The Child Health PSO at 10 Years: An Emerging Learning Network.

Fiona H. Levy
Katherine A. Conrad
Carol Kemper
Michaeleen Green

Follow this and additional works at: https://scholarlyexchange.childrensmercy.org/papers
The Child Health PSO at 10 Years: An Emerging Learning Network

Fiona H. Levy, MD, MBA*†; Katherine A. Conrad, FACHE‡; Carol Kemper, RN, PhD, CPHQ, CPPS, FAAN§; Michaeleen Green, BA¶

Abstract
Introduction: The 2005 Patient Safety and Quality Improvement Act, actualized as a Learning Network (LN), has enabled the Child Health Patient Safety Organization (PSO) to play a vital and novel role in improving the quality and safety of care. This article describes the Child Health PSO and proposes PSOs as a new construct for LNs. Methods: A PSOs ability to affect patient care depends on member organizations’ integration of PSO output into their individual Learning Healthcare Systems. Therefore, the Child Health PSO developed tenets of an LN to improve member engagement in PSO outputs. Results: All Child Health PSO members participate in case-based learning, requiring ongoing and robust participation by all members. The engagement has been strong, with 86% of children’s hospitals achieving a case learning activity metric and 60% of children’s hospitals submitting cases. From this LNs perspective, 53% of children’s hospitals are considered highly engaged. Conclusions: In the last 10 years, the Child Health PSO has evolved as a viable LN and, to sustain this, has set a target of 100% of participating children’s hospitals being highly engaged. The previously inconceivable notion of sharing information to improve patient safety among hospitals is now an expected result of the formation of trusting relationships under a federally certified PSO. According to participants, collaboration is an essential element that empowers individual children’s hospitals to eliminate preventable harm. (Pediatr Qual Saf 2021;6:e449; doi: 10.1097/pq9.0000000000000449; Published online July 28, 2021.)

INTRODUCTION
A Learning Healthcare System (LHS), as described by the Institute of medicine, is created from the application of timely evidence-based clinical decisions to drive individualized care better.1 In its 2013 report Best Care at Lower Cost, the Institute of Medicine codified the importance of shared knowledge and continuous learning to improve healthcare outcomes, quality, and equity and to lower costs. This approach is characterized by the use of real-time knowledge supporting clinical decision-making, the engagement and empowerment of patients, the transparency of data, and a leadership-instilled culture of learning.2 More recently, Learning Networks (LNs), which consist of multiple participating organizations working within a network architecture, have emerged to support the activities and outcomes of participant LHSs. These LNs are characterized by (1) the alignment of participants around a common goal; (2) policies, processes, and resources to enable multiactor collaboration; and (3) information sharing.3–5

The Child Health Patient Safety Organization (PSO) is a nonprofit subsidiary of the National Association of Children’s Hospitals, commonly referred to as the Children’s Hospital Association (CHA). On May 13, 2009, federal certification under the Patient Safety and Quality Improvement Act enabled a pioneering group of children’s hospitals to adopt a systematic approach to the detection and mitigation of harm risk to pediatric patients, which led to the formation of the Child Health PSO. This PSO is built on a history of collaboration among children’s hospitals to achieve better, safer, and more reliable patient care.6–14 It is designed to capture and learn from voluntarily reported infrequent preventable serious harm events occurring in children with diverse medical conditions. Preventable serious harm events are consistent with the Joint Commission’s Sentinel Event Policy description of events that result in permanent harm or
serious temporary harm that is not related to the patient’s illness or underlying condition.\textsuperscript{15} This PSO is unique compared with other pediatric LNs, which frequently focus on patient-level clinical data to drive disease-specific collaborative improvements in care for single conditions and other targeted groups of hospital-acquired illnesses and injuries.\textsuperscript{8–14}

This article describes the formation, growth, and maturation of the Child Health PSO. We communicate its evolution into a unique LN construct, discuss how organizers overcame hurdles unique to PSOs, and report on progress.

**METHODS**

The methods employed in this investigation focused on LNs’ identifying characteristics: alignment around a common goal, multiactor collaboration, and information sharing. The following sections examine each of these in turn.

