

# The Time is NOW to Improve Clinical Practice & Public Health: The California Cancer Registry Pathway to 2020

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# Disclosures

- The presenters have no conflicts to disclose.
- Dr. Edgerton is a member of the CAP Pathology Electronic Reporting (PERT) Committee, and liaison to the California Cancer Data Modernization Consortium.
- Mr. Pine is the Program Manager for the CCR Electronic Reporting Initiative.

# Five questions to ask in cancer care

- Who?
- What?
- When?
- Where?
- Why?

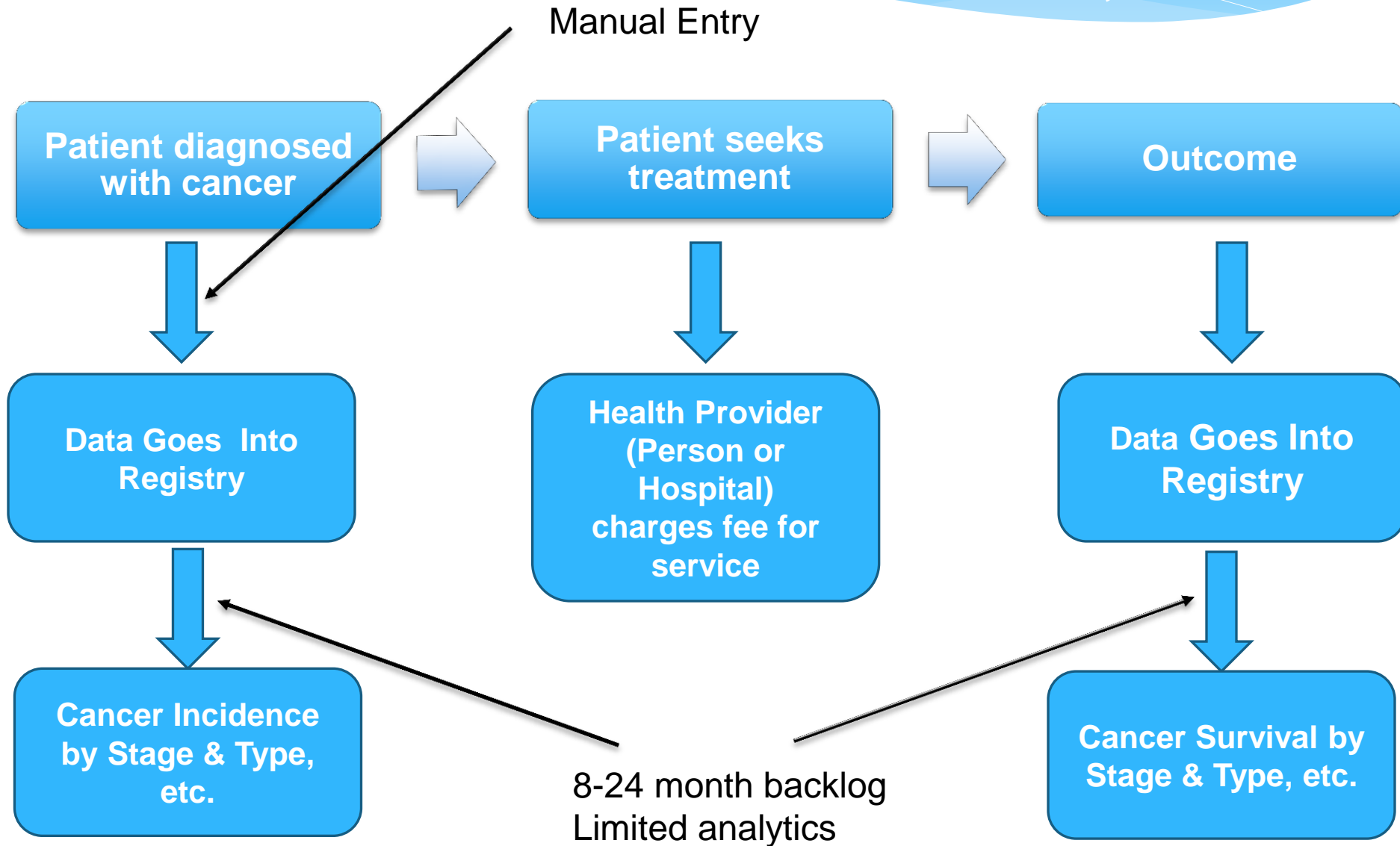
# Who?

