GLIN

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Asthma Care Pathway

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Purpose & Objective

This protocol provides evidence-based care recommendations in the screening and treatment of asthma in the primary care setting for adults. The protocol seeks to assist in early diagnosis and effective treatment of asthma. The asthma protocol should provide primary care physicians, family nurse practitioners, and physician's assistants with a guide that is evidence-based and cost-effective. This protocol was derived from clinical guidelines for individuals diagnosed with asthma who are **six (6) years of age or older.**

Goals of Care

- Achieve good control of symptoms and maintain normal activity levels
- Minimize the risk of asthma-related death, exacerbations, persistent airflow limitation and side-effects

It is also important to elicit the patient's own goals regarding their asthma, as these may differ from conventional medical goals. Shared goals for asthma management can be achieved in various ways, taking into account differing health care systems, medication availability, and cultural and personal preferences.

Screening Criteria & Risk Factors

- Patient Reported Outcome Measures (PROMs) are standardized instruments that capture patients' self-assessment of their health and can provide timely information on patient health status, function, and symptoms over time that can be used to improve patient-centered care and inform clinical decision-making
    - The Asthma Control Test™ (ACT) is a validated self-administered survey utilizing five (5) questions to assess asthma control on a scale from 0 (poor control) to 5 (total control) in individuals 12 years and older. Copyright 2002 by QualityMetric Incorporated. Asthma Control Test is a trademark of QualityMetric Incorporated.
    - The Asthma Control Questionnaire (ACQ) is a validated, self-administered survey available in various formats from the developer, Elizabeth F. Juniper, MCSP, MSc.
    - Asthma Therapy Assessment Questionnaire (ATAQ) is available in a version for adults (18 years and over) and a version for children and adolescents (5 – 17 years old). Copyright 2005 Merck Sharp & Dohme Corp., a subsidiary of Merck & Co., Inc.
- Spirometry
- Peak flow/expiratory flow (best performance 80% or above), if available.
- The recommendation is that children and adults with persistent asthma receive allergy testing, particularly for indoor inhalant allergens (animal dander, pollens, molds, house dust mites, cockroaches, and certain molds). Also, allergy testing can be considered for persons with intermittent asthma.

Assessing Risk

Risk factors for exacerbation

- One (1) or more exacerbations in the previous year
- Socioeconomic problems
- Poor adherence
- Incorrect inhaler technique
- Low forced expiratory volume in one (1) second (FEV1)
- Smoking
- Blood eosinophilia

Diagnosis and modify treatment based on co-morbidities

- Allergies
- Eczema
- Hay fever
- Sleep apnea
- Acid reflux
- Obesity
- Family history of asthma
- Allergies
- History of smoking

Criteria for Diagnosis

History of variable respiratory symptoms

Wheeze, shortness of breath, chest tightness and cough

- More than one type of respiratory symptom (in adults, isolated cough is seldom due to asthma)
- Symptoms occur variably over time and vary in intensity
- Symptoms are often worse at night or on waking
- Symptoms are often triggered by exercise, laughter, allergens, cold air
- Symptoms often appear or worsen with viral infections

Confirmed variable expiratory airflow limitation

Documented expiratory airflow limitation AND documented excessive variability in lung function

- Expiratory airflow limitation
  - At a time when FEV1 is reduced, confirm that FEV1/FVC is reduced compared with the lower limit of normal (usually >0.75-0.80 in adults)
- Excessive variability in lung function represented by one or more of the following:
  - Positive bronchodilator (BD) responsiveness (reversibility) test
    - Increase in FEV1 of >12% and >200 mL (greater confidence if increase >15% and > 400 mL)
    - Measure change 10-15 minutes after 200-400 mcg salbutamol (albuterol) or equivalent, compared with pre-BD readings. Positive test more likely if BD withheld before test: SABA ≥4 hours, twice daily LABA 24 hours, once daily LABA 36 hours
  - Excessive variability in twice daily PEF over 2 weeks
    - Average daily diurnal PEF variability >10%
  - Significant increase in lung function after four (4) weeks of anti-inflammatory treatment
    - Increase in FEV1 by >12% and >200 mL from baseline after 4 weeks of treatment, outside respiratory infections
  - Positive exercise challenge test
    - Fall in FEV1 >10% and >200 mL from baseline
  - Positive bronchial challenge test
    - Fall in FEV1 from baseline of ≥ 20% with standard doses of methacholine or ≥ 15% standardized hyperventilation, hypertonic saline or mannitol challenge
  - Excessive variation in lung function between visits (good specificity but poor sensitivity)
    - Variation in FEV1 of >12% and >200 mL between visits, outside of respiratory infections

