

Sutter Health eICU: How We Led the Tele-ICU Innovation Revolution



June 11, 2013
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Sutter Health eICU Program

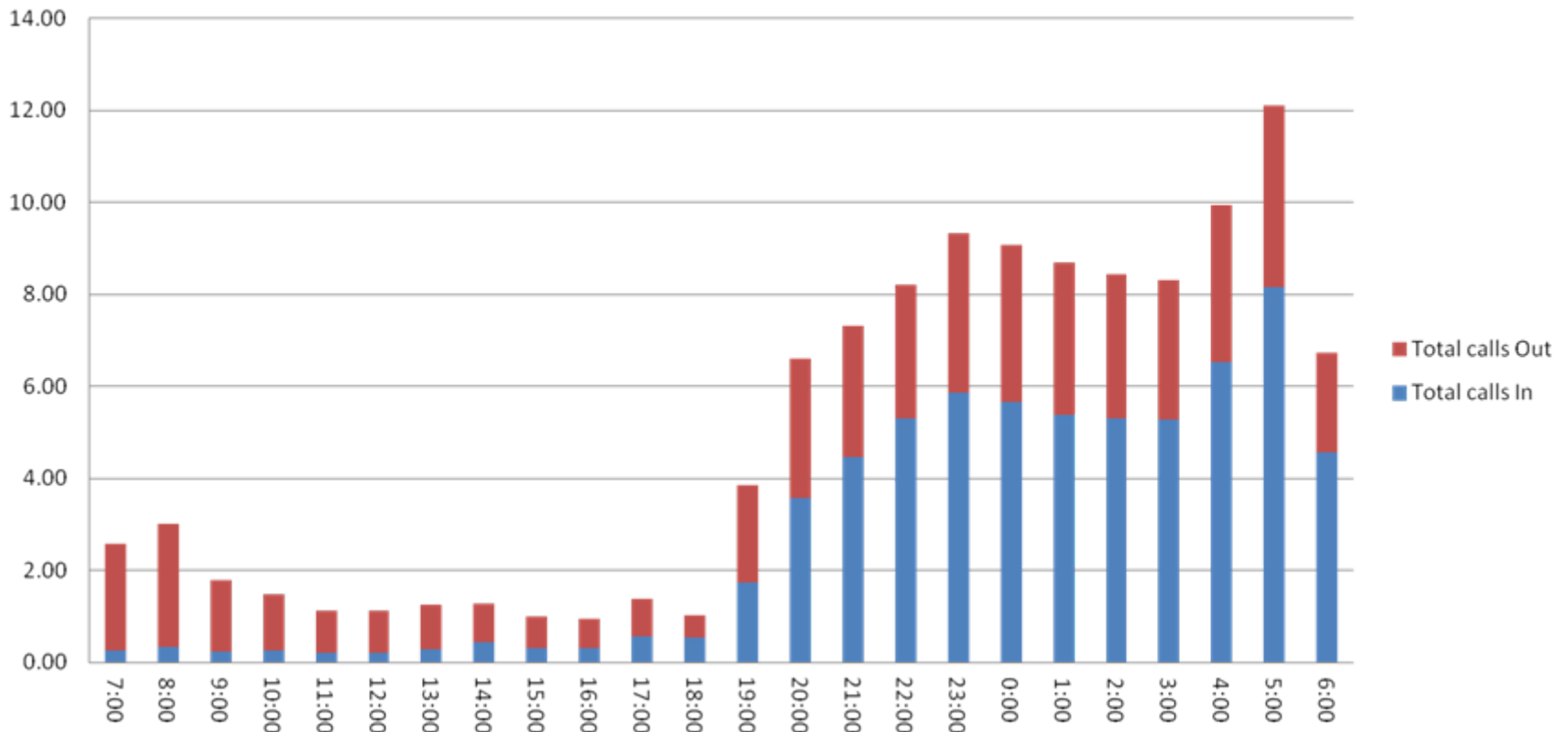
- Established in 2003 (Sacramento) and 2004 (Bay)
- Largest eICU operation in the Western US
 - 431 beds monitored (Sutter: 362; St. Joseph's: 45; El Camino: 24)
 - 49 eMDs
 - 57 eRNs
 - 20 clerical staff
 - 272 ADC (2011)
- Hours of Operation
 - 24/7 patient monitoring
 - 15-20 hr/day physician support

