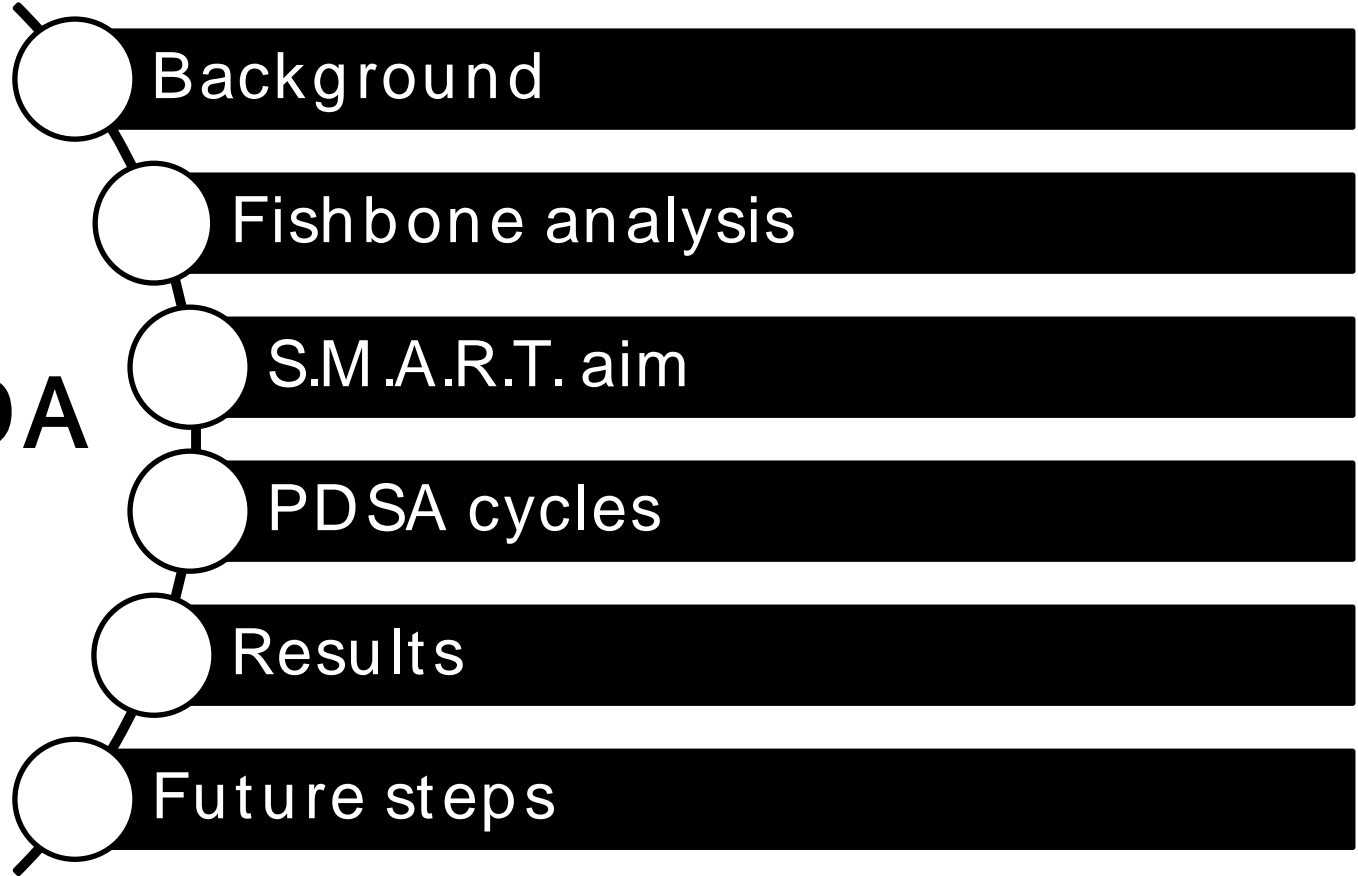


REDUCTION OF UNPLANNED EXTUBATIONS IN THE NICU

Speaker: Srirupa Hari Gopal MD
PI: Yuvraj Kalra MD, Anuj Sinha DO
Department of Pediatrics,
University of Tennessee College of Medicine Chattanooga



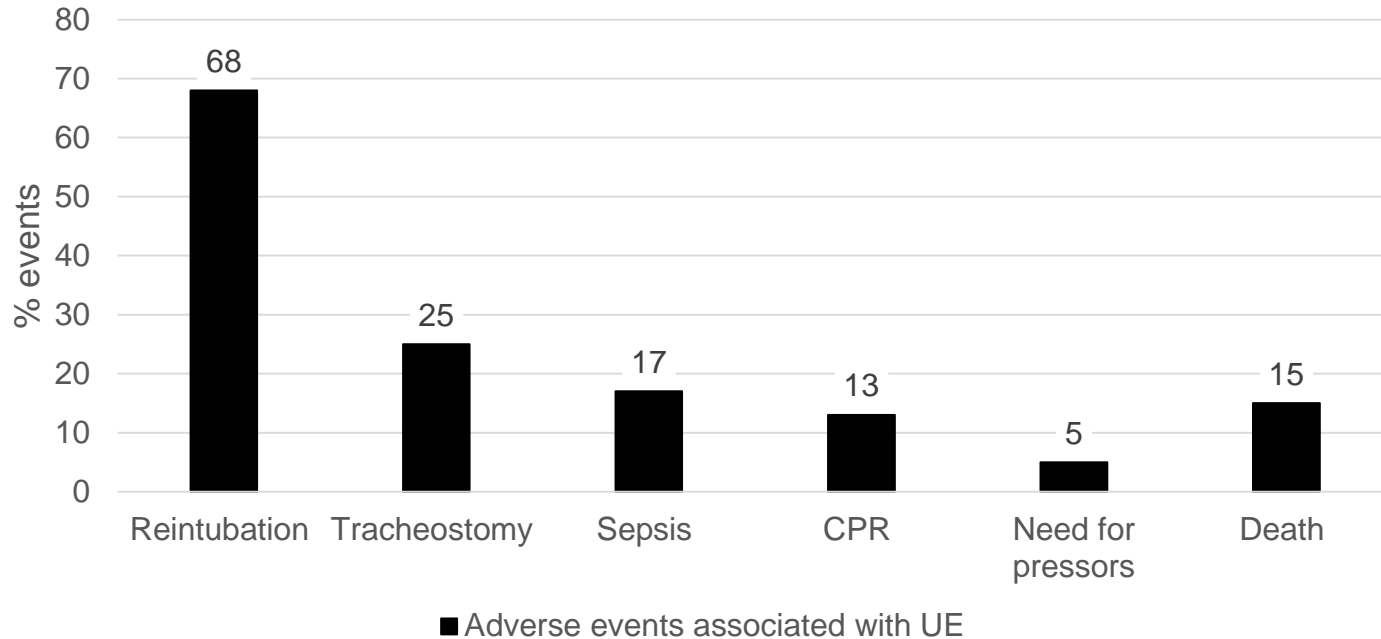
AGENDA



Unplanned extubations are defined as the inadvertent dislodgement of an endotracheal tube in a pediatric patient