History and Assessment of Severity

The functions of assessment and monitoring are based on the concepts of severity, control, and responsiveness to treatment

- Severity: intrinsic intensity of the disease process
- Control: degree to which the manifestations of asthma (symptoms, functional impairments, and risk of untoward events) are minimized, and the goals of therapy are met
- Responsiveness: the ease with which asthma control is achieved by therapy

Severity and control include the domains of current impairment and future risk

- Impairment: frequency and intensity of symptoms and functional limitations the patient is experiencing or has recently experienced
- Risk: likelihood of either asthma exacerbation, progressive decline in lung function or risk of adverse effects from medication

Long Term Asthma Management

Goal: Asthma Control

Reduce Impairment

- Prevent chronic symptoms
- Require infrequent use of short-acting beta-2-agonist (SABA)
- Maintain (near) normal lung function and normal activity

Reduce Risk

- Prevent exacerbations
- Minimize need for emergency care, hospitalization
- Prevent loss of lung function (or, for children, prevent reduced lung growth)
- Minimize adverse effects of therapy

Prevention

- Reducing Exposure to House Dust Mites
    - Use bedding encasements
    - Wash bed linens weekly
    - Avoid down filling
    - Limit stuffed animals to those that can be washed
    - Reduce humidity level (between 30% and 50% relative humidity per EPR-3)
- Reducing Exposure to Environmental Tobacco Smoke
    - Evidence suggests an association between environmental tobacco smoke exposure and exacerbations of asthma among school-aged, older children, and adults
- Reducing Exposure to Cockroaches
    - Remove as many water and food sources as possible to avoid cockroaches
- Reducing Exposure to Pets
    - People who are allergic to pets should not have them in the house
    - At a minimum, do not allow pets in the bedroom
- Reducing Exposure to Mold
    - Eliminating mold and the moist conditions that permit mold growth may help prevent asthma exacerbations
- Other Asthma Triggers
    - Air pollution
    - Trees, grass, and weed pollen
- Treat comorbid conditions
    - Consider allergic bronchopulmonary aspergillosis, gastroesophageal reflux, obesity, obstructive sleep apnea, rhinitis and sinusitis, and stress or depression. Treatment of these conditions may improve asthma control.
    - Consider inactivated flu vaccine for all patients >6 months of age.

Assessment and Monitoring

Initial Visit

- Assess asthma severity to initiate treatment (Appendix A)
- The patient's medical record will be reviewed, and the following information will be gathered and discussed
    - Complete medication history regarding asthma therapy and any medications which could affect asthma (e.g., beta-blockers, ASA, NSAIDs)
    - Asthma history: treatments, hospitalizations, ER/urgent care visits, intubations secondary to asthma in the past year
    - Assessment of asthma symptoms (cough, wheeze, SOB, chest tightness), frequency of daytime symptoms and nighttime symptoms, early morning symptoms that do not respond within 15 minutes of short-acting beta-2-agonist, symptoms with exertion
    - Review or order spirometry, if not done at diagnosis
    - Assess and classify severity of asthma
    - Asthma medications will be initiated, discontinued, or adjusted as needed
    - Assess social history, characteristics of home, work/environmental exposure, functional status
    - Identify asthma triggers and educate on avoidance
    - Discuss smoking cessation, if applicable
    - Assess and educate on inhaler technique and compliance
    - Review required immunizations (Appendix I)
    - Provide patients with a peak flow meter/diary (or a prescription for a peak flow meter) to determine personal best
        - Personal best = best value from two (2) weeks of PEF values when symptoms controlled, excluding outliers
        - Once the personal best has been established, the patient will be instructed to monitor every morning
        - If the patient is not compliant with PEF monitoring to determine personal best, the population average for their age and height will be used
    - Develop an individualized asthma action plan with written instructions for patients to take home
    - Follow-up within 1-3 months following initial visit