Sutter Health eICU Program

- Alta Bates Medical Center¹
- California Pacific Medical Center – Davies and California campuses
- Eden/San Leandro Medical Centers
- El Camino Hospital² (April 23, 2013)
- Marin General Hospital²
- Mills Peninsula Health Services
- Novato Community Hospital
- Petaluma Valley Hospital²
- Santa Rosa Memorial Hospital²
- St. Luke's Hospital
- Summit Medical Center¹
- Sutter Delta
- Sutter Lakeside Hospital
- Sutter Medical Center of Santa Rosa
- Memorial Hospital Los Banos
- Memorial Medical Center Modesto
- Sutter Amador Hospital
- Sutter Auburn Faith
- Sutter Coast Hospital
- Sutter Davis Hospital
- **Sutter Medical Center Sacramento**
- **Sutter Roseville Medical Center**
- Sutter Solano Medical Center
- Sutter Tracy Community Hospital

Sutter Health eICU Program

eICU Call per Hour by Time of Day
August 10, 2012 through March, 2013



**Intervention
2Q 2012-1Q 2013**

- **32,998 Interventions**
 - **Major 11,185**
 - **Intermediate 13,885**
 - **Minor 7,928**
 - **Major**
 - Sepsis
 - Respiratory failure
 - Shock
 - Other
 - Hypotension
 - Electrolyte abnormality
 - Acid-Base disturbance

Arrhythmia

Infection

Hypotension - titration of insulin therapy

Intermediate or Minor

- Communication with healthcare providers and/or family
- Diagnostic test evaluation or order
- Electrolyte abnormality
- Post-practice therapies (e.g. DVT, beta blocker, etc.)
- Respiratory distress
- Pain - evaluation and management
- Modifications to care plan (e.g. PRN medications for pain, fever)

Physicians and RN Tasks

RN

- Triage
- Virtual rounding
- Complex assessment
- Monitoring /responding to alerts & alarms
- Escalation and advocacy
- Supports effective decision-making
- Critical care consultant/advisor/mentor
- Surveillance/promotion of evidence-based practice
- Continuous performance improvement agent

MD

- Check in: Emergencies?
- Scan eCare Manager
- Address Sepsis Screens
- Multi-task: alarms, calls, admits, notes
- eCare Manager surveillance and case follow-up
- Confer re difficult or interesting cases
- Receive/give sign-outs

eWorkflow



Patient event

- Vital sign
- Lab result
- Care need
- Pt/family request
- MD request or sign-out

ICU call

eICU surveillance

eICU RN

- Care coaching
- Referral assistance
- Admit/APACHE/Sepsis
- SBAR creation
- Listen
- Verify
- Document



eICU MD

Review

- eCare Manager: Notes, Labs, Video
- EPIC/SHPER/EMR
- PACS/MUSE
- Call RN/Primary/Consultant

Enter order

Document

- Sepsis note (DRG documentation)
- SOAP and orders
- Consultation to/from RN/MDs

