PATIENT SAFETY FIRST
YEAR 2 REPORT

Improving Patient Safety and Perinatal Care across California

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EXECUTIVE SUMMARY

Every day, tens if not hundreds of thousands of errors occur in the U.S. healthcare system, impacting the lives of individuals and families across the nation\(^1\). To address this critical issue in hospitals, five key industry stakeholders came together in 2010 to develop and implement Patient Safety First...A California Partnership for Health. This innovative partnership is currently in its third year of existence with over 170 California hospital participants.

Patient Safety First utilizes regional peer to peer learning networks to accelerate the adoption of patient safety practices and strategies for improvement. At the close of year two of PSF significant improvements have been seen in reduction of sepsis mortality, ventilator acquired pneumonia (VAP), catheter associated urinary tract infections (CAUTI), central line blood stream infections (CLBSI) and the reduction of elective deliveries prior to 39 weeks gestational age:

- VAP rate declined from 2.32 per 1000 ventilator days in 2009 to 1.21 in 2011, 48% of the way toward a goal of zero
- CAUTI rate declined from 1.59 per 1000 catheter days in 2009 to 1.09 in 2011, 32% of the way toward a goal of zero
- CLBSI rate declined from 2.21 per 1000 central line days in 2009 to 1.34 in 2011, 39% of the way toward a goal of zero
- Sepsis mortality rate declined from 25.35 per 100 sepsis cases in 2009 to 20.15 in 2011, 67% of the way towards the goal of a statewide 30% reduction
- Perinatal gestational age deliveries under 39 weeks declined from 10.36% of all deliveries in 2009 to 3.6% in 2011, reaching the goal of 5% or less earlier than expected
- Over **973** lives have been saved as a result of reducing sepsis mortality

In addition, an estimated **$19,241,105** costs were avoided as a result of this initiative. PSF is an example of how patient safety and quality of care can be improved in hospitals while reducing costs on a large scale. In year three, PSF will position itself to build upon its current success and achieve further improvements in quality while lowering costs. Furthermore, PSF will work to align its goals with newly designated state and federal quality initiatives.

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INTRODUCTION

January 2012 marks the beginning of the third year of Patient Safety First…A California Partnership for Health. With over 170 hospitals participating, Patient Safety First (PSF) is the largest statewide collaborative effort focused on patient safety in the nation. Not only is PSF unique in its size and scale, but it is distinctive in that it brings together a health plan, hospital associations, a non-profit organization and hospitals as partners in an effort to improve care, health outcomes and reduce healthcare costs.

Partners have worked diligently during the first two years of PSF to make progress towards its original three-year program goals in the areas of hospital acquired infections, sepsis mortality and perinatal care. The purpose of this report is to highlight the results and outcomes during the first two years of this innovative partnership. Using data gathered from PSF partners this report:

- Describes the PSF program and identifies its goals
- Describes the peer to peer learning model utilized to reach its goals
- Reviews process outcomes achieved to-date
- Reviews progress toward achieving clinical outcomes
- Reviews cost avoidance results
- Provides recommendations for year three and beyond
BACKGROUND

Since the 2009 Institute for Healthcare Improvement (IHI) report, To Err is Human, patient safety has become a growing national priority with the demand for improving patient safety coming from all areas in healthcare, including individual hospitals, hospital systems, and quality improvement authorities such as the Agency for Healthcare Research and Quality (AHRQ), The Joint Commission (TJC), and National Quality Forum (NQF). Based on heightened awareness in the healthcare industry and the need for coordination among California’s patient safety efforts, Patient Safety First…A California Partnership for Health (PSF) was launched in January 2010.

PSF was developed to improve the quality of care provided to Californians, save lives and reduce healthcare costs. Anthem Blue Cross (Anthem) provided $6 million dollars over three years to fund this initiative. PSF partners include the Hospital Association of Southern California (HASC), Hospital Council of Northern and Central California (HCNCC), Hospital Association of San Diego & Imperial Counties (HASDIC), National Health Foundation (NHF) and Anthem. Each organization plays an important role in the organization and implementation of PSF.

The Regional Hospital Associations (RHA) are not-for-profit 501(c)(6) regional trade associations comprised of hospitals and health systems, related professional associations and associate members with a common interest in improving the operating environment for hospitals and improving the health status of the communities they serve. Combined, the three associations represent 95% (395) of all hospitals in the state. Their mission is to serve the political, economic, informational and educational needs of hospitals in their regions, and improve the quality and accessibility of health care services and thereby improve the health status of communities. RHAs are the direct connection between the PSF initiative and participating hospital partners. At the start of the initiative each RHA was charged with recruiting hospitals to participate in their regional improvement collaboratives. Each RHA organizes and facilitates in-person meetings and educational activities for their hospitals and reports progress back to PSF partners. The CEO from each of the RHAs participates in a PSF leadership team which helps frame the strategic direction of the initiative.

National Health Foundation (NHF) is a non-profit 501 (c) 3 charitable organization. The mission of NHF is to improve and enhance the health of the underserved by developing and supporting innovative projects that 1) can become independently viable, 2) provide systematic solutions to gaps in healthcare access and delivery and 3) have the potential to be replicated nationally. NHF is the program manager, evaluator and fiscal administrator for PSF. As such, NHF convenes and leads the project team, leadership team and all hands meetings. NHF also developed and maintains a web-based data collection and reporting system used to collect data from participating hospitals and RHAs and a dedicated project website (see Appendix A). NHF’s CEO participates in and facilitates the PSF leadership team meetings.

