# Learning the Asthma Guidelines by Case Studies

Timothy Craig, DO
Professor of Medicine and Pediatrics
Distinguished Educator
Penn State University
Hershey Medical Center

# Objectives

- 1. Learn the Asthma Guidelines
- 2. Be able to classify asthma severity
- 3. Be able to determine asthma control
- 4. Be able to successfully treat asthma
- 5. Be able to improve patient outcomes
- 6. Pass your boards

- 19 yo male with asthma since age 5
- Presents with EIB and year round nasal congestion
- Denies daytime symptoms
- Night time symptoms 2 times per month
- Uses SABA pre-exercise
- Never used any other type of inhaler
- He has moderate limitation on ability to exercise
- No ER visits or Hospitalizations
- What is his asthma severity?
- What would you do now?

- What is his asthma severity?

a. Mild intermittent asthma
b. Mild persistent asthma
c. Moderate persistent asthma
d. Severe persistent asthma

Ans:

- What is his asthma severity?
  a. Mild intermittent asthma
  b. Mild persistent asthma
  c. Moderate persistent asthma
  d. Severe persistent asthma

  Ans: C

# Classifying Severity in Patients ≥12 Years Not Currently Taking Long-Term Controllers

| Components of Severity | | Classification of Asthma Severity (Youths ≥12 of age and adults) | | | |
|---|---|---|---|---|---|
| | | Intermittent | Persistent | | |
| | | | Mild | Moderate | Severe |
| Impairment<br><br>Normal $FEV_1/FVC$:<br>8-19 yr 85%<br>20-39 yr 80%<br>40-59 yr 75%<br>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 | ≤2 days/week | >2 days/week but >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<br>• $FEV_1$ >80% predicted<br>• $FEV_1/FVC$ normal | • $FEV_1$ >80% predicted<br>• $FEV_1/FVC$ normal | • $FEV_1$ >60% but <80% predicted<br>• $FEV_1/FVC$ reduced 5% | • $FEV_1$ <60% predicted<br>• $FEV_1/FVC$ reduced >5% |
| Risk | Exacerbations requiring oral systemic corticosteroids | 0-1/year | >2 in 1 year | | |
| | | Relative annual risk of exacerbations may be related to $FEV_1$ | | | |

- What would you do now?

a. Start a LABA
b. Start a medium dose ICS
c. Start a high dose of ICS with LABA
d. Start a low dose of ICS with a LABA

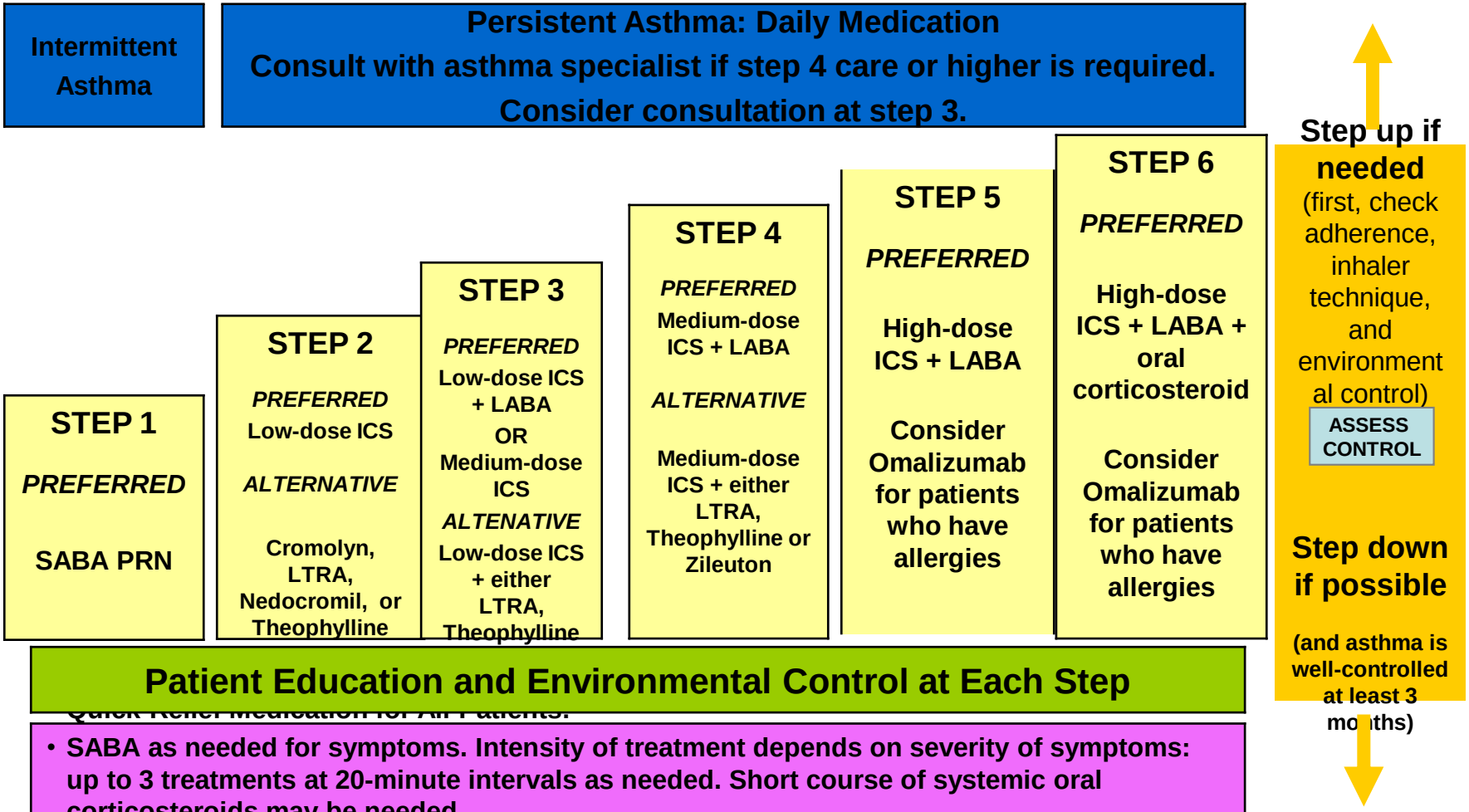
Ans:

