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Patient education: How to use a peak flow meter (Beyond the Basics)

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PEAK FLOW METER OVERVIEW

The management of asthma relies on a patient's ability to monitor their asthma regularly. Self-monitoring includes assessing the frequency and severity of symptoms (such as wheezing and shortness of breath) and measurement of lung function with a peak flow meter.

Peak flow meters measure your peak expiratory flow rate (PEFR), a number that correlates with how open the lung's airways are; as asthma worsens and the airways narrow, the PEFR decreases. Monitoring can help you and your healthcare provider determine the most appropriate asthma treatment plan.

A number of articles about asthma are available. For children, (see "[Patient education: Asthma symptoms and diagnosis in children \(Beyond the Basics\)](#)" and "[Patient education: Asthma inhaler techniques in children \(Beyond the Basics\)](#)" and "[Patient education: Trigger avoidance in asthma \(Beyond the Basics\)](#)").

For adults, (see "[Patient education: Asthma treatment in adolescents and adults \(Beyond the Basics\)](#)" and "[Patient education: Inhaler techniques in adults \(Beyond the Basics\)](#)" and "[Patient education: Asthma and pregnancy \(Beyond the Basics\)](#)").

ASTHMA MONITORING RECOMMENDATIONS

Experts recommend that people with moderate to severe persistent asthma, or who have asthma attacks, have a peak flow meter at home and know how to use it [1]. A peak flow meter is small, inexpensive, and easy for most patients to use.

The National Asthma Education and Prevention Program (NAEPP) recommends that patients use a peak flow meter to:

- Regularly monitor lung function and response to treatment over the short- and long-term
- Determine the severity of an asthma attack
- Assess response to treatment during an attack

You should use an asthma diary to record your daily peak flow meter readings, exposure to potential asthma triggers, asthma medication use, and asthma symptoms ([form 1](#) and [form 2](#)). This can help to show a cause-and-effect relationship between exposure to triggers and decreases in peak flow. You can review the asthma diary with a healthcare provider to make decisions about asthma treatment.

Peak flow meter readings can be used as part of your Asthma Action Plan, along with symptoms, to identify worsening of your asthma and need for additional treatment ([form 3](#) and [form 4](#)). You can discuss peak flow goals and treatment recommendations with your healthcare provider.

HOW TO USE A PEAK FLOW METER

Peak flow monitoring should be performed on a regular basis, even when asthma symptoms are not present. Peak flow should also be checked if symptoms of coughing, wheezing, or shortness of breath develop. You should demonstrate how to use a peak flow meter with your healthcare provider to verify that your technique is accurate.

Different brands of peak flow meters have unique features; however, these general instructions can be adapted to an individual's peak flow meter.

Getting the best readings — Several steps are important to make sure the peak flow meter records an accurate value:

- The peak flow meter should read zero or its lowest reading when not in use.
- Use the peak flow meter while standing up straight.
- Take in as deep a breath as possible.
- Place the peak flow meter in the mouth, with the tongue under the mouthpiece.
- Close the lips tightly around the mouthpiece.
- Blow out as hard and fast as possible; do not throw the head forward while blowing out.
- Breathe a few normal breaths and then repeat the process two more times. Write down the highest number obtained. Do not average the numbers.

IMPORTANT: Repeat the test if your tongue partially blocks the mouthpiece or if you cough or spit during the test. Most peak flow meters need to be cleaned periodically; cleaning instructions should be available when the unit is purchased.

Establishing a baseline measurement — Unlike a blood pressure reading or a cholesterol test, there is no peak flow measurement that is normal for everyone. For this reason, it is important to determine what peak flow value is normal for you.

To determine your **normal** peak flow measurement, you should measure your peak flow when you have no asthma symptoms. Perform three measurements with the same peak flow meter two to four times daily for two to three weeks.

You should note the highest peak flow measurement achieved; this is the "personal best." This number is used to determine if future peak flow measurements are normal or low, and is also used to create a normal range (between 80 and 100 percent of the personal best peak flow measurement).