Continued

Assessment and Monitoring

Follow-Up Visit

- Assess asthma control to determine if therapy should be adjusted (Appendix B)
- Assess at each visit: asthma control, proper medication technique, written asthma action plan, patient adherence, patient concerns, immunizations, tobacco use (personal or secondhand exposure)
- Obtain lung function measures by spirometry at least every 6-12 months; more frequently for asthma that is not well controlled.
- Determine if therapy should be adjusted: maintain treatment; step up, if needed; step down, if possible.
- Schedule follow-up care:
    - Asthma is highly variable over time.
    - See patients:
        - Every 2–6 weeks while gaining control
        - Every 1–6 months to monitor control
        - Every three (3) months if step down in therapy is anticipated (Appendix C)

Use of Medications

- Select medication and delivery devices that meet patient's needs and circumstances.
- Use stepwise approach to identify appropriate treatment options (see Appendix D)
- Inhaled corticosteroids (ICSs) are the most effective long-term control therapy
- When choosing treatment, consider domain of relevance to the patient (risk, impairment, or both), patient's history of response to the medication, and willingness and ability to use the medications
- Review medications, technique, and adherence at each follow-up visit
- When prescribing rescue therapy, consider not providing refills to better asses usage
- Consider consult to the GLIN pharmacy team if there is concern for medication administration technique, adherence to medication, or any cost barriers.

Patient Education for Self-Management

Teach Patients How to Manage Their Asthma

Teach and reinforce at each visit

- Self-monitoring to assess the level of asthma control and recognize signs of worsening asthma (either symptom or peak flow monitoring)
- Taking medication correctly (inhaler technique, use of devices, understanding the difference between long-term control and quick-relief medications)
- Long-term control medications (such as inhaled corticosteroids, which reduce inflammation) prevent symptoms. Should be taken daily; will not give quick relief
- Quick-relief medications (short-acting beta-2-agonists or low-dose ICS-formoterol) relax airway muscles to provide fast relief of symptoms, and will not provide long-term asthma control
- If used >2 days/week (except as needed for exercise-induced asthma), the patient may need to start or increase long-term control medications
- Avoiding environmental factors that worsen asthma
- Develop a written asthma action plan in partnership with the patient/family (sample plan available at https://www.nhlbi.nih.gov/resources/asthma-action-plan-2020.
- Agree on treatment goals
- Review at each visit any success in achieving control, any concerns about treatment, any difficulties following the plan, and any possible actions to improve adherence
- Provide encouragement and praise, which builds patient confidence
- Encourage family involvement to provide support
- Integrate education into all points of care involving interactions with patients
- Include members of all healthcare disciplines (e.g., physicians, pharmacists, nurses, respiratory therapists, and asthma educators) in providing and reinforcing education at all points of care

Teach patients how to use the asthma action plan

✓ Take daily actions to control asthma

✓ Adjust medications in response to worsening asthma

✓ Seek medical care as appropriate

✓ Encourage adherence to the asthma action plan

✓ Choose a treatment that achieves outcomes and addresses preferences important to the patient/family.

