HIMSS Davies Enterprise Application

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Core Item: Clinical Value

Executive Summary

Hawai‘i Pacific Health’s electronic medical record has been critical to improvements in overall safety, quality, and effectiveness of care. Significant measurable improvements have been achieved in reducing or eliminating ventilator associated pneumonia, catheter associated urinary tract infections, and central line associated bloodstream infections. Similar improvements have been accomplished in core measures, including very good performance in children’s asthma and recently adopted perinatal core measures. Outpatient clinical care improvements in diabetes, hypertension and cancer screening have benchmarked HPH Clinics to the 90th percentile of the country on many measures. The EMR, and Health IT as a whole, has served as the cornerstone of this success.
1. Background knowledge: In late 2006, Hawai‘i Pacific Health had come to a critical point in its journey to implement Hawai‘i’s largest integrated electronic medical record system. Although there was more than four years left to complete the project, the EMR already had more than a million unique patient records and included more than 10 years of clinical results for all four of its hospitals and 49 outpatient centers. The system was working well; clinicians were electronically collaborating across Oahu, Kaua‘i, Lanai, and the Big Island, despite hundreds of miles of separation. Oahu’s neighbor islands were benefitting from increased collaboration and access to specialty care. Understanding the critical importance these abilities could have on improving care, the Board of Directors mandated that annual clinical quality goals be established system wide and that management compensation be tied to the results.

2. Local Problem and Intended Improvement: A March 30, 2007 article headlined on the front page of the Honolulu Advertiser said it all: “Isle Hospitals Rated Low”. As a group, Hawai‘i ranked in the bottom 20% of all states for risk-adjusted mortality, patient safety, and risk-adjusted complications. As Hawai‘i largest health care system, this was not a good reflection on HPH’s four hospitals. Even so, it wasn’t all bad news. Health Grades placed Pali Momi Medical Center in the top 10 percent of hospitals nationwide for joint replacement surgery, and Straub was rated among the top hospitals for stroke care. Even so, it was clear from 2006 CMS Core Measure performance that improvements were needed in AMI, CHF, and pneumonia care in one or more hospitals within the HPH network. In April 2007, the Board of Directors set aggressive goals to achieve 100% on all core measures; and later added goals to eliminate infection associated with ventilators, central lines, and urinary catheters; and to drastically reduce injuries from medications; and eliminate pressure ulcers.

3. Design and Implementation: An initial focus was placed on CMS Core Measures, and later expanded to Harm Avoidance and Outpatient measures.

Core Measures Achieving the Board-directed goals was a monumental task. Order sets were built and standardized to help clinicians provide the necessary care for patients with heart attacks, heart failure, pneumonia, surgical care, perinatal care and children’s asthma care. The challenge was that use of the order sets or their components was optional, as efforts to mandate them across all hospitals had become problematic. Because there was no assurance a standard could be enforced, other steps had to be taken to verify the best care was being provided. The solution was to build an electronic surveillance system, as an extension of the EMR, to incorporate patient demographics, lab results, and diagnosis codes for identifying the in-house patients most likely to fall into one of the quality measurement categories. Members of the quality team used the system for a real time review of these patients to verify appropriate care and documentation, and implement whatever improvement was necessary and possible.

Harm Measures. In 2009, use of the electronic surveillance system was expanded beyond Core Measures improvement to focus on infection prevention. For all hospitals, every positive blood culture that might be later identified as being associated with a central line associated bloodstream infection (CLABSI), every urine culture that could be a catheter associated urinary tract infection (CAUTI), and every wound culture from a surgical patient would be evaluated by infection prevention nurses to quickly determine whether or not a patient had acquired a
healthcare associated infection. This real-time evaluation made it possible to find defects in care that may have allowed the infection to occur.

CAUTI improvements would be achieved by reducing the number of patients with catheters, minimizing the amount of time they are used, and providing careful attention to technique for insertion and management of the catheter. CDC guidelines were used to modify the EMR to assist with clinical decision making, and removal protocols were developed for nursing. Clinical information was aggregated for infection prevention nurses so they could make targeted rounds and discuss the ongoing needs with front line clinicians.

It has been shown that physicians tend to forget that a patient has a urinary catheter placed, and therefore don’t always remember to order the removal. To address this, reminder alerts were added to prompt the clinician to consider the continued need for catheterization, and to document reasons for continued use.

