April 11, 2023: 2:30-3:30pm

Applied Data Analytics

Hospital Quality Improvement Platform
Sentinel Signal Detection

Hospital Quality Institute
Leadership in quality and patient safety

California Hospital Association

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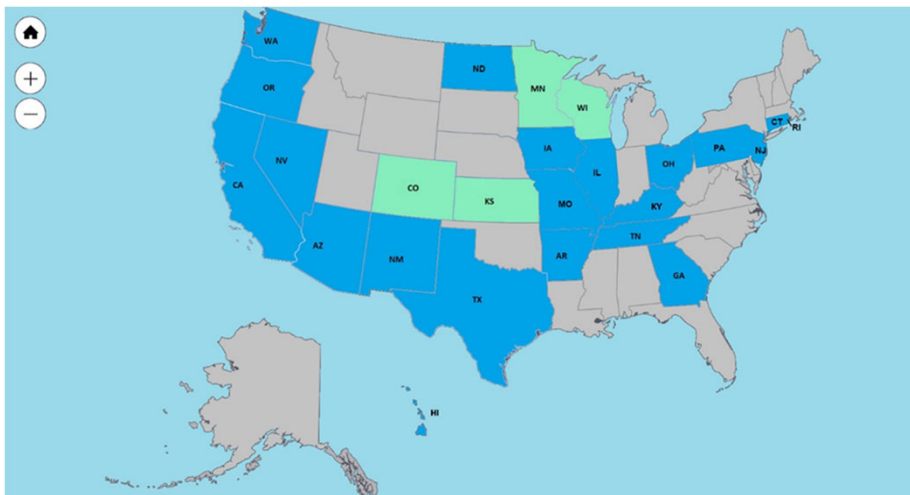---

The Hospital Quality Institute (HQI)

- **501 C 3 Non-Profit Organization**

- **Part of California Hospital Association**

- **Independent Board of Directors**

- **495 members (62 additional facilities in process)**

- **21 states**

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HQI Member Map

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HQI What We Do

1. **Collaborative Healthcare Patient Safety Organization (CHPSO)**
   - **Safety Reports**
   - **Member Research**

2. **Education**
   - **Annual Conference**
   - **Safe Tables / Webinars**

3. **HQI Cares & BETA HEART®**

4. **Hospital Quality Improvement Platform (HQIP)**

5. **Sentinel Signal Detection**

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HQI Why

- **To support members in their pursuit of safe, quality care and the attainment of zero harm**
- **Provide value and benefit to our members**

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Hospital Quality Improvement Platform (HQIP)

- **Comparative quality analytics platform**
- **Participating California hospitals: 154**
    - **40 Rural**
    - **24 CAH**
- **No barriers:**
    - **Web-based**
    - **Free for CHA members**
    - **Does NOT connect to EMR**
    - **Existing Data – NO new data files to make**
- **300+ timely quality measures & comparisons**
- **Rural/remote hospital measure report**
- **Sharing data for the greater good**

Hospital Quality Improvement Platform

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HQIP: Data Sources

1. **CDC NHSN – Healthcare-Associated Infections**
2. **CMQCC – Maternal Measures**
3. **HCAI (OSHPD) – SIERA Encounter Data**

SIERA File Type	HCAI	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug†	Sep	Oct	Nov	Dec
Inpatient (IP)	Report period	Jan 1–Jun 30						Jul 1–Dec 31					
	Due date	Sep 30 of the same year						Mar 31 of the *following* year					
Emergency Department (ED)	Report period	Jan 1–Mar 31			Apr 1–Jun 30			Jul 1–Sep 30			Oct 1–Dec 31		
	Due date	May 15 of the same year			Aug 14 of the same year			Nov 14 of the same year			Feb 14 of the *following* year		
Ambulatory Surgery (AS)	Report period	Jan 1–Mar 31			Apr 1–Jun 30			Jul 1–Sep 30			Oct 1–Dec 31		
	Due date	May 15 of the same year			Aug 14 of the same year			Nov 14 of the same year			Feb 14 of the *following* year		

†HCAI aggregates SIERA files and releases statewide Limited Data Sets around August of the *following* calendar year.