Readings below the normal range are a sign of airway narrowing in the lungs. A low peak flow measurement can occur before asthma symptoms such as wheezing or shortness of breath develop.

Remeasure your personal best peak flow value once per year to account for growth (in children) or changes in the disease (in both children and adults). In addition, verify home peak flow measurements with readings taken with equipment in a healthcare provider's office since this equipment is more sensitive. For long term management, most clinicians will recommend peak flow testing once per day, usually in the morning.

ASTHMA EMERGENCY CARE

If you do not improve or worsen despite treatment, you need emergency medical care. Severe asthma attacks can be fatal if not treated promptly. In most areas of the United States, you can call 911 for emergency medical assistance. Do not attempt to drive to a hospital or clinician's office on your own.

WHERE TO GET MORE INFORMATION

Your healthcare provider is the best source of information for questions and concerns related to your medical problem.

This article will be updated as needed on our web site (www.uptodate.com/patients). Related topics for patients, as well as selected articles written for healthcare professionals, are also available. Some of the most relevant are listed below.

Patient level information — UpToDate offers two types of patient education materials.

The Basics — The Basics patient education pieces answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials.

[Patient education: Asthma in adults \(The Basics\)](#)

[Patient education: Asthma in children \(The Basics\)](#)

Beyond the Basics — Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are best for patients who want in-depth information and are comfortable with some medical jargon.

[Patient education: Inhaler techniques in adults \(Beyond the Basics\)](#)

[Patient education: Asthma treatment in adolescents and adults \(Beyond the Basics\)](#)

[Patient education: Asthma and pregnancy \(Beyond the Basics\)](#)

[Patient education: Trigger avoidance in asthma \(Beyond the Basics\)](#)

[Patient education: Asthma symptoms and diagnosis in children \(Beyond the Basics\)](#)

[Patient education: Asthma inhaler techniques in children \(Beyond the Basics\)](#)

Professional level information — Professional level articles are designed to keep doctors and other health professionals up-to-date on the latest medical findings. These articles are thorough, long, and complex, and they contain multiple references to the research on which

they are based. Professional level articles are best for people who are comfortable with a lot of medical terminology and who want to read the same materials their doctors are reading.

[An overview of asthma management](#)

[Delivery of inhaled medication in adults](#)

[Enhancing patient adherence to asthma therapy](#)

[The use of inhaler devices in adults](#)

[Acute exacerbations of asthma in adults: Home and office management](#)

[Treatment of intermittent and mild persistent asthma in adolescents and adults](#)

[Treatment of moderate persistent asthma in adolescents and adults](#)

[Trigger control to enhance asthma management](#)

[Asthma education and self-management](#)

The following organizations also provide reliable health information.

- National Library of Medicine

(www.nlm.nih.gov/medlineplus/healthtopics.html)

- National Heart, Lung, and Blood Institute

(www.nhlbi.nih.gov/)

- American Lung Association

(www.lungusa.org)

- American Academy of Allergy, Asthma, and Immunology

(<http://www.aaaai.org/conditions-and-treatments/asthma.aspx>)

- American College of Allergy, Asthma, and Immunology

(www.acaai.org/allergist)

[1-4]

ACKNOWLEDGMENT

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REFERENCES

1. National Asthma Education and Prevention Program: Expert panel report III: Guidelines for the diagnosis and management of asthma. Bethesda, MD: National Heart, Lung, and Blood Institute, 2007. (NIH publication no. 08-4051) www.nhlbi.nih.gov/guidelines/asthma/asthgdln.htm (Accessed on June 03, 2018).
2. [Caress AL, Luker K, Beaver K, Woodcock A. Adherence to peak flow monitoring. Information provided by meters should be part of self management plan. BMJ 2002; 324:1157; author reply 1157.](#)
3. [Wensley D, Silverman M. Peak flow monitoring for guided self-management in childhood asthma: a randomized controlled trial. Am J Respir Crit Care Med 2004; 170:606.](#)
4. [Tierney WM, Roesner JF, Seshadri R, et al. Assessing symptoms and peak expiratory flow rate as predictors of asthma exacerbations. J Gen Intern Med 2004; 19:237.](#)