eICU call

Patient Intervention

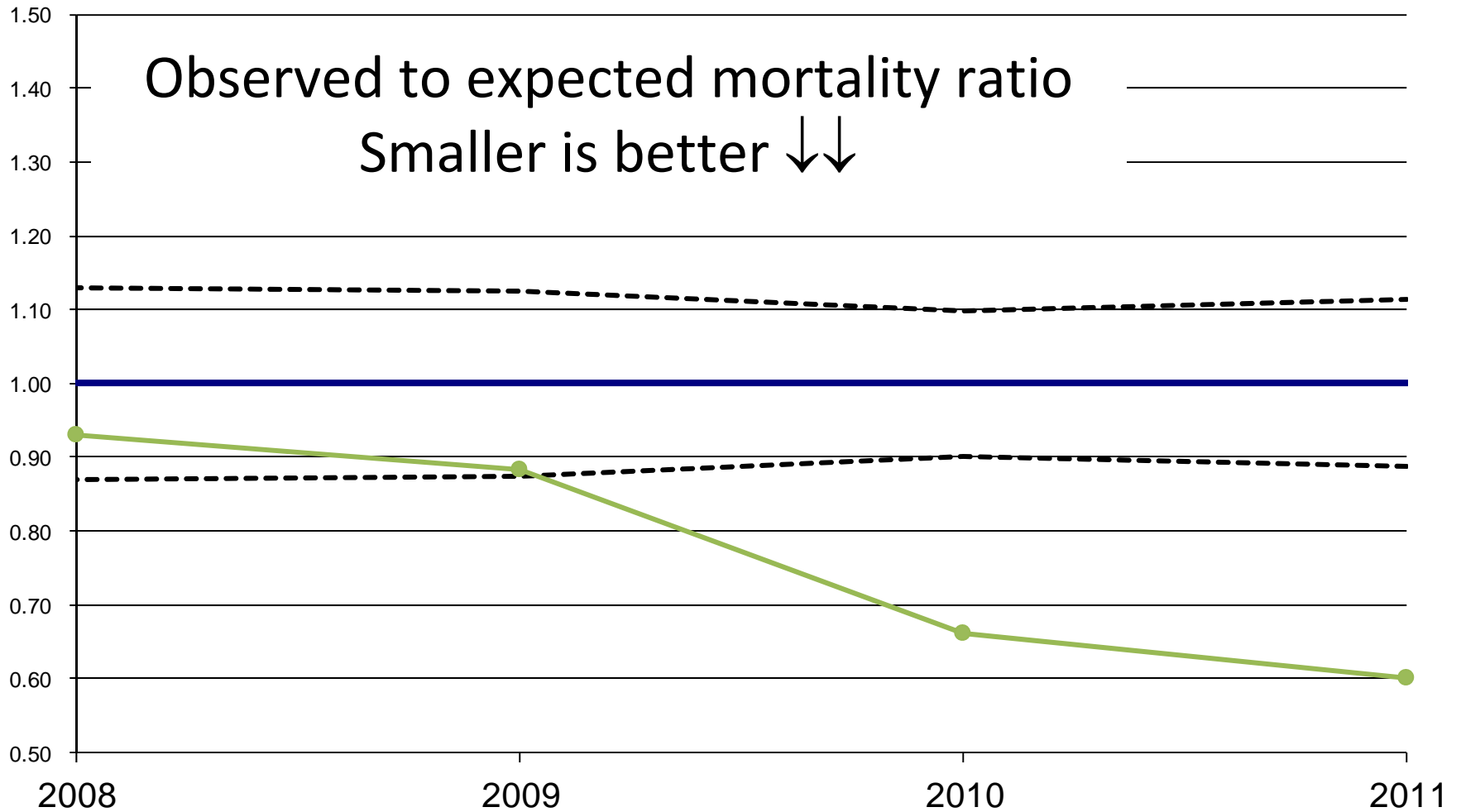
- Intubation
- Fluid resuscitation
- Blood pressure medication
- Defibrillation
- Drugs ordered/clarified
- Labs ordered
- Consultation provided
- Physician called/located
- RN/Family/MD reassured



