Asthma + Respiratory
FOUNDATION NZ

NZ ASTHMA GUIDELINES

Quick reference guide

To view the full NZ Child Asthma Guidelines and NZ Adolescent and Adult Asthma Guidelines, visit the NZ Respiratory Guidelines website at
nzrespiratoryguidelines.co.nz

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This quick reference guide is sourced from the following Guideline documents, which can be found at *nzrespiratoryguidelines.co.nz*:

- Asthma and Respiratory Foundation NZ Child Asthma Guidelines - June 2020 Update
- Asthma and Respiratory Foundation NZ Adolescent and Adult Asthma Guidelines 2020

Adolescent & Adult Asthma

Guideline Summary

DIAGNOSIS OF ADOLESCENT AND ADULT ASTHMA (AGED 12+)

In recent times, there have been a number of major advances in the treatment of asthma in adolescents and adults. There has also been greater recognition that the investigation and management of asthma in adolescents and adults (aged 12 and over) has a similar evidence base, which warrants the combining of guideline recommendations across these age groups. The diagnosis of asthma starts with the recognition of a characteristic pattern of symptoms and signs, in the absence of an alternative explanation.

Asthma MORE likely

- Two or more of the following symptoms:
  - Wheeze (most sensitive and specific symptom of asthma)
  - Breathlessness
  - Chest tightness
  - Cough
- Symptom pattern:
  - Intermittent
  - Typically worse at night or in the early morning
  - Provoked by exercise, cold air, allergen exposure, irritants, viral infections, beta blockers, aspirin or other non-steroidal anti-inflammatory drugs
  - Recurrent or seasonal
  - Began in childhood
- History of atopic disorder or family history of asthma
- Widespread wheeze heard on chest auscultation
- Symptoms rapidly relieved by inhaled SABA or budesonide/formoterol
- Airflow obstruction on spirometry (FEV_1/FVC < Lower limit of normal)
- Increase in FEV_1 following bronchodilator ≥12%; the greater the increase the greater the probability
- Variability in PEF over time (highest-lowest PEF/mean) ≥15%; the greater the variability the greater the probability

Asthma LESS likely

- Chronic productive cough in absence of wheeze or breathlessness
- No wheeze when symptomatic
- Normal spirometry or PEF when symptomatic
- Symptoms beginning later in life, particularly in people who smoke
- Increase in FEV_1 following bronchodilator <12%; the lesser the increase the lower the probability
- Variability in PEF over time <15%; the lesser the variability the lower the probability
- No response to trial of asthma treatment
- Clinical features to suggest an alternative diagnosis

Steps in making a clinical diagnosis of asthma:

- Take a clinical history
- Undertake a focused physical examination
- Document variable expiratory airflow limitation
- Assess response to inhaled bronchodilator and/or ICS treatment

