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Asthma

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In service to the PATIENT, COMMUNITY *and* MEDICINE *since 1879.*

Asthma!

UVM Family Medicine Review Course
6/14/13

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Disclosures

- Vermont Children's Health Improvement Program grant (VCHIP)

Asthma:
Diagnosis and Management

Top 5 things to know about Asthma

1. It is a **chronic** disease
2. **Spirometry** can be diagnostic, quick and easy
3. Level of **severity** is consistent over time
4. Assessing **control** guides treatment
5. **Asthma Action Plans** can improve outcomes

Case

- 45 year old woman calls in requesting cough syrup. She had a recent treated pneumonia about 6 weeks ago and has been unable to stop coughing. She has a history of reactive airways and occasional albuterol use.

  Make an appointment!

Asthma is a chronic disease

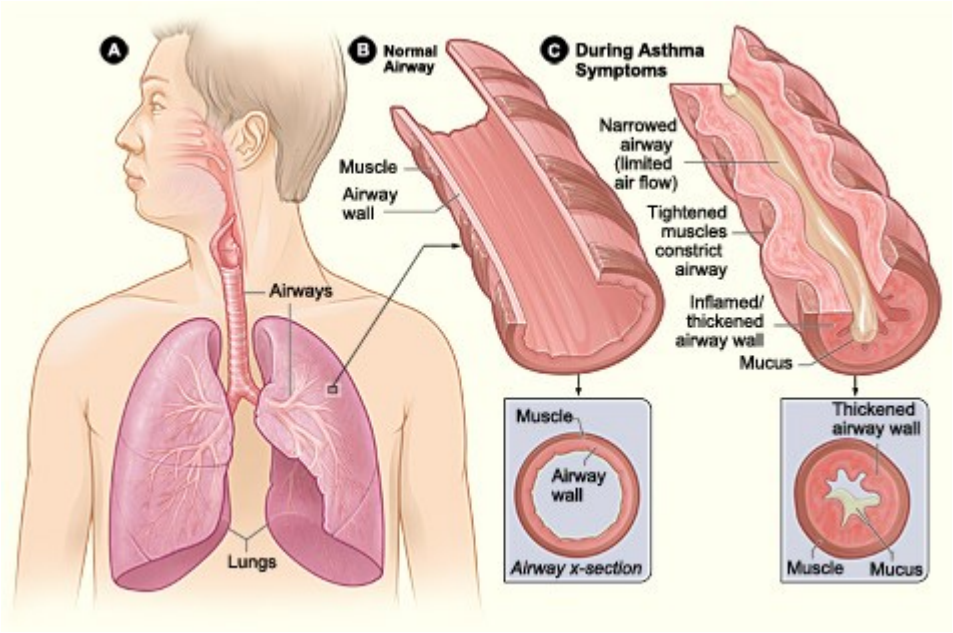
- 22 million Americans
- 6 million children
- Significant societal burden
  - > Lost work & school
  - > Lessened quality of life
  - > Avoidable ED visits
  - > Hospitalizations
  - > Deaths

Pathophysiology

- Bronchospasm
- Airway hyper-responsiveness
- Airway edema (chronic inflammation)
- Remodeling and scar

Cause:

- Innate immunity
- Genetics
- Environmental factors



Symptoms

- Wheezing
- Recurrent cough
- Recurrent wheeze
- Recurrent difficulty in breathing
- Recurrent chest tightness
- Worsened by
  - Exercise
  - Viral infection
  - Inhalant allergens
  - Irritants (wood smoke)
  - Changes in weather
  - Strong emotion
  - Stress
  - Menstrual cycles
- Nocturnal symptoms/sleep disturbance

Evaluation

- Detailed medical history
  - Symptoms + pattern
  - Aggravating factors
  - Development of disease
    - > treatment history
    - > history of exacerbations
  - Family History
  - Social History
    - > Impact of asthma on patient and family
    - > Assessment of patient's and family's perception of disease
    - > Smoking history or exposure
- Physical examination
  - Full HEENT and Pulmonary exam
  - Elicit a forced expiration (have children blow a tissue)
- Spirometry

Differential Diagnosis

- Rhinitis or Sinusitis
- Foreign Body/Mass
- Aspiration
- Laryngotracheomalacia
- Vocal Cord Dysfunction (VCD)
- Viral bronchiolitis or bronchitis
- Cystic Fibrosis
- Heart Disease
- Habit cough (or other non-asthma cough)
- GERD
- COPD
- CHF
- Pulmonary Embolus
- Medication Side Effect

Spirometry (as easy as an EKG)

