INNOVATION IN PATIENT SAFETY AND QUALITY AT THE NATIONAL LEVEL

We Will Not Compete on Safety: How Children’s Hospitals Have Come Together to Hasten Harm Reduction

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Background: Launched in 2012, the Children’s Hospitals’ Solutions for Patient Safety (SPS) Network is a collaborative of children’s hospitals in the United States and Canada working together to eliminate patient and employee/staff harm across all children’s hospitals.

Methods: The SPS Network, which has grown from 8 to 137 hospitals, has a foundation of leadership engagement, non-competition, data-driven learning, attention to safety culture, family engagement, and transparency. The SPS Leadership Group, which consists of more than 150 leaders from participating hospitals, forms condition-specific teams to promote the reduction of hospital-acquired harm in a phased design that includes an ongoing focus on both process improvement and safety culture enhancements. Hospital leaders are engaged through monthly reports, executive webinars, in-person meetings, and biannual training opportunities for boards of trustees. SPS has developed extensive opportunities for learning collaboration, including in-person networkwide learning sessions, regional meetings, general and condition-specific webinars, communications, and a shared website.

Results: Over time, the portfolio has expanded as SPS has achieved harm reduction targets for some conditions and begun work to reduce harm in other, previously unaddressed areas. In 2017 SPS reported a 9%–71% reduction in eight harm conditions by an initial cohort of 33 hospitals. SPS estimates that more than 9,000 children have been spared harm since 2012, with $148.5 million in health care spending avoided.

Conclusion: Participation in the SPS Network has been associated with improved safety in children’s hospitals. Widespread participation in this or similar collaborations has the potential to dramatically decrease harm to patients, employees, and staff.

The Children’s Hospitals’ Solutions for Patient Safety (SPS) Network represents the most comprehensive effort to date by children’s hospitals to create a universally safe and healing environment for all children who are in their care. What began as an agreement among leaders of eight Ohio children’s hospitals to not compete on safety but instead work together to prevent harm has grown into a national movement that is transforming the delivery of safe care in more than 130 children’s hospitals across North America. This learning network collaborates to promote the progress of each individual hospital on a journey toward zero harm. As a critical part of this process, hospital CEOs and their individual hospital governance boards align their organizational goals with the Network’s stepwise harm reduction goals, with an unapologetic long-term aim of zero harm in any children’s hospital, anywhere.

SPS began with the Ohio Children’s Hospital Association (OCHA), which was created in 1985 to advocate for appropriate child health policy (Figure 1). Over time, the association’s aim broadened to emphasize quality and safety. Process improvement work began in 2005 with an initiative to implement medical response teams in all OCHA hospitals. These hospitals achieved a 46% reduction in preventable cardiac arrests outside of intensive care.1 At the request of the state of Ohio, the group also developed consensus recommendations for five publicly reported pediatric quality measures, and in 2009 it launched the Ohio Children’s Hospitals’ Solutions for Patient Safety (OCHSPS) Network. This initiative achieved a 58% reduction in surgical site infections (SSIs) in designated procedures2 and a 34.5% reduction in overall adverse drug events (ADEs), sparing an estimated 3,600 patients harm.3 OCHSPS was well positioned in 2011 to develop and lead a national effort to implement the strategies they created. In 2012, with funding from the Center for Medicare & Medicaid Innovation (CMMI) Partnership for Patients program,3 25 hospitals from across the United States joined to form the SPS Network. By 2013 the Network had grown to 78 hospitals in 33 states. With new hospitals joining every year, including 5 Canadian hospitals, the Network has now expanded to more than 130 children’s hospitals (Figure 2).

With the simple but ambitious vision of “All Kids, All Hospitals, All Safe” and an unwavering mission to work together to eliminate serious harm across all children’s
The Children’s Hospitals’ Solutions for Patient Safety (SPS) Network

**THE SPS TIMELINE**

**2005**
- The Ohio Children’s Hospital Association (OCHA) begins developing pediatric quality measures for public reporting and begins collaborating to prevent cardiac and cardiopulmonary arrests outside of ICUs.

**2009**
- Ohio collaborative expands to include all eight pediatric referral centers and to focus on additional quality improvement projects.
- Ohio Children’s Hospitals Solutions for Patient Safety (OCHSPS) network is launched.
- SSI in high risk children were reduced by 60 percent and ADEs were reduced by 50% across all eight children’s hospitals in Ohio.