- Children's Hospitals' Solutions for Patient Safety (SPS)
<https://www.solutionsforpatientsafety.org/>

Adverse events associated with UE



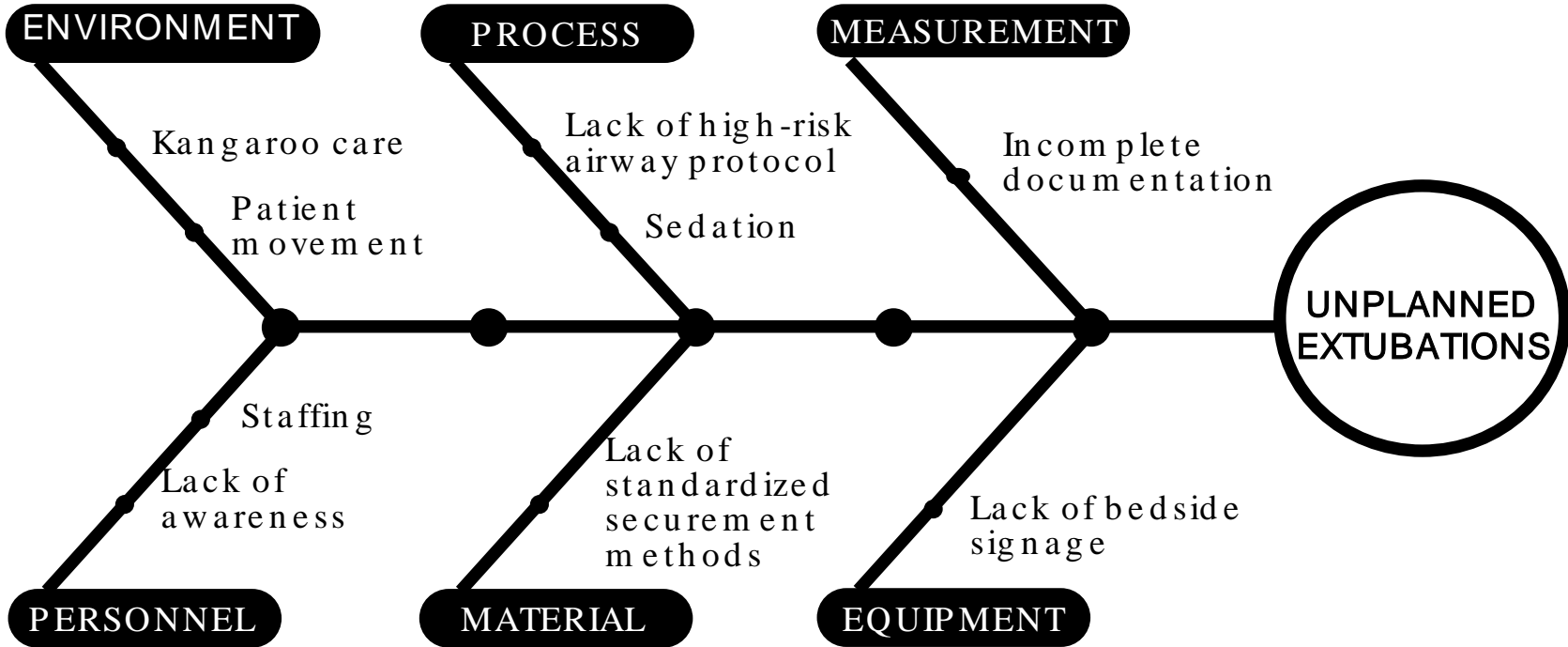
Respir Care. 2019 Dec;64(12):1500-1507. doi: 10.4187/respcare.06721. Epub 2019 May 28.

The Adverse Impact of Unplanned Extubation in a Cohort of Critically Ill Neonates.

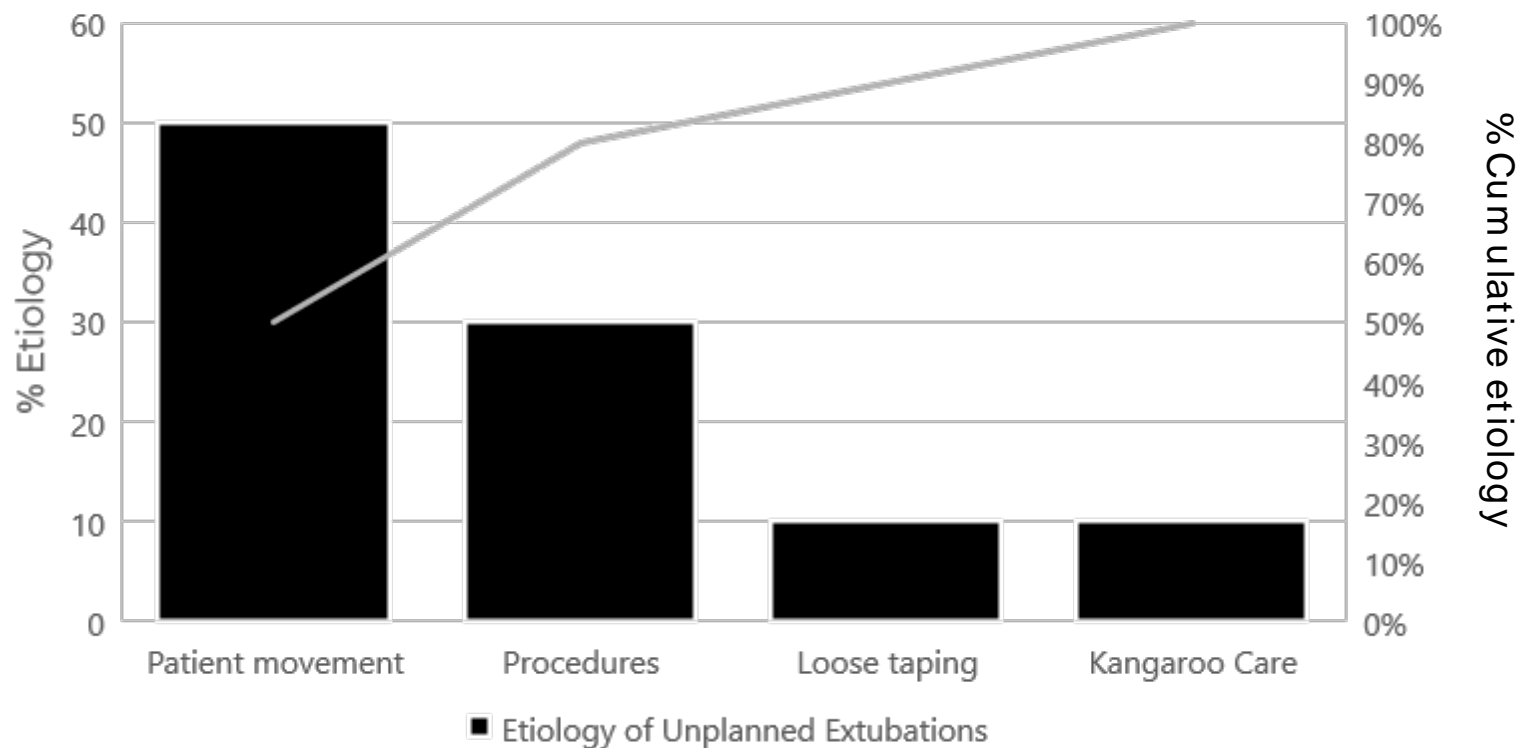
Kambestad KK^{1,2}, Huack A³, Nair S^{1,4}, Chapman R^{1,4}, Chin S^{1,4}, Langga L⁵, Mounger E⁴, Guerrero E⁵, Iyer NP^{6,4}.