Alignment of Participants around a Common Goal

For the Child Health PSO to affect patient safety and quality of care in children’s hospitals, participating organizations had to be willing and able to adopt a common goal of eliminating preventable serious harm, commit to submit safety event case detail to the PSO, and integrate PSO output into their delivery of care. Progress toward this goal began in 2011 with an in-person meeting of PSO members and with the application of federal protections allowing event learning from reported events. Although infrequent in any single organization, these events posed significant potential risks to pediatric patients across all member organizations. Participants endorsed the reporting and sharing of safety event data to better understand and address a broad range of pediatric safety risks independent of patient age, illness, or hospital-acquired condition. Children’s hospitals began to recognize otherwise unforeseen risks based upon learning that occurs within the structures that support multiactor collaboration described in section “Multiactor Collaboration and Information Sharing.” They recognized a unique opportunity to transition the PSO from a large pediatric data repository to a partnership among participating children’s hospital safety leaders that would support the elimination of preventable, serious harm to pediatric patients.

The formalization of the voluntary PSO Patient Safety Team (PST), which followed, was another important step toward achieving a common goal. PST members are volunteer pediatric safety experts, all experienced in applying safety science when analyzing serious harm events occurring in children’s hospitals. The team created a key driver diagram (KDD)\textsuperscript{16} (Fig. 1) modified through multiple iterative reviews by external sources, including quality and safety leaders from the PSO participating organizations, members of the PSO Board of Directors, and the CHA Board Committee for Quality and Safety.

Throughout, the elimination of preventable serious harm to pediatric patients remained the global aim of the KDD designed to support a PSO LN. The specific and measurable, motivating, attainable, relevant, and trackable and time-bound (SMART)\textsuperscript{17} aim evolved to reflect a growing understanding of the PSOs limited positional authority over participants to reduce specific harm events and recognize that the primary value of the PSO depended on case reporting, participation, and engagement by member organizations. A review of the PSO KDD reveals the premise that reducing patient harm in a children's hospital LHS can be achieved by optimizing participant engagement in the LN.

Recognizing that actionable change in the safety of care to children depends on a member’s case submission to the PSO and participation in additional case learning activities, investigators created a composite outcome metric, “engagement,” to establish an actionable and meaningful performance measure. The SMART Aim then became “100% engagement” of PSO member institutions by the end of 2022. To meet the composite engagement metric, a participating hospital is required to have reported 2 or more cases in 12 months and engaged in 2 of the 3 additional case learning activities: attended 80% of scheduled case learning events, attended the annual in-person meeting, and presented a case once every 3 years.

Multiactor Collaboration and Information Sharing

The PST reviewed and analyzed submitted case narratives leveraging common cause-analysis methods. Submitted cases had undergone a “standardized root cause analysis process”\textsuperscript{18} within the reporting hospital. This standard process was adopted by most participating children’s hospitals trained through a separate organization, Children’s Hospitals’ Solutions for Patient Safety. Cases were then reviewed individually and collectively by PST members to maximize recognition of risk patterns and causal factors, such as lack of situational awareness, failure to communicate effectively, process failures, and errors in decision-making. Using qualitative systematic processes for consensus during event reviews, additional categories were contemplated that were not clarified using existing taxonomies.

The PSTs role and data analytics process positioned the PSO as an early warning system to detect potential areas of risk related to the care of children. The PST standardized multiactor collaboration on high-priority risk areas using three methods of learning and information exchange: safety alerts, safe tables, and safety tools, all designed to influence member adoption of best safety practices.

Safety Alerts

With the prevention of repeat safety events in mind, the PSO created safety alerts in 2012 to support member organizations’ ability to recognize the potential for, and then prevent, harm events at other participating...
children’s hospitals. The alerts have provided information that allows organizations to conduct proactive self-assessments and implement mitigation strategies to prevent repeat serious safety events. To support the creation of individual alerts, we engaged individuals from member institutions with specific expertise in human factors science, cognitive bias, and diagnostic error in the development process. We also included clinical experts aligning with areas of risk identified, such as medication safety, care management, and surgical safety.