- What would you do now?

a. Start a LABA
b. Start a medium dose ICS with LABA
c. Start a high dose of ICS
d. Start a low dose of ICS with a LABA

Ans: B

# Stepwise Approach for Managing Asthma in Patients ≥ 12 Years of Age




NHLBI. National Asthma Education and Prevention Program. Expert Panel Report 3. Available at: http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf. Accessed 8.30.07.

- FVC was 90%, FEV-1 was 80% and his ratio was 85%
- CXR was normal
- Skin tests were positive for house dust mites
- Prescribed a medium dose of inhaled steroid and a LABA
- Started on nasal steroid
- Albuterol as needed
- Prednisone for severe asthma
- Educated on technique, adherence, acute asthma action plan and mite avoidance

- Returns in 3 month
- He has been using his ICS and LABA regularly
- Denies nighttime, daytime symptoms, or exercise related symptoms
- His QOL is good.
- Albuterol in the last week has been pre-exercise only.
- He used prednisone three times for asthma attacks over the past 12 weeks
- FEV-1 was 80% with a ratio of 83%
- What is his asthma control?
- What would you do?

- What is his asthma control?

A. Mild persistent asthma
B. Well controlled asthma
C. Not well controlled asthma
D. Very poorly controlled

Ans:

- What is his asthma control?

A. Mild persistent asthma
B. Well controlled asthma
C. Not well controlled asthma
D. Very poorly controlled

Ans: D

# Assessing Asthma Control in Patients ≥12 Years of Age

| Components of Severity | | Classification of Asthma Control (Youths ≥12 years of age & adults) | | |
|---|---|---|---|---|
| | | Well Controlled | Not Well Controlled | Very Poorly Controlled |
| Impairment | Symptoms | ≤2 days/week | >2 days/week | Throughout the day |
| | Nighttime awakenings | ≤2/month | 1-3x/week | ≥4x/week |
| | Interference with normal activity | None | Some limitation | Extremely limited |
| | Short-acting $beta_2$-agonist use for symptom control | ≤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*<br>ATAQ<br>ACQ<br>ACT | <br>0<br>≤0.75<br>≥20 | <br>1-2<br>≥1.5<br>16-19 | <br>3-4<br>N/A<br>≤15 |
| Risk | Exacerbations | 0-1/year | ≥2/per year | ≥2/per year |
| | Progressive loss of lung function | Evaluation requires long-term follow-up care. | | |
| | Treatment-related adverse effects | | | |

*Consider severity and interval since last exacerbation.

- What would you do?

  a. Increase to a high dose ICS

  b. Increase ICS to a high dose and add a LABA

  c. Add a short acting anticholingeric

  d. Add Zileutin (a lipo-oxygenase inhibitor)

