HIT to Accelerate Implementation of a Bundle for ICU Delirium

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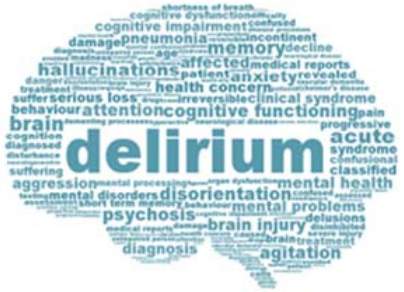
Baylor Scott & White Health (BSWH)

- More than 500 patient care sites including 43 hospitals in North and Central Texas
- 5.3 million patient encounters annually
- 34,000 employees
- 6,000 affiliated physicians
- Scott & White Health Plan
- $8.3 billion in total assets
- $5.8 billion in total net operating revenue

ICU Delirium ("Ever vs. Never")

- Increased ICU length of stay (8 vs 5 days)
- Increased hospital length of stay (21 vs 11 days)
- Increased time on ventilator (9 vs 4 days)
- Higher ICU costs ($22,000 vs $13,000)
- Higher ICU mortality (19.7% vs 10.3%)
- Higher hospital mortality (26.7% vs 21.4%)
- 3-fold increased risk of death at 6 months
- Increasing evidence as a risk factor for long-term cognitive impairment



Ely, et al. ICM2001; 27, 1892-1900
Ely, et al, JAMA 2004; 291: 1753-1762
Lin, SM CCM 2004; 32: 2254-2259
Milbrandt E, et al, Crit Care Med 2004; 32:955-962.
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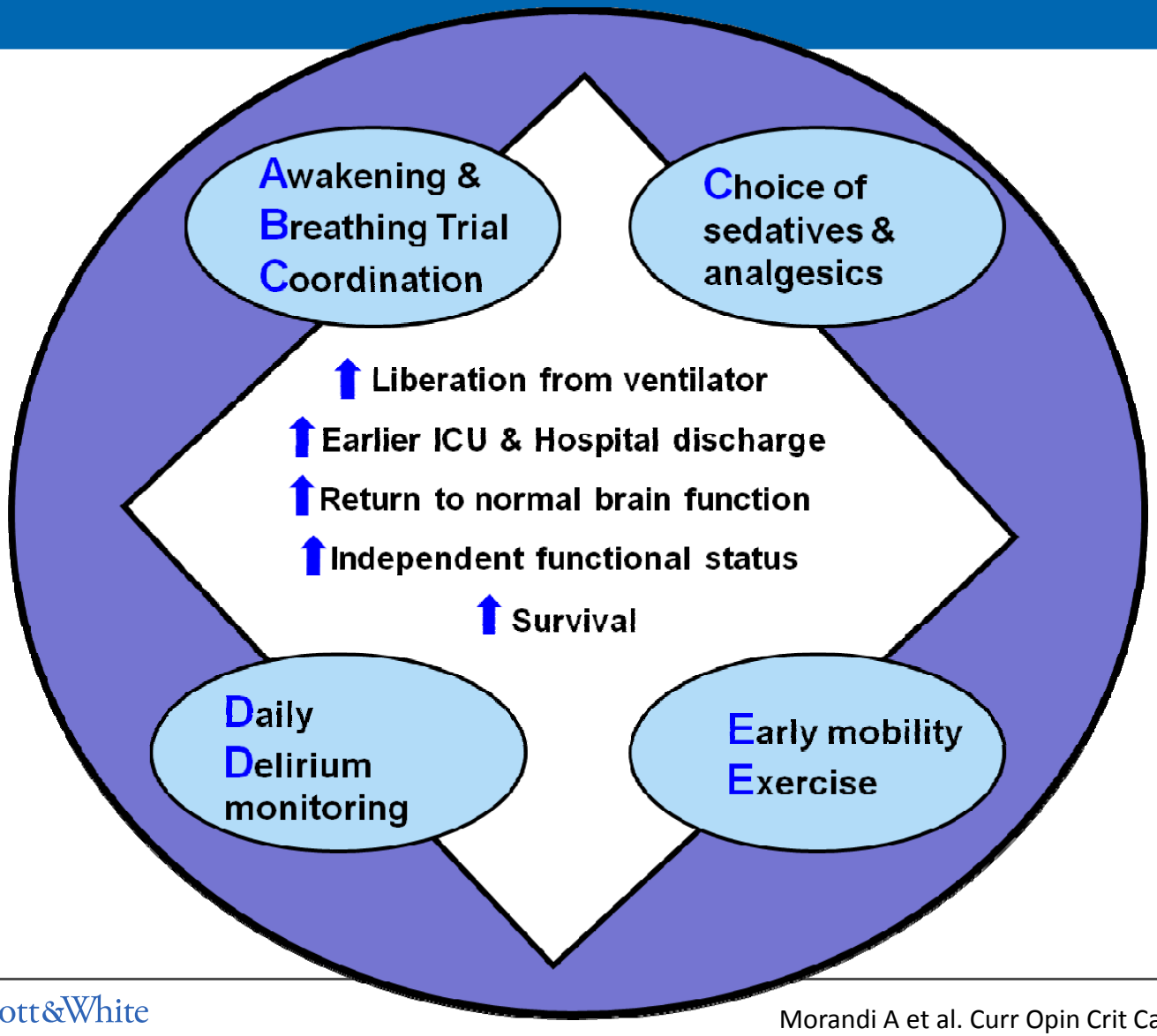
Synergy of the ABCDE Bundle