**2011**
- OCHSPS has reduced serious safety events by 55 percent and serious harm events by 40 percent.
- OCHSPS asked to lead national effort to implement the strategies they created in children’s hospitals throughout the country.

**2010**
- OCHSPS leaders set a bold, audacious goal: to be the safest state in the country for children to receive healthcare and to eliminate serious harm in the State of Ohio by the end of 2015.

**2012**
- 25 hospitals from across the nation joined the initial 8 Ohio hospitals in the first phase of the Children’s Hospital’s Solutions for Patient Safety (SPS) network.

**2013**
- The network grows to 78 hospitals in 33 states and Washington, DC.
- SPS partners with Child Health Patient Safety Organization (PSO), the nation’s only PSO dedicated to children’s hospitals.

**2015**
- SPS grows to 100+ hospitals, including Canada.

**2014**
- 80+ SPS hospitals work to achieve specific goals through a revised SPS structure that incorporates prevention standards and high reliability culture work.

**2016**
- SPS announces intention to eliminate employee harm in children’s hospitals.

**2017**
- SPS is now 130+ hospitals strong – all working to eliminate harm in children’s hospitals.

**Figure 1:** Between 2005 and 2017, the Network evolved from a focused quality improvement effort shared among a small number of hospitals into an international collaborative engaged in a broad portfolio of harm reduction work. SSI, surgical site infection; ADE, adverse drug event.
SPS Network Governance Structure

Figure 2: As of 2017, the SPS Network had grown to more than 130 member hospitals, distributed across the United States and Canada.

hospitals, SPS continues to build on the original design principles of the Network: data transparency, ownership of the work by hospital CEOs, working with a sense of urgency, an agreement not to compete on safety, a commitment to an “All Teach, All Learn” approach, explicit effort to build a culture of safety, and development of common goals. The following three targets were set at the end of 2016 for December 31, 2018: a 40% reduction in hospital-acquired conditions (HACs), a 20% reduction in seven-day readmissions, and a 50% reduction in the serious safety event (SSE) rate.

In June 2016, at its first SPS Employee/Staff Safety Summit, the Network announced the goal of eliminating serious harm not just for patients but also for employees. At that time, SPS articulated the specific target to reduce DART (Days Away, Restricted, or Transferred) events by 25% by June 2019. The areas of initial focus for reducing employee safety events were overexertions, slips/trips/falls, and patient behavioral events.

Over time, Network members have contributed to the evolution of the original guiding principles of SPS into today’s Network key drivers (Sidebar 1).

Sidebar 1. Key Drivers: The Tenets of the Children’s Hospitals’ Solutions for Patient Safety (SPS) Network

1. Transparency: A foundation of the Network is the concept that transparency can catalyze improvement. SPS has increased transparency within the Network beginning with the focus on top performers and best practices to increase the pace of learning. Currently, 98% of SPS hospitals agree to transparency within the Network, which allows them to see hospital-level data via a Transparency Report for Learning, as well as view the aggregate rate of the Network and for their region for each hospital-acquired condition (HAC). The top performers for each harm area share a narrative of their success factors as part of this report. The Network also shares aggregate data and best practices on its public website.

2. Leadership: Senior hospital leadership engagement is an absolute requirement for transformation in patient safety. Engaged leaders ensure visibility of the efforts across the organization, establish accountability, align incentives, and ensure that appropriate resource allocation occurs. CEOs of Network hospitals take ownership of the work and accountability for results. SPS has designed efforts to inspire and continuously develop the safety leadership skills, including specialized education for governing board members and targeted CEO communications.

3. Mission Focus: SPS is adamant that the Network must act with urgency and discipline, focusing on harm outcomes through a combination of high reliability concepts and improvement science methods.

4. Network Hospitals Will Not Compete on Safety: The SPS Network is built on the fundamental belief that by sharing successes and failures transparently and learning from one another, children’s hospitals can achieve their goals more quickly than working alone.

5. All Teach, All Learn: Network hospitals must humbly share and gratefully learn from others. SPS rejects the notion that only certain members are leaders or experts, and instead expects every member to contribute to both teaching and learning.

6. Culture of Safety: Hospitals within the Network employ the cultural transformation strategies learned from high reliability industries (described below).

