Bridging the Gap: Collaborative Preoperative Optimization for the Pediatric Patient

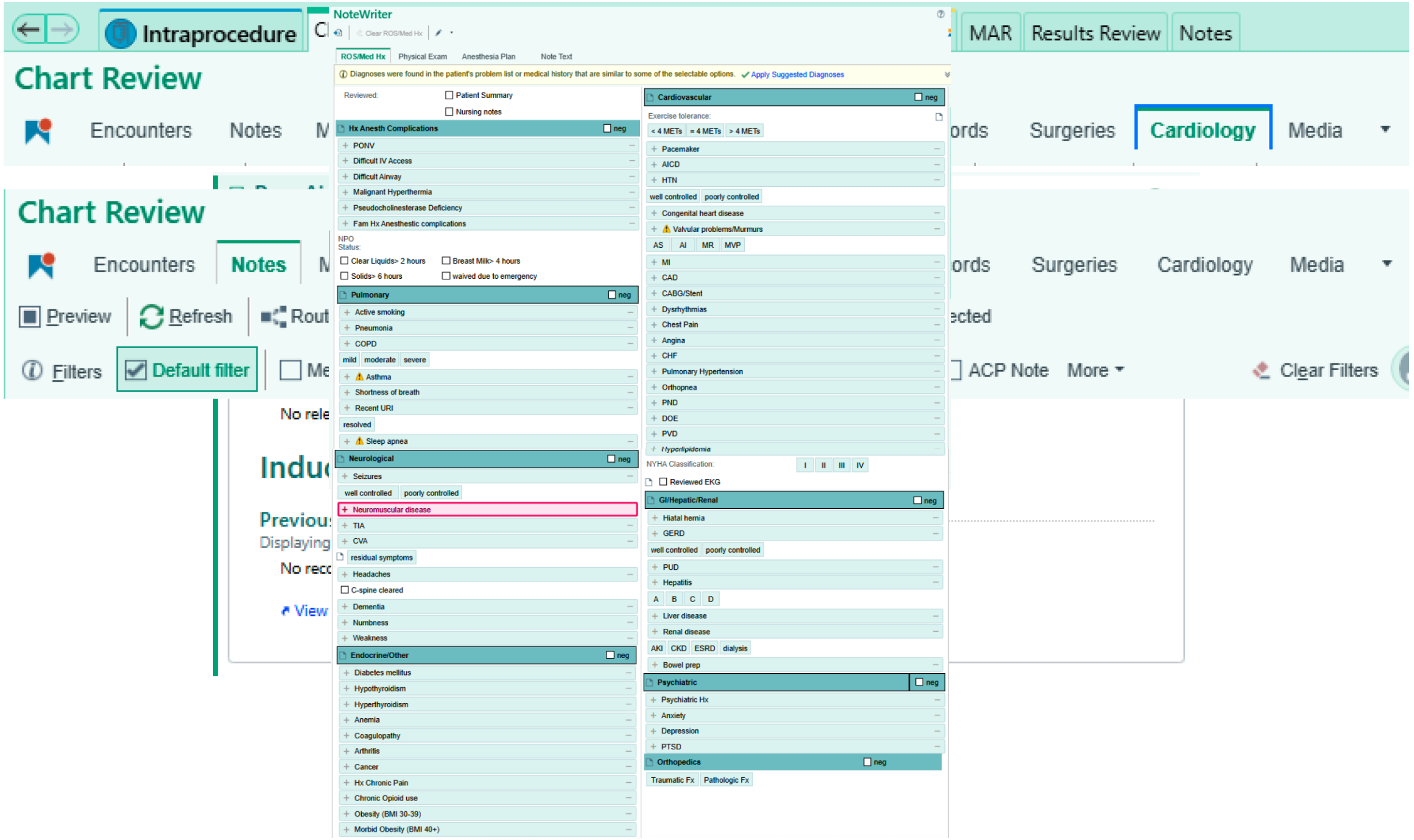
Michael Henry, MD

Disclosures:

- None

What is “clearance” and why do we need it?

- 4 Million pediatric operative procedures performed annually in the US
- Patients oftentimes have complex medical history or procedures that require medical optimization
- Pediatricians are aware of medical and social dynamics that impact patient care


Intraprocedure
NoteWriter
Clear ROS/Med Hx
ROS/Med Hx
Physical Exam
Anesthesia Plan
Note Text
Diagnoses were found in the patient's problem list or medical history that are similar to some of the selectable options.
Apply Suggested Diagnoses
Chart Review
Encounters
Notes
MAR
Results Review
Surgeries
Cardiology
Media
Reviewed:
Patient Summary
Nursing notes
Hx Anesth Complications
neg
PONV
Difficult IV Access
Difficult Airway
Malignant Hyperthermia
Pseudocholinesterase Deficiency
Fam Hx Anesthestic complications
NPO Status:
Clear Liquids> 2 hours
Breast Milk> 4 hours
Solids> 6 hours
waived due to emergency
Pulmonary
Active smoking
Pneumonia
COPD
mild
moderate
severe
Asthma
Shortness of breath
Recent URI
resolved
Sleep apnea
Neurological
Seizures
well controlled
poorly controlled
Neuromuscular disease
TIA
CVA
residual symptoms
Headaches
C-spine cleared
Dementia
Numbness
Weakness
Endocrine/Other
Diabetes mellitus
Hypothyroidism
Hyperthyroidism
Anemia
Coagulopathy
Arthritis
Cancer
Hx Chronic Pain
Chronic Opioid use
Obesity (BMI 30-39)
Morbid Obesity (BMI 40+)
Cardiovascular
Exercise tolerance:
< 4 METs
= 4 METs
> 4 METs
Pacemaker
AICD
HTN
well controlled
poorly controlled
Congenital heart disease
Valvular problems/Murmurs
AS
AI
MR
MVP
MI
CAD
CABG/Stent
Dysrhythmias
Chest Pain
Angina
CHF
Pulmonary Hypertension
Orthopnea
PND
DOE
PVD
Hyperlipidemia
NYHA Classification:
I
II
III
IV
Reviewed EKG
GI/Hepatic/Renal
Hiatal hernia
GERD
well controlled
poorly controlled
PUD
Hepatitis
A
B
C
D
Liver disease
Renal disease
AKI
CKD
ESRD
dialysis
Bowel prep
Psychiatric
Psychiatric Hx
Anxiety
Depression
PTSD
Orthopedics
Traumatic Fx
Pathologic Fx
Preview
Refresh
Filters
Default filter
ACP Note
More
Clear Filters