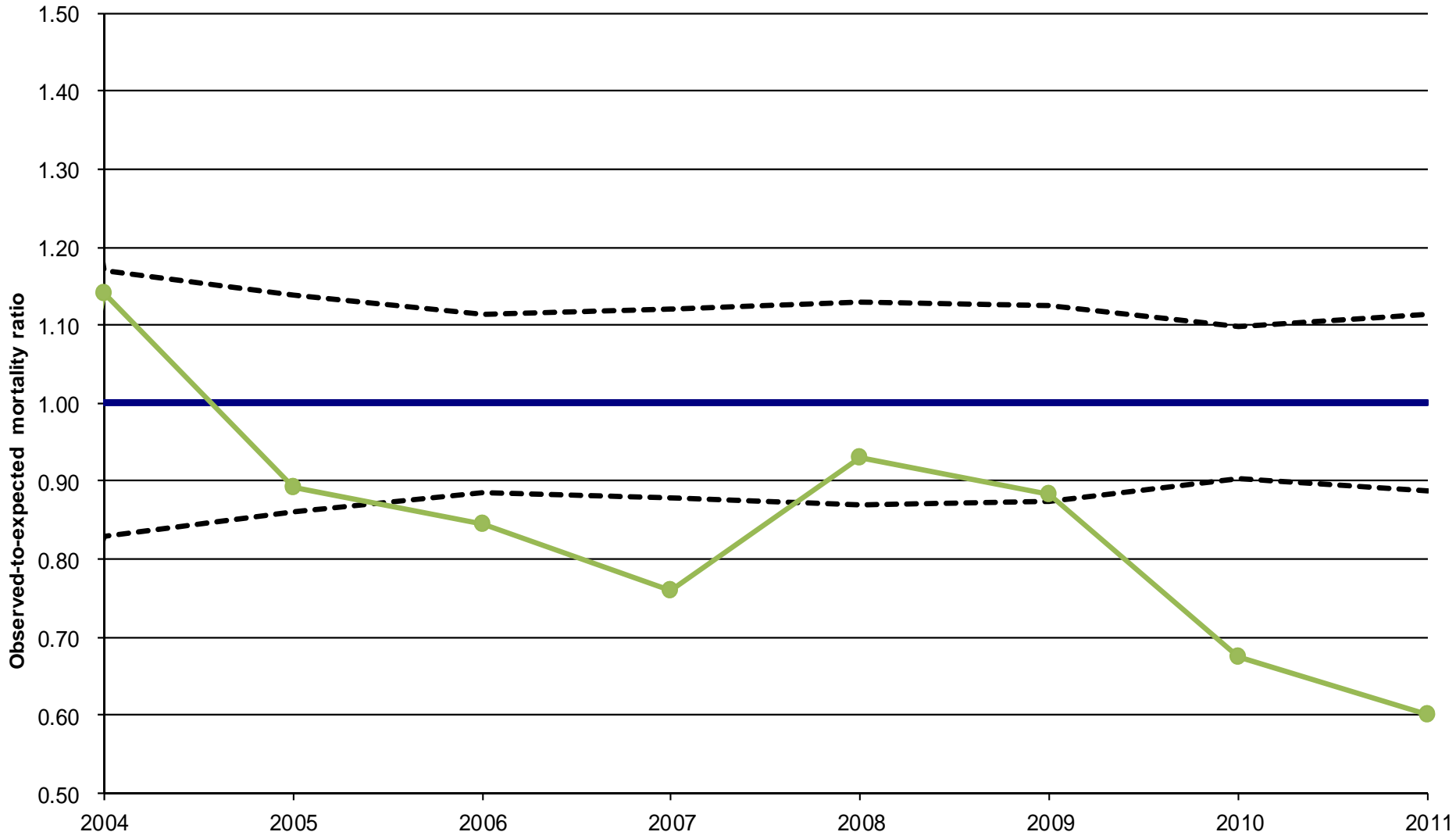
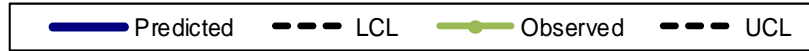
Complementary Capabilities

Dimension	On-site coverage	eCU coverage
Doctor /patient relationship	Full	Limited
History and physical	Full	Limited
Procedures	Full	Limited
Availability	Multi-tasked	Immediate
Just-in-time coaching	Limited	Full
Web-based resources	Limited	Full
“Deep-dive” review	Limited	Full
Curated data collection	Limited	Full
Protocolized care	Challenged	Promising

