

## Supplemental Information

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**PRE-INTUBATION: Airway Bundle Checklist**

To be discussed by Interprofessional Team  
 Date Completed: \_\_\_\_\_ Dates Reviewed/Revised: \_\_\_\_\_  
 (Please fill out a NEW bundle if there are significant changes)

**Checklist Criteria (excluding patients with a tracheostomy):**

Intubated/Recent Extubation  Intubation  
 Increasing Respiratory Support/FiO2 requirement moving towards intubation

**Difficult Intubation Risk Assessment**

Known Difficult or Critical Airway?	YES	NO
TEF and/or EA Repair within 14 Days?	YES	NO
Other risk factors for a difficult airway?	YES	NO

Please specify: \_\_\_\_\_  
 \*If YES to any of the above questions, an experienced airway provider should intubate.

**Difficult Bag-Mask Ventilation Risk Assessment**

History of difficult to bag-mask ventilate?	YES	NO
Risk factors for a difficult to bag-mask ventilate? (micrognathia, macroglossia, etc.)	YES	NO

Please specify: \_\_\_\_\_  
 \*If YES to any of the above questions, consider oral airway/LMA and discuss if paralysis is appropriate

**For non-intubated patients, when will we consider intubation?**

Hypoxemia and/or Elevated CO<sub>2</sub> refractory to:  
 HFNC  L/min  CPAP  cm H<sub>2</sub>O  NIMV  BiPAP  or  FiO<sub>2</sub> > \_\_\_\_\_ %  
 Prior to procedure at \_\_\_\_\_ on \_\_\_\_\_  
 Prolonged/Severe apnea  
 Other: \_\_\_\_\_

**If patient approaches above criteria initiate TEAM HUDDLE & discuss NPO status & IV access**

**For intubated patients, management for unplanned extubation?**

Trial non-invasive modality  or  Planned reintubation

**How will we intubate?**

Method:  Oral  Nasal  
 ETT Type:  Uncuffed  Cuffed  
 ETT Size:  2.5  3.0  3.5  4.0  Other: \_\_\_\_\_  
 Device:  CMAC  Laryngoscope  LMA  Flexible Bronchoscope  Other: \_\_\_\_\_  
 Meds:  Medications pre-ordered? (Neonatal Intubation Premedication Order Set in Epic)  
 If patient is opioid tolerant, order fentanyl at 2 mcg/kg/dose but be prepared to use both doses  
 Need for modification of premedication (i.e. difficult airway)? \_\_\_\_\_

**Please order medications "ON CALL, PRN for: Intubation"**  
**Admin Instructions: "Only to be administered at direction of FLC"**

**Who will intubate?**  
 Does this patient require ENT or Anesthesia? YES  NO

If Bundle is No Longer Required: Please dispose of in HIPAA compliant receptacle

THIS FORM IS NOT PART OF THE PATIENT'S MEDICAL RECORD

Side 1 of 2

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**INTUBATION: Airway Bundle Checklist**

**Immediate Pre-Intubation Procedure TIME OUT**  
 Team leader/intubator to verbalize immediately before intubation  
 Use laminated TIME OUT CARD on CMAC

**Intramuscular dosing for intubation premedication:**  
 Atropine 0.02 mg/kg  
 Fentanyl 2 mcg/kg  
 Succinylcholine 4 mg/kg

Other PATIENT SPECIFIC preparation:  
 \_\_\_\_\_

**Post-Procedure Debrief (To be led by team leader/intubator)**

Was Front Side of ABC filled out? If not, WHY?  
 Was the bedside TIME OUT CARD used?  
 If CMAC not used, WHY?  
 If no paralysis used, WHY?

ETT Cuff adjusted to minimal leak: YES / NO / N/A      Goal SBS \_\_\_\_\_ (- 3 to 0)  
 ETT position at gum: \_\_\_\_\_      LDA Flowsheet Complete? YES / NO  
 Was the patient difficult to bag-mask ventilate? YES / NO      Was the Patient difficult to Intubate? YES / NO  
 \*If Yes to either question please remember to put an ALERT in Epic and a SIGN at the bedside\*

Did you re-order pre-intubation medication? YES/NO

**Team Feedback**

All team members performed well without technical/communication challenges.  
 We could improve by: \_\_\_\_\_

**Was this an unplanned extubation?**  
 Link to Unplanned Extubation Survey:

If Bundle is Completed at Time of Intubation: Please turn in with N4N form and fill out a NEW Bundle

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### SUPPLEMENTAL FIGURE 9

Airway Bundle. BiPAP, bilevel positive airway pressure; CPAP, continuous positive airway pressure; EA, esophageal atresia; ENT, otolaryngology; ETT, endotracheal tube; FiO<sub>2</sub>, fraction of inspired oxygen; HFNC, high-flow nasal cannula; LMA, laryngeal mask airway; NIMV, nasal intermittent mandatory ventilation; SBS, state behavioral scale; TEF, tracheoesophageal fistula.