Hx Anesth Complications ☐ neg

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- Difficult Airway
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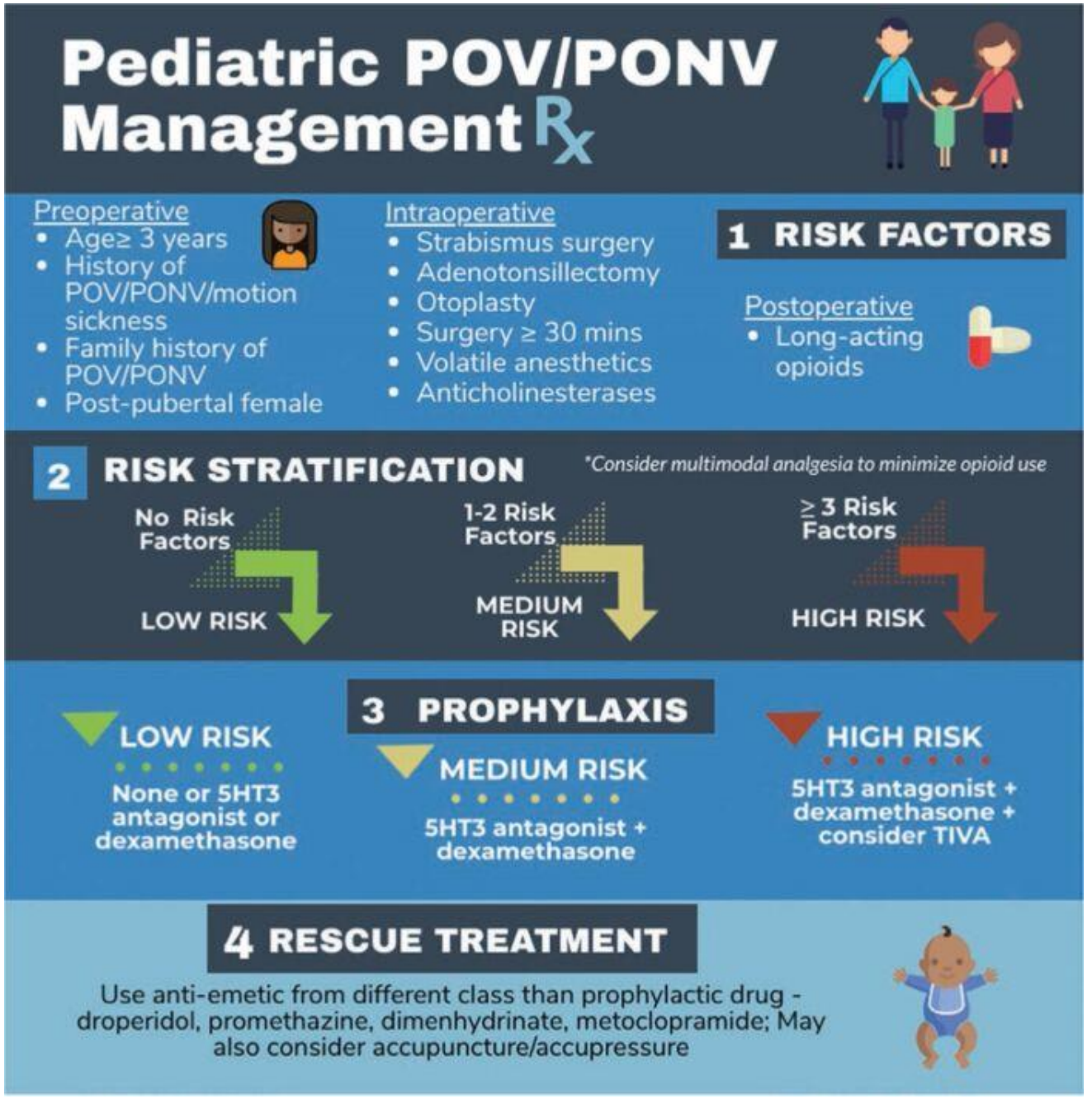

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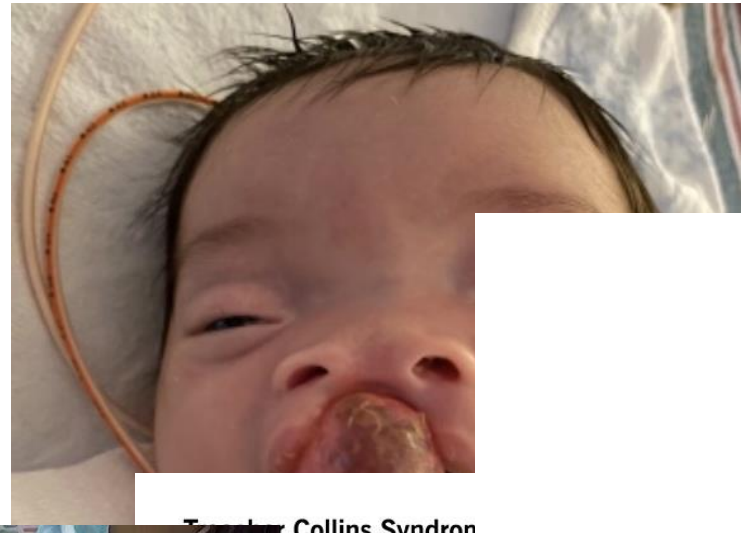
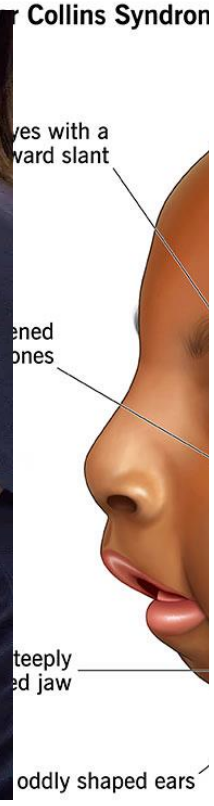
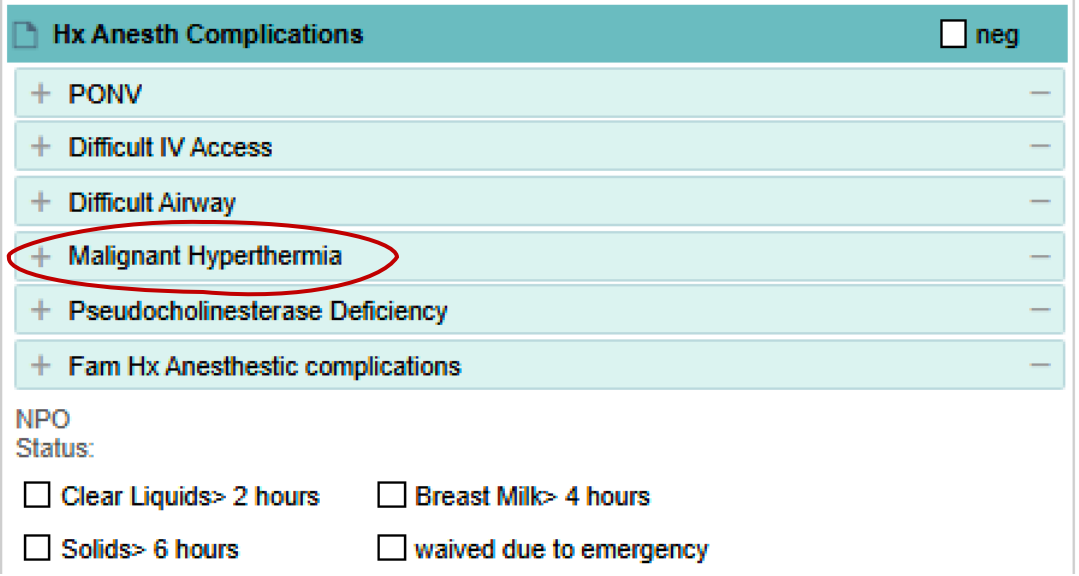


