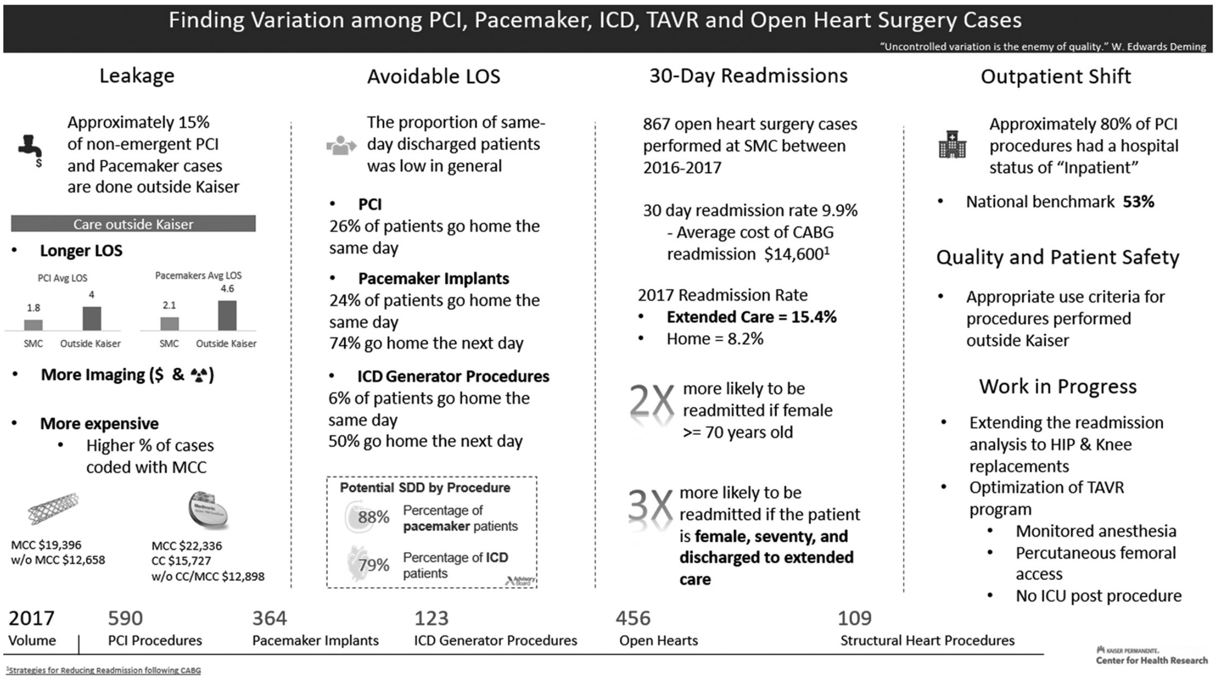

Abstract IHI ID 03 Figure 2

Objectives To propose an evidence-guided systematic approach for exploring data to identify QI opportunities.

Methods We developed a linear framework that begins with monitoring the literature in target clinical areas of importance. This review of existing knowledge by a multidisciplinary team provides parameters that guide data exploration and facilitates the selection of benchmarks and potential balance measures. Then, a robust dataset is built by combining relevant data sources. Next, data are analyzed using a combination of traditional statistical and quality improvement techniques. Lastly, key points are summarized and presented to stake holders as specific improvement opportunities in the context of business value; listing actionable targets with estimated impact.

Results The proposed methodology was tested on one of Kaisers target clinical areas of importance, interventional cardiology. Three potential improvement opportunities were identified:

1. network leakage;
2. avoidable hospital days; and
3. preventable 30 day hospital readmission.

Preliminary estimates suggested that our data could lead to approximately 1 million dollars in savings and up to 250 avoided hospital days while improving the quality and safety of care to our members.

Conclusions Systematic use of a framework for data exploration may create operational and strategic business value by increasing the speed at which data are transformed into actionable knowledge.

IHI ID 04 APPLICATION OF ELECTRONIC TRIGGER TOOL METHODS TO IDENTIFY TARGETS FOR IMPROVING DIAGNOSTIC SAFETY

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10.1136/ihisciabs.4

Background Failure to follow-up abnormal test results can lead to patient harm.

Objectives We created and validated electronic trigger algorithms that analyzed electronic health record (EHR) data from a large Veterans Affairs (VA) network to identify patients with potential delays in diagnostic evaluation for multiple cancers.

Abstract IHI ID 04 Table 1

Cancer Trigger	Unique Patients with Trigger Positives	Unique Patients Seen	Timeframe	PPV %(95% CI)	NPV %(95% CI)	Extrapolated Sensitivity % (95% CI)	Extrapolated Specificity % (95% CI)	Estimated Number of Diagnostic Delays Found per Year
Bladder	495	310,331	Jan 2012–Dec 2014	58.0 (53.0–62.9)	97.0 (90.8–99.2)	64.1 (59.4–68.5)	96.2 (95.6–96.6)	95.7
Breast	552	365,686	Jan 2010–May 2015	70.8 (66.0–75.1)	93.0 (85.6–96.9)	76.8 (72.7–80.4)	90.8 (89.2–92.1)	72.2
Colorectal	1,073	245,158	Jan 2013–Dec 2013	56.0 (51.0–61.0)	88.0 (79.6–93.4)	68.6 (65.4–71.6)	81.1 (79.5–82.6)	600.9
Hepatocellular	130	333,828	Jan 2011–Dec 2014	82.3 (74.4–88.2)	98.0 (92.3–99.7)	89.1 (81.8–93.8)	96.5 (94.8–97.7)	26.7
Lung	655	208,633	Jan 2012–Dec 2012	60.5 (55.5–65.3)	97.0 (90.8–99.2)	91.7 (88.6–94.1)	81.7 (79.6–83.7)	396.3
								1191.8