Safe Tables
“Safe Table” is a term coined by PSOs to denote their federally privileged and confidential convening activities. Protected safe tables are open only to PSO participants, so that they can learn from safety events either in person or virtually. Additional administrative and technical procedures are implemented to minimize risk of impermissible disclosures and comply with the regulation to preserve privilege and confidentiality protections of these activities. Safe table discussions are augmented through a virtual platform that supports member organizations sharing resources and asking questions of peer children’s hospitals.

The PSO operates 2 primary Safe Table activities: Case Learning. Case learning uses 1 or 2 cases to highlight specific areas of risk, such as insufficient coordination of care, failures associated with hospital discharge and home medications, or procedural mishaps/retained foreign objects. Case learning began in 2011. In 2013, it was aligned to support children’s hospitals’ focus on high-reliability organization principles from their participation in Solutions for Patient Safety and reporting of the serious safety event rate to track outcomes.10,19

Safety Huddles. PSO safety huddles are a variation on the daily safety brief held by many participating hospitals and a novel example of a safe table.20 Designed to broaden and hasten opportunities for shared risk
identification, participants voluntarily ask for help or report a risk warning to other organizations. These early warnings have involved device- and medication-related harm or near misses, outbreak trends, various process failures, unanticipated communication breakdown, and safety challenges associated with COVID response. Safety huddles, designed as a multicenter early warning system, provide opportunities for early intervention and prevention of harm during care for children. From the 2014 startup through 9 months of implementation in 2020, the PSO has conducted over 341 weekly Safety Huddles, each running less than 15 minutes, generating over 1,823 early warning reports that have alerted children’s hospitals of potential risks to assess and mitigate.

Safety Tools—Proactive Risk Assessments
In 2017, the PST, in collaboration with other subject matter experts, began developing safety tools designed to support risk assessment and mitigation for specific infrequent but significant events at individual children’s hospitals. Individual hospitals had previously conducted their proactive risk assessments based on a safety alert; however, development within the PSO enabled access to a broader level of expertise for the risk assessment to be more robust. Most recently, a safety toolkit on diagnostic safety was published.21

RESULTS
The breadth and sometimes nonspecific nature of the safety event data, coupled with voluntary reporting, presented several challenges. One such challenge is illustrated in Figure 2. Among the 1,347 cases analyzed using AHRQ Common Formats for Event Reporting—Hospital Version 2.0 (CFER-H V2.0a),22,23 562 cases fell using AHRQ Common Formats for Event Reporting—illustrated in Figure 2. Among the 1,347 cases analyzed presented several challenges. One such challenge is safety event data, coupled with voluntary reporting, the breadth and sometimes nonspecific nature of the

DISCUSSION
We believe that member hospital engagement in the form of LN contributions and active learning from the LN is one of the necessary tools to drive safety improvement across children’s hospitals and, therefore, maximize value from the PSO. Although we set an ambitious SMART Aim of 100% of children’s hospitals being highly engaged in 2022 and targeting 60% in 2020, we believe improvement to 53% of children’s hospitals being highly engaged as of September 2020 is significant considering the children’s hospitals’ operational challenges resulting from the COVID-19 pandemic. The goal-based measurement allowed us to identify and begin to address areas needed for improvement within PSO processes. For example, modifications of our case learning designed to increase participation have included coaching presenters to share safety event case details and corrective actions that are replicable and actionable. Finally, in 2019, participant organizations were provided customized feedback on engagement performance to create shared accountability for the effectiveness of the PSO’s value as an LN supporting the LHS.24 The preliminary review of data shows engagement has increased over the last nine months.

Our “highly engaged” composite measure provides a new view of PSO progress by factoring in the level of participation (or input) needed from each member to sustain the LN outputs to achieve the global aim from the participating organization’s perspective. Of 43 children’s hospitals participating in the PSO from 2015 to 2019, engagement steadily decreased from 56% in 2015 to 49% in 2018 and 2019, other than a peak of 65% in 2017. As of September 30, 2020, engagement has increased to 53% (Fig. 3).