- Patients
  - Better informed choices in cancer care
- Clinicians / hospitals
  - Quality improvement
  - Better treatment choices
- Public health policymakers
  - Standard of care
- Health plans
  - Coverage

# What is the role of the California (or any state) Cancer Registry?

- What is it **TODAY**?
  - Public Health: Cancer surveillance for incidence and survival
- What could it be **TOMORROW**?
  - Public Health: Cancer surveillance for incidence and survival
  - Quality improvement in treatment outcomes
  - Patient/consumer access to identifying best source of care for their individual cancer

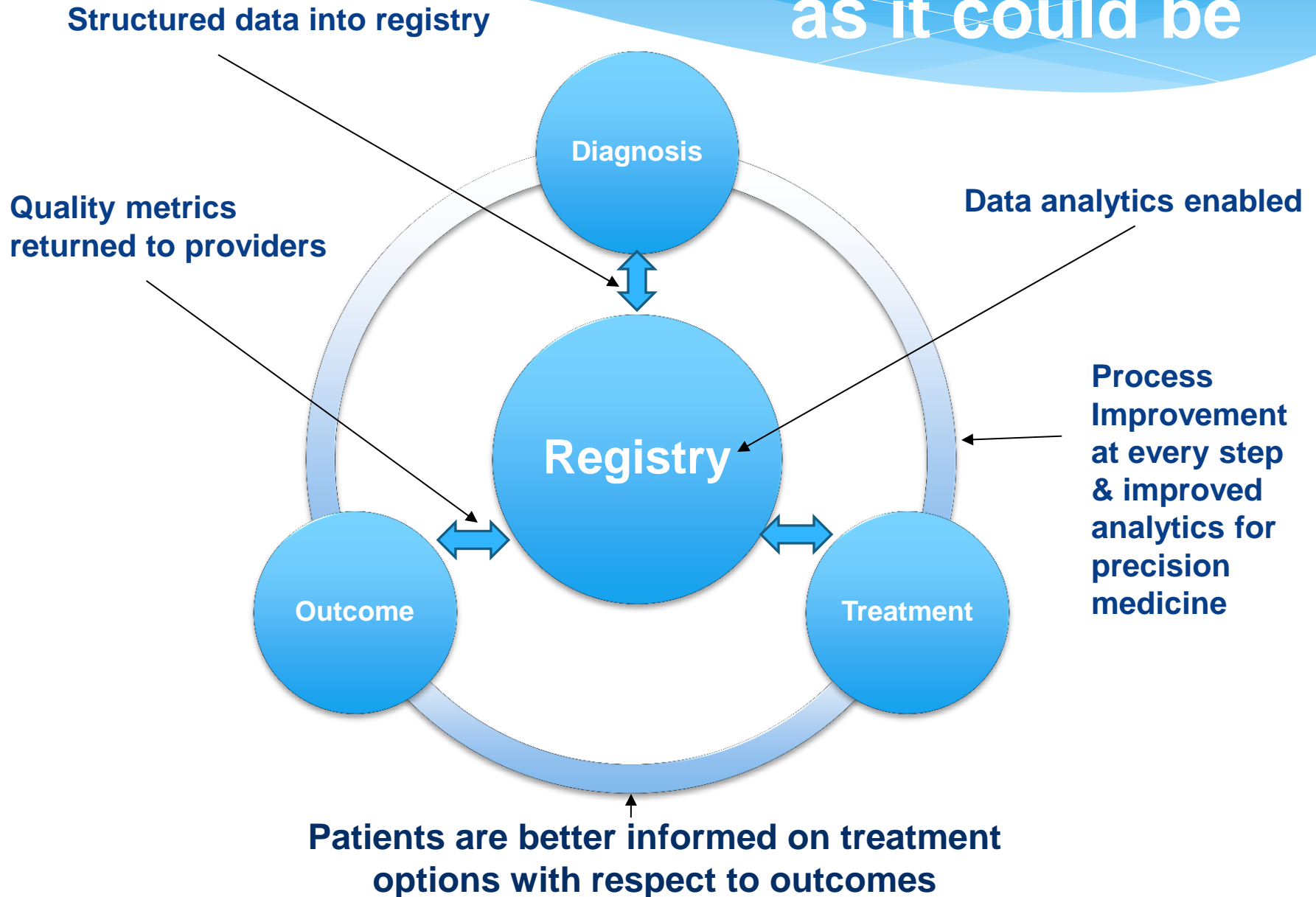
# When? TODAY, as-is



# But what if...

- Data was discretized
- Vocabulary was standardized
- Basic analytics were available
- System was expandable

