**Appendix 2:** Sample simulation case

**Program in Longitudinal Pediatric Simulation**

Intern Case #1

**Respiratory Distress, MGH Wards, SimBaby**

*Parent Role*

**Case Overview:**The intern will encounter a 20 month old old patient with a history of RAD/asthma who just came to the floor from the ED for an asthma exacerbation and is currently experiencing increased respiratory distress. The patient received prenisolone and stacked albuterol/ipatropium nebs x3 in the emergency room and is now on Q2H albuterol nebs. He has gotten behind in his treatment, going three hours before a neb in the transition from the ED to the floor.

**Case Goal**

The goal of the case is for the intern to recognize the clinical presentation of respiratory distress in a toddler, appropriately initiate management for worsening respiratory distress due to an asthma exacerbation, and demonstrate an understanding of secondary approaches to respiratory distress when primary approaches fail.

**Getting Started:**

You will orient the residents to the simulation process and then will play the role of the patient’s parent.

* Orient residents to the longitudinal simulation program
* Describe abilities of SimJunior which include: breath sounds, chest rise, can be intubated, ventilated with mask, pulses
* Remind residents that as they examine the child, they can describe what they are looking for and that the examination findings will be conveyed by the simulation coordinator.
* Encourage residents to “think out loud” and to utilize their co-resident when in the room
* Have the residents choose who will be the patient’s primary intern
* At the start of the case, you will be at the patient’s bedside
* Throughout the simulation, you should act in the role of the parent.

**Role Background:**

You are at the bedside of your 20 month old old son James. You have been told that James has “reactive airway disease” that worsens with colds and causes him to wheeze. James was feeling well until this AM when he started having cold symptoms—runny nose, sneezing, cough—and then he started wheezing over the course of the day. You gave him two treatments of albuterol inhaler (2 puffs each time) but by the evening he was having trouble breathing and so you brought him to the ED. He had no fevers at home. He got his usual treatment in the ED with nebulizers and steroids by mouth but you noticed that in the time it took him to get from the ED to the pediatric floor, three hours had gone by without him getting any treatments. Now you feel like he is working even harder to breathe than when you brought him in and you were concerned and called your nurse. You are worried that he is not turning around as quickly as he usually does when he gets admitted to the hospital and you are not sure why.

**Simulation**

When the residents come in, you will answer their questions and express your concern that he looks worse than when you brought him in and you don’t know what is different about this time versus the last time he was in the hospital.

If you are asked, you should provide the following additional history:

* James was born full term
* First wheezed at 6 months when he had RSV and since that time only wheezes when he gets colds.
* He is on no controller meds at home, although your pediatrician has discussed with you that should his wheezing get worse, he may need more aggressive management with daily inhaled steroids. You do have an albuterol inhaler to use with a spacer and mask for him at home.
* While your pediatrician has not said that he has asthma, you have been told that he has “reactive airway disease” and he may develop asthma as he gets older based on his wheezing with colds.
* He has been admitted to the hospital three times for his wheezing but has always turned around quickly and never required time in the PICU.
* He had no fevers at home and no known sick contacts. He is at daycare three days a week; the day you brought him in happens to be a day you were home with him.
* He has no allergies to medications.

You may ask questions, demonstrate anxiety (“What are you going to do for him?” “Why do you think this happened?”) and console your child.

**Debrief**

Participate fully in debrief and evaluate the lead resident, with the additional comment section box used for feedback for the secondary resident as well.

**Program in Longitudinal Pediatric Simulation**

Intern Case #1

**Respiratory Distress, MGH Wards, SimBaby**

*Nurse Role*

**Case Overview:**The intern will encounter a 20 month old patient with a history of RAD/asthma who just came to the floor from the ED for an asthma exacerbation and is currently experiencing increased respiratory distress. The patient received prenisolone and stacked albuterol/ipatropium nebs x3 in the emergency room and is now on Q2H albuterol nebs. He has gotten behind in his treatment, going three hours before a neb in the transition from the ED to the floor.

**Case Goal**

The goal of the case is for the intern to recognize the clinical presentation of respiratory distress in a toddler, appropriately initiate management for worsening respiratory distress due to an asthma exacerbation, and demonstrate an understanding of secondary approaches to respiratory distress when primary approaches fail.

**Getting Started:**

You will initially prepare the simulation setting and then will play the role of the patient’s nurse.

