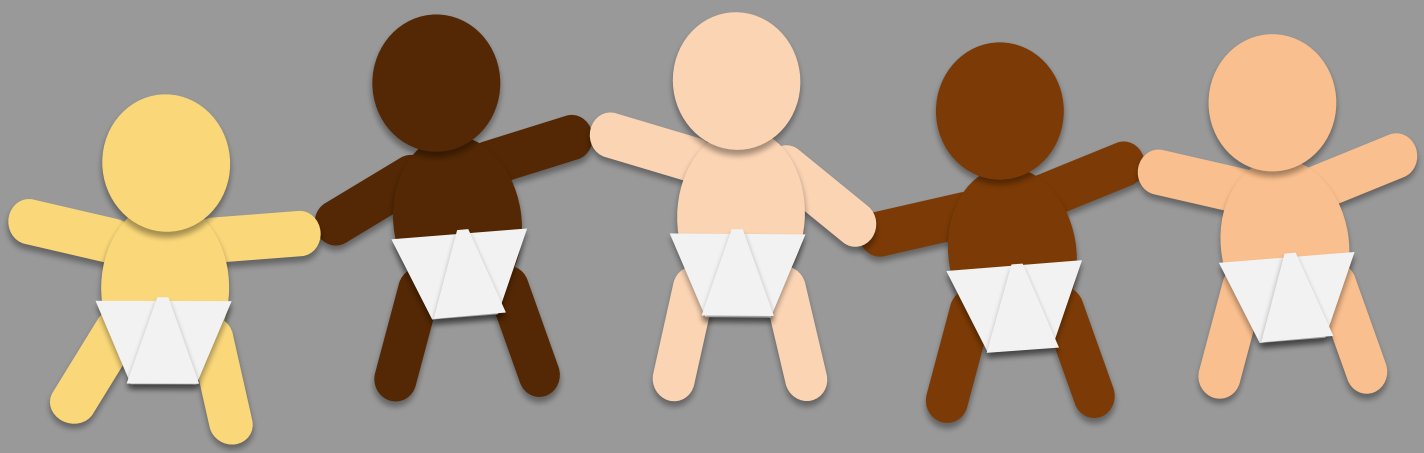
# Pediatric SimBox+
# *Tele* SimBox

## Pediatric Respiratory Distress
### Emergency Department/Hospitalist



SimBox Editorial Team Version 2.0 2020

# ED SimBox: Respiratory Distress

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# ED SimBox: Respiratory Distress

Background

## Purpose

**Thank you for your interest in SimBox low fidelity learning tools!**

This series of cases features low fidelity simulations that allow your teams to engage in the first 5-10 minutes of an emergency scenario.

You will use your own equipment and resources in your own clinical environment, or in the convenience of a virtual environment to practice non technical skills.

## SimBox, SimBox+ vs *Tele*Simbox

There are three ways in which the simulation can be delivered:

**SimBox Original**:

Low-fidelity manikin + video and tablet-based resources for use *in situ*.

**SimBox+** (SimBox **PLUS** a telefacilitator).

SimBox was adapted for use in remote or underserved areas and/or limited access to content or simulation experts, with a remote facilitator.

***Tele*SimBox**:

As a result of the COVID 19 Pandemic, SimBox was adapted to meet the demands for virtual learning platforms, and continuous education for learners of all levels. This version targets non-technical skills.

## Best way to use these resources

**SimBox or SimBox+**

- Review this document + run a session in your ED with a doll/pillow.

***Tele*SimBox**

- Reference: Tips / Tricks.
- Watch a sample recording of the telesimulation to see how it is run.

For additional questions or concerns, you can arrange a one-on-one tutorial with the project team.

## Sample telesimulation demo

## Guide

This guide is meant to explain to facilitators with ***varying levels of experience*** how best to use these didactic resources.

## Novice Facilitator

Review this entire guide and watch video ***prior to*** first session.

Utilize the Prebriefing / Debriefing Scripts, Prompts and Resources.

Review the Checklist.

Encourage all participants to complete Survey.

## Advanced Facilitator

Use the learning tools included ***or your own*** for Prebrief / Debrief and Educational Resources.