# When? TOMORROW, as it could be





# Where?

- Today: The California Cancer Registry (CCR)
- Tomorrow: Cancer registries across the US

# Why?

- Improve quality of outcomes
  - Quality improvement at the caregiver level
  - Improve survival
- Improve patient access to informed decision making

# Error reduction: IOM reports

- Reduce errors
  - 1999 IOM report estimated that 44K-98K people die per year because of medical errors
    - Errors account for a greater number of deaths than from either breast cancer, AIDS, or motor vehicle accidents
  - Extrapolations based on number of hospitalized patients place it as 3<sup>rd</sup> leading cause of death today
  - Extrapolation methodology controversial but points to need to continue to improve medical quality
    - QI requires data

# Cancer registries could be a rich data resource if...

- Data input was structured
  - Facilitates real-time reporting, requiring little human interaction after initial report completed
- Data analytics were in place
- Governance was in place to provide access for providers, consumers, and payors to PHI-free data

# What are the barriers to real-time acquisition of high quality incidence, treatment and survival data?

- **Volume**
  - 160,000 cancer pathology reports reviewed each year in California
  - 240,000 new cancer cases sent to California Cancer Registry from hospital-based registries
  - 57,000 cancer deaths a year in California
- **Process**
  - Multilayered processing, by mail, fax, electronic transmission
  - 8-24 month turnaround time
- **Result**
  - Surveillance reports released after science and care standards have already changed

# What are some challenges to automating the process?

- **Difficulty aggregating data due to:**
  - Lack of structured data in basic diagnostic reports, e.g., pathology reports
  - Lack of standardization of terminology
  - Time delays due to labor-intensive, manual curation processes
  - Multiple standards that are not readily interoperable
  - Version control
- **Potential Solutions**
  - Natural Language Processing (NLP)
  - Discretized Data Capture (DDC) at reporting level

# Potential solutions: Disadvantages corrected by the other method

## NLP

- Needs to be smart enough to distinguish cancer vs. benign
- May have trouble categorizing cases described on a continuum (e.g., intermediate to high)
- Continuous retraining against error requires refinement against a gold standard
- Version control and updates
- Missing information (no required data elements)

## DDC

- Requires manual input at caregiver level (e.g., pathologist)
- Required standard to be adopted across large community with disparate, individualized needs
- Requires widespread buy-in

# Which is better?

- Unbiased reports on comparisons are hard to come by
- **Take note:** Billing is based on discretized data elements
- DDC can be facilitated by easier to use templates, better designed clinician workstations to accommodate new workflow
  - Focusing now on pathology where pathology cancer report using a DDC approach to create a case, and
  - NLP and rules-based algorithms assist to resolve uniqueness of case and patient



# Today → Tomorrow

## Today

- Pathologist signs out report
- Report directs cancer patient care
- Report incorporated into EHR
- End of report lifecycle