Background

- Level IV academic NICU (Average ~52 patients/day)
- Average mechanical ventilator days : 236 days/month
- Average admissions per year: ~800
- Average UE rate Jan-May 2018: 4/ 100 vent days (9/month)
- **Core process intervention period:** June 2018- January 2019
- **Post- intervention period:** February 2019-February 2020



Etiology of Unplanned Extubations

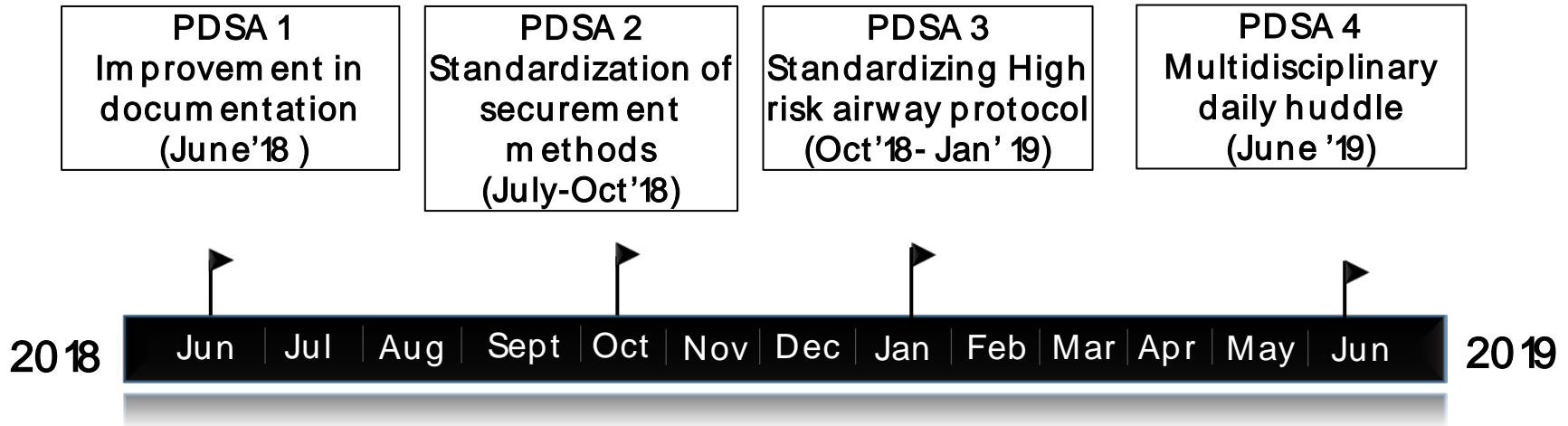


S.M.A.R.T. AIM

(Specific, Measurable, Attainable, Relevant, Time-based)

To reduce the rate of unplanned extubations in the NICU per SPS standards of <1 per 100 ventilator days by December 2020.*

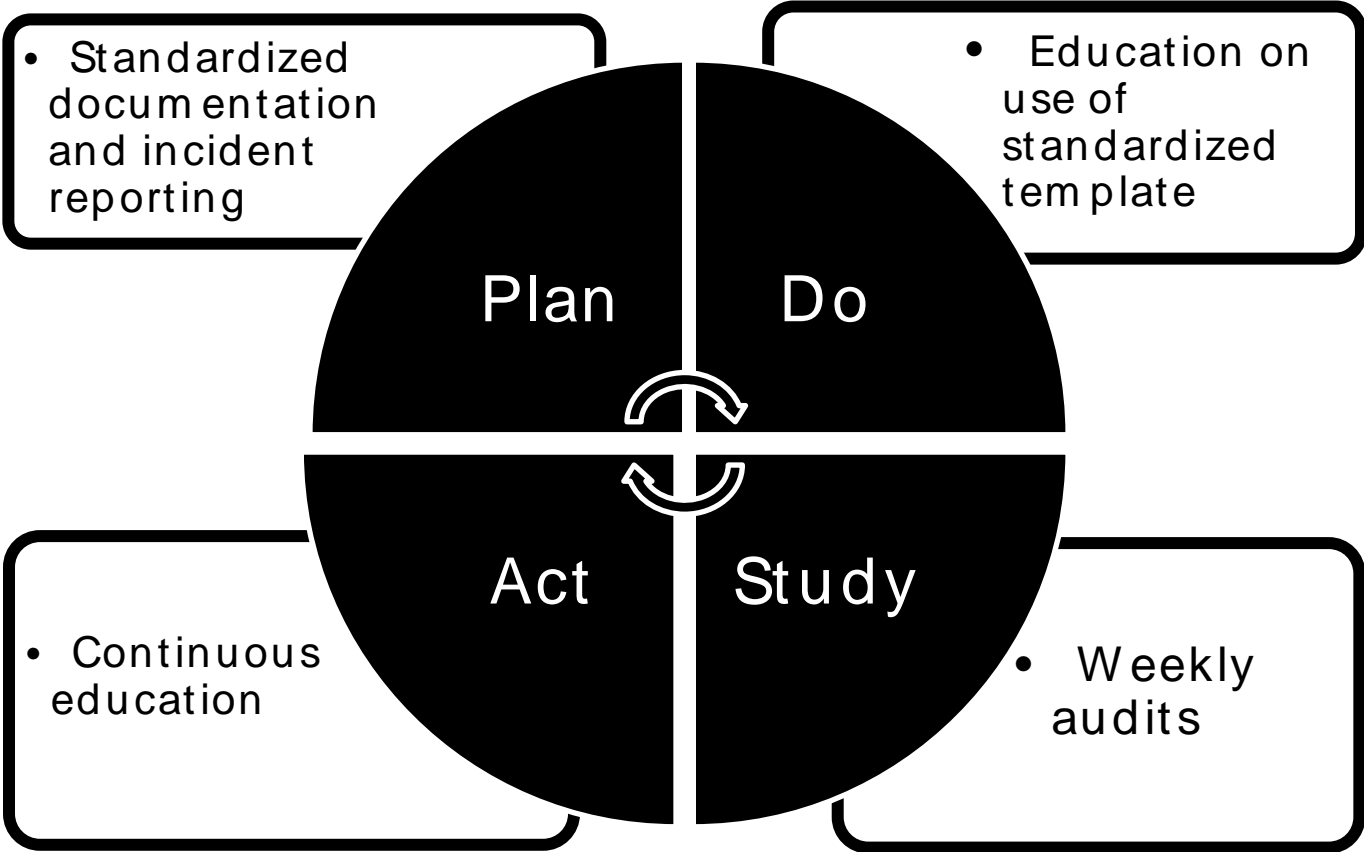
* <https://www.solutionsforpatientsafety.org/>