Review this Checklist ***or your own*** adapted to your specific learner group.

## *Tele* Tips / Tricks

Trial sharing the video ***prior to*** the session.

Use ***Gallery View***.

Have participants ***name themselves*** with assigned ***role.***

Ask ***observers to mute audio*** and ***turn off video*** for simulation.

Both participants and facilitators can use a ***"Time Out"*** whenever necessary to pause and regroup.

Move scenario along through the ***embedded participant***.

# ED SimBox: Respiratory Distress

## Case Summary

**After this activity, the team will be able to manage pediatric patient with Respiratory Distress with emphasis on the following objectives:**

1. Apply Crisis Resource Management and teamwork (with attention to role designation, directed orders, sharing mental model and closed loop communication with team and family members).
2. Prioritize treatment of potential etiologies to guide stabilization or escalation of care for a patient with Respiratory Distress.
3. Determine the appropriate destination for transfer.

## Overall Scenario Schema

Link to Pre-briefing Script for SimBox/SimBox+

**2 mins**

Play video to team

**Assign** or **Coach them to allocate** roles

| Team leader | Airway/survey/ bedside | Family liaison |
|---|---|---|

**6-10 mins**

Stem: A six month old infant in severe respiratory distress with saturations in the mid-80's, RR in 70's, tachycardic with HR's in 170's. On initiation of treatment, patient with improving saturations but worsening work of breathing. Need to discuss differential of respiratory distress, need for early intervention and then sign out to the PICU.

**Telesim Co-facilitator prompts are indicated in these boxes**

**15 mins**

Link to Debriefing Script

**10 mins**

**Option: re-run scenario**

# ED SimBox: Respiratory Distress

# Case Progression

## Scenario script:

"Please assign roles as you would in a typical scene response. You will hear a brief EMS dispatch and then see a two minute countdown clock as you prepare for the arrival of the patient." *CLICK TO **PLAY VIDEO***

Video states: "'EMS this is ALS Unit 1. We're coming in lights and sirens, we have an infant patient approximately 6 months old. Sats are currently in the mid-80s, intermittently can get up to 90 with BVM. The patient is in severe respiratory distress, tachypneic to the 70s, pulse ox going up and down between 80-85, heart rate is in the 170s, we're working on getting a blood pressure now. We'll be there in approximately 2 minutes. See you soon.

**The recorded narrator on the video states: "Hi guys, we're arriving now. The patient has continued to have desaturations that respond to BVM, however when not bagging the sats seem to drop."**

**2 minute warning**

**VIDEO GIVES 120 SECOND COUNTDOWN, THEN PATIENT APPEARS**

- Team assembles + confirms roles
- Asks for equipment: monitor, temperature, suction, oxygen, breathing (BVM/CPAP), access (IV), Broselow tape/app
- Calls for help

**Facilitator states: "Patient has arrived."**

**Time 0**

- Team confirms patient is on monitors, pulse oximetry, BP cuff, temperature

**Facilitator states: "Patient appears to be struggling to breath with subcostal retractions and nasal flaring. SpO2 80% on room air. Diffuse crackles are heard on lung exam."**

**+ 3:31 min**

**HR 187**
**BP 73/41(52)**
**RR 84**
**SPO2 86%**

- Team assesses patency/clearance of airway, attempts repositioning and suction
- Team notes hypoxia
- Requests intervention for breathing status (HFNC)
- Asks RN for access (IV/IO)

# ED SimBox: Respiratory Distress

# Case Progression

## SAMPLE History

**Signs/Symptoms**: 6-month-old with 3 days of cough and congestion; He was napping when mom noted loud breathing. Shortly after, he woke up, 1 episode of emesis with increased work of breathing with subcostal retractions. Has not fed well in the past 3 days. No recent known fevers.
**Allergies/Medications:** None/none.
**Birth/ Medical history:** Uneventful birth at 38 weeks gestation. History of eczema. Family history remarkable for asthma in his father and 7 year old sister. Vaccinations are up to date.
**Last meal:** Formula (Similac Advance) attempted bottle 4 hours ago with little success.
**Events:** Preceding URI symptoms, +sick contacts at home and at daycare.

