

System Spread at Scale: A Sepsis Story

Presented by

Andre Vovan, MD, FCCM, MBA
Regional Chief of Clinical Effectiveness
Providence St Joseph Southern CA

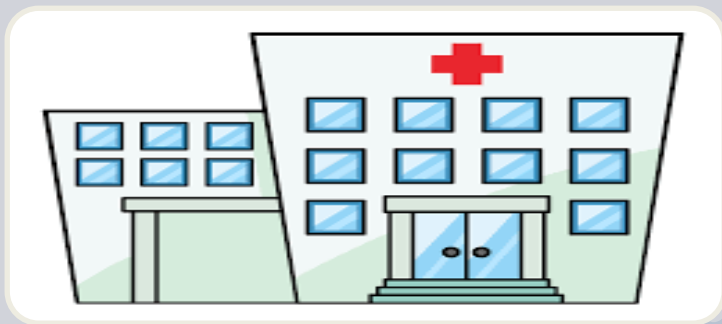
Sepsis is not a disease. It is a symptom of our broken health delivery system.

Due to a lack of or an inability to collaborate, communicate and coordinate care in a reliable and consistent manner, Sepsis is now the # 1 cause of mortality, and readmission for hospitals. Sepsis is also the most costly condition in aggregate for hospitals.

**Treatment is salt water and antibiotics
Solution is to re-engineer the delivery model**

Agenda

- What are the challenges to spread at scale
- How to get sepsis better in 1 hospital
- How to spread sepsis care across a region
- How to spread sepsis care across a system



50 Hospitals

- 8 Critical Access
- 7 > 500 bed
- 13 < 100 bed
- Rural, Urban, Suburban, Remote settings



Provider Mix

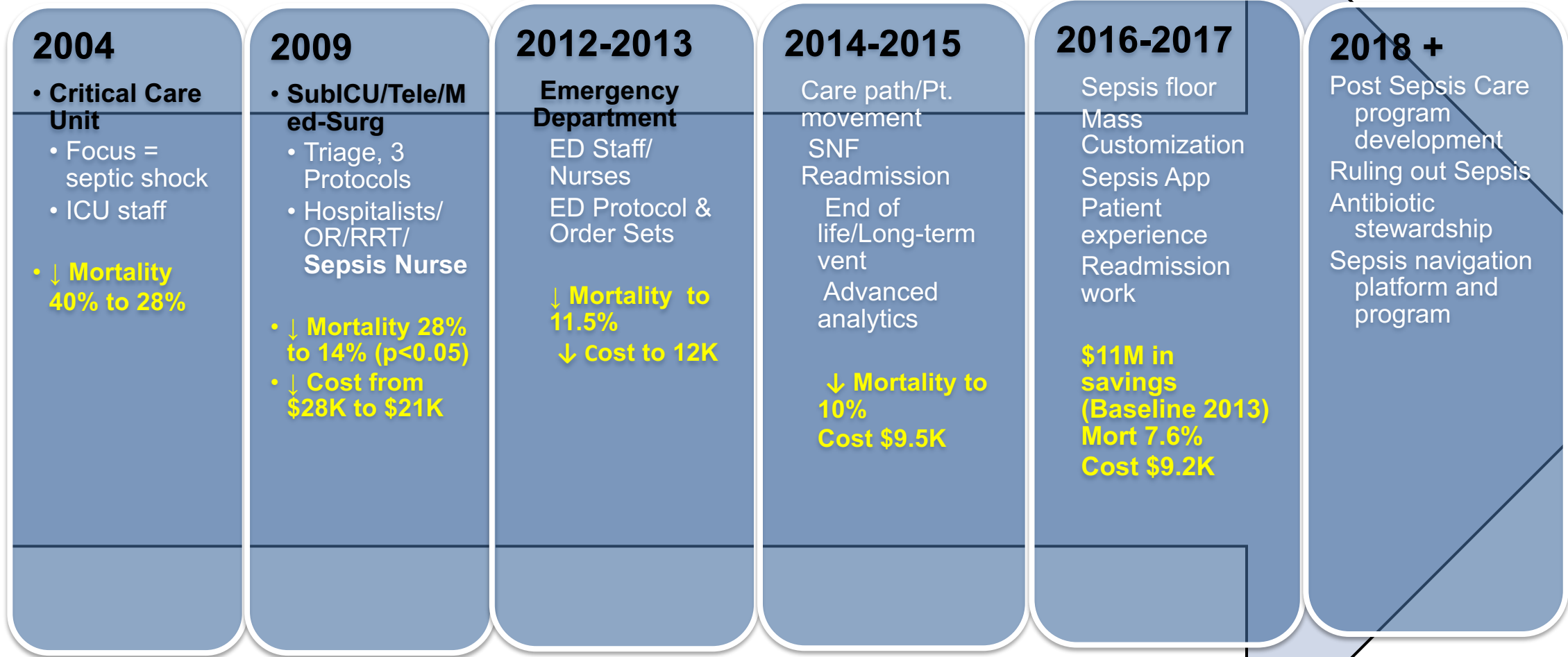
- ED MDs
- Hospitalists
- Intensivists
- Nurses/NPs/PAs
- Primary Care



Multiple EHRs

- EPIC (3 instances)
- Meditech (3 Regions)
- Allscripts

Chasing Sepsis at Hoag



Key Metrics						
	2013	2014	2015	2016	2017	
Cases	1558	1752	2057	2561	2034	
Avg LOS	7.45	7.00	6.76	6.57	6.47	
Avg Reimb Amount	\$19691	\$19342	\$20689	\$20258	\$15781	
Mortality	11.23%	11.13%	10.06%	9.61%	7.96%	

Cost Breakdown					
	2013	2014	2015	2016	2017 ↓
Room and Board-Med/Surg	\$2,490	\$2,191	\$2,223	\$2,305	\$2,094
Room and Board-Critical ...	\$2,829	\$2,581	\$1,997	\$1,829	\$1,739
Room and Board-SubICU	\$1,634	\$1,567	\$1,358	\$1,424	\$1,606
Pharmaceuticals	\$2,018	\$1,678	\$1,644	\$1,741	\$1,513
Laboratory	\$956	\$865	\$843	\$847	\$840
Radiology	\$605	\$565	\$534	\$466	\$470
Other	\$251	\$210	\$172	\$211	\$398
Non-Implant Supplies	\$401	\$381	\$381	\$420	\$328
Emergency Department	\$292	\$281	\$271	\$292	\$296
Operating Room	\$286	\$292	\$319	\$342	\$288
Respiratory	\$812	\$746	\$543	\$419	\$286
Blood Services	\$384	\$308	\$258	\$228	\$141
Physical Therapy	\$123	\$123	\$122	\$120	\$122
Implants	\$77	\$96	\$239	\$219	\$116
Cardiology	\$122	\$149	\$150	\$110	\$112
Dialysis	\$238	\$193	\$113	\$154	\$105
Speech Therapy	\$85	\$86	\$52	\$76	\$88
GI Lab	\$77	\$63	\$69	\$68	\$55
Anesthesiology	\$33	\$33	\$35	\$44	\$42
Occupational Therapy	\$28	\$21	\$19	\$21	\$25