- Standard
  - 3 efforts of 6 second forced exhalation
  - with an inspiratory loop
  - More reliable than peak flow but effort dependent
- With Reversibility
  - Give 2-4 puffs of an albuterol inhaler (with a spacer) or an albuterol nebulizer treatment
  - Repeat in 15 minutes
  - Significant response = 12 % and 200cc improvement in FEV1 and or FVC
- Intervals
  - Initial assessment
  - Once controlled
  - During prolonged or progressive exacerbations
  - Every 1-2 years

Spirometry Demonstration

Spirometry Interpretation

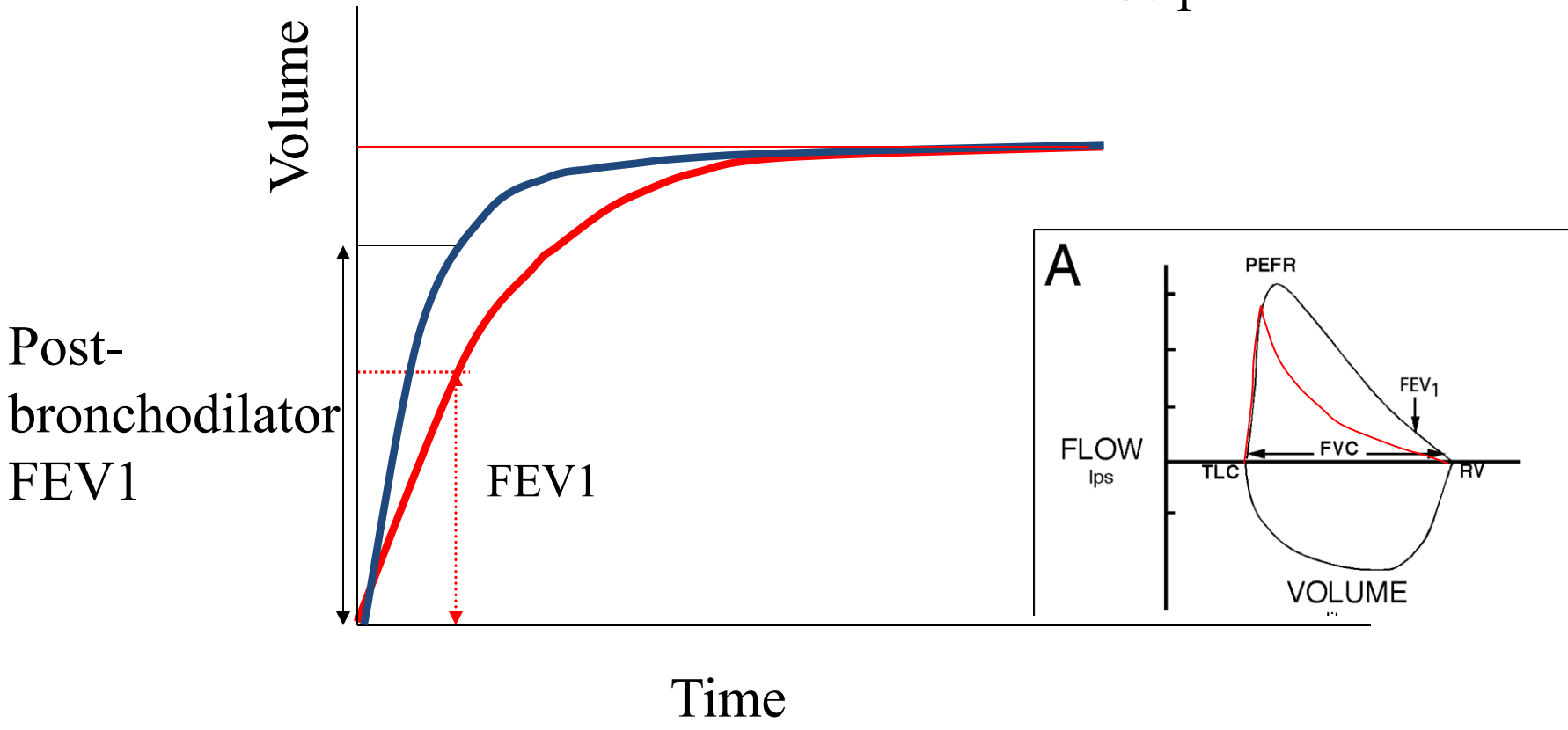
- Step 1: assess ratio of FEV1/FVC
  - < 90% predicted = airflow limitation
  - ≥ 90% predicted with abnormal values, refer for further pulmonary function testing
- Step 2: assess absolute level of FEV1 to quantify severity