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Association.™ ANTHEM is a registered trademark of Anthem Insurance Companies, Inc. The Blue Cross names and symbols are registered marks of the Blue Cross Association. As a collaborative partner Anthem funds the PSF initiative and participates in the project team meetings as well as the leadership team meetings. Anthem meets regularly with National Health Foundation to ensure the initiative has the support needed to advance its goals.

**PSF INITIATIVES**

The focus areas for PSF were determined by partners at the start of the project through a collaborative decision making process. The following initiatives were chosen as a result of Regional Hospital Associations’ existing patient safety efforts, the continued need for improvement in these areas and an assessment of potential impact², PSF initiatives include:

- Hospital Acquired Infections (HAIs): Ventilator Associated Pneumonia (VAP), Central Line Blood Stream Infections (CLBSI), Catheter Associated Urinary Tract Infections (CAUTI)
- Sepsis Mortality
- Perinatal Birth Trauma
- Non Medically Indicated Elective Deliveries prior to 39 weeks Gestational Age

After these focus areas were determined, three-year program goals were developed for each initiative (see Table 1).

**Table 1. PSF Three-Year Goals**

<table>
<thead>
<tr>
<th>Initiative</th>
<th>3 Year Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ventilator Associated Pneumonia (VAP)</strong></td>
<td>Hospitals will reach a rate of zero VAPs</td>
</tr>
<tr>
<td><strong>Catheter Associated Urinary Tract Infections (CAUTI)</strong></td>
<td>Hospitals will reach a rate of zero CAUTIs</td>
</tr>
<tr>
<td><strong>Central Line Blood Stream Infections (CLBSI)</strong></td>
<td>Hospitals will reach a rate of zero CLBSIs</td>
</tr>
<tr>
<td><strong>Sepsis</strong></td>
<td>Statewide 30% reduction in sepsis mortality</td>
</tr>
<tr>
<td><strong>Perinatal Birth Trauma</strong></td>
<td>Hospitals will reduce associated birth trauma by 25%</td>
</tr>
<tr>
<td><strong>Perinatal Gestational Age Deliveries</strong></td>
<td>Hospitals will reduce elective deliveries prior to 39 weeks to 5% or less</td>
</tr>
</tbody>
</table>

² According to the Centers for Disease Control and Prevention (CDC), approximately 1 out of every 20 hospitalized patients will contract an HAI [www.cdc.gov/HAIburden.html](http://www.cdc.gov/HAIburden.html) and hospitalization for septicemia or sepsis more than doubled from 2000 to 2008 [www.cdc.gov/nchs/data/databriefs/db62.htm](http://www.cdc.gov/nchs/data/databriefs/db62.htm).
PEER TO PEER LEARNING MODEL

In order to facilitate improvement in the aforementioned focus areas, PSF adopted components of the Institute for Healthcare Improvement (IHI) Breakthrough Series Collaborative Model for Achieving Breakthrough Improvement developed in 1995\(^3\). This model is a validated learning system that brings together a large number of teams from hospitals or clinics to seek improvement in a focused topic area. The key elements of the Breakthrough Series adopted by PSF include:

- **Facilitating Learning Sessions**: These sessions are face to face meetings through which peer-to-peer learning takes place amongst participating hospitals. Both expert faculty and peers present and share evidence-based practices and strategies for improvement. Lessons learned as well as barriers and success stories from hospitals are shared in breakout sessions and through informal dialogue and networking.

- **Model for Improvement**: This model was developed by Associates in Process Improvement and identifies four key elements of successful process improvement: specific and measurable aims, measures of improvement that are tracked over time, key changes that will result in the desired improvement, and a series of testing “cycles” during which teams learn how to apply key change ideas to their own organizations\(^4\). PSF hospitals are encouraged to use this process within their organizations to facilitate change and improvement.

- **Measurement and Evaluation**: Regular measurement and assessment are critical to ensure and sustain successful improvement. PSF requires hospitals to enter data for its initiatives and makes real time reports available to hospitals. NHF conducts data analysis and reports out aggregate results to all stakeholders.

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\(^4\) Associates in Process Improvement (API) develops methods, works with leaders and teams, and provides education and training to help organizations improve their products and services and to build their capability for ongoing improvement. ([www.apiweb.org](http://www.apiweb.org))
Patient Safety Practices

A core focus of PSF is to promote the adoption of evidence based patient safety practices. According to the Agency for Healthcare Research & Quality (AHRQ) patient safety practices are a type of process or structure whose application reduces the probability of adverse events resulting from exposure to the health care system across a range of diseases and procedures. While PSF promotes these practices, it is not the intent of this project to be prescriptive in determining which of these interventions hospitals should adopt to improve safety and quality of care within their unique settings. In this same vein, the project does not track the degree to which each hospital implements specific best practices and/or strategies for improvement, of which, there are varieties shared at the collaborative meetings to address the PSF initiatives. See Appendix B for a sample of promoted safety practices from all the Regions including IHI bundles for HAIs and the Perinatal Toolkit from March of Dimes.

DATA REPORTING

Evaluation and data collection, cornerstones of the PSF initiative, serve to measure change in outcomes of participating hospitals. National Health Foundation is responsible for overseeing the evaluation of the initiative to track and measure outcomes. As a part of the evaluation process participating hospitals sign a letter of agreement to commit to shared three-year outcomes goals and to submit required data in order to ensure this statewide initiative achieves its overall targeted performance improvements.