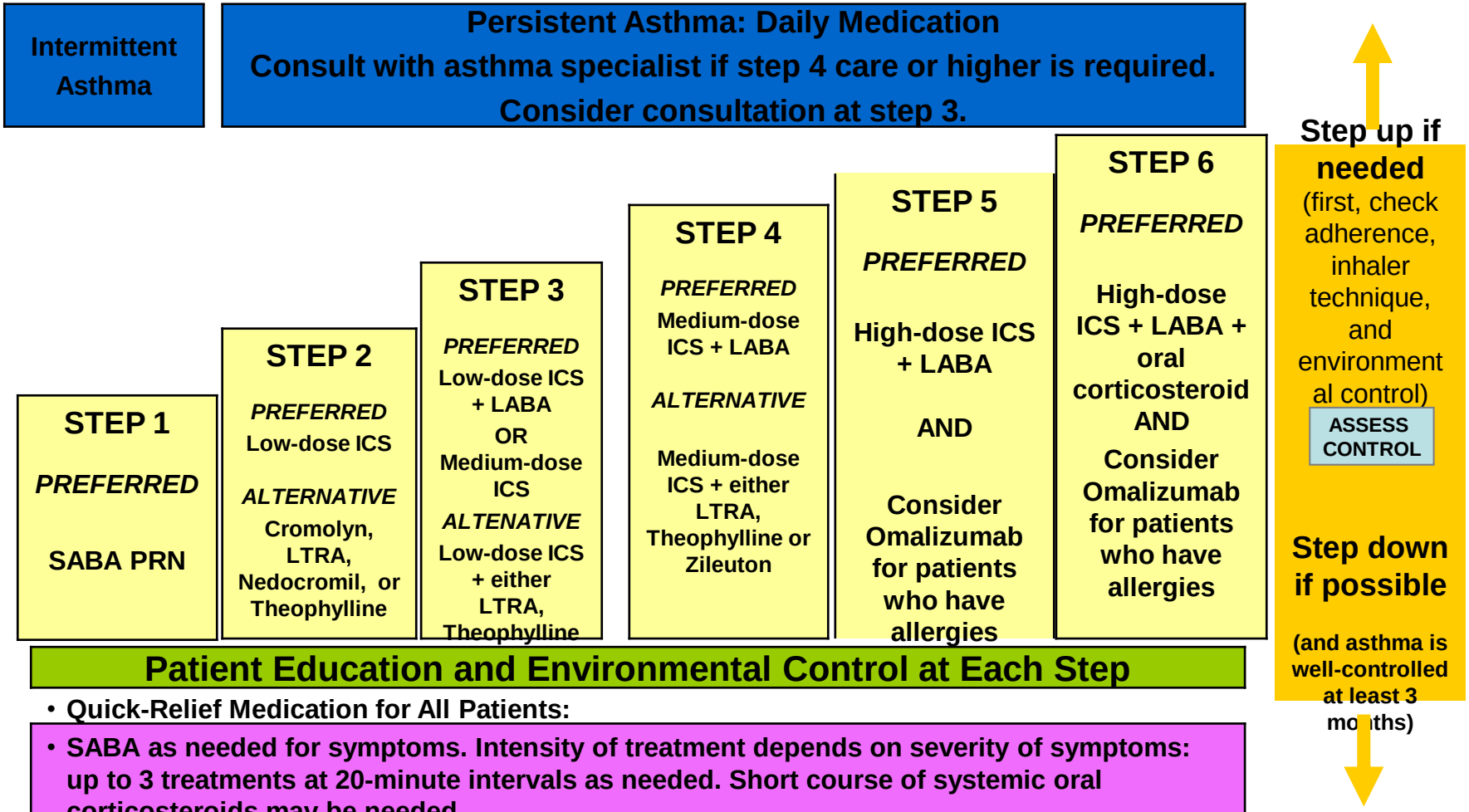
  e. Add omalizumab

  Ans:

- What would you do?
  a. Increase to a high dose ICS
  b. Increase ICS to a high dose and a LABA
  c. Add a short acting anticholingeric
  d. Add Zileutin (a lipo-oxygenase inhibitor)
  e. Add omalizumab

  Ans: B

# Stepwise Approach for Managing Asthma in Patients ≥ 12 Years of Age




**Patient Education and Environmental Control at Each Step**

- **Quick-Relief Medication for All Patients:**
- **SABA as needed for symptoms. Intensity of treatment depends on severity of symptoms: up to 3 treatments at 20-minute intervals as needed. Short course of systemic oral corticosteroids may be needed.**
- **Caution: Increasing of β-agonist or use >2x/week for symptoms control indicates inadequate control and the need to step up treatment.**

NHLBI. National Asthma Education and Prevention Program. Expert Panel Report 3. Available at: http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf. Accessed 8.30.07.