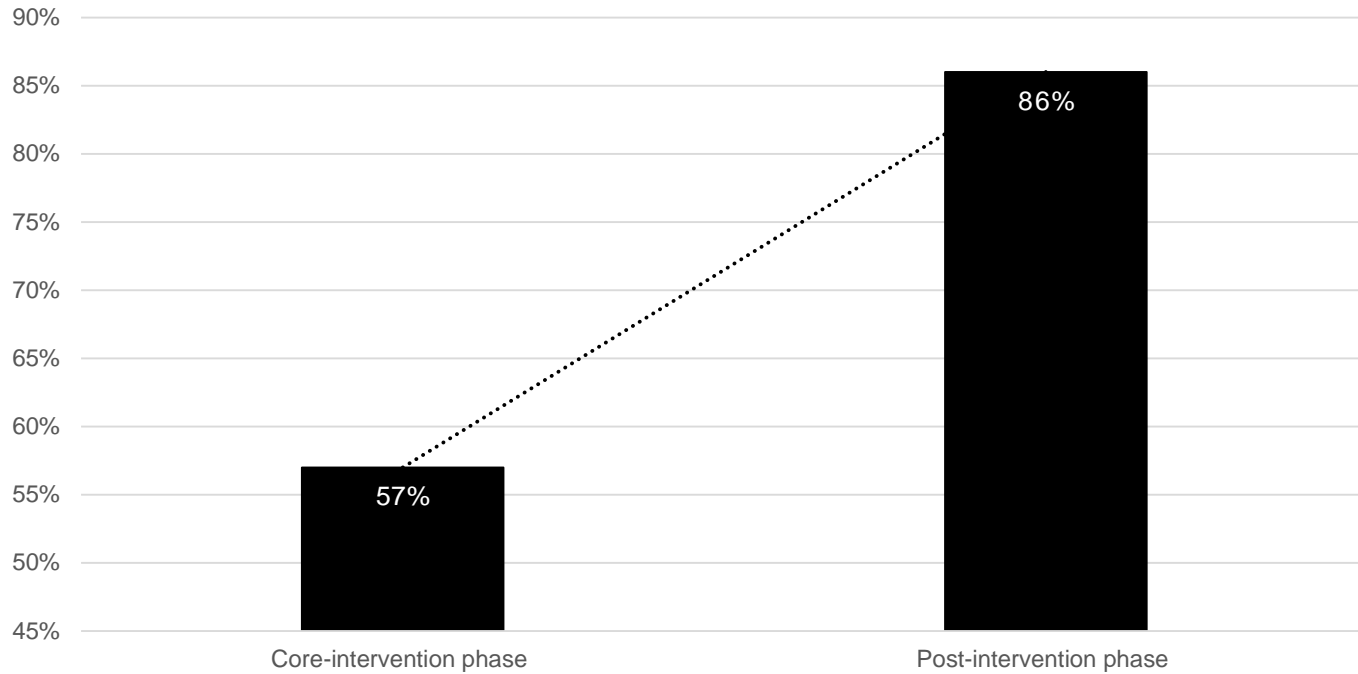
- Core process intervention period: June '18- Jan '19
- Post- intervention period: Feb '19-Feb '20

PDSA Cycle-1

*Improvement in
documentation of UE*



% Improvement in documentation



Difference : 29% , Significance level P = 0.0003

Unplanned Extubation

Date of Extubation

Date of Intubation

Size of ETT

Tube position on x-ray

Intended level of Securement (Gum)

Actual level of Securement (Gum)

How was tube secured?

Type of Ventilator

Type of Sedation

ETCO2 Monitor in place?

TCom Monitoring

What precipitated extubation?

Personnel at bedside at time of extubation?

TWO for Tubes Used?

Restraints Used?

Reintubated?

If not, mode of respiratory support

Did patient have Cardiac Arrest?

Type of Intubation

Tube position on x-ray

Date of last x-ray

Time of last x-ray

Was this documented?

Sedation/Paralytic Bolus Frequency

Continuous Sedation/Narcotics Drips

Comments:

Family at Bedside at time of Extubation

Restraints used?