Exercise-Induced Bronchoconstriction (EIB)

- Physical activity should be encouraged
- For most patients, EIB should not limit participation in any activity they choose
- Encourage a warm-up period or mask or scarf over the mouth for cold-induced EIB
- Provide patients with advice about prevention and management of exercise-induced bronchoconstriction (EIB) including daily treatment with ICS plus SABA as needed and pre-exercise, or with low dose ICS-formoterol as needed and before exercise with a warm-up before exercise if needed.
    - Regular controller treatment with ICS significantly reduces EIB
    - Breakthrough EIB often indicates poorly controlled asthma, and stepping up controller treatment (after checking inhaler technique and adherence) generally results in the reduction of exercise-related symptoms

Pregnancy

- Maintain asthma control throughout pregnancy
- Check asthma control at all prenatal visits
    - Asthma can worsen or improve during pregnancy; adjust medications as needed
    - Treating asthma with medications is safer for the mother and fetus than having poorly controlled asthma
- Maintaining lung function is important to ensure oxygen supply to the fetus
- ICS is the preferred long-term control medication
- Remind patients to avoid exposure to tobacco smoke
- Exacerbations and poor symptom control are associated with worse outcomes for both the baby (pre-term delivery, low birth weight, increased perinatal mortality), and the mother (pre-eclampsia).
- Although there is general concern about any medication use in pregnancy, the advantages of actively treating asthma in pregnancy markedly outweigh any potential risks of usual controller and reliever medications.
    - Use of ICS, beta-2-agonists, montelukast or theophylline is not associated with an increased incidence of fetal abnormalities