*CI=Confidence Interval

Methods We developed five trigger algorithms to detect delays in diagnostic evaluation of possible bladder, breast, colorectal, hepatocellular, and lung cancer. Each used structured clinical data to identify patient records with red-flags (abnormal test results warranting further diagnostic evaluation). Red-flags included high-grade hematuria (>50 red blood cells/high powered field; bladder cancer trigger), abnormal mammograms (breast cancer trigger), iron deficiency anemia or positive fecal immunochemical tests (colorectal cancer trigger), elevated alpha-fetoprotein (hepatocellular trigger), or chest imaging flagged as suspicious for malignancy (lung cancer trigger). Algorithms excluded records where follow-up was unnecessary (e.g., hospice patient) and records where follow-up was documented within 30 (lung cancer trigger) or 60 days (all others). We validated triggers by applying them retrospectively to EHR data (see table 1 for timeframes and sample sizes).
Results The five triggers yielded PPVs ranging from 56.0–82.3%, NPVs ranging from 88.0–98.0%, sensitivity from 64.1–91.7%, and specificity from 81.1–96.5% (see table 1). We estimated that these triggers have the potential to identify 1192 diagnostic errors in the VA network studied per year.
Conclusions Our triggers have potential to identify large numbers of patients experiencing delays in diagnostic evaluation. Implementing prospective electronic trigger-based measurement systems using these algorithms could support health systems in reducing delays in delays in cancer diagnosis.

IHI ID 05 BOARDING TIME IS A GAME WON IN MINUTES

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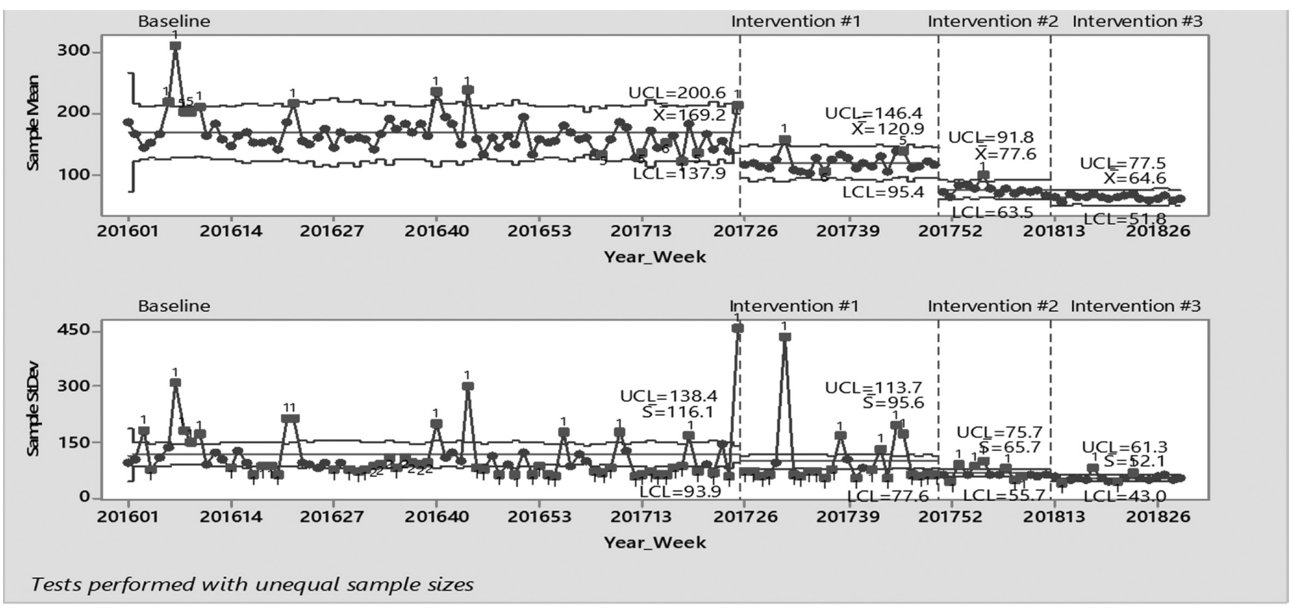
10.1136/ihisciabs.5

Background Rapid growth in patient volumes led to operating above 85% capacity with increased frequency. This growth strained antiquated patient flow processes that had not matured as patient demand increased. With limited options to increase physical capacity, a centralized effort to optimize patient throughput was prioritized at both the macro – and the microsystem level.
Objectives Getting the patient to the right place, at the right time, meant instituting a measurement system and standardizing bed management practices across the organization. Targeting delays in patient progression led to defining hospital boarding time as the time when a patient meets medical criteria to transfer to another level of care to the time the patient is transferred.
Methods Multiple plan-do-study-act cycles were completed during a pilot. An Xbar-S statistical process control chart assessed the impact of key interventions over time with a primary goal to reduce process variation to improve flow. Key interventions focused on process re-design, standardization of operational definitions, mistake proofing, and education for sustainability.



Intervention #1: Pilot

Mann-Whitney Test and CI: Pre, Post

```
        N  Median
Pre   2066  85.000
Post   678  80.000


Point estimate for η1 - η2 is 5.000
95.0 Percent CI for η1 - η2 is (2.002,7.001)
W = 2899643.5
Test of η1 = η2 vs η1 ≠ η2 is significant at 0.0003
The test is significant at 0.0003 (adjusted for ties)
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Abstract IHI ID 05 Figure 1 Xbar-S chart of hospital boarding time by intervention (2016–2018)