7. Process Reliability & Standardization: SPS hospitals commit to sharing both outcome and specific process reliability data monthly. The result is the accumulation of the largest available data set linking process reliability to HAC rates among children’s hospitals. Analysis of these data allows the Network to continually identify interventions associated with lower rates of harm.

8. Patient and Family Engagement: Recognizing the critical role that patients and families play in safety, SPS Network hospitals commit to engaging patients and families in their patient safety work, including participating in HAC improvement teams, safety leadership committees (including board committees, for many of the hospitals), at SPS hospital board trainings. SPS has a patient and family representative on its governing board and also incorporates families in its learning sessions.

9. Distributed Leadership: In the SPS Network, leadership is distributed across large numbers of participating sites. Each HAC targeted has 2–4 voluntary leaders and 3–10 subject matter experts from different participating sites, rather than a centralized “expert panel,” as is frequently used in quality improvement collaborative efforts. This distributed leadership model allows focused contribution of content and enhanced ownership and accountability. This conceptual approach to leadership has led to sustained operational improvements via shared accountability, a wide breadth of expertise, and diverse empowerment of micro-, meso-, and macrosystem quality leaders.
10. Core Network Infrastructure: Transformational change requires both local quality improvement infrastructure and a supportive centralized Network infrastructure. SPS infrastructure is necessary to facilitate data sharing, develop and support of continuous learning opportunities, share best practices, manage recruitment and orientation of member hospitals, identify and resolve problems, and create individual coaching opportunities for hospitals struggling with particular issues.

11. Partnerships: Working at this scale demands close attention to key external partnerships. This includes private and public funders, such as the Cardinal Health Foundation and the Centers for Medicare & Medicaid Services (CMS); organizations with significant overlap in audience and vision, such as the Children's Hospital Association and the Canadian Association of Paediatric Health Centres; firms with specialized knowledge to inform our culture work, such as Press Ganey/Healthcare Performance Improvement and Value Capture; as well as public entities that lead in the selection of quality definitions and metrics such as the Centers for Disease Control and Prevention (CDC).5

References

METHODS
Organizational Structure
As the SPS Network outgrew its original Ohio CEO governance structure, a new governance model was created in 2015 in alliance with the Children’s Hospital Association (CHA; Lenexa, Kansas). The 11-member board of directors consists of nine participating hospital CEOs, one family/patient representative, and one corporate/philanthropy representative. Figure 3 illustrates the SPS organizational structure.

The Network leadership team includes the president of SPS and the executive director, who lead the SPS management team, which oversees SPS Network operations. A clinical director and an associate clinical director, along with other Network content experts (quality improvement [QI], data analytics, and project management), guide the Network’s clinical strategy and tactics. This team is supported by staff skilled in project management, education, event planning, and communications. Under the leadership of the clinical directors, a Clinical Steering Team is responsible for oversight of the clinical work, measurement and data progress, and learning content for the Network. The clinical directors also work closely with the Clinical Leadership Group, which is composed of all HAC leaders and subject matter experts and which drives the development and refinement of tactical and cultural initiatives.

SPS is only as strong as its member hospitals. Therefore, it provides direction for recommended staff for participating hospitals—senior executive sponsor, quality leader, quality improvement staff, project manager, and data support. Another critical hospital success factor is the identification of hospital-level champions responsible for increasing SPS prevention bundle process reliability and actively participating in SPS learning opportunities. Hospitals that have expressed interest in joining are oriented through an annual onboarding process, which includes a six-month Getting Started course to guide them through the strategic, tactical, and logistic details of the Network (Sidebar 2).

Sidebar 2. The Getting Started Course

Getting Started
This is a six-month webinar course; each one-hour monthly live webinar requires one hour of homework. The course is designed to orient and prepare new hospitals in the Network for meeting the basic membership requirements and achieving the Network’s goals. Specifically, the course prepares hospitals for understanding each of the harm areas; the core components of Children’s Hospitals’ Solutions for Patient Safety (SPS); such how to collect and submit data for each of the hospital-acquired conditions (HACs); and the quality improvement methods used for improving outcomes. The topics discussed throughout the course include a review of the SPS structure and participation expectations, establishing infrastructure to support hospital improvement work, capturing outcome and process measures, and building will and energy for the work at the local level. In addition to attending the monthly webinars, participants complete homework monthly and a project and presentation, during which they demonstrate the steps that their hospital has taken to improve outcomes for one HAC.