* Gather props:
	+ PJs or small johnny if not already on manikin
	+ Gloves
* Gather the “Child Setup” airway/monitor/access equipment which should include correctly sized:
	+ Blowby O2
	+ Nebulizer Mask
	+ Tubing
	+ Nasal Canula
	+ Regular Face Mask
	+ Non-Rebreather Face Mask
	+ Bag-Valve Mask
	+ Monitor Leads
	+ BP cuff
	+ IV board x 2
	+ IV start kit
	+ Plastic Tape
* Gather Meds and Fluids:
	+ albuterol and ipatropium Nebs
	+ IV methylprednisolone
	+ IV magnesium
	+ IV terubtaline
	+ IV epinephrine
* Set Up Sim Junior
	+ Dress in pjs and cover with sheet
	+ Set up Blowby O2 near face with oxygen connected and on

**Role Background:**

You have recently received pass-off from the ED nurse about a new admission, 20 month old old James. He is here for an asthma exacerbation triggered by a URI. He received 2mg/kg prenisolone in the ED which he took without difficultyand then had 3 stacked albuterol/ipatropium nebs. He maintained his sats on blow-by O2 even while sleeping and was spaced to Q2H albuterol nebs x2 before a bed was available for him on the floor. The ED nurse does note that he is due for an albuterol neb now and by the time he arrives on the floor, three hours have arrived since his last treatment. He is very tachypnic on arrival with supraclavicular and substernal retractions. You therefore call the intern in to assess the patient.

**Simulation**

If you are asked, you should provide the following additional history:

* Patient Weight: 11 kg
* Temp (on admission): 99
* Treatment to date in the hospital:
	+ In the ED, was satting 98% on RA while awake and dropped to 94% while asleep. RR was in the 30s. Was given 2mg/kg prenisolone and 3 stacked albuterol/ipratropium nebs and then spaced to Q2H albuterol nebs and was looking very good and was sent to the floor. Respiratory viral panel sent and pending.
	+ Since arrival to the floor: just arrived on the floor and because of the transition from the ED to the floor, 3 hours passed between nebs.

Let the residents try to work through the case, but do ask them open questions such as “Is there anything you would like me to do?” If they are really struggling, you can ask more leading questions as the case progresses, but always let them try to talk it out first. Even if they head in the wrong direction initially, they often find their way back. You are concerned that the patient has fallen behind on treatments in the transition from the ED and requires restacking and potentially more intensive treatment which would require a transfer to the PICU.

**Debrief**

Participate fully in debrief and evaluate the lead resident, with the additional comment section box used for feedback for the secondary resident as well.

**Program in Longitudinal Pediatric Simulation**

Intern Case #1

**Respiratory Distress, MGH Wards, SimBaby**

*Simulation Coordinator Role*

**Case Overview:**The intern will encounter a 20 month old patient with a history of RAD/asthma who just came to the floor from the ED for an asthma exacerbation and is currently experiencing increased respiratory distress. The patient received prenisolone and stacked albuterol/ipatropium nebs x3 in the emergency room and is now on Q2H albuterol nebs. He has gotten behind in his treatment, going three hours before a neb in the transition from the ED to the floor.

**Case Goal**

The goal of the case is for the intern to recognize the clinical presentation of respiratory distress in a toddler, appropriately initiate management for worsening respiratory distress due to an asthma exacerbation, and demonstrate an understanding of secondary approaches to respiratory distress when primary approaches fail.

**Getting Started:**

You will get the simulator up and running while the RN role gathers supplies and the parent orients the residents. For the case, you will set the scenario for the residents and then run the simulator and come in at the end as the Senior Resident.

* Prepare other vital signs for start of case but do not display:
	1. Temp 99°C
	2. RR 60s
	3. BP 99/55
	4. HR 120s

**Role Background:**

You will give the residents the following information:

* “James 20 month old old M with a h/o RAD/asthma who was admitted for asthma exacerbation triggered by a URI. He just came to the floor from the ED and the signout you received from the ED stated that he got PO steroids and 3 stacked albuterol/ipatropium nebs, spaced to Q2H albuterol nebs, and was doing really well. You are called to the room by the nurse urgently after she evaluates him on arrival to the floor because he is now in ‘respiratory distress.’”

**Simulation**

During the case, as the residents describe their examination of the patient, you should let them know what findings they would see/feel/hear, but do not offer findings unless they perform the exam needed to elicit findings. You are also the primary faculty member for completing the checkbox evaluation of case-specific demonstrated knowledge, skills and attitudes during the simulation.

If the residents call for help, acknowledge that the person “has been paged”, etc, but is not immediately available. The microphone is turned on by a switch on the handle. Talk close to the microphone when speaking

