Executive Summary

The CMS Triple Aim focuses on improving the patient experience, improving population health, and reducing the cost of healthcare. A patient centered approach that focuses on preventive care and leveraging robust Electronic Health Record (EHR) technology is one of the most effective solutions to accomplish all three goals. This study will describe how a system wide EHR was used to manage population health by developing disease registries, point of care alerts, and physician engagement incentives.

Further improvement in patient engagement was realized using a care coordination team and a patient portal which are discussed in our Patient Engagement case study.
1. **Background Knowledge:** In the past, most efforts to improve population health have faced two challenges: lack of needed technology at the point of care, and a payment system based largely on fee for service, which favors treating the complications of disease over preventing them. With the installation of a system wide EHR and the assistance of a local payer, we were able to address both challenges.

In late 2009, Hawai‘i Pacific Health (HPH) completed a full deployment of an ambulatory EHR across all of its clinics; achieving integration of all inpatient and ancillary systems spanning four hospitals and 49 outpatient centers on multiple islands. In addition to having more than ten years of clinical data for more than a million patient records, the EHR included an online patient portal with scheduling, health reminders, and educational materials.

Given these new capabilities, HPH presented a proposal to the state’s largest commercial insurance company to help fund the development and operation of a population health program to improve health metrics for the plan’s 50,000 members using HPH primary care services. Following a successful negotiation, HPH had the financial resources and technology to build an effective population health program that would be driven by physicians rather than health plans.

2. **Local Problem and Intended Improvement:** Diabetes is a significant problem in Hawai‘i, particularly among native Hawaiians, and the problem is getting worse. In 1995, Hawai‘i had a diabetes rate of 4.4% and this has grown to 8.3%. Colorectal cancer for men and women (combined) is the second leading cause of cancer deaths in the State, and native Hawaiian women are more likely to die from breast cancer than any other group of U.S. women. A population management program focused on early cancer detection and diabetes management would have a significant impact on improving Hawai‘i’s overall health.

Surveys in 2009 indicated many of the preventative health measures for diabetes and cancer screenings at HPH were below the 50th or even 25th percentile, nationally. Physicians were completely unaware of how many patients with diabetes (or other diseases) they were managing. Previous attempts at population management by local health plans were largely ineffective and frequently led to physician and patient frustration as well-meaning case managers used often-inaccurate claims data to contact patients and institute clinical interventions that were not consistent with instructions given by physicians.

To address these challenges, system goals were set to achieve national 90th percentile performance in diabetes control measures and cancer screening over a three year period by building a robust population health management system. The program would include NCQA Level 1 Patient Centered Medical Home certification of all primary care clinics based on O‘ahu and Kaua‘i and also tools and staffing to support population management.
3. Design and Implementation:

**Stage 1. Information sharing through EHR (EPIC):** By 2009 HPH completed installation of a system wide EHR, providing clinicians with immediate access to all lab results and radiology; secure communication between physicians, staff and patients, and the ability to fax communications to any physician in the State. This became the foundation of the population health management process.

**Stage 2. Standardize Best Practices:** With over 1 million journal articles being published every year, it is challenging for physicians to keep up on the latest guidelines. However, once the EHR was in place and integrated into clinical workflow, it was possible to deploy a standardized set of rules to promote care improvement that could be shared by all staff and physicians.

Using the NCQA HEDIS (Healthcare Effectiveness Data and Information Set) database, a committee consisting of clinicians and IT specialists from HPH developed a set of standardized best practices for diabetes management, adult preventive care, cancer screening, and childhood immunizations. These standards were integrated into the EHR as point-of-care alerts. Medical assistants and physicians were trained to act on the alerts when they appeared.

One of the more effective tools developed was the ‘DUE’ button (Figure 2). This bright red alert appears at the top of every screen when any patient is overdue for a diabetes test, cancer screening or other intervention. It alerts all clinicians to the importance of preventative health measures, and ensures that all clinicians are following the same guidelines. When paired with written protocols, it enables non-physician staff to begin doing tasks previously assigned to physicians. Nurses and medical assistants who see this alert can immediately institute
standardized orders for a mammogram, an A1 C, a diabetes foot exam, or even refer patients to a diabetes educator if the A1 C is significantly elevated. Computer-based protocols allow tasks to be done without having to ask for the physician’s permission. This saves clinician time and allows staff to work at the top of their license, while physicians can still monitor outcomes and cosign orders through the computer.