PSF hospitals submit metric specific data on a quarterly basis to NHF through a secured, password protected web-based data collection and reporting system. To ensure standardized data is collected, data definitions for VAP, CLBSI, CAUTI, sepsis mortality, birth trauma and elective deliveries under 39 weeks were developed by PSF partners at the start of the initiative and shared with hospitals (see Appendix C). Using these definitions, hospitals provide retroactive data from 2009 for the purpose of establishing baseline measurement. NHF assesses progress on a quarterly and annual basis to support continuing improvement in PSF measures over the three year project. In addition, through the web portal hospitals are able to view reports on their progress compared to the aggregate progress of hospitals participating in their region and across the state.

In addition to outcomes data collection by hospitals, RHAs collect process level data including number of hospitals recruited, number of meetings/webinars conducted, etc. and report this to NHF via the data collection and reporting system. NHF uses this data to track progress on process level goals and

objectives developed at the beginning of the initiative and reports progress to partners annually and as requested.

OUTCOMES

As part of the evaluation process, NHF collects information on process measures including hospital and individual participation, meetings and webinars conducted and the number of hospitals submitting data. Clinical outcomes for all initiatives are also collected for VAP, CLBSI, CAUTI, sepsis mortality, perinatal birth trauma and elective delivery prior to 39 weeks. Outcomes discussed represent aggregate results to-date.

Process Measures

At the beginning of the PSF initiative, hospital recruitment goals were set for regions based on the total number of hospital members in each respective association (see Table 2). Each of the regions worked independently to recruit hospitals to participate in the PSF initiative. In its first year of implementation, PSF recruited 148 hospitals across the state, which cumulatively met the set participation goals. However, at the regional level, HCNCC fell behind its goal of recruiting 50 hospitals by 46% or by 23 hospitals. In 2011, HCNCC made significant strides in recruitment and exceeded its target goal of 50 hospitals by 3, contributing to the 173 hospitals participating in PSF across the state (see Table 2).

Table 2. Number of PSF Hospitals Participating 2010-2011

<table>
<thead>
<tr>
<th>Region</th>
<th>Hospital Recruitment Goal</th>
<th>2011 Actual Participating Hospitals</th>
</tr>
</thead>
<tbody>
<tr>
<td>HASC</td>
<td>80</td>
<td>100</td>
</tr>
<tr>
<td>HASDIC</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>HCNCC</td>
<td>50</td>
<td>53</td>
</tr>
<tr>
<td>Total</td>
<td>148</td>
<td>173</td>
</tr>
</tbody>
</table>

Source: NHF Data Collection System

Regions engage hospitals participants in local collaboratives which utilize the peer-to-peer learning model described above. The core activity for the collaboratives are the in-person meetings which bring together teams of 2-3 individuals from each hospital to participate in leaning sessions focused on strategies and best practices for making improvement in HAI, sepsis and perinatal initiatives. In addition, webinars are facilitated in-between the in-person meetings to ensure continuous engagement and interaction with hospital participants. Table 3 provides a synopsis of the activities conducted in each region to-date.
Table 3. PSF Participation by Activity 2010-2011

<table>
<thead>
<tr>
<th>Measure</th>
<th>HASC</th>
<th>HASDIC</th>
<th>HCNCC</th>
<th>PSF Total</th>
</tr>
</thead>
<tbody>
<tr>
<td># Hospitals Participating</td>
<td>100</td>
<td>20</td>
<td>53</td>
<td>173</td>
</tr>
<tr>
<td>-# Participating in Perinatal Track⁶</td>
<td>55 (55%)</td>
<td>15 (75%)</td>
<td>35 (66%)</td>
<td>95 (55%)</td>
</tr>
<tr>
<td># Meetings &amp; Webinars Conducted</td>
<td>37</td>
<td>16</td>
<td>53</td>
<td>106</td>
</tr>
<tr>
<td># Attendees Participating</td>
<td>2,519</td>
<td>508</td>
<td>1,366</td>
<td>4,393</td>
</tr>
</tbody>
</table>

Source: NHF Data Collection System

While 173 hospitals are participating and attending PSF activities statewide, the overall number of hospitals that entered data for any measure in 2010 is 79% (137) and 70% (122) in 2011 (see Table 4). The number of hospitals that entered paired data (data for consecutive years and quarters) was less (see Table 5).

Table 4. PSF Hospitals Submitting Any Data 2010-2011

<table>
<thead>
<tr>
<th>Initiative and Year</th>
<th>HASC</th>
<th>HASDIC</th>
<th>HCNCC</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>VAP</td>
<td>2010</td>
<td>69</td>
<td>69%</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>2011</td>
<td>59</td>
<td>59%</td>
<td>8</td>
</tr>
<tr>
<td>CLBSI</td>
<td>2010</td>
<td>69</td>
<td>69%</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>2011</td>
<td>59</td>
<td>59%</td>
<td>8</td>
</tr>
<tr>
<td>CAUTI</td>
<td>2010</td>
<td>62</td>
<td>62%</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>2011</td>
<td>56</td>
<td>56%</td>
<td>7</td>
</tr>
<tr>
<td>Sepsis</td>
<td>2010</td>
<td>45</td>
<td>45%</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>2011</td>
<td>40</td>
<td>40%</td>
<td>16</td>
</tr>
<tr>
<td>Perinatal Birth Trauma</td>
<td>2010</td>
<td>36</td>
<td>65%</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>2011</td>
<td>35</td>
<td>64%</td>
<td>9</td>
</tr>
<tr>
<td>Gestational Age Deliveries</td>
<td>2010</td>
<td>42</td>
<td>76%</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>2011</td>
<td>41</td>
<td>75%</td>
<td>9</td>
</tr>
</tbody>
</table>