Degree of severity	FEV1 % predicted
Mild	> 70
Moderate	60-69
Moderately Severe	50-59
Severe	35-45
Very Severe	< 35

- Step 3: assess response to bronchodilator
  - Significant response = 12 % *and* 200 cc increase in FEV1 and/or FVC

Reversible Airflow Limitation

FEV1/FVC < 90% predicted

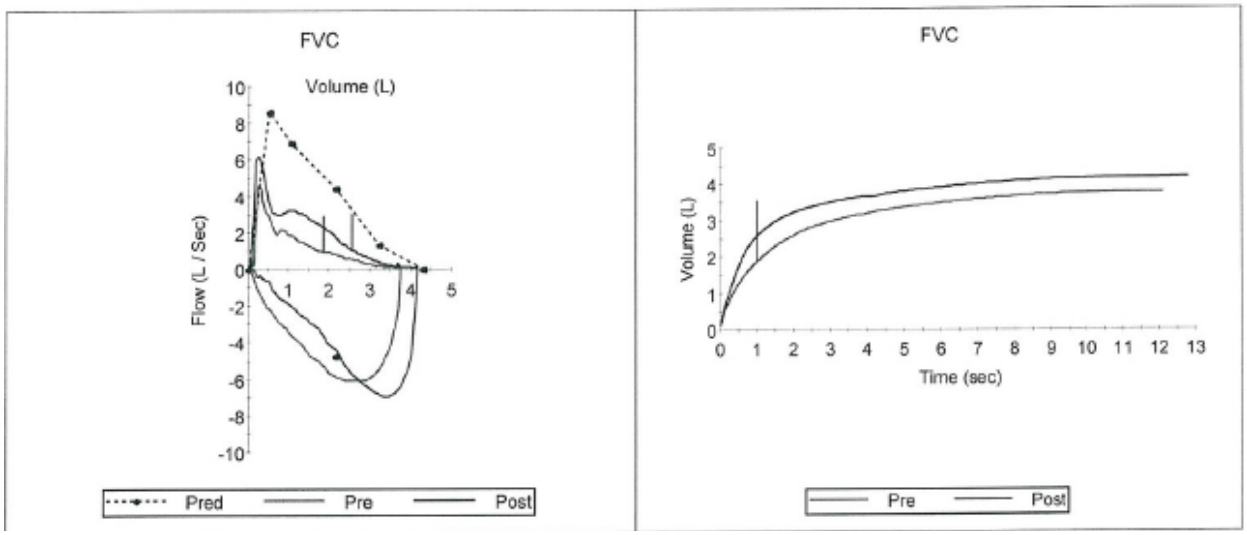


12 % and 200 cc increase in FEV1 *and/or* FVC

Case spirometry

Diagnosis: [redacted]
Tbco Prod: Never Smoked Yrs Smk: Pks/Day: Yrs Quit:
Medications: Singulair/ Albuterol/Tilade no albuterol today
Post Test Comments: Good efforts, reproducible results. 2 puffs albuterol self administered; has good MDI technique

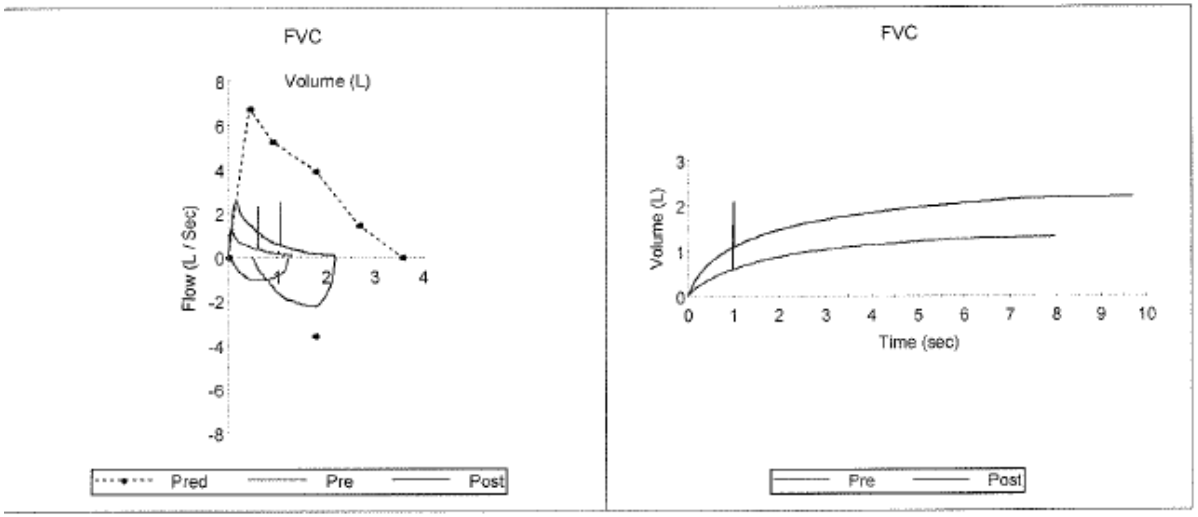
	Pre-Med				Post-Med		
	Actual	%Pred	Pred	LLN	Actual	%Pred	%Chng
---- SPIROMETRY ----							
FVC (L)	3.76	87	4.31	4.28	4.25	98	+12
FEV1 (L)	1.88	57	3.27	2.65	2.58	78	+37
FEV1/FVC (%)	50	65	76		61	80	+21
FEF 25-75% (L/sec)	0.86	31	2.75	0.36	1.79	64	+107
FEF Max (L/sec)	4.53	52	8.64	4.68	6.29	72	+38