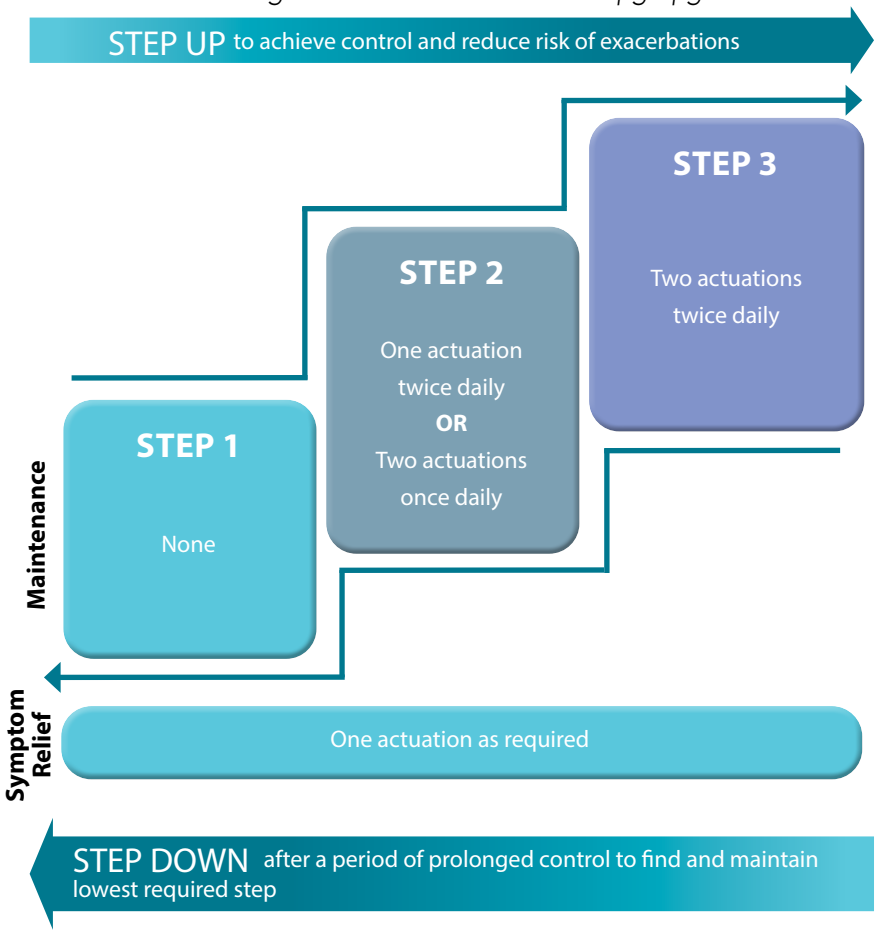
There is no reliable single 'gold standard' diagnostic test

STEPWISE APPROACH TO PHARMACOLOGICAL TREATMENT OF ADOLESCENT & ADULT ASTHMA

In the stepwise approach to asthma management, patients step up and step down as required to achieve and maintain control of their asthma and reduce the risk of exacerbations. **Before stepping up**, review inhaler technique, use, and treatable traits. **If a severe exacerbation occurs**, review and consider stepping up, or switch to AIR therapy based algorithm (if using traditional SABA reliever algorithm). **If asthma remains uncontrolled at Step 3**, consider add-on treatment and referral for specialist review.