Protocols also encouraged staff to perform Point of Care testing for HgbA1c and Cholesterol when needed. This resulted in improved patient convenience and faster results. Standardized training was used to ensure height, weight, blood pressure and other measures in the computer would be comparable and that staff would follow the alert protocols accurately.

**Stage 3. Measure, Report, Reward:**

It was soon discovered that alerting clinicians to best practices alone was only partially effective. To drive performance, the third stage focused on measuring, reporting, and rewarding successful use of the protocols and alerts. Data extracted from the EHR was translated into spreadsheets to create easy-to-read charts and graphs which were distributed to physicians and operations staff monthly.

As these reports were developed, it was interesting to note that while most physicians were giving very good care, nearly all physicians were lacking in at least one area. These “gaps in care” could be identified through reports as illustrated below, where an otherwise excellent physician appeared to have very poor control of patient blood pressures. In this case, it was determined that there were inconsistencies in the way blood pressure was being measured and recorded by staff. To correct this, American Heart Association guidelines for blood pressure measurements were adopted and all staff trained. This physician’s quality score quickly improved (see last bar in the red box in Figure 3)

![Figure 3. Quality report for an individual physician identifies gap in care for blood pressure control](image)

Peer interaction was also shown to be very powerful in improving quality, so a special report was created to view the performance of multiple physicians at a glance. These reports were color-
coded so the level of performance was immediately apparent. Blue represented national 90th percentile performance, Green 75th, White 50-75th, and Red is less than the 50th percentile. Gaps in care at all levels were identified and addressed. These unblinded reports were distributed to physicians and managers on a monthly basis via email.

This level of transparency allowed physicians to identify peers who demonstrated excellent care and then share best practices with each other to accelerate improvements in managing the entire population. This measurement and reporting system also allowed physician leaders to assist each physician in performing against national benchmarks.

To further promote quality, the physician compensation model was modified so that physicians who failed to perform above the 50th percentile on at least 3 of 6 major quality measures lost up to 10% of their income. Physicians whose quality scores were above the 75th, and 90th percentiles were given bonuses totaling up to 10% of salary based on a graduated point system.

To mitigate the negative consequences of accepting sicker patients into a practice, a bonus for managing more complex patients was also included.

Funds were provided by the population health management contract discussed previously. The contract included standard payment of primary care services, but also provided both a per member per month management fee for the 50,000 commercially insured patients included in the program, and up to $1.6 million in quality bonuses for achieving mutually-agreed upon results. Targets were set for improvement as well as performance. An independent auditor (Attest) was used to certify the HPH data system so clinical data could be submitted directly to NCQA from the EHR rather than relying on claims data alone.
**Stage 4.5 Patient Centered Care Delivery Team and Patient Engagement:**
Additional improvement in disease management occurred when we implemented an outreach team who used the reports to reach out to patients outside the physician’s office, and by offering an online portal to allow patients to view laboratory data, manage appointments and communicate with their physicians online. This program is discussed in detail in the HPH Case study, “Patient Engagement”.

**4. How was Health IT Utilized:** As described extensively in the previous sections, this transformation of care could not have occurred without a system-wide EHR with its stored data extracts, reports, and built-in alerts. A robust IT infrastructure has to be the foundation of any significant transformation in healthcare delivery that would attempt to address the burdens of chronic disease and patient “noncompliance”. With over two million patient records currently in the HPH EHR, the data repository is used to extract data from Epic to create disease registries. Reports and spreadsheets generated from the registries are regularly distributed to the physicians. Health maintenance alerts built into the EHR helped guide clinicians and patients to improve care.

**5. Value /Derived Outcomes:** The impact of the program has been significant. Many of the quality measures described above have moved from the 25th percentile to the 90th percentile in national performance. Population Management efforts with diabetes patients have been particularly noteworthy, as can be seen in Table 1. The number of patients receiving ideal care: or ‘All Measures Met’, Trend is shown in Figure 3.