From 2013-07-01 To 2017-06-30

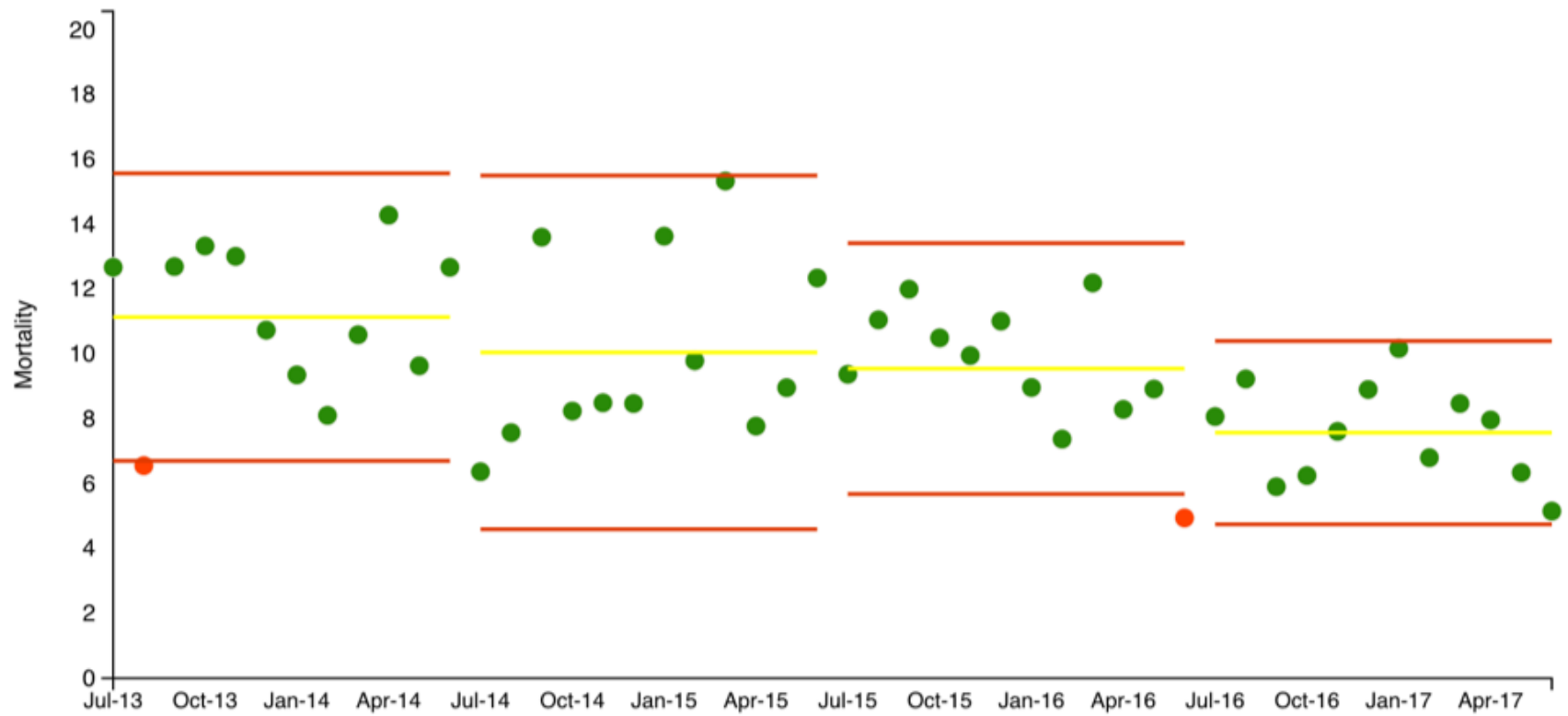
95%



Measures

Mortality

UCL μ LCL



Hospital
All

Fiscal Year
2013,2014,2015,2016

Financial Class
All

DRG

- All
- 853
- 854
- 870
- 871
- 872

Discharge Group

- All

From 2013-07-01 To 2017-06-30

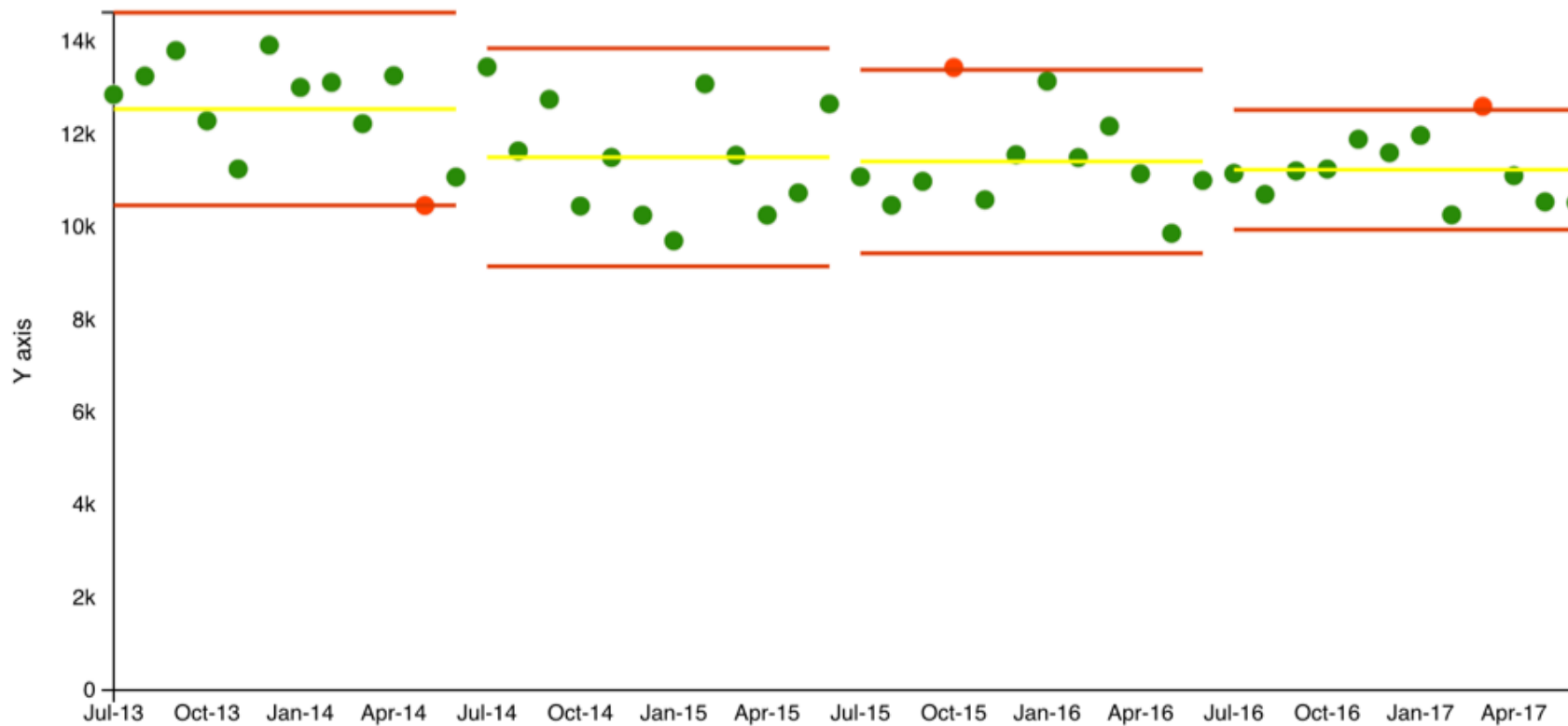
95%



UCL μ LCL

Measures

Avg Cost



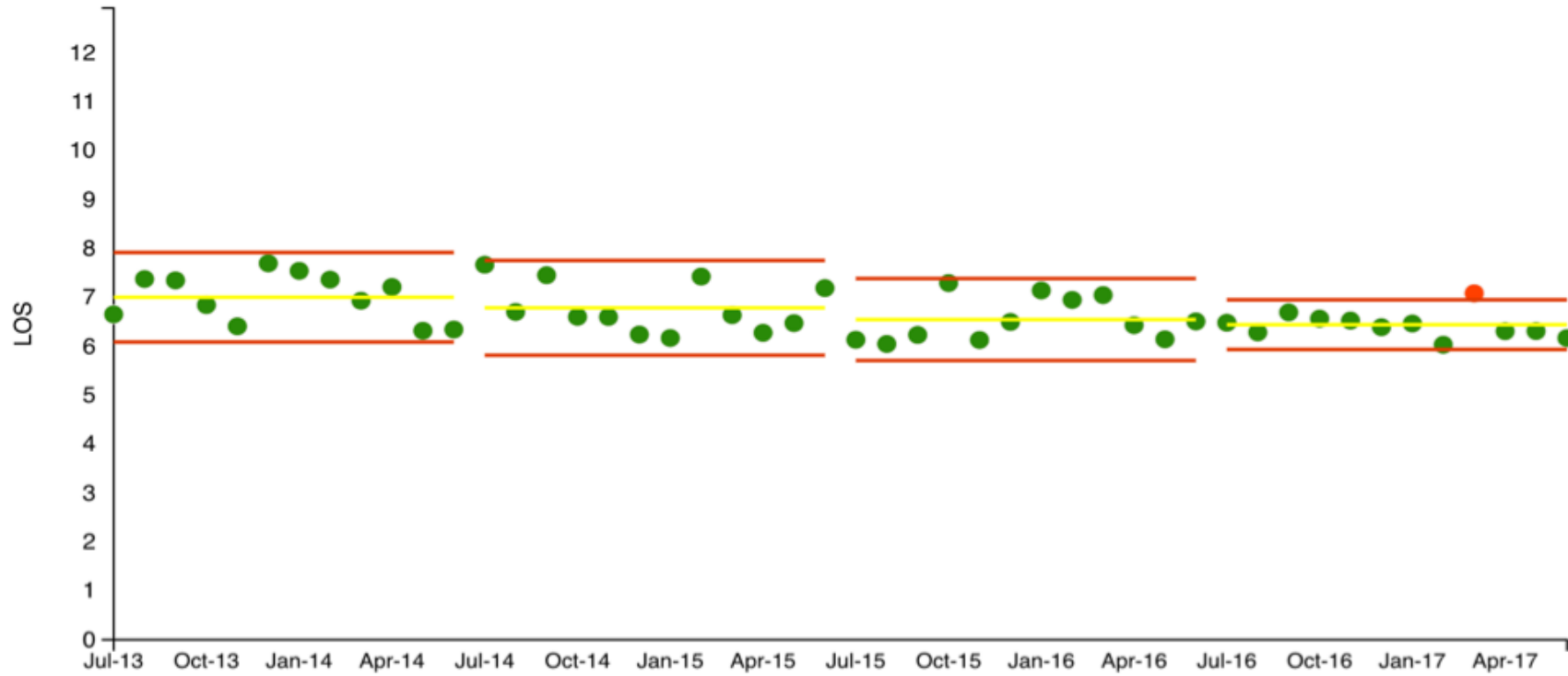
From 2013-07-01 To 2017-06-30

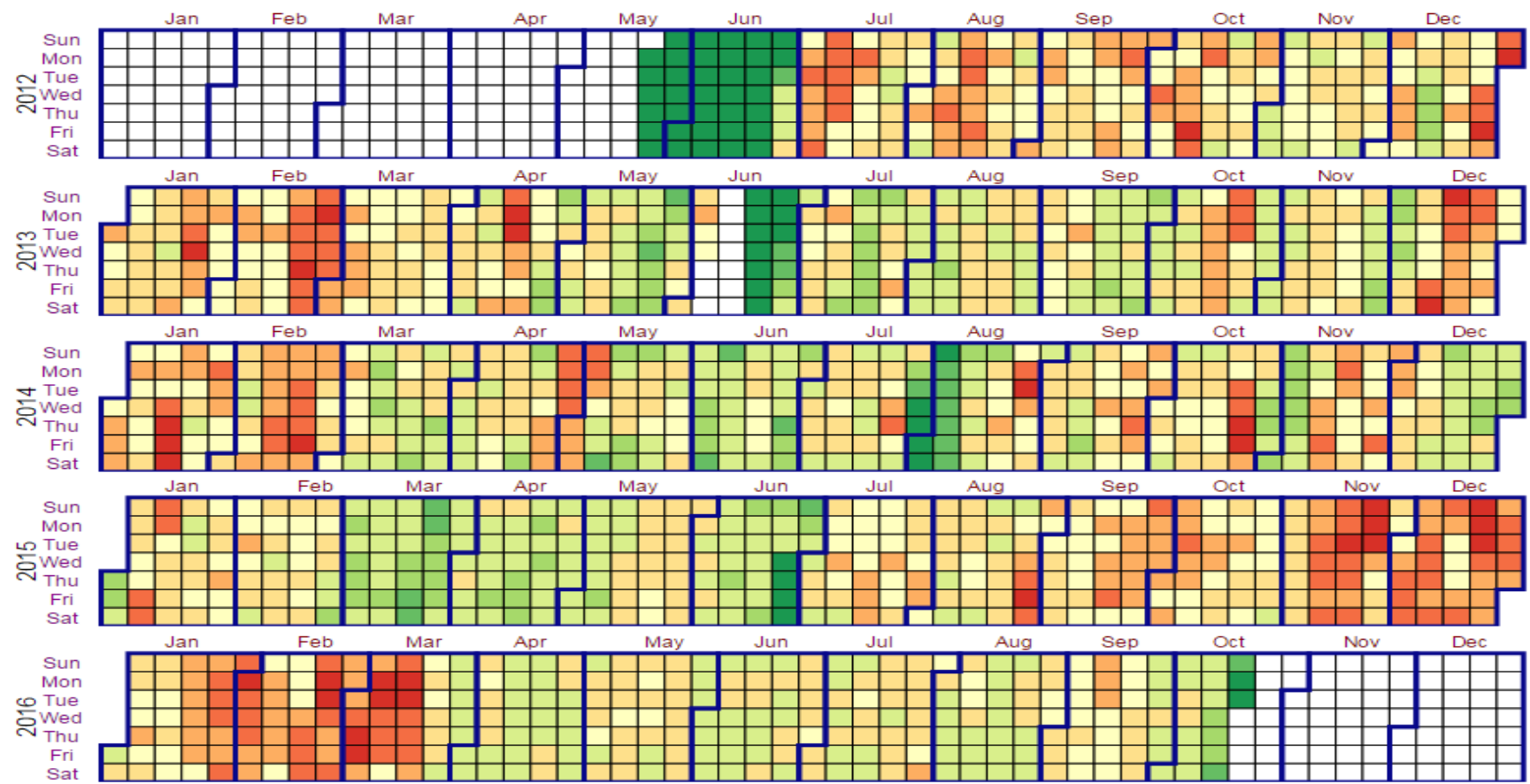
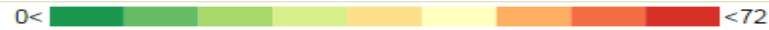
95%

UCL μ LCL

Measures

LOS





Hospital
 All

Fiscal Year

- All
- 2013
- 2014
- 2015
- 2016
- 2017

DRG

- All
- 853
- 854
- 870
- 871
- 872

From 2016-01-01 To 2017-06-30