Topic 366 Version 16.0

GRAPHICS

Asthma Record - Please bring to each visit

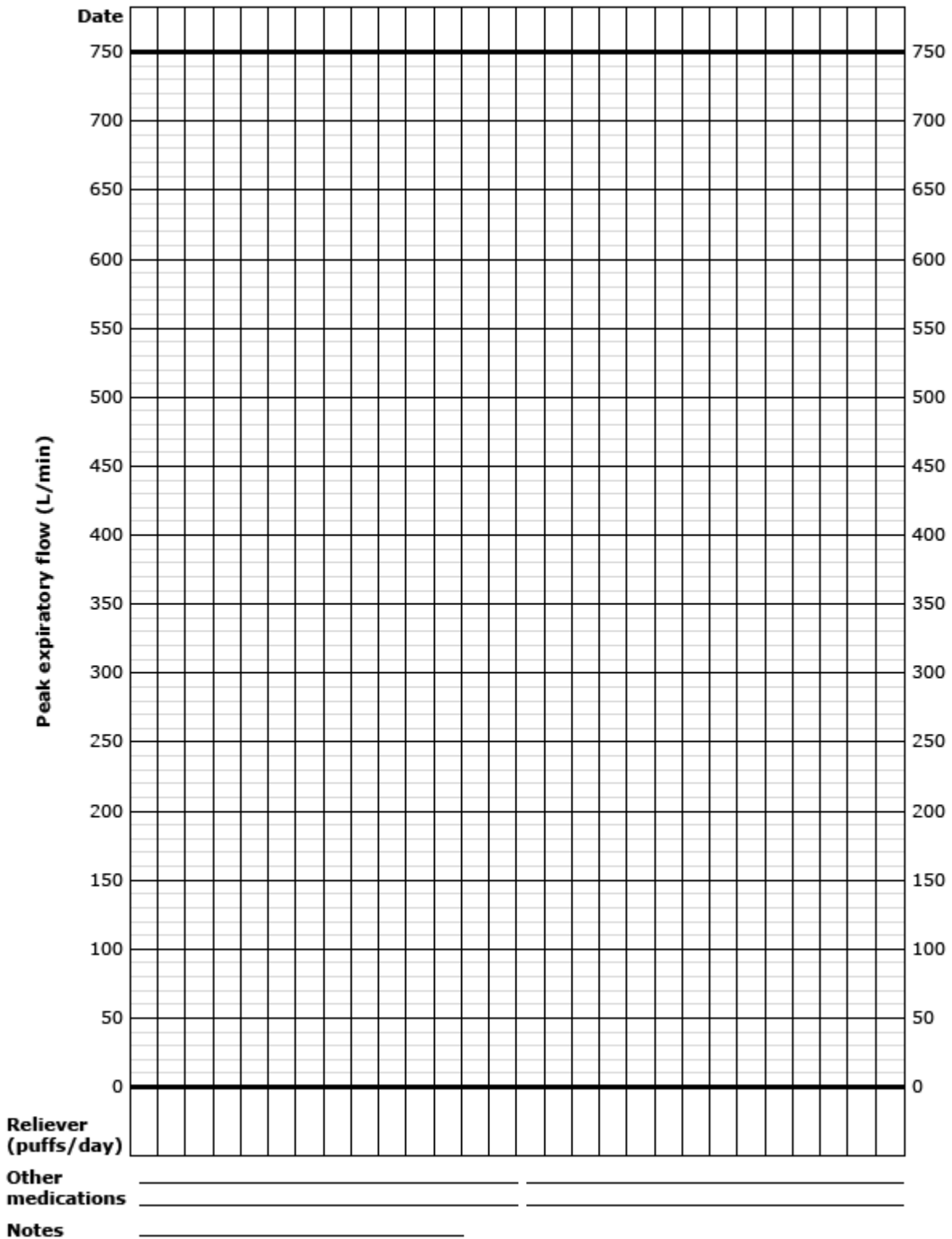
Use the symptom severity key below to give a numerical value to the severity of your asthma. In the comments section, note any triggers that seem to affect your asthma on the day it occurs. Triggers can include colds or infections, exercise, irritants, allergens, and cold air.

