PEDIATRIC ASTHMA

Estimated Time: 60 minutes • Debriefing Time: 60 minutes

Scan to Begin

Patient Name: Patrick A. Armstrong

SCENARIO OVERVIEW

Patrick Armstrong is a 16-year-old patient experiencing an asthma exacerbation. He attempted to drive himself to the ED, but called 911 when the symptoms worsened. This scenario contains IPE components in that paramedic provides the handoff report to the Nursing student in the ED as the scenario begins, and a respiratory consult occurs in State 2.

State 1 consists of an initial patient assessment and interventions based on an included ED protocol for asthma and a severity classification table. Students may auscultate lung sounds in various anatomical locations and obtain a peak flow reading. Students should notify the provider of the patient's status at end of State 1. In State 2, students administer a nebulizer and Methylprednisolone IVP as well as call Respiratory Therapy for a STAT continuous neb. In State 3, new orders are received from the provider for IV Magnesium and an ABG draw. Students can also read a progress note from the respiratory therapist consult. In State 4, twenty-four hours have elapsed. The patient's status has improved and discharge orders are received. Students should provide patient education using the handouts provided.

LEARNING OBJECTIVES

1. Integrate evidence-based practice while using the nursing process to care for a pediatric patient with asthma
2. Perform a focused respiratory assessment
3. Participate in procedures used to screen, diagnose, and treat pediatric patients with asthma
4. Safely administer respiratory system medications
5. Effectively utilize therapeutic communication while caring for a pediatric patient experiencing an acute exacerbation of asthma
6. Demonstrate effective inter-professional communication and collaboration

CURRICULUM MAPPING

WTCS NURSING PROGRAM OUTCOMES

- Implement one's role as a nurse in ways that reflect integrity, responsibility, ethical practices, and an evolving professional identity as a nurse committed to evidence-based practice, caring, advocacy and quality care
- Demonstrate appropriate written, verbal, and nonverbal communication in a variety of clinical contexts
- Integrate social, mathematical, and physical sciences, pharmacology, and pathophysiology in clinical decision making
- Provide patient centered care by utilizing the nursing process across diverse populations and health care settings
- Minimize risk of harm to patients, members of the healthcare team and self through safe individual performance and participation in system effectiveness
- Lead the multidisciplinary health care team to provide effective patient care throughout the lifespan
- Use information and technology to communicate, manage data, mitigate error, and support decision-making

NURSING FUNDAMENTALS

- Maintain a safe, effective care environment for adults of all ages
- Use appropriate communication techniques
- Use the nursing process
- Provide nursing care for patients with alterations in oxygenation
- Adapt nursing practice to meet the needs of diverse patients in a variety of settings

NURSING HEALTH PROMOTION

- Use principles of teaching/learning when reinforcing teaching plans
- Promote healthy coping in acute and chronic illness

COMPLEX HEALTH ALTERATIONS I

- Evaluate nursing care for patients with chronic alterations in the respiratory system

SIMULATION LEARNING ENVIRONMENT & SET-UP

ENVIRONMENT:

Inside room: This is an ED room. Peak flow meter and oxygen equipment available.

Inside or outside room: Hand sanitizer and/or sink

Outside room: Computer or form(s) for documentation

PATIENT PROFILE

Name: Patrick A. Armstrong

DOB: 11/16/20xx

Age: 16

MR#: 1116

Gender: Male

Height: 177.5 cm (5 ft 11 in)

Weight: 109 kg (240 lbs)

Allergies: NKDA

Admitting Diagnosis: shortness of breath (R06.02)

Medical History: asthma, unspecified (493.90)

Code Status: Full code

Ethnicity: African American

Spiritual Practice: Unknown

Primary Language: English

EQUIPMENT/SUPPLIES/SETTINGS

Patient

- Patient has already changed into hospital gown; he just arrived via ambulance. He is on O2 via nasal cannula at 2L/min.
- Note placement of multiple QR codes for anatomically correct lung sounds
- Personal Albuterol inhaler from home (no spacer) at bedside
- **QR Code: Asthma Action Plan** or a printed version of Asthma Action plan at bedside

Simulator/Monitor Settings

- RR 35, O2 sat 93% on 2L, HR 116, BP 148/92, End tidal CO2: 30

Supplies

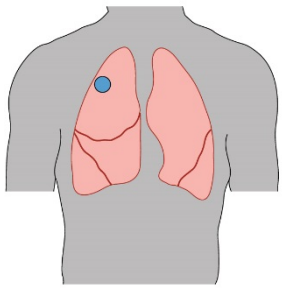
- General
    - Equipment to obtain vitals including oxygen saturation
    - Peak Flow Meter (if not available, students can scan **QR Code: Peak Flow Meter**)
    - Nebulizer equipment
- Medications (realistic labels are available by scanning the QR code)
    - DuoNeb
    - Methylprednisolone IV
    - Magnesium IV
    - Prednisone PO
    - Albuterol MDI
    - Advair
- Printed Patient Education Materials
    - Appendix B: Initial Asthma Action Plan; Appendix D: Revised Asthma Action Plan
    - Appendix C: Managing Your Asthma, Using Peak Flow, Using MDI with Spacer, Normal Peak Flow, Using Advair Diskus

QR CODES

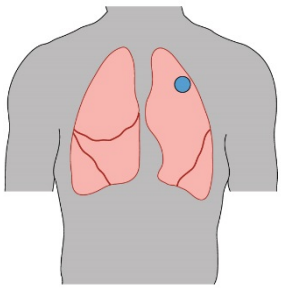
REPORT	PATIENT	PATIENT ID	FACILITATOR
ADVAIR	ALBUTEROL NEB	DUONEB	ASTHMA ACTION PLAN
MAGNESIUM IV	PEAK FLOW VIDEO	PEAK FLOW RESULT	PREDNISONE PO
METHYLPREDNISOLONE IV			

CHEST QR CODES

Cut along the dotted lines. Fold along the solid line to create a bi-fold of the diagram and QR code.



ANTERIOR 2



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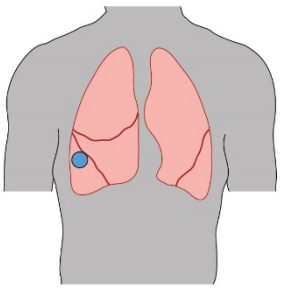

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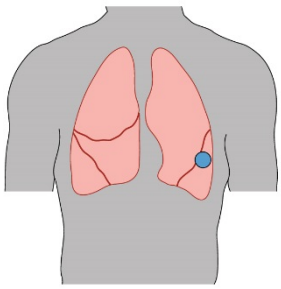

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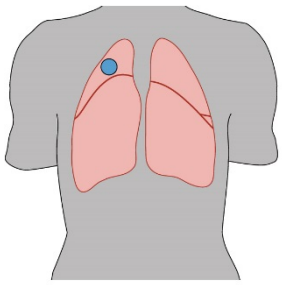
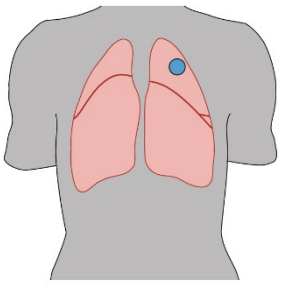
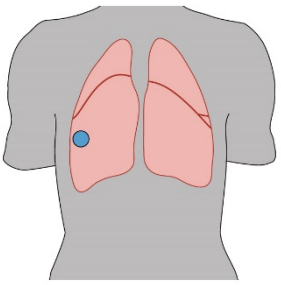


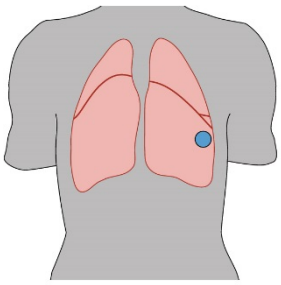
POSTERIOR 0



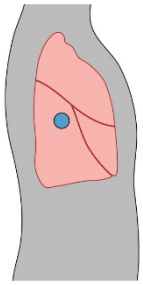
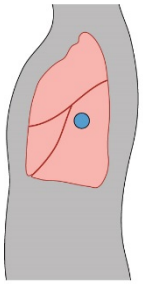
POSTERIOR 1



POSTERIOR 4



POSTERIOR 5

	
RIGHT AXILLARY 1	LEFT AXILLARY 1

TEACHING PLAN

PREBRIEF

The facilitator should lead this portion of the simulation. The following steps will guide you through Prebrief.

- Scan the **QR code:** "**Scan to Begin**" while students are in Prebrief
- "Meet Your Patient" (on iPad) and explain how the iPad works in the simulated learning environment including:
    - For some scenarios, it may be helpful to tell students where the QR code are located. For others, you may want students to "find" the QR codes during their assessments. This is your choice.
    - Describe how a QR code sound will work in the scenario. For the most authentic sound experience, student should use ear buds or the ARISE "stethoscope" for all QR codes with the following symbol: 🔊. Example: **QR Code: Chest Anterior 1** 🔊
    - As the facilitator, you should be aware that throughout the simulation some QR codes are necessary to the programming of the iPad content. Directions for which QR codes are required (to be scanned) in each state are listed under each state of the documentation below. The QR codes are also in **BOLD** type.
    - Level Up tab – This tab "tells" the content in the iPad to change to what is needed for the next state of a simulation. It is used a few times in this scenario after the provider is notified to display new orders (those just given over the phone) and lab results, etc...
    - Medication QR Codes – The student(s) must scan **QR Code: Patient ID** prior to scanning any medication. That scan is valid for 2 minutes and then it "times out." The student(s) will need to scan **QR Code: Patient ID** again to give more medications.
    - MAR Hyperlinks – On the MAR all medications are underlined and hyperlinked to DailyMed, which is a medication reference housed by the National Library of Medicine. Students can click on these links during the simulation for up-to-date medication content, labels, and package insert information.
- Discuss the simulation "Learning Objective(s)" (on iPad) as well as any other Prebrief materials

- Get "Report" (on iPad)
    - Possible Facilitator Questions
        - What clinically relevant information did you gather from the paramedic report that is important for continuity of care?
        - What is an "end tidal CO2 reading?"
- Play the "Patient" video (on iPad)
    - Possible Facilitator Questions
        - Evaluate the patient's respiratory status.
        - What are your priorities of care as you enter the patient's room?
- Review initial tabbed content as a group. Encourage students to organize and prioritize a plan of care for when they enter the room.
    - Review the ED Protocol together before entering the room

ED PROTOCOL

See Appendix A for a printable version of the ED Protocol

ORDERS

No reports available.