**Facilitator states: "The patient's oxygen saturation is improving, but still has subcostal retractions and nasal flaring. Rectal temp of 36.5 deg C. Would you like to make any changes in his breathing treatment?"**

**+ 3:31 min**

**HR 185 BP 73/41**
**RR 81**
**Sat 88%**

- Team verbalizes illness state: patient in respiratory distress
- Request for deep suctioning
- Supplement oxygen with HFNC
- Estimate weight from Broselow
- Discuss obtaining chest x ray

**Facilitator states: "The child is pale appearing with dry mucous, membranes, sunken eyes, poor skin turgor. Capillary refill time (CRT) 3 seconds."**

**+ 6:47 min**

**HR 176-178**
**BP 77/45**
**RR 68-71**
**Sat 90-91%**

- Team notes history, physical exam and hypovolemic state
- Request for IV/IO access
- Request of 10-20 mL/kg bolus of NS
- Asks nurse for STAT POC glucose

**Facilitator states: "Patient's glucose is 52."**
**If CXR is requested: "CXR is pending."**

**+ 7:51 min**

**HR 172-175**
**BP 80/48**
**RR 67 Sat 89-93%**

- Give D10 5 mL/kg.
- Start on maintenance IVF with dextrose.

**Facilitator states: "The patient seems to like the HFNC - is pinking up and breathing more comfortably. NS bolus in, CRT now 2 seconds. Patient is a bit more alert. I'll work on getting a repeat glucose once that D10 bolus is in."**

**+ 9:13 min**

**HR 164-168**
**BP 80/48**
**RR 64**
**Sat 92-94%**

- Reevaluate ABCDs
- Request follow up glucose level
- State differential and further workup plan
- Informs PICU team

**Facilitator states: "The PICU team is here. Can you please give them a status update on what's going on with this patient?"**

**+ 10:32 min**

**HR 165**
**BP 80/48**
**RR 64**
**Sat 92%**

- Hand off patient to PICU team
- Update family

Conclude simulation and move to debrief.
Link to resource page: educational content

# ED SimBox: Respiratory Distress

## Checklist

| TASK | | Done correctly | Not done correctly | Not done |
|---|---|---|---|---|
| Team-centered care | Verbally assemble the necessary staff, equipment and resources to care for an ill pediatric patient in the ED | | | |
| | Demonstrate effective teamwork and communication (i.e. designate leader/roles, directed orders, closed-loop communication, sharing mental model) | | | |
| | Demonstrates appropriate PPE | | | |
| Family-centered care | Obtain an appropriate history from the family member (SAMPLE) | | | |
| | Address family concerns, update on care (translate medical aspects of care in plain language) | | | |
| Medical knowledge | Verbalize the initial management of an acutely ill pediatric patient (airway, breathing, circulation) | | | |
| | Verbalize the first line diagnostic tests of a patient in respiratory distress | | | |
| | Verbalize the first line therapeutic intervention of a patient in respiratory distress | | | |
| | Demonstrate handoff of care at end of case | | | |

# ED SimBox: Respiratory Distress

# Prebriefing Script

## Tips to establish psychological safety in simulation

**Basic Assumption**: "we believe that everyone participating in our activities is intelligent, capable, cares about doing their best and wants to improve" - ***CMS, Boston MA***

**Introduce team and Prebrief**

**Welcome your team, make introductions:** "This simulated resuscitation is to practice our team's response to an emergency. We will spend about 15 minutes in simulation, then we will debrief for 20 to discuss what went well and what could be improved with input from the team. Even though it is not real, and the manikin can't be harmed, everyone will get the most out of this scenario if we take it as seriously as possible."

**Describe**

**Describe simulator capabilities, equipment and how to participate:**
"Act as you would within your role. You will not get monitor feedback unless your equipment is attached to the patient. Airway equipment should be attached to oxygen, etc. Try to make tasks realistic and timely using your equipment. Please ask for clarifications."

**Demo**

**Closed loop communication demo**:
Know your role and task designation with closed loop communication to verify and complete.
Leader: Tech, we need an EKG.
Tech: OK going to get the machine.
Tech: OK, I've got the EKG machine here.