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HQIP Live Demo

Hospital Quality Improvement Platform

Platform:
https://hqipanalytics.org

Learn More:
https://hqinstitute.org/the-hospital-quality-improvement-platform/
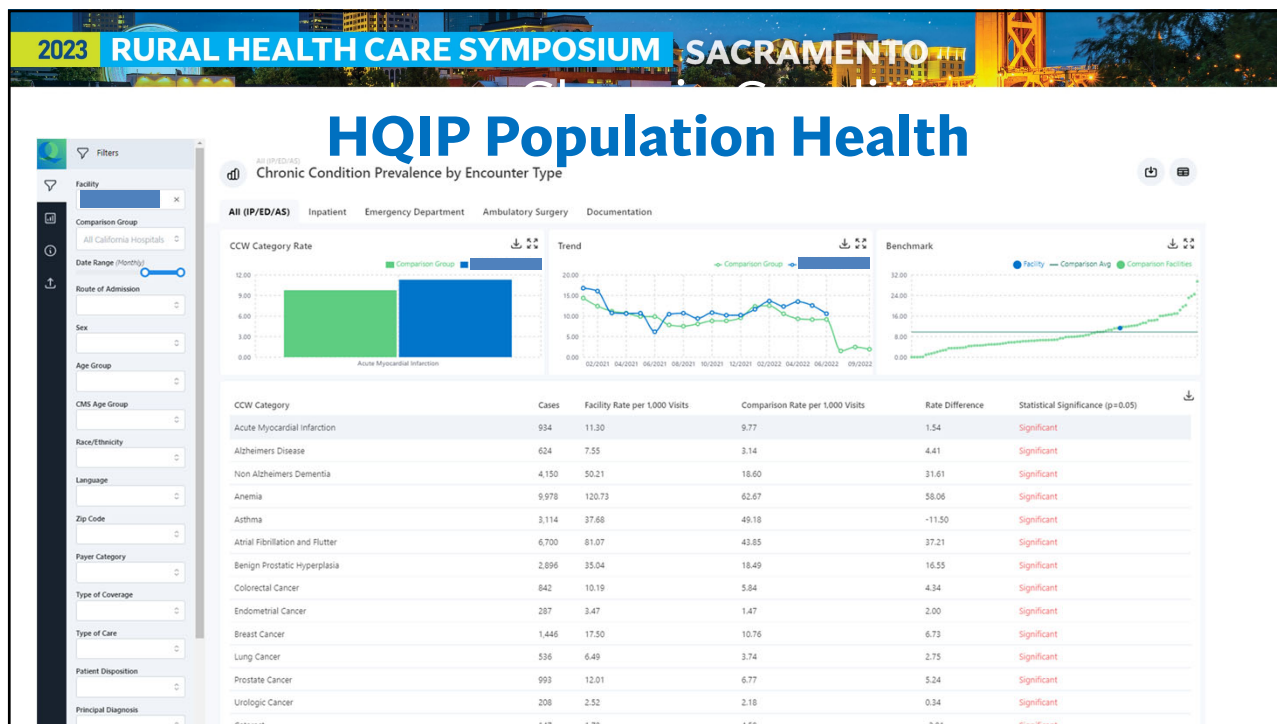