Transforming Hospital Culture to Reduce Harm
Serious safety events (SSEs), proposed by Throop and Stockmeier as measures of harm, are deviations in standard of care that results in significant harm and may be classified as SSE 1, Death; SSE 2, Severe Permanent Harm; SSE 3, Moderate Permanent Harm; SSE 4, Severe Temporary Harm; and SSE 5, Moderate Temporary Harm.5 SPS hospitals are employing cultural transformation strategies to significantly reduce SSEs. These strategies, borrowed from high reliability industries such as aviation and nuclear energy, are intended to promote sensitivity to operations, preoccupation with failure, deference to expertise, commitment to resilience, and reluctance to simplify interpretations, as defined by Weick and Sutcliffe.7 SPS and the Child Health Patient Safety Organization (Child Health PSO), a program sponsored by the CHA,8 collaborate to align curriculum and methodology for the operationalization of these principles.

The basic components of the SPS culture transformation methods, known within the Network as the “culture work,”
Figure 3: The Children’s Hospitals’ Solutions for Patient Safety (SPS) Network is governed by a board of directors composed mainly of member hospital chief executives. The leadership team oversees improvement teams made up of a combination of Network staff and volunteer clinical leaders and subject matter experts from member hospitals across the Network. HAC, hospital-acquired condition.
consist of the adoption of the SSE definition; training in rigorous, structured cause analysis; and universal application of error prevention behaviors and leadership methods based on the Press Ganey/Healthcare Performance Improvement (HPI) model1 to reinforce them. Hospitals commit to the “culture work” within two years of joining SPS (Sidebar 3).

Sidebar 3. Children’s Hospitals’ Solutions for Patient Safety (SPS) Culture Work

The SPS culture work is closely based on Press Ganey’s proprietary Healthcare Performance Improvement (HPI) High Reliability model and delivered under a formal agreement with Press Ganey/HPI. Hospitals adopt the Press Ganey/HPI Serious Safety Event classification system, which introduces specificity with respect to level of harm and certainty of causation. They deploy teams to learn rigorous Press Ganey/HPI Cause Analysis processes at an annual two-day event coordinated by SPS and delivered in conjunction with Press Ganey/HPI. Hospital teams also adopt an Error Prevention and Leadership Methods curriculum focused on promoting individual safety behaviors and tools to support critical thinking and teamwork. Examples of error prevention tools include appropriate assertion and clear communication using SBAR (Situation, Background, Assessment, Recommendation) and structured handoff. Examples of leadership methods include a daily organizationwide Safety Brief and Rounding to Influence. This curriculum is learned at an annual two-day in-person “train the trainer” workshop delivered by SPS culture leaders, with assistance provided by experienced staff from member organizations. The expectation is that organizations deliver this training (generally through three-hour in-class sessions) to all staff and leaders. Implementation is further supported by a series of webinars covering additional components, such as common cause analysis and safety coach program implementation, as well as “office hours,” during which members can ask questions of other Network members who are experienced in the culture work.

The webinars and in-person training sessions, shown in their monthly sequence, are as follows:
- Serious Safety Event Classification: One half-day (4 hours), with 3 1-hour follow-up sessions (webinar)
- Root Cause Analysis: Two full-day in-person training (16 hours), with 3 1-hour follow-up sessions
- Error Prevention/Leadership Methods: Two full-day in-person training (16 hours), with 3 1-hour follow-up sessions
- Disclosure webinar: 2 hours (webinar)
- Apparent Cause Analysis / Common Cause Analysis: 2 hours (webinar)
- Safety Coaches: 2 hours (webinar)

SPS continuously creates and updates additional programs to complement and support the training, as follows:
- Twice-yearly in-person learning events for hospital boards, to promote effective governance for safety.
- Data collection and analysis regarding execution of the individual components of the culture work to identify additional opportunities for well-building and education.
- Complementary educational offerings and work groups on subjects such as human factors and ergonomics, fostering resilience, and high-performing microsystems.
- Education and collaborative improvement around application of safety culture methods to employee safety.
- Reinforcement of the culture work through regular national and regional learning sessions.