Anti-Inflammatory Reliever (AIR) Therapy Based Algorithm

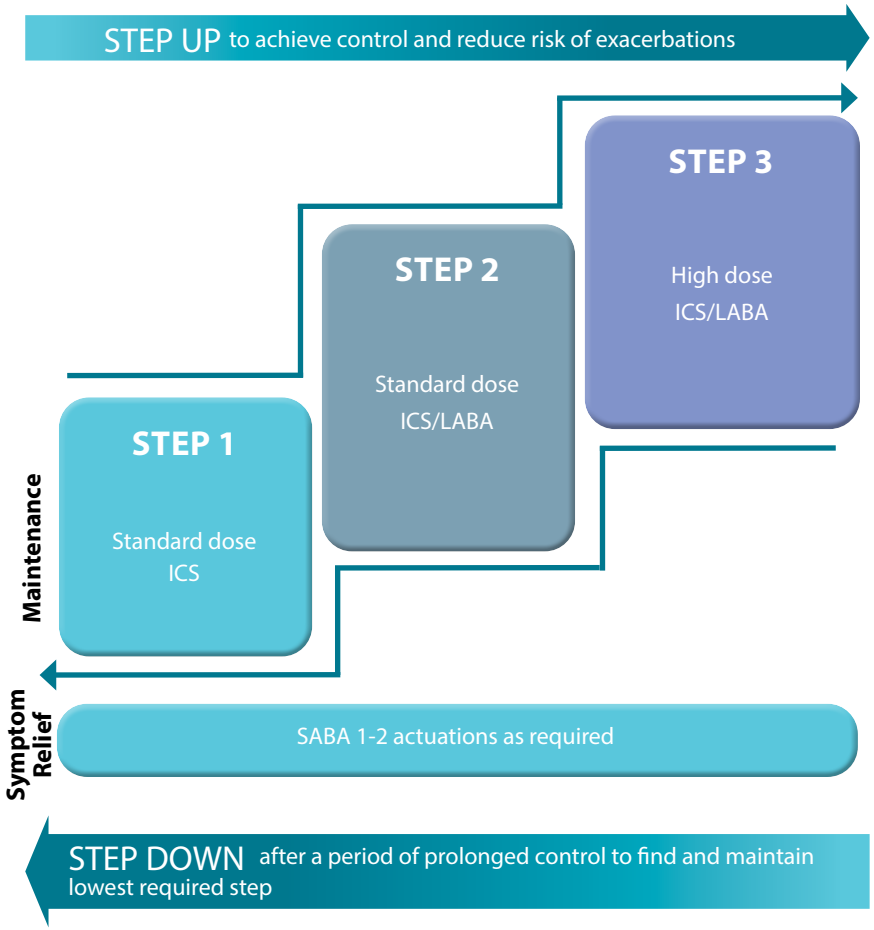
Using budesonide/formoterol 200µg/6µg



What is Anti-Inflammatory Reliever (AIR) therapy?

The AIR therapy based algorithm is the preferred algorithm and is based on the budesonide/formoterol 200 µg/ 6µg turbuhaler formulation as reliever therapy, with or without regular maintenance budesonide/formoterol therapy. The use of budesonide/formoterol as both maintenance and reliever therapy at Steps 2 and 3 is also known as 'Single combination ICS/LABA inhaler Maintenance And Reliever Therapy (SMART)'.

Traditional SABA Reliever Therapy Based Algorithm



RECOMMENDED STANDARD DAILY DOSE OF ICS IN ADULT ASTHMA	
Beclomethasone dipropionate	400-500 µg/day
Beclomethasone dipropionate extrafine	200 µg/day
Budesonide	400 µg/day
Fluticasone propionate	200-250 µg/day
Fluticasone furoate	100 µg/day

ALGORITHM FOR MANAGEMENT OF ACUTE SEVERE ASTHMA IN ADOLESCENTS AND ADULTS (PRIMARY CARE, AFTERHOURS, OR ED)

IMMEDIATELY

ASSESS SEVERITY

MILD/MODERATE: FEV_1 or PEF >50%

- Give 6 x 100 µg salbutamol via MDI and spacer

SEVERE: FEV_1 or PEF 30-50%

- Give 6 x 100 µg salbutamol via MDI and spacer

OR

- Salbutamol 2.5 mg via nebulisation
- Prednisone 40 mg
- Oxygen if required to keep stats >92%

LIFE-THREATENING: FEV_1 or PEF <30%

- Give continuous salbutamol via nebulisation
- Ipratropium bromide 500 µg via nebulisation
- IV hydrocortisone 100 mg OR prednisone 40 mg
- Oxygen if required to keep stats >92%
- If anaphylaxis is present, give IM adrenaline

ARRANGE URGENT TRANSFER TO HOSPITAL BY AMBULANCE

- All patients will require hospital admission

REFER TO ICU/HDU

- Give salbutamol 2.5 mg via nebulisation, frequency determined by response, up to continuously
- IV hydrocortisone 100mg 6 hourly or prednisone 40mg daily
- Ipratropium bromide 500 µg via nebulisation, up to hourly
- Consider IV magnesium sulphate 1.2-2.0g over 20 min
- Oxygen if required to keep stats 92-96%
- Investigations include ABG, CXR, U & E

15-60 MIN

REASSESS

FEV_1 or PEF >70%

- Consider oral prednisone 40 mg, if not given above

DISCHARGE

- Once pre-discharge conditions are met

FEV_1 or PEF 50 - 70%

- Give prednisone 40 mg, if not given above
- Repeat salbutamol 6x100 µg via MDI and spacer

FEV_1 or PEF <50%

- Give 6 x 100 µg salbutamol via MDI and spacer, or salbutamol 2.5 mg via nebulisation, up to 3 times over 1st hour
- Ipratropium bromide 6x20 µg via MDI and spacer, or 500 µg via nebulisation
- Oxygen if required to keep stats 92-96%

1-2 HRS

REASSESS

STABLE

- No signs of severe asthma and FEV_1 or PEF >70%

DISCHARGE

- Once pre-discharge conditions are met

UNSTABLE

- Signs of severe asthma or FEV_1 or PEF < 50- 70%

ADMIT

- Transfer by ambulance, and admit to hospital

Note on FEV_1 and PEF

For practical purposes, the FEV_1 and PEF are considered interchangeable when expressed as % predicted for the purpose of assessment of acute asthma severity.