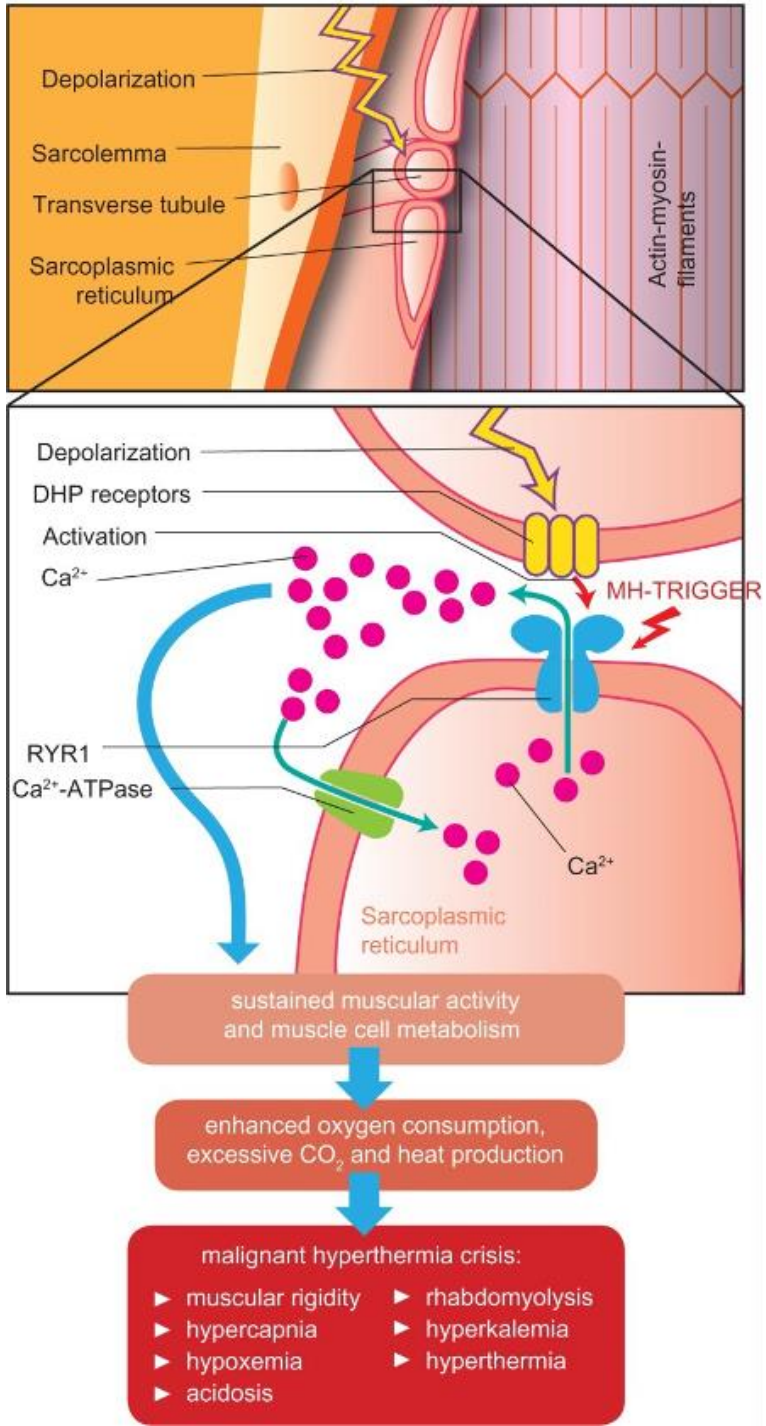




"My grandmother died during anesthesia"

"My brother had to go to the ICU after a brief dental procedure"

MH Associated Syndromes	Non-MH Associated Syndromes
Central core disease King-Denborough syndrome Multi mini core disease Centronuclear myopathy Congenital fiber type disproportion myopathy Native American myopathy (STAC3 Disorder)	Duchenne muscular dystrophy Becker muscular dystrophy Mitochondrial disease



- [ ] **Hx Anesth Complications** — [ ] neg
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  - Difficult IV Access
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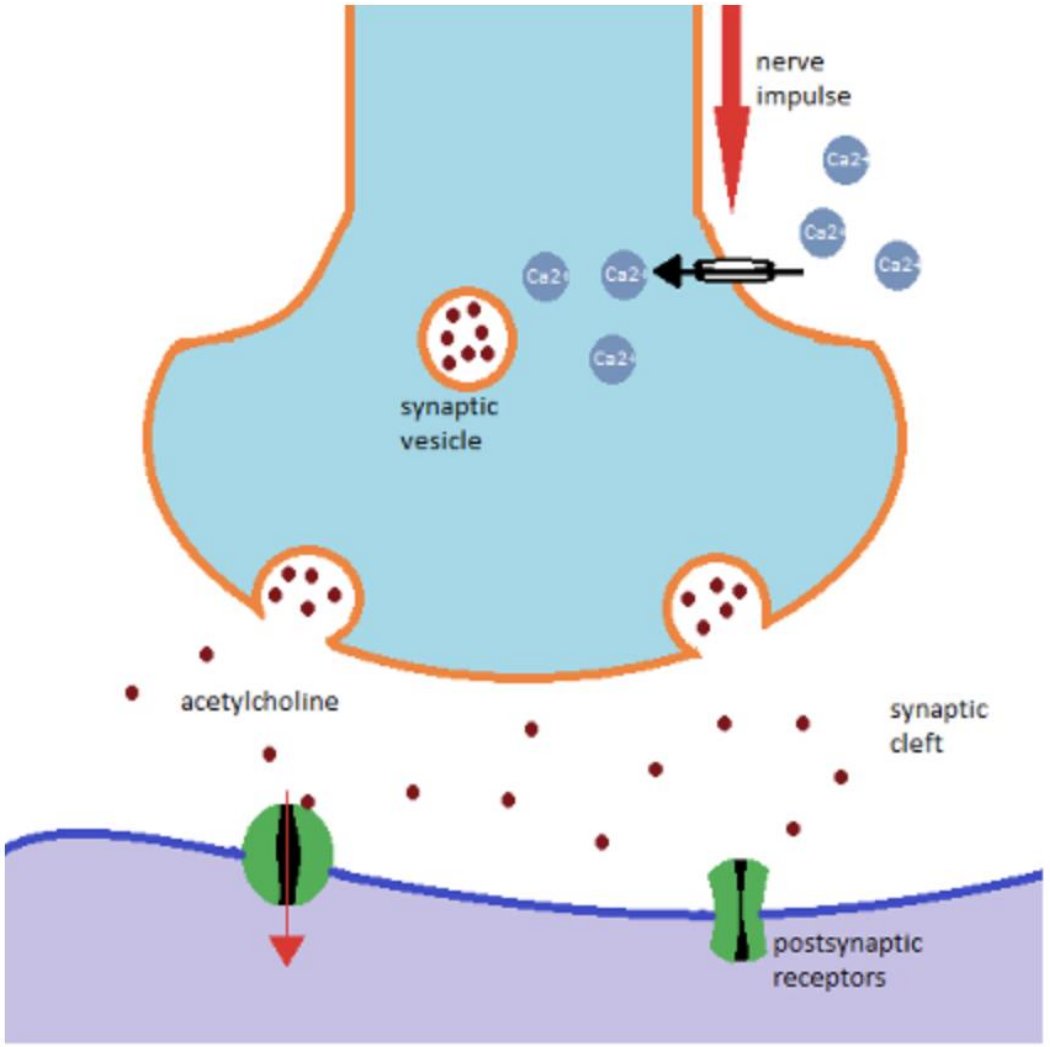