Reference

SPS has continued to drive the involvement of patients and families at all levels. For example, one of the SPS trustees is a parent who has helped SPS significantly with the development of senior leader and board member training. Network members are expected to include families in governance and tactical harm reduction work, and adherence to this expectation is tracked and reported. The Network has also focused on the error disclosure process to families by creating a training manual to prepare clinicians for disclosure.

Operational Definitions and Bundles

The first step in achieving process reliability and standardization, which we undertook in 2012, was to develop standard operational definitions for pediatric HACs. We used a participatory approach led by a panel of pediatric safety experts, in which all available and relevant research, as well as existing operational definitions used by national organizations, were considered. The experts prioritized research that included children, as well as operational definitions widely supported by children’s hospitals, such as those by the Centers for Disease Control and Prevention’s (CDC) National Healthcare Safety Network. The participating hospitals were then given the opportunity to comment on the panel’s operational definitions, which led to critical refinement. At SPS’s inception, the hospitals rapidly adopted these standard definitions, which are continuously monitored, clarified, and updated. In 2014, after considerably more development, SPS hospitals identified evidence-based bundle elements and then formalized pediatric prevention bundles, with the goal of spreading them to all children’s hospitals across the globe. The SPS Prevention Bundles, which are available on the SPS website, are developed through the identification of potential best practices, planned experimentation, factorial design, analysis of covariance and analysis using statistical process control. The SPS Prevention Bundles, which address seven pediatric HACs and readmissions, are as follows:
- Catheter-Associated Urinary Tract Infections (CAUTI)
- Central Line–Associated Bloodstream Infections (CLABSI)
- Serious Falls (Falls with Injury)
- Pressure Injuries (PI)
- Readmissions
- Surgical Site Infections (SSI)
- Ventilator-Associated Pneumonia (VAP)
- Venous Thromboembolism (VTE)

The bundles include both standard elements, which have strong evidentiary support, and recommended elements, which are less well supported by evidence but, in the opinion of SPS subject matter experts, represent best practices. The standard and recommended elements for SSI, for example, are shown in Sidebar 4.


<table>
<thead>
<tr>
<th>SPS Standard Element</th>
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<tbody>
<tr>
<td>Preoperative bath</td>
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Children's Hospitals’ Solutions for Patient Safety (SPS) Network Design Phases, 2015–2018

**Figure 4:** Network improvement efforts are organized into a series of discrete phases, corresponding to idea generation, testing, evidence generation, sustaining improvement, and dissemination. HAC, hospital-acquired condition; QI, quality improvement.

- No razor
- Appropriate antibiotic timing

**SPS Recommended Elements**
- Appropriate skin antisepsis (‘Skin Prep“IntraOp’)
- Appropriate antibiotic redosing

**HAC Harm Reduction Approach**
To accelerate the reduction of serious harm from HACs, SPS implemented a five-phase approach (Figure 4). This design allows SPS to accelerate the pace of improvement by organizing the HAC and culture work into five distinct phases: Discovery, Pioneer, Aviator, Orbiting, and Explorer, as we now describe.

- **Discovery Phase:** This phase predominantly occurs outside the Network structure; it is carried out by individual innovators and researchers. Potential opportunities to apply new strategies within SPS to reduce harm are monitored and prioritized by Network leadership.
- **Pioneer Phase:** This phase begins with the introduction of a new HAC or culture change to the SPS Network. SPS recruits a cohort of volunteer hospitals willing to work intensively to reduce the rates of that HAC at their hospitals, using a planned experimentation factorial design to establish effective best practices when those were previously unknown. The results from this cohort are used to develop a networkwide prevention bundle.
- **Aviator Phase:** This phase begins with adoption of the HAC definition and measurement by all hospitals in the SPS Network. The hospitals that participated in the cohort during the Pioneer Phase share and teach best-practice methods for the established prevention bundle. Every SPS hospital is expected to achieve high reliability to the prevention bundle, working toward a shared Network reduction goal. This phase is completed when the Network reduction target is achieved.
- **Orbiting Phase:** In this phase, which is focused on sustaining improvements, hospitals continue to submit monthly HAC rates. Network leaders monitor the
Table 1. Children’s Hospitals’ Solutions for Patient Safety (SPS) Network Categories of Harm*