When the case has run 10 minutes, or has reached a natural stopping point earlier, arrive in the room as the senior resident and ask the residents to present the patient to you. Ask questions to help reveal their deeper understanding of the patient, or to justify their management of the patient.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Scenario Stage** | **Patient Condition** | **Simulator Parameters and Trends** | **Expected Intervention** | **Response to Calls for Help** |
| **Initial assessment and decision** -early signs of respiratory decompensation | Gen: acute resp distressA: poor air movement, no wheezingB: retractions but very tightC: warm extremitiesD: awake, alert, interactiveNo PIV | Vitals:RR 60sBP 95/55HR 120sSaO2 92% on BBO2SaO2 up to 94% on NC or FM O2RR down to 40s if stacked nebs or continuous albuterol is given; if one albuterol neb is given RR should come down and go up again a few minutes after the neb endsHR up to 140s if albuterol administeredBS show diffuse wheezing after treatments | * ABCs
* Call for help from senior
* Apply supplemental O2
* Put patient on cardiac monitor
* Ask what meds the patient has received, the hospital course
* Call for/administer nebulized albuterol (+/- ipatropium)
 | Senior is “on the way”Nurse gives hospital course if asked |
| **Reassess after initial interventions**-signs/sxs severe distress | Gen: A: open airway, slightly better air movement B: diffuse wheeze throughoutC: warm extremitiesD: looking tired, less alert | Vitals: RR trending back up to 50s-60sBP stable 95/55HR trending up to 160sSaO2 trending down to high 80s on supplemental O2 | * Recognize deterioration
* Increase FIO2 and try non-rebreather
* Call for Senior/Rapid Response, Respiratory Therapist, PICU fellow for transfer
* Ensure that still getting continuous albuterol
* Get access, consider magnesium/terbultaline/epinephrine
* Consider getting ABG/VBG (if they do, appears “normal” indicating that the initial respiratory alkalosis is becoming an acidosis as the patient is tiring: pH 7.42, pCO2 42, HCO326, paO2 80)
* Consider intubation
 | Senior is “on the way” and the people requested “have been paged” |
| **Reassess after intervention—only do this part of the scenario for residents who easily go through the rest of the scenario**-respiratory failure ensues | Gen: A: open airwayB: respiratory arrest, no breathingC: strong pulses, warm extremitiesD: unresponsive | Vitals:RR – noneBP – 88/50HR – 160s but trending downSaO2 – 75% on max FIO2With bagging SaO2 increases to 88% | * Call a code
* Check for pulses, initiate bag mask ventilation (1 breath every 3 seconds)
* Start magnesium or terbutaline infusion while awaiting code team
 | Code team including respiratory therapist and PICU fellow arrive and intubate the patient and transfer to the PICU |

Silence monitor beeping by closing the active window on the computer at the end of the case.

**Debrief**

Participate fully in debrief and evaluate the lead resident, with the additional comment section box used for feedback for the secondary resident as well. During the simulation you should have completed the checkbox evaluation of demonstrated knowledge, skills and attitudes.

**Key debriefing/learning points:**

* Recognition and treatment of a child in respiratory distress from an asthma exacerbation
	1. Signs and symptoms of respiratory decompensation in an asthmatic toddler
		1. Tachypneia
		2. Hypoxemia
		3. No wheezing on exam does not mean there is no asthma—there may be so much bronchoconstriction that there is no air movement to create wheezing
		4. Decreasing level of alertness
	2. Initial management of a child with an asthma exacerbation
		1. Putting the child on the monitor
		2. Oxygen in the correct form
		3. Albuterol nebs; use of ipratropium nebs in the ED setting (3 stacked nebs) and lack of evidence for efficacy for it outside of the ED setting, although not harmful to try. Recognize that HR will increase with albuterol.
		4. Steroids—2mg/kg, takes a few hours to kick in, consideration of IV methylprednisolone
		5. Calling for appropriate help
			1. When to get senior, respiratory therapist, Rapid Response, code, PICU fellow
			2. Role of the PICU fellow in evaluating patients who are deteriorating vs in the acute code setting
		6. Role of an ABG/VBG
			1. Interpreting—what does a respiratory alkalosis imply? Acidosis or normalization of the gas? pCO2 and CO2 retention in impending respiratory failure
* Continuing management of patient with asthma who is deteriorating
	+ 1. Movement to the PICU
		2. Continuous albuterol, magnesium, terbutaline, epinephrine
		3. When to intubate—preferably before respiratory collapse
* Calling a code
	+ 1. The appropriate timing of rapid response vs. code
		2. What to do while waiting—maintaining ABCs: bagging, checking pulse, keeping on the monitor, continuing treatment with albuterol
* Recognition that young children may have worsening respiratory distress, even when the appropriate interventions are made.

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| --- | --- | --- | --- | --- |
| **Checklist: Respiratory Distress** |   |   |   |   |
| **Did the resident:** | **Yes** | **No** | **W/Prompting** | **Comments** |
| Undress the child to do an exam?  |   |   |   |   |
| Put the child on the monitor? |   |   |   |   |
| Put the child on oxygen? |   |   |   |   |
| Recognize that the child was in respiratory distress? |   |   |   |   |
| Ask what medications the patient had already received? |   |   |   |   |
| Discuss the patient's status with the parent? |   |   |   |   |
| Determine the need for x-ray? |   |   |   |   |
| Initiate appropriate therapy? |   |   |   |   |
| Call for senior help or rapid response? |   |   |   |   |
| Reassess the child by physical exam after intervention? |   |   |   |   |
| Give the senior a concise yet thorough account of the patient's history? |   |   |   |   |
| Explain to the senior what is believed to be going on with the patient and give an appropriate plan? |   |   |   |   |
| Make appropriate use of the nurse? |   |   |   |   |
| Appropriately designate tasks to the other resident in the room? |   |   |   |   |
| Take suggestions from the other resident seriously and appropriately? |   |   |   |   |
| Articulate personal strengths in dealing with this case during the debriefing? |   |   |   |   |
| Articulate personal weaknesses in dealing with this case during the debriefing? |   |   |   |   |
| Articlate ways to improve for next time during the debriefing? |   |   |   |   |