Implementation of a Multidisciplinary Sepsis Pathway

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Sepsis Pop Quiz

- Out of the 1,298 mortalities at Vidant Medical Center in the calendar year 2014, what percent were sepsis- related?

Aims

- **Global**
  - Improve health outcomes for patients (≥18 years) with sepsis
- **Specific**
  - Decrease sepsis mortality for adult patients at VMC by 10% over a year by implementation of a multidisciplinary sepsis pathway
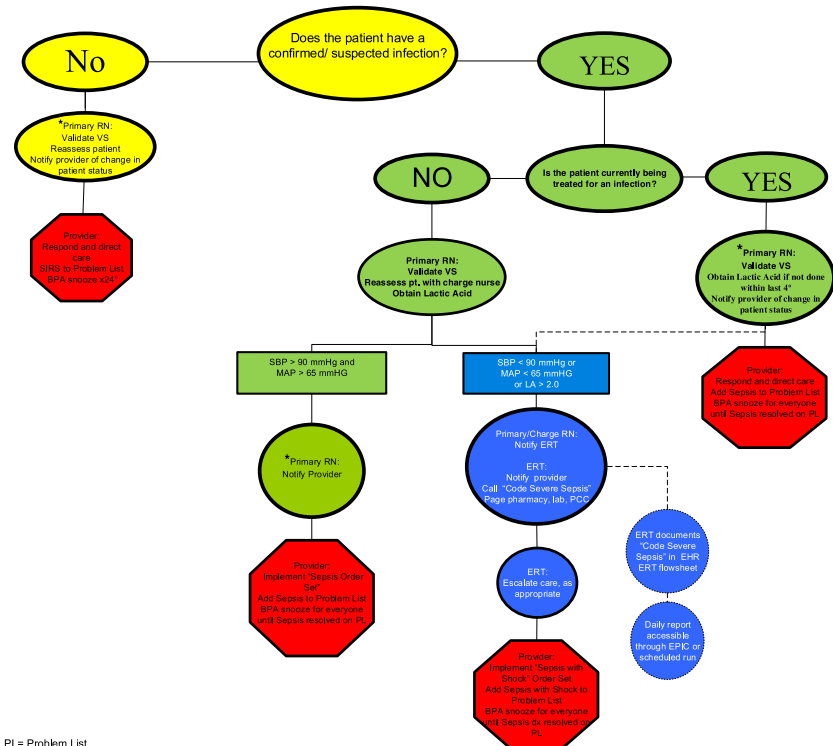
Collaborative Team Members

- Ismail Kassim, MS2
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- Hazel Pennington, RN
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- Christy Harding, Nurse Manager 3 East
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- Myra Lewis, Nurse Manager, SIU
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- Dawn Jones , Lab Manager
- Patricia Denton, RN (Emergency Response Team: ERT)

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VIDANT HEALTH

Initial Multidisciplinary Sepsis Pathway: December 2014

- Systemic inflammatory response syndrome (SIRS) Best Practice Alert

- Sepsis and Sepsis with Shock Order Set (OS) Usage

- Standardized communication between Nurse-MD-ERT team

VMC Sepsis Pathway

Does the patient have a confirmed/ suspected infection?

No

*Primary RN:
Validate VS
Reassess patient
Notify provider of change in patient status

Provider:
Respond and direct care
SIRS to Problem List
BPA snooze x24*

YES

Is the patient currently being treated for an infection?

NO

Primary RN:
Validate VS
Reassess pt. with charge nurse
Obtain Lactic Acid

YES

*Primary RN:
Validate VS
Obtain Lactic Acid if not done within last 4*
Notify provider of change in patient status

SBP > 90 mmHg and MAP > 65 mmHG

SBP < 90 mmHg or MAP < 65 mmHG or LA > 2.0

Provider:
Respond and direct care
Add Sepsis to Problem List
BPA snooze for everyone until Sepsis resolved on PL

*Primary RN:
Notify Provider

Primary/Charge RN:
Notify ERT

ERT:
Notify provider
Call "Code Severe Sepsis"
Page pharmacy, lab, PCC

ERT documents "Code Severe Sepsis" in EHR ERT flowsheet

Provider:
Implement "Sepsis Order Set"
Add Sepsis to Problem List
BPA snooze for everyone until Sepsis resolved on PL

ERT:
Escalate care, as appropriate

Daily report accessible through EPIC or scheduled run

Provider:
Implement "Sepsis with Shock" Order Set
Add Sepsis with Shock to Problem List
BPA snooze for everyone until Sepsis dx resolved on PL