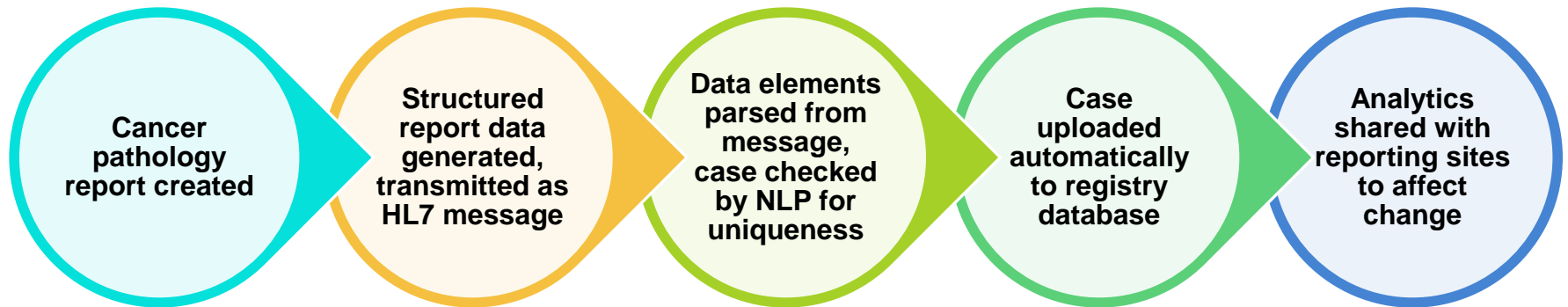
## Tomorrow

- Pathologist signs out report with DDC
- Report directs cancer patient care
- Report incorporated into EHR
- Structured cancer data shared in real-time
- Advanced data analytics performed, measured against best practices
- Patients can access information on their cancer types versus survival by institution
- Clinicians compare outcomes system-wide
- Information drives change & patient outcomes improved

# How can we do this?

- DDC
  - Standardization of data up front
    - Surgical pathology cancer reports are “semi-structured” and lend themselves to synoptic cancer reporting
  - Clinical standards are set by the CAP Cancer Protocols
- *Example:* Use of CAP electronic Cancer Checklists (eCC) allows for structured cancer reporting
  - Structured eCC report data sent as HL7 message, parsed at registry
  - Continued template improvement to reduce pathologist time
  - Evolution to ONC-Structured Data Capture (SDC) model as information standard

# Structured cancer data capture, transmission, and usage



# QI project examples using CAP eCC

- Surgical Resection Positive Margins
  - Provide feedback to surgeons with higher than expected positive margin rates
- Lymph Node Retrieval Rates
  - Increase retrieval rate by pathologists / pathology assistants
- Frequency of cases meeting ASCO/CAP cold ischemia and fixation times
  - Feedback provided to surgery or radiology on need for pre-analytic data
- Correlation of hormone receptor positivity with histologic type
- Now, what can the CCR do?

# Cancer pathway to 2020

Real-time data across the cancer care continuum

Diagnostic  
Community

Treatment  
Community

General  
Business  
Data

Self-  
Reporting  
Patient  
Experience

Home  
Care  
Services

- Pathology
- Imaging
- Laboratory
- Biomarkers
- Genomics
- Pertinent negatives

- Oncology
- Radiation
- Surgery
- Hormonal
- Clinical Trials
- Response to treatment

- Billing/Claims
- Demographic
- Family History

- Blogs
- Connection to Cancer Community
- Self-Reporting for Research

- Care-Coordination
- Quality of Life
- Pain-Measurement

# Historical surveillance processes

Electronic pathology reports received at CCR (8K-13K per month)

Case-finding: Manual determination if reportable (40-50% marked as not reportable)

If reportable, manually classified and staged. Attempt to link automatically

If report does not link, sent out for follow-up

If follow-up is not received, ePath report is abstracted as a "Path-Only" case

- Narrative text delays incidence case reporting
  - Value in automatically processing incidence data in real-time
- Narrative text delays CCR ability to operate as a real-time surveillance registry, providing additional value to California residents

# Real-time cancer surveillance registry

- Real-time aggregated cancer data set
  - True data aggregation via source documents
  - Incidence data availability in real-time
  - System determines case-inclusion in research data set
  - Quality Control Metrics
  - Business development of Key Performance Indicators (KPI)
- Approach towards ePath
  - Automated ePath report processing, diagnosis starts case
  - Discrete data capture

# CCR Structured Reporting Initiative: To date

- **Phase 1 (Pilot)**
  - Feb 2013 – July 2013
  - 2 sites, de-identified, legacy reports
    - LIS vendors / software: Cerner CoPathPlus, mTuitive xPert
- **Phase 2**
  - Feb 2014 – Dec 2014
    - UCSF Benioff Children's Hospital Oakland (SCC Soft)
    - St. Joseph's Health System (mTuitive xPert)
  - Real-time transmission of structured pathology reports
- **Phase 3**
  - 2015 – 2016+
  - New sites onboarding, maintenance & sustainability
    - LIS vendors / software: Epic, Cortex, Voicebrook, custom LIMS