<table>
<thead>
<tr>
<th>Category</th>
<th>Year SPS Began Work</th>
<th>Current Phase/Work Group</th>
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</thead>
<tbody>
<tr>
<td>Adverse Drug Events (ADE)</td>
<td>2012</td>
<td>Aviator</td>
</tr>
<tr>
<td>Antimicrobial Stewardship (ASP)</td>
<td>2017</td>
<td>Pioneer</td>
</tr>
<tr>
<td>Catheter-Associated Urinary Tract Infections (CAUTI)</td>
<td>2012</td>
<td>Orbiting</td>
</tr>
<tr>
<td>Central Line–Associated Bloodstream Infections (CLABSI)</td>
<td>2012</td>
<td>Aviator</td>
</tr>
<tr>
<td>Central Line–Associated Bloodstream Infections</td>
<td>2016</td>
<td>Work Group</td>
</tr>
<tr>
<td>Hematology/Oncology (CLABSI-Hem/Onc)</td>
<td>2017</td>
<td>Pioneer</td>
</tr>
<tr>
<td>Central Venous Catheter Venous Thromboembolism (CVC-VTE)</td>
<td>2017</td>
<td>Pioneer</td>
</tr>
<tr>
<td>Employee/Staff Safety: Overexertion</td>
<td>2017</td>
<td>Pioneer</td>
</tr>
<tr>
<td>Employee/Staff Safety: Patient Behavioral Events</td>
<td>2018</td>
<td>Pioneer</td>
</tr>
<tr>
<td>Employee/Staff Safety: Slips, Trips &amp; Falls</td>
<td>2018</td>
<td>Pioneer</td>
</tr>
<tr>
<td>Serious Falls (Falls with Injury) (Falls)</td>
<td>2012</td>
<td>Orbiting</td>
</tr>
<tr>
<td>Nephrotoxic Acute Kidney Injury (NAKI)</td>
<td>2018</td>
<td>Pioneer</td>
</tr>
<tr>
<td>Non-Central Venous Catheter Venous Thromboembolism (Non-CVC VTE)</td>
<td>2012</td>
<td>Aviator</td>
</tr>
<tr>
<td>Peripheral Intravenous Infiltration and Extravasations (PIVIE)</td>
<td>2015</td>
<td>Pioneer</td>
</tr>
<tr>
<td>Pressure Injuries (PI)</td>
<td>2012</td>
<td>Aviator</td>
</tr>
<tr>
<td>Readmissions</td>
<td>2012</td>
<td>Aviator</td>
</tr>
<tr>
<td>Respiratory Device-Related Pressure Injuries (Respiratory Device-Related PI)</td>
<td>2017</td>
<td>Work Group</td>
</tr>
<tr>
<td>Surgical Site Infections (SSI)</td>
<td>2012</td>
<td>Orbiting</td>
</tr>
<tr>
<td>Unplanned Extubations (UE)</td>
<td>2016</td>
<td>Pioneer</td>
</tr>
<tr>
<td>Ventilator-Associated Events (VAE)</td>
<td>2017</td>
<td>Pioneer</td>
</tr>
</tbody>
</table>

Year of launch and design phases (as explained in Figure 4) are shown.  
* With the exception of Antimicrobial Stewardship Programs, Employee Safety, and Readmissions, these are all hospital-acquired conditions (HACs). Centers for Medicare & Medicaid Services. Hospital-Acquired Conditions (Updated: Aug 19, 2015.) Accessed May 13, 2018. [https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/HospitalAcqCond/Hospital-Acquired_Conditions.html](https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/HospitalAcqCond/Hospital-Acquired_Conditions.html).

data, looking for and intervening on any potential deterioration of HAC rates or outstanding opportunities for further reduction.  
• Explorer Phase: In this phase, the resources are shared beyond the Network, globally, and the findings are spread through publications, partnerships, public presentations/webinars, and the SPS website.

In 2012, with funding from the CMMI Partnership for Patients program, SPS began focusing on addressing a broader number of HACs and since then has continued to add to this list as more opportunities to reduce harm are identified and prioritized; 19 harm areas are shown in Table 1.