**Disclose**

In case of a safety concern during the simulation, state "Let's take a safety pause". If a real event happens that is **not** part of the simulation, state "This is not a simulation". Disclose if video recording.

# ED SimBox: Respiratory Distress

# Debriefing Script

## Components of a Debrief (Based on 3Ds + PEARLS)

"The purpose of this debrief is to discuss areas of great performance and discover areas for improvement. It is not a blame session- everyone is here to do their best."

**Defuse**
1-2 minutes

**Solicit emotions and reactions**
"Reactions?"; "Let's take a moment to gather our thoughts."

**Summary**
1-2 minutes

**Clarify facts**
"Can a teammate share a short summary of the case?"; "Were there other thoughts?"

**Discover**
7-8 minutes

**Explore Performance**
"What went well?"
"What could be improved?"
Use observations of learner experiences to highlight strengths of the team and individuals, while asking learners for their thoughts, observations and reflections. Then provide specific areas of opportunity for improvement.

**Deepen**
1-2 minutes

**Provide focused feedback and identify patient care priorities**
Elicit any other outstanding issues or concerns

**Take-Home points**
1-2 minutes

**Identify take-home points to apply to future practice :** Round the room reflections and thanks for participation

**Ref:** PEARLS Debrief Framework .+ The 3D model of debriefing. *Semin Perinatol*. 2011;35(2):52-58

# ED SimBox: Respiratory Distress

# Debriefing Prompts

**This page provides possible questions to elicit teaching points during the debrief for each objective. These questions are not meant to replace your team discussion, but can help to steer the debriefing session.**

**Demonstrate a team-based approach to care for a patient with tachycardia**

***How did your team prepare for the arrival of an ill infant in respiratory distress?***

Crisis & Crew Resource Management: Assign roles, designate team leader, share mental model and practice closed loop communication

**Perform a systematic primary assessment/reassessment of an infant in respiratory distress**

***How does your team perform a systematic assessment of an ill pediatric patient?***

- *PAT Pediatric Assessment Triangle*
- *Appearance TICLS: tone, interactivity, consolability, look/gaze, speech/cry*
- *Work of breathing: Important to undress to visualize WOB*
- *Circulation/capillary refill: Where and how is this assessed in the pediatric patient?*

***Airway Breathing Circulation Caveats:*** *Consider pediatric anatomical differences - ABC vs CAB (in adult patient)*

***SAMPLE mnemonic:*** *signs/symptoms, allergies, medications, last meal, events preceding*

**Demonstrate a stepwise approach to intervention in an infant with respiratory distress**

***Explain your stepwise approach to intervention after the primary assessment.***

*Focus on the vital signs and your clinical exam findings (mental and hydration status, respiratory, cardiovascular exams). Suction, increase oxygen and positive pressure supplementation, consider early trial of high flow nasal cannula (escalate further PRN). After any intervention, remember to reassess the patient to note any positive/negative changes based on your intervention.*

***What medications will help this patient?***

*The medications to treat respiratory distress will depend on your working diagnosis. In classic bronchiolitis, no medications are indicated. Treatment is supportive: suction, breathing, hydration, antipyretics PRN. In setting of fever (T >38C, 100.4F), antipyretics are indicated (note: avoid non-steroidal anti-inflammatory medication, ie: Motrin, in children <6 months of age due to theoretical nephrotoxic risk). If clinical presentation and workup indicates bacterial pneumonia, influenza, pertussis, or other etiology, treat accordingly. Note on bronchodilators: Studies have NOT demonstrated a consistent benefit for albuterol treatment in infants with typical bronchiolitis. May consider an albuterol trail with features suggestive of possible asthma (recurrent wheezing, age >12 mos, prior albuterol and/or inhaled corticosteroid use, family history of asthma).*

# ED SimBox: Respiratory Distress

# Debriefing Prompts

**This page provides possible questions to elicit teaching points during the debrief for each objective. These questions are not meant to replace your team discussion, but can help to steer the debriefing session.**