Spirometry

Diagnosis: [redacted]
Tbco Prod: Never Smoked Yrs Smk: Pks/Day: Yrs Quit:
Medications: Albuterol;
Post Test Comments: Very good patient efforts. Cough noted in pre-Bronchodilator. 2-puffs Albuterol MDI give for post studies.

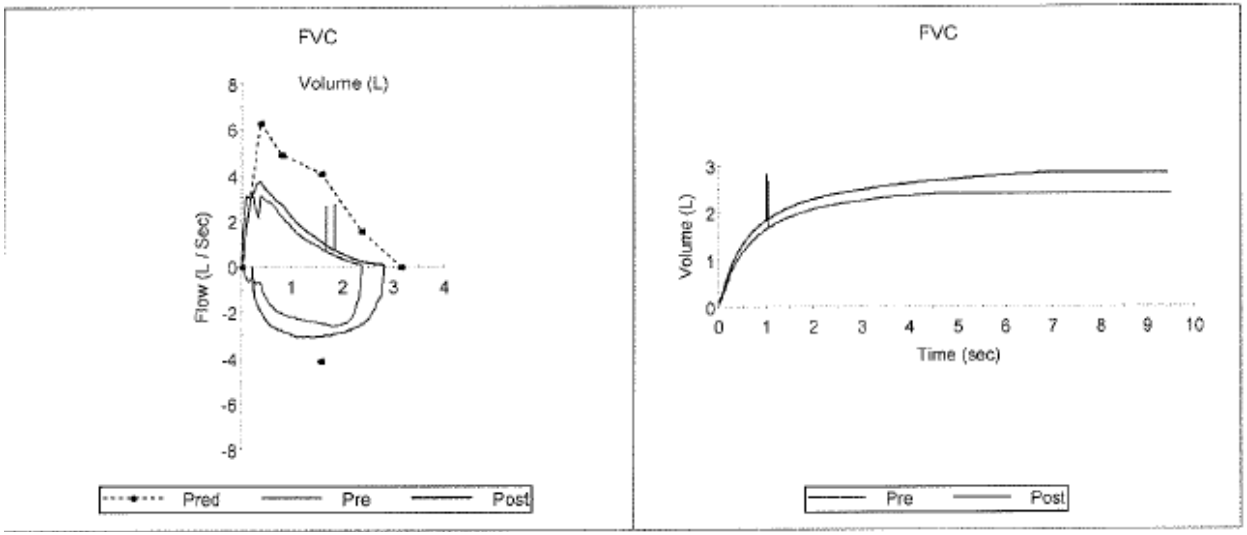
	Pre-Med				Post-Med		
	Actual	%Pred	Pred	LLN	Actual	%Pred	%Chng
---- SPIROMETRY ----							
FVC (L)	1.30	36	3.56	2.74	2.19	61	+67
FEV1 (L)	0.60	21	2.83	2.67	1.09	38	+81
FEV1/FVC (%)	46	57	80		50	62	+8
FEF 25-75% (L/sec)	0.29	10	2.80	1.97	0.98	35	+235
FEF Max (L/sec)	1.32	19	6.77	3.75	2.43	35	+84



Spirometry

Diagnosis: [redacted]
Tbco Prod: Cigarette Yrs Smk: 20.0 Pks/Day: 1.0 Yrs Quit: 3.0
Medications: Advair; Albuterol
Post Test Comments: Very good reproducible efforts. 2 puff Albuterol given for post studies.