RESULTS

SPS Network Participation and Process

Between 2011 and 2018, the SPS Network grew from 8 to 137 children’s hospitals. The Network added 25 hospitals in 2012, 45 in 2013, and between 4 and 20 every year since then. During that time, only 3 hospitals discontinued their participation. The Network currently represents 38 states and the District of Columbia, as well as three Canadian provinces, encompassing at least 35 million patient-days. More than 9,000 health professionals are in the SPS hospital contact database. In particular, more than 160 leaders from participating hospitals have volunteered their time and expertise since the beginning of the Network as part of the SPS Leadership Group (Appendix 1, available in online article). As part of their participation, hospitals receive a monthly report of their results that includes Shewhart control charts for each HAC, displaying hospital-level and network-level data. Twice per year, hospitals also receive a report with detailed descriptions of the best practices among Network hospitals and with contact information for those top performers.

SPS has hosted 11 networkwide learning sessions that were each attended by between 300 and 540 people. To allow for additional in-person collaboration, SPS organized itself into 12 regions in 2017 and to date has hosted 16 regional meetings. Webinars that are both general and HAC–specific are a cornerstone of the SPS model. Since its inception in 2012, SPS has hosted approximately 100 webinars every year. An average of 108 people attend the monthly HRO [high reliability organization] Wednesday webinars. One hundred hospitals have begun to fully implement the culture transformation methods. SPS hosts biannual board trainings attended by between 50 and 80 board members and senior executives. CEO webinars are also held twice per year and are attended by approximately 85 leaders. Additional communications include a weekly project manager e-mail communication, leader podcasts, monthly CEO reports, a quarterly quality leader e-mail communication, regular social media updates, and ad hoc e-mails.
HAC Progress Through Design Phases

As stated earlier, the original eight hospitals worked on two HACs—SSIs and ADEs—prior to the formation of the national Network. In 2012 the expanded Network adopted an additional eight HACs, as well as readmissions; however, SPS has not developed prevention bundles for all HACs. Since then, the Network has achieved the initial reduction targets for three of those HACs—(SSI, CAUTI, and Serious Falls (Falls with Injury)—which have progressed to the Orbiting phase (Figure 5). At the same time, SPS developed eight evidence-based prevention bundles, as listed on page 000. These bundles are shared in detail with all Network hospitals for implementation and posted on the SPS public website. As SPS achieved targets and developed the bundles, nine additional conditions were added to the portfolio in the Pioneer phase, including categories of harm such as unplanned extubations and subgroups of other HACs, such as CLABSI in hematology/oncology patients and device-related pressure injuries. One HAC, obstetric adverse events, was part of the SPS portfolio from 2012 through 2015, after which it was discontinued because of the limited number of SPS children's hospitals that serve as primary birthing centers.

Outcomes

In the first published report of networkwide results, in which outcomes data for the baseline (April 2011–March 2012) and postintervention periods (April 2012–March 2015) were reported, the first cohort of 33 SPS hospitals demonstrated significant harm reduction in eight of nine HACs (range, 9%–71%; \( p < 0.005 \) for all). In addition, the rolling 12-month SSE rate for this group decreased by 50%. Subsequent results are equally promising and displayed on the Network's public website for real-time review. Individual-HAC articles have reported reductions for pressure injuries and SSIs.

To estimate the number of children spared harm through the efforts of participating hospitals, SPS created cohort baselines by joining year and compares the expected results to the current monthly performance. Those calculations suggest that SPS has spared approximately 9,000 children from serious harm. Similar calculations can be used to esti-
mate the costs averted using published estimates of the cost of each HAC and multiplying by the number of children who have been spared harm. Subsequently, SPS estimates a savings of more than $148.5 million through June 2017.

DISCUSSION

In just a few years, SPS has succeeded in bringing together more than 130 children’s hospitals in the United States and Canada to collaborate on pediatric patient safety. Using process improvement and efforts focused on improving the culture of safety, this collection of hospitals has effectively identified prevention bundles and reduced serious harm events for several common categories of harm. Despite these initial accomplishments, harm in the hospital setting remains too common and the challenges to eliminating harm in children’s hospitals altogether are significant.