PDSA cycle 2



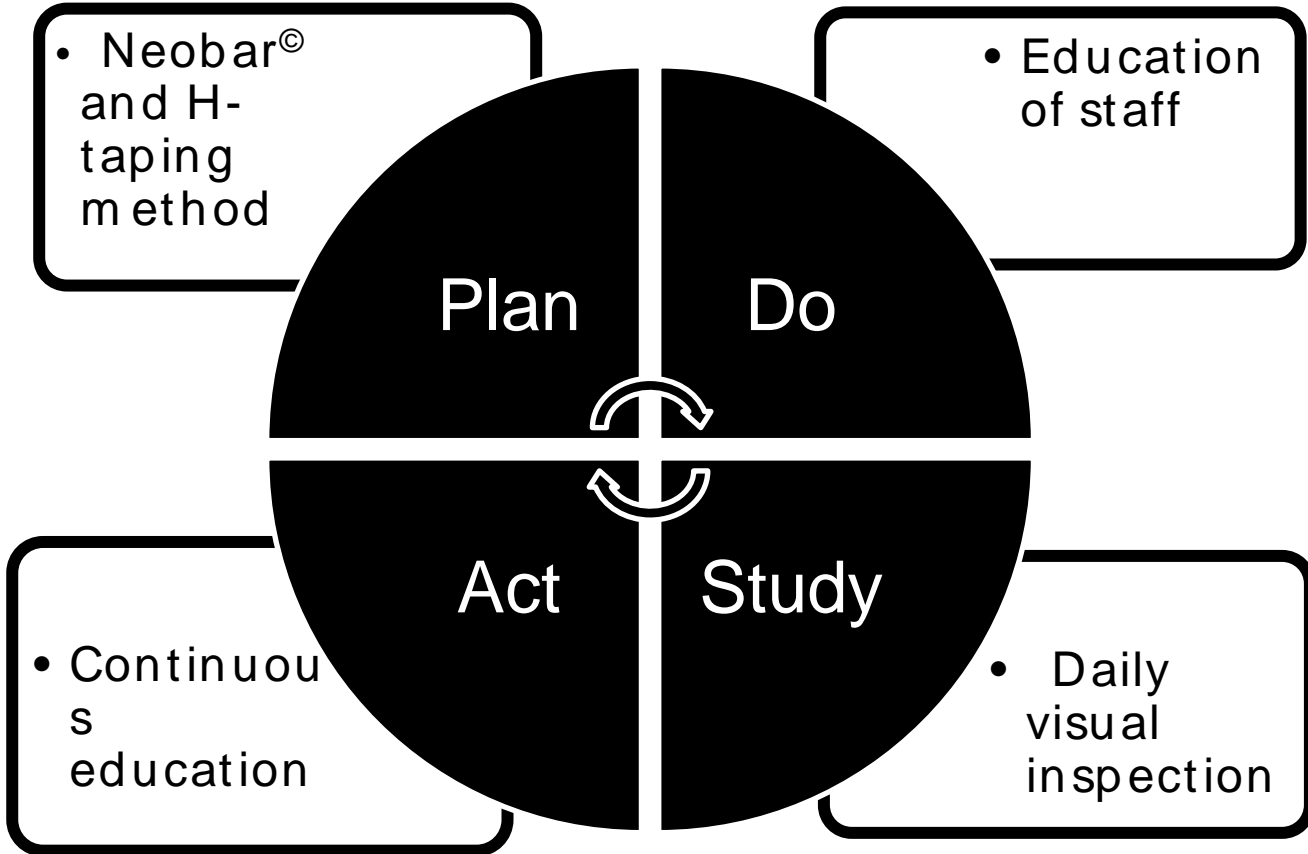
PDSA cycle 3



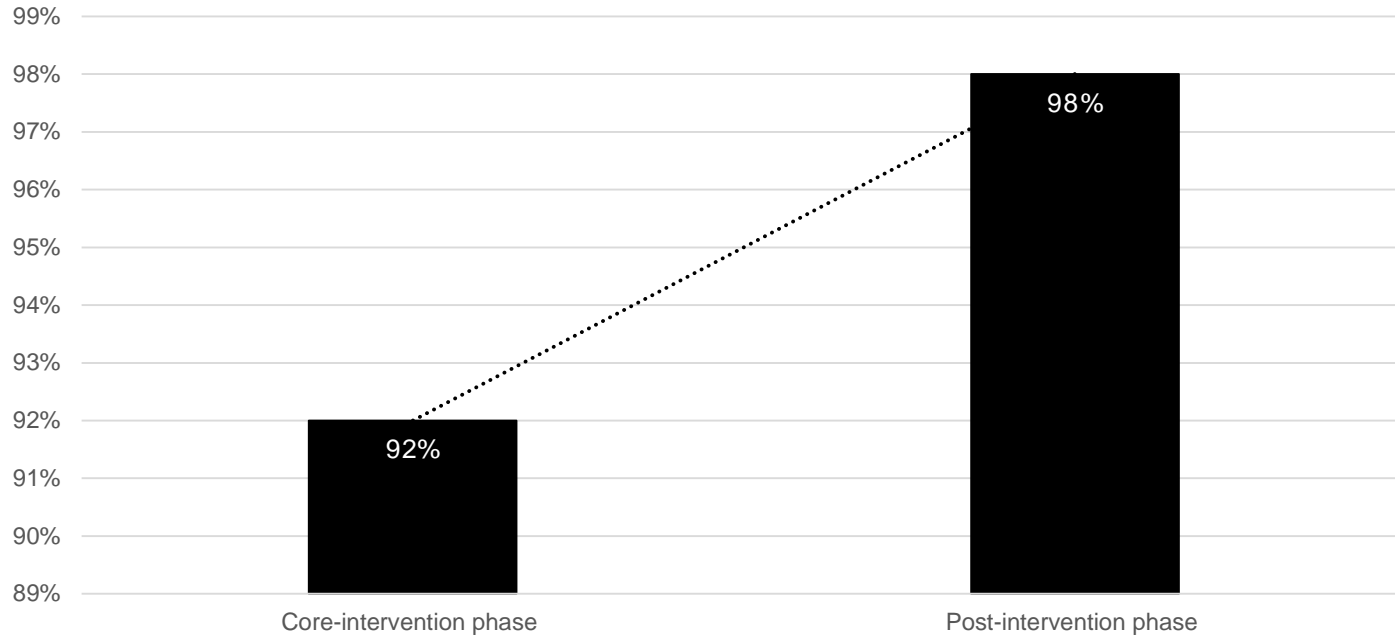
PDSA cycle 1

PDSA Cycle-2

*Standardized securement
methods for ETT*



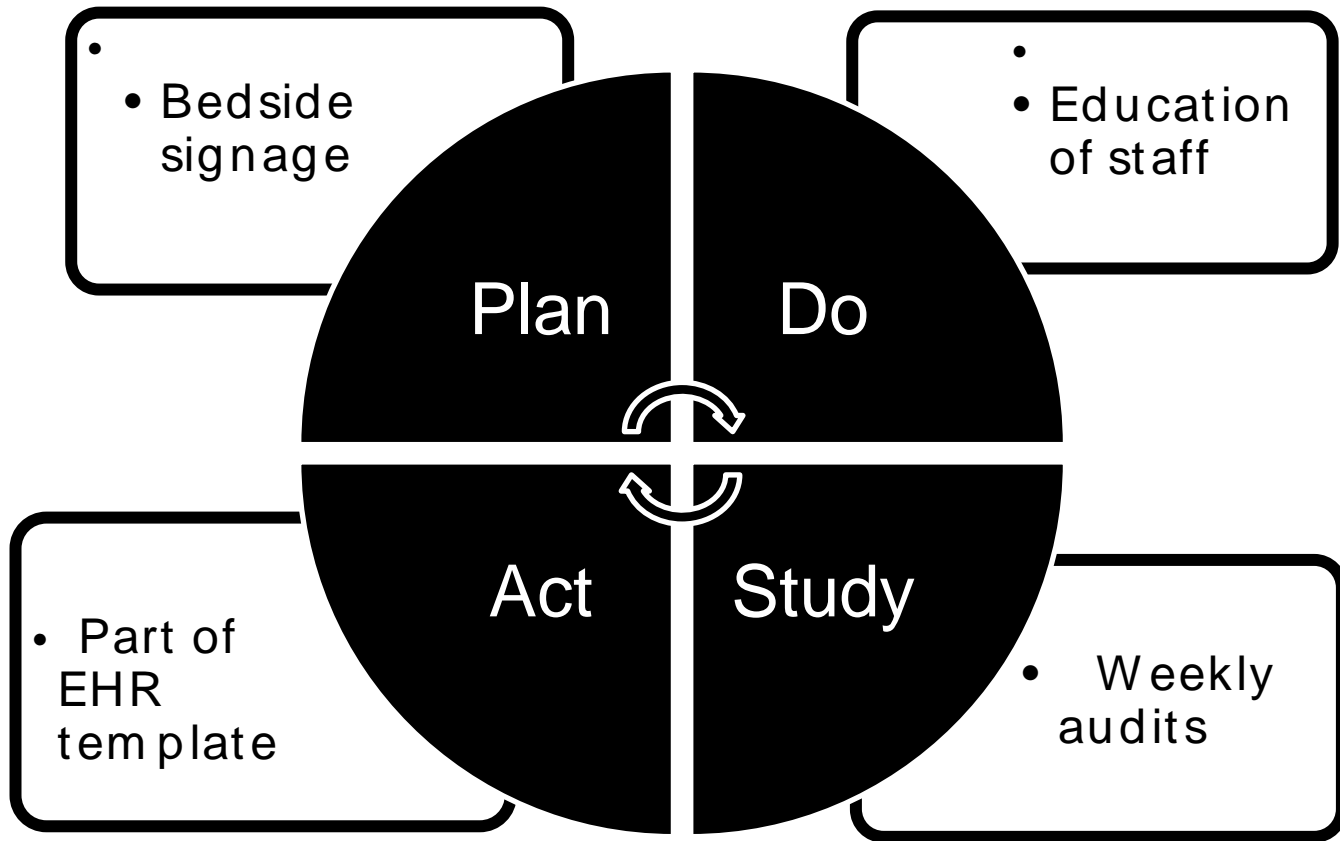
% Improvement in securement methods



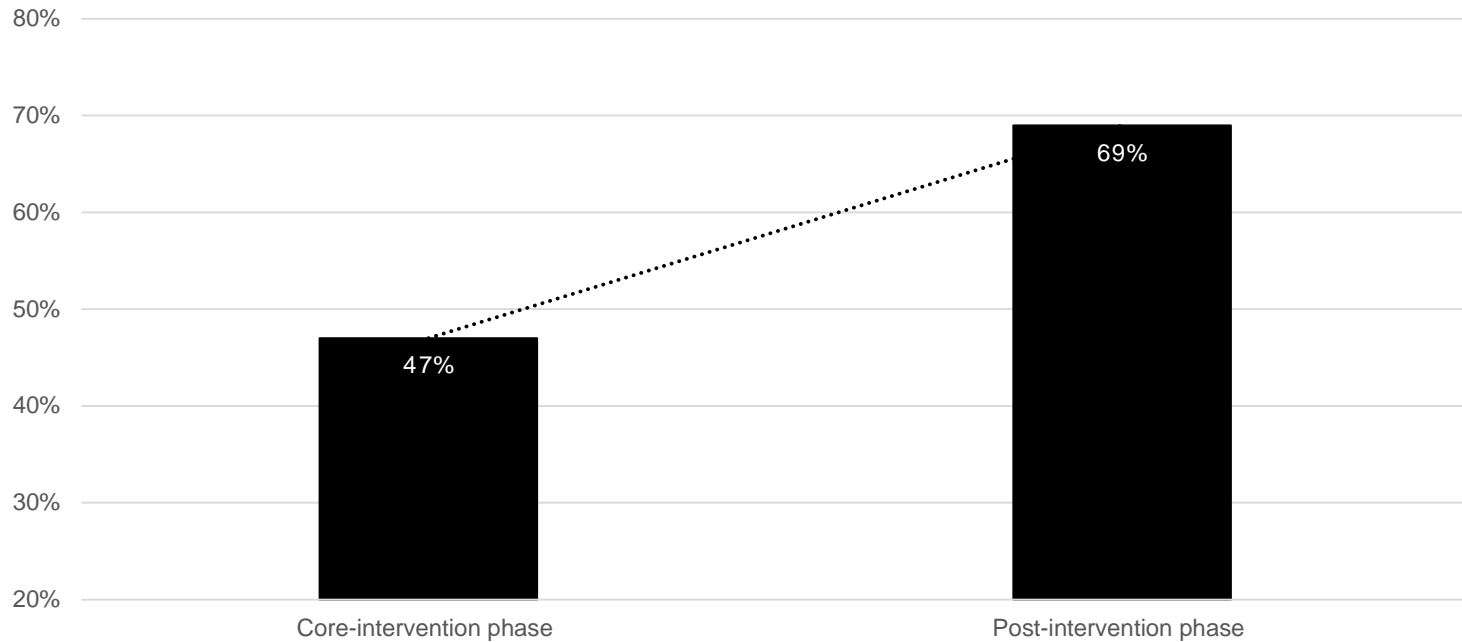
Difference 6%, Significance level $P = 0.1254$

PDSA Cycle-3

*Standardized protocol for
high risk airway*



% Improvement in using 2 for tubes



Difference 22%, Significance level P = 0.0102

High Risk Airway

Safe Suction

19cm

double red

ETT size

3.0

ETT Taped @

8cm

RAS → Dayshift

Nightshift

STOP!

