Asthma in a Minute: School Nurse Toolkit for Asthma Self-Management Education

Busy School Nurses Can Teach Key Asthma Education Lessons, One Minute at a Time

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Overview of *Asthma in a Minute*

**Purpose**

School nurses recognize asthma as one of the most, if not *the* most, prevalent chronic health conditions affecting our students. Self-management of asthma is of primary concern for young adolescent students as they make the transition from the elementary years, through middle school, to high school and beyond. As the responsibility to recognize symptoms and respond safely shifts from parents and other adults to the student, the need for effective asthma education is evident. This project is targeted to a middle school population. A wealth of asthma resources exist: the problem, for most school nurses, is finding enough time to teach.

**Goals and Objectives**

This project empowers any school nurse to systematically capture brief increments of time, typically one to five minutes, to deliver key messages as outlined by the leading asthma experts (NHLBI, 2007b). The nationally recognized guidelines for asthma care, commonly referred to as the EPR-3 (Expert Panel Report 3), should be familiar to all school nurses as the “gold standard” of care. The Missouri Asthma Program provides extraordinary resources for school nurses in this state.

*Asthma in a Minute* provides a lesson checklist, student incentive cards, and teaching outlines to support the nurse. This combination of tools, all derived from evidence-based sources, realistically facilitates learning and allows quick documentation, electronically and/or on paper. Topics are clustered into five categories: basic asthma facts, self-monitoring, medications, triggers, and Asthma Action Plans.

**How to Use the Toolkit**

Print the Airflow Record and Checklist two-sided on cardstock. Print the “key cards” as brightly colored cards, hole-punched in one corner, a different color for each category. Give each student a carabiner keyring. As you teach a topic, the student adds the card to the ring. Copy the Airflow Record and Checklist to share with parents and PCPs.

**Evaluation**

Pre and post-test knowledge questionnaires are suggested to evaluate the effectiveness of teaching in the short term. Over time, incidence of urgent care visits can be tracked to assess successful self-management.

**Summary**

*Asthma in a Minute* was implemented as a six-week project with a small group of 6th grade students in one middle school. School nurses are encouraged to use this packet as a starting point. Replicate the materials for use in your practice, and track what worked or what did not resonate with your students. For further information, or to share your experiences, please contact the author, Dottie Bardon, at bardondorothy@rsdmo.org. Breathe easy!
Collect the “keys” to asthma control!

Pre-test
- Asthma Knowledge Questionnaire
- Asthma Control Test

Basic Asthma Facts
- Respiration 101: lungs and airways, how does breathing work? 1
- Airways with asthma: inflammation, constriction, mucous* 2

Self-Monitoring
- Recognize asthma symptoms, day and night 3
- Measure airflow with the ASMA1 digital meter, exhale *hard and fast* 4
- PEF/FEV1 skill check: coach a classmate with the Asma1 meter 5

Medications
- Quick-relief inhalers: help in a hurry for shortness of breath 6
- Control medication: ICS every day to prevent persistent symptoms 7
- Other medications prescribed for you 8
- MDI [metered dose inhaler]: use the InCheck Dial, inhale *slow & soft* 9
- Spacer or holding chamber: delivers the medicine better 10
- Nebulizer: delivers the medicine differently, and deeper 11
- DPI [dry powder inhaler]: control or combination medications 12
- Inhaler skill check: coach a classmate with the InCheck Dial 13

Triggers
- Allergens and irritants, at home and everywhere* 14
- Exercise-induced asthma, activity and sports 15

Asthma Action Plan
- Calculate your personal best numbers* 16
- Asthma Action Plan 17
- Bonus topic, your choice! 18

Post-test
- Asthma Knowledge Questionnaire
- Asthma Control Test

*let’s tackle these key concepts first!
Airflow Record: Peak Expiratory Flow & Forced Expiratory Volume in 1 second

Birthday/Age & Height

Personal Best

Green Zone [80-100%]  Yellow Zone [50-80%]  Red Zone [<50%]

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>PEF Peak expiratory flow</th>
<th>FEV1 Forced expiratory volume, in one second</th>
<th>Before inhaler</th>
<th>After inhaler</th>
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<th>Comments/Symptoms</th>
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School Nurse Contact Information:
School Nurse Teaching Outline:

A. Basic Asthma Facts

Aligned with Key Cards

#1: Respiration 101: lungs and airways, how does breathing work?