Date	Wheeze	Cough	Activity	Sleep	Inhaled adrenaline-like	Prednisone	Cromolyn	Inhaled steroids	Theophylline	Peak flow rate			Comments

Wheeze	None	0	Some	1	Medium	2	Severe	3
Cough	None	0	Occasional	1	Frequent	2	Continuous	3
Activity	Normal	0	Can run short distance	1	Can walk only	2	Missed school or stayed indoors	3
Sleep	Fine	0	Slight wheeze or cough	1	Awake 2-4 times, wheeze or cough	2	Awake most of the time	3

Graphic 68404 Version 3.0

Asthma peak flow daily diary



Adapted from: Woolcock Institute of Medical Research, 2006.

Graphic 76505 Version 2.0

Asthma action plan

My Asthma Action Plan

Age ≥5 years


Patient name: _____
 Medical record #: _____
 Clinician's name: _____ DOB: _____
 Clinician's phone #: _____ Completed by: _____ Date: _____

Long-term control medicines	How much to take	How often	Other instructions
		_____ times per day EVERY DAY!	
		_____ times per day EVERY DAY!	
		_____ times per day EVERY DAY!	
		_____ times per day EVERY DAY!	
Quick-relief medicines	How much to take	How often	Other instructions
		Take ONLY as needed	NOTE: If this medicine is needed frequently, call clinician to consider increasing long-term control medications.

Special instructions when I feel ● **good**, ● **not good**, and ● **awful**.

GREEN ZONE

I feel **good**.
 {My peak flow is in the GREEN zone.}




YELLOW ZONE

I do **not** feel good.
 {My peak flow is in the YELLOW zone.}

My symptoms may include one or more of the following:

- Wheeze
- Tight chest
- Cough
- Shortness of breath
- Waking up at night with asthma symptoms
- Decreased ability to do usual activities




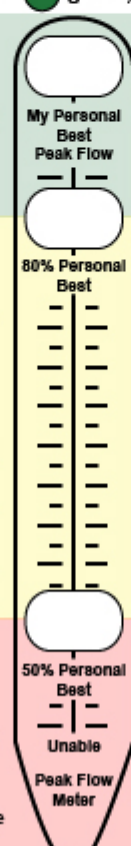
RED ZONE

I feel **awful**.
 {My peak flow is in the RED zone.}

Warning signs may include one or more of the following:

- It is getting harder and harder to breathe
- Unable to sleep or do usual activities because of trouble breathing





My Personal Best Peak Flow _____
 80% Personal Best _____
 50% Personal Best _____
 Unable _____
 Peak Flow Meter

PREVENT asthma symptoms everyday:

- Take my long-term control medicines (above) every day.
- Before exercise, take _____ puffs of _____
- Avoid things that make my asthma worse like: _____

CAUTION. I should continue taking my long-term control asthma medicines every day AND:

- Take _____

If I still do not feel good, or my peak flow is not back in the Green Zone within one hour, then I should:

- Increase _____
- Add _____
- Call _____

MEDICAL ALERT! Get help!

- Take _____ until I get help immediately.
- Take _____
- Call _____

Danger! Get help immediately! Call 9-1-1 if you have trouble walking or talking due to shortness of breath or lips or fingernails are gray or blue.

‰: percent.

Reproduced from: National Heart, Blood, and Lung Institute Expert Panel Report 3 (EPR 3): Guidelines for the Diagnosis and Management of Asthma. NIH Publication no. 08-4051, 2007.

Graphic 53142 Version 4.0

Child asthma action plan

Reproduced from: National Heart, Blood, and Lung Institute Expert Panel Report 3 (EPR 3): Guidelines for the Diagnosis and Management of Asthma. NIH Publication no. 08-4051, 2007.

Graphic 78132 Version 4.0

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