Many of the data sources involved in the SPS program, such as in-person process audits, active surveillance for harms such as pressure injury, review by experts to ensure that cases meet operational definitions, and uploading of data to SPS, require a degree of manual management. This results in significant workload in an environment in which leaders are pressed to find efficiencies through use of electronic data sources and administrative data. However, surprisingly, many hospital staff members express a sense of value in the investment made in the manual collection of data in that they find the data more “credible” and more conducive to real-time awareness and cause analysis, which engages a great number of frontline staff in the improvement work. Nevertheless, it behooves us to align definitions and data sources whenever possible, and efforts are under way to consider efficiencies with other organizations, such as the CDC, to which children’s hospitals submit similar data. Another challenge inherent in the use of voluntarily reported data is that despite the use of standard definitions, data may not be obtained or classified in exactly the same way among hospitals. An example is the application of the National Coordinating Council for Medication Error Reporting and Prevention (NCC-MERP), which SPS uses as a standard classification for ADEs. Even when hospitals are internally consistent with the classification system, they may still classify cases differently from other hospitals. This means the Network must operate with a “constant caution” for any analysis or reporting that involves comparisons between hospitals or over time. The Network was conceived on a foundation of noncompetition between members, and Network leaders regularly repeat the motto that “this is not benchmarking; the goal is to improve your own outcomes over your own baseline over time.” However, hospital leaders are under constant pressure to use these data for comparison, particularly in cases in which multiple children’s hospitals exist in the same marketplace. The pressure for comparison comes from boards to demonstrate exceptional performance and from the many external groups who use data to award competitive distinctions. In response, the Network seeks partnerships that allow for

Photo caption: From left to right: Stephen Muething, MD; Melissa Shepherd, BA; Nicholas Lashutka, BA, President, SPS; Maitreya Coffey, MD; Anne Lyren, MD, MSc; and Michael Fisher, Chairman, Board of Trustees, SPS.
multiplicative impact rather than competition for attention and resources as opportunities continue to proliferate. SPS leaders have engaged in discussions with U.S. News & World Report, Leapfrog, and Magnet to better understand where our efforts could align for pediatric safety. The exponential pace of growth of the Network, while a rewarding measure of its success, creates a challenge for SPS, which must effectively onboard new members while adapting to the evolving needs of more experienced members. To mitigate the discrepancy for newer hospitals, SPS created a catalog of webinars recorded since the Network’s inception; organized the Getting Started course; partners hospitals newer to the Network with more experienced hospitals; which agree to be readily available for practical questions; offers foundational coursework at every national learning session and board training; and created a regional structure to allow for more intimate collaboration with local peers. At the same time, the majority of the ongoing webinars and learning opportunities are designed to support the hospitals that are already familiar with the fundamentals and are now working to further accelerate their harm reduction. Furthermore, the mission of eliminating serious harm requires a continuous broadening of the portfolio of harms addressed by the Network. Similarly, identifying and achieving improvements in more “recent” harms while sustaining reductions in mature HACs requires constant attention and continuous titrating of the intensity of different Network interventions and activities. From the viewpoint of the participating hospital, the portfolio of harms and the great number of cultural and tactical interventions a hospital is required to carry out to fully participate in the Network program require a significant investment of leadership attention and human resources. Dialogue with Network members consistently highlights challenges in growing and maintaining these resources in a fiscally constrained sector. SPS developed a “value calculator” that helps hospitals estimate the value of their SPS membership and in-kind investment of hospital-level resources. The calculator incorporates quantitative data reflecting both lives spared harm and costs averted as the individual hospital’s HAC rates decrease. The Network also emphasizes both the business case for quality and patient stories at board trainings and on CEO webinars that help executives understand the need to invest in this work. Finally, QI work requires a distinct set of knowledge and skills, and the Network and its members are all affected by the sectorwide challenge to build and maintain sufficient capacity in this rapidly expanding field, compounded by the uneven access to opportunities for education and mentorship to develop QI professionals.

NEXT STEPS

The number of improvement networks is destined to grow, given the multitude of opportunities to apply the SPS approach. In the future, Network goals include extending the culture work further through the exploration and application of human factors and ergonomics and Safety-II principles, deepening relationships with researchers and innovators to achieve further improvements when results plateau, continuing to identify new harms to address, and considering the expansion of our scope beyond our initial inpatient focus. Clearly, the Network is on a multi-decade journey, and its viability will require constant evolution of targets and methods. Collaborative learning is critical to making the improvements in health care safety that we all expect and deserve.

SEE THE ONLINE VERSION OF THIS ARTICLE FOR APPENDIX 1. CHILDREN’S HOSPITALS’ SOLUTIONS FOR PATIENT SAFETY (SPS) LEADERSHIP GROUP.

SUPPLEMENTARY MATERIALS

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jcjq.2018.04.005.

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