**Identify signs of dehydration and hypoglycemia**

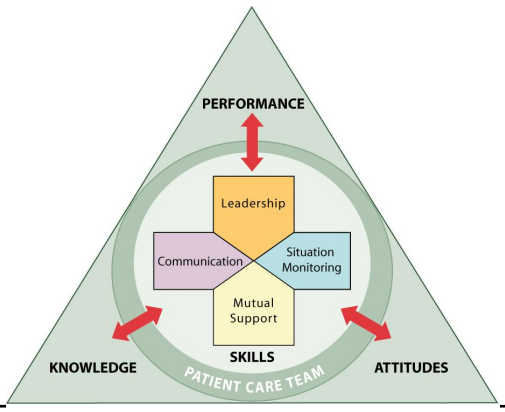
***How do you identify signs of dehydration in an infant?***
*Dehydration will often present as tachycardia, sunken eyes, lack of tears, sunken fontanelle, fatigue, dry mucous membranes, and pale or mottled skin with prolonged capillary refill >3 seconds on exam. History red flags for dehydration include: poor eating, vomiting, decreased urine output.*

***Describe the value of obtaining a POC glucose and intervention associated with it?***
*With a history of poor feeding and decreased urine output in an infant, think about checking a basic chemistry panel to assess dehydration status and electrolyte abnormalities. Laboratory studies often take some time to return, but POC glucose (point of care) is easily accessible and can result within seconds. Treat dehydration with NS fluids and hypoglycemia with a dextrose-containing bolus.*
*Hypoglycemia can present with hemodynamic instability, seizures, fatigue, or tremors, but can be managed with administering a D10 bolus (starting with 5 ml/kg) and then following glucose levels closely.*

**Describe the desired diagnostic work up and when to obtain it through the scenario**

***When should you obtain imaging and laboratory studies?***
*If the clinical course suggests classic bronchiolitis, imaging and viral testing are not routinely recommended. If there is indication of superinfection (ie: prolonged fever, local epidemiology indicates significant flu activity) or if the patient is toxic/severely ill in appearance, consider obtaining x-ray and labs: CBC w/ differential, chemistry, blood gas + lactate, respiratory viral panel, blood cultures, and can also consider inflammatory markers (ESR, CRP, procalcitonin). If there is paroxysmal or prolonged cough, apnea, or known pertussis exposure, consider pertussis testing.*

## TeamSTEPPS Approach

| Components of effective teams (as developed in TeamSTEPPS) Table @DrM_Kou | | | |
|---|---|---|---|
| **Communication** | **Leadership** | **Situation Monitoring** | **Mutual Support** |
| **SBAR**:<br>**S**ituation<br>**B**ackground<br>**A**ssessment<br>**R**ecommendation | **Brief:**<br>Planning, setting tone | **STEP:**<br>**S**tatus of pt<br>**T**eam Members<br>**E**nvironment<br>**P**rogress toward goal | **Task assistance:**<br>awareness of team work load |
| **Call out:**<br>sharing critical information with the team | **Huddle:**<br>Ad-hoc planning | **I'M SAFE:**<br>• **I**llness<br>• **M**edication<br>• **S**tress<br>• **A**lcohol/Drugs<br>• **F**atigue<br>• **E**ating and Elimination | **Feedback:**<br>providing information for purpose of team improvement |
| **Check back:**<br>Loop Closure | **Debrief:**<br>Exchange of information to inform team of performance and effectiveness | | **Advocacy and assertion:**<br>advocating for patient in case of a disagreement with decision maker |
| **Handoff:**<br><br>**I PASS the BATON**<br><br>**I**ntroduction<br>**P**atient<br>**A**ssessment<br>**S**ituation<br>**S**afety Concern<br><br>**B**ackground<br>**A**ctions<br>**T**iming<br>**O**wnership<br>**N**ext | **@DrM_Kou**<br>  <br> | | **Two challenge rule:** information conflict regarding patient safety<br><br>**DESC Script:**<br>Tool for personal conflict*<br>**D**escribe situation<br>**E**xpress your concern<br>**S**uggest an alternative<br>**C**onsensus should be stated<br><br>**CUS:** I'm **concerned**<br>I'm **uncomfortable**<br>This is a **safety** issue<br><br>**Collaboration:** working toward a common mission |