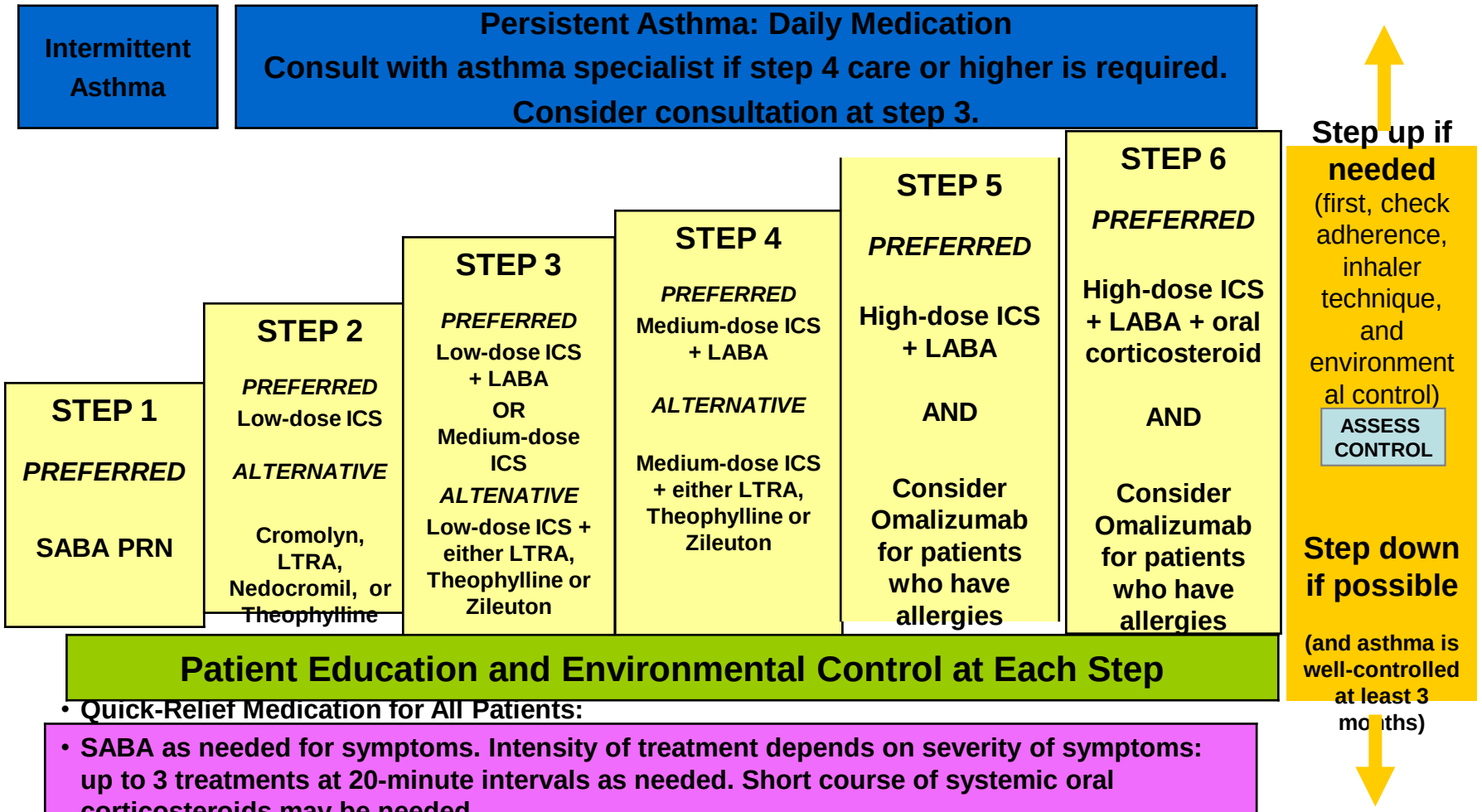
- Prescribe a peak flow meter
- High dose inhaled corticosteroid plus LABA
- Consider omalizumab or mepolizumab
- SABA PRN and pre-exercise
- Increase albuterol for yellow zone
- Prednisone for red zone
- F/U in 1 month

# Review the Guidelines

# Classifying Severity in Patients ≥12 Years Not Currently Taking Long-Term Controllers

| Components of Severity | | Classification of Asthma Severity (Youths ≥12 of age and adults) | | | |
|---|---|---|---|---|---|
| | | Intermittent | Persistent | | |
| | | | Mild | Moderate | Severe |
| Impairment<br><br>Normal $FEV_1/FVC$:<br>8-19 yr 85%<br>20-39 yr 80%<br>40-59 yr 75%<br>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 | ≤2 days/week | >2 days/week but >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<br>• $FEV_1$ >80% predicted<br>• $FEV_1/FVC$ normal | • $FEV_1$ >80% predicted<br>• $FEV_1/FVC$ normal | • $FEV_1$ >60% but <80% predicted<br>• $FEV_1/FVC$ reduced 5% | • $FEV_1$ <60% predicted<br>• $FEV_1/FVC$ reduced >5% |
| Risk | Exacerbations requiring oral systemic corticosteroids | 0-1/year | >2 in 1 year | | |
| | | Relative annual risk of exacerbations may be related to $FEV_1$ | | | |

# Stepwise Approach for Managing Asthma in Patients ≥ 12 Years of Age




- Quick-Relief Medication for All Patients:
- SABA as needed for symptoms. Intensity of treatment depends on severity of symptoms: up to 3 treatments at 20-minute intervals as needed. Short course of systemic oral corticosteroids may be needed.
- Caution: Increasing of β-agonist or use >2x/week for symptoms control indicates inadequate control and the need to step up treatment.