# St. Joseph Health (SJH): Case study

- Integrated Catholic health care delivery system
- Organized into two regions in California
  - NorCal – Eureka, Santa Rosa, Queen of the Valley
  - SoCal – Orange, St. Jude, Mission, Laguna Beach, St. Mary's
- 10 acute care hospitals, home health agencies, hospice care, outpatient services, skilled nursing facilities, community clinics, and physician organizations.
- 9 laboratories using the CAP eCC for cancer pathology reporting
- 48 pathologists

# Key factors for SJH participating

- SJH already using CAP eCC through mTuitive / Meditech
- Pathologist buy in & champion identified
- Worked with project management on site
- Executive support obtained
- Contracts
- Project justification development & submission
- Mitigating costs of project
  - Funding by California Department Public of Health to offset costs

# Project workflow

Pathologist signs out cancer report via CAP eCC in LIS

Report data saved as discrete data

Report data transformed by vendor/ LIS into interoperable electronic message

Message with structured data automatically sent by SJH to CCR

Data instantly uploaded into CCR Data Management System

Data can be tracked, grouped, analyzed, and shared to improve clinical practice

# Planning, testing, and implementation

- Planning & site evaluation – 3+ months
- Time for iterative testing - 3 months
- Implementation - 1+ month
- Quality Measurement
  - Pathology reports near 100% complete
- Automation – Daily transmission
  - Messages including pathology report data automatically transmitted to the California Cancer Registry from SJH

# SJH reporting: Real-time statistics

- First 4 months at first live site in Northern California
  - 16 different CAP eCC template types used
  - 193 reports received by CCR
  - Most used: Invasive Breast (73 reports)
  - Biomarker reports submitted
- First month at higher population density site in LA Basin
  - 28 different CAP eCC template types used
  - 92 reports received by CCR
  - Most used: Invasive Breast (20 reports)
  - Biomarker reports submitted

# SJH reporting: Ongoing practice

- St. Joseph North and South (10 facilities)
- Direct to CCR database
  - 30 - 40 reports/ week from North
  - 80 - 100 reports/ week from South
- Working towards auto-population of cancer abstracting software at the SJH local cancer registry
  - Ease the burden of reporting
  - Operational improvement at the local registry level to report and collect cancer case information

# Benefits for SJH

- Standardized synoptic reporting with automatic updates
- Vendor (mTuitive) offers ready support, with customizations as needed
- CAP works with pathologists to help optimize eCC, advises on accreditation efforts
- Peer pathologist WG meetings improve workflow for all
- 90% completeness and compliancy rates
- Tumor board reporting to be handled similarly

# Workflow benefits for CCR

- SJH data sent daily to CCR → Very FAST
- Data quality / standardization
- Automatically uploads into CCR data management system
- Assured report completeness
- No manual transfer of data, alleviating data transfer errors as in prior abstraction process



# SJH practice challenges

- Initial complaints about report length at some sites
- Issues with margin section terminology
  - For one facility, surgeons used different nomenclature
- Labs had to adjust to not having their own interpretation of the guidelines
- Change, change, change....

# Long term vision: CCR establishing new partnerships

- Facilitate registry, clinical, and research partnerships
  - Historical processes rely upon researcher hypothesis
    - CCR plans to leverage business intelligence against data warehouse
    - CCR outputs possibly trends or anomalies, possible areas of interest to researchers
  - CCR would like to facilitate use of the CCR data set
    - Physicians, reporting facility, eventually patient access to data
    - Ability to leverage reporting facility data analytic capabilities
    - Translate data analytics into clinical action affecting patient care

# Future capabilities of data sharing

- Access for pathologists & clinicians
  - CCR database that doctors will be able to access
    - *Example – If the patient has been treated at different California sites, provide access to information from all sites to point of care*
- Research
  - Treatments and their efficacy
  - Expected outcomes
  - Regional cancer statistics
- Quality metrics
  - Measure report completeness, key for accreditation compliance
    - *Example - Define cases to be reviewed for non-compliance*
  - Biomarker data
    - *Example – Is your site above or below average in testing volume?  
What are the most frequently run tests and results?*