#2: Airways with asthma: inflammation, constriction, mucous

Teaching Points:

Describe normal lung and respiratory system. Locate bronchial airways on a poster or model, explain cross section depiction. Point out alveoli/air sacs at the end of progressively smaller tubules.

Describe asthma pathophysiology: airways become hyper-sensitive to irritants, causing inflammation [swelling] which narrows the airway, making it more difficult to move air in and out. Airways are “twitchy”, over-reacting to stimuli.

Emphasize three characteristics of an asthma flare-up that reduce the space within the airway, making it harder to breathe:

- Inflammation /swelling of the airways. Thickens the walls, narrowing the passageway
- Constriction/tightening of the muscles bands around the airways. Analogy: rubber bands around a tube
- Excess mucous production, blocking the passage

Explain that different medicines treat one or more of these three problems of asthma.

Teaching Tools: Use what you have!

Choose one manipulative or video for first encounter, reinforce with others later.

- Poster: post a wall chart or diagram of the respiratory system
- Straws, large and small diameter, or pinch straw with fingers, to mimic breathing through a narrowed tube.
- Airway or lung model, such as an anatomical 4 Piece Bronchus Model depicting normal, constricted, inflamed, and mucous plug
- Video clips from TUAC
- Children’s books on asthma
- American Lung Association video clip [<2 minutes]
- Local children’s hospital DVD, show clip
- Open Airways flip chart: “lungs before and during an asthma episode”
- DYI model using cardboard tube lined with bubble wrap, rubber bands around

Notes for next time:
School Nurse Teaching Outline:

B. Self-Monitoring

Aligned with Key Cards

#3: Recognize asthma symptoms, day and night

#4: Measure airflow with the Vitalograph/asma1 digital meter,

\textit{exhale hard \& fast}

#5: PEF/FEV1 skill check: coach a classmate with the ASMA1 meter

Teaching Points

Teach recognition of subjective symptoms, including:

- Short of breath
- Wheezing
- Coughing
- Tight chest
- Can’t run or exercise comfortably
- Waking up during the night

Night-time symptoms can be an important clue, especially among children who have been suffering mild persistent asthma symptoms for so long, they do not realize what they feel is not normal. These students are called “poor perceivers”.

Using a validated questionnaire such as the Asthma Control Test (ACT) can illustrate poor control. \url{http://www.asthmacontroltest.com/}

Teach PEF and FEV1:

- PEF Peak Expiratory Flow [PEF] tells you \textit{how fast} you can exhale
- Forced Expiratory Volume 1 [ FEV1] tells you \textit{how much} air you can exhale in the first second
- FEV1 is considered the “vital sign” of asthma
- “exhale hard and fast” is the verbal cue to emphasize for airflow measurement
- Traditional peak flow meter for home use, compare and contrast
- FEV1 is a more sensitive indicator of status, predicting deterioration sooner than reflected by PEF
- Data should be recorded and shared with parent and primary care provider, routinely at checkups and whenever symptomatic

Technique:

- Use an individual one-way exhalation cardboard mouthpiece for each student [red]
- Inhale deeply
• Seal your lips around the mouthpiece
• Use the verbal cue “exhale hard and fast”
• Repeat at least 3 times, record your best readings
• Return demonstration of correct technique
• Reinforce—ask the student to teach a classmate

Teaching tools: use what you have.

• Vitalograph asma1 device: [https://vitalograph.com/products/monitors-screeners/asthma/asma-1](https://vitalograph.com/products/monitors-screeners/asthma/asma-1)
• Video clip from TUAC, Vitalograph, or any online search
• Traditional peak flow meter [often familiar to students, but measures only PEF]
• Package insert directions from devices
• Clock or stopwatch to count seconds
• Asthma Control Test: [http://www.asthmacontroltest.com/](http://www.asthmacontroltest.com/)

Notes for next time:
School Nurse Teaching Outline:

C. Medications

Aligned with Key Cards

#6: Quick relief inhalers: help in a hurry for shortness of breath

#7: Control medication: ICS every day to prevent persistent symptoms

#8: Other medications prescribed for you

#9: MDI [metered dose inhaler: use the InCheck Dial, inhale soft & slow

#10: Spacer or holding chamber: delivers medicine more effectively

#11: Nebulizer: delivers the medicine differently, and deeper

#12: DPI (dry powder inhaler): control or combination medications

#13: Inhaler skill check: coach a classmate with the InCheck Dial

Teaching Points

The school nurse should tailor the lesson to match the individual student’s prescribed medications. Students will have no interest in irrelevant medications. Always ask if control, controller, or daily medications have been prescribed in the past: many families use different wording, or do not continue control medications after an exacerbation, even if the PCP recommended doing so.