MAR

PRN BASED ON PROTOCOL	
If mild exacerbation based on Severity Scale: Albuterol nebulizer 0.15 mg/kg, max 5 mg, every 20 minutes PRN up to three doses (250 mcg dose if <20kg; 500 mcg if > 20 kg)	**Last Given**
If moderate or severe exacerbation based on Severity Scale: Albuterol/ipratropium (Duoneb) unit dose nebulizer every 20 minutes PRN up to three times	**Last Given**
If moderate exacerbation: Prednisone 2mg/kg PO x 1 dose	**Last Given**

DAILY RECORD

Vital signs from on arrival will display here: Pulse 116, RR 35, BP 148/92, Temp 37.3, O2 sat 93% on 2L

VITAL SIGNS

- Screen is open for entry and not verified against any parameters. Patient ID must be scanned before entering vitals.
- Simulator settings: Pulse 116, RR 35, BP 148/92, O2 sat 93%

PROGRESS NOTES

No reports available.

LABS/DIAGNOSTICS

No reports available.

PATIENT EDUCATION

“Managing Your Asthma” handout is displayed. See Appendix D for printable versions of the Patient Education handouts.

LEVEL 1

The iPad reads, “The iPad is at Level 1.”

SCANNER

Use this to scan available QR Codes.

EXIT

The iPad reads, “Are you sure you want to exit? All data will be lost.”

- If “No” is selected, the iPad will return to the tabbed content.
- If “Yes” is selected, the iPad will let the student(s) exit and prompt them to complete an embedded 3-5 minute survey.

STATE 1

PATIENT ASSESSMENT

- Patient Overview
    - Patient is just arriving to the Emergency Department via EMS. He attempted to drive himself to the ED, but when symptoms worsened he called 911. He states he is having an asthma exacerbation and has not yet been seen by the provider. Students should select interventions based on the Asthma protocol and severity table provided in tabbed content.
- Expected Student Behaviors
    - Introduce themselves to the patient
    - Verify patient identity by asking name and date of birth
    - Communicate therapeutically regarding patient concerns
    - Obtain a brief focused health history on his current respiratory status
    - Perform a focused respiratory assessment by scanning **QR Codes: Chest** 🔊 at various anatomical locations on anterior, medial and posterior chest
- *(Optional)*
  Students may attempt to obtain a peak flow meter reading (if they believe it is appropriate due to patient's condition) by scanning the **QR Code: Peak Flow**.
    - They should evaluate patient's attempt and realize the reading will not be accurate.
    - An image of a peak flow meter with the result (150 L/min) will immediately follow.
- Students can scan the **QR Code: Asthma Action Plan** (or a printed copy can be at bedside). Students should analyze his current peak flow result and determine he is in the "red zone."
    - Students may elect to immediately administer a DuoNeb nebulizer based on the ED protocol provided. They must first scan **QR Code: Patient ID** before scanning the **QR code: DuoNeb** as they would in practice before administering a medication.
    - Students should notify the provider of their assessment findings and interventions using SBAR format
- Technician Prompts

- Overview: Patient is feeling very short of breath and is speaking in 4-5 word sentences and sounds breathless. He has already used his albuterol 4-5 times today. He knows that exposure to a cat probably triggered his asthma symptoms. The paramedic reported finding cigarettes in the car, but at this time it is unknown if the patient smokes.
- Initial patient responses can include:
  - "I was hanging out at a friend's house today... playing video games. I started to have ... a hard time breathing."
  - "I noticed they ... have a cat... I'm allergic to cats."
  - "I've used my inhaler ... like 4 or 5 times today."
  - "I called my dad at work ... and he said to go to the emergency room ... so I tried to drive here ... but it got worse ... so I called 911."
- If students ask the following questions, provide these responses:
  - Do you feel short of breath?
    - Answer: "Yes."
  - Do you have a cough?
    - Answer: "Sometimes at night."
  - Do you take any other medications?
    - Answer: "Just Advil when I'm sore from football practice."
  - Do you smoke?
    - Answer: "Sometimes. But don't tell my dad - he'll get mad."
  - Does anyone in your household smoke?
    - Answer: "Yes"
  - Are you following an asthma action plan?
    - Answer: "I brought it ... but not sure how to use it." (Show printed document or have students scan **QR Code: Asthma Action Plan**?
  - Do you have your inhaler with you?
    - Answer: "Yes" – in his hand

  - After student calls and provides SBAR report to provider: Provide the new orders below. These orders will also display on iPad after the **QR Code: Facilitator** is scanned indicating students can move to State 2
    - Albuterol/Ipratropium nebulizer; may repeat x 3
  - Respiratory Therapy consult STAT for continuous neb 15 mg/hr for 2 hours then re-evaluate peak flow and FEV1
    - IV Methylprednisolone (1 mg/kg, maximum 125 mg) STAT
  - Monitor Vital Signs and Alertness at least every 2o minutes
  - Immediately notify MD or call rapid response if signs of impending respiratory failure such as: altered mental status, inability to speak, intercostal retractions, worsening fatigue

- Suggested Facilitator Questions
  - What focused assessments will you perform on a patient with an asthma exacerbation?
  - How do you rate Patrick's current respiratory status based on the ED protocol?
  - How do you rate Patrick's current respiratory status based on his personal Asthma Action Plan?
  - How will you modify your approach to the developmental level of teenager?
  - What will you do if a teenager asks you to not share information with their parent(s)?
  - How would you describe the lungs sounds you are hearing?
  - What do these lungs sounds indicate is occurring physiologically in the patient's lungs?
  - What medications will improve the patient's respiratory status? How do they work?
  - What is an Asthma Action Plan and how is it used?
- Tabbed iPad Prompts & Content Changes
  - The scenario automatically advances to Level 2 after the student(s) scans **QR Code: Facilitator**

- Students will receive a message indicating they have been approved to proceed and new orders received.

STATE 2

NO IMPROVEMENT IN PATIENT CONDITION

- Overview
    - Students should implement new orders received from provider on iPad
- Expected Student Behaviors
    - Continually monitor patient response to interventions and for signs of worsening condition
    - Administer Duoneb nebulizer up to three doses. Scan **QR code: Duoneb**
        - Note: **QR Code: Patient ID** must be scanned before all medication scans preceding administration, just as required in clinical practice.
    - Start IV
    - Initiate cardiac monitoring
    - Administer Methylprednisolone IVP. Scan **QR code: Methylprednisolone IVP**
        - Note: **QR Code: Patient ID** must be scanned before all medication scans preceding administration, just as required in clinical practice.
    - Calculate correct dosage based on Patrick's weight (109 kg)
    - Vial information provided on QR code label: 125 mg/2ml
    - Call Respiratory Therapy for continuous nebulizer using SBAR format
    - Notify provider of patient's response to interventions
- Technician Prompts
    - Overview: Patient remains short of breath and does not improve after the administration of the IV Methylprednisolone or the Duoneb nebulizer. He is beginning to tire at the end of this state.
    - Initial patient responses can include (in 1-2 word sentences and tired voice):
        - "Why ... am I not ...getting better?"
        - "I'm having... a hard time... breathing."

        - "Why ... am I getting... IV medicine? ... How will it help?"
        - If students mention a continuous neb: "What's a... continuous neb?"
    - When students call Respiratory Therapy:
        - Students should use SBAR format to communicate the patient's status and need for continuous neb. If they don't use SBAR format, ask questions about patient's situation and background/history.
        - If they don't describe the urgency of the situation, ask for clarification of patient's current status and if this is truly a "STAT" situation.
    - When students call the provider at the end of this state (after expected behaviors have been completed):
        - They should use SBAR format to give an updated status and patient's response to interventions. If they don't use SBAR format, ask appropriate questions to elicit the information.
        - New orders should be given to students verbally at this point (and will also display on the iPad after QR Code: Facilitator is scanned):
            - Magnesium IV 75 mg/kg, max of 2.5 g administered over 20 minutes, STAT
            - ABG STAT

- Suggested Facilitator Questions
    - What are the proper steps for using a peak flow meter? (Refer students to handout under Patient Education tab.)
    - How will you evaluate if the patient performed the procedure accurately?
    - How should you document a peak flow reading?
    - How will methylprednisolone IVP help Patrick?
    - How quickly should the methylprednisolone IV work?
    - What is a continuous nebulizer treatment?
    - What should you communicate to Respiratory Therapy when you call them?
    - What information should you communicate to the provider?

- What conditions are you monitoring for that would indicate Patrick's condition is worsening?

- Tabbed iPad Prompts & Content Changes
  - The scenario advances to Level 3 after the student(s) scans **QR Code: Facilitator**
  - The iPad will read, "You have been approved to proceed. New orders received."

ORDERS

Date	Time	Order
Today	Now	Albuterol/Ipratropium nebulizer; may repeat x 3
		Respiratory Therapy consult STAT for continuous neb 15 mg/hr for 2 hours then re-evaluate peak flow and FEV1
		IV Methylprednisolone (1 mg/kg, maximum 125 mg) STAT
		Monitor Vital Signs and alertness at least every 2o minutes
		Continuous cardiac monitoring
		Immediately notify MD or call rapid response if signs of impending respiratory failure such as: altered mental status, inability to speak, intercostal retractions, worsening fatigue
		----- James Emerson, M.D.