4-STEP ASTHMA CONSULTATION - ADOLESCENT AND ADULT

1 Assess asthma control

Complete the Asthma Control Test* (ACT) score:

- 20–25: well controlled
- 16–19: partly controlled
- 5-15: poorly controlled

Review lung function tests

- Peak flow monitoring

AND/OR

- Spirometry

Review patient history

- Severe asthma attacks in last 12 months (requiring urgent medical review, oral corticosteroids or bronchodilator nebuliser use)

2 Consider other relevant clinical issues

Ask and investigate

- E.g. using prescribing records, ask about medication use, including adherence with maintenance treatment

Check inhaler technique

- Knowing and understanding how to use each inhaler device is the cornerstone of asthma management and symptom control

Enquire about clinical features associated with increased risk

- E.g. poor symptom control, high SABA use (>3 canisters per year), history of sudden asthma attacks

Consider treatable traits

- E.g. overlapping disorders, comorbidities, environmental, behavioural

Decide whether peak flow monitoring is indicated

- To assist in self-management, check how well medication is working, & to monitor condition

3 Decide if a step-up or step-down is required

Step-up in the level of treatment

- In patients where asthma is not adequately controlled, poor lung function or recent severe exacerbation

Change to the AIR therapy

- Consider in patients who have had a recent severe exacerbation and are currently treated with traditional SABA reliever therapy based algorithm.

Possible step-down in the level of treatment

- For patients who have had a sustained period of good control

4 Complete an Asthma Action Plan

Decide which plan to use

- AIR budesonide/formoterol reliever ± maintenance therapy
- 3-stage maintenance ICS or ICS/LABA + SABA reliever
- 4-stage maintenance ICS + SABA reliever *(This includes the instruction to increase dose and frequency of ICS in worsening asthma)*

Completing the plan

- For those with peak flow instructions, enter personal best recent peak flow and peak flow at each level in the plan. Recommended cut points of <80% for getting worse, <60 to 70% for severe asthma and <50% for an emergency
- Enter the prednisone regimen
- Enter additional instructions in the box provided (e.g. avoidance of provoking factors)
- Save a copy of the plan on the patient record, print, or email to patient (via patient portal)

The Asthma Control Test (ACT) can be accessed at *asthmacontrol.co.nz

Child Asthma

Guideline summary

DIAGNOSIS OF CHILD ASTHMA

Asthma in children is defined on the basis of characteristic symptoms and signs occurring in a typical pattern, and the response to treatment, in the absence of an alternative explanation. The key to making the diagnosis of asthma is to take a careful clinical history and assess clinical +/- spirometry response to inhaled bronchodilator and/or ICS treatment. There is no reliable single 'gold standard' diagnostic test.

Asthma MORE likely

- More than one of the following:
  - Wheeze (most sensitive and specific symptom of asthma)
  - Breathlessness
  - Chest tightness
  - Cough
- Particularly if:
  - Typically, worse at night or in the early morning
  - Provoked by exercise, cold air, allergen exposure, irritants, viral infections, stress and aspirin
  - Recurrent or seasonal
- Personal history of atopic disorder or family history of asthma
- Widespread wheeze heard on chest auscultation
- Otherwise unexplained expiratory airflow obstruction on spirometry
- Otherwise unexplained blood eosinophilia or raised exhaled nitric oxide
- Bronchial hyper-responsiveness on challenge testing at appropriate age
- Positive response to bronchodilator (clinical or lung function)