Analysis of performance on the composite measure components reveals that member children’s hospitals reporting two or more case reports has increased from 58% in 2019 to 60% in 2020, following a peak of 72% in 2017. Achieving other case learning activities has increased from 74% of children’s hospitals in 2019 to 86% in 2020, following a peak of 84% in 2017. Annual meeting attendance by September 2020 reflected 100% of members registering for the October virtual annual meeting (97% ultimately attended, which did not impact measures overall). Member attendance in 80% of safe tables decreased significantly from 33% of children’s hospitals in 2015 and 2016 to a low of 17% in 2019, but this has improved to 42% as of September 30, 2020. Case presentation once every three years has remained steady at or above 79% of children’s hospitals since 2016, fulfilling a case learning teaching principle to which members contribute as part of the LN (Fig. 4A and B).
is commonly stated within the PSO that no child should experience a preventable safety event if learnings from another hospital’s event can prevent its occurrence. Yet, we recognize that the relatively infrequent occurrence of serious harm incidents, combined with an absence of condition-specific alignment, can challenge an organization’s efforts to identify and mitigate safety risks to their patients.25 When PSO-submitted event details are combined, collated, and analyzed, newly acquired knowledge of infrequent risks provides insight on priorities for improving safety. However, this requires sufficient, reliable data; participation in and contribution to learning opportunities, and overall network engagement (the LN). Also required is each organization’s willingness to prioritize and tailor their processes to implement specific safety interventions within their organizations (the LHS).

The PSO embraced many of the characteristics of disease-specific LNs, tailoring them as needed to realize its unique goal. We have achieved the 3 major components of an LN: (1) alignment of participants around a common goal; (2) policies, processes, and resources to enable multiactor collaboration; and (3) sharing of information to achieve the goal. By contemplating our lessons learned, we have demonstrated a new path for an action-oriented LN.
Fig. 3. A new composite measure from an LN perspective improves understanding of engaged participation.

Fig. 4. Analysis of performance across all components of the composite measure allows identification of targeted areas for improvement. A, Reports breakdown of composite engagement data into rates of case reporting and learning activity participation. B, Details engagement percentages for each of the three case learning activities.
to support the elimination of serious pediatric harm. Future studies on member perspective of barriers to engagement, measuring children’s hospitals’ adoption of tools, and the impact of engagement to eliminate serious harm are all opportunities for broader understanding of the LN impact.

The last 10 years have seen the Child Health PSO evolve as a viable LN to support children’s hospitals’ LHSs. The sharing of information—historically considered inconceivable—is now an expectation embedded in the trust relationships formed within the PSO. The PSO allows for both mature and novel practices for information sharing and risk consciousness, resulting in a promising formula for collaboration. From the perspective of those actively participating, this collaboration is not just an option—it is now an essential element that further empowers individual children’s hospitals to eliminate preventable harm to pediatric patients. We believe that this is the real success of the PSO LN.

ACKNOWLEDGMENTS

The authors wish to thank past and present members of the Child Health PSO Patient Safety Team for their passionate commitment of time and effort, Barbara Weis for her persistent hard work and analytic skills in support of the PSO, and Angelo Giardino, MD, Ph.D., MPH, FAAP, Chief Medical Officer and Chair, Department of Pediatrics, Primary Children’s Hospital, and Troy Richardson, Biostatistician, Children’s Hospital Association, for their expert manuscript review.