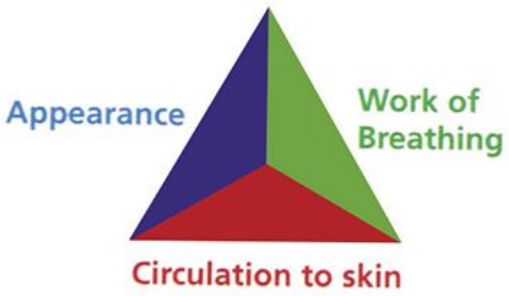
https://www.ahrq.gov/professionals/education/curriculum-tools/cusptoolkit/modules/implement/teamworknotes.html

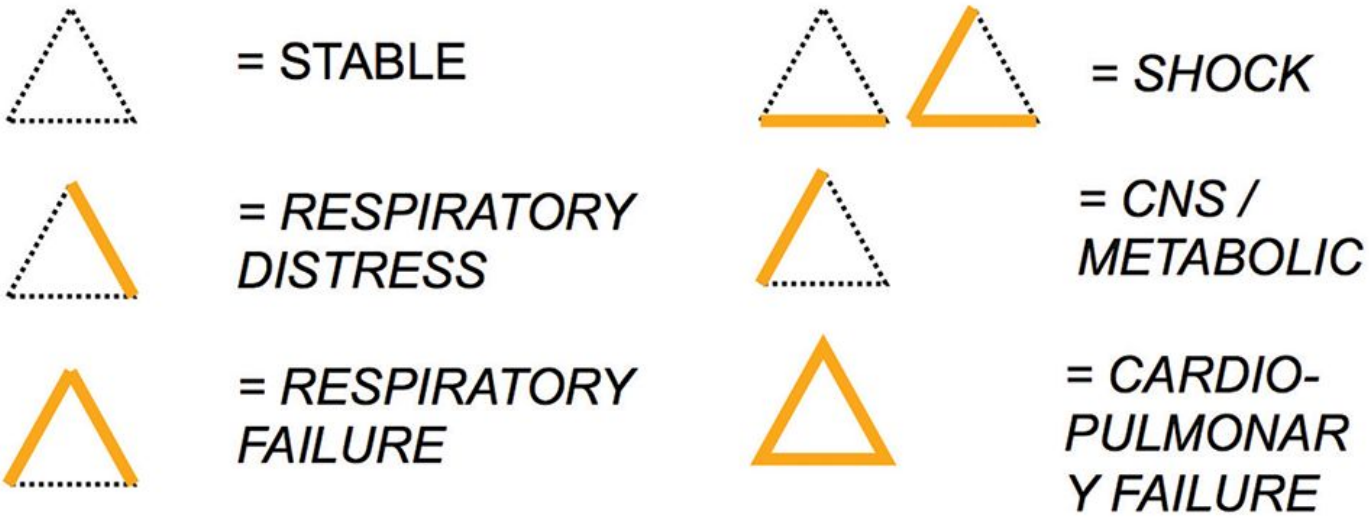
## Pediatric Vital Signs/Weight by Age

| Age | Weight (kg) | Pulse | Resp | Systolic BP* |
|---|---|---|---|---|
| **Newborn** | **3** | 100-180 | 30-60 | 60-70 |
| **6 mos** | **7** | 100-160 | 30-60 | 70-80 |
| **1 yr** | **10** | 100-140 | 24-40 | 72-107 |
| **2** | **12** | 80-130 | 24-40 | 74-110 |
| **3** | **15** | 80-130 | 24-40 | 76-113 |
| **4** | **16** | 80-120 | 22-34 | 78-115 |
| **5** | **18** | 80-120 | 22-34 | 80-116 |
| **6** | **20** | 70-110 | 18-30 | 82-117 |
| **8** | **25** | 70-110 | 18-30 | 86-120 |
| **10** | **35** | 60-100 | 16-24 | 90-123 |
| **12** | **40** | 60-100 | 16-24 | 90-127 |
| **14** | **50** | 60-100 | 16-24 | 90-132 |
| **15+** | **55+** | 60-100 | 14-20 | 90-135 |