Appendix

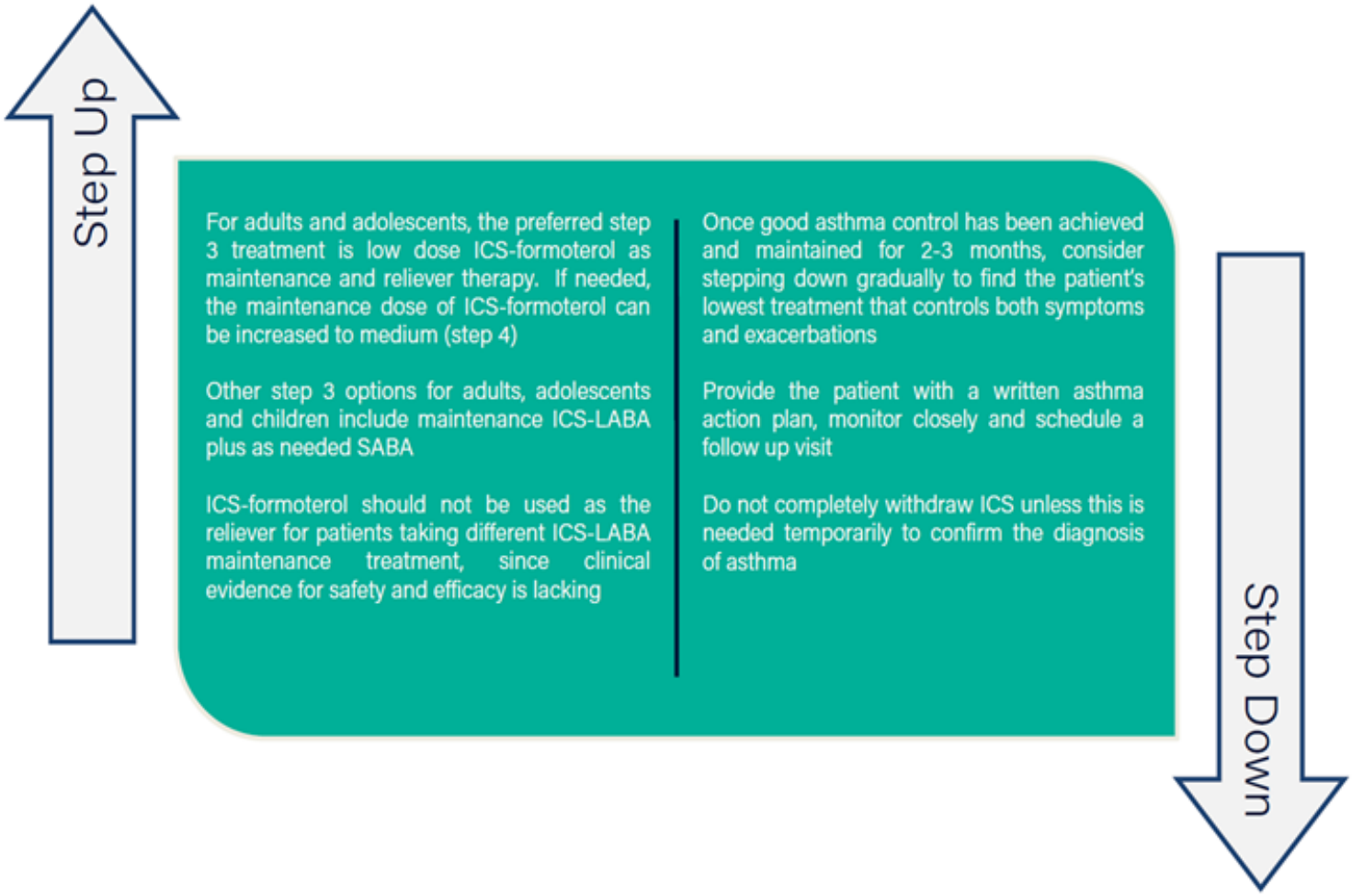
Appendix A
Asthma Classification

Severity Based on Treatment Level	Mild Asthma *	Moderate Asthma	Severe Asthma
	Defined as asthma that is well controlled with as-needed ICS-formoterol, or with low dose ICS plus as-needed SABA	Defined as asthma that is well controlled with Step 3 or Step 4 treatment (e.g. with low or medium dose ICS-LABA in either treatment track)	Defined as asthma that remains uncontrolled despite optimized treatments with high dose ICS-LABA, or that requires high dose ICS-LABA to prevent it from becoming uncontrolled. Severe asthma must be distinguished from asthma that is difficult to treat due to inadequate or inappropriate treatment, or persistent problems with adherence.

Appendix B
Assessing Symptom Control

Asthma Symptom Control		Level of Asthma Symptom Control		
In the past four (4) weeks, has the patient had:		Well Controlled	Partly Controlled	Uncontrolled
Daytime asthma symptoms more than twice/week?	Yes ☐ No ☐	None of these	1-2 of these	3-4 of these
Any night waking due to asthma?	Yes ☐ No ☐			
Reliever (SABA) for symptoms more than twice/week?	Yes ☐ No ☐			
Any activity limitations due to asthma?	Yes ☐ No ☐			

Appendix C
Escalation/De-escalation of Care



Appendix D
Therapy Tracks

Track 1: Controller and Preferred Rescue

Step 1-2	Step 3	Step 4	Step 5
As needed low dose ICS-formoterol	Low dose maintenance ICS- formoterol	Medium dose maintenance ICS-formoterol	Add-on LAMA Refer for phenotypic assessment. Consider high does maintenance ICS-formoterol, ± anti-IgE, anti-IL5/5R, anti-IL4R, anti-TSLP

RELIEVER: As needed low dose ICS-formoterol

Track 2: Controller and Alternative Rescue

Step 1	Step 2	Step 3	Step 4	Step 5
Take ICS whenever SABA taken	Low dose maintenance ICS	Low dose maintenance ICS-LABA	Medium/high dose maintenance ICS-LABA	Add-on LAMA Refer for phenotypic assessment. Consider high dose maintenance ICS-LAMA, ± anti-IgE, anti-IL5/5R, anti-IL4R, anti-TSLP

RELIEVER: As needed short acting ß2-agonist

Track 2 may be considered if ICS-formoterol is not available or affordable, in cases of patient preference, if the patient has good adherence with their controller and has had no exacerbations in the last 12 months.