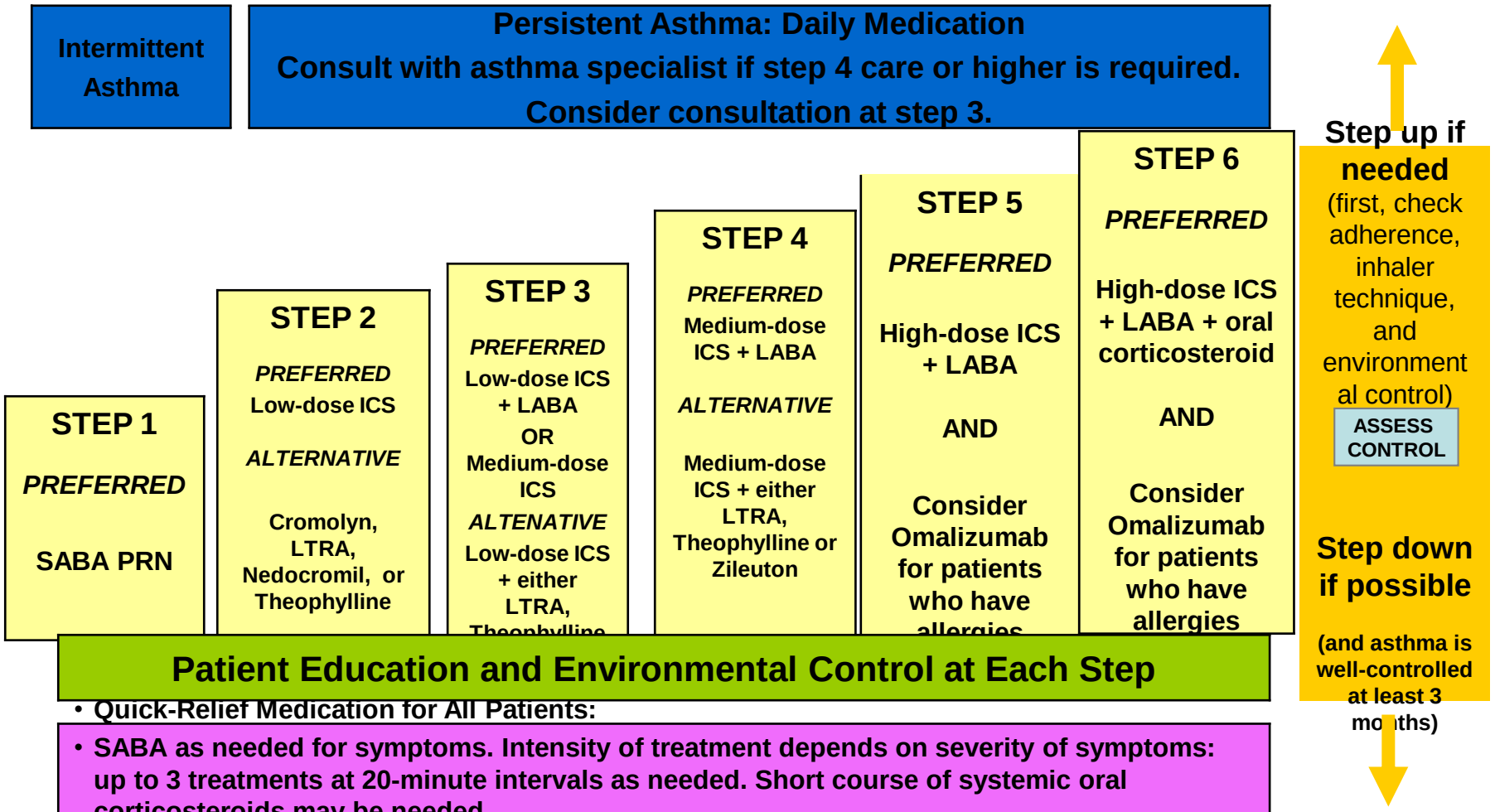
NHLBI. National Asthma Education and Prevention Program. Expert Panel Report 3. Available at: http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf. Accessed 8.30.07.