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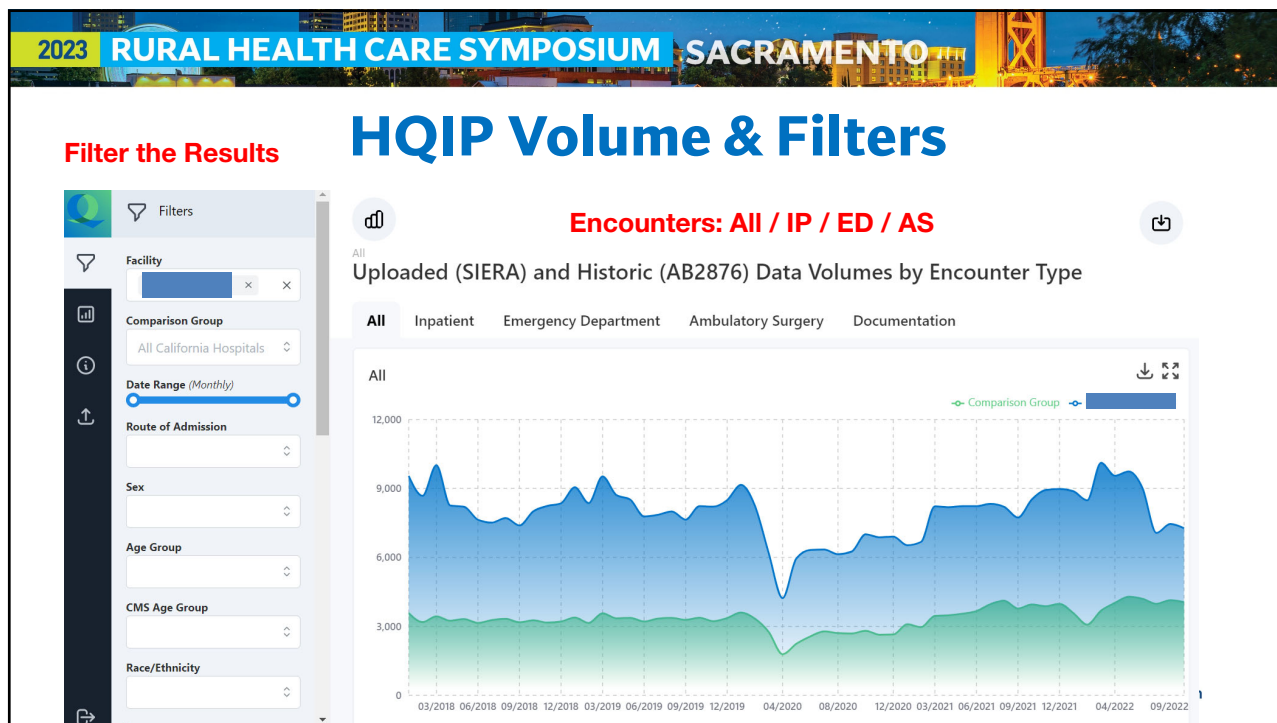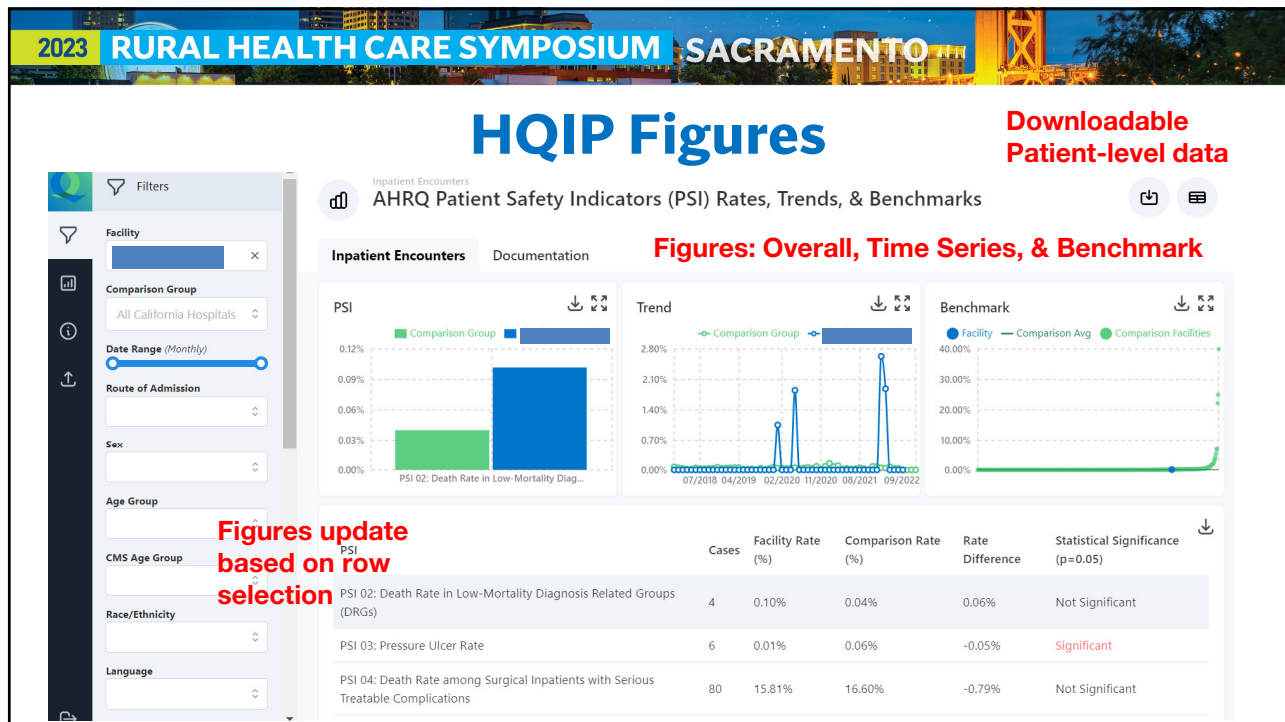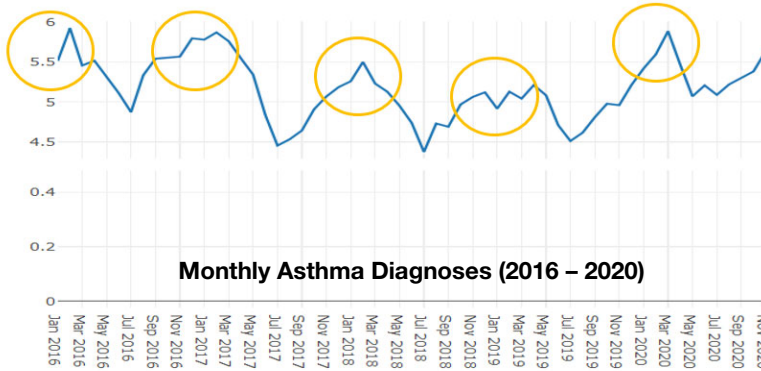
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HQIP Landing Page