Source: NHF Data Collection System

⁶ The hospitals participating in the perinatal track are a subset of those participating in the overall collaborative; therefore the 95 participating are included in the 173 total.
To ensure statistical reliability, measurement of change has only been analyzed using data from like hospitals with paired data, e.g. those hospitals submitting data for consecutive years and quarters. The number of hospitals that entered paired data is less than those entering any data but still provides statistically significant results (see Table 5).

**Table 5. PSF Hospitals Submitting Paired Data for 2009, 2010 and 2011**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HASC</td>
<td>20</td>
<td>20</td>
<td>6</td>
<td>15</td>
<td>27</td>
<td>20</td>
</tr>
<tr>
<td>%</td>
<td>20%</td>
<td>20%</td>
<td>6%</td>
<td>15%</td>
<td>49%</td>
<td>36%</td>
</tr>
<tr>
<td>HASDIC</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td>10%</td>
<td>13%</td>
<td>13%</td>
</tr>
<tr>
<td>HCNCC</td>
<td>9</td>
<td>7</td>
<td>5</td>
<td>9</td>
<td>15</td>
<td>6</td>
</tr>
<tr>
<td>%</td>
<td>17%</td>
<td>13%</td>
<td>9%</td>
<td>17%</td>
<td>43%</td>
<td>17%</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>28</td>
<td>12</td>
<td>26</td>
<td>44</td>
<td>28</td>
</tr>
<tr>
<td>%</td>
<td>17%</td>
<td>16%</td>
<td>7%</td>
<td>15%</td>
<td>42%</td>
<td>27%</td>
</tr>
</tbody>
</table>

*Source: NHF Data Collection System*

**CLINICAL OUTCOMES**

Overall, participating hospitals in PSF have shown statistically significant improvement in reduction of HAIs, sepsis mortality and perinatal gestational age deliveries under 39 weeks. Below is a synopsis of outcomes achieved in 2010 and 2011. For a comprehensive analysis of year one outcomes refer to the PSF 2010 Year End Report.

**2010**

First year results showed impressive movement in HAI and sepsis mortality measures, however outcomes for the perinatal measures were not discernible as a result of the small number of hospitals reporting data for those measures.

**Outcome Summary using Paired Data 2009 & 2010**

- There were 0.99 fewer VAP cases per 1,000 ventilator days in 2010 than in 2009 (p<0.01)
  - Representing a 41% reduction towards the goal of a zero VAP rate
- There were 0.50 fewer CAUTI cases per 1,000 catheter days in 2010 than in 2009 (p=0.04)
  - Representing a 24% reduction towards the goal of a zero CAUTI rate
- There were 0.45 fewer CLBSI cases per 1,000 central line days in 2010 than in 2009 (p=0.02)
  - Representing a 25% reduction towards the goal of a zero CLBSI rate
- There were 2.26 fewer Sepsis deaths per 100 sepsis cases in 2010 than in 2009 (p<0.01)
  - Representing a 11% reduction, more than a third of the way towards the goal of a 30% decline over 3 years
Perinatal birth trauma cases per 1,000 live births and elective deliveries prior to 39 weeks per 100 live births prior to 39 weeks trended downward, however these differences were not statistically significant, most likely due to the small number of hospitals reporting data for these outcomes.

**2011**

In the second year of PSF, hospitals continued to build upon their initial improvement in HAIs and sepsis mortality. Because of the initial gains made in 2010, major movement was more difficult to demonstrate in 2011; however results show consistent movement toward the three year PSF goals (see Table 6). In 2011, data entry by hospitals for early elective deliveries allowed for the first analysis of this measure which demonstrated a positive decline (see Table 7).

**Outcome Summary using Paired Data 2009 & 2011**

- There were 1.11 fewer VAP cases per 1,000 ventilator days in 2011 than in 2009 (p=0.01)
  - Representing a 48% reduction towards the goal of a zero VAP rate
- There were 0.51 fewer CAUTI cases per 1,000 catheter days in 2011 than in 2009 (p=0.17)
  - Representing a 32% reduction towards the goal of a zero CAUTI rate
- There were 0.87 fewer CLBSI cases per 1,000 central line days in 2011 than in 2009 (p=0.01)
  - Representing a 39% reduction towards the goal of a zero CLBSI rate
- There were 5.20 fewer Sepsis deaths per 100 sepsis cases in 2011 than in 2009 (p<0.01)
  - Representing a 21% reduction, about two-thirds of the way towards the goal of a 30% decline over 3 years
- Elective deliveries prior to 39 weeks represented 10.36% of all deliveries in 2010, but only 3.6% of deliveries in 2011 (p<0.01)
  - Representing a 65% reduction, meeting the goal of 5% or less within 3 years (2011 mean 3.6%)