# Assessing Asthma Control in Patients ≥12 Years of Age

| Components of Severity | | Classification of Asthma Control (Youths ≥12 years of age & adults) | | |
|---|---|---|---|---|
| | | Well Controlled | Not Well Controlled | Very Poorly Controlled |
| Impairment | Symptoms | ≤2 days/week | >2 days/week | Throughout the day |
| | Nighttime awakenings | ≤2/month | 1-3x/week | ≥4x/week |
| | Interference with normal activity | None | Some limitation | Extremely limited |
| | Short-acting $beta_2$-agonist use for symptom control | ≤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*<br>ATAQ<br>ACQ<br>ACT | <br>0<br>≤0.75<br>≥20 | <br>1-2<br>≥1.5<br>16-19 | <br>3-4<br>N/A<br>≤15 |
| Risk | Exacerbations | 0-1/year | ≥2/per year | ≥2/per year |
| | Progressive loss of lung function | Evaluation requires long-term follow-up care. | | |
| | Treatment-related adverse effects | | | |

*Consider severity and interval since last exacerbation.

# Stepwise Approach for Managing Asthma in Patients ≥ 12 Years of Age




NHLBI. National Asthma Education and Prevention Program. Expert Panel Report 3. Available at: http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf. Accessed 8.30.07.

# New develops that have been published since the guidelines have been published:

- 1. Tiotropium Bromide can be added in place of a LABA to a moderate to high dose of ICS if the patient is not controlled or to a ICS/LABA combination for poor control
- 2. Ipratropium bromide can be used in the ED when albuterol use in maximized and patient still has symptoms.  This may decrease risk for hospitalization.
- 3. Mepolizumab is approved for severe asthma and inhibits IL-5 and decreases influx of eosinophils into the airway and decrease exacerbations.
- 4. Omalizumab decreases exacerbations and is now approved to use in child.

# New developments that have been published since the guidelines have been published:

- Montelukast is not as effective as ISC, but compliance is better and for this reason over many years the benefits may be equal to ICS (NEJM)
- Montelukast is not as effective as adding LABA to ICS, but due to better compliance over many years the benefits may be equal to adding LABA to ICS (NEJM)
- Aerobic exercise is effective in reducing asthma symptoms
- Vitamin D deficiency is common in asthma and replacement may decrease steroid resistance.
- Adding macrolides may not be of significant benefit in most asthma patients

# What is important about the guidelines

- Severity classification followed by control.
- Assess impairment and risk
- Ages 0 to 4, 5 to 12 and greater than 12.
- Addition of functional ability and exacerbations to both severity and control.
- Stresses that ICS are the drug of first choice.
- Addition of omalizumab and zileutin.

# Assessing Asthma Control: "Rules of Two"

- If the answer to following questions is yes, a long term controller may be needed or you need to increase care
  - Do you take your quick relief inhaler more than TWO TIMES A WEEK?
  - Do you awaken at night with asthma more than TWO TIMES A MONTH?
  - Do you have daytime symptoms more than twice a week?
  - Do you have attacks more than twice a year
  - OR is there any limitation on exercise or QOL

- 35 year old banker
- Frustrated with his care- “they do not listen to me”
- “I have had asthma since age 3 and always stable, but now I am miserable”
- I no longer can run.  I had 3 attacks this year requiring prednisone”

# What are some possibilities that may result in his asthma attacks?

- A. Staph lung infections
- B. Warm humid air
- C. Reflux
- D. Pneumococcal infections
- E. Rhinovirus
- Ans:

# What are some possibilities that may result in his asthma attacks?

- A. Staph lung infections
- B. Warm humid air
- C. Reflux
- D. Pneumococcal infections
- E. Rhinovirus
- Ans: E

- What is the most common cause for poor asthma control?
- A. Poor technique
- B. Poor compliance
- C. Under treatment
- D. Failure to appropriate recognize asthma severity
- Ans:

- What is the most common cause for poor asthma control?
- A. Poor technique
- B. Poor compliance
- C. Under treatment
- D. Failure to appropriate recognize asthma severity
- Ans:  A

# What are some possibilities that may result in uncontrolled asthma?

- Poor adherence
- Poor technique
- Under treatment
- Tobacco
- Allergen exposure
- Occupational exposure
- Medications (non-selective beta-blockers, ACE-I, ASA)
- Infections (atypical bacteria and viruses)
- Upper airway inflammation
- Depression and poor social system

- 35 year old banker
- Frustrated with his care- “they do not listen to me”
- “I have had asthma since age 3 and always stable, but now I am miserable”
- I no longer can run.  I have had 3 attacks this year alone requiring prednisone”

- NKDA, denies bee-sting or food allergies
- Family history is positive for asthma and eczema
- Non-smoker, banker
- Home is allergen proofed and he traded his cat for a goldfish last year
- He tolerates ASA and NSAID
- ROS is positive for anxiety and depression, severe nasal congestion

# Exam

- Allergic shiners
- Boggy nasal mucosa
- Pharyngeal edema and cobblestoning
- Scattered wheezes through both lung fields