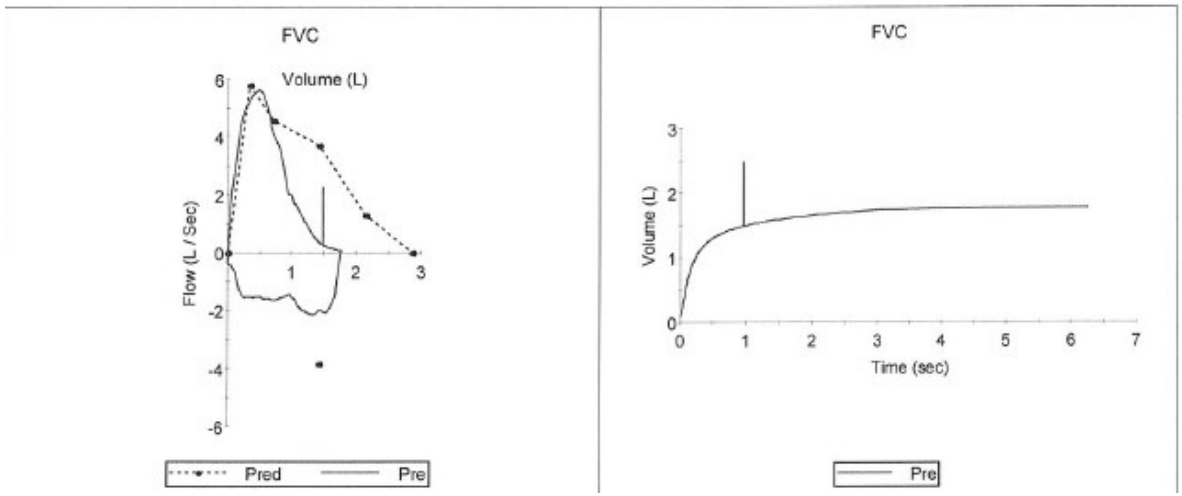
	Pre-Med				Post-Med		
	Actual	%Pred	Pred	LLN	Actual	%Pred	%Chng
---- SPIROMETRY ----							
FVC (L)	2.39	75	3.15	2.44	2.83	89	+18
FEV1 (L)	1.68	66	2.55	2.41	1.85	72	+10
FEV1/FVC (%)	70	86	81		65	80	-7
FEF 25-75% (L/sec)	1.17	42	2.73	2.00	1.56	57	+33
FEF Max (L/sec)	3.14	50	6.28	3.63	3.83	61	+22



Spirometry

Diagnosis: sob
Tbco Prod: Never Smoked Yrs Smk: Pks/Day: Yrs Quit:
Medications: albuterol-none atrovent-none
symbicort-took am
xopenex-took am pulmicort-none
Post Test Comments: Good patient effort & cooperation. Bronchodilator not ordered by physician
Repeatable data LMB

	Pre-Med				Post-Med		
	Actual	%Pred	Pred	LLN	Actual	%Pred	%Chng
---- SPIROMETRY ----							
FVC (L)	1.77	61	2.86	2.27			
FEV1 (L)	1.50	67	2.23	1.72			
FEV1/FVC (%)	85	107	79	69			
FEF 25-75% (L/sec)	1.92	86	2.23	1.16			
FEF Max (L/sec)	5.60	96	5.79	4.31			



Level of severity

- 'The intrinsic intensity of the disease process. **Assess asthma severity to initiate therapy.'**
- Diagnoses
  - Intermittent
  - Mild persistent
  - Moderate persistent
  - Severe
- Impairment and Risk

Severity Criteria

Classifying severity for patients who are not currently taking long-term control medications.

Components of Severity		Classification of Asthma Severity (Youths ≥12 years of age and adults)			
			Persistent		
		Intermittent	Mild	Moderate	Severe
Impairment Normal FEV_1/FVC: 8–19 yr 85% 20–39 yr 80% 40–59 yr 75% 60–80 yr 70%	Symptoms	≤2 days/week	>2 days/week but not daily	Daily	Throughout the day
	Nighttime awakenings	≤2x/month	3–4x/month	>1x/week but not nightly	Often 7x/week
	Short-acting $beta_2$-agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week but not >1x/day	Daily	Several times per day
	Interference with normal activity	None	Minor limitation	Some limitation	Extremely limited
	Lung function	• Normal FEV_1 between exacerbations • FEV_1 >80% predicted • FEV_1/FVC normal	• FEV_1 ≥80% predicted • FEV_1/FVC normal	• FEV_1 >60% but <80% predicted • FEV_1/FVC reduced 5%	• FEV_1 <60% predicted • FEV_1/FVC reduced >5%
Risk	Exacerbations requiring oral systemic corticosteroids	0–1/year (see note)	≥2/year (see note) →		
		← Consider severity and interval since last exacerbation. Frequency and severity may fluctuate over time for patients in any severity category. →			
		Relative annual risk of exacerbations may be related to FEV_1			