HQIP Reports
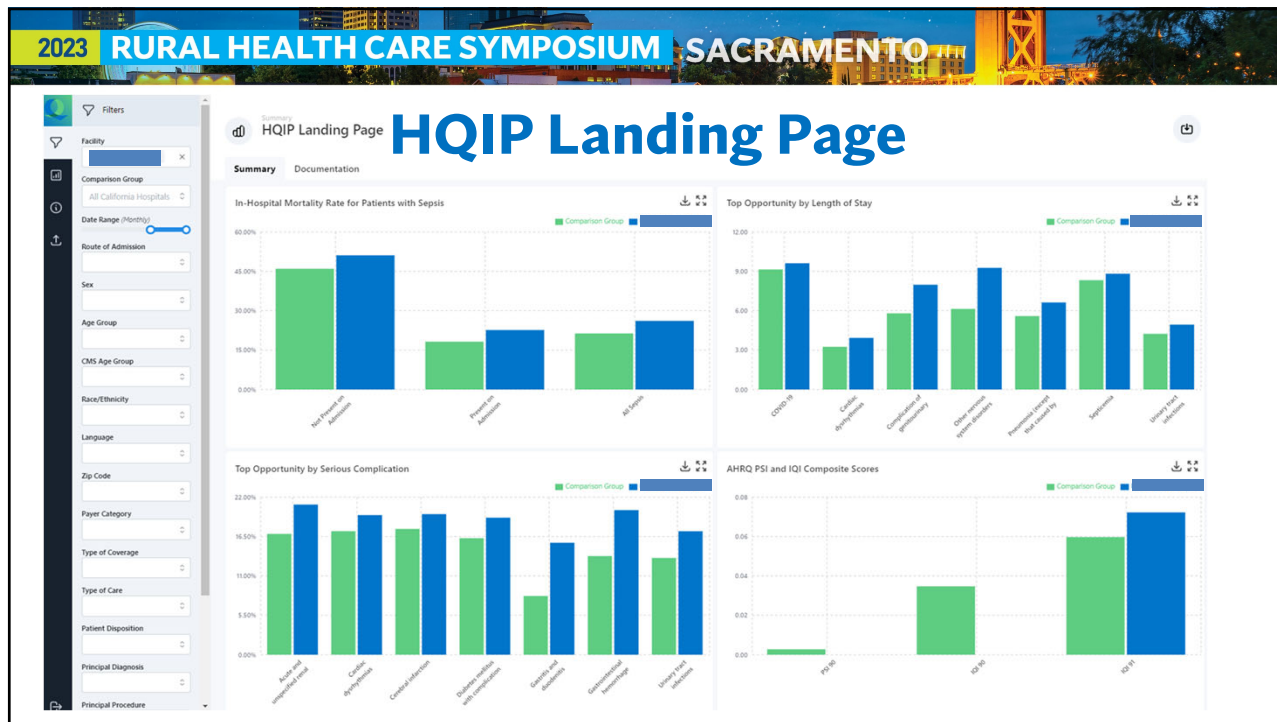
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What is Sentinel Signal Detection?