Preintubation Time Out	
✓ <b>Right Patient:</b>	State patient name and verify allergy status Aspirate stomach
✓ <b>Right Plan:</b>	Review and revise the AB front page plan Maximum 2 attempts per provider
✓ <b>Right Prep:</b>	Patient and bed positioned correctly? Working IV? If IV access not available see AB or EMR for IM dosing
✓ <b>Right Equipment:</b>	SOAP, tape
✓ <b>Right Monitoring:</b>	QRS volume on?
✓ <b>Right Rescue Plan:</b>	Review rescue plan. Identify person to call airway emergency Double press ASCOM Alert Button, or call Emergency #4CODE State: "Stat Airway Emergency NICU Bed _____"
✓ <b>Right Attitude:</b>	State out loud. "If anybody has a concern at any time during the procedure, speak up."

### SUPPLEMENTAL FIGURE 10

Time out card. IM, intramuscular; SOAP, suction, oxygen, airway, personnel.

**SUPPLEMENTAL TABLE 3** Patient Characteristics by 12 Month Time Epoch

Patient Characteristics	November 2016–October 2017, <i>n</i> = 344	November 2017–October 2018, <i>n</i> = 276	November 2018–October 2019, <i>n</i> = 323	November 2019–August 2020, <sup>a</sup> <i>n</i> = 239	<i>P</i>
Birth GA, median (IQR), wk	32 (26–36)	32 (26–37)	30 (25–37)	28 (25–36)	.06
Birth wt, median (IQR), g	1705 (750–2660)	1500 (790–2725)	1330 (730–2560)	1240 (680–2500)	.09
Day of life at intubation, median (IQR)	57 (18.5–110.5)	42.5 (13–88.5)	49 (20–89)	45 (14–99)	.11
Corrected GA at time of intubation, median (IQR), wk	40 (35–46)	39 (35–42) <sup>b</sup>	39 (34–44) <sup>b</sup>	38 (32–44) <sup>b</sup>	.03
Wt at intubation, median (IQR), g	3100 (2000–4200)	2900 (2000–3600)	2800 (1800–3800)	2900 (1600–3800)	.09
Male sex, <i>n</i> (%)	217 (63)	185 (67)	202 (63)	139 (58)	.43
Diagnoses, <sup>c</sup> <i>n</i> (%)					
Chronic respiratory failure	122 (35)	96 (35)	109 (34)	79 (33)	.93
Acute respiratory failure	104 (30)	83 (30)	95 (29)	74 (31)	.98
Congenital anomaly requiring surgery	71 (21)	47 (17)	60 (19)	52 (22)	.51
Neurologic impairment (HIE, seizure, stroke)	32 (9)	21 (8)	29 (9)	30 (13)	.28
Congenital heart disease (excluding isolated PDA)	32 (9)	19 (7)	29 (9)	26 (11)	.46
Airway or craniofacial anomaly	35 (10)	26 (9)	22 (7)	18 (8)	.39
Surgery or procedure for acquired disorder	4 (1)	18 (7) <sup>b</sup>	37 (11) <sup>b,d</sup>	33 (14) <sup>b,d</sup>	<.001
Sepsis	17 (5)	13 (5)	15 (5)	7 (3)	.66
Indication for intubation, <sup>c</sup> <i>n</i> (%)					
Ventilation failure	103 (30)	75 (27)	104 (32)	63 (26)	.34
Reintubation after unplanned extubation	36 (10)	48 (17) <sup>b</sup>	59 (18) <sup>b</sup>	50 (21) <sup>b</sup>	.004
Intubation for procedure	54 (16)	32 (12)	36 (11)	28 (12)	.26
Oxygenation failure	44 (13)	32 (12)	34 (11)	38 (16)	.27
Frequent apnea or bradycardia events	23 (7)	24 (9)	29 (9)	20 (8)	.70
Upper airway obstruction	12 (3)	9 (3)	11 (3)	9 (4)	.99
Unstable hemodynamics	10 (3)	7 (3)	2 (1)	5 (2)	.13
Other indication	10 (3)	0 <sup>b</sup>	5 (2)	3 (1)	.02
Surfactant administration	6 (2)	5 (2)	2 (1)	3 (1)	.52
Difficult airway, <i>n</i> (%)					
Difficult airway features <sup>e</sup>	98 (28)	85 (31)	79 (24)	82 (34)	.07
History of difficult airway	37 (11)	50 (18) <sup>b</sup>	52 (16) <sup>b</sup>	45 (19) <sup>b</sup>	.02

GA, gestational age; HIE, hypoxic-ischemic encephalopathy; IQR, interquartile range; PDA, patent ductus arteriosus.

<sup>a</sup> Only includes 10 mo.

<sup>b</sup> Statistically significant compared with November 2016–October 2017 epoch.

<sup>c</sup> >1 diagnosis or indication could be selected. Indications occurring in <1% of the population are not reported.

<sup>d</sup> Statistically significant compared with November 2017–October 2018 epoch.

<sup>e</sup> Defined as presence of any of the following: a known previous history of difficult airway, upper airway obstruction, limited mouth opening, limited neck extension, micrognathia, midfacial hypoplasia, cleft palate and a short thyromental distance (per NEAR4NEOS definitions).