# What Tests Would You Order at this time?

- A. Sinus CT
- B. PH probe
- C. DLCO
- D. Spirometry
- E. Skin testing

- Ans:

# What Tests Would You Order at this time?

- A. Sinus CT
- B. PH probe
- C. DLCO
- D. Spirometry
- E. Skin testing

- Ans: D

# Procedures

- Spirometry was done
  - FVC was 92% predicted
  - FEV-1 was 68% predicted
  - FEV1/FVC ratio was 70%
  - He reversed 16% with 4 puffs albuterol

CXR- hyperinflation other wise normal

Treatment was initiated and return visit, spirometry and skin testing were arranged in 2 weeks

- 35 year old banker
- Frustrated with his care- “they do not listen to me”
- “I have had asthma since age 3 and always stable, but now I am miserable”
- I no longer can run.  I have had 3 attacks this year alone requiring prednisone”

# What is his asthma severity?

a. Mild intermittent asthma
b. Mild persistent
c. Moderate persistent
d. Severe persistent asthma

Ans:

# What is his asthma severity?

a. Mild intermittent asthma

b. Mild persistent

c. Moderate persistent

d. Severe persistent asthma

Ans: D

# Classifying Severity in Patients ≥12 Years Not Currently Taking Long-Term Controllers

| Components of Severity | | Classification of Asthma Severity (Youths ≥12 of age and adults) | | | |
|---|---|---|---|---|---|
| | | Intermittent | Persistent | | |
| | | | Mild | Moderate | Severe |
| Impairment<br><br>Normal $FEV_1/FVC$:<br>8-19 yr 85%<br>20-39 yr 80%<br>40-59 yr 75%<br>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 | ≤2 days/week | >2 days/week but >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<br>• $FEV_1$ >80% predicted<br>• $FEV_1/FVC$ normal | • $FEV_1$ >80% predicted<br>• $FEV_1/FVC$ normal | • $FEV_1$ >60% but <80% predicted<br>• $FEV_1/FVC$ reduced 5% | • $FEV_1$ <60% predicted<br>• $FEV_1/FVC$ reduced >5% |
| Risk | Exacerbations requiring oral systemic corticosteroids | 0-1/year | >2 in 1 year | | |
| | | Relative annual risk of exacerbations may be related to $FEV_1$ | | | |

# RECOMMENDATIONS

1.

2.

3.

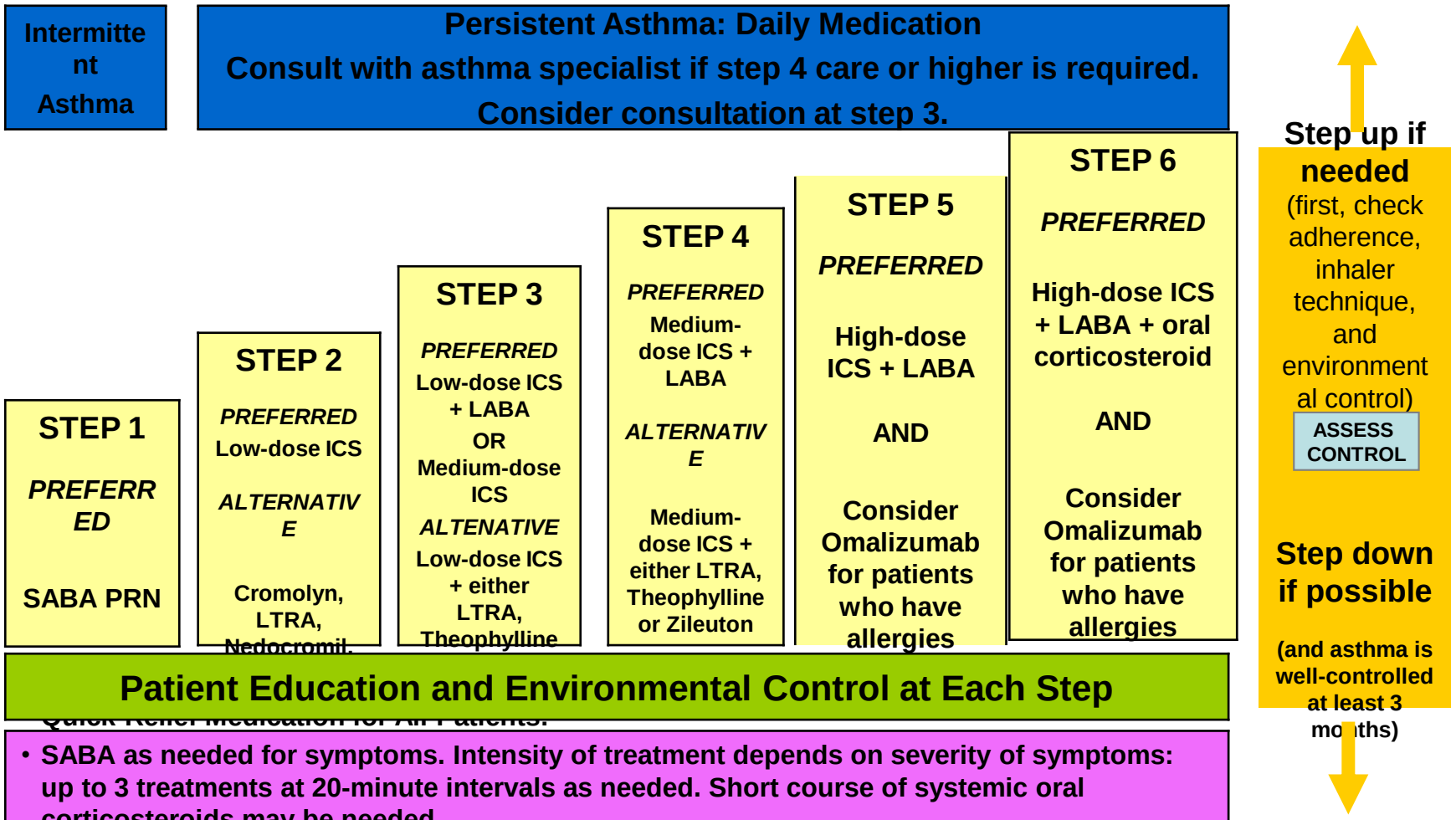
4.