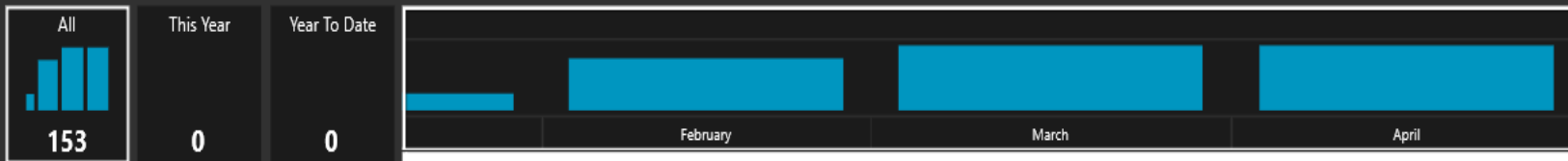
# CCR data analytics

- CCR has completed research towards key performance indicators & data analytics
  - Compliance rate over time
    - Specific analysis on how many structured reports were received in total or over a period of time
    - Measure against cancer abstracts received
      - Cancer abstract, full abstract needs first course treatment data
  - Diagnostic latency (timeliness)
    - Measure of the time from specimen received date to report received at CCR (case pathologically diagnosed and finalized)
    - Measure of time from surgery date and date received at CCR

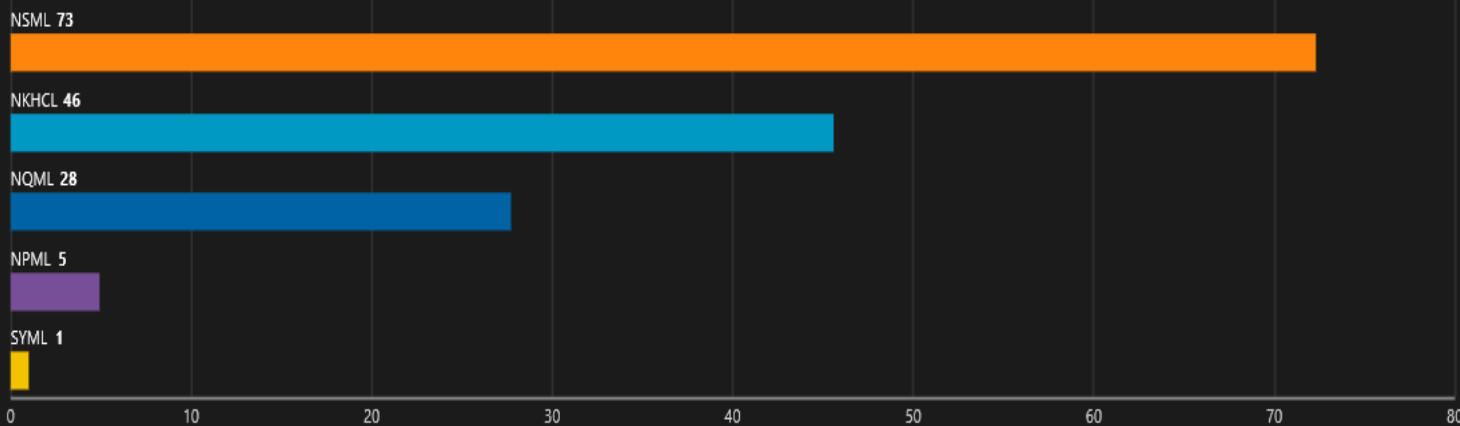
# CCR data analytics - con't

- Business intelligence & quality improvement opportunities
  - **Lymph node retrieval**
    - How many lymph nodes were retrieved within the specimen
    - Data will reference to primary site, certain primaries should have more lymph nodes recovered with any resection
  - **Positive prostate margins**
    - Counts on cases with positive margins
      - Can present by vendor, facility group, hospital, physician
  - **HER2 positive rate by site**
    - Data can be viewed from multiple perspectives
    - Facility, group, hospital, physician