Asthma LESS likely

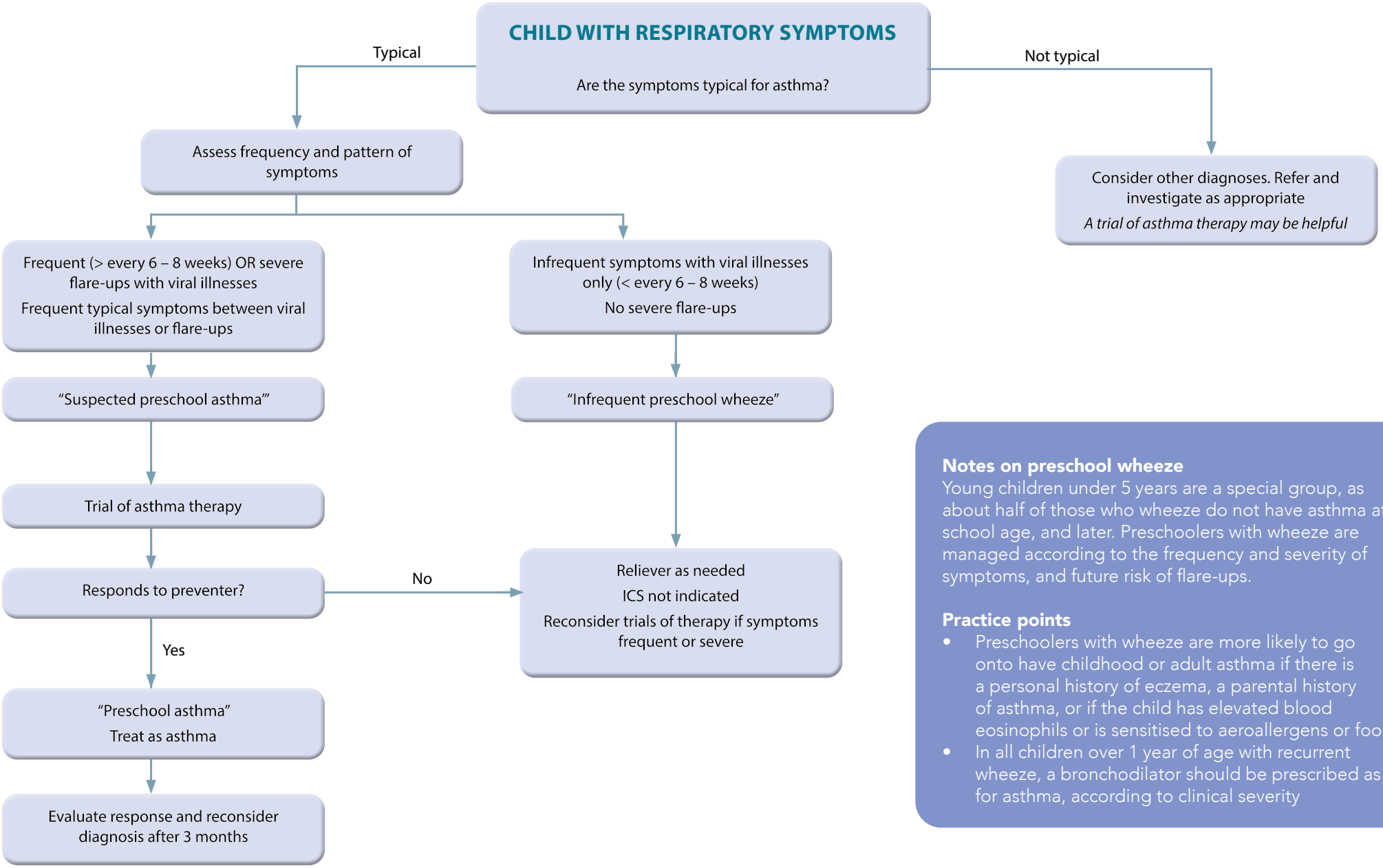
- Isolated cough in absence of wheeze or difficulty breathing
- History of wet, moist or productive cough
- No wheeze or repeatedly normal physical examination when symptomatic
- Normal spirometry or peak flow (PEF) when symptomatic
- No response to trial of asthma treatment
- Features that point to an alternative diagnosis (see below)