Figure 1. Mechanism of action of neuromuscular blocking agents

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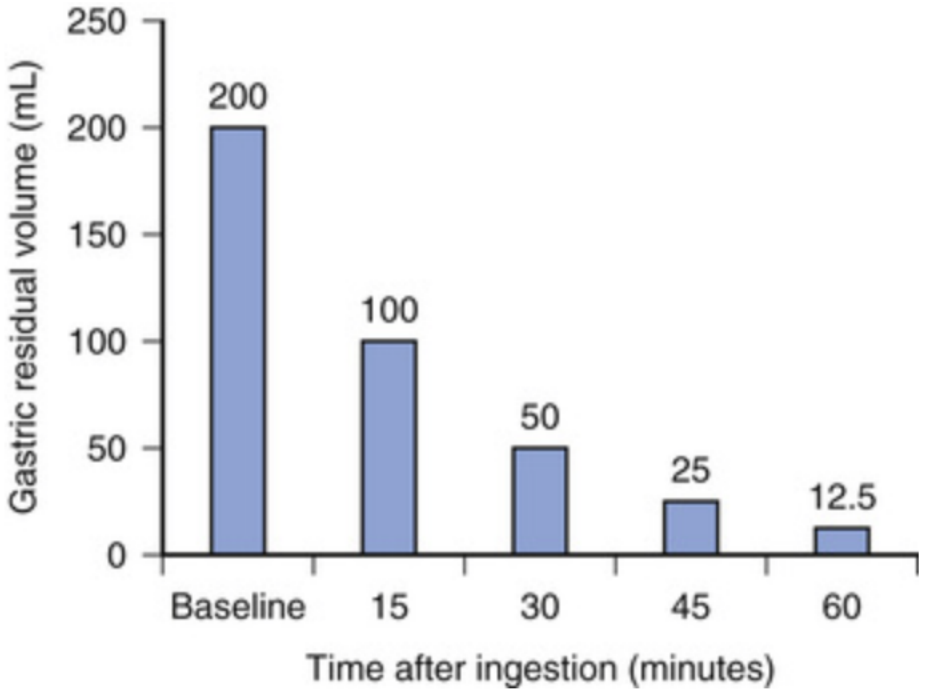
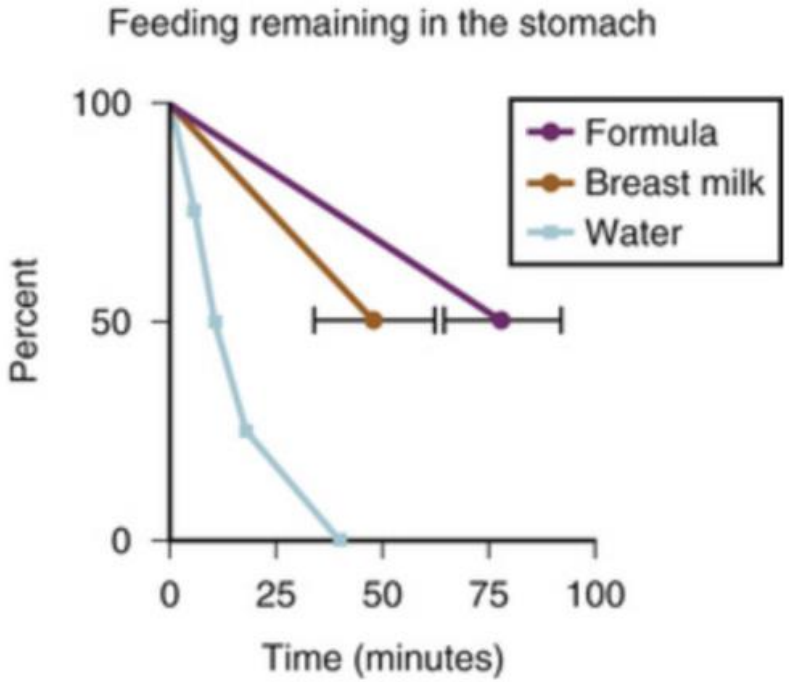
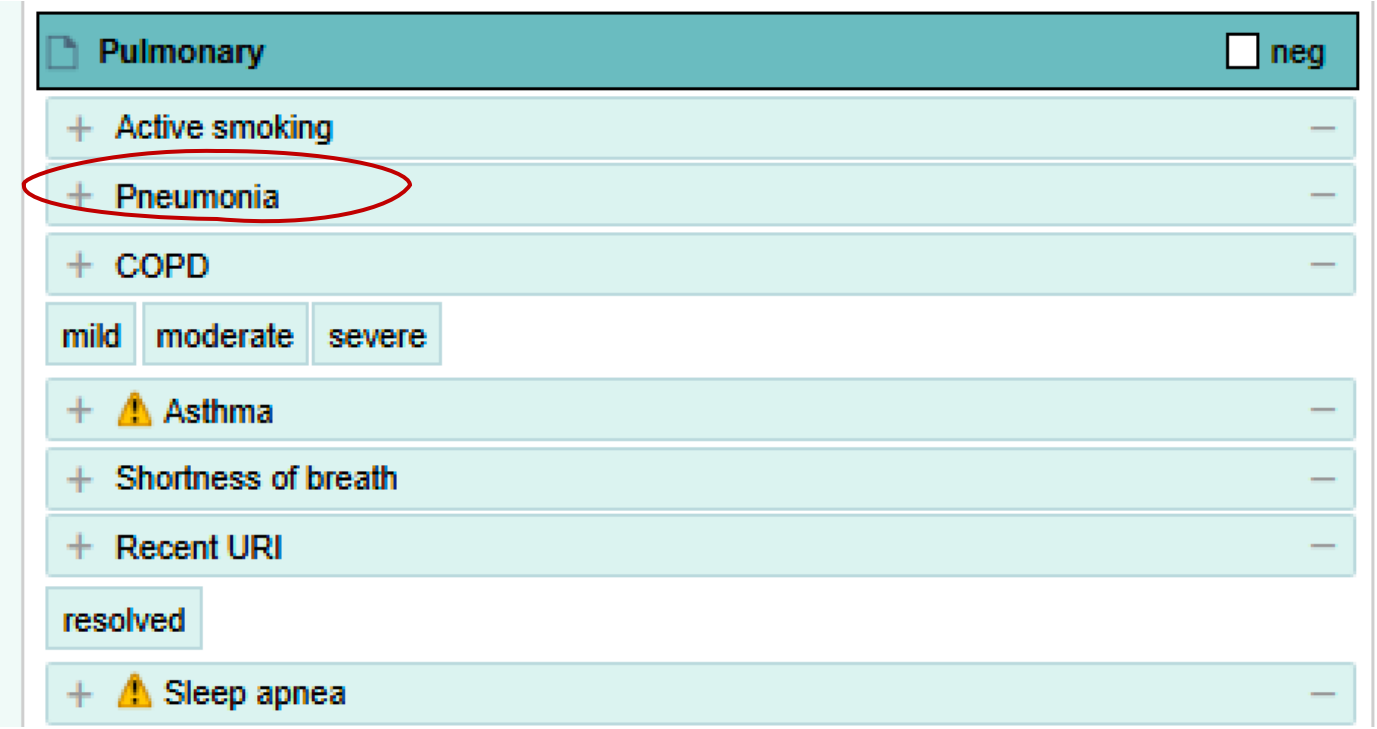




