



Predict difficult airway and post-intubation hypotension (See below for Push-Dose Epinephrine):

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, push-dose epinephrine (see below).
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.
5. Optimize positioning: shoulder roll for infants and children, ramp positioning for obese patients.

Prepare

Pre-oxygenate

Pre-medicate (optional)

Induce

Paralyze

Perform video or direct laryngoscopy

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

Cricothyrotomy

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 EtCO₂ capnography (gold standard).
6. Confirmation on CXR.

Continuing sedation/analgesia

Post-intubation care

Goal SpO₂ > 93% for three minutes. Mask and NC in all patients. Non-rebreather with flush rate O₂ if spontaneously breathing. Bag-mask ventilation if no spontaneous breathing. Non-invasive PPV if in ARDS.

PUSH-DOSE EPINEPHRINE

- Mix 9 mL of NS with 1 mL of epinephrine 1:10,000 (or 0.1 mg/mL) to make epinephrine 10 mcg/mL.
- Adult dose is 0.5-2 mL Q 2-5 minutes (5-20 mcg).
- Pediatric dose is 0.1 mL/kg, max 2 mL.

ADULTS, may choose one or more:

1. Fentanyl 2 mcg/kg
2. Ketamine 0.1-0.3 mg/kg
3. Rocuronium 0.1 mg/kg

PEDIATRICS:

Atropine – onset <1 minute. Use for <1 year or if using ketamine. 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.

ADULTS, choose one agent. Reduce doses if risk of hypotension.

1. Etomidate 0.3 mg/kg: first line for most patients.
2. Ketamine 1-2 mg/kg.
3. Propofol 2 mg/kg.
4. Midazolam 0.1-0.3 mg/kg.

PEDIATRICS:

Midazolam AND fentanyl, using doses on [Pediatric Critical Care Guide](#) (code sheets). May need to repeat fentanyl dose.

ADULTS, choose one:

1. Rocuronium 1-2 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.

PEDIATRICS:

Rocuronium, using doses on [Pediatric Critical Care Guide](#) (code sheets). **DO NOT USE SUCCINYLCHOLINE.**

Consider making changes:

- Try other form of laryngoscopy.
- Change provider doing the procedure.
- Contact anesthesia.
- Change patient position.
- Use bougie.

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.

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.

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.

- 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 12/7/21.

Click [here](#) to see the supplemental resources for this guideline.

If comments about this guideline, please contact Travis_Nelson@ykhc.org or Leslie_Herrmann@ykhc.org.



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

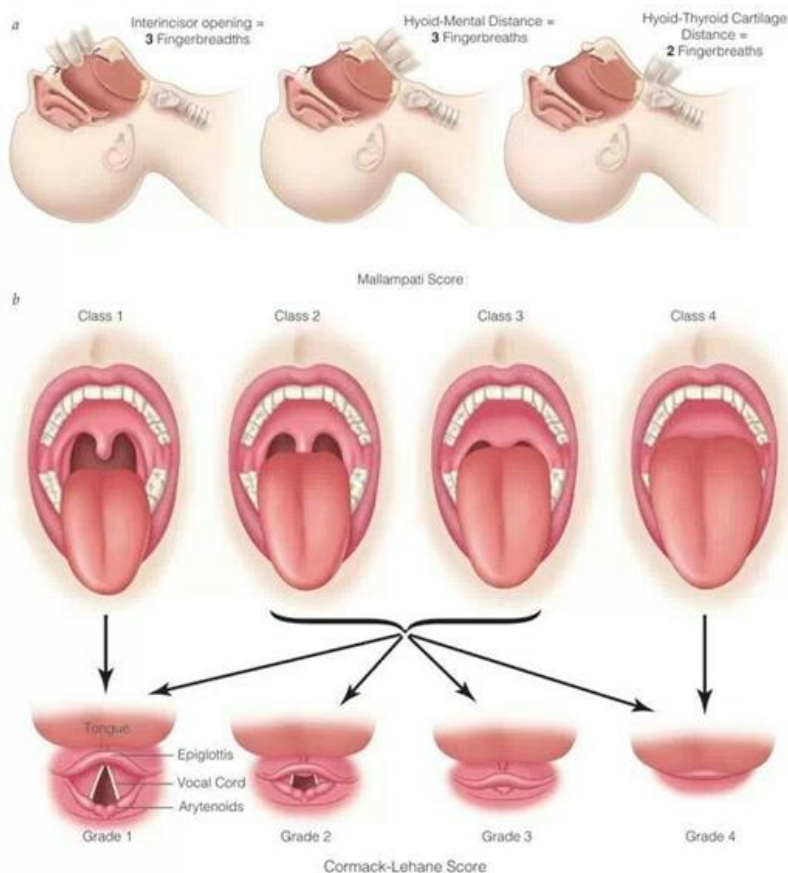
Wilson Score

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

LEMON System

L	Look: trauma, large tongue
E	Evaluate 3:3:2 rule.
M	Mallampati score ≥ 3
O	Obstruction
N	Neck mobility (limited)

Helpful Resource: [the Difficult Airway App](#)



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, denervating neuromuscular disease
Use after acute phase of burns, major trauma, crush injury

Relative contraindications:

Elevated ICP
Pseudocholinesterase deficiency

Treatment of malignant hyperthermia:

Dantrolene 2.5 mg/kg IV, redosing based on expert guidance

Difficulty with BVM

Predictors of Difficulty with BVM

R	Radiation/Restriction
O	Obstruction/Obesity/OSA
M	Mask seal/Male/Mallampati ≥ 3
A	Aged
N	No teeth

Options if having difficulty with BVM

- 2-hand technique with 2 providers
- Oral/nasal airways
- Positioning
- Consider no paralytics

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

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

Initial Ventilator Settings:

(1) Set Tidal volume (V_t) = 6-8 mL/kg using Ideal Body Weight. See [MDCalc Tidal Volume Calculator](#).

(2) Reduce V_t by 1 mL/kg every 1-2 hours until V_t 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: PaO₂ 55-80 mmHg or SpO₂ 88-95%.

Use a minimum PEEP of 5 cm H₂O. Consider use of incremental FiO₂/PEEP combinations such as shown below (not required) to achieve goal.

PEDIATRICS: Suggested Starting Ventilator Settings

1. Set FiO₂ to 1.0 and titrate to maintain SpO₂ 92-94%. Goal is to decrease FiO₂ to <0.5 if possible.

2. Set Tidal Volume (V_t) at 8-10 mL/kg. If concern for ARDS, set V_t to 6-8 mL/kg.

3. Goal is inspiratory plateau pressures <30 cm H₂O.

4. Set respiratory rate by age, increasing or decreasing based on disease process:

Adolescents 12-15 breaths/minute

Children 15-20 breaths/minute

Infants 20-25 breaths/minute

Neonates 25-30 breaths/minute

5. Set PEEP to 5 cm H₂O to optimize alveolar recruitment.

6. Set inspiratory time by age:

Adolescents 1.0 second

Children 0.7 second

Infants/neonates 0.5 second

7. If using pressure support, set at 5-10 cm H₂O.

8. Get a blood gas ~30 minutes after any changes to ventilator settings.

Call PICU at (907) 297-8809 immediately to help troubleshoot any problems.

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.
For high PCO₂: increase rate and Tidal Volume
For low PO₂: increase FiO₂ and PEEP
- Obtain ABG prior to intubation, 30 minutes following intubation, and 30 minutes after vent changes.
- Goal plateau pressure < 30 cm H₂O; decrease V_t to lower plateau pressure.
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.

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