Quick-Relief Medication:

• Use when you have symptoms
• Use before activity to prevent exercise-induced symptoms
• Works within minutes
• Metered dose means the device measures a dose when you push down on the canister to take a “puff”
• Albuterol is the most common quick relief medicine
• Watch expiration dates and doses remaining
• Always tell an adult if you don’t get relief after 2 puffs

Control Medication:

• Daily, long-term medicine to prevent symptoms of persistent asthma
• If prescribed by your doctor, take this every day
• Prevents airway swelling [inflammation]
• Takes several days to work: does not give immediate relief
• ICS (Inhaled Corticosteroids) are the first, best medicine for persistent asthma, according to the EPR-3 expert guidelines
• ICS is a safe, low dose steroid, not a “bad” steroid
• Combination meds, long term bronchodilators, leukotrienes, allergy meds: review as prescribed
• After many weeks of good control, PCP may consider “stepping down” from ICS; students/parents should not stop on their own

Technique: how to use an MDI correctly
• Exhale completely
• Seal your lips around the mouthpiece
• Press down the canister
• Inhale *soft and slow*
• Hold your breath a few seconds
• Wait one full minute between puffs
• Rinse your mouth after use
• Practice with the InCheck Dial

InCheck Dial: this device teaches correct inflow rate and length of time [in liters per minute] for optimal inhalation of asthma medications
• Set the device for the type of inhaler by turning the top to the matching icon
• Calculate target inhalation speed: for albuterol MDI, 2 X FEV1
• The tool is a practice device: pretend it is an inhaler
• Use an individual one-way inhalation cardboard mouthpiece [blue] for each student
• Ask student to show how they usually inhale their MDI—most will inhale too quickly, for too brief a period of time, and too forcefully
• White disk shows seconds of inhalation duration, stays afloat while inhaling—count seconds aloud
• Red wheel shows the intensity of inhalation effort: use the range on the cylinder or the EPR3 guideline of 30 as the goal
• To prepare the device, use the verbal cue “tap and tip”: tap the far end briskly against the palm of your hand to send the white disk, the red wheel, and the silver magnet to the clear end. Then tip the magnet back up to the top (mouthpiece) end
• Use fingers to mark the target
• Exhale deeply, then seal lips around the one-way inhalation mouthpiece and inhale
• Practice inhaling slowly and softly
• Most middle school students will have a target of 4-5 seconds—count out loud
• Keep the white disk afloat and the red wheel at the target
• Use the verbal cue “*inhale soft and slow*”
• Instruct students to visualize the mist “hitchhiking” a ride on a steadily inhaled breath of air, deep into the airways, making the 90 degree turn rather than slamming into the back wall of the throat

Spacer or Valved Holding Chamber:
• Holds the medicine for deeper inhalation
• Delivers more of the medicine to the lungs
• Use whenever possible
• Follow the manufacturer’s instructions
Nebulizer:
• Mixes the quick-relief medicine with liquid to make a mist
• Breathing in the mist over several minutes delivers the medicine more deeply into lungs
• May be prescribed by PCP to treat exacerbation
• If school nurse or parents initiate, PCP evaluation is indicated to review current medication protocol

Dry Powder Inhaler:
• InCheck Dial can be used to coach technique: inhalation time is shorter, but the rate or effort is higher
• Set dial to the matching icon
• Target time in seconds is equal to the student’s personal best FEV1

Practice Makes Perfect:
• Improper inhalation technique results in an incomplete dose delivered
• Inhalation technique requires ongoing practice and coaching
• School nurses are perfectly poised to provide and reinforce this technique as students mature over time
• This skill was the most common answer to “what did you learn from the Asthma in a Minute project? “I learned I was breathing in my medicine too fast.”