PL= Problem List
PCC= Patient Care Coordinator
ERT= Emergency Response Team

*RN to notify ERT whenever clinically appropriate

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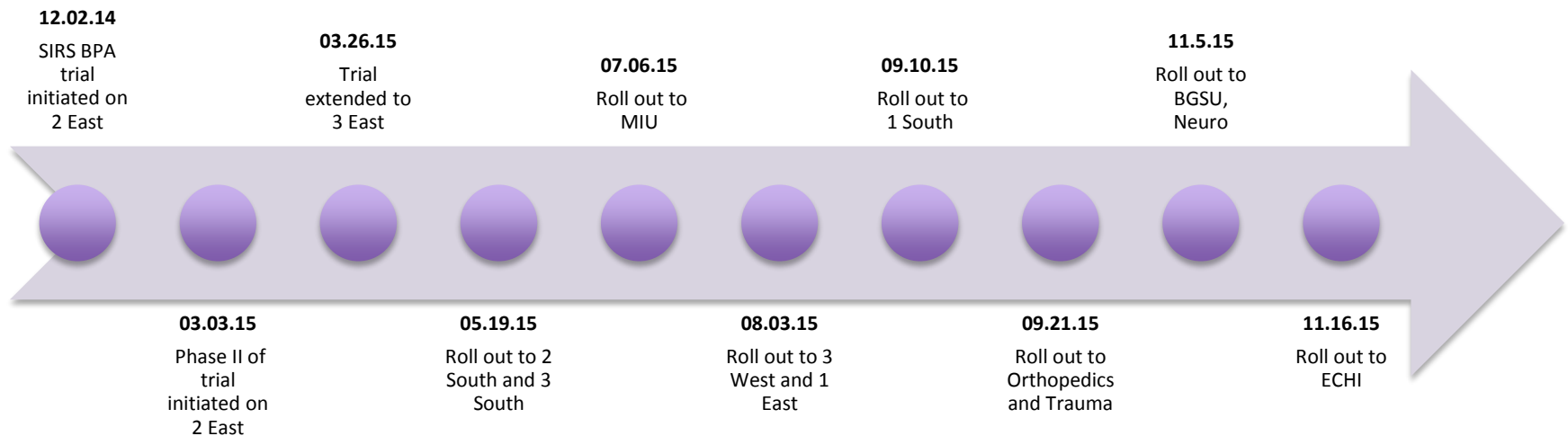Brody School of Medicine

VIDANT HEALTH

First PDSA Cycle

- Pathway implementation began on a single unit (2 East) in 12.2.2014
- Pilot provided opportunity for data and frontline staff feedback
- Changes made:
    - Revision of BPA parameters
    - Revision to pathway
    - Medical Executive Committee approved Lactic Acid(LA) protocol
    - Automatic notification of ERT by lab for LA value >2
    - Refining audit and feedback reports to staff

Ready to roll-out to next unit...

- Pathway revised and implemented on second unit (3 East) in March 2015
- Subsequent units went live every 4-6 weeks
  - **Just-in-time** training to staff and providers
  - Training led by **unit leadership:** train the trainer
  - ERT support during roll-out
  - **Audit and feedback reports** provided to unit leadership
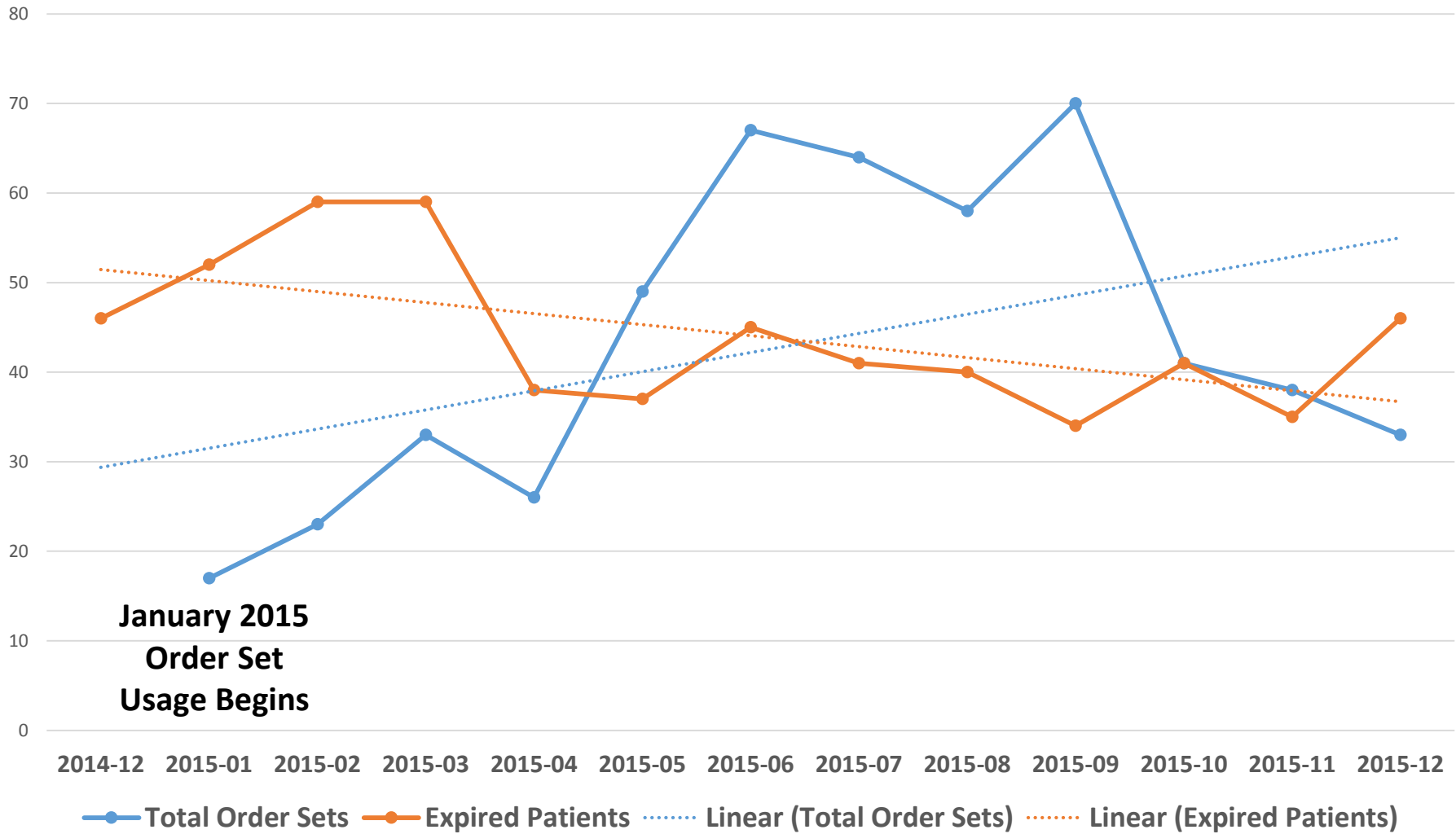
VMC Implementation: Sepsis Pathway Timeline

