggested.[4–6,17,18] Although focused efforts on HACs may have had some successes, HACs are only a small part of the patient safety story. Moving forward, widespread adoption of trigger tools such as GAPPS that can be used to more sensitively identify AEs may lead to improvement in AE reporting. Other creative solutions such as family reporting of AEs may augment current reporting efforts in hospitalized children as well.[19,20] Whether increased reporting translates to improved overall safety remains unclear.

Even if we are to achieve a meaningful reduction in reportable harm, the potential for unmeasured harm still looms. We must be careful about making the false conclusion that hospital care is safe on the basis of our available metrics. Stockwell et al's[11] results can be used to reinforce the notion that the only dependable way to avoid harm from an intervention is to avoid the intervention in the first place.[17] If a child has an opioid-related respiratory arrest or a life-threatening bleed after a tonsillectomy, do we ever address whether the tonsillectomy was indicated? When a peripherally inserted central catheter becomes infected, how often do we question the necessity of the catheter in the first place? Given that even safely delivered health care can cause harm, we agree with recent calls to label unnecessary care as a reportable safety event.[21] Only by identifying all sources of harm and equally weighing errors of omission with errors of commission can we hope for a future in which hospitals are truly safe.

ABBREVIATIONS

AE: adverse event
GAPPS: Global Assessment of Pediatric Patient Safety
HAC: hospital-acquired condition
SPS: Solutions for Patient Safety

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