Morandi A et al. Curr Opin Crit Care,2011;17:43-9

Delirium Bundle Implementation: Quasi-Experimental Study Design

Intervention Groups

Design Characteristics

Basic Implementation Program
- Access to EHR modifications
- Access to standardized reports

Enhanced Implementation Program
- Access to EHR modifications
- Access to standardized reports
- Engagement of site champions
- Participation in content development
- Supplemental training

- 3 hospitals in each group
- Matched site traits wherever able
- Programs operated concurrently
- Randomization not feasible
- Outcomes analyses via time series

ABCDE Bundle Implementation Tactics

Adoption Program Component	Time to Completion
Activate Nurse/ Physician Champions and secure clinical staff conceptual buy-in	1-3 months (based on hospital size)
Assess current state (workflow, performance)	1-month
Development of supportive EHR Documentation and order set with incorporation into production (live use) environment	months
Training Sessions (staged at hospitals with multiple ICUs): a. "Train the trainer" (with outside consultants) b. Frontline staff training (2-hour session)	4-6 month cycle to launch each unit; multiple "reinforcement" sessions required.
Use of daily rounding tool	9-12 months
Standardized Performance Reporting (hospital and unit levels)	4 months after completion of EHR workflow tools
Optimization/EHR refinement/standing meetings	Ongoing
Accountability as a system critical care goal	3 months after standardized reporting

Order Set

These practices will be applied to intensive care unit patients according to the criteria below. If indicated by clinical status, physicians may chose to "opt out" of specific patients receiving the bundle by ordering "Discontinue ABCDE Bundle."

SEDATION MANAGEMENT (AWAKENING)

☑ Initiate Sedation Vacation: Hold analgesic / sedation for continuous infusion 2 times daily

Exclude if patient meets one of the following criteria and document exclusion criteria that patient met in nursing focus notes each day:

- FiO_2 60 or above
- PEEP greater than 7.5 cm
- Neurosurgical patient
- Increased intracranial pressure (greater than 10 cm H_2O)
- Heart rate greater than 140 bpm
- Patient on neuromuscular blocker
- Open surgical abdomen
- Active seizures
- Active alcohol withdrawal
- Active agitation
- Myocardial ischemia within the last 24 hours

☑ Do not resume infusion unless the following criteria are met:

- Agitated or combative
- O2 saturation falls below 90%
- Respiratory Rate is 40 or above
- Worsening dyspnea

☑ If patient meets any of the criteria (above), **resume** infusion at **HALF** of the previous rate

☑ If these symptoms persist, contact the physician

SPONTANEOUS BREATHING TRIAL

☑ Do a Spontaneous Breathing Trial with Continuous Positive Airway Pressure Support plus 5 cmH_2O if patient is:

- Hemodynamicaly stable on no vasopressors,
- Not actively agitatated
- FiO_2 is 60 % or less
- PEEP 7.5 or less
- Oxygen saturation greater than 88%
- No active myocardial ischemia within the past 24 hours
- Patient awake, and able to follow 3 out of the 4 following commands:
  - Opens eyes with verbal command
  - Points two fingers upon instructions
  - Follows caregiver's voice using eyes
  - Sticks out tongue with verbal command

☑ Discontinue spontaneous breathing trial and resume prior ventilator settings for:

- Respiratory rate greater than 35 or less than 8 for 5 minutes or longer
- SPO_2 less than 88% for greater than 5 minutes
- Abrupt changes in mental status
- Acute Cardiac Arrhythmia
- Heart rate greater than 130 or less than 60
- Accessory muscle use
- Abdominal Paradoxical Breathing
- Diaphoresis
- Marked dyspnea

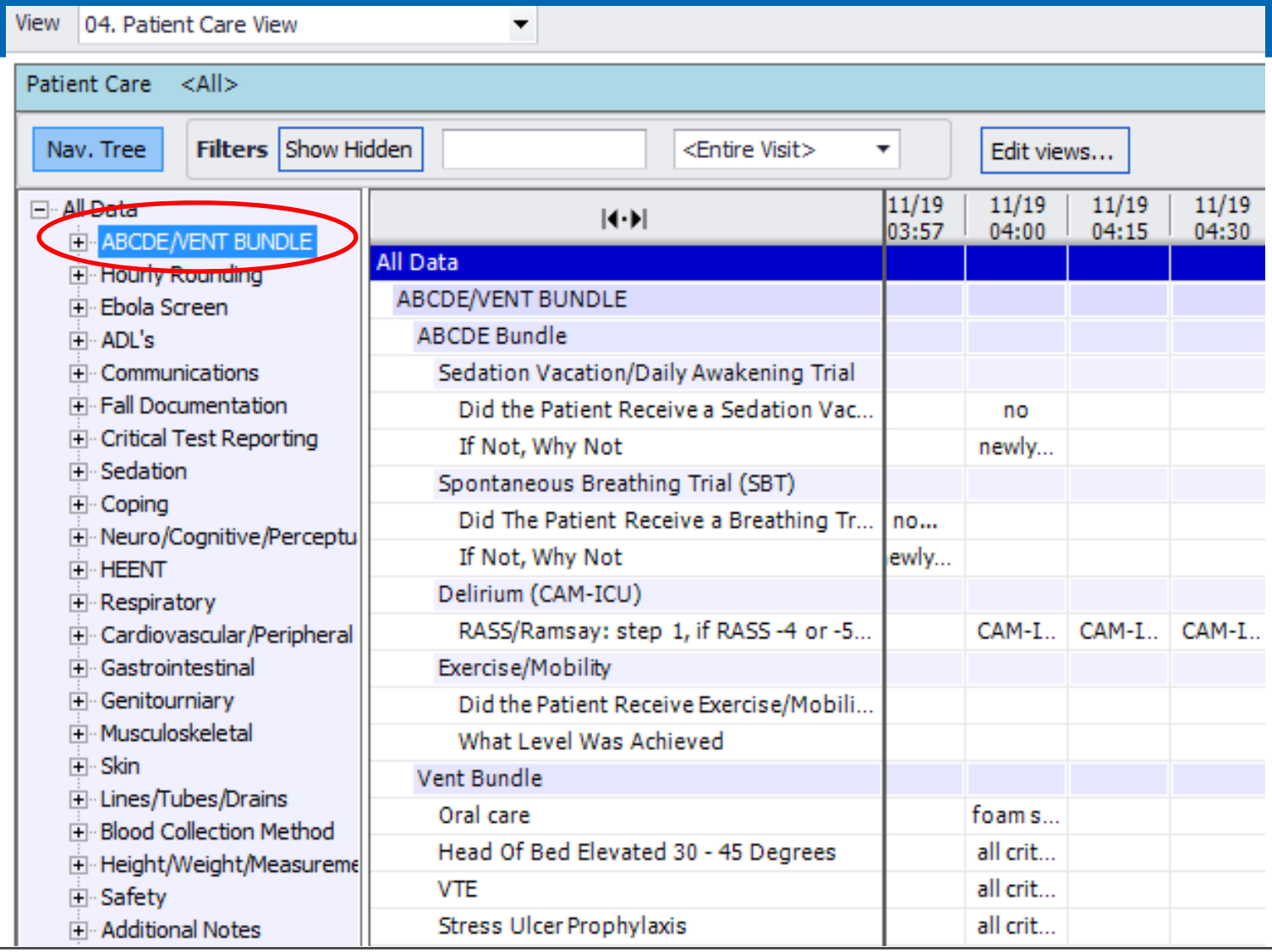
☑ If spontaneous breathing trial successful then measure:

- ☑ Respiratory rate
- ☑ Tidal volume
- ☑ Call physician after 30 minutes with results of the trial

Critical Care Flowsheet

	11/19/2014 7:00	11/19/2014 7:05
Peak Airway Pressure Mean Airway Pressure (cm H2O)	31	31
Sigh Rate (breaths/hr) Sigh Volume (L)		
Ventilator-Associated Pneumonia		
Oral care	brush foam swab	
Head Of Bed Elevated 30 - 45 Degrees	all criteria met	
VTE		
Stress Ulcer Prophylaxis	all criteria met	
Sedation Vacation/Daily Awakening Trial		
Did the Patient Receive a Sedation Vacation Today	no	
If Not, Why Not	PEEP greater than 7.5	
Was the Sedative Infusion Resumed		
If So, Why		
Exercise/Mobility		
Did the Patient Receive Exercise/Mobility Therapy Today	yes	
If Not, Why Not		
What Level Was Achieved	passive range of moti	
Sedation Scale		
Richmond Agitation Sedation Scale (RASS)	Deep sedation (-4)	Deep sedation (-4)
Confusion Assessment Method - ICU		
Confusion Assessment Method		
RASS/Ramsay: step 1, if RASS -4 or -5 or Ramsay 5 or 6, STOP Reassess later	CAM-ICU assessmer	CAM-ICU assessmer
Feature 1: Acute Onset or Fluctuating Course		
Feature 2: Inattention		
Feature 3: Altered Level of Consciousness		
Feature 4: Disorganized Thinking		
CAM Overall Score		

Real-Time Reporting for “Measure-Vention”



Standardized Performance Reporting

Table 1. SAT Adherence Rate

	Nov 2013	Dec 2013	Jan 2014	Feb 2014	Mar 2014	Apr 2014	May 2014	Jun 2014	Jul 2014	Aug 2014	Sep 2014	Oct 2014
n	12	10	23	21	13	1	26	26	24	13	12	22
N	19	25	41	34	23	9	38	41	30	21	17	34
%	63	40	56	62	57	11	68	63	80	62	71	65

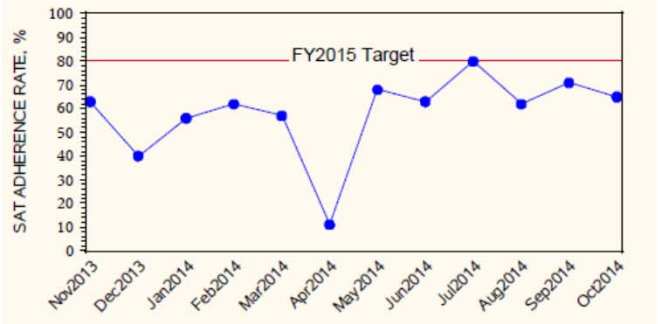


Table 2. SBT Adherence Rate

	Nov 2013	Dec 2013	Jan 2014	Feb 2014	Mar 2014	Apr 2014	May 2014	Jun 2014	Jul 2014	Aug 2014	Sep 2014	Oct 2014
n	13	11	23	19	16	2	26	36	16	14	13	20
N	14	18	27	22	19	5	28	39	17	15	15	22
%	93	61	85	86	84	40	93	92	94	93	87	91