12.02.14
SIRS BPA trial initiated on 2 East

03.26.15
Trial extended to 3 East

07.06.15
Roll out to MIU

09.10.15
Roll out to 1 South

11.5.15
Roll out to BGSU, Neuro

03.03.15
Phase II of trial initiated on 2 East

05.19.15
Roll out to 2 South and 3 South

08.03.15
Roll out to 3 West and 1 East

09.21.15
Roll out to Orthopedics and Trauma

11.16.15
Roll out to ECHI

Outcomes

- Leading Indicators
  - OS Usage
  - ERT Response to pts with LA value >2
- Lagging Indicators
  - Mortality
  - Length of Stay (LOS)
  - ICU Utilization

Sepsis Order Set Utilization
v.
Expired Sepsis Patients
January 2015- December 2015

January 2015

Order Set

Usage Begins

| | 2014-12 | 2015-01 | 2015-02 | 2015-03 | 2015-04 | 2015-05 | 2015-06 | 2015-07 | 2015-08 | 2015-09 | 2015-10 | 2015-11 | 2015-12 |

━━●━━ **Total Order Sets**   ━━●━━ **Expired Patients**   ·········· **Linear (Total Order Sets)**   ·········· **Linear (Expired Patients)**

Leading Indicator:
Timely Interventions*

	Nov-15	Dec-15	Jan-16	2/1-15/2016	Total
Lactic Acid >2	79	106	166	126	351
#Patients	50	81	94	87	225
Intravenous Fluids	12	18	24	18	54
Antibiotics (start or change)	8	5	11	5	24
Vasopressor Therapy	1	3	1	0	5
Escalation of Care (IU or ICU)	6	8	8	4	22
Non-Sepsis Diagnosis	12	17	21	22	50
Palliative Care Decision	1	2	0	0	3