Assessing control

- 'The degree to which the manifestations of asthma are minimized by therapeutic interventions and the goals of therapy are met. **Assess and monitor asthma control to adjust therapy.**'

Goal:

- Reduce impairment
  - Well-controlled asthma is defined as use of rescue therapy 2 or fewer times per week.
  - SABA use prior to exercise is not rescue therapy.
- Reduce risk
  - Prevent exacerbation
  - Prevent loss of function
  - Avoid side effects

Control Criteria

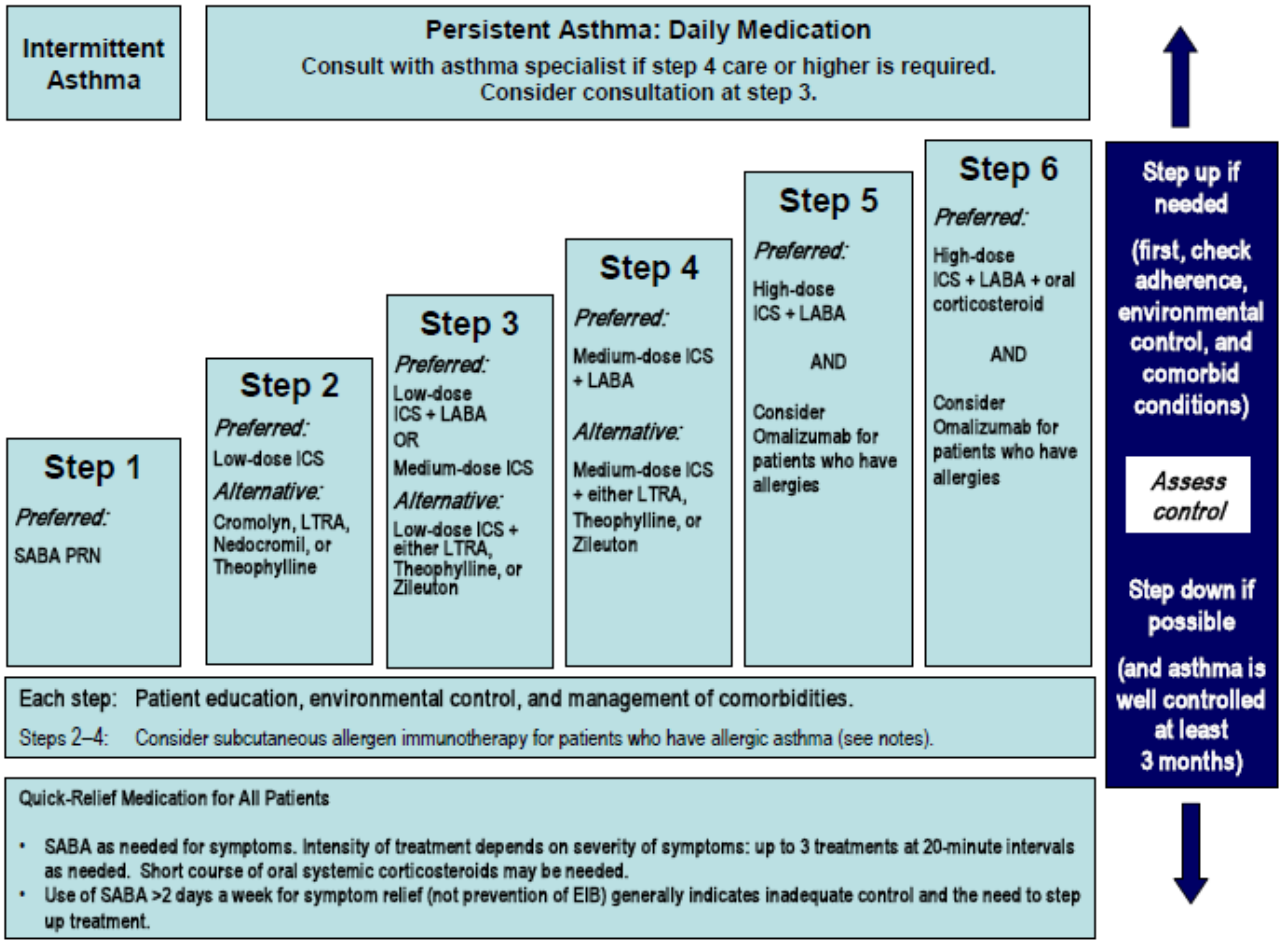
Components of Control		Classification of Asthma Control (Youths ≥12 years of age and adults)		
		Well-Controlled	Not Well-Controlled	Very Poorly Controlled
Impairment	Symptoms	≤2 days/week	>2 days/week	Throughout the day
	Nighttime awakening	≤2x/month	1–3x/week	≥4x/week
	Interference with normal activity	None	Some limitation	Extremely limited
	Short-acting $beta_2$-agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week	Several times per day
	FEV_1 or peak flow	>80% predicted/ personal best	60–80% predicted/ personal best	<60% predicted/ personal best
	Validated Questionnaires ATAQ ACQ ACT	 0 ≤0.75* ≥20	 1–2 ≥1.5 16–19	 3–4 N/A ≤15
Risk	Exacerbations	0–1/year	≥2/year (see note)	
		Consider severity and interval since last exacerbation		
	Progressive loss of lung function	Evaluation requires long-term followup care		
	Treatment-related adverse effects	Medication side effects can vary in intensity from none to very troublesome and worrisome. The level of intensity does not correlate to specific levels of control but should be considered in the overall assessment of risk.		