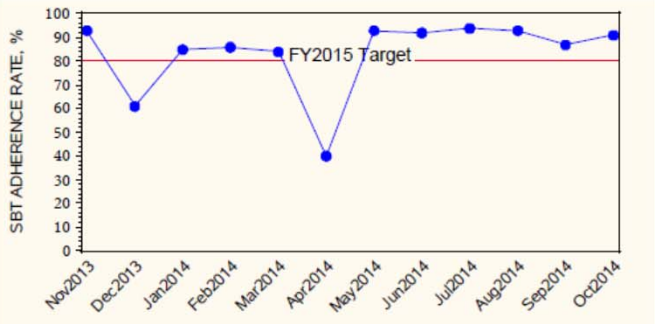


Table 3. CAM-ICU Adherence Rate

	Nov 2013	Dec 2013	Jan 2014	Feb 2014	Mar 2014	Apr 2014	May 2014	Jun 2014	Jul 2014	Aug 2014	Sep 2014	Oct 2014
n	81	80	113	103	68	26	186	115	82	38	42	115
N	102	104	161	143	88	36	247	164	101	66	66	153
%	79	77	70	72	77	72	75	70	81	58	64	75

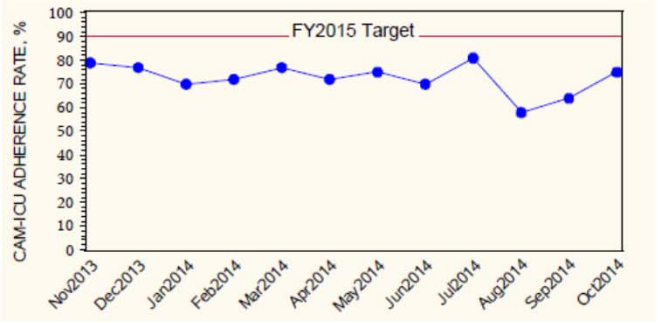
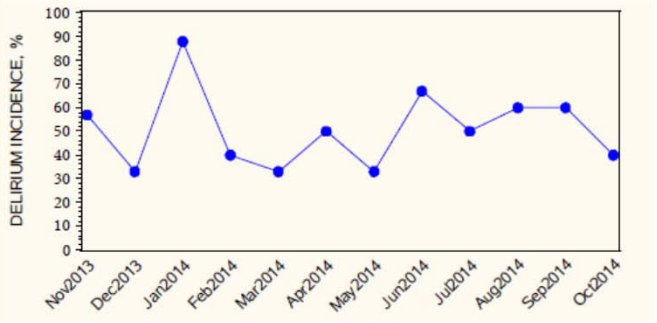