MAR

Medication Administration Record

Scheduled		
Methylprednisolone IVP 1 mg/kg STAT	**Due Now**	**Last Given**
Albuterol continuous nebulizer 15 mg/hr for 2 hours then re-evaluate peak flow and FEV1 per respiratory therapy		
Continuous Infusion		

	Started
PRN	
Albuterol and Ipratropium (Duoneb) nebulizer PRN, may repeat every 20 minutes up to three times	**Last Given**
Discontinued	
If mild exacerbation based on Severity Scale: Albuterol nebulizer 0.15 mg/kg, max 5 mg, every 20 minutes PRN up to three doses (250 mcg dose if <20kg; 500 mcg if > 20 kg)	**Last Given**
	30 mins ago via EMT
If moderate or severe exacerbation based on Severity Scale: Albuterol/ipratropium (Duoneb) unit dose nebulizer every 20 minutes PRN up to three times	
If moderate exacerbation: Prednisone 2mg/kg PO x 1 dose	

STATE 3

NEW ORDERS RECEIVED

- Overview
    - New orders are received from provider for IV Magnesium and STAT ABG. Progress notes from Respiratory Therapy consult appear on iPad.
- Expected Student Behaviors
    - Administer IV Magnesium
        - Scan **QR Code Patient ID** then **QR Code: Magnesium IV**
        - Calculate dose and rate of pump based on:
            - Order: Magnesium 75 mg/kg, maximum 2.5 g administered over 20 minutes
            - Magnesium QR code displays Magnesium sulfate 20g in 540 ml
    - Call Respiratory Therapy or lab for a STAT ABG
        - Note: When Labs-Diagnostics tab is tapped, a message is received, "Have you called for ABGs to be drawn?" After students tap "Yes," ABG results will be displayed under the Lab-Diagnostics tab
- Technician Prompts
    - Overview: Patient is still short of breath and is tiring from the work of breathing. He should be speaking in one or two word sentences only and exhibit exhaustion in his tone of voice.
    - Initial patient responses can include:
        - "How will...Magnesium... help me?"
        - "What is... an ABG?"
        - "Will it hurt?"
        - "How will this help?"
    - When students call Respiratory Therapy or lab to request an ABG, they should correctly report the patient's name and date of birth, as well as the urgency of the request.
- Possible Facilitator Questions

- "How will IV Magnesium help Patrick at this time?"
- "Interpret the ABG results."
- "What do the ABG results tell us about Patrick's condition?"
- "Is intubation and ventilation required at this time? Why or why not?"

- Tabbed iPad Prompts & Content Changes
  - The scenario advances to Level 4 after the student(s) scans **QR Code: IV Magnesium** and students have viewed the new ABG results under the **Labs-Diagnostic** tab.
  - The iPad will then display a message: "Twenty-four hours have elapsed." Then, a new plaque will appear that reads, "Patient's condition has improved. New orders received."

ORDERS

Date	Time	Order
Today	60 minutes ago	Albuterol/Ipratropium nebulizer; may repeat x 3
		Respiratory Therapy consult STAT for continuous neb 15 mg/hr for 2 hours then re-evaluate peak flow and FEV1
		IV Methylprednisolone (1 mg/kg, maximum 125 mg) STAT
		Monitor Vital Signs and Alertness at least every 2o minutes
		Continuous cardiac monitoring
		Immediately notify MD or call rapid response if signs of impending respiratory failure such as: altered mental status, inability to speak, intercostal retractions, worsening fatigue
		----- James Emerson, M.D.
Today	Now	Magnesium IV 75 mg/kg, max of 2.5 g administered over 20 minutes, STAT
		ABG STAT
		----- James Emerson, M.D.

MAR

Medication Administration Record

Scheduled		
Methylprednisolone IVP 1 mg/kg STAT	**Due Now**	**Last Given**
		30 minutes ago
Albuterol continuous nebulizer 15 mg/hr for 2 hours then re-evaluate peak flow and FEV1 per respiratory therapy		Started 20 minutes ago
Continuous Infusion		
Intravenous magnesium sulfate (75 mg/kg, maximum 2.5 g administered over 20 minutes) STAT		**Started**
PRN		
Albuterol and Ipratropium (Duoneb) nebulizer PRN, may repeat every 20 minutes up to three times		**Last Given**
		50 minutes ago
		30 minutes ago
		10 minutes ago
Discontinued		
If mild exacerbation based on Severity Scale: Albuterol nebulizer 0.15 mg/kg, max 5 mg, every 20 minutes PRN up to three doses (250 mcg dose if <20kg; 500 mcg if > 20 kg)		**Last Given**
		30 mins ago via EMT
If moderate or severe exacerbation based on Severity Scale: Albuterol/ipratropium (Duoneb) unit dose nebulizer every 20 minutes PRN up to three times		
If moderate exacerbation: Prednisone 2mg/kg PO x 1 dose		

LAB/DIAGNOSTICS

Arterial Blood Gas (ABG)			
	Today – 10 minutes ago	Units	Reference Range
pH	7.36		7.35-7.45
$PaCO_2$	43	mmHg	35-45
PaO_2	85	mmHg	80-100
HCO_3	24	mmol/L	22-26
Base Excess	1	mmol/L	0+/-3
SaO_2	89%	%	
Site = ® Radial	Modified Allen's test = √		% O2 = 100

Facilitator Note: When students tap on the Lab-Diagnostics tab, they will be asked "Have you called for ABGs to be drawn?"

- If they have not yet called, they should tap "No" and make the appropriate phone call
- If they have called, they should tap "Yes," and then the ABG results are displayed.

PROGRESS NOTES

Today/30 minutes ago Respiratory Therapy	Patient admitted to ED with exacerbation of known asthma. VS on arrival were: Pulse 116, RR 35, BP 148/92, O2 sat 93%. Bilateral breath sounds: diffuse inspiratory and expiratory wheezes throughout. Attempted peak flow but patient was unable secondary to distress. Duoneb given without incident. Post vital signs were: pulse 120, RR 30, BP 150/94, O2 sat 94%. Breath sounds: slight improvement in aeration. Strong hacking, nonproductive cough. Called back to room 30 minutes later to start continuous nebulizer per MD order. Started without incident. Continuous cardiac monitoring implemented. Current vital signs: pulse 110, RR 25, BP 144/88, O2 sat 98%. Will recommend serum electrolytes to MD. Will recheck q15 minutes per protocol. RN is aware of patient status. ---------- Will Smith, RRT

STATE 4

PATIENT PREPARED FOR DISCHARGE

- Overview
    - At the beginning of this state, students receive a message "Twenty-four hours have elapsed. The patient's condition has improved. New orders received." Discharge orders are received from the provider. Students should reassess patient for stability for discharge and perform patient education using the Patient Education handouts provided.
- Expected Student Behaviors
    - View the new orders
    - Reassess vital signs to verify he is stable
    - Reassess lung sounds by scanning **Chest QR codes** in all anatomic locations to verify he is stable
    - Use the Patient Education handouts provided to:
        - Accurately provide medication information about Advair and albuterol
        - Accurately provide patient education about how to use the Asthma Action Plan and the Peak Flow Meter
        - Accurately provide patient education regarding asthma management
- Technician Prompts
    - Overview: Patient is feeling much better and is no longer short of breath. He is relieved that he finally feels better, but does not want this to happen again. He does not understand the proper use of medications or the Asthma Action Plan until accurate instructions are provided by the student.
    - Simulator settings should now be: Pulse 74, Respiratory Rate 18, BP 128/68, Temp 37.2 C, O2 sat 100% on room air
    - Initial patient responses can include:
        - "What is the difference between Albuterol and Advair?"

- "So do I use both inhalers when I'm having an asthma attack like today?"
- "I've never used a spacer before... I don't know how to do it."
- "I've never used Advair before... I don't know how to do it."
- "I forgot how to use the Peak Flow meter."
- "What do the numbers on the Peak Flow meter mean?"
- "I don't understand the difference between the 'yellow zone' and the 'red zone' on the Asthma Action Plan."
- "How often am I supposed to use the Peak Flow Inhaler?"
- "I knew that I'm allergic to cats but I didn't know there were other triggers."

- Suggested Facilitator Questions
  - What assessments and documentation are required by the nurse before the patient is discharged?
  - What is the mechanism of action for Advair?
  - How is does Advair work differently than albuterol?
  - Which inhaler should be used during an 'asthma attack'?
  - What are some important teaching points to include about Advair? Albuterol?
  - What do the green, yellow and red zones mean on the Asthma Action Plan?
  - When should the patient seek immediate medical attention?
  - How should the patient use their Peak Flow meter at home?
- Tabbed iPad Content Changes

ORDERS

Provider Orders

Date	Time	Order
Yesterday	On ED admission	Albuterol/Ipratropium nebulizer; may repeat x 3
		Respiratory Therapy consult STAT for continuous neb 15 mg/hr for 2 hours then re-evaluate peak flow and FEV1
		IV Methylprednisolone (1 mg/kg, maximum 125 mg) STAT
		Monitor Vital Signs and Alertness at least every 2o minutes
		Continuous cardiac monitoring
		Immediately notify MD or call rapid response if signs of impending respiratory failure such as: altered mental status, inability to speak, intercostal retractions, worsening fatigue
		----- James Emerson, M.D.
Yesterday	2 hours after ED admission	Magnesium IV 75 mg/kg, max of 2.5 g administered over 20 minutes, STAT
		ABG STAT
		----- James Emerson, M.D.
Today	Now	Discharge to home with following orders:
		Albuterol inhaler every 4 hours while awake and up to every 4 hours as needed during sleep for the first three days after ED visit, then weaned as tolerated with goal of discontinuing by day 5.
		Prednisone 60 mg PO daily x 1 , then 50 mg PO daily x 1, then 40mg PO daily x 1, then 30 mg PO daily x 1, then 20 mg daily x 1, then 10 mg daily x 1, then stop.
		Advair 250/50 mcg inhaler 1 puff twice daily
		Schedule follow-up visit with primary care provider in the next 7 days
		Provide discharge education including: • Signs and symptoms necessitating return to ED: worsening shortness of breath, difficulty speaking a complete sentence or increased work of breathing • Discharge medications as listed above • Written asthma action plan • Risk factors for asthma and prevention of acute exacerbation
		----- James Emerson, M.D.