DRG 871, 872	Discharge Group All	Financial Class All	DRG 871, 872	Discharge Group All	Financial Class All
Attending MD All	Payor Group All	Age Group All	Attending MD All	Payor Group All	Age Group All
Hospital All	Surgeon All	Consulting MD All	Hospital All	Surgeon All	Consulting MD All
Admit Unit 7W			Admit Unit 3E, 4E, 8W, 9W, IH5, IH6		

Cases 575	Mortality 2.43	Avg LOS 4.96	Cases 968	Mortality 5.48	Avg LOS 4.90
Avg Direct Cost 5,803			Avg Direct Cost 6,535		

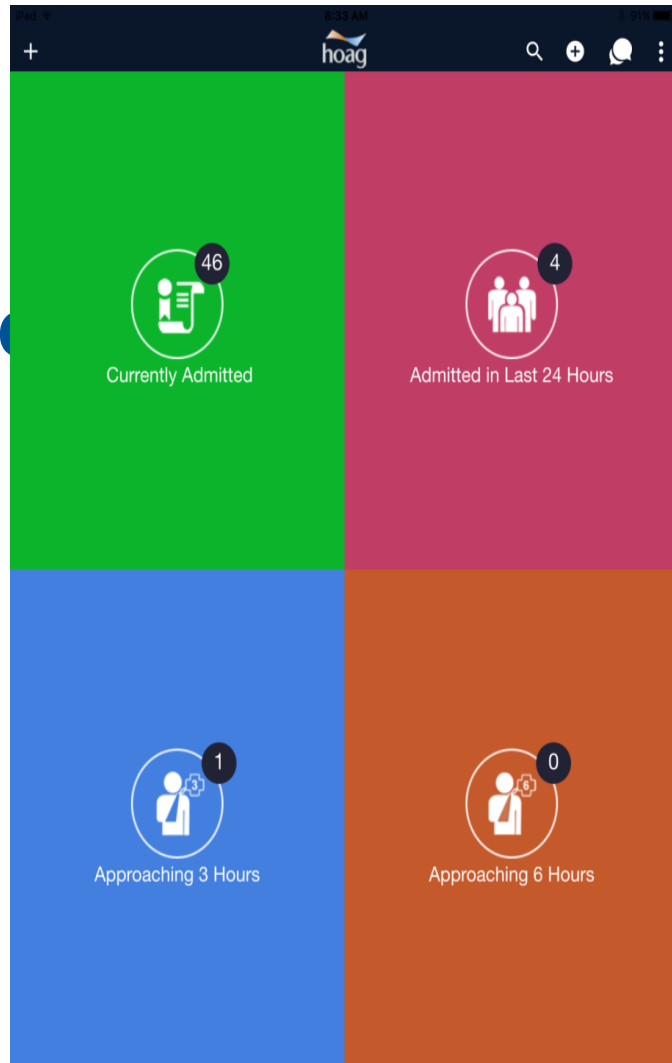
Cost Detail	
Med/Surg Cost	2,693.97
Pharmaceuticals	710.28
laboratory	641.76
Emergency Department	294.93
Radiology	274.00
Sub ICU Cost	219.54
Other	166.78
Non-Implant Supplies	122.24
Respiratory	119.58

