

## ***Supplemental Document A – Implementation Toolkit***

### **Airway Bundle QI Project: Apneic oxygenation**

**Congratulations!** Your site is selected to be one of the vanguard sites for the next Quality Improvement (QI) Project for the NEAR4Kids project, **apneic oxygenation**. We have learned many lessons from the Airway bundle checklist implementation that will hopefully make your process a smooth transition with success.

It is important to know that the NEAR4Kids project is a QI project and needs to be rolled out just as you do for all other QI safety bundles (i.e. VAP, CLABSI, CAUBI, sedation pathway). You will need to show that your unit has a commitment to the project by providing a letter from your QI chair or unit medical director (template attached). We also recommend that you continue to work with **a multidisciplinary team** to assist with education, implementation and continued maintenance to ingrain this safety QI into the culture of your unit. The multidisciplinary team should include MD (attending, fellow), RN, RT, NP, PA &/or research assistant depending on the make-up of the providers in your unit. Each discipline will have a varied level of participation depending on the commitment they can make. At a minimum it is best to have a point person that can give input on workflow and ensure education and information is translated to their own teams.

Apneic oxygenation is best utilized for any intubations in your ICU, because our data showed desaturation occurs commonly even patients without lung pathology. The occurrence of desaturation is associated with increased adverse tracheal intubation associated events rate. When correctly used, apneic oxygenation can reduce risk of desaturation and may decrease adverse events rate. However, the use of apneic oxygenation requires staff education and pre-planned approach.

We recommend that you develop inclusive education to be provided at least 2 weeks prior to implementation so that everyone knows what will be happening, where to get everything, and the purpose of this QI project. You may choose to include simulation to demonstrate how it works. We have included a copy of the online education used from CHOP. There will be also a demonstration video on the NEAR4Kids website soon. Feel free to include this in your education. It is also helpful to provide compliance feedback to disciplines so they can assist with achieving the team goal of 80% compliance for both at risk and intubated patients.

Lastly, we recommend that you continue to report the compliance rates and trend in TIAE rates at your quality improvement committee.

Please let us know if there are questions or barriers to implementation that we can assist you with.

Sincerely,

Akira Nishisaki

Natalie Napolitano

Hayley Buffman

### Checklist for QI Implementation:

- Receive letter of support and send to Hayley Buffman
- Form Multidisciplinary Airway QI Team
- Update checklist for apneic oxygenation and send to QI committee for approval
- Determine work flow that best suits your unit culture including who has ultimate ownership
- Outline compliance monitoring plan
- Set Go Live date and notify us
- Develop education plan for each discipline
- Go Live

[Sample letter]

Dear National Emergency Airway Registry for Children (NEAR4KIDS) Quality Improvement Committee,

We reviewed and discussed the introduction of apneic oxygenation as the NEAR4KIDS (National Emergency Airway Registry for Children) quality improvement project. This letter confirms our endorsement of implementation of apneic oxygenation as the quality improvement project in our pediatric ICU. Our scheduled starting date for implementation of the apneic oxygenation is XXXXXXXX (date).

Pediatric ICU Quality improvement committee Chair

Date:

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## Airway Bundle Checklist (FRONT and BACK)



Date: _____	[Place patient sticker/stamp here]
Time: _____	
<b>Front page completed</b> (check all that apply):	
<input type="checkbox"/> On admission <input type="checkbox"/> During/after rounds <input type="checkbox"/> Prior to intubation <input type="checkbox"/> After intubation	
<input type="checkbox"/> Prior to extubation                      By _____	

### Assessment for ANTICIPATED Airway Management

#### Intubation Risk Assessment

<b>Difficult Airway</b>	History of difficult airway?	YES	NO
	Physical? (e.g. small mouth, small jaw, large tongue, or short neck)	YES	NO
<b>At Risk For:</b>	High risk for rapid <b>desaturation</b> during intubation	YES	NO
	Increased ICP, pulmonary hypertension, need to avoid <b>hypercarbia</b>	YES	NO
	<b>Unstable hemodynamics</b> (e.g. hypovolemia, potential need for fluid bolus, vasopressor, CPR)	YES	NO
	Other risk factors? _____	YES	NO