- Pulmonary
  - Active smoking
  - Pneumonia
  - COPD
    - mild
    - moderate
    - severe
  - ⚠ Asthma
  - Shortness of breath
  - Recent URI
    - resolved
  - ⚠ Sleep apnea



Postpone elective surgery 4-6 weeks

- Airway hyperreactivity
- Mucociliary Clearance
- Alveolar recovery

- **Pulmonary** ☐ neg
  - \+ Active smoking —
  - \+ Pneumonia —
  - \+ ~~COPD~~ —
    - mild
    - moderate
    - severe
  - \+ ⚠ Asthma
  - \+ Shortness of breath
  - \+ Recent URI
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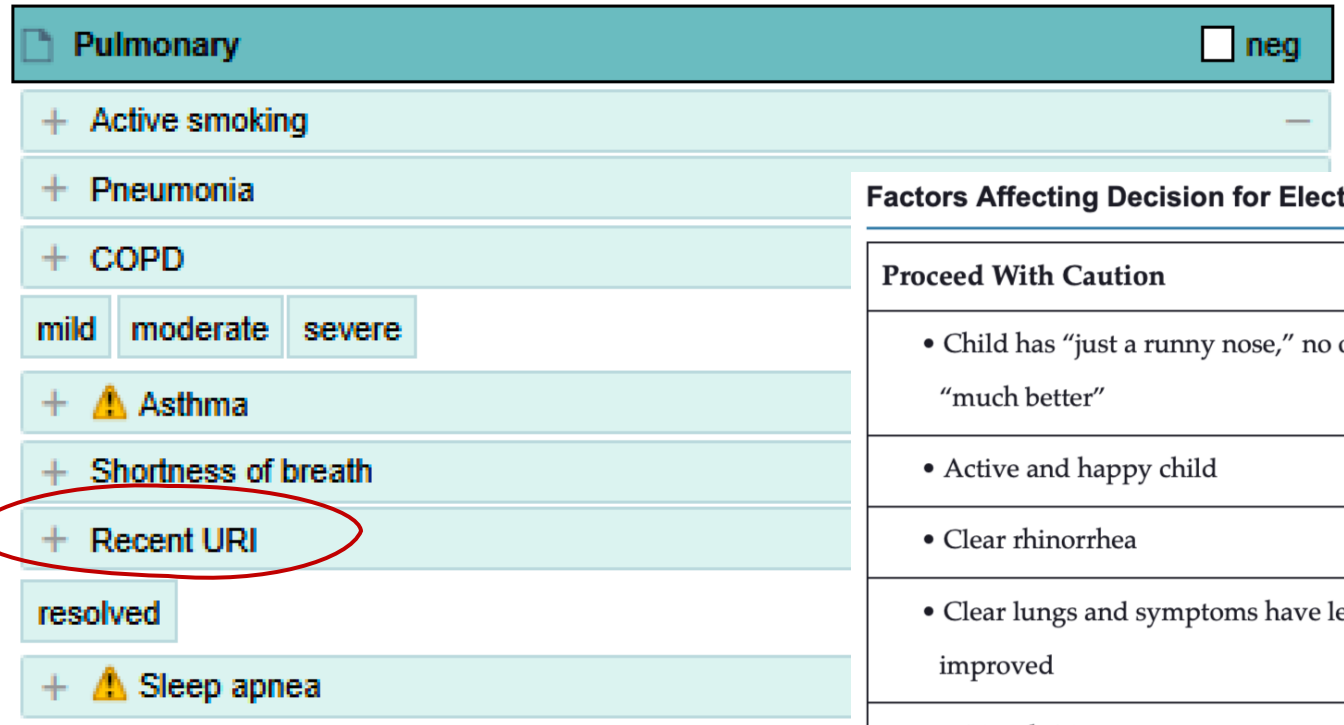
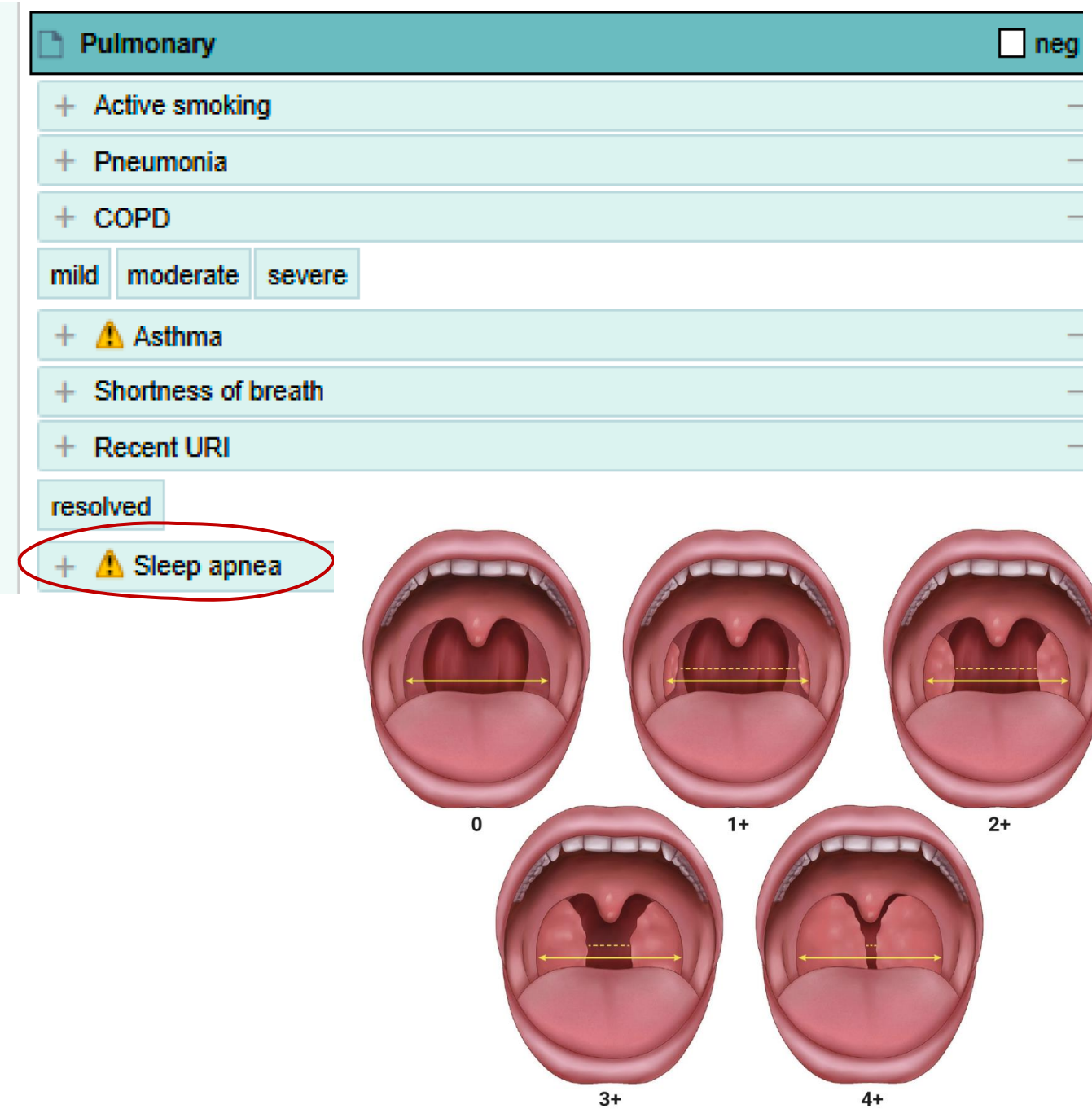