*ERT and Lab Collaboration

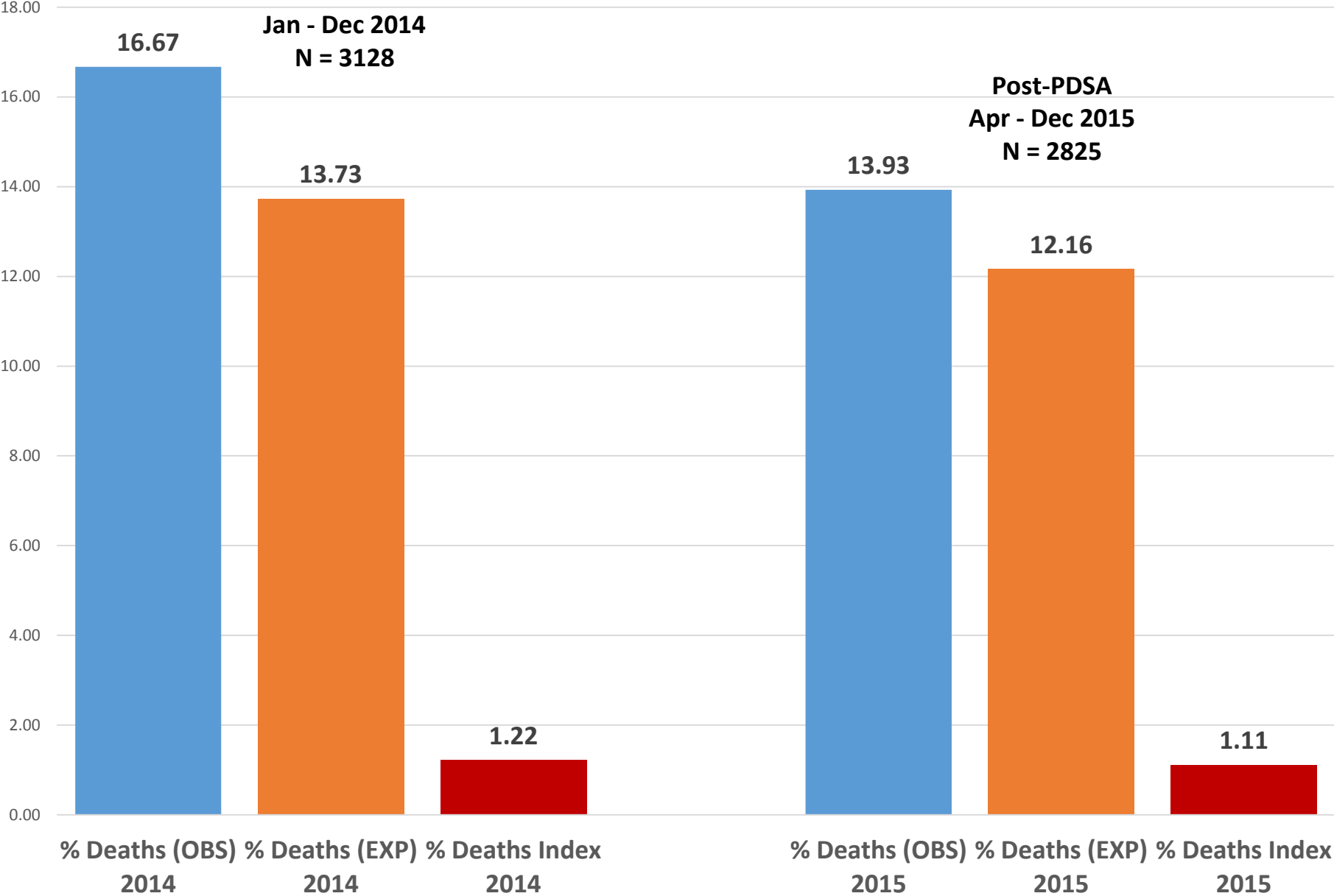Sepsis Observed Mortality Trends
January 2014-December 2015
2014 N = 3128 , 2015 N = 3788