Perinatal birth trauma cases per 1,000 live births trended slightly upwards from 2010 to 2011, but the difference was not statistically significant
Table 6. Comparison of 2009 and 2011 HAI and Sepsis Outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th># Hospitals</th>
<th>Average Rate 2009</th>
<th>Average Rate 2011</th>
<th>Absolute Difference</th>
<th>T-statistic</th>
<th>p-value</th>
<th>Percent Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAP cases/1,000 ventilator days</td>
<td>32</td>
<td>2.32</td>
<td>1.21</td>
<td>1.11</td>
<td>2.70</td>
<td>0.01</td>
<td>48%</td>
</tr>
<tr>
<td>CAUTI cases/1,000 catheter days*</td>
<td>12</td>
<td>1.59</td>
<td>1.09</td>
<td>-0.51</td>
<td>1.47</td>
<td>0.17</td>
<td>32%</td>
</tr>
<tr>
<td>CLBSI cases/1,000 central line days</td>
<td>30</td>
<td>2.21</td>
<td>1.34</td>
<td>-0.87</td>
<td>2.70</td>
<td>0.01</td>
<td>39%</td>
</tr>
<tr>
<td>Sepsis deaths/100 sepsis cases</td>
<td>26</td>
<td>25.35</td>
<td>20.15</td>
<td>-5.20</td>
<td>3.68</td>
<td>&lt;0.01</td>
<td>21%</td>
</tr>
</tbody>
</table>

Source: NHF Data Collection System

*Not statistically significant

Table 7. Comparison of 2010 and 2011 Perinatal Outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th># Hospitals</th>
<th>Average Rate 2010</th>
<th>Average Rate 2011</th>
<th>Absolute Difference</th>
<th>T-statistic</th>
<th>p-value</th>
<th>Percent Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perinatal birth trauma cases/1,000 live births*</td>
<td>44</td>
<td>2.55</td>
<td>3.13</td>
<td>0.59</td>
<td>1.59</td>
<td>0.12</td>
<td>23% increase</td>
</tr>
<tr>
<td>Elective deliveries prior to 39 weeks/100 live births</td>
<td>28</td>
<td>10.36</td>
<td>3.60</td>
<td>-6.76</td>
<td>3.54</td>
<td>&lt;0.01</td>
<td>65%</td>
</tr>
</tbody>
</table>

Source: NHF Data Collection System

*Not statistically significant

While statistics validate improvements, graphical representations illustrate trends. Data for each initiative is graphed quarterly for regions in comparison to the statewide PSF average and the National Healthcare Safety Network (NHSN) data (when available) as a national benchmark.

7 NHSN is a secure, internet based surveillance system managed by the CDC.
**Chart 1. VAP Cases per 1,000 Ventilator Days**

Source: NHF Data Collection System

**VAP**: For PSF, there is a statistically significant trend ($p=.01$) downwards.

**Chart 2. CLBSI Cases per 1,000 Central Line Days**

Source: NHF Data Collection System

**CLBSI**: For PSF, there is a statistically significant trend ($p=.01$) downwards.
Chart 3. CAUTI Cases per 1,000 Patient Days

Source: NHF Data Collection System

CAUTI: For PSF, there is a statistically significant trend (p=.01) downwards. This trend is from 5.6 to 0.4 CAUTI cases per 1,000 patient days.

Chart 4. Sepsis Death per 100 Sepsis Cases

Source: NHF Data Collection System

Sepsis: For PSF, there is a statistically significant trend (p=.01) downwards.
**Chart 5. Perinatal Birth Trauma per 1,000 Live Births**

Source: NHF Data Collection System

**Birth Trauma**: For PSF, there is no discernible trend and no statistically significant trend or level shift.

**Chart 6. Elective Deliveries Prior to 39 Weeks as a Percent of all Deliveries Prior to 39 Weeks**

Source: NHF Data Collection System

**Elective Deliveries <39 weeks**: For PSF, there is a statistically significant trend (p=.01) downwards.
Progress Towards Goals

All initiatives, besides perinatal birth trauma, are showing improvement towards reaching PSF goals (see Table 8). As PSF enters year three, the focus for hospitals will be to continue improvement in reducing sepsis mortality and elective deliveries prior to 39 weeks and eventually reach a rate of zero for HAIs. While VAP shows some hospitals consistently reaching zero, CLBSI and CAUTI show less success (see Chart 7).

Table 8. PSF Hospital Progress Towards 3-Year Goals

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Three Year Goal</th>
<th>Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ventilator Associated Pneumonia</td>
<td>Rate of zero VAPs</td>
<td>Rate declined from 2.32 in 2009 to 1.21 in 2011, 48% percent of the way toward zero</td>
</tr>
<tr>
<td>Catheter Associated Urinary Tract Infection</td>
<td>Rate of zero CAUTIs</td>
<td>Rate declined from 1.59 in 2009 to 1.09 in 2011, 32% of the way toward zero</td>
</tr>
<tr>
<td>Central Line Blood Stream Infections</td>
<td>Rate of zero CLBSIs</td>
<td>Rate declined from 2.21 in 2009 to 1.34 in 2011, 39% of the way toward zero</td>
</tr>
<tr>
<td>Sepsis Deaths</td>
<td>30% reduction in Sepsis Mortality</td>
<td>Rate declined from 25.35 in 2009 to 20.15 in 2011, 67% of the way towards the goal.</td>
</tr>
<tr>
<td>Perinatal Birth Trauma</td>
<td>25% reduction associated birth trauma</td>
<td>No measurable trend</td>
</tr>
<tr>
<td>Perinatal Gestational Age Deliveries</td>
<td>Reduce elective deliveries prior to 39 weeks to 5% or less</td>
<td>Percentage declined from 10.36% in 2009 to 3.6% in 2011, goal has been met!</td>
</tr>
</tbody>
</table>