#### Planning (all risk noted above should be considered in plan)

**Who** will intubate? (Specify primary provider who will perform **first** laryngoscopy):

- Resident     Fellow     NP     Attending     Anesthesiologist     ENT physician     RT     Other - Specify below: \_\_\_\_\_

<b>How</b> will we intubate? <b>Method:</b> <input type="checkbox"/> oral vs. <input type="checkbox"/> nasal <b>ETT Type:</b> <input type="checkbox"/> Cuffed <input type="checkbox"/> Uncuffed <b>ETT Size:</b> <input type="checkbox"/> 3.0 <input type="checkbox"/> 3.5 <input type="checkbox"/> 4.0 <input type="checkbox"/> 4.5 <input type="checkbox"/> 5.0 <input type="checkbox"/> 5.5 <input type="checkbox"/> 6.0 <input type="checkbox"/> 6.5 <input type="checkbox"/> 7.0 <input type="checkbox"/> 7.5 <input type="checkbox"/> 8.0 <input type="checkbox"/> Other: _____ <b>Device:</b> <input type="checkbox"/> Laryngoscope <input type="checkbox"/> LMA _____ <input type="checkbox"/> Glidescope _____ <input type="checkbox"/> CMAC <input type="checkbox"/> Other: _____ <b>Blade:</b> <input type="checkbox"/> Mac _____ <input type="checkbox"/> Miller _____ <input type="checkbox"/> Wis-Hipple _____ <b>Meds:</b> <input type="checkbox"/> Atropine _____mg <input type="checkbox"/> Glycopyrrolate _____mcg <input type="checkbox"/> Fentanyl _____mcg <input type="checkbox"/> Midazolam _____mg <input type="checkbox"/> Ketamine _____mg <input type="checkbox"/> Propofol _____mg <input type="checkbox"/> Rocuronium _____mg <input type="checkbox"/> Vecuronium _____mg <b>Apneic Oxygenation:</b> YES / NO _____ L/min (<1y = 5L; 1-7y = 10L; ≥ 8y = 15L) <b>Other:</b> _____
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**When** will we intubate? (Describe the timing of airway management):

- Prior to procedure at: \_\_\_\_\_     Mental Status Changes     Hypoxemia refractory to CPAP: SpO2 < \_\_\_\_\_%  
 Ventilation failure refractory to NIV     Loss of Airway Protection     Other: \_\_\_\_\_

<b>Backup?</b> Advanced Airway Provider: <input type="checkbox"/> Attending <input type="checkbox"/> Anesthesia <input type="checkbox"/> ENT <input type="checkbox"/> Fellow <input type="checkbox"/> Other: _____ <input type="checkbox"/> Difficult Airway Cart <input type="checkbox"/> Difficult Airway Emergency Page <input type="checkbox"/> Other: _____
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## Immediate Pre-Intubation Procedure TIME OUT

Date: \_\_\_\_\_

Time: \_\_\_\_\_

Front page not filled out: Why? \_\_\_\_\_

**(Complete immediately before intubation)**

- Right Patient:** Confirm 2 identifiers and allergy status.  
Did the patient eat or drink in the last 6 hours?
- Right Plan:** Review and revise the FRONT PAGE plan
- Right Prep:** Patient accessible and positioned correctly, bed cleared for intubation, working IV?
- Right Equipment:** SOAP (e.g Suction, Oxygen, Airway, Personnel), IV fluid bolus readily available?
- Right Monitoring:** BP cycling frequently, different extremity from pulse ox, pulse ox volume?
- Right Rescue plan:** Difficult Airway cart/kit and equipment available? Who can we call for assistance?  
**Double press ASCOM Alert Button, or call Emergency# 4CODE**  
**State: "Stat Airway Emergency" (Provide Location)**
- Right Attitude:** State out loud:  
**"IF anybody has a concern at any time during the procedure please SPEAK UP."**

Designate who will press record if CMAC is in use.

Other PATIENT SPECIFIC preparation:

## Post-Procedure TIME OUT

All team members performed well without technical/communication challenges.

Or

Briefly describe below (comments by provider)

	What did we do well?	What can we improve upon?
1. RT		
2. Nurse		
3. Resident		
4. NP/PA		
5. Fellow		
6. Attending		

ETT Cuff adjusted to minimal leak: YES / NO

Goal SBS \_\_\_\_\_ (- 3 to +2)

Was the patient difficult to 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.\**

NEAR4Kids data form completed after intubation?