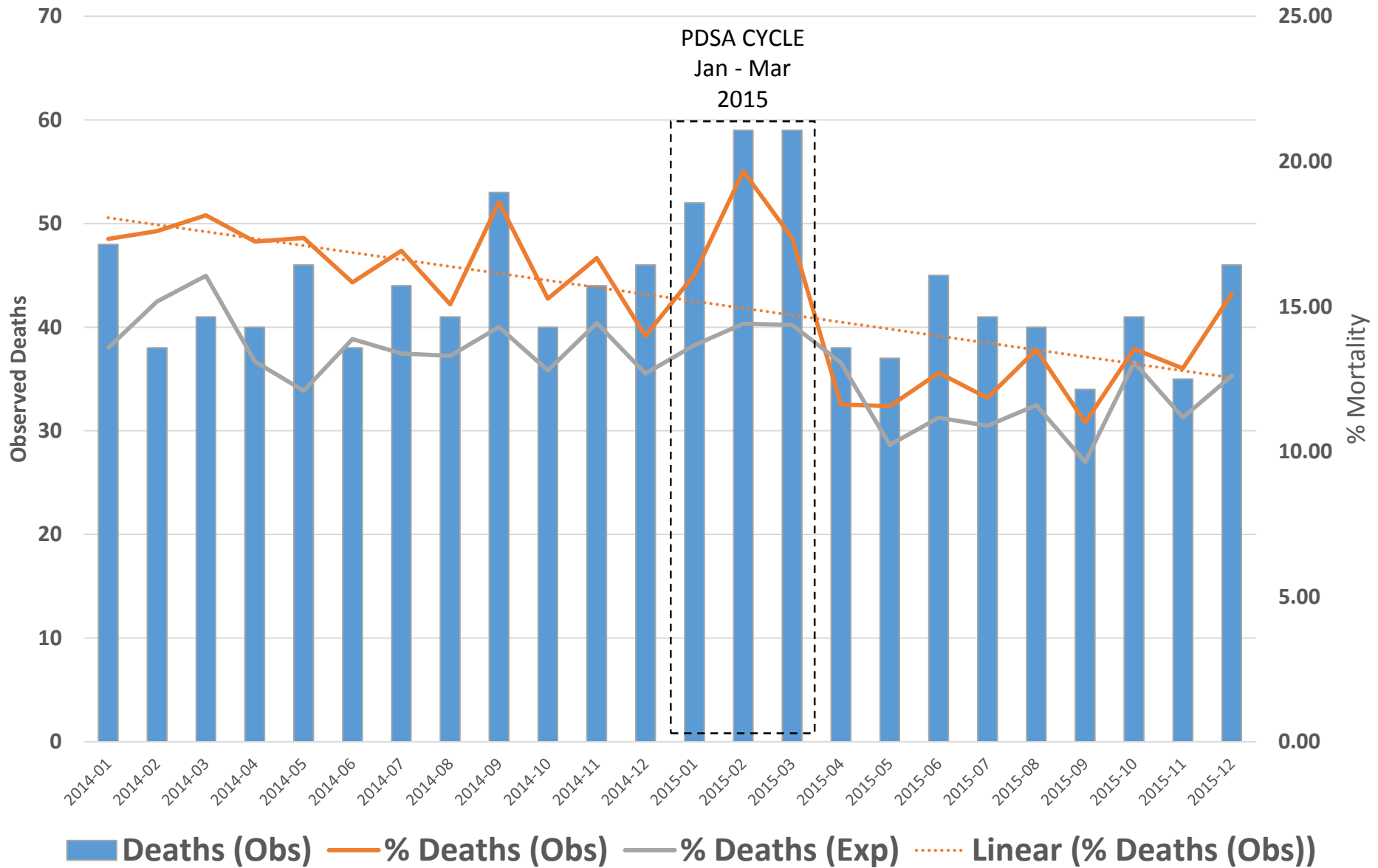
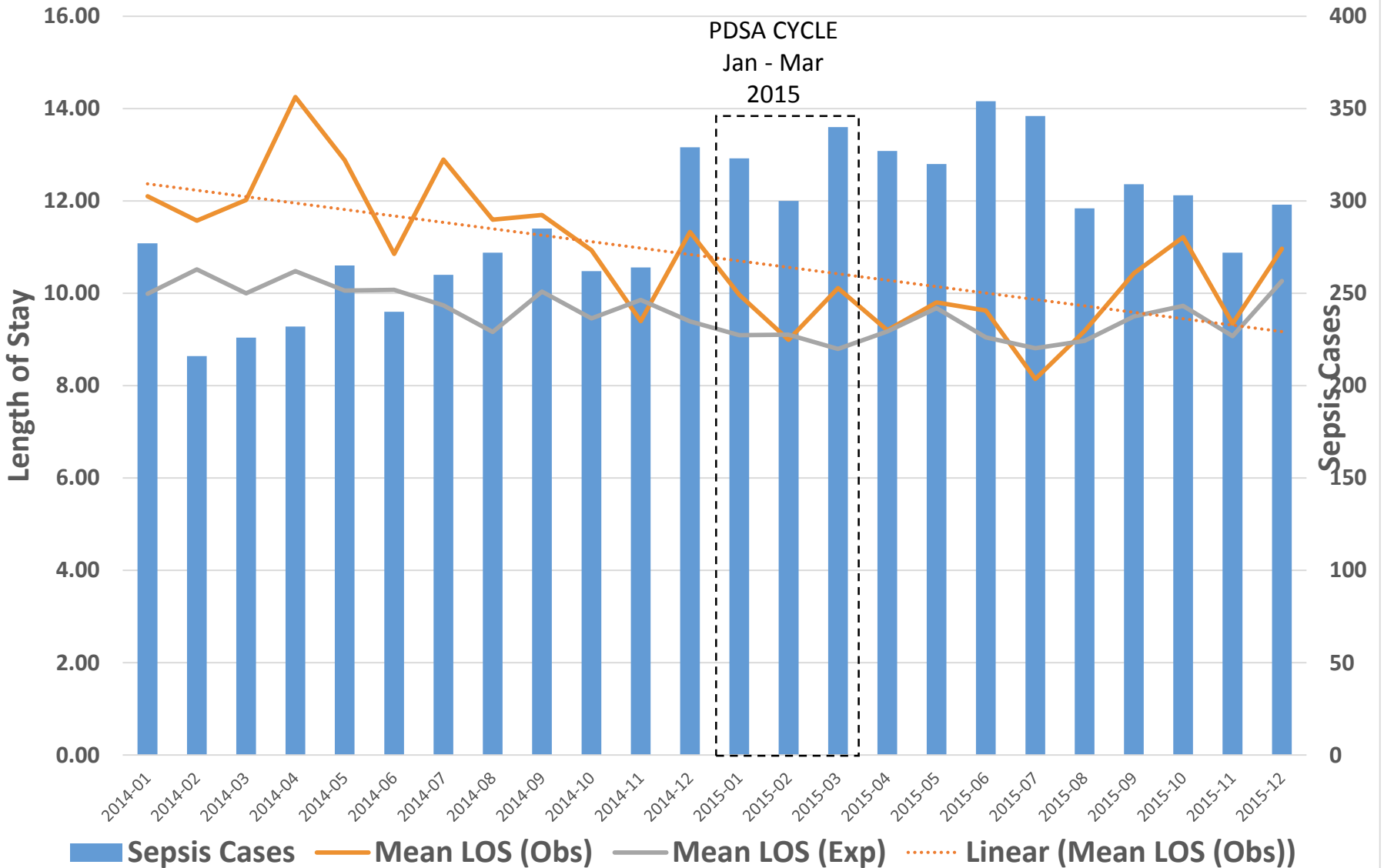Vidant Health Sepsis Intervention Improvement Project