**Ventilator Associated Pneumonia (VAP).** The complexity of VAP made it impractical to identify these patients through the surveillance system. Instead, HPH found that rounding and discussing patients was the best way to identify these patients. To facilitate appropriate care, a prevention care bundle was embedded into the EMR where interventions are documented, and the standard documentation template was changed to remind nurses to perform oral care and to note the position of the head of the bed (both important components of the ventilator bundle).

**Outpatient Measures.** In 2010, the quality program was expanded beyond inpatient settings to include HPH primary care clinics. Focus was placed on chronic disease management with outcome metrics established to include diabetes care, hypertension, cancer screening (colorectal, cervical, breast), and childhood immunizations. Population registries were developed to help support outreach services. Call Centers (for contacting patients about needed screening exams) and chronic disease management clinics were developed and staffed. To provide physicians with timely feedback, un-blinded monthly reports were sent to all adult primary care physicians reflecting peer performance. Compensation was changed to provide incentives to primary care physicians achieving 75th and 90th percentile scores based on national HEDIS quality benchmarks.

**4. How was Health IT Utilized:** As discussed in Section 3, Health IT enabled every aspect of clinical improvement. Information from the EMR was used to create electronic dashboards, health maintenance alerts, best practice alerts, and disease registries. EMR work queues were built to ensure collaboration between Quality Management and Medical Records for resolving questions regarding clinical documentation around any measure. A relational clinical database ensured rapid reporting and flexibility. The clinical surveillance system described earlier was installed separately from the EMR, but was tightly integrated such that manual data entry was not necessary.

Health IT was not limited to inpatient and outpatient settings. Patients were empowered through a web portal to enable viewing of laboratory results, educational materials, appointment scheduling, and health maintenance reminders. The portal also supported communication with their health care providers through their home computers, Android phones, or iPhones. The
online patient partnership ensured shared responsibility for outcomes, driving results even further. More than 25,000 patients now regularly communicate through this portal, averaging 650 logons per day.

5. Value Derived/Outcomes: Today, all hospitals and primary care clinics perform significantly better than the national average on nearly all metrics, as described below.

Core Measures. Prolonged perfect compliance was achieved with children’s asthma, and each of the adult hospitals has delivered long periods of failure free care in the component scores of the heart attack and heart failure core measures. In recognition of this performance, the American Heart Association gave gold awards to Pali Momi, Straub, and Wilcox hospitals for coronary artery disease care, a gold award to Wilcox for Stroke care, and a silver award to Pali Momi for heart failure care.

Central Line Associated Blood Stream Infections. Pali Momi Medical Center, Straub Clinic and Hospital and Wilcox Memorial Hospital ICUs have not had a single patient develop CLABSI in more than 2 years (May 2009, October 2010 and September 2010, respectively). Previously, each of these hospitals averaged 3 or 4 per year. Kapi‘olani’s results are shown in Figure 1.

![g-chart: CLABSI at PICU](image)

*The goal of Rare Event tracking is the lengthen the time between the event. We want to reduce the occurrence of Rare event by increasing the number of days between the events.*

Ventilator Associated Pneumonia. Good results have been achieved in all four hospitals: Kapi‘olani’s PICU has provided care without a VAP for 47 consecutive months. The Pali Momi ICU has provided care without a VAP in the last 23 consecutive months. The other two hospitals have each had at least a 12 month period without any patients experiencing a VAP. Figure 2 shows the VAP improvements that Straub has achieved.
Catheter Associated Urinary Tract Infection (CAUTI). Significant improvements were also achieved in reducing CAUTI across all hospitals with improvement ranging from 9% to 79%. For example, at the start of the program in early 2010, the mean CAUTI rate per 1000 catheter days at Pali Momi was 4.81. This mean was lowered by 79%, to 1.00, by the end of 2011. Results for all hospitals are shown in Figure 3 (also see Figure A-1 in the Appendix).

Diabetes Care. At the start of the program, approximately 8% of 7,352 patients identified as diabetics had met all 8 of the diabetes metrics (LDL testing and control below 100, Blood Pressure control, nephropathy screening, HbA1C testing and control below 7, pneumococcal vaccine, non-smoking status). Over 24 months that number had risen to 20%, making HPH a high national performer for diabetes care (refer to Figure 4).
Cancer Screening. Prior to the start of the quality initiative, the clinics were performing near the 50th percentile nationally for colorectal, cervical, and breast cancer screening. Today, Straub performs at the 75th percentile for breast and cervical cancer screening and in the 90th percentile for colorectal cancer screening. Kaua’i Medical Clinic performs at the 75th percentile for colorectal and breast cancer screening, and at the 90th percentile for cervical cancer screening.