REFERENCES

1. Institute of Medicine. The Learning Healthcare System: Workshop Summary. National Academies Press; 2007.
2. Institute of Medicine. Best Care at Lower Cost: The Path to Continuously Learning Health Care in America. National Academies Press; 2013.
3. Britto MT, Fuller SC, Kaplan HC, et al. Using a network organizational architecture to support the development of learning healthcare systems. BMJ Qual Saf. 2018;27:937–946.
4. Terao M, Hoffman JM, Brilli RJ, et al. Accelerating improvement in children’s healthcare through quality improvement collaborations: a synthesis of recent efforts. Curr Treat Options Pediatr. 2019;5:111–130.
5. Fjeldstad OD, Snow CS, Miles RE, et al. The architecture of collaboration. Strat Mgmt J. 2012;33:734–750.
6. Lannon CM, Peterson LE. Pediatric collaborative networks for quality improvement and research. Acad Pediatr. 2013;13(suppl 4):S69–S74.
7. Lannon CM, Peterson LE. Pediatric collaborative improvement networks: background and overview. Pediatrics. 2013;131(suppl 4):S189–S195.
8. Margolis PA, Peterson LE, Seid M. Collaborative chronic care networks (C3Ns) to transform chronic illness care. Pediatrics. 2013;131(suppl 4):S219–S223.
9. Hayes LW, Dobyns EL, DiGiovine B, et al. A multicenter collaborative approach to reducing pediatric codes outside the ICU. Pediatrics. 2012;129:e785–e791.
10. Lyren A, Brilli RJ, Zieker K, et al. Children’s hospitals’ solutions for patient safety collaborative impact on hospital-acquired harm. Pediatrics. 2017;140:e20163494.
11. Sharek PJ, McCleed RE Jr, Taketomo C, et al. An intervention to decrease narcotic-related adverse drug events in children’s hospitals. Pediatrics. 2008;122:e861–e866.
12. Neu AM, Miller MR, Staut J, et al; SCOPE Collaborative Participants. Design of the standardizing care to improve outcomes in pediatric end stage renal disease collaborative. Pediatr Nephrol. 2014;29:1477–1484.
13. Billett AL, Colletti RB, Mandel KE, et al. Exemplar pediatric collaborative improvement networks: achieving results. Pediatrics. 2013;131(suppl 4):S196–S203.
14. Miller MR, Niedner MF, Huskins WC, et al; National Association of Children’s Hospitals and Related Institutions Pediatric Intensive Care Unit Central Line-Associated Bloodstream Infection Quality Transformation Teams. Reducing PICU central line-associated bloodstream infections: 3-year results. Pediatrics. 2011;128:e1077–e1083.
15. The Joint Commission. Sentinel event policy and procedures. 2021. Available at: https://www.jointcommission.org/resources/patient-safety-topics/sentinel-event/sentinel-event-policy-and-procedures. Accessed February 8, 2021.
16. Institute for Healthcare Improvement. QI essentials toolkit: driver diagram. IHL.org. 2017. Available at: http://www.ihi.org/resources/Pages/Tools/Quality-Improvement-Essentials-Toolkit.aspx. Accessed February 11, 2020.
17. Blanchard KH. Leading at a Higher Level: Blanchard on Leadership and Creating High Performing Organizations. 3rd ed. Pearson; 2019.
18. Center for Medicare & Medicaid Services. Guidance for performing Root Cause Analysis (RCA) with Performance Improvement Projects (PIPs). 2014. Available at: https://www.cms.gov/medicare/provider-enrollment-and-certification/qapi/downloads/guidance-forrca.pdf. Accessed February 5, 2021.
19. Clapper C, Merlino J, Stockmeier C. Zero Harm: How to Achieve Patient and Workforce Safety in Healthcare. McGraw-Hill Education; 2019:165–167.
20. Paterson C, Miller K, Benden M, et al. The safe day call: reducing silos in health care through frontline risk assessment. Jt Comm J Qual Patient Saf. 2014;40:476–471.
21. Children’s Hospital Association. Diagnostic Safety Toolkit: Improving Communications to Enhance Diagnostic Safety (Child Health PSO). Available at: https://www.childrenshospitals.org/Quality-and-Performance/Patient-Safety/Resources/Diagnostic-Safety-Toolkit. Published May 15, 2020. Accessed July 21, 2020.
22. Clancy CM. Common formats allow uniform collection and reporting of patient safety data by patient safety organizations. Am J Med Qual. 2010;25:73–75.
23. Agency for Healthcare Research and Quality. AHRQ Common Formats for Event Reporting—Hospital Version 2.0a: Event Descriptions—Local Collection (Supplemental). Available at: https://www.psoppc.org/psoppc_web/DLMS/downloadDocument?groupId=1388&pageName=common%20formats%20Hospital%20V2.0a. Published July 2018. Accessed October 18, 2019.
24. Langley GJ, Moen RD, Nolan KM, et al. The Improvement Guide: A Practical Approach to Enhancing Organizational Performance. 2nd ed. Jossey-Bass; 2009:3–11.
25. Hoppes M, Mitchell JL, Venditti EG, et al. Serious safety events: getting to zero™. J Healthc Risk Manag. 2013;32:27–45.