Table 4. Delirium Incidence

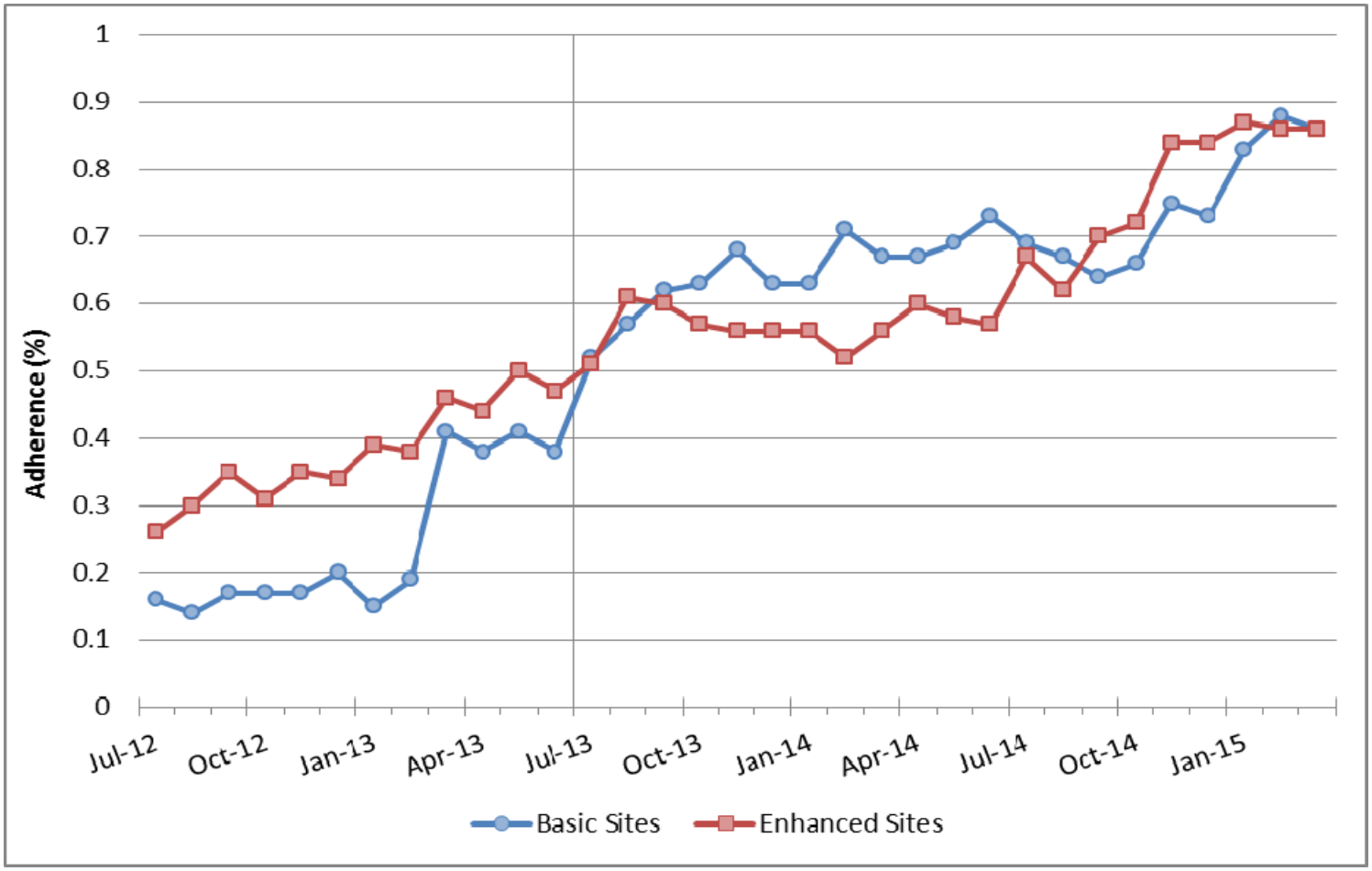
	Nov 2013	Dec 2013	Jan 2014	Feb 2014	Mar 2014	Apr 2014	May 2014	Jun 2014	Jul 2014	Aug 2014	Sep 2014	Oct 2014
n	4	3	7	4	2	2	4	4	4	3	3	4
N	7	9	8	10	6	4	12	6	8	5	5	10
%	57	33	88	40	33	50	33	67	50	60	60	40



Eligibility for Report:

- Vent ≥ 24 hours
- Vent ≤ 2 weeks
- Specific neuro. diagnoses excluded
- Based on admin. data
- Reports electronically derived

Delirium Bundle Uptake by Intervention Group



Bundle Impact on Patient Outcomes: Preliminary Data

Patients with Bundle Adherence Rate ≥ 60%

- Spent less time on the ventilator (-.32 days; 95%CI: -0.55, -0.08)
- No change in documented coma incidence (OR=0.97; 95%CI: 0.76-1.23)
- Had fewer days with coma or delirium (45%; 95%CI: 0.30-0.59)
- Were more likely to be mobilized out of bed (OR = 2.05, 95%CI: 1.67-2.53)
- Were more likely to be discharged home (OR = 1.22; 95%CI: 1.01-1.47)
- Had reduced risk of inpatient mortality (OR = 0.43; 95%CI: 0.32-0.57)

Key Lessons Learned

- Strong relationship between clinical workflow and EHR structured documentation/CDS; deploying the EHR modifications should be a 1st step in hardwiring a care process
- Focusing resources on EHR modification (placing this phase as early as possible in the implementation program sequence) appears to be a high-yield practice uptake approach
- Hospitals with a strong pre-existing QI acumen were able to leverage the EHR modifications with minimal support
- Even with HIT tools, “person-to-person” propagation and clear lines of accountability were still crucial to adoption