Yukon-Kuskokwim HEALTH CORPORATION

Clinical Guideline

Intubation (Adult and Pediatrics)

Prepare

Predict difficult airway and post-intubation hypotension:
1. Shock Index (SI) = HR/sBP. If >0.8, high likelihood of post-intubation hypotension. Optimize resuscitation with fluids/blood prior to intubation if possible.
2. Have at bedside: BVM with correct size mask, OPA/NPA, suction, LMA/i-Gel, bougie.
3. Predictors of difficult intubation: see next page. ***Consider contacting anesthesiology if difficult airway is anticipated!***
4. Prepare several doses of all medications, including an extra dose of paralytic and boluses of post-intubation sedation.

Pre-oxygenate

Goal SpO_2 > 93% for three minutes. Mask *and* NC in all patients.
Non-rebreather with flush rate O_2 if spontaneously breathing.
Bag-mask ventilation if no spontaneous breathing.
Non-invasive PPV if in ARDS.

Pre-medicate (optional)

FOR ADULTS, may choose one or more:
1. Fentanyl 2-4 mcg/kg
2. Ketamine 0.1-0.3 mg/kg
3. Rocuronium 0.1 mg/kg

FOR PEDIATRICS:
Atropine – onset <1 minute. Use for younger than 12 months. Use doses on Pediatric Critical Care Guide (code sheets).
Consider using in any patient at risk for bradycardia associated with airway manipulation, shock, hypoxia, acidosis, or severe electrolyte abnormalities.

Induce

FOR ADULTS, choose one:
1. Etomidate 0.3 mg/kg: first line for most patients.
2. Ketamine 1-2 mg/kg
3. Propofol 2 mg/kg: caution hypotension.
4. Midazolam 0.1-0.3 mg/kg: caution hypotension.

FOR PEDIATRICS:
Midazolam AND fentanyl, using doses on Pediatric Critical Care Guide (code sheets).
May need to repeat fentanyl dose.

Paralyze

FOR ADULTS, choose one:
1. Rocuronium 1 mg/kg: duration 30-40 minutes.
2. Succinylcholine 1-2 mg/kg: duration 3-5 minutes; see warning on next page.
3. Vecuronium 0.1 mg/kg: duration 45-65 minutes.

FOR PEDIATRICS:
Rocuronium, using doses on Pediatric Critical Care Guide (code sheets).
DO NOT USE SUCCINYLCHOLINE.

Perform video or direct laryngoscopy

Fails → **Bag-mask ventilation ± OPA or supraglottic airway (LMA/i-Gel)**

Succeeds → Consider making changes:
- Try other form of laryngoscopy.
- Change provider doing the procedure.
- Contact anesthesia.
- Change patient position.
- Use bougie.

Succeeds

Fails → **Cricothyrotomy**

Succeeds

Confirm placement:
1. Visualize tube through cords.
2. End tidal CO2 detector turns and remains yellow after 6 breaths.
3. Bilateral breath sounds.
4. No noise over epigastrium.
5. *Normal waveform on $EtCO_2$ capnography (gold standard).*
6. Confirmation on CXR.

PEDIATRICS
- Secure tube with silk tape.
- Do not use a commercial tube holder device for tubes 5.0 and smaller.
- Always place NG/OG tube for decompression.

Continuing sedation/analgesia

FOR ADULTS:
1. Fentanyl 1-4 mcg/kg/hour, bolus 50-100 mcg.
2. Midazolam 0.02-0.1 mg/kg/hour, bolus 1-5 mg.
3. Propofol 5-80 mcg/kg/minute, bolus 1-2 mg/kg.
4. Ketamine 0.5 mg/kg/hour, bolus 1-2 mg/kg.

FOR PEDIATRICS:
- Fentanyl continuous infusion with boluses Q15minutes *prn*, using doses on Critical Care Guide. Give bolus prior to starting drip.
- Consider midazolam boluses if needed. Consider continuous infusion if needed. Watch for hypotension.

Post-intubation care

- Obtain ABG.
- Place NG/OG tube.
- Elevate head of bed 30-45°.
- BP Q3 minutes x30 minutes.
- Place in-line suction.
- Consider nebulized treatments.
- Consider C-collar.

This guideline is designed for the general use of most patients but may need to be adapted to meet the special needs of a specific patient as determined by the medical practitioner.
Approved by MSEC 2/5/20.
If comments about this guideline, please contact Travis_Nelson@ykhc.org or Leslie_Herrmann@ykhc.org.