MAR

Medication Administration Record

Scheduled		
Methylprednisolone IVP 1 mg/kg STAT	**Due Now**	**Last Given** Yesterday in ED
Discharged to Home on Following Medications: • Albuterol inhaler every 4 hours while awake and up to every 4 hours as needed during sleep for the first three days after ED visit, then weaned as tolerated with goal of discontinuing by day 5. • Prednisone 60 mg PO daily x 1, then 50 mg PO daily x 1, then 40mg PO daily x 1, then 30 mg PO daily x 1, then 20 mg daily x 1, then 10 mg daily x 1, then stop. • Advair 250/50 mcg 1 puff twice daily		
Continuous Infusion		
Intravenous magnesium sulfate (75 mg/kg, maximum 2.5 g administered over 20 minutes) STAT		**Last Given** Yesterday in ED
PRN		
Albuterol and Ipratropium (Duoneb) nebulizer PRN, may repeat every 20 minutes up to three times		**Last Given** Yesterday in ED x 3 doses
Discontinued		
Albuterol continuous nebulizer 15 mg/hr for 2 hours then re-evaluate peak flow and FEV1 per respiratory therapy		**Last given** Yesterday in ED
If mild exacerbation based on Severity Scale: Albuterol nebulizer 0.15 mg/kg, max 5 mg, every 20 minutes PRN up to three doses (250 mcg dose if <20kg; 500 mcg if > 20 kg)		**Last Given** Yesterday via EMT

If moderate or severe exacerbation based on Severity Scale: Albuterol/ipratropium (Duoneb) unit dose nebulizer every 20 minutes PRN up to three times	
If moderate exacerbation: Prednisone 2mg/kg PO x 1 dose	

PROGRESS NOTES

Date/Time	Note
Yesterday/ On ED admission Respiratory Therapy	Patient admitted to ED with exacerbation of known asthma. VS on arrival were: Pulse 116, RR 35, BP 148/92, O2 sat 93%. Bilateral breath sounds: diffuse inspiratory and expiratory wheezes throughout. Attempted peak flow but patient was unable secondary to distress. Duoneb given without incident. Post vital signs were: pulse 120, RR 30, BP 150/94, O2 sat 94%. Breath sounds: slight improvement in aeration. Strong hacking, nonproductive cough. Called back to room 30 minutes later to start continuous nebulizer per MD order. Started without incident. Continuous cardiac monitoring implemented. Current vital signs: pulse 110, RR 25, BP 144/88, O2 sat 98%. Will recommend serum electrolytes to MD. Will recheck q15 minutes per protocol. RN is aware of patient status. ---------- Will Smith, RRT
Today/Now Hospitalist	Patient has shown marked improvement since yesterday after receiving IV Magnesium and Methylprednisolone therapy. FEV1 has returned to 75% of personal best with minimal wheezing in upper lung fields at this time. Vital signs are stable. May be discharged home – see discharge orders. ----- James Emerson, M.D.

PATIENT EDUCATION

Patient Education handouts now include:

- Managing Your Asthma
- Asthma Action Plan (revised with Advair)
- Albuterol MDI with Spacer
- Peak Flow
- Advair Diskus

See Appendix C for printable versions of these handouts.

EXIT

Students may exit after viewing the Patient Education tab.

LEVEL 4/EXIT

- When the Level 4 tab is tapped, the iPad reads, “The iPad is at Level 4.”
- The Level 4 tab will automatically disappear after the Patient Education tabbed is viewed (students are not prompted about this).
- When the Exit tab is tapped, the iPad reads, “Scenario objectives have been met. Are you sure you want to exit the game?”
    - If “No” is selected, the iPad will return to the tabbed content.
    - If “Yes” is selected, the iPad will let the student(s) exit and prompt them to complete an embedded 3-5 minute survey.

DEBRIEF

Nothing needed from the iPad.

QUESTIONS

1. Reaction: "How do you feel this scenario went?" (Allow students to vent their emotional reactions before delving into learning objectives.)
2. Review understanding of learning objective: Integrate evidence-based practice while using the nursing process to care for a pediatric patient with asthma
    a. Explain how you used the Asthma Severity scale and ED protocol to provide care to a patient experiencing an acute asthma exacerbation.
    b. Explain how the Asthma Action Plan is used to help patients self-manage their asthma.
    c. When should a patient with asthma seek immediate medical attention?
    d. Describe the current evidence-based practices for using a Meter Dose Inhaler like albuterol.
3. Perform a focused respiratory assessment on a pediatric patient with asthma
    a. What did you find on your initial focused respiratory assessment?
    b. What do these findings indicate is occurring physiologically?
4. Review understanding of learning objective: Participate in procedures used to screen, diagnose, and treat pediatric patients with asthma
    a. Explain how Peak Flow readings are used to help manage and diagnose patients with asthma
    b. How are ABGs used to manage a patient experiencing an acute asthma exacerbation?
5. Review understanding of learning objective: Safely administer respiratory system medications
    a. What medications were used to treat Patrick's acute asthma exacerbation?
    b. Relate the ordered medications to the physiological processes occurring during asthma.
    c. Were these medications effective for Patrick?

   d. If Patrick hadn't improved after the administration of IV Magnesium, what might have been the next collaborative intervention as his status was worsening?

6. Review understanding of learning objective: Effectively utilize therapeutic communication while caring for a pediatric patient experiencing an acute exacerbation of asthma

   a. Anxiety is a common emotional response during an acute asthma attack.

      i. What kind of therapeutic techniques did you use to help manage Patrick's anxiety?

      ii. Were they effective?

      iii. If you could "do over," would you change your therapeutic approach?

7. Review understanding of learning objective: Demonstrate effective interprofessional communication and collaboration

   a. How did you communicate your findings and concerns to the provider? Did you use SBAR?

   b. How did you communicate your concerns to the respiratory therapist? Did you use SBAR?

   c. If you could "do over," how would you change how you communicated and collaborated with other health care disciplines?

8. Summarize/Take away Points:

   a. "In this scenario you assessed a patient with asthma who was currently experiencing symptoms an asthma exacerbation requiring care in the Emergency Department. What is one thing you learned from participating in this scenario that you will take into your nursing practice?" (Ask each student to share something unique from what the other students share.)

NOTE: Debriefing technique is based on INASCL Standard for Debriefing and NLN Theory-Based Debriefing by Dreifuerst.

APPENDIX A: ED PROTOCOL FOR ASTHMA

Initial Assessment and Ongoing Monitoring:

1. Perform Initial Assessment of Severity (**refer to Table 1 below**)
2. Administer oxygen to maintain O2 sat >92%
3. Ongoing monitoring of respiratory rate, heart rate, oxygen saturation, degree of alertness, accessory muscle use, and retractions every 20 minutes for first hour of therapy.
4. Measure peak expiratory flow rate (PEFR) if patient condition allows. Optimally measure three attempts while standing, use best score, and compare to child's known personal best.

If Mild Exacerbation based on Severity Scale:

1. Administer albuterol nebulization (0.15 mg/kg, max 5 mg) (250 mcg dose if <20kg; 500 mcg if > 20 kg)
2. Patients who do not respond after three doses should be reassessed by provider and treated accordingly.

If Moderate Exacerbation based on Severity Scale:

1. Administer albuterol nebulization (0.15 mg/kg, max 5 mg) combined with ipratropium bromide (250 mcg dose if <20kg; 500 mcg if > 20 kg). May repeat albuterol/ipratropium neb every 20 to 30 minutes for three doses.
2. Administer Prednisone 2mg/kg PO x 1 dose
3. If there is a lack of clinical improvement despite treatment with nebulizer treatment and systemic glucocorticoid: administer Magnesium sulfate IV 75 mg/kg, max of 2.5 g administered over 20 minutes
4. Patients who do not respond should be reassessed by provider and treated accordingly.

If Severe Exacerbation based on Severity Scale:

1. Administer albuterol nebulization (0.15 mg/kg, max 5 mg) combined with ipratropium bromide (250 mcg dose if <20kg; 500 mcg if > 20 kg). May repeat albuterol/ipratropium neb every 20 to 30 minutes for three doses.
2. Children with poor inspiratory flow or children who cannot cooperate with nebulized therapy can be treated with epinephrine subq 0.01 mL/kg of a 1 mg/mL solution; maximum dose of 0.4 mg or 0.4 mL
3. For patients with a poor response to initial treatment:
    a. Administer intravenous methylprednisolone (1 mg/kg, maximum 125 mg) as soon as intravenous access is obtained.
    b. Continuously nebulized albuterol
    c. Administration of intravenous magnesium sulfate (75 mg/kg, maximum 2.5 g administered over 20 minutes)

d. Endotracheal intubation may be considered by provider

Discharge to Home

Children who have marked improvement within first one to two hours of therapy with FEV1 returning to > 70% of personal best with minimal symptoms may be discharged home based on provider recommendation with the following discharge medications and education:

- Albuterol inhaler every 4 hours while awake and up to every 4 hours as needed during sleep for the first three days after ED visit, then weaned as tolerated with goal of discontinuing by day 5.
- If they received systemic glucocorticoids in the ED: Prednisone 1 mg/kg PO twice daily x 5 days
- Advair 250/50 mcg 1 puff twice daily
- Follow-up visit with primary care provider in the next week
- Discharge education:
    - Signs and symptoms necessitating return to ED: worsening shortness of breath, difficulty speaking a complete sentence or increased work of breathing
    - Discharge medications as listed above
    - Written asthma action plan
    - Risk factors for asthma
    - Prevention of acute exacerbation