5.

# Recommendations

- Treat his asthma aggressively with high dose ICS and LABA
- Nasal steroid
- Reassurance
- Review medication use
- Educate on technique
- Acute action plan
- Determine hypersensitivities

# Stepwise Approach for Managing Asthma in Patients ≥ 12 Years of Age




NHLBI. National Asthma Education and Prevention Program. Expert Panel Report 3. Available at: http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf. Accessed 8.30.07.

# 2 Week Follow-up

- He was on a high dose ICS and a LABA.
- Exercise has improved
- He is sleeping nights, free of day symptoms, and not using albuterol
- QOL is improved.
- Not needed urgent care
- Spirometry was normal
- Skin tests were positive to cats and dust mites

# What is his asthma control?

- A. Well controlled
- B. Not well controlled
- C. Very poorly controlled
- D. Very, very, very poorly controlled

- Ans:

# What is his asthma control?

- A. Well controlled
- B. Not well controlled
- C. Very poorly controlled
- D. Very, very, very poorly controlled

- Ans:  A

# Assessing Asthma Control in Patients ≥12 Years of Age

| Components of Severity | | Classification of Asthma Control (Youths ≥12 years of age & adults) | | |
|---|---|---|---|---|
| | | Well Controlled | Not Well Controlled | Very Poorly Controlled |
| Impairment | Symptoms | ≤2 days/week | >2 days/week | Throughout the day |
| | Nighttime awakenings | ≤2/month | 1-3x/week | ≥4x/week |
| | Interference with normal activity | None | Some limitation | Extremely limited |
| | Short-acting $beta_2$-agonist use for symptom control | ≤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*<br>ATAQ<br>ACQ<br>ACT | <br>0<br>≤0.75<br>≥20 | <br>1-2<br>≥1.5<br>16-19 | <br>3-4<br>N/A<br>≤15 |
| Risk | Exacerbations | 0-1/year | ≥2/per year | ≥2/per year |
| | Progressive loss of lung function | Evaluation requires long-term follow-up care. | | |
| | Treatment-related adverse effects | | | |

*Consider severity and interval since last exacerbation.

# What would you do now?

- A. Drop off the LABA
- B. Start omalizumab
- C. Review his acute asthma plan
- D. Decrease him to a low dose ICS

- Ans:

# What would you do now?

- A. Drop off the LABA
- B. Start omalizumab
- C. Review his acute asthma plan
- D. Decrease him to a low dose ICS

- Ans: C

- Your patient has severe persistent asthma that is well controlled
- Follow-up in 3 months
- Consider decreasing dose of ICS on the next visit
- If needs an increase in care consider omalizumab, tiotropium or mepolizumab.

# Summary: what is stressed in the guidelines

- Severity classification on first visit.
- Asthma control on subsequent visits.
- Different guidelines for ages 0 to 4, 5 to 12 and greater than 12.
- Addition of functional ability and exacerbations to both severity and control.
- Stresses that ICS are the drug of first choice.
- Addition of omalizumab for severe asthma.
- Addition of zileutin for moderate asthma.
- Increase importance of Prednisone for severe asthma and very poorly controlled asthma

Thank you and enjoy your day.

Tim

tcraig@psu.edu