Red Flags (Suggesting alternative diagnoses*)

- Daily symptoms from birth
- Frequent or daily wet, moist-sounding or productive cough
- Digital clubbing
- Chest wall deformity
- Failure to thrive
- Heart murmur
- Spilling, vomiting or choking
- Asymmetrical chest findings
- Stridor as well as wheeze
- Persistent ear, nose or sinus infection
- Family history of unusual chest disease
- Symptoms much worse than objective signs or spirometry

** Consider other diagnoses such as; aspiration, bronchiectasis, ciliary dyskinesia, cystic fibrosis, developmental airway anomaly, foreign body aspiration, heart disease, hyperventilation, immunodeficiency, tuberculosis, vocal cord dysfunction*

DIAGNOSTIC PATHWAY FOR ASTHMA AND WHEEZE IN CHILDREN 1-4 YEARS



Notes on preschool wheeze

Young children under 5 years are a special group, as about half of those who wheeze do not have asthma at school age, and later. Preschoolers with wheeze are managed according to the frequency and severity of symptoms, and future risk of flare-ups.

Practice points

- Preschoolers with wheeze are more likely to go onto have childhood or adult asthma if there is a personal history of eczema, a parental history of asthma, or if the child has elevated blood eosinophils or is sensitised to aeroallergens or food
- In all children over 1 year of age with recurrent wheeze, a bronchodilator should be prescribed as for asthma, according to clinical severity

STEPWISE APPROACH TO PHARMACOLOGICAL TREATMENT OF CHILDREN WITH WHEEZE 1-4 YEARS

STEP UP to achieve control and reduce risk of exacerbation. Check adherence and inhaler technique before stepping up

STEP 1
Infrequent or non-steroid responsive 'preschool wheeze'

No maintenance
therapy required

STEP 2
'Preschool Asthma'

Low dose ICS
if frequent OR severe symptoms

STEP 3
'Preschool Asthma'