# ← Cancer Observation Count by Lab January 20 - April 30, 2015



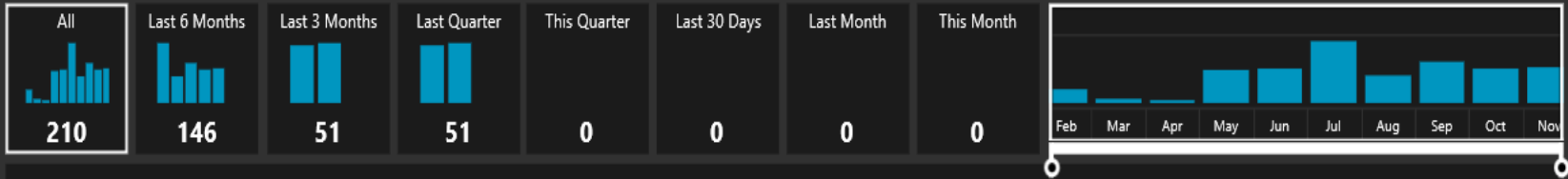
Cancer Observation Count by Lab



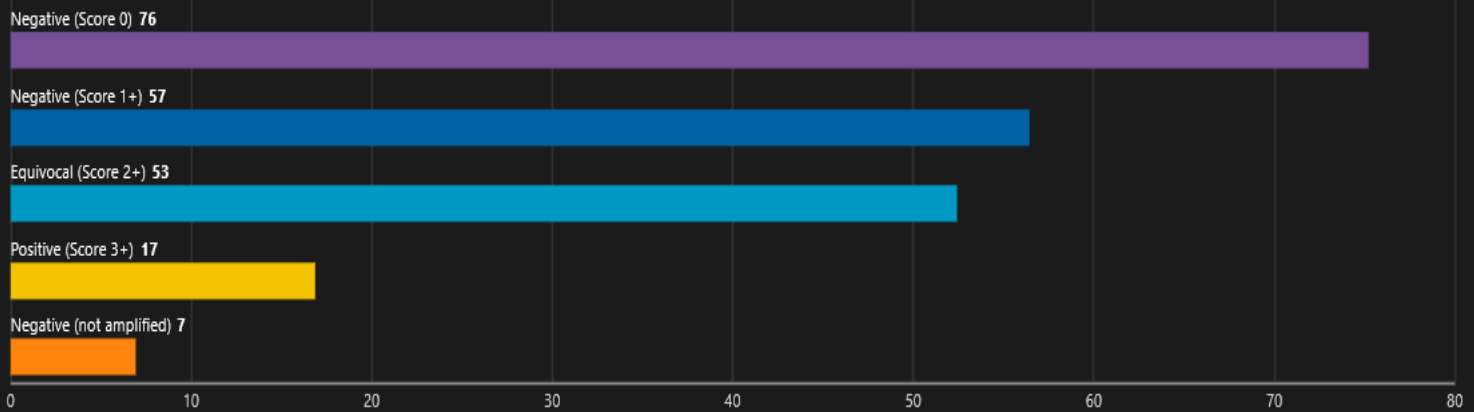
Cancer Observation Count by Lab

	Specimen Date	Lab Name	Observation Short Text	Report Count
1	2015/01/20	NKHCL	COLON AND RECTUM	1
2	2015/01/21	NSML	INVASIVE CARCINOMA OF THE BREAST	1
3	2015/01/22	NPML	URINARY BLADDER	1
4	2015/01/26	NSML	DCIS OF THE BREAST	1

# HER 2 Results Report by Facility Group February 5 - November 23, 2015



Breast Cancer Case Counts per HER 2 results



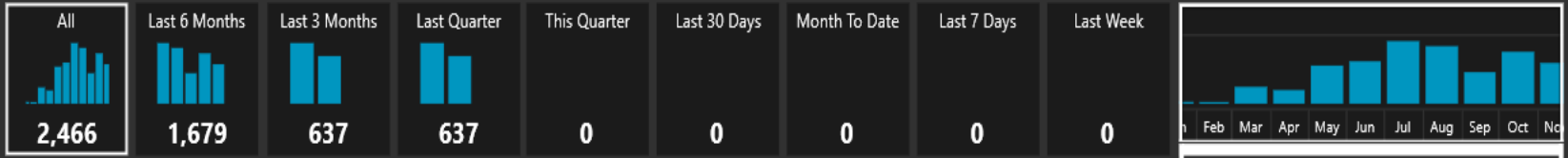
Breast Cancer Case Counts per HER 2 results

	ReportDate	orderingfacilityname	ObservationValueText	Report Count
1	2015/02/05	NSM	Equivocal (Score 2+)	1
2	2015/02/05	NSM	Negative (not amplified)	1
3	2015/02/06	NSM	Negative (Score 0)	1
4	2015/02/11	NSM	Negative (Score 1+)	1