Asthma Treatment

- 3 age groups
  - 0-4 years of age
  - 5-11 years of age
  - > 12 years of age (youth and adult)
- 6 steps
- Patient education and partnership (literacy-level sensitive)
  - Self-management education
    - > Self-monitor
    - > AAP
    - > Inhaler/device technique
  - Schedule follow up to assess responsiveness
    - > 2-6 weeks while gaining control
    - > 1-6 months is controlled
    - > 3 month interval if step-down is anticipated
- Environmental control
- Manage co-morbidities

Asthma Treatment

FIGURE 4–5. STEPWISE APPROACH FOR MANAGING ASTHMA IN YOUTHS ≥12 YEARS OF AGE AND ADULTS



Asthma Action Plans (AAPs)

Asthma Action Plan

Name: [redacted] DOB: [redacted]
Doctor's Name: Alicia A Jacobs, MD Dept: 802-847-2055
Primary Care Provider: Alicia A Jacobs, MD
Emergency Contact Information:

Asthma Type: Moderate Persistent
Allergies and Triggers: Infections / Colds
Nebulizer: Please administer with mask directly on patient's face. Inhaler: Please administer using spacer device.

GREEN = GO	DAILY MEDICINE
• Breathing is good • No cough, wheeze or chest tightness • Sleep through the night • Can do usual activities	Medicine/ How Much/ How Often/When budesonide-formoterol (SYMBICORT HFA) 160mcg-4.5mcg

10-15 MINUTES BEFORE SPORTS OR PLAY, USE:

YELLOW = CAUTION	
• First signs of a cold • Cough • Wheeze • Chest tightness • Coughing at night • Symptoms with activity	Medicine/ How Much/ How Often/When albuterol MDI 2 puffs Every 4 hours as needed. Continue your green medications.

** IF NOT BETTER, CALL YOUR HEALTH CARE PROVIDER **

Signs of Respiratory Distress: Fast breating, using chest muscles to breathe, increasing wheezing, ribs show, unable to speak well.