Sepsis Mortality

Jan - Dec 2014
N = 3128

Post-PDSA
Apr - Dec 2015
N = 2825

	2014	2015
% Deaths (OBS)	16.67	13.93
% Deaths (EXP)	13.73	12.16
% Deaths Index	1.22	1.11
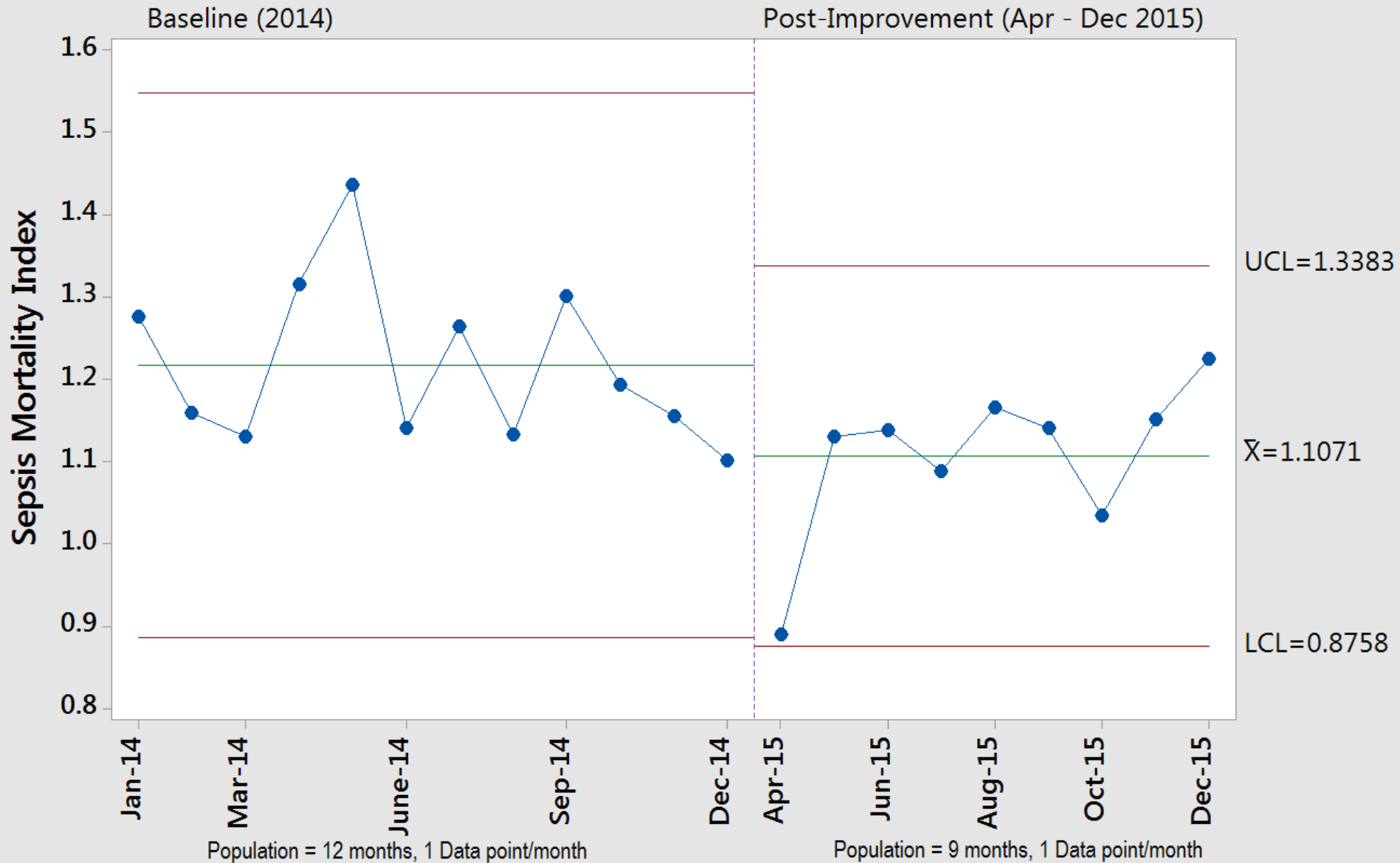
Impact