2 Licensed Personnel

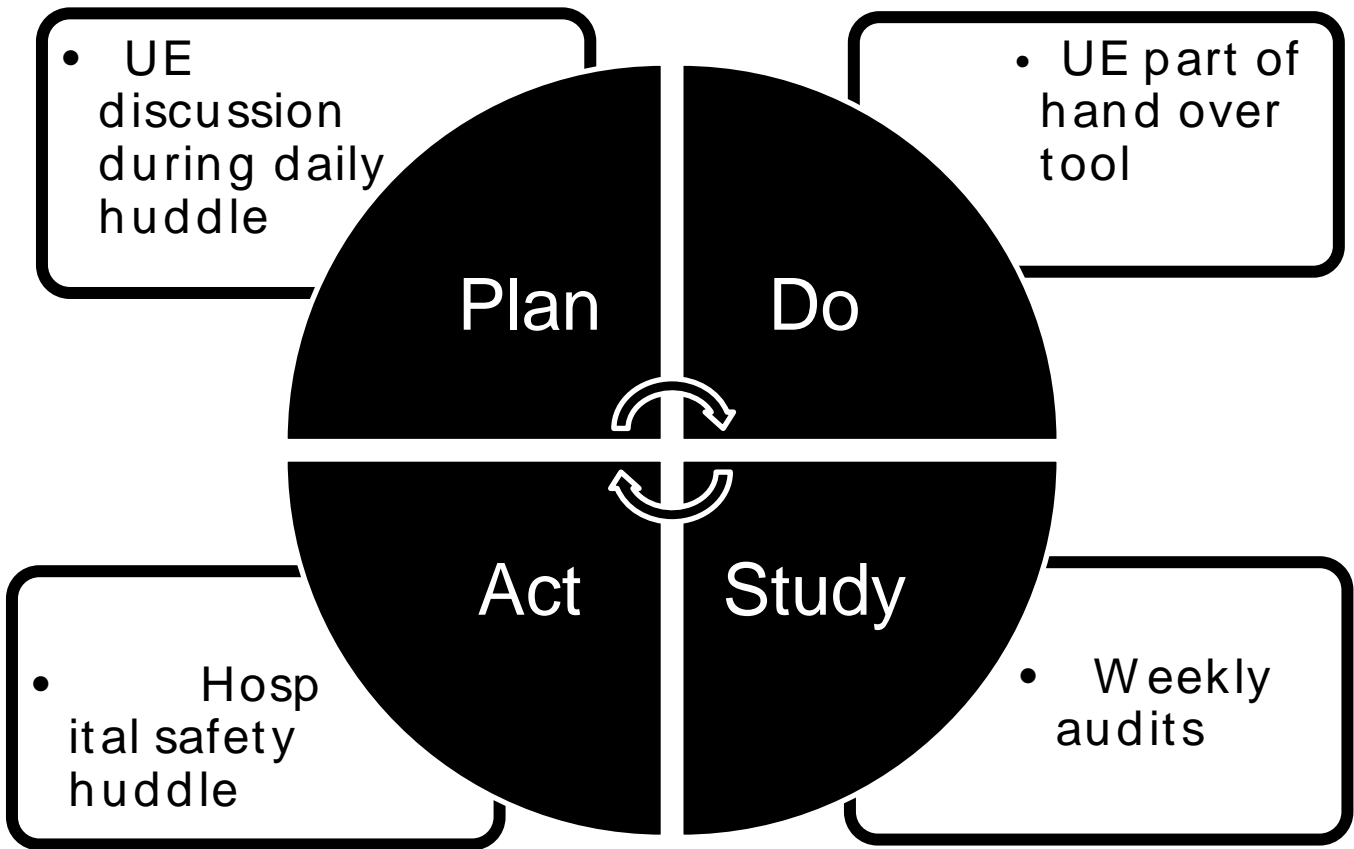
MUST be @ Bedside

for Procedures!

(RT, RN)

PDSA Cycle-4

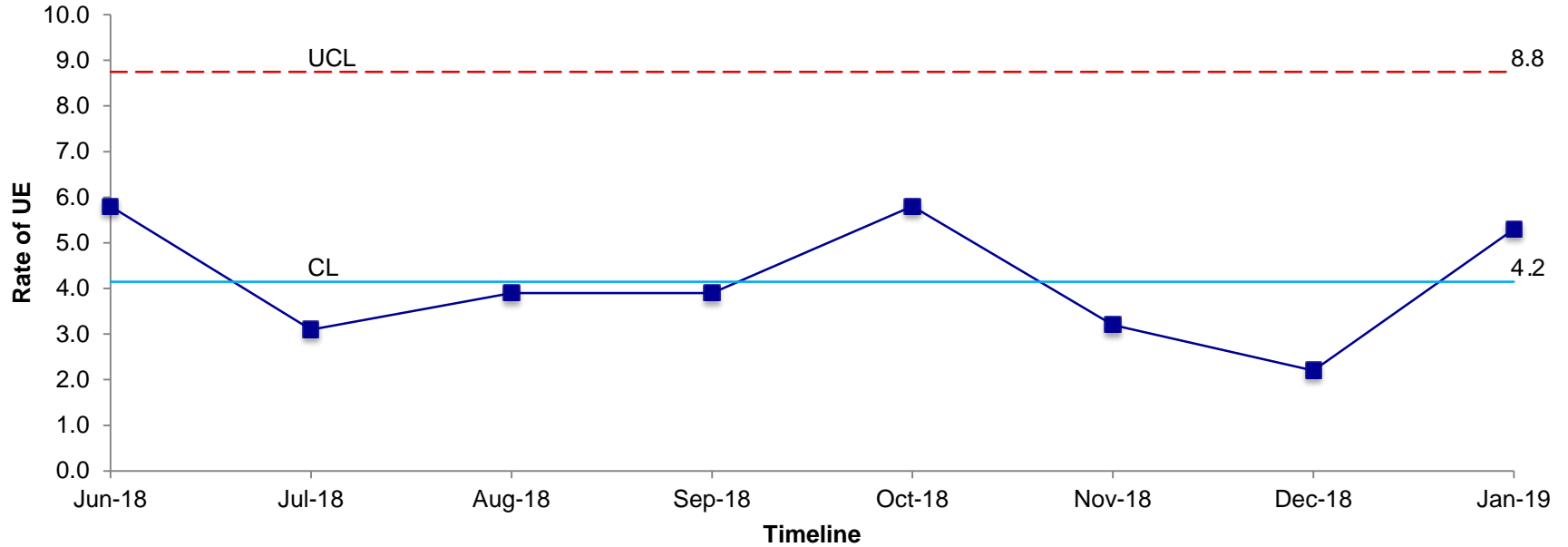
*Establishment of
Multidisciplinary daily huddle*