Source: NHF Data Collection System

While it is important to look at goals, from a PSF perspective it is also instructive to examine trends on a hospital level. This illustrates that while some hospitals have reached zero, maintaining zero over time is more difficult.
A total of 17 hospitals reported VAP cases for every quarter in 2010 and 2011 (see Chart 7). There were 13 hospitals that reported zero VAP cases for all but one quarter during the 2010-2011 period. There were 68 hospitals that reported at least one quarter to six quarters of no VAP cases from 2010-2011.

**Chart 7. PSF Hospitals Reaching Zero VAP Infections 2010-2011**

![Chart 7](image)

*Source: NHF Data Collection System*

Very few hospitals (N=2) reported zero CAUTIs for every quarter of 2010 and 2011 (see Chart 8). Twenty-six hospitals reported having no CAUTIs for one or two quarters during 2010 and 2011, while 51 hospitals reported having no CAUTIs for three to seven quarters during the period.

**Chart 8. Hospitals Reaching Zero CAUTI Infections 2010-2011**

![Chart 8](image)

*Source: NHF Data Collection System*
Only 7 hospitals reported having zero CLBSIs for all of 2010 and 2011 and four reported zero CLBSIs for all but one quarter (see Chart 9). Twenty-six hospitals reported zero CLBSIs for only one quarter during the period and 11 hospitals reported having zero CLBSIs for four quarters during the period.


![Chart showing number of quarters by number of hospitals reporting zero CLBSIs per 1,000 central line days.]

*Source: NHF Data Collection System*

Many PSF hospitals have reached zero for one or more HAIs however many still have work to do to achieve and sustain that goal. Those that have reached zero are looked to as case examples of how to successfully reduce hospital acquired infections. As more hospitals reach zero, PSF will begin focusing on sharing strategies for how to maintain zero HAIs to become high reliability hospitals.

**Cost Avoidance**

The cost avoidance analysis uses paired data for 2010-2011 to provide the most accurate assessment of cost reduction generated during the first two years of the PSF initiative. Cost avoidance calculation is based on the business case analysis model documented by Dr. Richard Brilli for preventing VAP in pediatric ICU\(^a\) (see Appendix D).

The key points of the cost avoidance analysis are as follows:

- **973** lives saved, using paired data for avoided sepsis mortality for 2010-2011
- **$19,241,105** amount of costs avoided overall, using paired data for 2010-2011

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Conclusion
At the end of the second year of PSF, it is evident that hospitals continue to reap benefits from participating in the statewide partnership and in turn have improved patient safety in California. Partners continue to work diligently to make progress towards their original 3 year program goals in the areas of hospital acquired infections, sepsis mortality and perinatal care and results are illustrative of this.

All initiatives, besides perinatal birth trauma, are showing improvement towards reaching PSF goals; all of these changes are statistically significant except for CAUTI. In addition, over 973 lives have been saved as a result of reducing sepsis mortality. Improvement in patient safety has also been translated into significant cost savings. Based on paired data for 2010 and 2011 in comparison to 2009, an estimated $19,241,105 of costs has been avoided statewide. This is most likely an underestimate as the figure is based only on hospitals that have submitted paired data over two years.

In year three, the focus for PSF hospitals will be to continue improvement in the areas where initial success has already been made, i.e. for HAIs, sepsis mortality and elective deliveries less than 39 weeks. PSF partners will re-evaluate continued focus on perinatal birth trauma as progress in this initiative has not been realized in the first two years of PSF. Despite this, overall results for year two prove PSF to be an example of how patient safety and quality can be improved in hospitals while reducing costs.

Recommendations for Year Three
Regions will focus on leveraging the first two years of success to reach PSF goals in year three.

1. While positive overall trends are apparent, it is likely that these trends are not an entirely accurate representation of results due to continued challenges with data submission. Overall hospital participation in data entry is high (approximately 70%) however it is necessary to have data from like hospitals in all quarters to measure improvement (under 25% depending on initiative). Without more complete data, we can only estimate the potential impact that PSF is having on improving patient safety. Therefore, in 2012 it is necessary to push hospitals to enter data for all quarters and for partners to be creative in incentivizing data entry.

2. Perinatal efforts continue to have significant public health and cost avoidance impact. Further emphasis must be placed on perinatal initiatives in addition to data collection for all quarters for these measures in order to show even greater progress. It is also recommended that PSF form a more formal partnership with March of Dimes for perinatal initiatives to leverage the work they have already done in this area across the state and nation.

   Additionally the lack of positive trends in perinatal birth trauma is likely due to the fact that it was selected as an outcome under the assumption that rates would decrease as a result of decreases in early elective deliveries. It is imperative that partners discuss the removal of this initiative from PSF in year three to reduce unnecessary data collection.

3. While strategies for improvement are not measured in PSF, they are promoted and hospitals are encouraged to share what works for them. PSF has been recognized externally for their efforts in improving patient safety however individual hospitals have not. In year 3, it may
valuable to recognize and incentivize hospitals to share best practices with fellow participating hospitals at regional meetings. Awards and/or prizes can be given out.