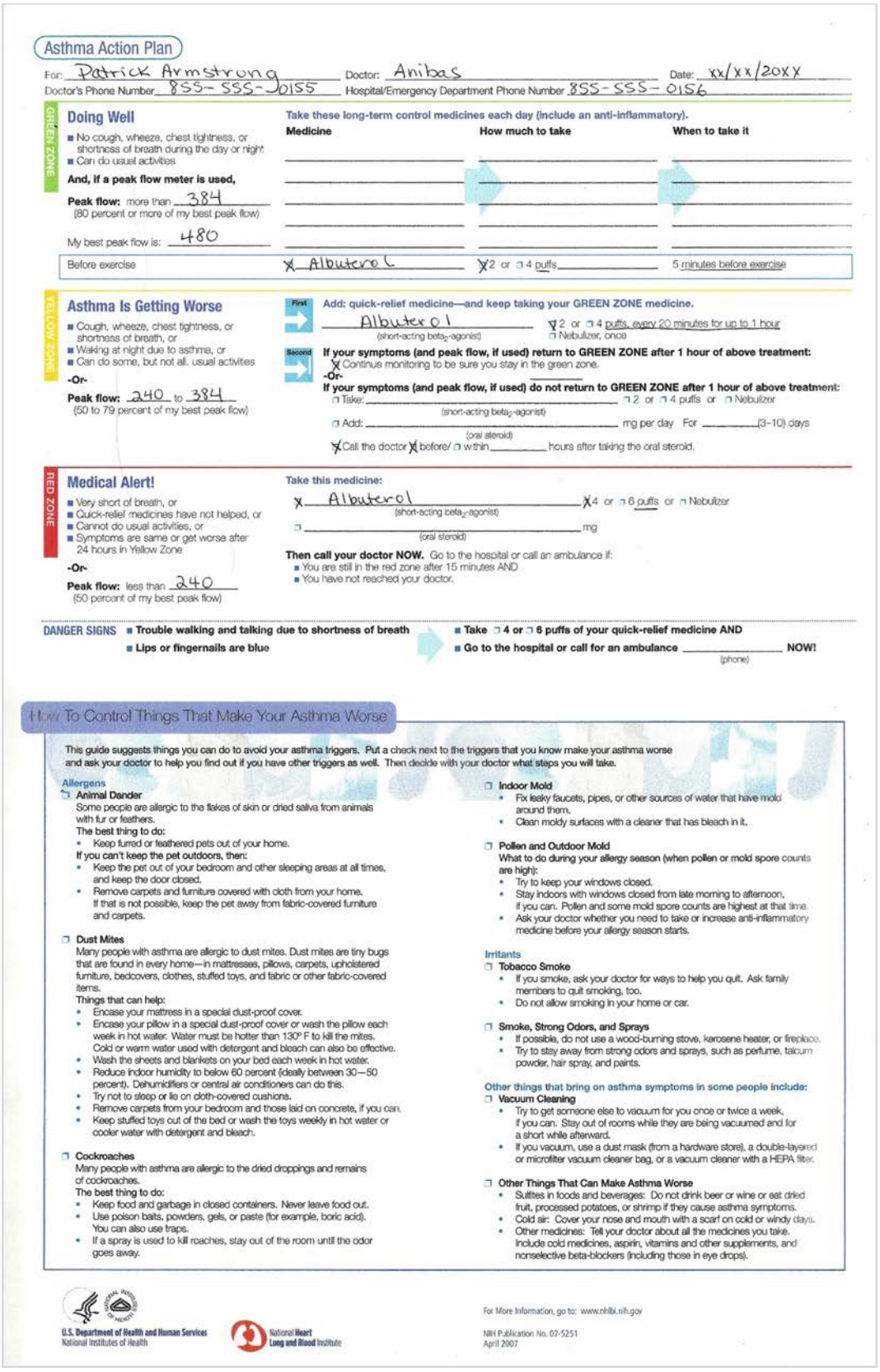
Protocol based on: Scarfone, R. (2016). Acute asthma exacerbations in children: Emergency Department Management. Downloaded from www.uptodate.com

Table 1: FORMAL EVALUATION OF ASTHMA EXACERBATION SEVERITY

	Mild	Moderate	Severe	Respiratory Arrest Imminent
SIGNS/SYMPTOMS				
Breathlessness	While walking; can lie down	While at rest; prefers sitting (infant: shorter cry, difficulty feeding)	While at rest; Sits upright (Infant: stops feeding)	
Talks in...	Sentences	Phrases	Words	None
Alertness	May be agitated	Usually agitated	Usually agitated	Drowsy or confused
Respiratory Rate	Increased Guide to rates of breathing in awake children: <2 months: < 60/min 2-12 months: < 50/min 1-5 years: < 40/min 6 -8 years < 30/min	Increased	Often greater than 30 in adults	
Use of accessory muscles: suprasternal retractions	Usually not	Commonly	Usually	Paradoxical thoracoabdominal movement
Pulse/minute	< 100 Guide to normal pulse rates in children: 2-12 months: < 160/min 1-2 years: < 120/min 2-8 years < 110/min	100-120	> 120	Bradycardia
PEF Of percent predicted or percent personal best	≥70%	40-69%	< 40%	< 25%
SaO2	≥ 95%	90-95%	<90%	
ABGs PaCO2	< 42 mmHg (test not usually necessary)	< 42 mmHg (test not usually necessary)	>42 mmHg: possible respiratory failure	

Source: National Heart, Lung, Blood Institute (2007) The Expert Panel Report 3 (EPR–3) Guidelines for the Diagnosis and Management of Asthma. Downloaded from: http://www.nhlbi.nih.gov/health-pro/guidelines/current/asthma-guidelines)

APPENDIX B: INITIAL ASTHMA ACTION PLAN



Asthma Action Plan

For: Patrick Armstrong Doctor: Anibas Date: xx/xx/20xx

Doctor's Phone Number 855-555-0155 Hospital/Emergency Department Phone Number 855-555-0156

GREEN ZONE

Doing Well

- No cough, wheeze, chest tightness, or shortness of breath during the day or night
- Can do usual activities

And, if a peak flow meter is used,

Peak flow: more than 384
(80 percent or more of my best peak flow)

My best peak flow is: 480

Take these long-term control medicines each day (include an anti-inflammatory).

Medicine	How much to take	When to take it
Before exercise	X Albuterol	X 2 or ☐ 4 puffs	5 minutes before exercise

YELLOW ZONE

Asthma Is Getting Worse

- Cough, wheeze, chest tightness, or shortness of breath, or
- Waking at night due to asthma, or
- Can do some, but not all, usual activities

-Or-

Peak flow: 240 to 384
(50 to 79 percent of my best peak flow)

First: **Add: quick-relief medicine—and keep taking your GREEN ZONE medicine.**

Albuterol (short-acting beta$_2$-agonist) X 2 or ☐ 4 puffs, every 20 minutes for up to 1 hour ☐ Nebulizer, once

Second: **If your symptoms (and peak flow, if used) return to GREEN ZONE after 1 hour of above treatment:**

X Continue monitoring to be sure you stay in the green zone.

-Or-

If your symptoms (and peak flow, if used) do not return to GREEN ZONE after 1 hour of above treatment:

☐ Take: _____ (short-acting beta$_2$-agonist) ☐ 2 or ☐ 4 puffs or ☐ Nebulizer

☐ Add: _____ (oral steroid) mg per day For _____ (3–10) days

X Call the doctor X before/ ☐ within _____ hours after taking the oral steroid.

RED ZONE

Medical Alert!

- Very short of breath, or
- Quick-relief medicines have not helped, or
- Cannot do usual activities, or
- Symptoms are same or get worse after 24 hours in Yellow Zone

-Or-

Peak flow: less than 240
(50 percent of my best peak flow)

Take this medicine:

X Albuterol (short-acting beta$_2$-agonist) X 4 or ☐ 6 puffs or ☐ Nebulizer

☐ _____ (oral steroid) mg

Then call your doctor NOW. Go to the hospital or call an ambulance if:

- You are still in the red zone after 15 minutes AND
- You have not reached your doctor.

DANGER SIGNS

- **Trouble walking and talking due to shortness of breath**
- **Lips or fingernails are blue**

- **Take ☐ 4 or ☐ 6 puffs of your quick-relief medicine AND**
- **Go to the hospital or call for an ambulance _____ (phone) NOW!**

How To Control Things That Make Your Asthma Worse

This guide suggests things you can do to avoid your asthma triggers. Put a check next to the triggers that you know make your asthma worse and ask your doctor to help you find out if you have other triggers as well. Then decide with your doctor what steps you will take.

Allergens

☐ **Animal Dander**
Some people are allergic to the flakes of skin or dried saliva from animals with fur or feathers.
The best thing to do:
- Keep furred or feathered pets out of your home.

If you can't keep the pet outdoors, then:
- Keep the pet out of your bedroom and other sleeping areas at all times, and keep the door closed.
- Remove carpets and furniture covered with cloth from your home. If that is not possible, keep the pet away from fabric-covered furniture and carpets.

☐ **Dust Mites**
Many people with asthma are allergic to dust mites. Dust mites are tiny bugs that are found in every home—in mattresses, pillows, carpets, upholstered furniture, bedcovers, clothes, stuffed toys, and fabric or other fabric-covered items.
Things that can help:
- Encase your mattress in a special dust-proof cover.
- Encase your pillow in a special dust-proof cover or wash the pillow each week in hot water. Water must be hotter than 130° F to kill the mites. Cold or warm water used with detergent and bleach can also be effective.
- Wash the sheets and blankets on your bed each week in hot water.
- Reduce indoor humidity to below 60 percent (ideally between 30–50 percent). Dehumidifiers or central air conditioners can do this.
- Try not to sleep or lie on cloth-covered cushions.
- Remove carpets from your bedroom and those laid on concrete, if you can.
- Keep stuffed toys out of the bed or wash the toys weekly in hot water or cooler water with detergent and bleach.