Here is the link to download the video file directly:

[https://player.vimeo.com/external/181693239.hd.mp4?s=6be3bb14bc7c3e2ad9bb017fcbf610746c1fc587&profile\\_id=174&download=1](https://player.vimeo.com/external/181693239.hd.mp4?s=6be3bb14bc7c3e2ad9bb017fcbf610746c1fc587&profile_id=174&download=1)

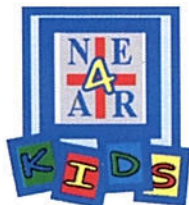
You may also access the video online (as well as download it from this review page):

<https://vimeo.com/user8989405/review/181693239/82898c940d>

[Mark Sim](#)

[Jane Sim](#)

## Airway Bundle Checklist (FRONT and BACK)



Date: <u>5/24/2016</u>	[Place patient sticker/stamp here]
Time: <u>15:00</u>	<u>Sim, Mark</u> <u>MRN: 12345678</u>
Front page completed (check all that apply):	
<input checked="" type="checkbox"/> On admission <input type="checkbox"/> During rounds <input type="checkbox"/> After Rounds <input type="checkbox"/> Just prior to intubation <input type="checkbox"/> Prior to Extubation	
By <u>Nishisaki</u>	

### Assessment for ANTICIPATED Airway Management

#### Intubation Risk Assessment

<b>Difficult Airway</b>	History of difficult airway?	YES	NO <input checked="" type="radio"/>
	Physical? (e.g. small mouth, small jaw, large tongue, or short neck)	YES	NO <input checked="" type="radio"/>
<b>At Risk For:</b>	High risk for rapid <b>desaturation</b> during intubation	YES <input checked="" type="radio"/>	NO <input type="radio"/>
	Increased ICP, pulmonary hypertension, need to avoid <b>hypercarbia</b>	YES	NO <input checked="" type="radio"/>
	<b>Unstable hemodynamics</b> (e.g. hypovolemia, potential need for fluid bolus, vasopressor, CPR)	YES	NO <input checked="" type="radio"/>
	Other risk factors? _____	YES	NO <input checked="" type="radio"/>

#### Planning (all risk noted above should be considered in plan)

**Who** will intubate? (Specify primary provider who will perform **first** laryngoscopy):

Resident  
  Fellow  
  NP  
  Attending  
  Anesthesiologist  
  ENT physician  
  RT  
  Other - Specify below: \_\_\_\_\_

**Who** will bag-mask?  Resident  Fellow  NP  Attending  RT  Other (Specify) \_\_\_\_\_

<b>How</b> will we intubate? <b>Method:</b> <input checked="" type="checkbox"/> oral vs. <input type="checkbox"/> nasal <b>ETT Type:</b> <input checked="" type="checkbox"/> Cuffed <input type="checkbox"/> Uncuffed
<b>ETT Size:</b> <input type="checkbox"/> 3.0 <input checked="" type="checkbox"/> 3.5 <input type="checkbox"/> 4.0 <input type="checkbox"/> 4.5 <input type="checkbox"/> 5.0 <input type="checkbox"/> 5.5 <input type="checkbox"/> 6.0 <input type="checkbox"/> 6.5 <input type="checkbox"/> 7.0 <input type="checkbox"/> 7.5 <input type="checkbox"/> 8.0 <input type="checkbox"/> Other: _____
<b>Device:</b> <input checked="" type="checkbox"/> Laryngoscope <input type="checkbox"/> LMA _____ <input type="checkbox"/> Glidescope _____ <input type="checkbox"/> Other: _____
<b>Blade:</b> <input type="checkbox"/> Mac _____ <input type="checkbox"/> Miller _____ <input checked="" type="checkbox"/> Wis-Hipple <u>1.5</u>
<b>Meds:</b> <input checked="" type="checkbox"/> Atropine _____ mg <input type="checkbox"/> Glycopyrrolate _____ mcg <input type="checkbox"/> Fentanyl _____ mcg <input checked="" type="checkbox"/> Midazolam _____ mg <input checked="" type="checkbox"/> Ketamine _____ mg <input type="checkbox"/> Propofol _____ mg <input checked="" type="checkbox"/> Rocuronium _____ mg <input type="checkbox"/> Vecuronium _____ mg
<b>Apneic Oxygenation:</b> <input checked="" type="radio"/> YES / <input type="radio"/> NO <u>HFNC</u> L/min (<1y = 5L; 1-7y = 10L; ≥8y = 15L)
<b>Other:</b> _____

