

Pamphlet #7: ASTHMA AND PEAK FLOW MONITORING

Introduction

Asthma can cause narrowing of the bronchial tubes and, as a result, difficulty moving air through those tubes into and out of the lungs. How can one measure the extent to which the system of bronchial tubes has become narrowed? We routinely make such measurements when you come for an appointment at Mass General Brigham Asthma Center. We ask you to blow the air from your lungs as forcefully and as rapidly as possible into a recording device, usually a spirometer. The faster the air exits your lungs, the more widely open the bronchial tubes. The slower the air exits your lungs, the more narrowed they are. This test is one very valuable measurement of how well or poorly controlled your asthma is at that moment.

The Rationale

In this pamphlet we discuss a method that enables you to measure on your own and whenever you wish the extent of bronchial narrowing in your lungs. Home peak flow measurements are simple to make, and they provide you and your medical provider with an accurate record of the activity of your asthma, not just on the day of your visit to the office, but on days when your breathing is good and on days when it is not. In addition, if you are having an attack of asthma, measurement of your peak flow will give you information about how severe the attack is and help you to decide what actions need to be taken to get better.

Many persons who have had asthma for a long time feel that they can judge the severity of an attack of their asthma simply by paying close attention to their symptoms of cough, wheezing, chest tightness, and shortness of breath. Although it is true that some persons become quite adept at estimating the severity of their bronchial tube narrowing, studies have shown that more than half the time persons with asthma will be mistaken in their estimates. Too often, persons with asthma will underestimate how severe their asthma attack is. They will tell themselves and others that their breathing is not all that difficult, that they are "O.K.," even when their asthma attack is really quite severe and potentially dangerous. Measurement of peak flow allows one to test one's guess against the reality of an actual measurement. It gives accurate information that you can then use to make good decisions about managing your asthma. It also helps you better to communicate about your asthma with your medical provider. For instance, he/she will understand more clearly if you call to report that you have measured your peak flow to be 200 liters per minute, perhaps half of your usual peak flow value, than if you simply describe having "some cough and chest congestion."

Peak Flow Meters

A variety of simple devices are available that measure the fastest rate at which air can come out of your lungs. They are lightweight plastic tubes, usually about the size of a mobile phone, and cost approximately 15-20 dollars. Electronic peak flow meters (such as *PiKo-1*[®] and *Microlife*[®]) are available at a somewhat greater cost. Peak flow meters are sold at most drug stores and can also be purchased on-line. If undamaged, a peak flow meter should continue to function properly for 3-5 years without needing replacement.

Measuring Your Peak Flow

Measuring your peak flow takes less than one minute. It requires that you take in a deep breath—as deep as you can—and then exhale a short forceful breath into the peak flow meter. The exhaled breath need not last more than a second or two; it is a rapid, short blast of breath. Use your chest and abdominal muscles to force the air out from your lungs as quickly as possible right from the start. You must seal your lips tightly around the mouthpiece of the peak flow meter so that no air escapes from being recorded; and you must be certain that no air is blown from your nose when making the measurement (if in doubt, simply pinch your nose with your fingers while blowing into the peak flow meter). Pitfalls to avoid include the following. When holding your peak flow meter, place your fingers and thumb in such a way that they do not block the movement of the plastic indicator if it is located on the outside of the device; and do not obstruct the hole or holes where your air exits from the device. Don't let your front teeth get in the way; they can grip the mouthpiece along with your lips. And don't puff with your cheeks in a spit-like maneuver but rather exhale air from your lungs as quickly as possible.

Your mechanical (as opposed to electronic) peak flow meter will have a plastic indicator that marks your peak flow along a scale of numbers from zero to 600 or 800. First, set the indicator to zero before you blow into the device. Next, after your lungs are as full of air as possible, give a rapid, forceful blow. Then, find where along the scale the indicator has been moved by your exhalation: That is the first peak flow reading. Set the indicator back to zero and repeat the process once and preferably twice more. The largest of the two or three readings that you have made is considered your peak flow.

Your peak flow meter does not require washing. Simply keep the mouthpiece clean and the meter itself free of dirt and debris.

Recording Your Peak Flow

There is no precise answer to be given to the question: "When and how often should I record my peak flow?" If you are newly assessing your asthma – or trying to distinguish asthma from some other potential cause of cough or shortness of breath -- you may want to make measurements every day for a week or two, recording the results in a diary (that often comes with the peak flow meter) or simply on a piece of paper noting the dates and times of the

measurements. You can make a measurement before and 5-10 minutes after using a quick-acting bronchodilator (like albuterol, formoterol, or levalbuterol) to see how much improvement results from use of the medication. Be sure that at some point you record your peak flow when you are feeling perfectly well, so that you know what your best possible value is, referred to as your “personal best” peak flow.

It is particularly valuable to make peak flow measurements if you feel that you are having an attack of asthma. Measure your peak flow to find out how severe the attack is, and then measure it again one or more times to determine how much improvement you are getting from the asthma medicines taken to treat the attack.

Taking Action Based on Your Peak Flow Measurements

Peak flow measurements can alert you to difficulty with your breathing before you are aware of the change. By making regular measurements at times when you are feeling well, you will have identified your “personal best” peak flow. Then, if your peak flow falls significantly from this target value, you know that something should be done to bring your breathing function back toward this value.

As a general rule, a peak flow value 80% or greater of your best peak flow is considered within a safe range; from 50 to 80% of your best peak flow is a moderate fall; and less than 50% (that is, less than half) of your best peak flow is considered a severe decrease in your breathing function. Urgent action needs to be taken if you have a severe decline in your peak flow to less than half of your normal value. We encourage you to develop an Action Plan with your medical provider so that you know what he or she recommends that you do in these various circumstances. A pamphlet on [Developing an Asthma Action Plan](#) has been developed by the Mass General Brigham Asthma Center.

A guide to normal peak flow values is shown in the table below. Note that even among healthy persons of the same age, sex, and height, there is considerable variability of peak flow, as much as 80-100 liters/minute above or below the specific “normal” value given. That is why it is particularly helpful for you to determine – on a good day when your breathing feels “as good as it gets” – what you own best (normal for you) value is.

Summary

With a peak flow meter available at home, you can determine the status of your asthma by measurement and not have to rely on an estimate or guess. Like a person with high blood pressure who can monitor his or her blood pressure at home, you need not rely just on how you are feeling to know the status of your bronchial tubes and so, of your asthma. This information will help your medical provider give you the best possible advice regarding your asthma care, and it will help you to make good decisions about your asthma management at those times when you need to take action on your own.

WOMEN						MEN					
Age	Height					Age	Height				
	55"	60"	65"	70"	75"		60"	65"	70"	75"	80"
20	390	423	460	496	529	20	554	602	649	693	740
25	385	418	454	490	523	25	543	590	636	679	725
30	380	413	448	483	516	30	532	577	622	664	710
35	375	408	442	476	509	35	521	565	609	651	695
40	370	402	436	470	502	40	509	552	596	636	680
45	365	397	430	464	495	45	498	540	583	622	665
50	360	391	424	457	488	50	486	527	569	607	649
55	355	386	418	451	482	55	475	515	556	593	634
60	350	380	412	445	475	60	463	502	542	578	618
65	345	375	406	439	468	65	452	490	529	564	603
70	340	369	400	432	461	70	440	477	515	550	587

PEAK FLOW VALUES IN LITERS/MINUTE