☐ **Cockroaches**
Many people with asthma are allergic to the dried droppings and remains of cockroaches.
The best thing to do:
- Keep food and garbage in closed containers. Never leave food out.
- Use poison baits, powders, gels, or paste (for example, boric acid). You can also use traps.
- If a spray is used to kill roaches, stay out of the room until the odor goes away.

☐ **Indoor Mold**
- Fix leaky faucets, pipes, or other sources of water that have mold around them.
- Clean moldy surfaces with a cleaner that has bleach in it.

☐ **Pollen and Outdoor Mold**
What to do during your allergy season (when pollen or mold spore counts are high):
- Try to keep your windows closed.
- Stay indoors with windows closed from late morning to afternoon, if you can. Pollen and some mold spore counts are highest at that time.
- Ask your doctor whether you need to take or increase anti-inflammatory medicine before your allergy season starts.

Irritants

☐ **Tobacco Smoke**
- If you smoke, ask your doctor for ways to help you quit. Ask family members to quit smoking, too.
- Do not allow smoking in your home or car.

☐ **Smoke, Strong Odors, and Sprays**
- If possible, do not use a wood-burning stove, kerosene heater, or fireplace.
- Try to stay away from strong odors and sprays, such as perfume, talcum powder, hair spray, and paints.

Other things that bring on asthma symptoms in some people include:

☐ **Vacuum Cleaning**
- Try to get someone else to vacuum for you once or twice a week, if you can. Stay out of rooms while they are being vacuumed and for a short while afterward.
- If you vacuum, use a dust mask (from a hardware store), a double-layered or microfilter vacuum cleaner bag, or a vacuum cleaner with a HEPA filter.

☐ **Other Things That Can Make Asthma Worse**
- Sulfites in foods and beverages: Do not drink beer or wine or eat dried fruit, processed potatoes, or shrimp if they cause asthma symptoms.
- Cold air: Cover your nose and mouth with a scarf on cold or windy days.
- Other medicines: Tell your doctor about all the medicines you take. Include cold medicines, aspirin, vitamins and other supplements, and nonselective beta-blockers (including those in eye drops).

U.S. Department of Health and Human Services
National Institutes of Health

National Heart Lung and Blood Institute

For More Information, go to: www.nhlbi.nih.gov

NIH Publication No. 07-5251
April 2007

APPENDIX C: PATIENT EDUCATION HANDOUTS

MANAGING YOUR ASTHMA

If you suffer from asthma, an obstructive disease of that affects lungs, you're not alone. Over 26 million people in the U.S. are affected by asthma. With asthma, the airways in the lungs are narrowed, inflamed, or twitchy. The obstruction of the airways can make it difficult to breathe. Asthma symptoms can be well managed using the following guidelines:

LIFESTYLE MODIFICATIONS

Be aware of your asthma symptoms.

Learn about your symptoms of asthma. One of the most common symptom of asthma is wheezing. It is a musical, high-pitched, whistling sound made when airflow is blocked in the lungs. Sometimes, the only symptom of asthma is coughing. The cough is usually non-productive, chronic, and mostly at night. You may also notice shortness of breath, difficulty breathing or chest tightness.

Know your Asthma Action Plan.

Follow the advice provided by your health care provider. Every person with asthma is different, and your Asthma Action Plan will give you specifics for your particular asthma symptoms and lifestyle. This can take the guess-work out if you experience an asthma attack and can be shared with others if you need assistance.

Use your peak flow meter.

Track your asthma using a peak flow meter. The peak flow meter measures how fast you can push air out of the lungs. Decreases in peak flow meter results can signal an upcoming asthma attack, so it's important to monitor your results.

Know when to see your provider.

If you notice an increase in episodes, severity, or symptoms at night you should talk with your provider. Also, if you're limiting your normal activities, missing a lot of work or school, or feel like you're not reaching your personal best on a regular basis you should see your doctor. A visit is also a good idea if your asthma medications don't seem to work anymore, or you're using quick-relief inhalers more than twice per week. You should also see your doctor at least once a year for new prescriptions for your medication.

Seek emergency treatment when necessary.

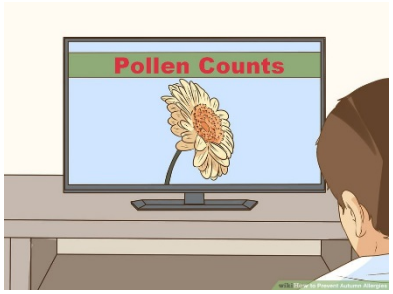
Asthma can become a serious, life-threatening condition very quickly, so you should seek immediate assistance if you have the following symptoms:

- Severe difficulty breathing
- Lips, fingers, or fingernails turning blue
- Feeling as though you are about to pass out
- Not being able to walk or talk in full sentences.

Recognize the medications used to treat your asthma.

The goal of asthma treatment is to control your symptoms and maintain your lung function over time. Albuterol is a "quick-relief" medicine to help open your airways. It is also used during a severe asthma attack. Advair is a long-term "control" medicines used to reduce inflammation of your lungs and to decrease the frequency and severity of asthma attacks. However, Advair is not useful during an acute asthma attack.

Avoid allergic triggers



Identify allergens that trigger your asthma. Allergens are substances that cause allergic reactions. Common outdoor allergens include pollens from grass, trees, and weeds. Common indoor allergens include dust mites, cockroaches, mold, and pets. While it may not always be possible to avoid allergens, you can talk to your doctor about allergy treatments or medications. You can also try to decrease the effects of allergens on asthma by:

- Avoiding yard work
- Tracking the pollen report
- Covering mattresses and pillows with hypoallergenic covers
- Using HEPA air filters
- Replacing carpet with wood or tile floors
- Removing garbage from the home daily
- Using bait stations or traps to control roaches (or calling an exterminator)
- Cleaning damp areas weekly to prevent mold growth
- Avoiding the use of vaporizers and humidifiers
- Avoiding pets with fur or feathers

Other triggers to avoid

Watch for medicine or illness triggers. Colds, flu, and sinus infections are some upper respiratory illnesses that can irritate your airways and cause asthma attacks. To fight these illnesses, frequently wash your hands and get a flu shot every year. Note: some aspirin and anti-inflammatory medicines like ibuprofen and naproxen are responsible for some asthma flare-ups. Check labels on over-the-counter and prescription medications to avoid these substances.

Avoid smoke

If you smoke, stop smoking. Smoking irritates the mucous linings of the airways which stimulates them to produce more mucus than normal. It also greatly increases your risk of other lung problems and cancer. If you have asthma, you should quit smoking to give your sensitive lungs a chance to recover. Avoid being around smoke in general. Second hand smoke can also wreak havoc on the linings of your airways so try to avoid being around cigarette smoke as much as possible.

Exercise

Strengthen your lungs through moderate exercise. While strenuous exercise when your lungs are weak could lead to an asthma attack, moderate exercise can actually strengthen your lungs. Start with light or moderate exercises, like walking, and work your way into a more challenging workout regimen. Exercise most days of the week for at least 30 minutes. Talk with your provider to tailor an exercise routine that fits the limitations of your asthma.

Content adapted from: http://www.wikihow.com/Control-Asthma

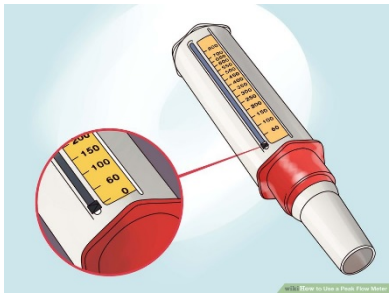
PEAK FLOW RATE

Peak flow rate (or peak expiratory flow rate) is the measurement of how much air you can blow out of your lungs in one breath. It is useful for you to measure and track this because it will help you know when your asthma is flaring up and/or when you should seek medical attention.

STEPS FOR PERFORMING THE PEAK FLOW RATE PROCEDURE:

1. Ensure the mouthpiece is clean and free of obstructions.

2. Ensure the marker is set to zero.



3. Stand up or sit upright.

4. Take as deep a breath in as you can and hold it.

5. Place the mouthpiece in your mouth and form as tight a seal as possible around it with your lips.

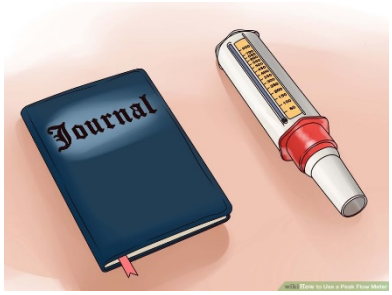
6. Breathe out as hard as you can through your mouth. Plug your nose if you have to.

7. Observe and record the reading.

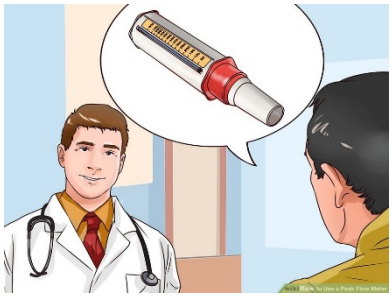
8. Repeat the process at least 2 more times and record the highest reading.

9. Take your readings every day. If possible, your readings should be taken about the same time every day.

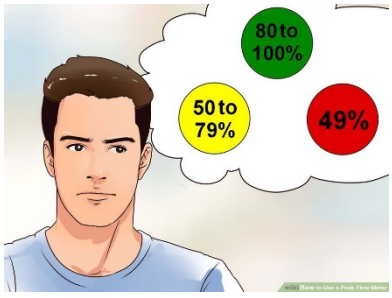
10. Keep a daily journal of your peak flow rates as well as any other asthma-like symptoms you experience (such as coughing or wheezing).



11. Bring your journal to doctors' appointments. This will help him/her make sure you are taking the proper asthma medications.