Statistical methods to differentiate information-bearing patterns (signals) from random patterns (noise) that distract from the information

Monthly Asthma Diagnoses (2016 – 2020)

The goal is to identify public health trends in order to help members reduce patient harm

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Big Data to Help Rural Hospitals

HQI is a 'big data' organization (really 2 under one roof)

Hospital Quality Improvement Platform

The Data:
- ~57 million encounter records (IP, ED, AS)
- ~4 million new encounters quarterly

Primary Data 'Units':
ICD-10 Diagnosis Codes

Patient Number	Principal Diagnosis	Other Diagnosis 1	Other Diagnosis 2	Other Diagnosis 3
xxxxxxxxxx	A021	J189	J869	.
xxxxxxxxxx	A021	N390	N12	.
xxxxxxxxxx	A021	Q851	E872	.

CHPSO
Eliminating preventable harm and improving the quality of health care delivery
Collaborative Healthcare Patient Safety Organization
A DIVISION OF THE HOSPITAL QUALITY INSTITUTE

The Data:
- ~3 million safety reports
- ~38k avg new reports monthly

Primary Data 'Units':
Free-Text Narrative Reports

Reviewed by MD Mary at 1pm Sep 14, 2020 (ABC Hospital): @@@ checked at patient around 9am. blood glucose level was 98 mg/dL. It went up to 120 mg/dL at 11am. Test result back showing positive covid. Notified Mr. George for potential covid exposure. Emailed lab at abc123@gmail.com for another check up.

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Data Reduction

How we Turn Data into Useful Information

Hospital Quality Improvement Platform

- ~72k ICD-10 diagnosis codes

- Up to 25 diagnosis codes per encounter record

- Create ~1,600 Diagnosis Groups using the first 3 digits of diagnosis codes

ICD-10 Diagnosis	New Category
A021	A02
A0472	A04
E860	E86
U071	U07
A020	A02
.	.

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Collaborative Healthcare Patient Safety Organization
Eliminating preventable harm and improving the quality of health care delivery
A DIVISION OF THE HOSPITAL QUALITY INSTITUTE

- ~200k words, abbreviation, drug names, jargon, dosages, etc.

- Free-text reports of events up to 8,000 characters long

- Create ~2,500 Word Vectors to find synonyms, abbreviations, misspellings

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Identifying Signals

After the data is prepared, we use advanced statistical techniques (ARIMA time series models) to identify changes and historical abnormalities in codes and words (signals)

HQIP (Dx Codes)

CHPSO (Text Narrative)

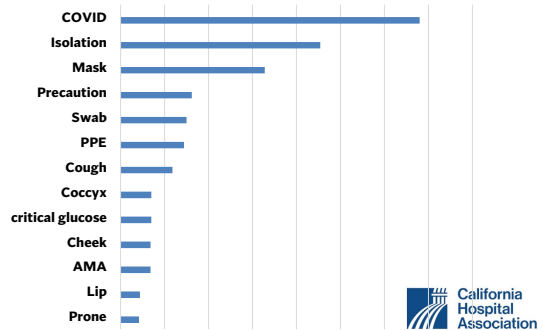

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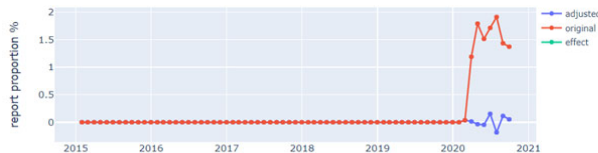
Statewide & Hospital-Specific Signals

Sentinel signal detection is being integrated into HQIP and CHPSOData: Personalized alerts about signals detected at YOUR hospital