**BP* in children is a late and unreliable indicator of shock**

## Pediatric Assessment Triangle




## Pediatric Mental Status

**A**- Alert
**V**- Responsive to verbal
**P**- Responsive to painful
**U**- Unresponsive

# BRONCHIOLITIS

## LOWER RESPIRATORY TRACT INFECTION

Viral obstruction of bronchioles due to mucus plugging and ventilation-perfusion mismatch, worse on day 3-4 of illness with no cure.
Common causes: Respiratory Syncytial Virus, Influenza, Human Rhinovirus, Human Metapneumovirus

## EPIDEMIOLOGY

Most common in children less than 2

Outbreaks from winter to spring with peak in January-February

1.4 MILLION ED visits per year

150000 admissions per year

## SIGNS AND SYMPTOMS

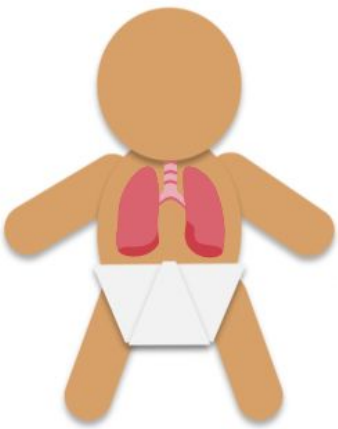
Fever and fussiness

Congestion

Decreased intake/output

Post tussive emesis

APNEA



Characteristic cough
Respiratory distress +
Increased respiratory rate

- nasal flaring
- retractions
- grunting

Lung exam :
crackles + wheezes

SIMBOX EDUCATIONAL MEDIA 2020: AAP CLINICAL PRACTICE GUIDELINE
HTTPS://PEDIATRICS.AAPPUBLICATIONS.ORG/CONTENT/134/5/E1474

## DO

- Suction Promptly
- Treat shock if present
- Give antipyretics
- Provide Oxygen by facemask or High Flow Humidified Nasal Cannula if saturations <90% or resp distress
- Give PO/IV/NG fluids as indicated

## DON'T ROUTINELY

- Order viral testing or CXR
- Treat with systemic corticosteroids
- Treat with bronchodilators
- Give oral or IV antibiotics unless concomitant bacterial infection or high suspicion of SBI
- Give O2 if work of breathing is stable and saturations >90%

## RISK FACTORS FOR SEVERE DISEASE

Premature or age <12 weeks

Cardiac or pulmonary disease

Immune deficiency.

Neuromuscular disease

## CONSIDER ADMISSION

- O2 sat < 90%
- increased work of breathing
- Poor perfusion
- high risk patients.

Follow insitutional treatment guide if available.

MAYBELLE KOU MD MED, NADIRA RAMKELLAWAN ND, DANIELLA SANTIAGO HADDOCK MD 2020

SIMBOX EDUCATIONAL MEDIA 2020: AAP CLINICAL PRACTICE GUIDELINE
HTTPS://PEDIATRICS.AAPPUBLICATIONS.ORG/CONTENT/134/5/E1474

## OVERVIEW

Friedman, Jeremy N., et al. "Bronchiolitis: recommendations for diagnosis, monitoring and management of children one to 24 months of age." *Paediatrics & child health* 19.9 (2014): 485-491. Available at: https://www.cps.ca/en/documents/position/bronchiolitis

## VIDEOS & PODCASTS

Brad Sobolewski, PEM Currents. Bronchiolitis, 2017. Available at: https://www.pemcincinnati.com/podcasts/?p=334

## ALGORITHMS

Bronchiolitis Clinical Pathway/Algorithm by Children's Hospital of Philadelphia. Available at: https://www.chop.edu/clinical-pathway/bronchiolitis-emergent-evaluation-clinical-pathway

We want to hear how this went for you and thank you for your feedback.
Please go online and click on either PARTICIPANT or FACILITATOR survey:
**https://www.acepsim.com/** *OR*
Use **QR code**: Take out your mobile device, open camera, get QR code in front o
camera, a link should pop up, click on that link.

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