**When** will we intubate? (describe the timing of airway management):

Prior to procedure at: \_\_\_\_\_  
  Mental Status Changes  
  Hypoxemia refractory to HFNC **GPAP**: SpO2 < \_\_\_\_\_%  
 Ventilation failure refractory to NIV  
  Loss of Airway Protection  
  Other: \_\_\_\_\_

<b>Backup?</b> Advanced Airway Provider: <input checked="" type="checkbox"/> Attending <input type="checkbox"/> Anesthesia <input type="checkbox"/> ENT <input type="checkbox"/> Fellow <input type="checkbox"/> Other: _____ <input checked="" type="checkbox"/> Difficult Airway Cart <input type="checkbox"/> Difficult Airway Emergency Page <input type="checkbox"/> Other: _____
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Front page not filled out: Why? \_\_\_\_\_

## Immediate Pre-Intubation Procedure TIME OUT

Date: 5/24/2016

Time: 16:30

**(Complete immediately before intubation)**

<input checked="" type="checkbox"/>	<b>Right Patient:</b> Confirm 2 identifiers and allergy status. Did the patient eat or drink in the last 6 hours?
<input checked="" type="checkbox"/>	<b>Right Plan:</b> Review and revise the FRONT PAGE plan
<input checked="" type="checkbox"/>	<b>Right Prep:</b> Patient accessible and positioned correctly, bed cleared for intubation, working IV?
<input checked="" type="checkbox"/>	<b>Right Equipment:</b> SOAP (e.g Suction, Oxygen, Airway, Personnel), IV fluid bolus readily available?
<input checked="" type="checkbox"/>	<b>Right Monitoring:</b> BP cycling frequently, different extremity from pulse ox, pulse ox volume?
<input checked="" type="checkbox"/>	<b>Right Rescue plan:</b> Difficult Airway cart/kit and equipment available? Who can we call for assistance? <b>Double press ASCOM Alert Button, or call Emergency# 4CODE</b> <b>State: "Stat Airway Emergency" (Provide Location)</b>
<input checked="" type="checkbox"/>	<b>Right Attitude:</b> State out loud: <b>"IF anybody has a concern at any time during the procedure please SPEAK UP."</b>

Other PATIENT SPECIFIC preparation:

Apneic Oxygenation → will keep same flow (pt on HFNC) and increase FiO<sub>2</sub> 100%.

## Post-Procedure TIME OUT

All team members performed well without technical/communication challenges.

Or

Briefly describe below (comments by provider)

	What did we do well?	What can we improve upon?
1. RT	No Desaturation	
2. Nurse	Good closed loop communication	
3. Resident		
4. NP/PA		
5. Fellow	No Desaturation	Took too long to intubate
6. Attending		

ETT Cuff adjusted to minimal leak: YES/NO

Goal SBS -2 (-3 to +2)

Was the patient difficult to 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.\**

Back page completed by (PRINT): Nadkarni

Intubated by: Newton

NEAR4Kids data form completed after intubation?



## Airway Bundle Checklist (FRONT and BACK)



Date: 5/24/2016 [Place patient sticker/stamp here]  
 Time: 15:00 Sim, Jane  
 MRN: 12345678  
 Front page completed (check all that apply):  
 On admission  During rounds  After Rounds  Just prior to intubation  Prior to Extubation  
 By Naskarni

### Assessment for ANTICIPATED Airway Management

#### Intubation Risk Assessment

Difficult Airway	History of difficult airway?	YES	<u>NO</u>
	Physical? (e.g. small mouth, small jaw, large tongue, or short neck)	YES	<u>NO</u>
At Risk For:	High risk for rapid desaturation during intubation	YES	<u>NO</u>
	<u>Increased ICP</u> , pulmonary hypertension, need to avoid hypercarbia	<u>YES</u>	<u>NO</u>
	Unstable hemodynamics (e.g. hypovolemia, potential need for fluid bolus, vasopressor, CPR)	YES	<u>NO</u>
	Other risk factors? <u>Avoid Hypoxemia, Hypercarbia</u>	YES	<u>NO</u>