Supplement I: Predictors of Difficult Intubation

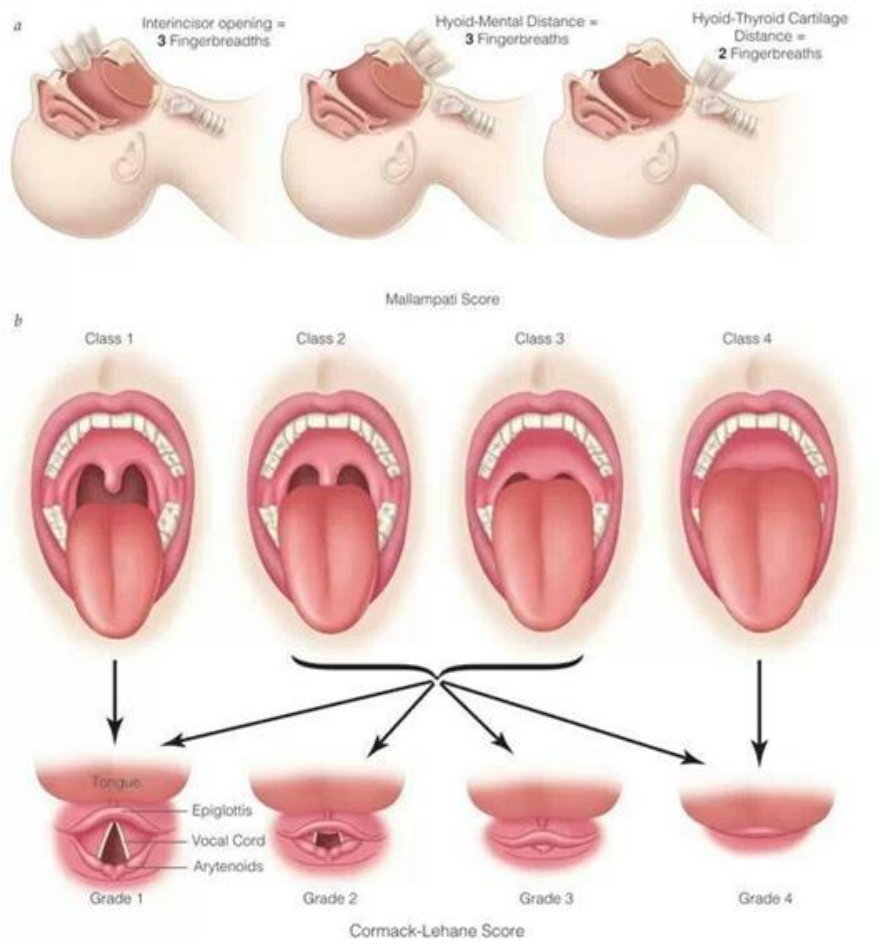
Predictors of Difficult Intubation

- Mallampati grade 3 or 4
- Cormack & Lehane grade 3 or 4
- Wilson score of > 2
- LEMON system; objective/subjective scoring

Wilson Score			
	0	**1**	**2**
Weight (kg)	< 90	90-110	> 110
Head and neck movement	> 90°	~ 90°	< 90°
• Inter-incisor gap (cm) • SL (maximum forward protrusion of lower incisors beyond uppers)	> 5 > 0	= 5 = 0	< 5 < 0
Receding mandible	None	Moderate	Severe
Buck teeth	None	Moderate	Severe

LEMON System	
L	**L**ook: trauma, large tongue
E	**E**valuate 3:3:2 rule.
M	**M**allampati score ≥ 3
O	**O**bstruction
N	**N**eck mobility (limited)

Helpful Resource: **the Difficult Airway App**



Supplement II: Use of Succinylcholine

Absolute contraindications:
Family / personal history of malignant hyperthermia
Hyperkalemia; if unknown K, obtain EKG for peaked T's
Upper motor neuron injury, denerving neuromuscular disease
Use after acute phase of burns, major trauma, crush injury

Relative contraindications:
Elevated ICP
Pseudocholinesterace deficiency

Treatment of malignant hyperthermia:
Dantrolene 2.5 mg/kg IV, redosing based on expert guidance

Resources: Guideline adapted from Strayer Airway Algorithm, Austin Hospital Airway Algorithm
Predictors of Difficult Intubation: http://medind.nic.in/iad/t05/i4/iadt05i4p257.pdf

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Clinical Guideline

Initial Ventilator Settings for an Intubated Adult

ARDS/Protective Ventilation Protocol (appropriate for most patients without indication for alternate ventilation):

Initial Ventilator Settings:
(1) Set Tidal volume (Vt) = 6-8 mL/kg using Ideal Body Weight. See **MDCalc Tidal Volume Calculator**.
(2) Reduce Vt by 1 mL/kg every 1-2 hours until Vt 6 mL/kg.
(3) Set initial rate to 18-35 bpm based on pre-intubation rate.
Obstructive lung disease: Consider lower RR to maximize expiratory phase.
(4) Set initial PEEP at 5 cm H2O.
• If BMI > 30, set PEEP to 8 cm H2O.
• If BMI > 40, set PEEP to 10 cm H2O.
(5) Set initial FiO2 at 30-40%; adjust to SpO2 88-95%.
(6) Set inspiratory flow rate 60-80 lpm.
Obstructive lung disease: Consider inspiratory flow rate 80-100 lpm

Adjust settings based on patient status, blood gases, CXR, and expert consultation.

Oxygenation goal: PaO_2 55-80 mmHg or SpO_2 88-95%.
Use a minimum PEEP of 5 cm H_2O. Consider use of incremental FiO_2/PEEP combinations such as shown below (not required) to achieve goal.

For all modes of ventilation:

• Initial vent setting are based on patient presentation.

• Vent settings are adjusted based on patient tolerance of mechanical ventilation and ABG results.

• Obtain ABG prior to intubation, 30 minutes following intubation, and 30 minutes after vent changes.

• Goal plateau pressure < 30 cm H_2O; decrease Tv to lower PP.
Obese patients may require higher plateau pressure

• Target pH > 7.30; increase RR to control hypercapnia.

• Avoid intubation if possible in patients with obstructive lung disease; maximize use of NIPPV.