12. Find your "normal" peak flow rate and track your peak flow zone.



Related patient education handouts: NORMAL PEAK FLOW RATE, ASTHMA ACTION PLAN

Content adapted from: http://www.osceskills.com/e-learning/subjects/explaining-the-peak-expiratory-flow-rate-technique/ and http://www.wikihow.com/Use-a-Peak-Flow-Meter

USING AN MDI WITH A SPACER

If you have been diagnosed with a lung disease such as asthma or COPD, the use of an MDI (metered dose inhaler), like Albuterol or Flovent, may be indicated. These instructions will ensure you are using the MDI and Spacer correctly.

STEPS FOR USING AN MDI WITH A SPACER:

1. Take off the MDI cap.

The cap is a small covering located over the mouthpiece to prevent foreign objects from getting in the MDI. Ensure the mouthpiece and spray hole are clean.

2. Shake the MDI.

Hold the inhaler in a vertical position with one hand and shake it 10 to 15 times.

3. Prime the MDI.

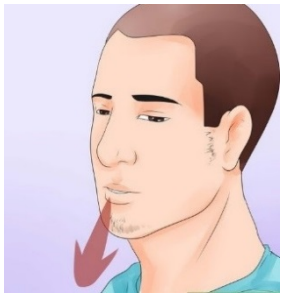
If this is the first time you've used the MDI or if you have not used it in more than a week, you need to prime it. This ensures the inhaler delivers the correct amount of medicine when used. You prime the MDI by squeezing the canister down into the plastic mouthpiece, emitting a single spray.

IMPORTANT: After you prime the MDI, you need to repeat Step 2 – Shake the MDI.

4. Connect the MDI and the spacer.

Connect the MDI mouthpiece to the back end of the spacer. Depending on the spacer and mouthpiece you have, they may click together neatly, or the mouth piece might simply slide in through a narrow rubber slit.

5. Breathe out as much as you can.



Ideally, you want to empty your lungs as much as possible.

6. Place the spacer's mouthpiece in your mouth.

It should sit just above your tongue. Keep your lips closed around it. Lift your chin up slightly. Hold the inhaler between your pointer finger and thumb.

7. Squeeze the inhaler once then breathe in the medication slowly and deeply.

Pull air into your lungs through your mouth until you reach your peak capacity. Some spacers have a whistle on them. Listen for the whistle. If you hear it, you are breathing in too rapidly. If you don't hear it, you are breathing in at an acceptable rate.

8. Remove the spacer mouthpiece from your mouth.

Hold your breath for about 10 seconds. Then, exhale slowly and deeply through your mouth.

9. Shake the MDI.

If you are prescribed a second “puff” of the MDI, you must shake the MDI again (like in Step 2) before repeating Steps 4-8.

Content adapted from: http://www.wikihow.com/Use-an-Asthma-Inhaler

NORMAL PEAK FLOW RATE

To create your asthma action plan, you need to find your "normal" peak flow rate. This is done by recording your peak flow rate for two weeks at about the same time of day when your asthma is under control. Then, you and your doctor will determine what a normal peak flow rate is for you.

Once you know your normal peak flow rate, follow the "zone" system on your "Asthma Action Plan." This system helps you and your doctor decide how to treat your asthma.

The zone system can be compared to the colors of a traffic light.

Green Zone

80% to 100% of your normal peak flow rate signals go. Your asthma is under good control. Continue to follow the green zone of your asthma action plan.

Yellow Zone

50% to 80% percent of your normal peak flow rate signals caution. Your symptoms could get better or worse. Follow the yellow zone of your asthma action plan.

Red Zone

Less than 50% of your normal peak flow rate signals stop. This a Medical Alert! Contact your healthcare provider now and follow the red zone of your asthma action plan.

Related patient education handouts: PEAK FLOW METER, ASTHMA ACTION PLAN

Content adapted from: http://www.lung.org/lung-health-and-diseases/lung-disease-lookup/asthma/living-with-asthma/managing-asthma/measuring-your-peak-flow-rate.html and https://www.aaaai.org/conditions-and-treatments/library/at-a-glance/peak-flow-meter

HOW TO USE ADVAIR DISKUS

Advair is a prescription drug containing fluticasone and salmeterol that helps asthma sufferers prevent asthma attacks. Advair comes in an easy-to-operate disc-shaped inhaler called the "Diskus." Knowing how (and when) to use your Advair inhaler properly is vital to preventing asthma symptoms.

STEPS FOR USING THE ADVAIR DISKUS:

1. **Expose the mouthpiece.** Hold the Discus horizontal in one hand. With your other hand, put your thumb on the the small curved section. Slide it away from you. The inner part of the Diskus should turn and click into place. The mouthpiece is now exposed. Turn the mouthpiece towards you.

2. **Push the lever to prepare the dose.** Hold the inhaler flat and level with the mouthpiece facing you. Use your finger to slide the lever until you feel it click into place. The dose is now ready.

3. **Breathe out as much as you can.** Ideally, you want to empty your lungs completely.

4. **Inhale.** Bring the Advair inhaler to your mouth. Place your lips on the mouthpiece. Breathe in deeply. Take

your entire breath through your mouth in order to inhale the complete dose. Don't breathe through your nose.

Keep the inhaler flat and level as you breathe. This ensures the medicine is dispensed properly.

5. **Hold it in.** Hold your breath for at least 10 seconds (or as long as you can) after inhaling. The medicine needs a short amount of time to be fully absorbed.

   After 10 seconds (or as long as you're able to hold your breath), breathe out slowly, smoothly and evenly. You can start breathing normally.

6. **Rinse your mouth.** Rinse your mouth out with clean water. Do this each time you take a dose of Advair. Finish by gargling before your spit the water out. Do not swallow the water you use to rinse.

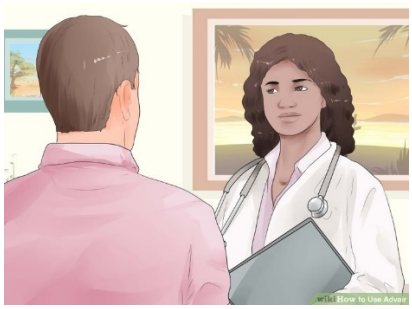
   This is to prevent a fungal infection of the throat called Thrush. Advair can cause an imbalance of the organisms in your mouth which allows this fungus to take hold.

7. **Close and store the inhaler**. Slide the Diskus closed again. The dose dial will automatically move forward one number. Put the inhaler someplace safe and clean for easy access in the future.

   Store Advair in a cool, dry place where it isn't within the reach of children. An Advair inhaler can be used for one month after it is first removed from the foil.

8. **Using Advair Responsibly**

   When in doubt, always follow your health care provider's directions. The specifics for when to take Advair vary from patient to patient. Advair is a prescription drug, so you'll need to meet with a provider before you can use it.



9. **Use Advair as prescribed to prevent attacks**. Advair is typically used once in the morning and once in the evening. Try to take your Advair doses at roughly the same time each day.

10. **Take one dose at a time.** You may not be able to taste or smell the medicine when you inhale it, but it's still there.

    Do not double an Advair dose even if you feel your symptoms worsen. The medicine takes time to work. Your provider will be able to recommend alternative treatments for sudden, severe symptoms

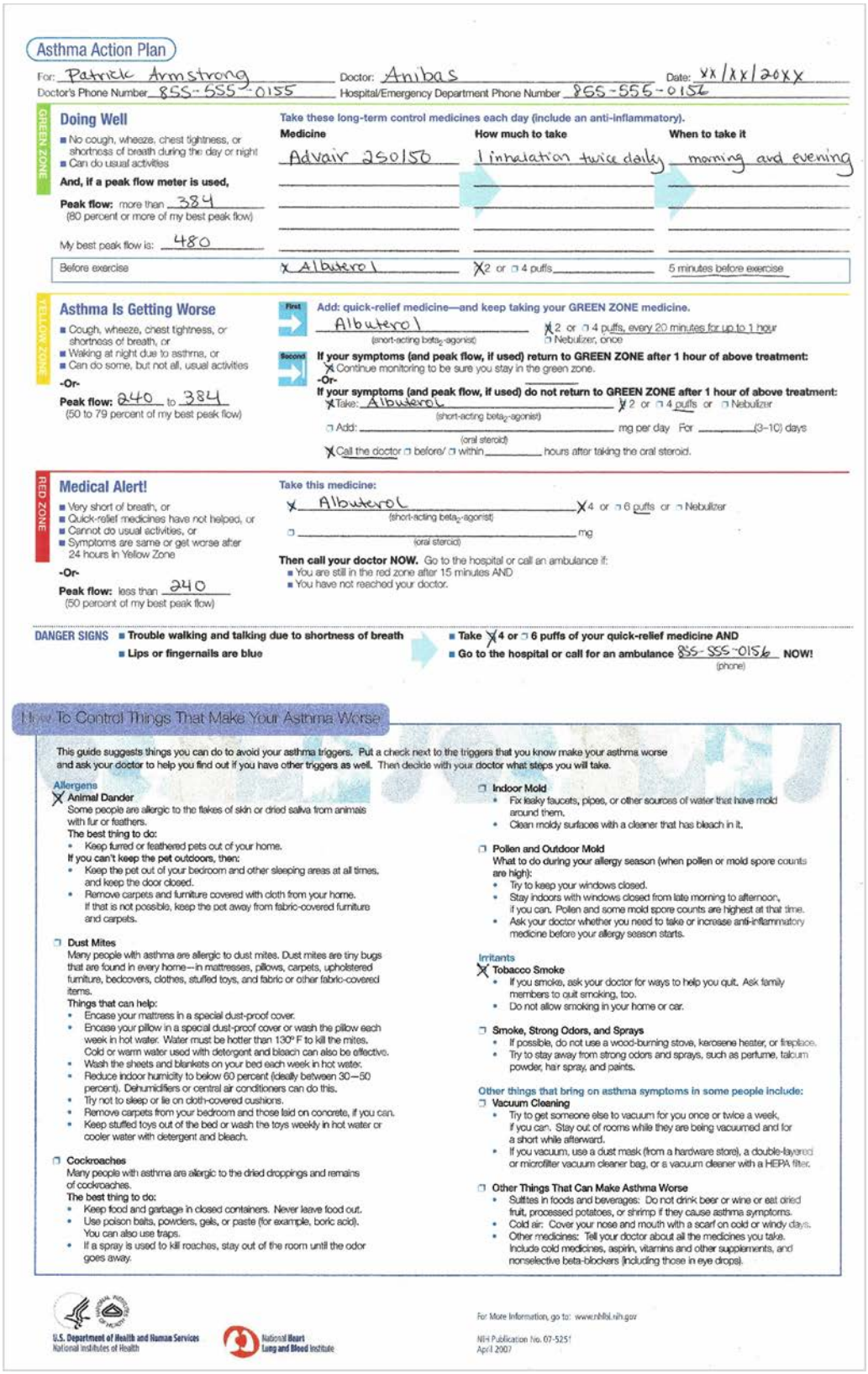
11. **Take the medicine until you are directed to stop**. Just like you shouldn't take the medicine more often than it's prescribed, you also won't want to take it *less* often. If you stop too early, your symptoms can worsen.