To date, the EMR has improved HPH’s anticipated results in the CMS Value Based Purchasing program from less than 50% of the measures being at or above the anticipated achievement threshold, to now more than 80% of the measures being at that level.

6. Lessons Learned
1) Although mandated adherence to standardized order sets would have helped to ensure progress toward many of the quality goals, it wasn’t the only solution. Building an electronic surveillance system to support real-time monitoring and communication proved very effective. The added benefit of this approach was that regular clinical face-to-face interaction provided continued awareness for the initiatives.

2) Quality of care was dramatically improved with aligned incentives. Board level mandates of System-wide goals provided standardization of quality goals across all hospitals. This had the added effect of hospitals learning from each other and competing on shared results.

3) Initial progress on Outpatient Quality measures was slow until un-blinded results were shared among the primary care physicians and incentives put in place to make the effort financially beneficial to the participants. The results were enough to create effective dialogue for self-improvement and drove a friendly spirit of competition between clinics.

4) Early efforts to leverage the EMR to drive improved performance on Core Measures, Harm Avoidance, and HEDIS (outpatient metrics) helped focus attention on dashboards and reporting, positioning HPH to be among the first to receive Medicare Meaningful Use stimulus money ($6.9M to date) and to gain confidence in developing gain sharing models.

7. Financial Considerations: HPH was able to offset much of the costs of the quality improvement programs by partnering with a large local health plan to negotiate interim and long term quality performance contracts. The Outpatient program (diabetes, cancer screening, etc.) alone cost $2.5 million to implement (90% of that is annual operating costs) but has generated $3.5 million in contracted net income over two years. The inpatient program is expected to...
exceed budgeted net income by several million dollars in 2012. These Quality and Financial successes have established HPH’s local reputation and given local health plans confidence in HPH’s ability to improve care and drive down cost. HPH is now well situated for implementing an Accountable Care Organization before the end of 2013.
APPENDIX. TABLES AND FIGURES

CAUTI rate per 1000 catheter-days
Pali Momi Medical Center
January 2010 to February 2012

* The difference in Mean before and after Rounding start was statistically significant (p<0.01)

Figure A-1. Example CAUTI Rate Improvements

<table>
<thead>
<tr>
<th>Patients</th>
<th># Pts Meeting</th>
<th>Score</th>
<th>50th Percentile</th>
<th>75th Percentile</th>
<th>90th Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDL Control</td>
<td>765</td>
<td>506</td>
<td>66.1%</td>
<td>48.5%</td>
<td>56.8%</td>
</tr>
<tr>
<td>BP Control</td>
<td>765</td>
<td>615</td>
<td>80.4%</td>
<td>68.6%</td>
<td>74.1%</td>
</tr>
<tr>
<td>Nephropathy Screen</td>
<td>765</td>
<td>726</td>
<td>94.9%</td>
<td>85.6%</td>
<td>89.8%</td>
</tr>
<tr>
<td>A1C Poor Ctl</td>
<td>765</td>
<td>109</td>
<td>14.2%</td>
<td>24.5%</td>
<td>20.7%</td>
</tr>
<tr>
<td>All Met</td>
<td>765</td>
<td>200</td>
<td>26.1%</td>
<td>7.9%</td>
<td>16.2%</td>
</tr>
</tbody>
</table>

HTN BP Control | 1,605 | 1,225 | 76.3% | 65.0% | 70.6% | 75.0% |

<table>
<thead>
<tr>
<th>Eligible</th>
<th># Pts Meeting</th>
<th>Score</th>
<th>50th Percentile</th>
<th>75th Percentile</th>
<th>90th Percentile</th>
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<tbody>
<tr>
<td>COL Screen</td>
<td>3,170</td>
<td>2,336</td>
<td>73.7%</td>
<td>64.0%</td>
<td>70.3%</td>
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<tr>
<td>BCS Screen</td>
<td>2,171</td>
<td>1,685</td>
<td>77.6%</td>
<td>73.0%</td>
<td>77.0%</td>
</tr>
<tr>
<td>CCS Screen</td>
<td>2,816</td>
<td>2,430</td>
<td>86.3%</td>
<td>77.2%</td>
<td>79.9%</td>
</tr>
</tbody>
</table>

Figure A-2. Performance Against National HEDIS Benchmarks for Kauai Medical Clinic