Lives Saved Based on Improvement			
	Deaths	Total Cases	Mortality Rate
Calendar Year 2014 (Baseline)	519	3128	16.59%
Calendar Year 2015	527	3788	13.91%
2015 Intervention (April-December)	357	2825	12.64%

% Change, Baseline to Intervention =	*-3.95%*

Estimated lives saved based on intervention (3.95% X 2825 cases)	**112**

Sepsis LOS Trends
Jan 2014-Dec 2015
2014 N = 3128 , 2015 N = 3788

Sepsis LOS

11.79	Jan - Dec 2014
	N = 3128
9.90	

Post-PDSA
Apr - Dec 2015
N = 2825

9.77

9.36

1.19

1.04

Avg LOS (OBS) 2014   Avg LOS (EXP) 2014   LOS Index 2014   AVG LOS (OBS) 2015   AVG LOS (EXP) 2015   LOS Index 2015

ICU Utilization

- % ICU Cases 2014 — Jan - Dec 2014: **39.23**
- % ICU Cases 2015 — Post-PDSA Apr - Dec 2015: **33.17**
- Mean ICU Days 2014 — Jan - Dec 2014: **7.17**
- Mean ICU Days 2015 — Post-PDSA Apr - Dec 2015: **6.35**
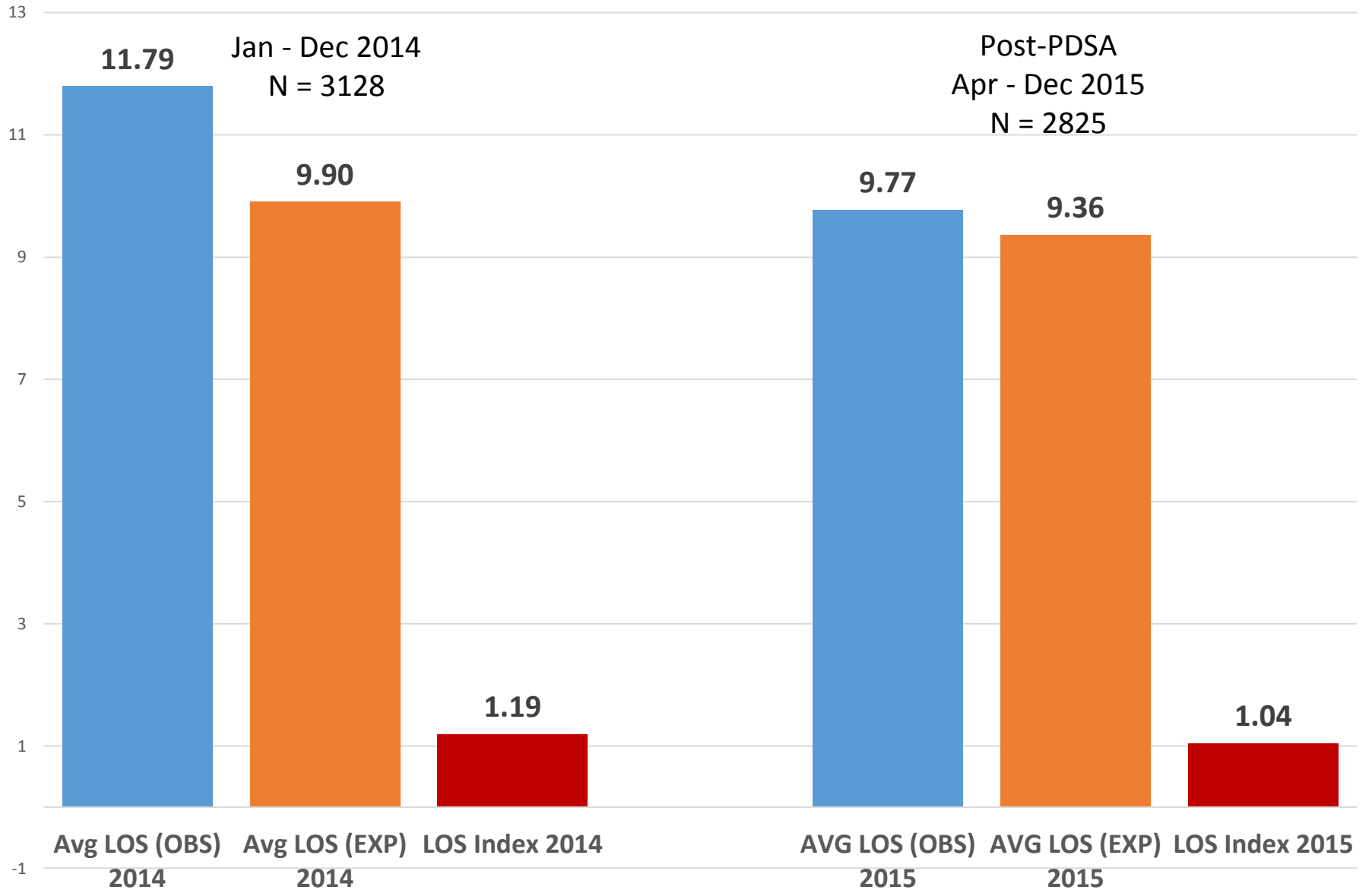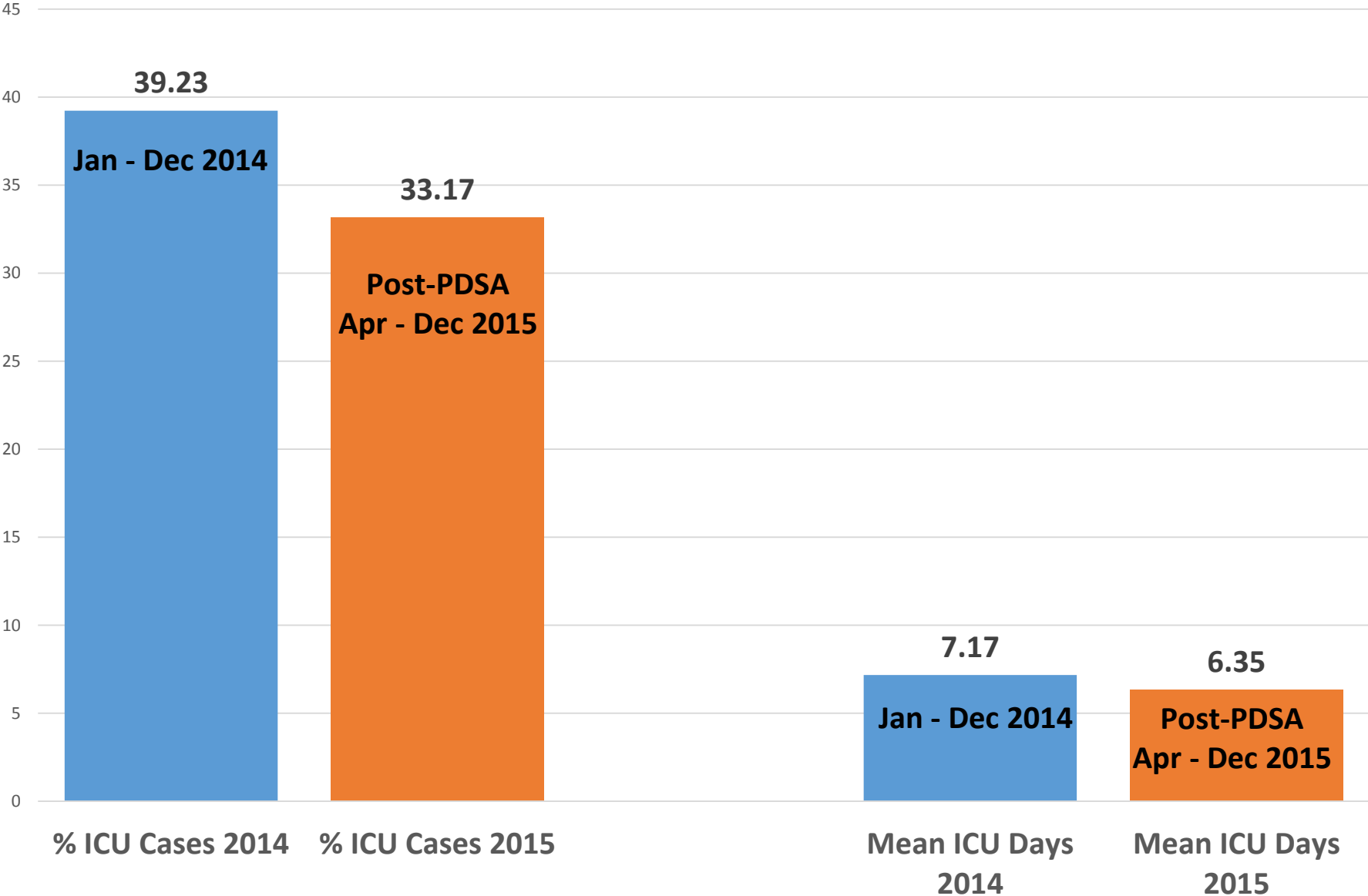
Strengths

- Support from executive leadership
- **Engagement** from physician and unit leadership
- **Unit-by-unit rollout** instead of big bang
- Dedicated ERT available to support staff
- Automatic lab alert to ERT
- **Audit and feedback** to frontline staff

Lessons Learned

- Balancing benefits of alerts with concerns of alarm fatigue

- Protocol is not a substitute for clinical reasoning

- Necessity of clear communication between frontline staff

Potential Impact

- **Decrease mortality and save lives***
  - 112 Lives Saved

- **Decreased ICU utilization and LOS***
  - 171 fewer pts went to ICU
  - 768 fewer ICU days

*projected based on data from April- December 2015

Questions?