Cost Detail	
Med/Surg Cost	2,603.93
Pharmaceuticals	917.83
laboratory	654.00
Radiology	399.99
Sub ICU Cost	351.82
ICU Cost	326.87
Emergency Department	293.32
Other	208.41
Respiratory	138.75

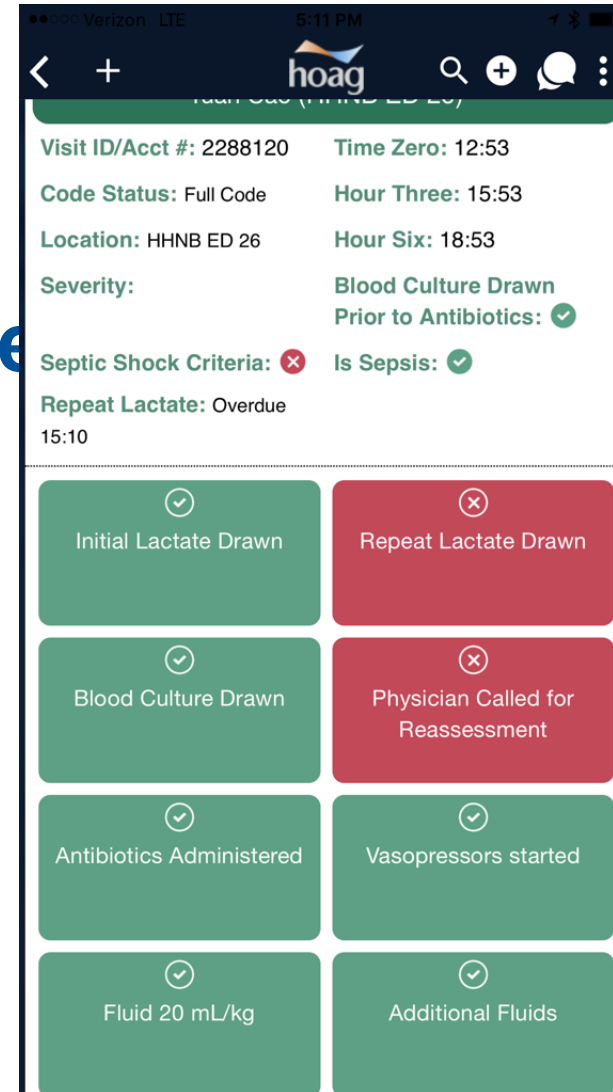
Quarterly Monthly
 Contribution Margin LOS

Month
10k

Key Lo



View Se



Search By Account No / Record No



Approaching Hour3

Approaching Hour6

All Patients

Compliance Categories ▶

Antibiotic	Lactate	Fluid	Blood Culture	Vasopressor	Reasses Volume
<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Both	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Both	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Both	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Both	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Both	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Both

Account No	Patient Name	Location	Sepsis Time Zero	LOS	Antibiotic	Lactate	Fluid	Blood Culture	Vasopressor	Physician C for Reassessn
20071714	Brenda Danon	CCU 20	12-14-2016 10:16:00 pm	0	👍	👍	👍	👍	NA	NA
20071562	Robert Ashley	HHNB 1012	12-14-2016 6:37:00 pm	1	👍	👍	👍	👍	NA	NA
20070797	William Lyon	HHNB ICU 7	12-14-2016 4:23:00 pm	1	👍	👍	👍	👍	NA	👍
20070103	Karl Hanselman	HHNB 4w19	12-14-2016 6:02:00 am	1	👍	👍	👍	👍	👍	👍
20079116	Mario Peca	10w05	12-14-2016 4:00:00 am	1	👍	👍	👍	👍	NA	NA
20070093	Ramila Patel	HHNB ED 29	12-14-2016 3:16:00 am	1	👍	👍	👍	👍	NA	NA
20070017	Judith Sochat	HHNB 1019	12-13-2016 9:57:00 pm	1	👍	👍	👍	👍	NA	NA

Sepsis Nurse

- Decrease cost of knowledge maintenance
- Increase specialization
- Increase speed of iteration

Sepsis Floor

- Decrease movement
- Decrease error
- Increase specialization
- Increase adaptation

Sepsis App

- Decrease cost of tracking/
data gathering
- Decrease cost of audits
- Decrease cost of maintenance
- Decrease cost of reporting

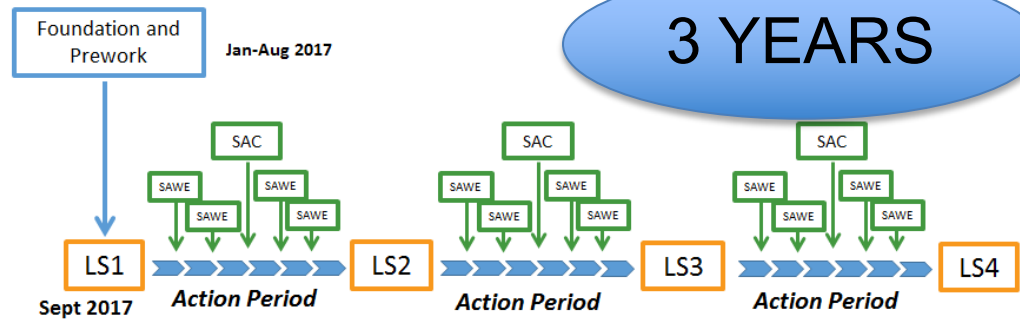
13 YEARS

Chasing Sepsis at Hoag

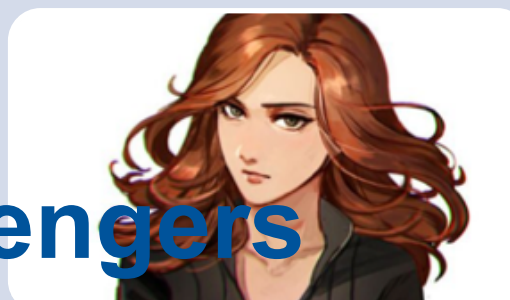
<p>2004</p> <ul style="list-style-type: none"> • Critical Care Unit • Focus = septic shock (DRG 870) • ICU staff <p>• ↓ Mortality 40% to 28%</p>	<p>2009</p> <ul style="list-style-type: none"> • SubICU/Tele/Med-Surg • Triage, 3 Protocols • Hospitalists/OR/RRT/Sepsis Nurse <p>• ↓ Mortality 28% to 14% (p<0.05)</p> <p>• ↓ Cost \$28K to \$21K</p>	<p>2012-2013</p> <ul style="list-style-type: none"> • Emergency Department • ED Staff/Nurses • ED Protocol & Order Sets <p>• ↓ Mortality to 11.5%</p> <p>• ↓ Cost to 15K</p>	<p>2014-2015</p> <ul style="list-style-type: none"> • Care path/Pt. movement • SNF Readmission • End of life/Long-term vent • Advanced analytics <p>• ↓ Mortality to 10%</p> <p>• Cost \$9.5K</p>	<p>2016</p> <ul style="list-style-type: none"> • Sepsis floor • Mass Customization • Sepsis App • Patient experience • Readmission work <p>• \$11M in savings (Baseline 2013)</p>
--	---	--	--	---



3 YEARS



Spreading across a region: is it a one off?