HQIP Alerts
Top 10 Diagnosis Signals by Theme

Rank	Diagnosis Description (Dx Code)
1	Encounter for screening for infectious and parasitic diseases (Z11)
2	Volume depletion (E86)
3	Disorders of lipoprotein metabolism and other lipidemias (E78)
4	Encounter for immunization (Z23)
5	Liveborn infants according to place of birth and type of delivery (Z38)
6	Other anxiety disorders (F41)
7	Other stimulant related disorders (F15)
8	Exposure to other specified factors (X58)
9	Hemorrhoids and perianal venous thrombosis (K64)
10	Encounter for screening for malignant neoplasms (Z12)

CHPSO Alerts
All Themes

Bar chart themes (descending): COVID, Isolation, Mask, Precaution, Swab, PPE, Cough, Coccyx, critical glucose, Cheek, AMA, Lip, Prone

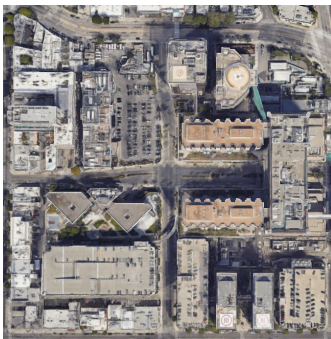California Hospital Association

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Rural Hospital Considerations

Do these two hospitals focus on the same metrics?

Hospital A

Hospital B

How can HQIP provide value for Hospital B?

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Rural Hospital Considerations (cont.)

Conversations with Quality Leaders at Rural Hospitals:

- **ED-based metrics**

- **Metrics with volume at rural hospitals**

- **Save us time - Measures we report (e.g., QHI or MBQIP)**

- **Population health in our community**

- **Utilization measures**

- **Send us your wish list: HQIAnalytics@HQInstitute.org** California Hospital Association
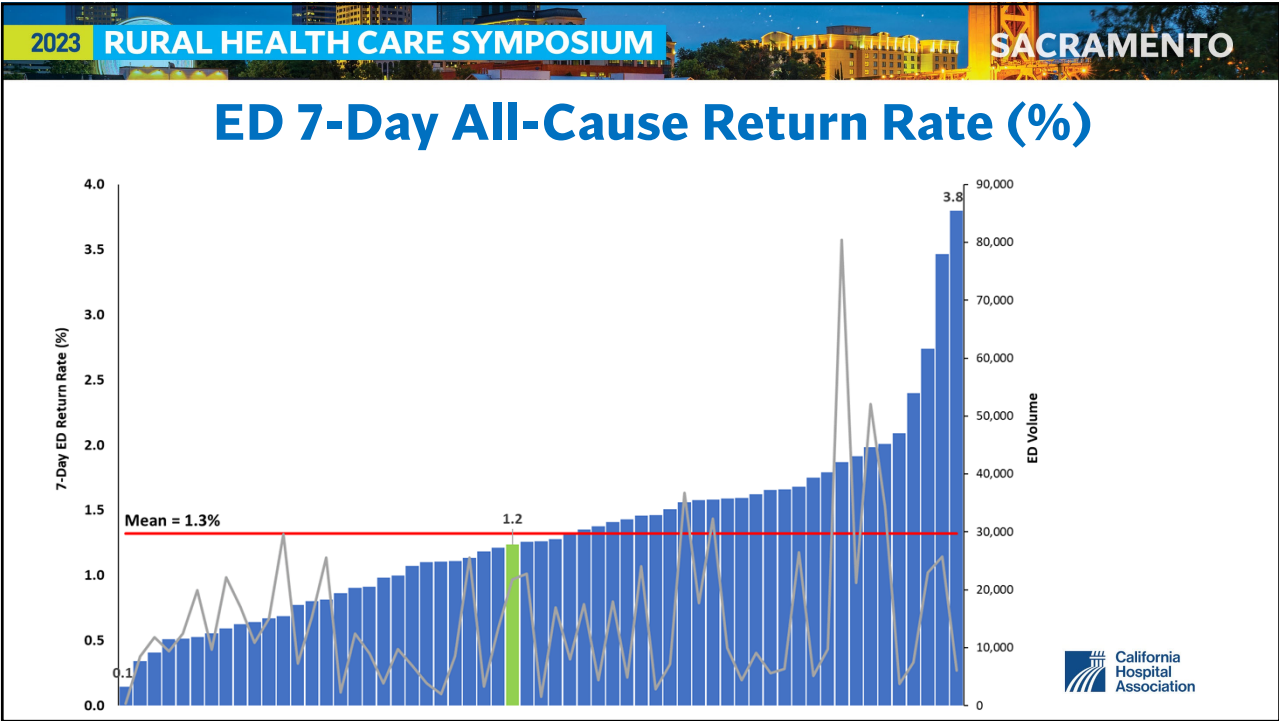
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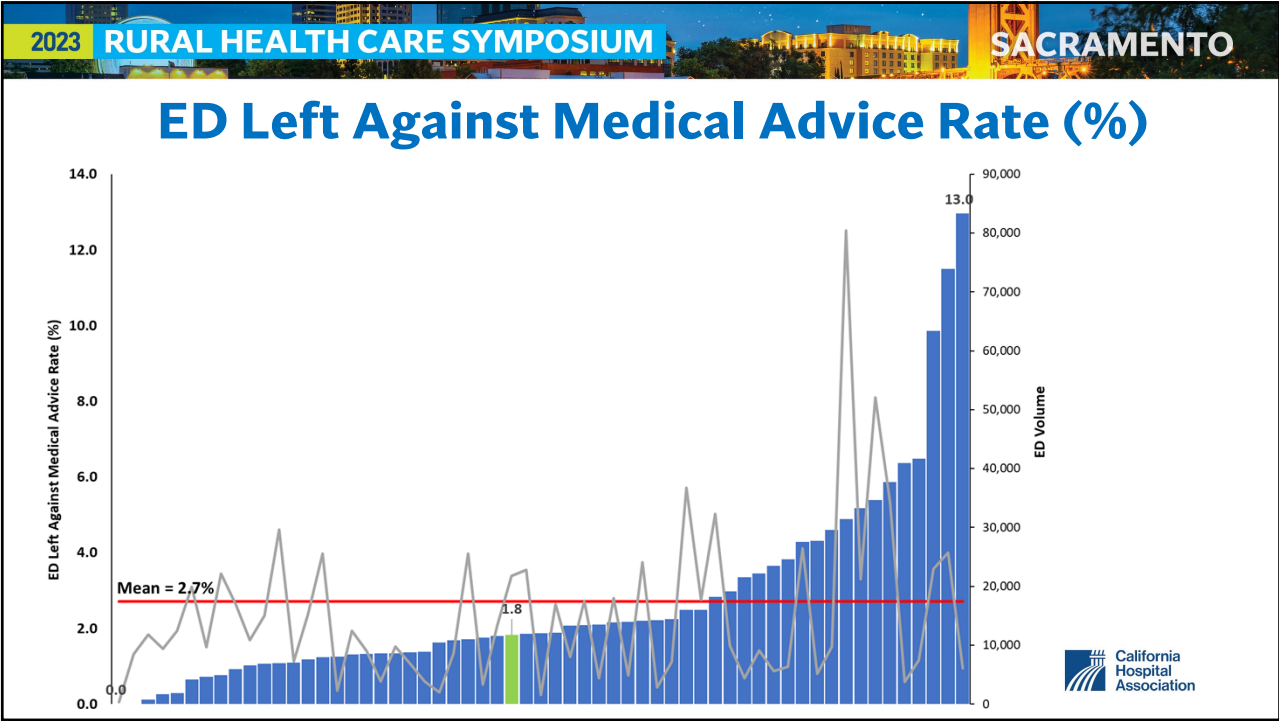# Building Rural Hospital Focused Metrics

- **ED 7-day all-cause return rate (%)**

- **ED left against medical advice (AMA) rate (%)**

- **Community Uncontrolled diabetes (LOS)**

- **Pneumonia mortality rate (%)**

- **Stroke mortality rate (%)**

- **COPD or asthma admission rate (older adults)**

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ED 7-Day All-Cause Return Rate (%)

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ED Left Against Medical Advice Rate (%)

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You Should be Using HQIP Because:

- Make decisions, see where your challenges are, celebrate successes
- Free to CHA members
- Data hurdles removed
- Customized to rural hospitals
- Minimal time/labor investment
- Very user friendly
- Greater good

Contact HQI to schedule a demo

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Questions?

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Thank you

Join HQIP or Schedule a Demo:
HQIAnalytics@hqinstitute.org

Scott Masten
smasten@hqinstitute.org

Follow us on Twitter:
@CHPSO and @HQInstitute

HQIP Participation is: *Free, Easy, and Important for CA*

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