Teaching tools: use what you have!
• InCheck Dial teaching device: http://www.element-clarke.com/ProductInfo/InhalerTechniqueTraining/InCheckDIAL.aspx
• MDI trainer, containing no medication
• Poster illustrating commonly used inhalers and medicine delivery systems
• Package inserts from new prescriptions: focus on the “how to use” section
• Nebulizer and tubing set
• Video clips showing proper technique from TUAC, the Celment-Clarke website are a good place to start if time is short
• Aerochamber: http://www.aerochambervhc.com/

Notes for next time:
School Nurse Teaching Outline:

D. Triggers

Aligned with Key Cards

#14: Allergens and irritants, at home and everywhere

#15: Exercise-induced asthma, activity and sports

Teaching Points:

Triggers are things or circumstances that make asthma symptoms flare up. Some triggers are substances, tiny particles in the air, commonly called “air stuff”, such as:

- Tobacco smoke
- Pollen, especially from trees & grasses
- Dust mites in pillows and mattresses
- Insect debris, especially cockroaches in older buildings
- Pollution, dust, strong smells
- Perfume, paint fumes, air fresheners
- Animal dander, saliva

Other triggers include:

- Strong emotions, like laughing or crying
- Illnesses, like colds and flu
- Cold air
- Physical exertion

Exercise-Induced Asthma:

Adolescents are particularly concerned with the effect asthma can have on athletic participation. Verbalize their question, if unspoken: can kids with asthma play sports?

- Of course they can!
- People with well-controlled asthma can play any sport or game they chose
- Challenge students to watch for pro and amateur athletes on sidelines using inhalers
- Use a quick-acting bronchodilator, such as albuterol, to avoid shortness of breath before activities known from experience to cause symptoms, such as PE class
- If prescribed, continue taking control medicines even when feeling well—that simply means it is working
- Self-management lets students stay in control so they don’t miss a minute of fun and fitness activity

Teaching tools: Use what you have!
- Posters, websites, and books
- Allergen-blocking pillow covers
- Advocate for smoking avoidance [or cessation] if students live in households with tobacco smokers
- Simply talking about triggers with two or more students stimulates many comments on how to avoid common concerns

**Notes for next time:**
School Nurse Teaching Outline:

E. Asthma Action Plans

Aligned with Key Cards

#16: Calculate your personal best numbers

#17: Written Asthma Action Plans

#18: Bonus topic, your choice!

Teaching Points

Many students are unfamiliar with the concept of a formal Asthma Action Plan, which is a one-page written document to guide self-management on both good and bad days. Even when a plan is provided by the PCP, parents often do not share this form with the child. By middle school age, the student is capable of understanding and utilizing an AAP.

If no plan has been provided, the school nurse can utilize a standard template, such as the AAP endorsed by the Asthma and Allergy Foundation, to draft a plan to be sent with the student’s airflow data to a medical appointment. [http://www.aafa.org/page/asthma-treatment-action-plan.aspx](http://www.aafa.org/page/asthma-treatment-action-plan.aspx)

Increasingly, PCP adherence to the EPR-3 Guidelines will illustrate just how essential school input can be to the medical management of students with asthma.

Personal Best PEF and FEV1:

- Ideally, gather and record 2 weeks of data in the morning and late afternoon
- In the school setting, collecting data when the student presents for preventive or symptomatic inhaler use establishes a useful baseline
- Use a calculator to assist the student to calculate 80% and 50% of personal best
- Compare to the expected values for age and gender using EPR3 guidelines

Asthma Action Plan:

- Consider an AAP to be an individual “game plan” to guide self-management
- Guides daily management when doing well...
- ...and helps the student recognize and respond to worsening asthma
- Based on airflow data [PEF & FEV1] or symptoms, or both
- Think of a traffic light: Green means Go, Yellow means Caution, and Red means Stop!
- Green zone: 80-100% of personal best. I feel good, no limitations. Indicates good control on current medication plan
- Yellow zone: 50-80% of personal best. I do not feel good, some asthma symptoms, caution! Indicates worsening asthma symptoms, measures should be taken to improve status
• Red zone: less than 50% of personal best. *I feel awful, serious symptoms, <50%, medical alert!* Could indicate a medical emergency: seek medical care promptly