2008-2011: 453 Lives Saved

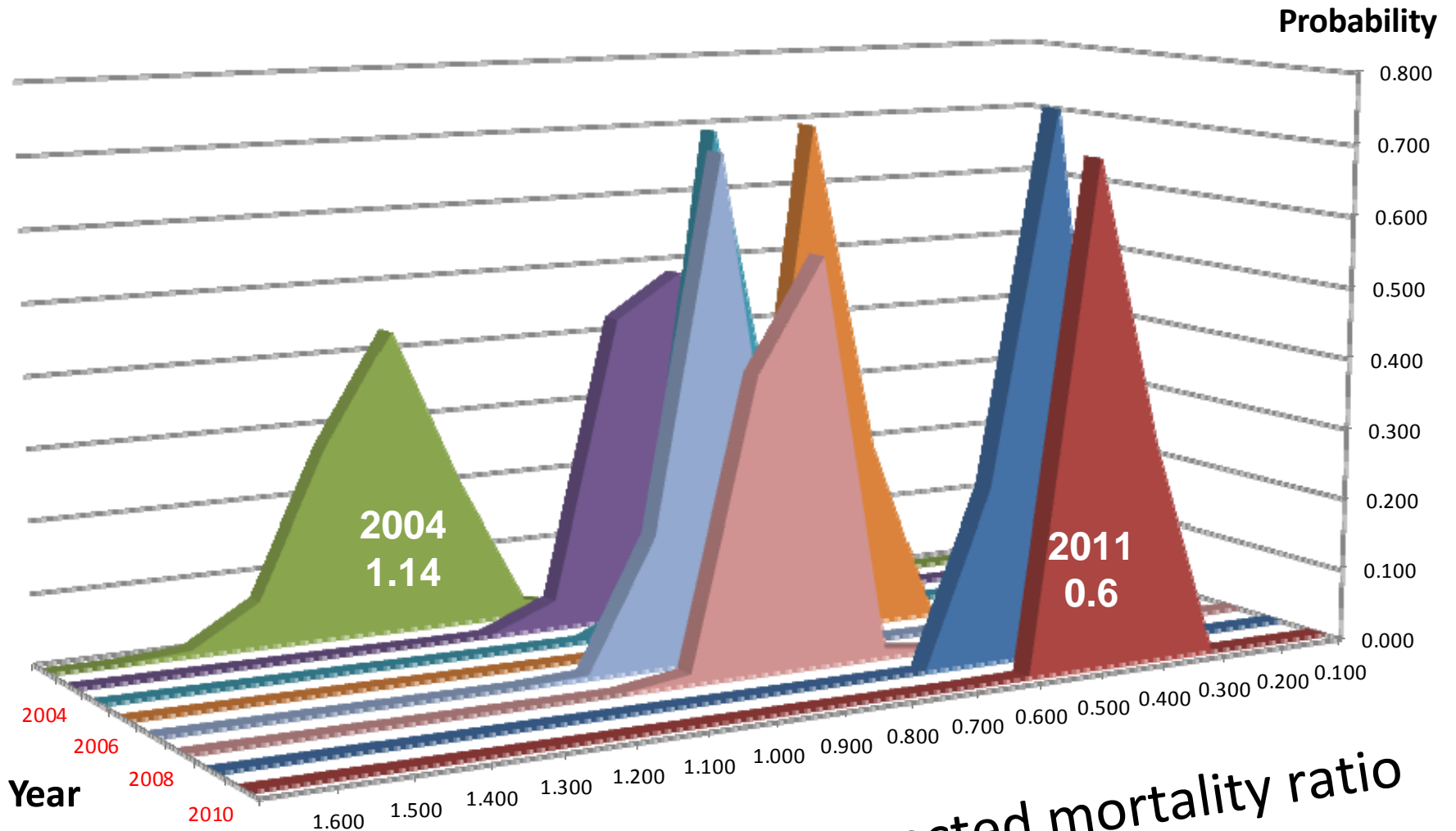


Auburn Roseville Memorial General All Diagnoses ICU Mortality Ratio



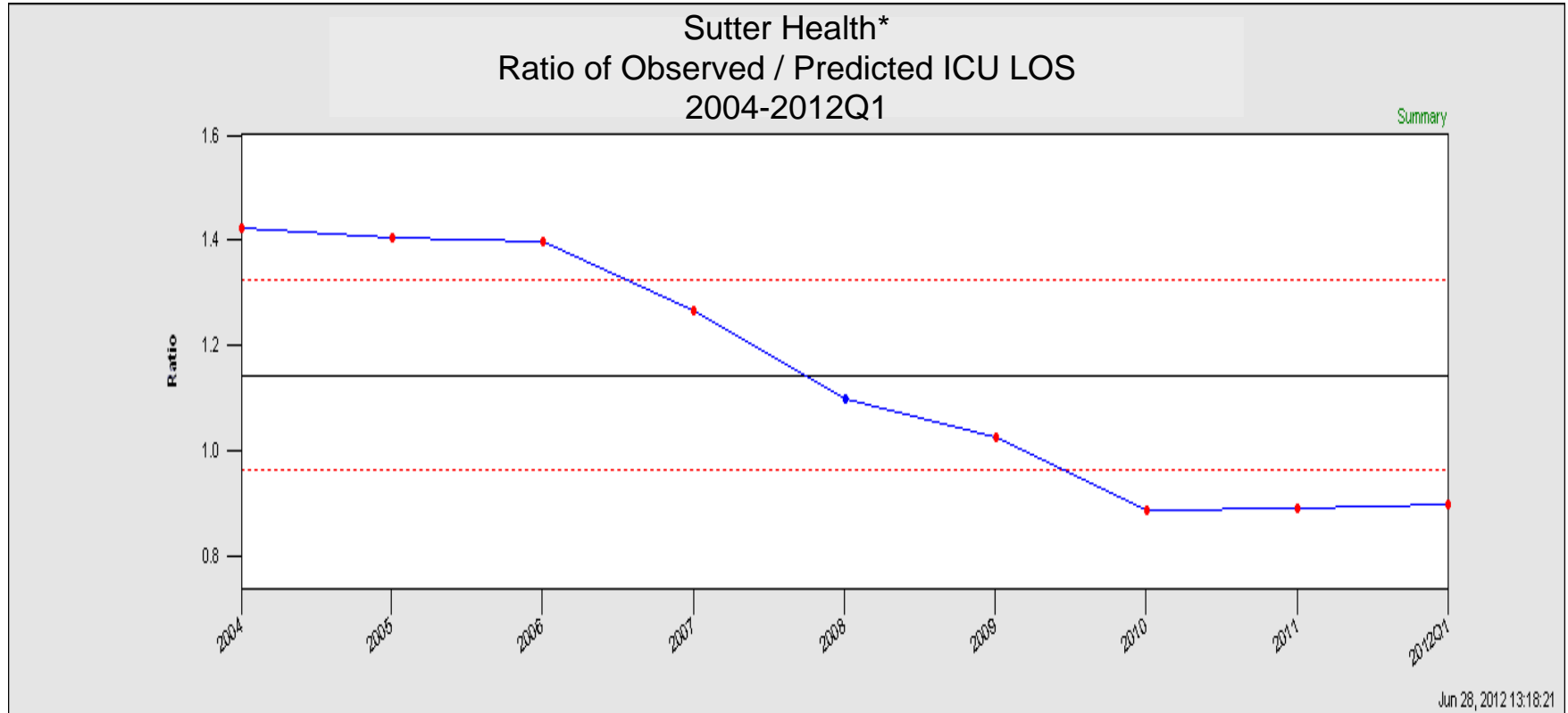
Cerner APACHE® n = >40,000

2004 2005 2006 2007 2008 2009 2010 2011



Observed to expected mortality ratio
Smaller is better → →

ICU Length of Savings = \$6,709,000



Time	2004	2005	2006	2007	2008	2009	2010	2011	2012Q1
LOS Ratio	1.42	1.40	1.39	1.26	1.10	1.02	0.89	0.89	0.90
Saved ICU Days	-4857	-6418	-8064	-4441	-2047	-602	2965	3056	688

* Includes data from Auburn Faith, Roseville, Sutter Memorial and Sutter General .

**Data source: APACHE

***ratios > 1 and negative numbers = number of days lost (more ICU days than predicted per APACHE)

**** \$1,000 more per ICU day versus floor day was used to estimate cost savings (2965 + 3056 + 688 = 6709 x \$1,000)

- Sepsis-related deaths in the hospital system have decreased 29% since 2008
- More than 1,300 lives saved between 2007 and 2010
- \$21 million in cost savings because of reduced LOS
- Length of stay has been cut at least 17%

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- More than 1,300 lives saved between 2007 and 2011
- A total of \$2 billion in cost savings because of reduced length of stay
- Length of stay has been cut at least 17%