Factors Affecting Decision for Elective Surgery in a Child With Upper Respiratory Tract Infection

Proceed With Caution	Consider Cancellation
• Child has "just a runny nose," no other symptoms, "much better"	• Parents confirm symptoms: fever, malaise, cough, poor appetite, just developed symptoms last night
• Active and happy child	• Lethargic, ill-appearing
• Clear rhinorrhea	• Purulent nasal discharge
• Clear lungs and symptoms have leveled off or have improved	• Wheezing, rales that do not clear
• Older child	• Child <1 year, former premie
• Social issues: hardship for parents to be away from work, insurance will run out	• Other factors: history of reactive airway disease, major operation, endotracheal tube required
• No fever	• Fever >38.5°C
• Outpatient procedure that will not expose immunocompromised children to possible infectious agent	• Inpatient procedure that may result in exposure of immunocompromised children to viral/bacterial infection

From Tait AR, Malviya S. Anesthesia for the child with an upper respiratory tract infection: still a dilemma? *Anesth Analg.* 2005;100:59-65.



Common indications for overnight admission after tonsillectomy:

- Age < 3yo
- severe OSA (apnea-hypopnea index ≥10 obstructive events/hour, oxygen saturation nadir <80%, or both);
- obesity: body mass index greater than 95th percentile;
- Trisomy 21;
- craniofacial anomalies;
- Sickle cell disease;
- neuromuscular disorders;
- mucopolysaccharidoses; and
- bleeding diathesis.

Neurological ☐ neg

+ Seizures −

well controlled | poorly controlled

+ Neuromuscular disease −

+ TIA −

+ CVA −

residual symptoms

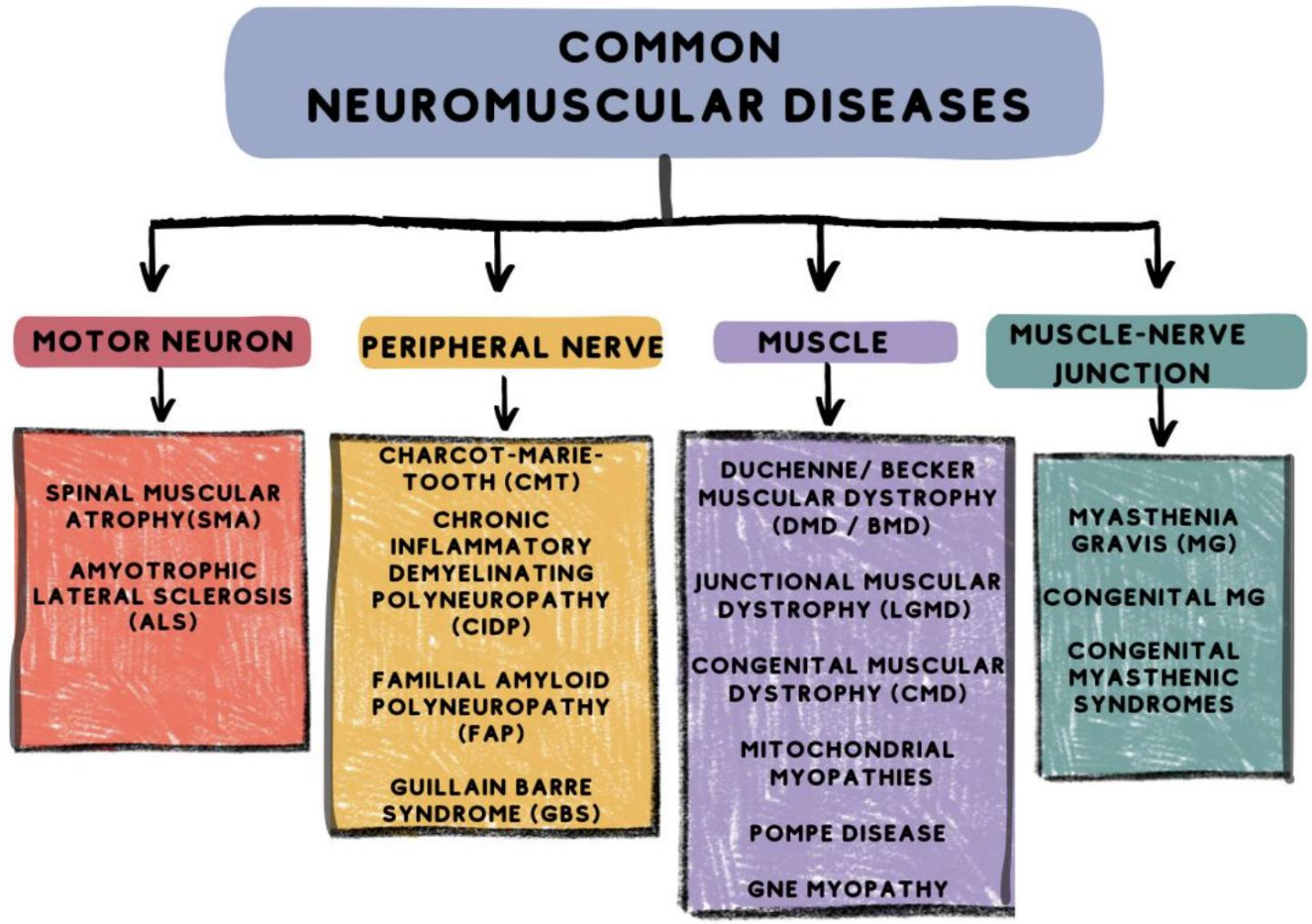
+ ⚠ Headaches −

☐ C-spine cleared

+ Dementia −

+ Numbness −

+ Weakness −



- Endocrine/Other — ☐ neg
  - Diabetes mellitus
  - Hypothyroidism
  - Hyperthyroidism
  - Anemia
  - Coagulopathy
  - Arthritis
  - Cancer
  - Hx Chronic Pain
  - Chronic Opioid use
  - Obesity (BMI 30-39)
  - Morbid Obesity (BMI 40+)