**Teaching Tools: use what you have!**

• Sample AAPs, such as AAF’s at [http://www.aafa.org/page/asthma-treatment-action-plan.aspx](http://www.aafa.org/page/asthma-treatment-action-plan.aspx)
• Calculator for percentages
• Any traffic light image

**Notes for next time:**

**Bonus Card**

• Key Card #18 is a wild card. Use to cover or review any topic of interest to the student, or any skill the nurse believes needs revisiting
Asthma in a Minute

Pre-test

Name________________________date____

1. To measure air flow with a peak flow meter, you should: [check all that apply]
   ___ take a deep breath, then exhale slow and soft into the device
   ___ take two deep breaths and then cough three times before you start
   ___ take a deep breath, then exhale hard and fast into the device
   ___ do it at least three times, and write down your best reading
   ___ only do it once, since that will always be your best

2. To get the correct amount of medicine from a metered dose inhaler, you should: [check all that apply]
   ___ exhale completely, then inhale slow and soft for several seconds
   ___ exhale completely, then inhale as hard and fast as you can
   ___ hold your breath for a few seconds after inhaling the medicine
   ___ use a holding chamber if available
   ___ practice with a coach to be sure you are doing it correctly
   ___ stand on your head for one minute

3. An asthma trigger is something that makes asthma worse. Common asthma triggers are: [check all that apply]
   ___ tobacco smoke
   ___ pollen from trees and grasses
   ___ mold
   ___ dairy products
   ___ dust mites in pillows and sheets
   ___ air pollution
   ___ homework
   ___ illness
   ___ broccoli
   ___ laughing or crying really hard
   ___ eating breakfast

4. What is the purpose of an Asthma Action Plan? [choose the best single answer]
   ___ tells you what to do only on days you feel perfectly fine
   ___ tells you what to do only on days when your asthma symptoms are terrible
   ___ tells you what to do on both good and bad asthma days
   ___ tells your parents they can run a red light on the way to the hospital

5. How does asthma make it hard to breathe? [check all that apply]
   ___ swelling inside the lining of the airways [inflammation]
   ___ muscles tighten around the airways [constriction]
   ___ excess mucus clogs the airways
   ___ airways expand and take in too much air

6. What else do you want to know about asthma? What questions do you have? [use the back for more space.]
Asthma in a Minute
Post-test

Name____________________date_____

1. To measure air flow with a peak flow meter, you should: [check all that apply]
   ___ take a deep breath, then exhale slow and soft into the device
   ___ take two deep breaths and then cough three times before you start
   ___ take a deep breath, then exhale hard and fast into the device
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   ___ dust mites in pillows and sheets
   ___ air pollution
   ___ homework
   ___ illness
   ___ broccoli
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   ___ swelling inside the lining of the airways [inflammation]
   ___ muscles tighten around the airways [constriction]
   ___ excess mucus clogs the airways
   ___ airways expand and take in too much air

6. What have you learned about your asthma that you didn’t know before?
Asthma in a Minute

ANSWER KEY

1. To measure air flow with a peak flow meter, you should: [check all that apply]

___take a deep breath, then exhale slow and soft into the device
___take two deep breaths and then cough three times before you start
X__take a deep breath, then exhale hard and fast into the device
X__do it at least three times, and write down your best reading
___only do it once, since that will always be your best

2. To get the correct amount of medicine from a metered dose inhaler, you should: [check all that apply]

X__exhale completely, then inhale slow and soft for several seconds
___exhale completely, then inhale as hard and fast as you can
X__hold your breath for a few seconds after inhaling the medicine
X__use a holding chamber if available
X__practice with a coach to be sure you are doing it correctly
___stand on your head for one minute

3. An asthma trigger is something that makes asthma worse. Common asthma triggers are: [check all that apply]

X__tobacco smoke
X__pollen from trees and grasses
X__mold
___dairy products
X__dust mites in pillows and sheets
X__air pollution
___homework
X__illness
___broccoli
X__laughing or crying really hard
___eating breakfast

4. What is the purpose of an Asthma Action Plan? [choose the best single answer]

___tells you what to do only on days you feel perfectly fine
___tells you what to do only on days when your asthma symptoms are terrible
X__tells you what to do on both good and bad asthma days
___tells your parents they can run a red light on the way to the hospital

5. How does asthma make it hard to breathe? [Check all that apply]

X__swelling inside the lining of the airways [inflammation]
X__muscles tighten around the airways [constriction]
X__excess mucus clogs the airways
___airways expand and take in too much air
When is your ACT score this season?