4. While maximizing results for year three of PSF is of utmost importance, it is imperative to begin planning beyond 2012 and aligning PSF initiatives with emerging statewide initiatives. PSF member hospitals, regional hospitals associations and NHF must be an integral part of the statewide patient safety conversations.

Beyond 2012

In light of the passage of the Affordable Care Act (ACA), the Centers for Medicare and Medicaid Services (CMS) is pushing to improve quality while reducing cost which entails adequate quality improvement programming and measurement of quality indicators nationally and statewide. Hospitals now have a financial incentive to improve quality as focus moves from volume to improved outcomes. With the passage of the ACA, various mechanisms for reimbursement of hospitals based on quality will be available including value based purchasing and new ACO (Medicare) and Medicaid quality/cost based reimbursement structures (see Appendix G).

Additionally, the ACA has facilitated the creation of the Health Research and Educational Trust (HERT) in partnership with the American Hospital Association which in turn has created Hospital Engagement Networks (HENs) of which California is a participant. Many of the initiatives that HEN hospitals must participate in coincide with PSF initiatives. Additionally, within California, other quality initiatives already exist and are evolving such as California Hospital Patient Safety Organization (CHPSO) which focuses on measuring retained surgical items. Both the HEN and CHPSO are part of a larger effort under California Hospital Association entitled California Quality Improvement Project (QIP).

PSF has been a pioneer in aiming to improve quality and reduce costs. PSF member hospitals have already shown improvement in four important hospital based avoidable harms’ initiatives. Because of the success of PSF hospitals, the “low hanging fruit” has already been picked in terms of improvement. For this reason and for the sake of achieving the largest statewide impact, PSF must align itself with CHA’s QIP initiatives, CHPSO and the HEN. Moving forward it is imperative that all potential initiatives be aligned with one another to avoid repetition and to maximize impact.

In addition, while strategies for improvement were promoted to PSF hospitals, they were not prescriptive and/or measured. Moving forward it will be important to focus on strategies or best practices that individual hospitals are using and measure use of these best practices in relationship to improvement. This will entail more focused one on one work and assistance for hospitals facing challenges in making progress.

On, April 9, 2012 the partners of Patient Safety First convened a year two All Hands meeting to discuss 2010-2011 cumulative results and recommendations for moving forward. As a result of this meeting suggestions were made to eliminate initiatives that would be duplicative of statewide initiatives as well as those initiatives that were showing little improvement or had almost reached zero. It is important that initiatives moving forward be significant public health threats, cost drivers and have the possibility to improve through collaboration. Table 11 suggests future initiatives for year four and beyond based upon discussion at the All Hands meeting.
It is a testament to the success of the first two years of Patient Safety First that the partners can look forward to continuing the initiative and adapting to the emerging state and federal priorities of increasing quality while decreasing costs.
Appendix A.

Screen Shot of the PSF Website

ABOUT PATIENT SAFETY FIRST

In 2010 Patient Safety First... a California Partnership for Health was launched to improve quality of care, reduce health care costs and ultimately save lives by improving patient safety and perinatal care in California.

Patient Safety First (PSF) is a groundbreaking three-year, $6-million collaboration between the National Health Foundation, California’s Regional Hospital Associations, Anthem Blue Cross and over 160 hospitals across the state.

PATIENT SAFETY FIRST FOCUS AREAS

- Sepsis Mortality
- Ventilator Associated Pneumonia
- Central Line Blood Stream Infections
- Catheter Associated Urinary Tract Infections
- Perinatal Birth Trauma
- Perinatal Gestational Age Deliveries Under 39 weeks

Patient Safety First uses a collaborative model to help facilitate hospital improvement. Participating hospitals engage in regional peer to peer learning networks to share best practices, lessons learned and successful strategies for improvement. Hospitals submit data into the project database. Results from 2010 include a 41% reduction in ventilator associated pneumonia, a 25% reduction in central line blood stream infections, cost avoidance of over $11 million dollars and 800 lives saved.

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### Appendix B. Patient Safety Practices/Strategies Sample from Regions