Core Team: Sepsis Avengers

Vision

Andre
Vovan

Plan

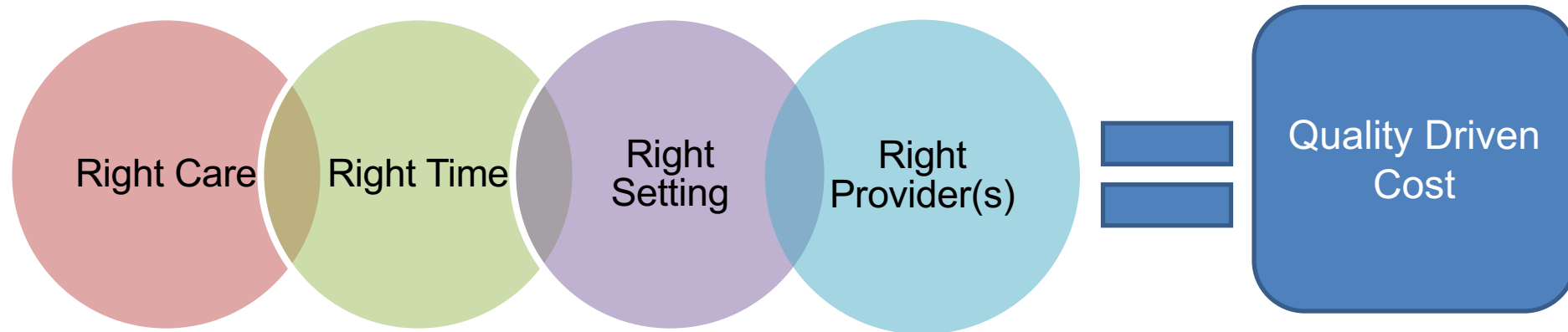
Erin
Jasper

Connect

Tammy
Alvarez

Execute

Robin
Myran



Core Design and Operational Themes

Mass Customization

Fail Fast Fail Cheap

If you want to go fast, go alone,
if you want to go far, go together

Getting Physicians on board w/ Mass Customization



Craftsman Production

Master craftsman

Art of medicine

High cost product/
service created for
individuals

Mass Production

Break process into
repeatable steps

Cookbook medicine/
One size fits none

Low cost
product/Service for
Mass

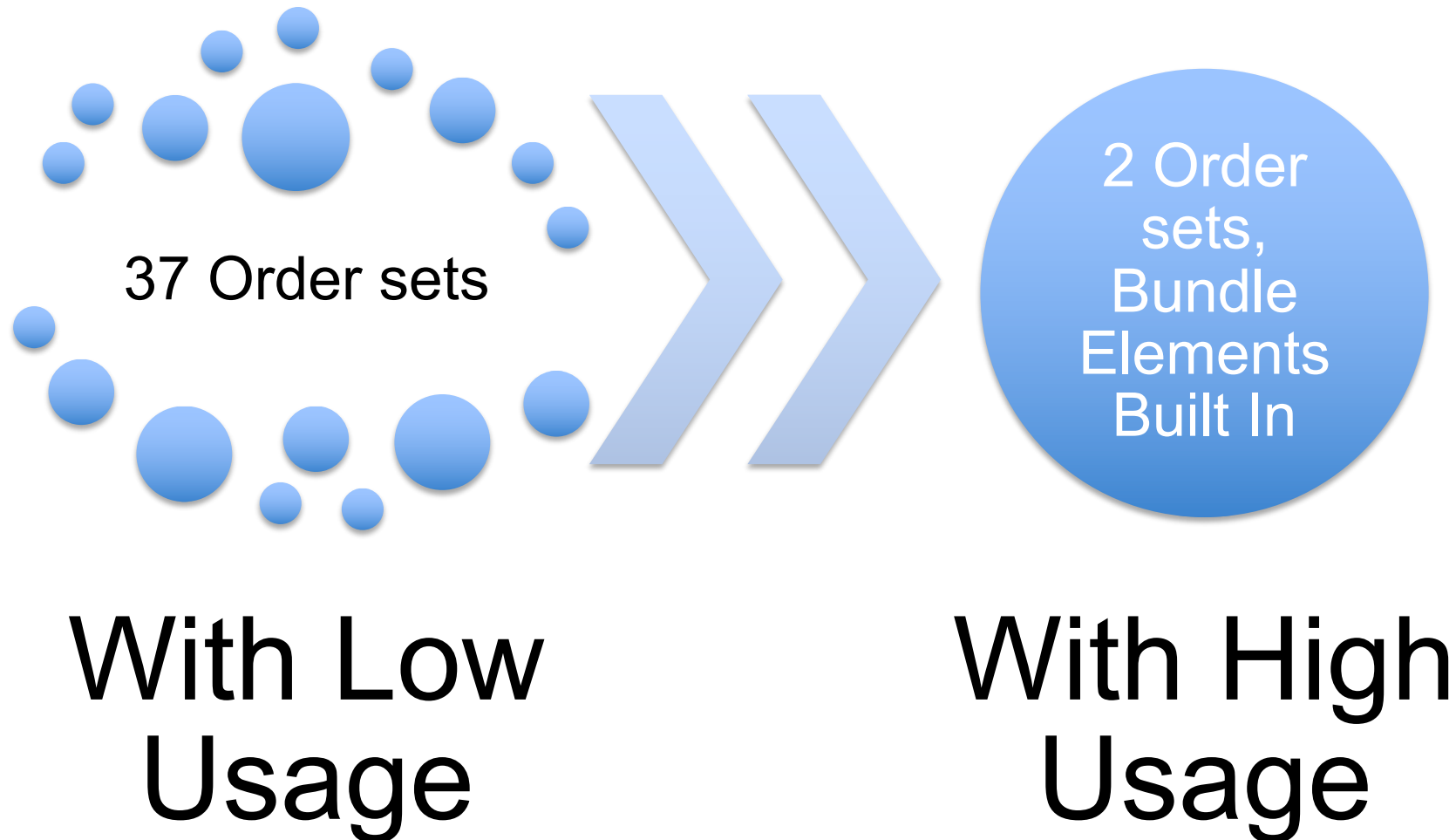
Mass Customization

Modularization, push
out point of
differentiation

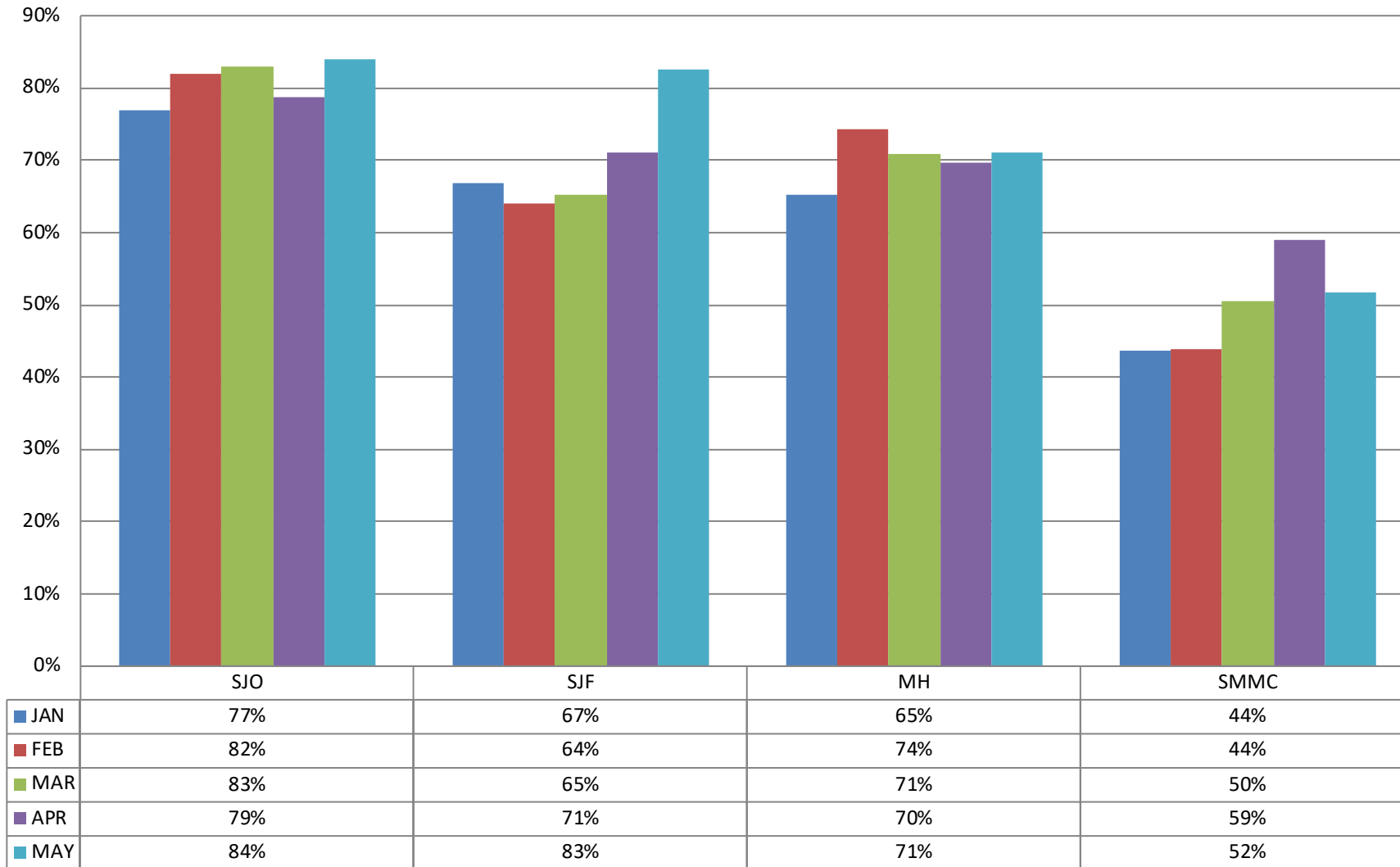
One Size fits me
medicine

Low cost, high quality,
customized
product/service

Applying Mass Customization and “fail fast, fail cheap” to Sepsis Order Sets:



OS Usage Overall - SoCal - 2017



**Standard Order
Sets for Sepsis
(ED and
Inpatient)
37 to 2**

**Common Data
Report; standards
and definitions for
measuring
success**

**common tool for
screening and
documenting
sepsis**

**Approval from
So Cal and
NorCal CEOs for
Sepsis RN
function**

**500+ lives saved,
\$8.5M saved in
cost/case**

P23

System Spread : Overcoming Dependencies | Constraints

How can change spread politically

How can clinical change spread

How can we speed up adoption and work for future efforts

Business Case and ROI

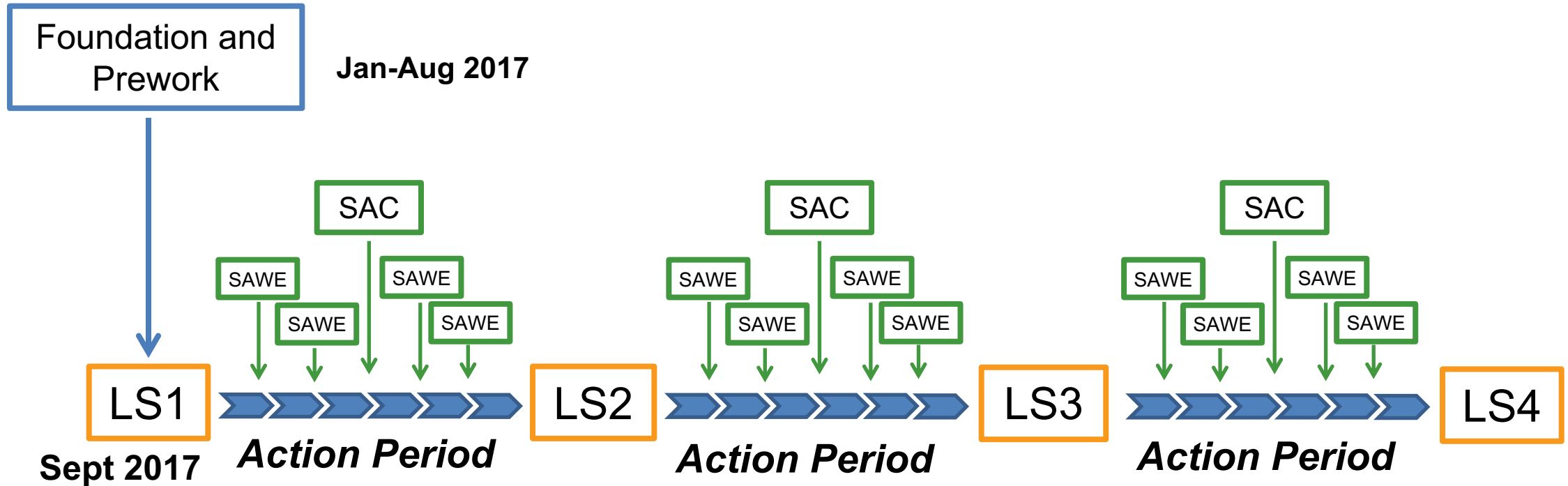


Name	Yr 1	Y2	Y3	Total	ROI
ST. JOHN'S HEALTH CENTER	\$ 181,787	\$ 242,687	\$ 303,587	\$ 728,060	30 x
LITTLE CO OF MARY HOSPITAL TORRANCE	\$ 417,005	\$ 356,934	\$ 496,634	\$ 1,270,572	53 x
LCM SAN PEDRO HOSPITAL	\$ 163,877	\$ 218,777	\$ 273,677	\$ 656,330	27 x
PROV HOLY CROSS MEDICAL CTR	\$ 463,869	\$ 397,047	\$ 552,447	\$ 1,413,363	59 x