Take the Asthma Control Test every season to monitor your control.

What does it mean when the right:

• Can't run or play comfortably
• Tight chest
• Coughing
• Wheezing
• Short of breath

Your asthma is not under good control?

Recognize Asthma Symptoms: How do you know when:

3

Describe your asthma: persistent, moderate, or severe.

Most of the time, which describes your asthma?

Persistent asthma can be intermittent (sometimes) or persistent.

Excess mucus blocking the airway
• Constriction (tightening) of muscles around airways
• Inflammation (swelling) of the airway

Cause(s):
The lining of airways is overly-sensitive in people with asthma.

Always have an asthma action plan.

What makes it so hard to breathe?

2

One Minute at a Time

Teach Key Asthma Lessons,

How busy School Nurses Can Asthma in a Minute

Expiration: 20/20

Respiration: 10/15

Lungs and airways: how does breathing work?
Do you take control medication?

If you've been told by your doctor to take a medicine to prevent asthma, you may have symptoms of persistent asthma.

Control Medication: Daily, Long-Term Medicine to Prevent

Always take your entire dose as prescribed by your doctor.

FEV1 is the Vital Sign of Asthma: Know your numbers and work on making your FEV1 better.

What are your FEV1 and PEF numbers today?

Practice makes perfect.

PEF and FEV1 Skill Check: Practice makes perfect.

Your quick-relief MDI is 

Always use an asthma inhaler if you don't feel better after 2 puffs.

An inhaler is the most common quick-relief medicine.

MDI stands for Metered Dose Inhaler.

Before activity to prevent exercise-induced symptoms.

When you have symptoms relief, "rescue" inhaler.

Quick-Relief Medication: When should you use a quick.
Should see your doctor very soon
•
•
"Or, if patient's start this for worsening symptoms, you
•
Unlikely needed by your doctor
•
Medication may deep into your lungs
•
Breathes in the lungs over several minutes deliver the
•
Munts the quick-release medication with liquid to make a mist
•
Medicate: Do I need this? How does it work?

Breaths
•
If using mask (instead of multiple-metered inhalation seal 3.5
•
Use whenever available
•
Inhale the seal for 2-3 breaths per puff
•
Delivers more of the medication to your lungs
•
Holds the medicine so you can inhale deeply

Spacer or Valved Holding Chamber: Do I need this? How

11

Calculate your target inhalation speed
•
Practice with the inhaler itself
•
If you don't get good relief from 2 puffs, tell an adult
•
When a breath minute between breaths
•
Hold your breath a few seconds
•
Inhale for 3 seconds
•
Press down the meter
•
Seal your lips around the multipurpose
•
Exhale completely

Correctly?
Medicated Dose Inhaler (MDI): How to use an MDI

10

Moter mediations: You other medications are
•
Long-term medications
•
Combination medications
•
Alergy medications

Enough?
Other medications: What if ICs and quick relief are not

9
Exercises-Induced Asthma: Can Kids With Asthma Play Sports?

Exertion, emotion, or stress can trigger symptoms of asthma. Before activities you know can cause symptoms, take an inhaler or use your quick-relief medication to avoid symptoms. If you have symptoms, choose an activity that you can play safely. Use your quick-relief medication to avoid symptoms of exercise-induced asthma. 

Physical exertion:
- Cold air
- Allergens
- Exercise
- Strain emotions, like laughing or crying
- Pollutants, dust, smoke, odors
- Food allergens
- Strenuous exercise

You avoid allergens and irritants?

Try this: Things that make your asthma worse. How can you avoid them?

Follow the instructions...
What questions are on your mind?

Practice

What self-management skill would you like to review or

Bonus Topic: Your choice!

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Asthma Action Plan: What is it? What does it do for me?

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What are your airflow numbers?

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17

18

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My 50% PEF

My 80% PEF

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Compare to the expected values for your age and gender

Calculate 80% and 50% of personal best

Morning and late afternoon are ideal

Gather and record 2 weeks of data

Personal Best: What are your airflow numbers?
References


Product Websites

AeroChamber Valved Holding Chamber.  http://www.aerochambervhc.com/