<table>
<thead>
<tr>
<th>PSF Initiative</th>
<th>Intervention/Best Practice</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sepsis</strong></td>
<td>Early Goal Directed Therapy (EGDT)</td>
<td>Goal-directed therapy has been used for severe sepsis and septic shock in the intensive care unit. This approach involves adjustments of cardiac preload, afterload, and contractility to balance oxygen delivery with oxygen demand. <a href="http://www.nejm.org">www.nejm.org</a></td>
</tr>
<tr>
<td></td>
<td>Algorithms and Order Sets</td>
<td>A step by step protocol for the treatment of sepsis. Used in conjunction with EGDT to increase recognition and early treatment of sepsis. <a href="http://www.nursing.sdsu.edu/inr/miscfiles/sepsis.ppt">www.nursing.sdsu.edu/inr/miscfiles/sepsis.ppt</a></td>
</tr>
<tr>
<td></td>
<td>Rapid Response Team</td>
<td>The Rapid Response Team — known by some as the Medical Emergency Team — is a team of clinicians who bring critical care expertise to the bedside. Simply put, the purpose of the Rapid Response Team is to bring critical care expertise to the patient bedside (or wherever it’s needed). <a href="http://www.ihi.org/explore/RapidResponseTeams/Pages/default.asp">http://www.ihi.org/explore/RapidResponseTeams/Pages/default.asp</a></td>
</tr>
<tr>
<td><strong>CLBSI</strong></td>
<td>Central Line Placement Checklist</td>
<td>Implementing a central line checklist at the time of insertion will help to ensure that all processes related to central line placement are executed for each line placement, thereby leading to a reliable process. The checklist includes a list of activities that are considered standard work before, during, and after the procedure, as well as a safety checklist. <a href="http://www.ihi.org/knowledge/Pages/Tools/CentralLineInsertionChecklist.aspx">http://www.ihi.org/knowledge/Pages/Tools/CentralLineInsertionChecklist.aspx</a></td>
</tr>
<tr>
<td></td>
<td>CLIP Forms</td>
<td>Central line insertion practices (CLIP) adherence monitoring forms are designed to monitor processes performed at the time of central line insertion. Feedback of adherence data has been a component of multifaceted interventions that have successfully reduced CLBSI rates. <a href="http://www.dhcs.ca.gov/provgovpart/initiatives/nqi/.../CDPHCLIPInstr.doc">www.dhcs.ca.gov/provgovpart/initiatives/nqi/.../CDPHCLIPInstr.doc</a></td>
</tr>
<tr>
<td><strong>CAUTI</strong></td>
<td>CAUTI Bundle</td>
<td>A series of interventions related to catheter care that, when implemented together, will achieve significantly better outcomes than when implemented individually. <a href="http://www.ihi.org">www.ihi.org</a></td>
</tr>
<tr>
<td>PSF Initiative</td>
<td>Intervention/Best Practice</td>
<td>Summary</td>
</tr>
<tr>
<td>----------------</td>
<td>---------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Perinatal Birth Trauma</td>
<td>CMQCC OB Hemorrhage Toolkit</td>
<td>A resource for health care providers to improve readiness, recognition, response and reporting of hemorrhage. Obstetric hemorrhage is a leading cause of pregnancy-related morbidity and mortality but has major opportunities for improved outcomes. <a href="http://www.cmqcc.org/ob_hemorrhage">http://www.cmqcc.org/ob_hemorrhage</a></td>
</tr>
<tr>
<td>Non-Medically Indicated Elective Deliveries &lt;39 weeks</td>
<td>March of Dimes Less than 39 weeks toolkit</td>
<td>A comprehensive toolkit that includes a step-by-step guide to assist hospitals leaders will the implementation of policies to eliminate non-medically indicated deliveries before 39 weeks gestational age. Available to all hospitals across the country. <a href="http://www.marchofdimes.com/professionals/medicalresources_39weeks.html">www.marchofdimes.com/professionals/medicalresources_39weeks.html</a></td>
</tr>
<tr>
<td>Physician/Staff Education</td>
<td></td>
<td>Effective interventions for reducing early elective deliveries begins with educating clinical providers and support staff about changes that are necessary for improving care. <a href="http://www.marchofdimes.com/professionals/medicalresources_39weeks.html">www.marchofdimes.com/professionals/medicalresources_39weeks.html</a></td>
</tr>
<tr>
<td>Policy/Procedure Revision</td>
<td></td>
<td>This includes developing new process for scheduling inductions aimed toward decreasing inappropriate inductions, establishing standards that follow ACOG and national criteria and establishing policies that provide clear direction to nursing staff and clerks for scheduling process. <a href="http://www.marchofdimes.com/professionals/medicalresources_39weeks.html">www.marchofdimes.com/professionals/medicalresources_39weeks.html</a></td>
</tr>
<tr>
<td>“Hard Stop” Policy</td>
<td></td>
<td>A strict policy that eliminates elective deliveries under 39 weeks gestation without documented pulmonary maturity studies. Research shows this is the most effective way to reduce and eventually eliminate elective deliveries &lt;39. <a href="http://www.scha.org/files/documents/ajog_obstetrics_article.pdf">www.scha.org/files/documents/ajog_obstetrics_article.pdf</a></td>
</tr>
</tbody>
</table>
Appendix F.

Patient Safety First…A California Partnership for Health
Awards & Recognition

- **Best of Blue Presentation 2011**
  Tracy Wang, Anthem Blue Cross Clinical Research Manager, presented “Collaborations to Drive Community Wide Engagement” using PSF as the model.

- **Best of Blue 2011 Clinical Distinction Award**
  This award recognizes the achievements of the Blue Plans that take a leadership role in:
  - Making healthcare safe
  - Improving care quality, accessibility and affordability
  - Engaging providers, consumers and communities
  Tracy Wang accepted this award on behalf of Patient Safety First partners.

- **Wellpoint Premier Award 2011**
  An internal Wellpoint/Anthem award recognizing exemplary programs that work to advance their mission and values.

- **National Patient Safety Foundation Forum-Poster Presentation 2011**
  Mia Arias, Program Director, presented a poster on PSF at the NPSF 13th Annual Patient Safety Congress. This is a premier annual Congress of patient safety experts and practitioners from around the globe.

- **Institute for Healthcare Improvement (IHI) -Poster Presentation 2012**
  Mia Arias, Program Director, presented a poster on PSF at this annual event which draws nearly 6,000 health care leaders from around the world to Orlando, FL and thousands more via satellite broadcast.

- **National Patient Safety Foundation Forum-Poster Presentation 2012**
  PSF will present year 2 outcomes at the upcoming NPSF 14th Annual Patient Safety Congress.