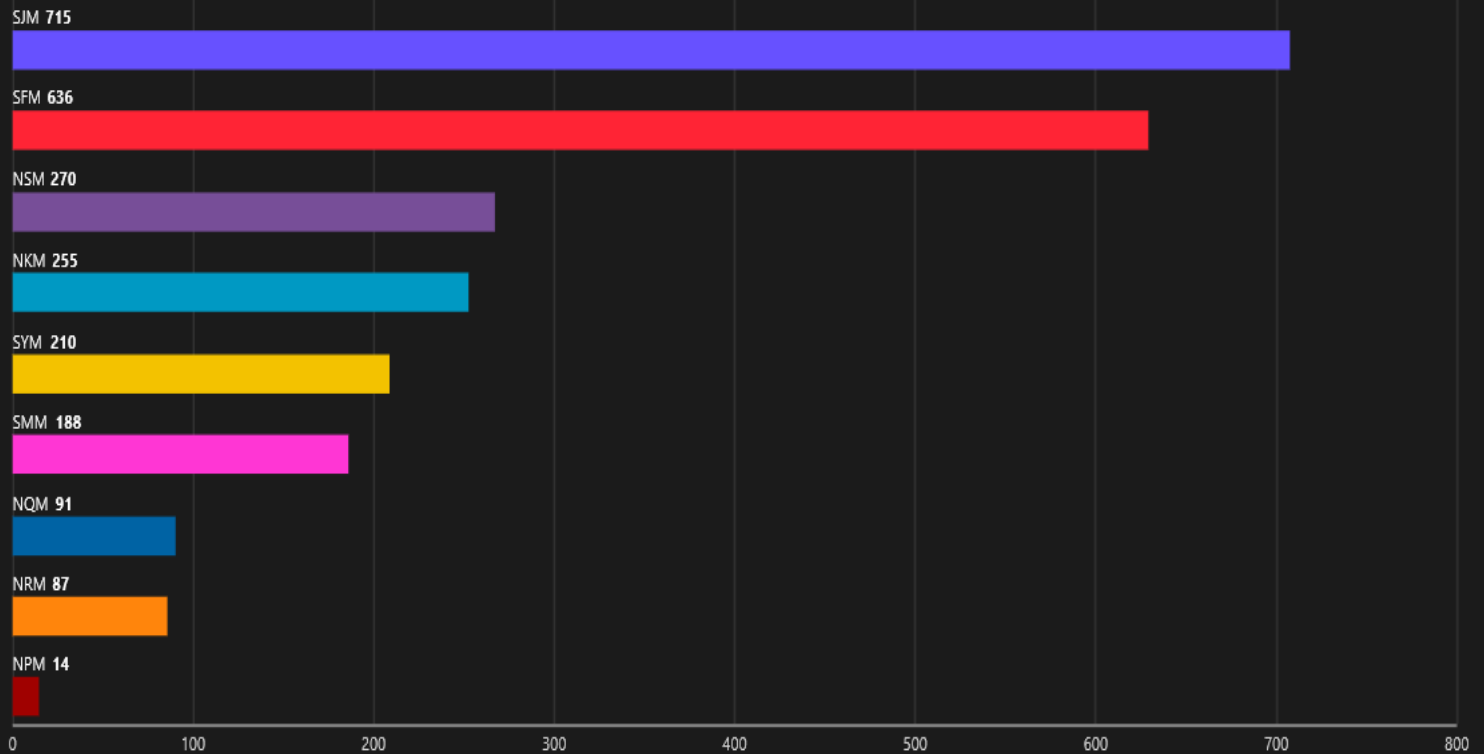


# Colorectal Case Count by Hospital January 18 - November 21, 2015

Activity



Colorectal Case Count where there are metastasis in 7 or more lymph nodes





# CCR providing value to California physicians, health systems, and county health

- Provide reports / data sets, and analytics to physicians diagnosing and treating cancer
  - Pathologists, oncologists, primary care
- Statistical analysis reported back to health systems and group practices
- Raw data and statistical analysis reported back to county health programs

# CCR providing value to California cancer patients

## CCR data access for patients

- “Where do I go when I have X type of cancer?”
- “How many number of times this year has X type of cancer been treated by Z institution where I am currently being seen”?
- “Where has my X type of cancer been diagnosed and treated the most in California in the past year”?
- “Where has my X type of cancer in Y stage had the best survival outcomes over the last 5-10 years?”

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# Q&A