PROV TARZANA MEDICAL CENTER	\$ 380,289	\$ 325,507	\$ 452,907	\$ 1,158,703	48 x
PROV ST JOSEPH MEDICAL CTR	\$ 445,362	\$ 381,206	\$ 530,406	\$ 1,356,974	56 x
ST PETER HOSPITAL	\$ 365,663	\$ 312,988	\$ 612,500	\$ 1,291,150	58 x
CENTRALIA HOSPITAL	\$ 251,337	\$ 335,537	\$ 421,000	\$ 1,007,874	46 x
PROV EVERETT MED CTR PACIFIC CAMPUS	\$ 837,591	\$ 484,035	\$ 997,533	\$ 2,319,159	105 x
EDMONDS MAIN BLDG	\$ 365,066	\$ 312,477	\$ 609,666	\$ 1,287,208	58 x
ISSAQUAH MAIN BLDG	\$ 178,205	\$ 237,905	\$ 162,683	\$ 578,792	26 x
BALLARD MAIN BLDG	\$ 58,506	\$ 78,106	\$ 69,678	\$ 206,290	9 x
FIRST HILL MAIN BLDG	\$ 566,553	\$ 484,939	\$ 946,153	\$ 1,997,645	90 x
CHERRY HILL MAIN BLDG	\$ 79,998	\$ 106,798	\$ 133,598	\$ 320,394	14 x
ST JOSEPHS HOSPITAL					
MOUNT CARMEL HOSPITAL	\$ 54,029	\$ 72,129	\$ 90,229	\$ 216,386	9 x
HOLY FAMILY HOSPITAL	\$ 360,588	\$ 308,644	\$ 429,444	\$ 1,098,676	46 x
SACRED HEART MEDICAL CENTER	\$ 678,789	\$ 581,007	\$ 808,407	\$ 2,068,203	86 x
ST PATRICK HOSPITAL	\$ 236,711	\$ 316,011	\$ 395,311	\$ 948,032	39 x
ST JOSEPH MEDICAL CENTER POLSO					
ST MARY MEDICAL CENTER	\$ 68,655	\$ 91,655	\$ 114,655	\$ 274,965	11 x
KADLEC REGIONAL MEDICAL CENTER	\$ 352,529	\$ 470,629	\$ 588,729	\$ 1,411,886	59 x
	\$ 8,472,326	\$ 8,184,123	\$ 11,716,949	\$ 28,373,397	40 x

Key Assumptions (factored into calculations):

- Travel to Learning Sessions based on how Region/SA is engaging
- Paying MDs to attend both Learning Sessions and Regional/Local Meetings
- Cost of providing additional robust analytics tools and the Sepsis Mobile App
- Ability to staff a dedicated Sepsis RN “function” at 1 FTE per every 1200 Sepsis Cases
- Assumed an increased cost per case reduction every year (\$200/\$300/\$400 per year)

Collaborative Framework – IHI Breakthrough Series



LS Learning Session: Every 6 months

SAC Service Area Collaborative: Every 6 months (midway between Learning Sessions)