RED = STOP	SYMPTOMS ARE BAD

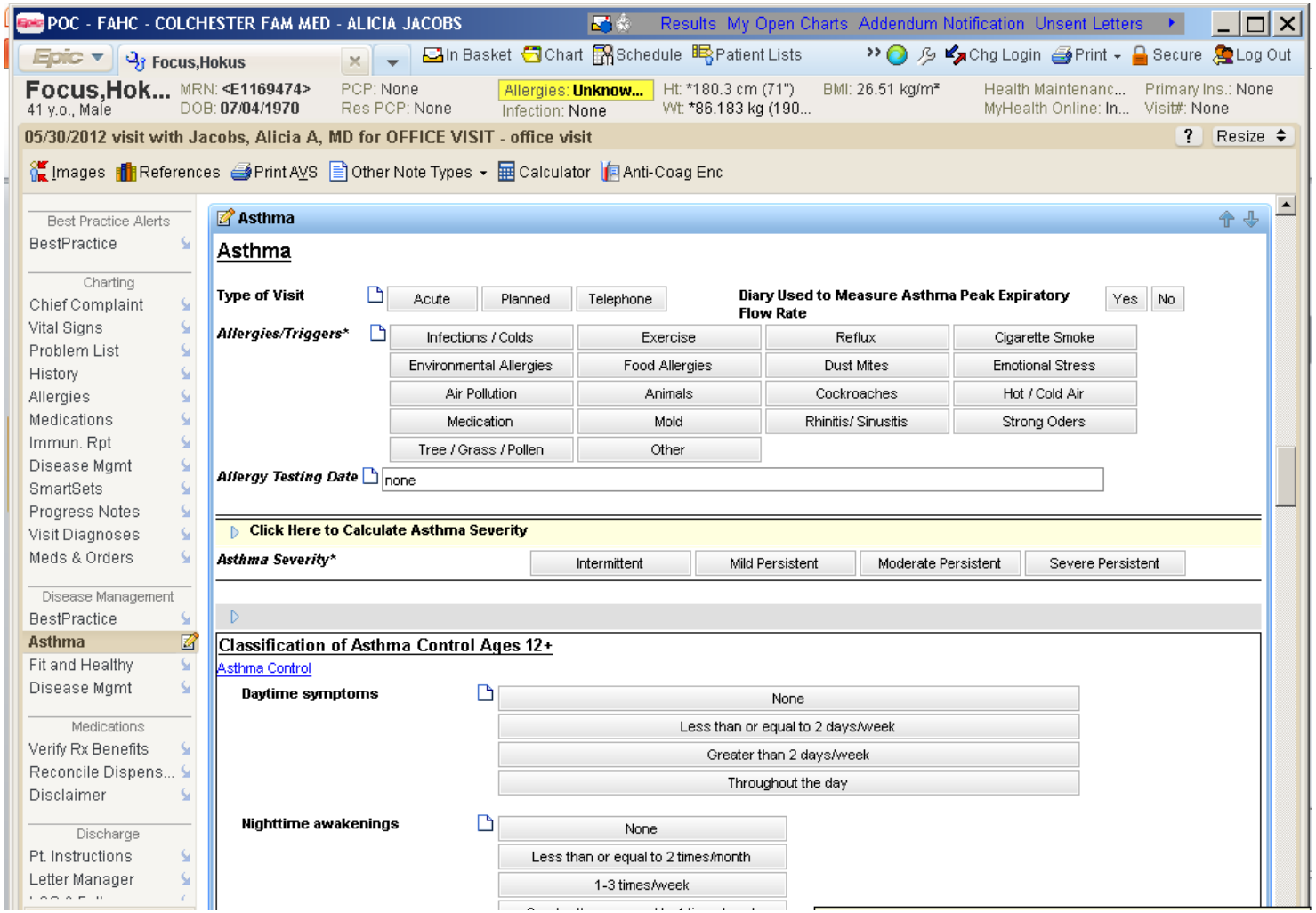
AAPs

- Recommended for patients with persistent asthma (especially requiring treatment at steps 4,5 or 6)

- Improved control through:
  - Patient education
  - Clear dosing
  - More regular follow up to assess adherence

Quality Study

Asthma SmartForm



Variables in HealthCare

- FAHC ‘high reliability’
- PRISM
- TPCC
- PCMH
- VT Blueprint for Health
- COM
- Green Mountain Care
- ACOs

Quality Project

- Use the SmartForm – a robust PRISM platform
- Collaborate across Primary Care (Pediatrics, Family Medicine and PCIM)
- Improve operations
- Improve outcomes in a chronic health condition
- Primary care outcomes research

Operational plan

- Train all physicians, nurse practitioners and physician assistants in asthma diagnosis, in assessment of severity and control and in management
- Train all nurses and providers in use of spirometry, interpretation and indications
- Improve asthma outcomes
  - Use asthma actions plans
  - Use SmartForm for evidence based treatment plans

Timeline

- FM training – May 11th, 15th
- Nurse in-service – June 6th
- PCIM training – June 6th
- Incorporate spirometry in workflow
- Turn on SmartForm - by 7/2/12
- FM resident training 8/2/12
- Medicine resident training during August
- Site based follow up

Case – improving outcomes

- My patient was seen, given a spacer for her albuterol inhaler and placed on Flovent 110 due to continued high use of her rescue inhaler. At follow-up, she reported decreased but continued albuterol use (only once a day) and after any exercise.

PRISM demonstration

Asthma Summary

1. It is a **chronic** disease
2. **Spirometry** can be diagnostic, quick and easy
3. Level of **severity** is consistent over time
4. Assessing **control** guides treatment
5. **Asthma Action Plans** can improve outcomes

References

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