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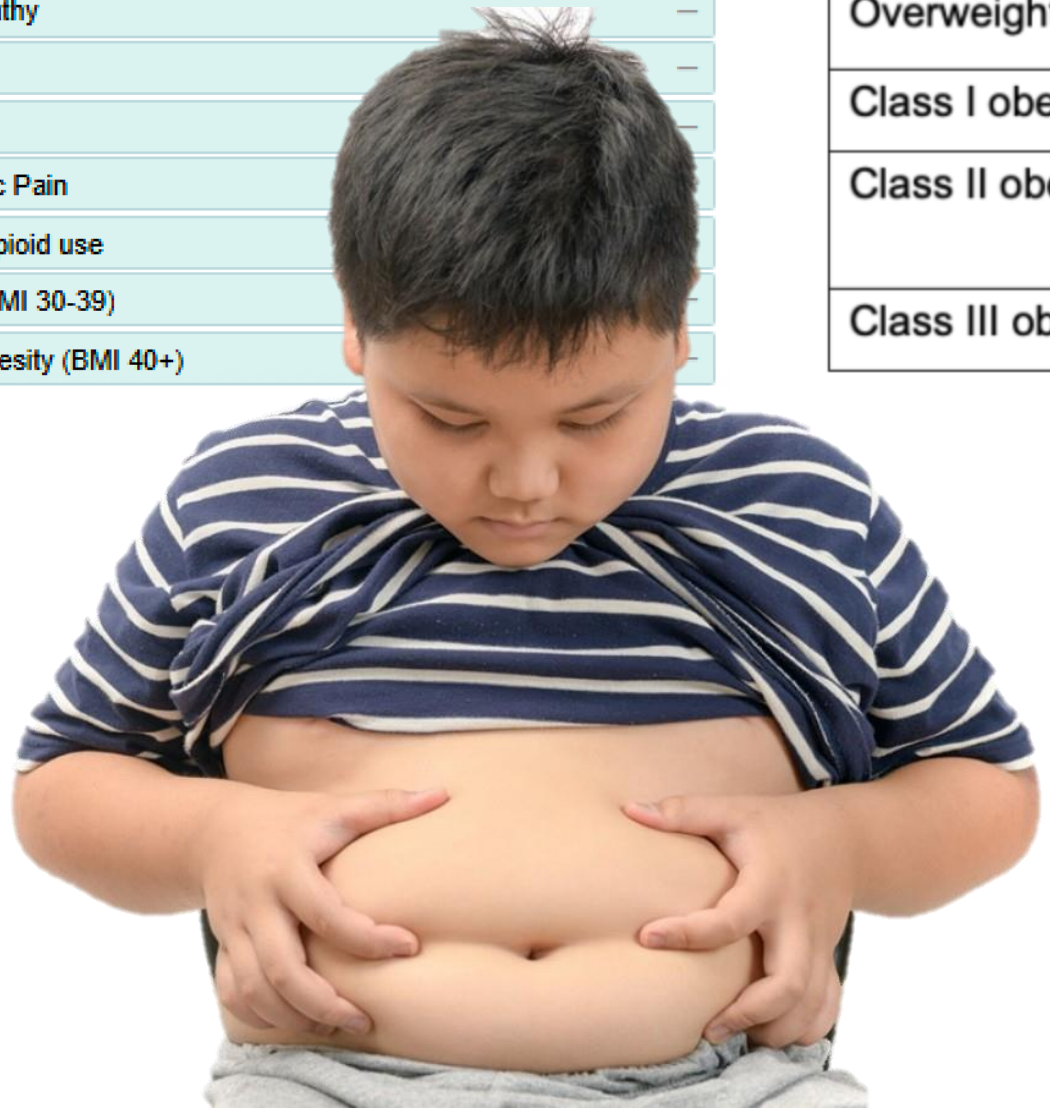
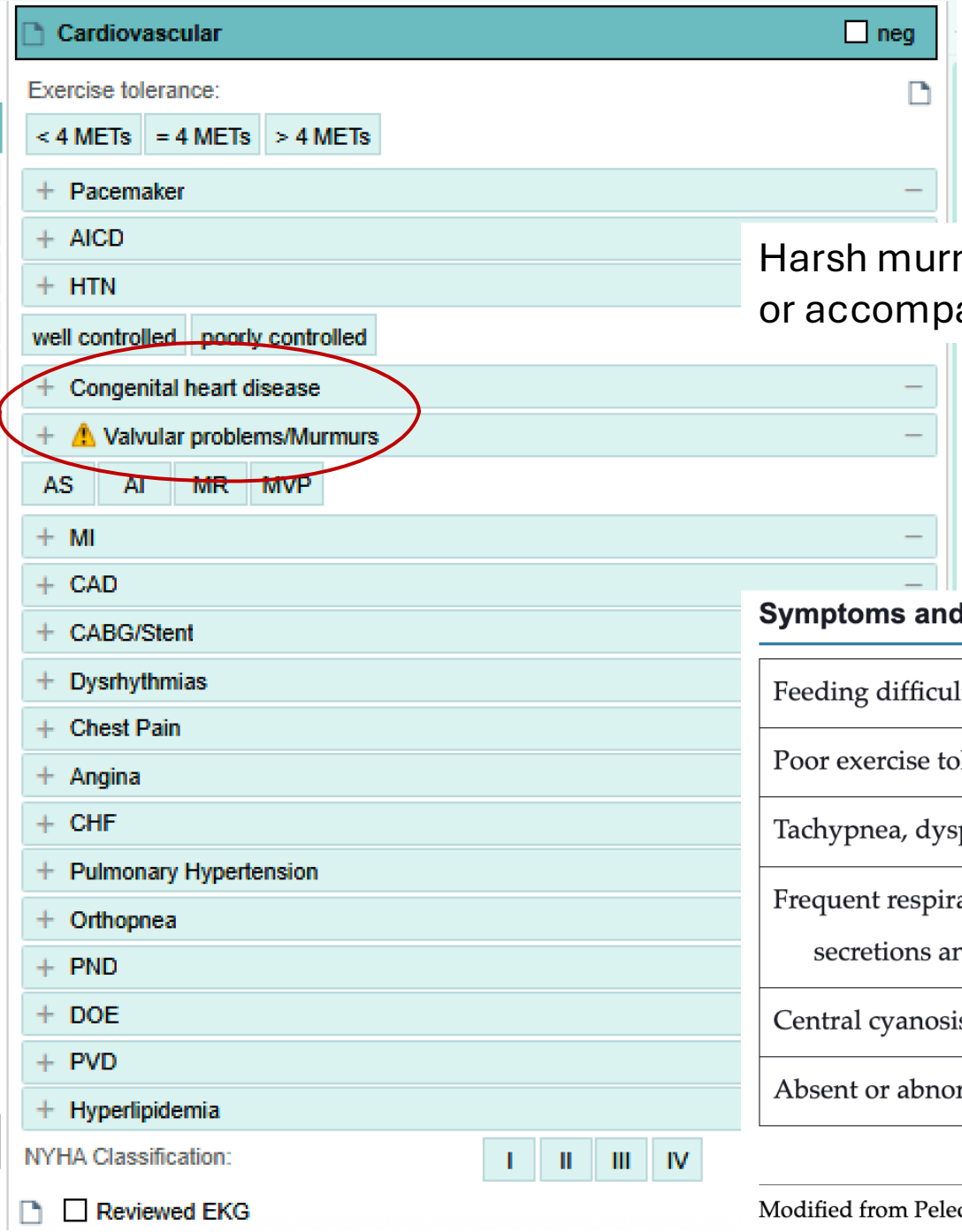


Status	Description
Normal weight	BMI >5th percentile and <85th percentile
Overweight	BMI ≥85th percentile and <95th percentile
Class I obesity	BMI ≥95th percentile
Class II obesity	BMI ≥120% of the 95th percentile, or BMI ≥ 35 and <40
Class III obesity	BMI ≥140% of the 95th percentile or BMI ≥ 40



Harsh murmur, difficult to localize, bounding pulses, louder than grade II/VI or accompanied by other findings → See Cardiology/order echo

Symptoms and Signs of Heart Disease

Feeding difficulties: disinterest, fatigue, diaphoresis, tachypnea, dyspnea
Poor exercise tolerance
Tachypnea, dyspnea, grunting, nasal flaring, and intercostal, suprasternal, or subcostal retractions
Frequent respiratory tract infections (a result of compression of airways by plethoric vessels leading to stasis of secretions and atelectasis)
Central cyanosis (involving warm mucous membranes: tongue and buccal mucosa) or poor capillary refill
Absent or abnormal peripheral pulses

Modified from Pelech AN. Evaluation of the pediatric patient with a cardiac murmur. *Pediatr Clin North Am.* 1999;46:167-188.