SAWE Service Area WebEx: Monthly

Teach Improvement Science: Increase core competency of caregivers

Model for Improvement: Current State At-Scale

Current State Analysis

Focus Area or Tactic	SHS	PRMCE	PAMC	OR	SJH	EWM
Common Data Definitions/Tools	Red	Red	Red	Green	Green	Green
Documentation and Coding	Green	Red	Red	Green	Green	Red
Compliance to 3hr bundle	Red	Red	Red	Green	Green	Green
Compliance to 6hr bundle	Red	Red	Red	Green	Green	Red
Utilization/Creation/Modification of Sepsis Order Sets	Red	Green	Red	Green	Green	Red
Early identification of Sepsis	Red	Green	Red	Green	Green	Green
Overall workflow of the 1 st 6 hours	Red	Red	Red	Green	Green	Red
Use of a Sepsis RN/real-time technology to ensure bundle compliance	Red	Red	Red	Red	Green	Red
Feedback loop/mechanism for sharing sepsis performance	Red	Red	Red	Green	Green	Red
Hand-off of care between ED and critical care/floors	Red	Green	Green	Green	Green	Green
Post-6hr sepsis protocol	Red	Red	Red	Red	Red	Red
Triaging patients to appropriate level of care	Red	Green	Green	Red	Green	Green
Downgrading/transitioning patients to appropriate level of care	Red	Red	Green	Red	Red	Green
Overall patient flow of sepsis patients	Red	Red	Red	Red	Red	Red
Patient/Family education and expectation setting	Red	Red	Red	Green	Red	Red
Discharge process for sepsis patients	Red	Red	Green	Red	Red	Red
Post-acute partnerships	Red	Red	Red	Red	Red	Red
Post-Sepsis Syndrome	Red	Red	Red	Red	Red	Red
Palliative/End of Life Care	Red	Red	Green	Green	Red	Green

Phase I: First 6 hours
Strategic Impact: Mortality

Phase II: Flow of the Sepsis Patient through our System
Strategic Impact: Cost

Phase III: Discharge & Post-Acute Care
Strategic Impact: Readmissions & Pop Health

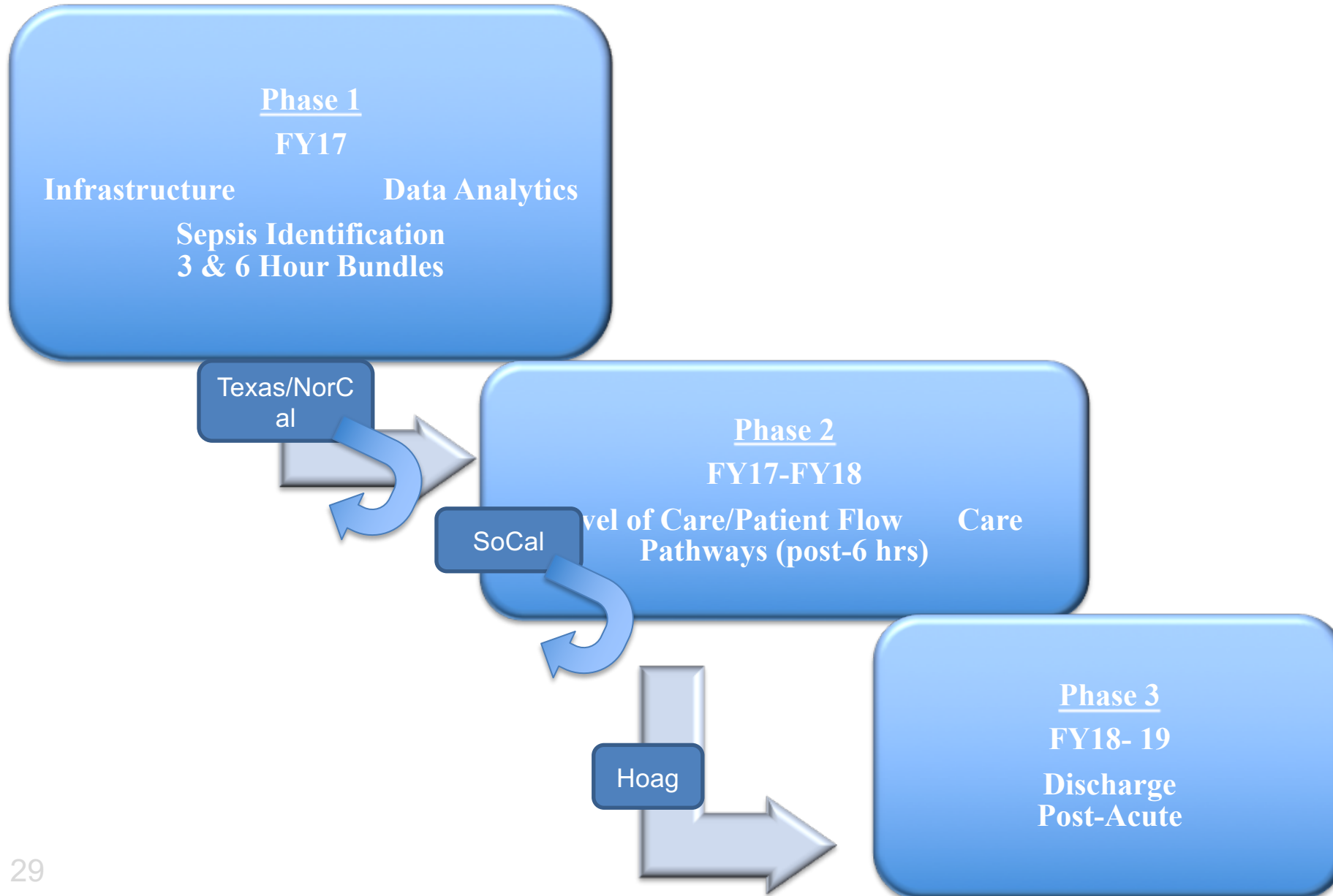
Creating Future State

Leverage point principle

Concentrate on solving the root causes that cost less to fix but affect more or have a bigger impact



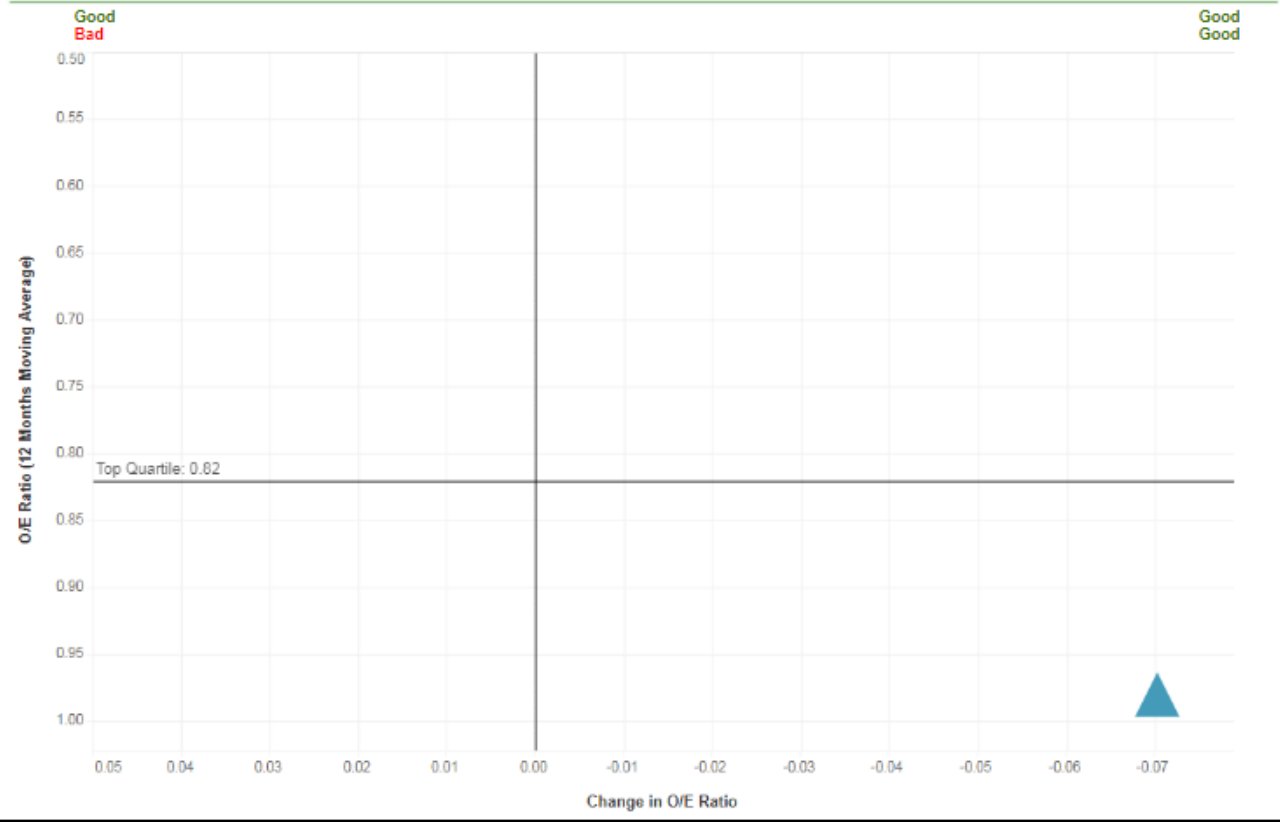
Sepsis Collaborative: A Phased Approach to “Fast Alone, Far Together”