#### Planning (all risk noted above should be considered in plan)

**Who** will intubate? (Specify primary provider who will perform first laryngoscopy):

Resident  Fellow  NP  Attending  Anesthesiologist  ENT physician  RT  Other - Specify below:

**Who** will bag-mask?  Resident  Fellow  NP  Attending  RT  Other (Specify) \_\_\_\_\_

**How** will we intubate? Method:  oral vs.  nasal      ETT Type:  Cuffed  Uncuffed  
 ETT Size:  3.0  3.5  4.0  4.5  5.0  5.5  6.0  6.5  7.0  7.5  8.0  Other: \_\_\_\_\_  
 Device:  Laryngoscope  LMA \_\_\_\_\_  Glidescope \_\_\_\_\_  Other: \_\_\_\_\_  
 Blade:  Mac \_\_\_\_\_  Miller \_\_\_\_\_  Wis-Hipple 1.5  
 Meds:  Atropine \_\_\_\_\_ mg  Glycopyrrolate \_\_\_\_\_ mcg  
 Fentanyl \_\_\_\_\_ mcg  Midazolam \_\_\_\_\_ mg  Ketamine \_\_\_\_\_ mg  Propofol \_\_\_\_\_ mg  
 Rocuronium \_\_\_\_\_ mg  Vecuronium \_\_\_\_\_ mg  
 Apneic Oxygenation: YES NO 5 L/min (<1y = 5L; 1-7y = 10L; ≥8y = 15L)  
 Other: \_\_\_\_\_

**When** will we intubate? (describe the timing of airway management):

Prior to procedure at: \_\_\_\_\_  Mental Status Changes  Hypoxemia refractory to CPAP: SpO2 < \_\_\_\_\_ %  
 Ventilation failure refractory to NIV  Loss of Airway Protection  Other: Increased ICP

**Backup?** Advanced Airway Provider:  Attending  Anesthesia  ENT  Fellow  Other: \_\_\_\_\_  
 Difficult Airway Cart  Difficult Airway Emergency Page  Other: \_\_\_\_\_

Front page not filled out: Why? \_\_\_\_\_

**Immediate Pre-Intubation Procedure TIME OUT**

Date: 5/24/2016

Time: 16:00

**(Complete immediately before intubation)**

<input checked="" type="checkbox"/> <b>Right Patient:</b> Confirm 2 identifiers and allergy status. Did the patient eat or drink in the last 6 hours?
<input checked="" type="checkbox"/> <b>Right Plan:</b> Review and revise the FRONT PAGE plan
<input checked="" type="checkbox"/> <b>Right Prep:</b> Patient accessible and positioned correctly, bed cleared for intubation, working IV?
<input checked="" type="checkbox"/> <b>Right Equipment:</b> SOAP (e.g Suction, Oxygen, Airway, Personnel), IV fluid bolus readily available?
<input checked="" type="checkbox"/> <b>Right Monitoring:</b> BP cycling frequently, different extremity from pulse ox, pulse ox volume?
<input checked="" type="checkbox"/> <b>Right Rescue plan:</b> Difficult Airway cart/kit and equipment available? Who can we call for assistance? <b>Double press ASCOM Alert Button, or call Emergency# 4CODE</b> <b>State: "Stat Airway Emergency" (Provide Location)</b>
<input checked="" type="checkbox"/> <b>Right Attitude:</b> State out loud: <b>"IF anybody has a concern at any time during the procedure please SPEAK UP."</b>

Other PATIENT SPECIFIC preparation:

**Post-Procedure TIME OUT**

All team members performed well without technical/communication challenges.

Or

Briefly describe below (comments by provider)

	What did we do well?	What can we improve upon?
1. RT	No Desaturation	Mother chose not to stay
2. Nurse	Good closed loop communication	
3. Resident		
4. NP/PA		
5. Fellow		Took longer to intubate
6. Attending		Head up 30" after intubation

ETT Cuff adjusted to minimal leak: YES/NO

Goal SBS -2 (-3 to +2)

Was the patient difficult to 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.\**

Back page completed by (PRINT): Nackarni

Intubated by: Newton

NEAR4Kids data form completed after intubation?