GI/Hepatic/Renal

☐ neg

+ Hiatal hernia –
+ GERD –

well controlled | poorly controlled

+ PUD –
+ Hepatitis –

A | B | C | D

+ Liver disease –
+ Renal disease –

AKI | CKD | ESRD | dialysis

+ Bowel prep –

Psychiatric

☐ neg

+ Psychiatric Hx –
+ Anxiety –
+ Depression –
+ PTSD –

Orthopedics

☐ neg

Traumatic Fx | Pathologic Fx

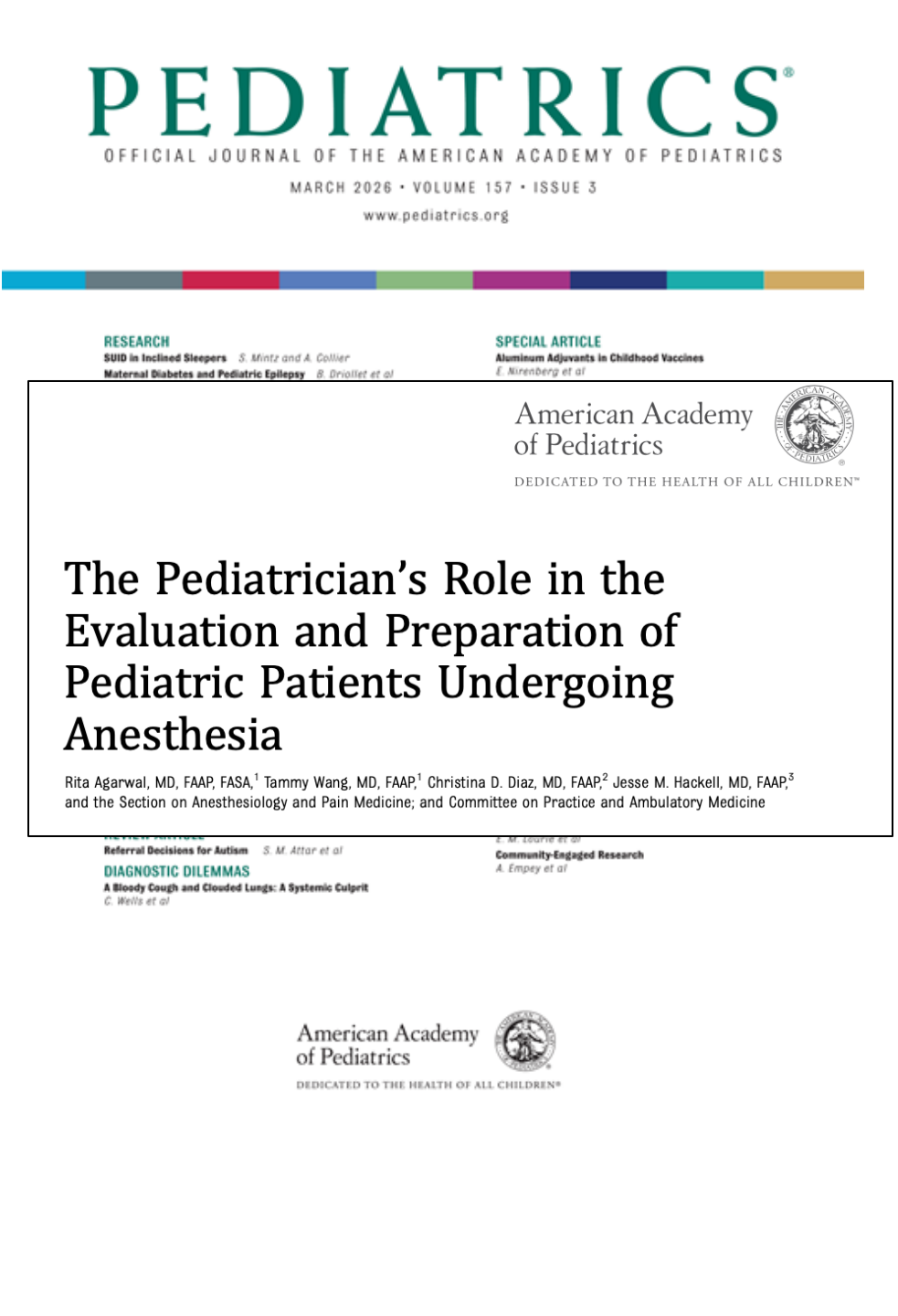


TABLE 1. Past Medical History of Importance to Safe Anesthesia Care

Medical History	Significance	Implication (Selected Interventions by Anesthesiologist)
Personal or family history of malignant hyperthermia (MH)	MH is triggered by volatile anesthetics and succinylcholine	Inhalational or mask induction are contraindicated, and the child will need preoperative intravenous (IV) access
Personal or family history of postoperative nausea and vomiting (PONV)	Increased incidence of recurrent PONV	Additional antiemetics or change in anesthetic technique
History of emergence delirium, agitation, or night terrors	Agitation or delirium may recur or worsen	Change in anesthetic technique, prepare the family for potential reoccurrence
Personal or family history of delayed emergence	Genetic polymorphisms may lead to recurrent delays in emergence	Change in anesthetic technique, further discussion with family
History of prematurity	Increased airway reactivity and decreased functional respiratory capacity are common even in healthy-appearing children Increased risk of postanesthesia apnea and bradycardia until 60 weeks' postconceptional age[35–37] Increased risk of anesthetic or sedation related respiratory risks until at least age 22 y[2] Increased incidence of difficult IV access	Avoid or minimize airway manipulation Consider preoperative bronchodilator therapy Consider delaying nonurgent surgery until after 60 weeks' postconceptional age May need vascular access consult or ultrasound-guided IV access
Obstructive sleep apnea or sleep-disordered breathing	Increased sensitivity to opioids and other anesthetics	May not be a suitable candidate for a free-standing ambulatory surgery center Minimize opioids and use alternate analgesic techniques
Recent respiratory tract infection in previous weeks	Increased incidence of perioperative respiratory complications, including the need for supplemental oxygen and/or hospital admission Depending on the causative virus, this risk may persist for up to 2–3 mos	Elective cases may need to be rescheduled When appropriate, anesthetic technique may need to be changed to minimize airway manipulation
COVID-19	Myocarditis or multisystem inflammatory syndrome in children (MISC)	Determine degree of organ involvement, which may require changes in anesthetic approach
Resolved significant medical issues such as repaired congenital cardiac disease, cardiac arrythmias, or malignancy in remission	Continued residual physiologic derangements may increase risk in the perioperative period Potential scarring of vessels or long-term effects of chemotherapy agents	Change in anesthetic technique May need additional evaluation or intraoperative monitors
Patient with obesity	May have difficulty with ventilation, intubation, hypertension, diabetes, etc	May need specialized equipment for airway management Medication dosing is altered
Chronic medical conditions	See more details in text	See more details in text

Questions?

Sources:

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