Updated: January 2018

Select View
 Providence St. Joseph Health

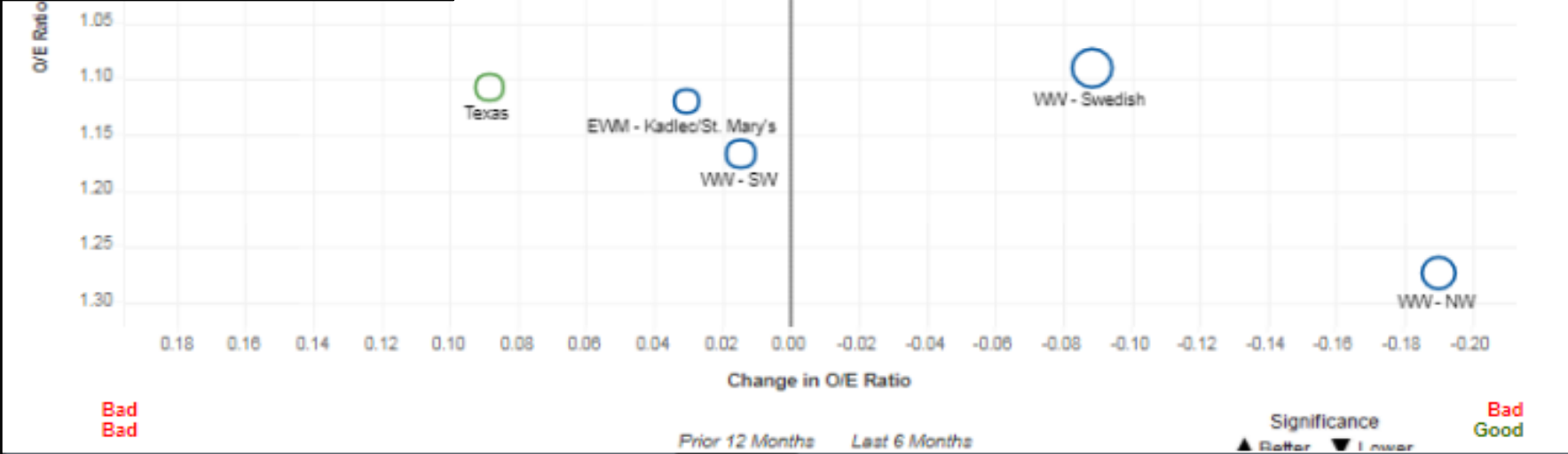
12MMA Ending
 November 2017



Sepsis Mortality French Plot
 12 Months Moving Average: Dec16 - Nov17
 Collaborative View

Select View
 Collaborative

12MMA Ending
 November 2017

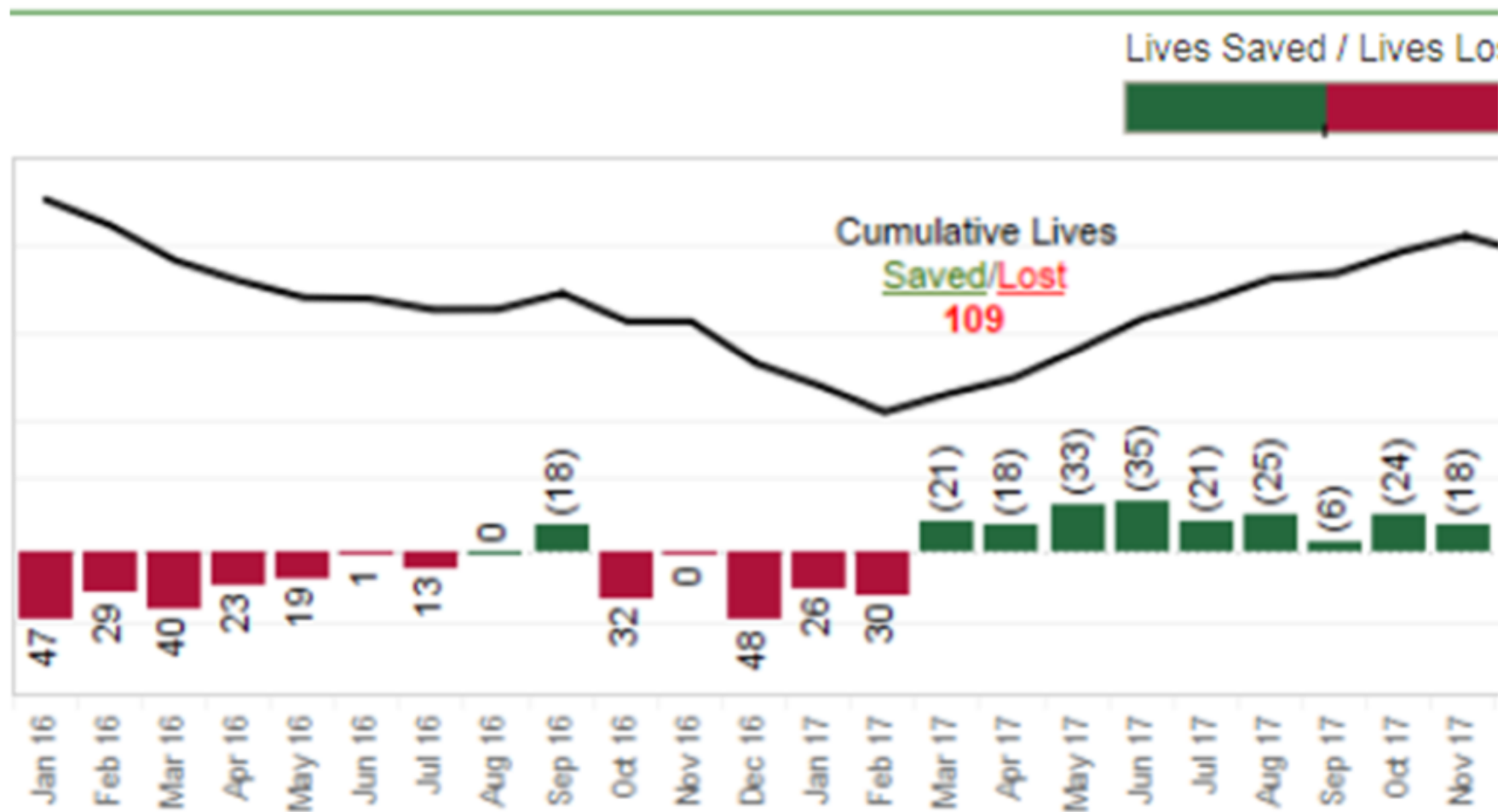


Bad
 Bad

Prior 12 Months Last 6 Months

Significance
 ▲ Better ▼ Lower

Bad
 Good



PSJH Targets/Projections

Results

Hoag (since 2009): Saved 1300 Lives and \$13M

Legacy St. Joseph Health (since 2015): Saved > 500 lives
and \$8M

- Current System O:E: 1.0 → Top Quartile Target: 0.82 (18% decrease)
- Cumulative cost/case savings \$28M