Other controller options for either track

Step 2	Step 3	Step 4	Step 5
Low dose ICS whenever SABA taken, or daily LTRA, or add HDM SLIT	Medium dose ICS, or add LTRA, or add HDM SLIT	Add LAMA or LTRA or HDM SLIT, or switch to high dose ICS	Add azithromycin (adults) or LTRA: add low dose OCS but consider side-effects

Appendix E
Reliever Medications

Medication Class	Available Prescriptions
ICS-formoterol	• budesonide-formoterol (Symbicort™) - Generic Available • mometasone-formoterol (Dulera™)
Short-Acting Inhaled Beta-2 Agonists (SABA)	• albuterol (Proair™, Proventil™, Ventolin™) – Generic Available • levalbuterol (Xopenex™) – Generic Available

Appendix F
Controller Medications

Medication Class	Available Prescriptions
Inhaled Corticosteroids (ICS)	• beclomethasone (Qvar™) • budesonide (Pulmicort™) • ciclesonide (Alvesco™) • fluticasone (Flovent™) • mometasone (Asmanex™)
Inhaled Corticosteroid/Long-Acting Inhaled Beta-2 Agonist Combinations (ICS/LABA)	• budesonide-formoterol (Symbicort™) – Generic Available • fluticasone-salmeterol (Advair™, AirDuo™) – Generic Available • fluticasone-vilanterol (Breo Ellipta™) • mometasone-formoterol (Dulera™)
Leukotriene Modifiers	• montelukast (Singulair™) – Generic Available • zafirlukast (Accolate™) – Generic Available • zileuton (Zyflo™)
Methylxanthines	• theophylline (Theo-24™) – Generic Available
Anti-interleukin-5	• mepolizumab (Nucala™) • reslizumab (Cinqair™)
Anti-Immunoglobulin E (IgE)	• omalizumab (Xolair™)
Anti-Interleukin 4R (IL4R)	• dupilumab (Dupixent™)
Anti-Thymic Stromal Lymphopoietin (TSLP)	• tezepelumab (Tezspire™)

Appendix G
Comparative Dosing of ICS

Inhaled Corticosteroid	Low (mcg)	Medium (mcg)	High (mcg)
beclometasone dipropionate (pMDI, standard particle, HFA)	200-500	>500-1000	>400
beclomethasone dipropionate (DPI or pMDI, extrafine particle, HFA)	100-200	>200-400	>400
budesonide (DPI or pMDI, standard particle, HFA)	200-400	>400-800	>800
ciclesonide (pMDI, extrafine particle, HFA)	80-160	>160-320	>320
fluticasone furoate (DPI)	100	100	200
fluticasone propionate (DPI)	100-250	>250-500	>500
fluticasone propionate (pMDI, standard particle, HFA)	100-250	>250-500	>500
mometasone furoate (DPI)	Depends on the DPI device – see package insert		
mometasone furoate (pMDI, standard particle, HFA)	200-400	200-400	>400
Definitions: pMDI = pressurized metered-dose inhaler, HFA= hydrofloroalkane DPI = dry powder inhaler			

Appendix H
Quality Metrics and Best Practice

Asthma medication ratio (AMR)– The percentage of patients 5-64 years of age who were identified as having persistent asthma and had a ratio of controller medications to total asthma medications of 0.50 or greater during the measurement year.

Best Practices to Improve Asthma Treatments

- Counsel patient on differences between controller vs. rescue inhaler therapy to ensure proper utilization
- Counsel patients on inhaler technique to ensure proper utilization
- Use combination inhaler therapy to minimize complexity of regimen for patients
- Counsel patients if they experience increase in rescue inhaler therapy to contact the office to potentially adjust dose of controller therapy
- Instruct patients to use manufacturer coupons on brand name medications to reduce cost of treatment (commercial insurance plans only)
- Use 90 day supplies on generic medications whenever possible to prevent missed monthly refills
- Suggest use of medication reminder applications or alarms to improve adherence
- Send cancellation requests to pharmacy with any changes in medications or dose to ensure outdated scripts are not refilled accidentally
- Utilize medication adherence reports from payers to identify non-adherent patients
- Medent Users-Use the "Import RX History" feature to review prescription fill history for your patients during appointments to encourage compliance

Appendix I
Immunizations

	COVID	PPSV23	PCV20	Flu (annually)
6-18	X	X		X
+18	X		X	X

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For additional questions, please reach out to your assigned Practice Transformation Consultant.

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