<table>
<thead>
<tr>
<th>Population Management Metric</th>
<th>Tot Patient Population</th>
<th>Percent of Patients at Goal</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Kaua‘i Medical Clinic</td>
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<tr>
<td>LDL Control - Diabetics</td>
<td>3,905</td>
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<td>Blood Pressure Control – Hypertension Patients</td>
<td>8,515</td>
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<tr>
<td>Colorectal Screening</td>
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<tr>
<td>Breast Cancer Screening</td>
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<tr>
<td>Cervical Cancer Screening</td>
<td>12,586</td>
<td>86.6%</td>
</tr>
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</table>

**Blue** = National HEDIS 90th percentile, **Green** = 75th percentile, **White** = 50th percentile

The ability to engage physicians using data helped to drive significant volume increases in cancer screening exams and office visits, and the increased services provided $305,936 in additional revenue. See the Figures in the Appendix for some of the improvements.
6. Lessons Learned: While all physicians seem to want to provide high-quality care, convincing them of the reliability of the data was a challenge. Having a system-wide EHR allowed us to show that this data truly came from their own offices which helped convince them of its validity. Physicians were encouraged to challenge the data as sometimes we did find errors in how we collected it.

Gaining physician trust to allow their staff to act independently was also important. Physicians who had initially challenged the process became some of its strongest champions when they saw the results, and then encouraged their nurses and medical assistants to act independently. There was a clear shift from “my approach” to “our approach”. Providing clear feedback with data to everyone on the team was critically important to success. Managers and even receptionists changed their behavior when they understood its impact on patient care and outcomes.

We learned that financial rewards were certainly beneficial in moving the process forward, but other interventions such as the new transparency report were actually more powerful. There was a sense of competition and a desire to be successful among the physicians when they saw the reports, but also significant cooperation and sharing of ideas.

We found that by investing time and effort to study capabilities of the EHR, many tasks we initially had employees do manually, such as satisfying health maintenance alerts, could be done automatically by the computer using lab and billing data.

Point of care testing proved to be a useful tool to catch overdue patients in the office and give them immediate feedback on their health. The information was entered into the EHR and served
to satisfy alerts and reports.

It took a combination of IT talent and patient feedback to improve the signup process for the patient portal. Having physicians give out access codes was successful, but slow and restrictive. A patient kiosk in the lobby for signup went largely unused. Our best success came from having medical assistants and care coordinators sign patients up right in the exam room, and “do it now” marketing materials were developed to encourage this. Patients could also sign up at home with proper identifying information.

Having physicians review the list of patients to be contacted helped build trust until we were able to use their suggestions to create screening protocols to remove deceased patients from the list, or to identify patients with previous surgery or cancer that would disqualify them from an exam. A physician may still be contacted through the EHR if there are questions, and the history of patient contacts is tracked in the EHR for clinicians to review.

Each time we identified a gap in care in one physician’s office, we looked at all the others who were underperforming. Clerical errors, such as staff rounding up blood pressure numbers, were often present in more than one location. Automated blood pressure cuffs were deployed to help avoid subjective differences in hearing and stethoscopes, to enable rapid repeat checks of elevated readings, and to insure that patients waited the recommended five minutes before repeating a reading. Repeat checks also assured patients we were paying attention, and helped convince some of them to start medication when multiple readings were elevated.

7. Financial Considerations: Partnership with a major health plan in Hawaiʻi was a critical step toward success, and our new capability to drive improvement using valid, timely clinical data from the EHR was essential in building that relationship. The result was funding for the project, additional revenue for the system, and financial reward for physicians for providing quality. The quality bonus achieved under the program’s first year was just under $1.6 million in addition to $2 million paid in PMPM fees. In addition, the increased net revenue generated from the additional screening procedures including mammograms, colonoscopies, and other screening is at least $300,000 annually. Anecdotal feedback from patients has also demonstrated how pleased they are with the ease-of-use and simplicity of the process.
**APPENDIX. TABLES AND FIGURES**

**Figure A-1. Diabetes Eye Exams**

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<tr>
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**Figure A-2. Sample Individual Physician Report**