12. **Don't use Advair to treat asthma attacks**. The medicine in Advair is not meant to stop sudden, acute asthma attacks.

    Instead, carry a prescribed "rescue inhaler" such as Albuterol for use during an acute attack.

Content adapted from: http://www.wikihow.com/Use-Advair

APPENDIX D: REVISED ASTHMA ACTION PLAN



Asthma Action Plan

For: Patricia Armstrong Doctor: Anibas Date: XX/XX/20XX

Doctor's Phone Number 855-555-0155 Hospital/Emergency Department Phone Number 855-555-0152

GREEN ZONE — Doing Well

- No cough, wheeze, chest tightness, or shortness of breath during the day or night
- Can do usual activities

And, if a peak flow meter is used,

Peak flow: more than 384 (80 percent or more of my best peak flow)

My best peak flow is: 480

Take these long-term control medicines each day (include an anti-inflammatory).

Medicine	How much to take	When to take it
Advair 250/50	1 inhalation twice daily	morning and evening
Before exercise: X Albuterol	X 2 or ☐ 4 puffs	5 minutes before exercise

YELLOW ZONE — Asthma Is Getting Worse

- Cough, wheeze, chest tightness, or shortness of breath, or
- Waking at night due to asthma, or
- Can do some, but not all, usual activities

-Or-

Peak flow: 240 to 384 (50 to 79 percent of my best peak flow)

First — Add: quick-relief medicine—and keep taking your GREEN ZONE medicine.

Albuterol (short-acting beta2-agonist) X 2 or ☐ 4 puffs, every 20 minutes for up to 1 hour ☐ Nebulizer, once

Second — If your symptoms (and peak flow, if used) return to GREEN ZONE after 1 hour of above treatment:

X Continue monitoring to be sure you stay in the green zone.

-Or-

If your symptoms (and peak flow, if used) do not return to GREEN ZONE after 1 hour of above treatment:

X Take: Albuterol (short-acting beta2-agonist) X 2 or ☐ 4 puffs or ☐ Nebulizer

☐ Add: _____ (oral steroid) mg per day For _____ (3–10) days

X Call the doctor ☐ before/ ☐ within _____ hours after taking the oral steroid.

RED ZONE — Medical Alert!

- Very short of breath, or
- Quick-relief medicines have not helped, or
- Cannot do usual activities, or
- Symptoms are same or get worse after 24 hours in Yellow Zone

-Or-

Peak flow: less than 240 (50 percent of my best peak flow)

Take this medicine:

X Albuterol (short-acting beta2-agonist) X 4 or ☐ 6 puffs or ☐ Nebulizer

☐ _____ (oral steroid) mg

Then call your doctor NOW. Go to the hospital or call an ambulance if:

- You are still in the red zone after 15 minutes AND
- You have not reached your doctor.

DANGER SIGNS

- Trouble walking and talking due to shortness of breath
- Lips or fingernails are blue

→ Take X 4 or ☐ 6 puffs of your quick-relief medicine AND

→ Go to the hospital or call for an ambulance 855-555-0156 (phone) NOW!

How To Control Things That Make Your Asthma Worse

This guide suggests things you can do to avoid your asthma triggers. Put a check next to the triggers that you know make your asthma worse and ask your doctor to help you find out if you have other triggers as well. Then decide with your doctor what steps you will take.

Allergens

X **Animal Dander**

Some people are allergic to the flakes of skin or dried saliva from animals with fur or feathers.

The best thing to do:

- Keep furred or feathered pets out of your home.

If you can't keep the pet outdoors, then:

- Keep the pet out of your bedroom and other sleeping areas at all times, and keep the door closed.
- Remove carpets and furniture covered with cloth from your home. If that is not possible, keep the pet away from fabric-covered furniture and carpets.

☐ **Dust Mites**

Many people with asthma are allergic to dust mites. Dust mites are tiny bugs that are found in every home—in mattresses, pillows, carpets, upholstered furniture, bedcovers, clothes, stuffed toys, and fabric or other fabric-covered items.

Things that can help:

- Encase your mattress in a special dust-proof cover.
- Encase your pillow in a special dust-proof cover or wash the pillow each week in hot water. Water must be hotter than 130° F to kill the mites. Cold or warm water used with detergent and bleach can also be effective.
- Wash the sheets and blankets on your bed each week in hot water.
- Reduce indoor humidity to below 60 percent (ideally between 30–50 percent). Dehumidifiers or central air conditioners can do this.
- Try not to sleep or lie on cloth-covered cushions.
- Remove carpets from your bedroom and those laid on concrete, if you can.
- Keep stuffed toys out of the bed or wash the toys weekly in hot water or cooler water with detergent and bleach.

☐ **Cockroaches**

Many people with asthma are allergic to the dried droppings and remains of cockroaches.

The best thing to do:

- Keep food and garbage in closed containers. Never leave food out.
- Use poison baits, powders, gels, or paste (for example, boric acid). You can also use traps.
- If a spray is used to kill roaches, stay out of the room until the odor goes away.

☐ **Indoor Mold**

- Fix leaky faucets, pipes, or other sources of water that have mold around them.
- Clean moldy surfaces with a cleaner that has bleach in it.

☐ **Pollen and Outdoor Mold**

What to do during your allergy season (when pollen or mold spore counts are high):

- Try to keep your windows closed.
- Stay indoors with windows closed from late morning to afternoon, if you can. Pollen and some mold spore counts are highest at that time.
- Ask your doctor whether you need to take or increase anti-inflammatory medicine before your allergy season starts.

Irritants

X **Tobacco Smoke**

- If you smoke, ask your doctor for ways to help you quit. Ask family members to quit smoking, too.
- Do not allow smoking in your home or car.

☐ **Smoke, Strong Odors, and Sprays**

- If possible, do not use a wood-burning stove, kerosene heater, or fireplace.
- Try to stay away from strong odors and sprays, such as perfume, talcum powder, hair spray, and paints.

Other things that bring on asthma symptoms in some people include:

☐ **Vacuum Cleaning**

- Try to get someone else to vacuum for you once or twice a week, if you can. Stay out of rooms while they are being vacuumed and for a short while afterward.
- If you vacuum, use a dust mask (from a hardware store), a double-layered or microfilter vacuum cleaner bag, or a vacuum cleaner with a HEPA filter.

☐ **Other Things That Can Make Asthma Worse**

- Sulfites in foods and beverages: Do not drink beer or wine or eat dried fruit, processed potatoes, or shrimp if they cause asthma symptoms.
- Cold air: Cover your nose and mouth with a scarf on cold or windy days.
- Other medicines: Tell your doctor about all the medicines you take. Include cold medicines, aspirin, vitamins and other supplements, and nonselective beta-blockers (including those in eye drops).

U.S. Department of Health and Human Services
National Institutes of Health

National Heart Lung and Blood Institute

For More Information, go to: www.nhlbi.nih.gov

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CREDITS

Asthma action plan from National Heart, Lung and Blood Institute at https://www.nhlbi.nih.gov/health/resources/lung/asthma-action-plan

Asthma Severity protocol from: National Heart, Lung, Blood Institute (2007) The Expert Panel Report 3 (EPR–3) Guidelines for the Diagnosis and Management of Asthma. Downloaded from: http://www.nhlbi.nih.gov/health-pro/guidelines/current/asthma-guidelines)

Medication information from National Library of Medicine: Daily Med at http://dailymed.nlm.nih.gov/dailymed/

Normal lung sound from Thinklabs Medical, LLC, Centennial, CO at http://www.thinklabs.com/lung-sounds

Patient education files adapted from OSCE Skills and wikiHow at http://www.osceskills.com/e-learning/subjects/explaining-the-peak-expiratory-flow-rate-technique/ and http://www.wikihow.com/Use-a-Peak-Flow-Meter

Pictures from Shutterstock.com

Wheeze lung sound from Wikipedia at https://en.wikipedia.org/wiki/Wheeze

REFERENCES

Global Initiative for Asthma (2016). Pocket Guide for Asthma Management and Prevention. Downloaded from: http://ginasthma.org/2016-gina-report-global-strategy-for-asthma-management-and-prevention/

National Heart, Lung, Blood Institute (2007) The Expert Panel Report 3 (EPR–3) Guidelines for the Diagnosis and Management of Asthma. Downloaded from: http://www.nhlbi.nih.gov/health-pro/guidelines/current/asthma-guidelines)

Joint Commission (2016). Children's Asthma Care. Downloaded from https://www.jointcommission.org/childrens_asthma_care/.

Sawicki, G. and Haver, K. (2016). Acute asthma exacerbations in children: Home/office management and severity assessment. In: UptoDate, Post TW (Ed), UptoDate, Waltham, MA. (Accessed on August 1, 2016)

Scarfone, R. (2016). Acute asthma exacerbations in children: Emergency department management. In UptoDate, TePas E (Ed), UptoDate, Waltham, MA (Accessed on February 22, 2017)

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