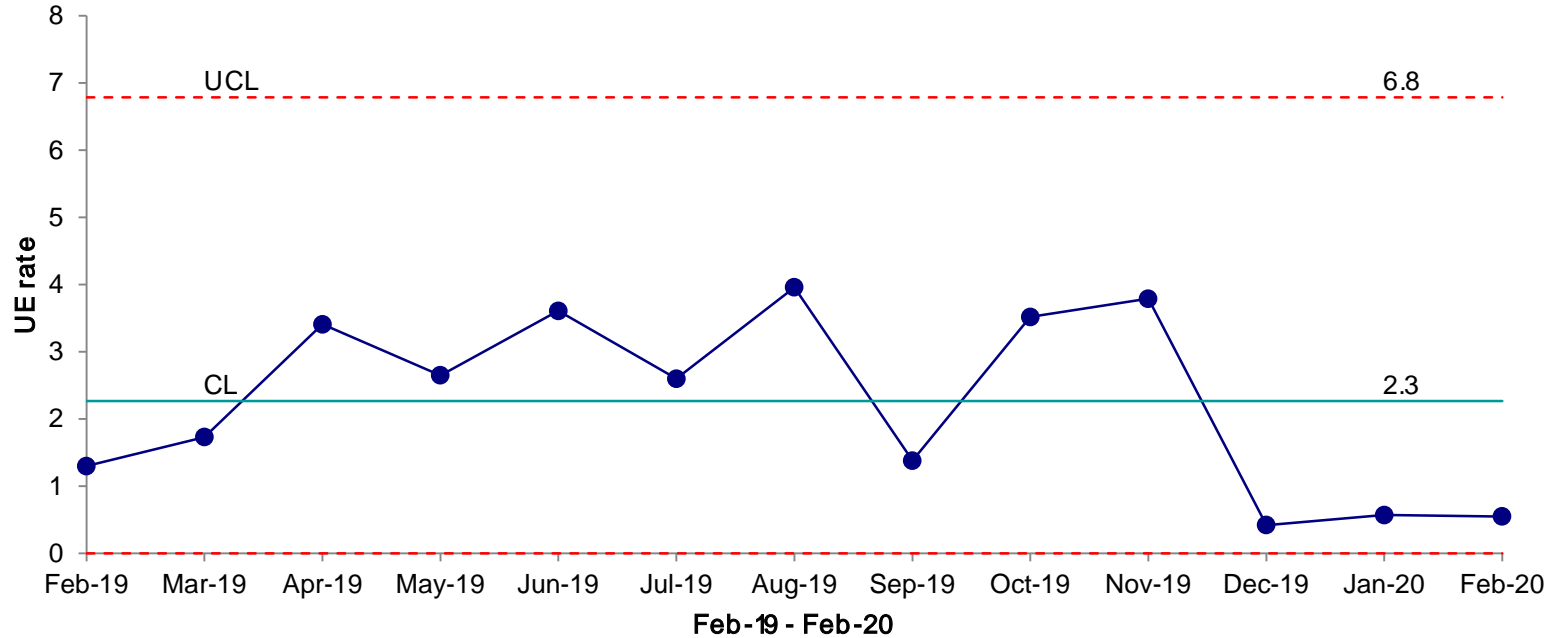
Results

- Overall cohort characteristics
 - Average gestational age of 28 weeks
 - Birth weight of 1130 g
 - Post menstrual age of 33 weeks
 - 65% of the UE were re-intubated, 30% had continuous sedation and no patients required CPR after the UE
- The UE rate decreased from 4.2 to 2.3/ 100 ventilator days
- Average monthly UE events reduced from 10 to 4.5/ month

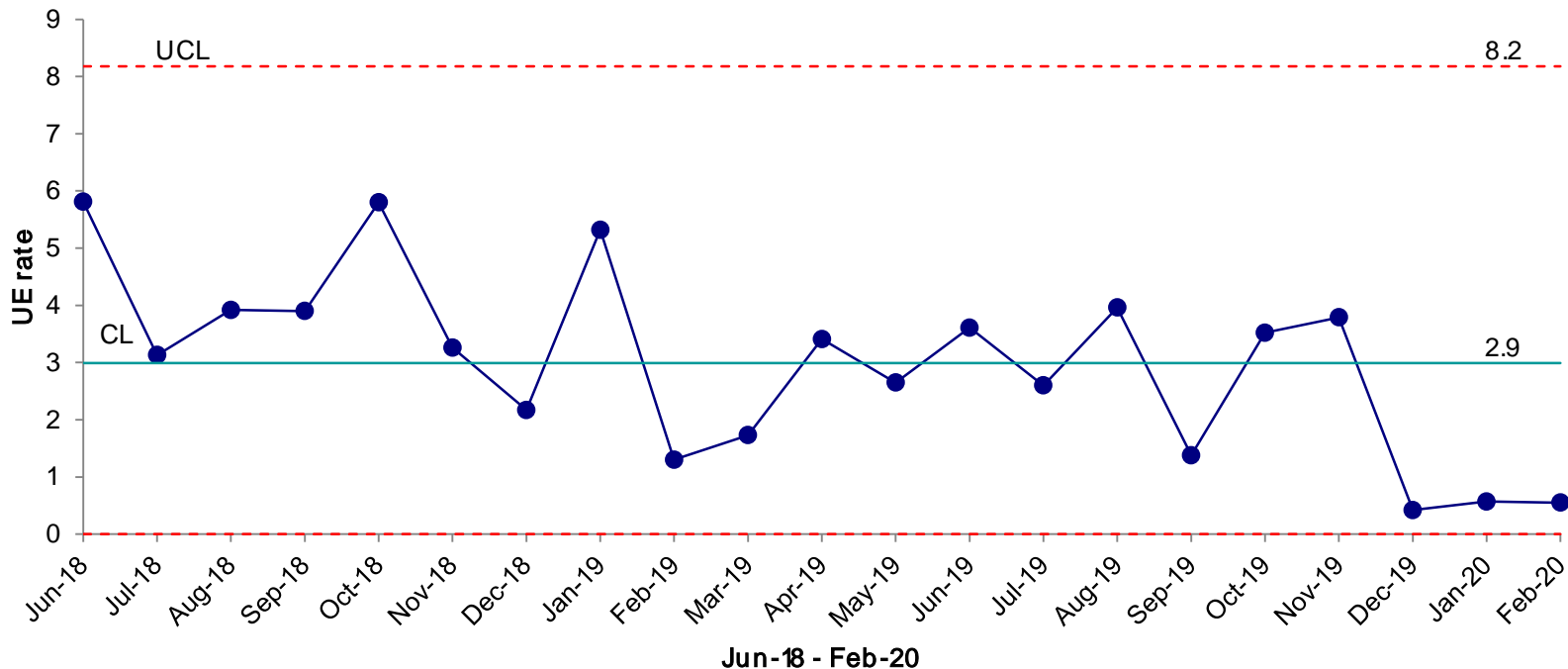
Rate of UE June 2018 - Jan 2019



Control Chart: UE rate during post-intervention period



Control Chart: UE rate June 2018- February 2020



← Core intervention period →



Future steps

Im prove
com pliance of
PDSA cycles

ACA huddle
after each UE

Adverse events
due to UE in NICU

Summary

- Unplanned extubations remains an important comorbidity in the NICU
- Reduction of UE with the help of QI initiatives can lead to meaningful improvement in preventable harm.

Thank You