BPA Changes

Patients admitted between 12/2/14 and 12/31/14 and coded by 1/7/15 on 2 East

	BPA: 3 /4 SIRS Criteria	BPA: *Modified 2/4 SIRS Criteria
BPAs Fired	2609	6515
Patients Alerted On	896	1581
Sepsis Detected	124	276
Percent of Patients with Sepsis Diagnosis Detected	45%	100%

*Exclusion of heart rate and
respiratory rate combination

Audit and Feedback

Sepsis Alerts Detail Report — *VIDANT MEDICAL CENTER*

BPA Date: 3/26/2015

HAR	Alert	Date/Time	Order Set?	Prob List Entry after	Pt. Expired?	User	User Title	Department			
	SEPSIS IP DETECTION CP/NA BPA	3/26/15 20:50	N	N	N	BARRETT, ANITA T	ANA	3EAS-PIT	02/20/15- 58 yo M hx aids, HTN, pna, CHF, prison inmate- cc SOB- dx'd PJP- SIRS BPA hypothermia, tachycardia, tachypnea- tx'd clindamycin, ceftriaxone, cefepime, azithromycin, bactrim	RN and CP documented in pertinent findings. Good job!	Provider needs to add Sepsis POA on problem list
	SEPSIS IP DETECTION MD BASE	3/26/15 20:53	N	N	N	SHULER, MARC WESLEY	NP	3EAS-PIT			
	SEPSIS IP DETECTION RN BASE	3/26/15 21:35	N	N	N	GOFF, ABBY E	RN	3EAS-PIT			
	SEPSIS IP DETECTION CP/NA BPA	3/26/15 6:50	N	N	N	FULFORD, TAKIA	NA	3EAS-PIT	03/17/15- 55 yo M hx dementia- cc increased agitation and agression- SIRS criteria - leukocytosis, tachycardia, tachypnea- tx'd with vancomycin and piperacillin	No documentation by RN or CP	No documentation by provider
	SEPSIS IP DETECTION MD BASE	3/26/15 7:04	N	N	N	NORMAN, CHRISTOPHER	PA-C	3EAS-PIT			
	SEPSIS IP DETECTION CP/NA BPA	3/26/15 20:38	N	N	N	EDWARDS, KEYONA S	CP	3EAS-PIT	03/20/15- 93 yo M hx HTN, DM, HF, prostate ca, Asthma, hypothyroid- cc N&V, SOB- dx'd - SIRS BPA hypothermia,	No documentation by RN or CP	Provider needs to add Sepsis POA on problem list- Has SIRS d/t gram
	SEPSIS IP DETECTION MD BASE	3/26/15 20:43	N	N	N	SHULER, MARC WESLEY	NP	3EAS-PIT			
	SEPSIS IP DETECTION MD BASE	3/26/15 20:44	N	N	N	SHULER, MARC WESLEY	NP	3EAS-PIT			
	SEPSIS IP DETECTION RN BASE	3/26/15 20:54	N	N	N	SHAW, LINDSAY	RN	3EAS-PIT			
	SEPSIS IP DETECTION CP/NA BPA	3/26/15 16:22	N	N	N	THOMAS, SHARON	CP	FAMILY MEDICINE-PIT	03/22/15- 54 yo F hx depress, HTN, fibromyalgia, sleep apnea- cc low grade fever, HA, N&V, muscle aches- dx'd UTI and AKI- SIRS BPA hyperthermia,	No documentation by RN or CP	Provider needs to add Sepsis POA on problem list- Has SIRS +UTI in ED note
	SEPSIS IP DETECTION RN BASE	3/26/15 16:47	N	N	N	HARRISON, LAUREN N	RN	FAMILY MEDICINE-PIT			
	SEPSIS IP DETECTION MD BASE	3/26/15 16:51	N	N	N	BRAY, EMILY L	MD	FAMILY MEDICINE-PIT			
	SEPSIS IP DETECTION MD BASE	3/26/15 13:30	N	Y	N	FREDERICK, ANDRE'D	MD	3EAS-PIT	03/22/15- 79 yo F hx COPD, emphysema, CHF, DM, HTN, Asthma- dx'd with COPD with acute bronchitis- SIRS BPA	No documentation by RN or CP	Provider needs to add Sepsis POA on problem list
	SEPSIS IP DETECTION RN BASE	3/26/15 17:10	N	Y	N	MCDOUGAL, KIMBERLY J	RN	3EAS-PIT			
	SEPSIS IP DETECTION RN BASE	3/26/15 9:07	N	N	N	WHITE JR, WALTER O'NE	RN	3EAS-PIT		No documentation by RN- CP documented well. Good job!	

Updated Multidisciplinary Sepsis Pathway

- **SIRS Best Practice Alert set at Modified 2/4 criteria**
- Sepsis and Sepsis with Shock Order Set (OS) Usage
- **Lactic Acid (LA) Protocol**
- **Automatic Lab Notification of ERT for LA value >2**
- Standardized communication between Nurse-MD-ERT team
- **"Is It Sepsis?" education card embedded in pathway**