Low dose ICS
and
Montelukast

STEP 4
'Preschool Asthma' Poor Control

Same as Step 3
and
Referral to a paediatrician

Maintenance

Symptom Relief

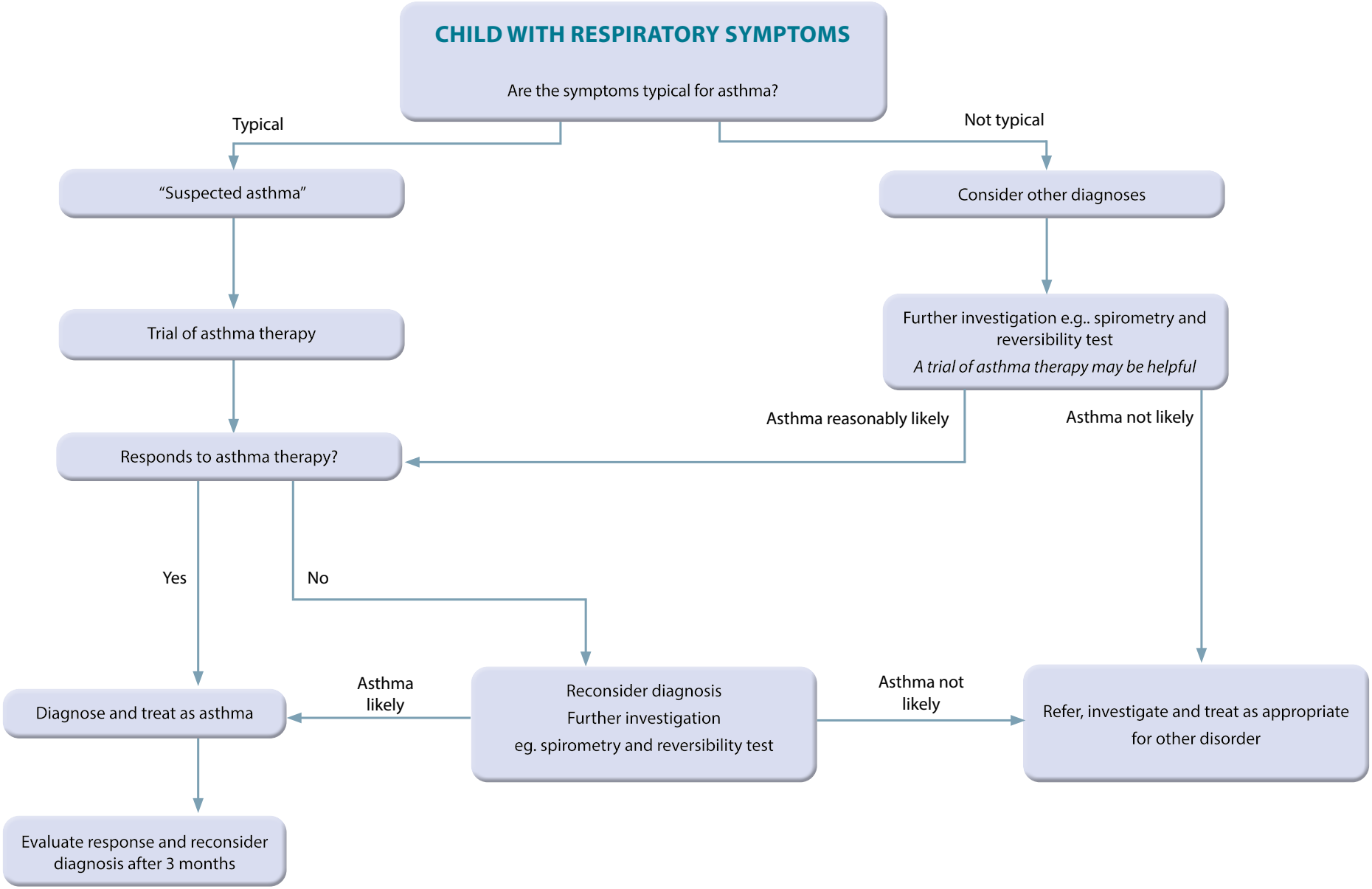
SABA reliever 1-2 puffs as needed

STEP DOWN if stable for 3 months, step down in incremental fashion. If relapse occurs, resume previous level of therapy

RECOMMENDED LOW AND STANDARD DAILY DOSE OF ICS IN CHILDREN WITH ASTHMA

LOW DOSE		STANDARD DOSE	
Beclomethasone dipropionate	200 µg/day	Beclomethasone dipropionate	400-500 µg/day
Beclomethasone dipropionate ultrafine	100 µg/day	Beclomethasone dipropionate ultrafine	200 µg/day
Budesonide	200 µg/day	Budesonide	400 µg/day
Fluticasone propionate	100 µg/day	Fluticasone propionate	200-250 µg/day

DIAGNOSTIC PATHWAY FOR ASTHMA AND WHEEZE IN CHILDREN 5-11 YEARS



STEPWISE APPROACH TO PHARMACOLOGICAL TREATMENT OF CHILDREN WITH ASTHMA 5-11 YEARS

STEP UP to achieve control and reduce risk of exacerbation. Check adherence and inhaler technique before stepping up

STEP 1

NO maintenance therapy required

STEP 2

Low dose ICS

STEP 3

Low dose ICS/LABA

STEP 4

Poor control with low dose ICS/LABA

Standard dose ICS/LABA

Add montelukast if poor control

Referral to paediatrician if poor control

STEP 5

Frequent or continuous systemic steroids

Standard dose ICS/LABA

Plus montelukast

Consider high dose ICS/LABA

Definite referral to paediatrician

Consider biologics

Maintenance

Symptom Relief

SABA reliever 1-2 puffs as needed (unless on SMART* therapy)

STEP DOWN if stable for 3 months, step down in incremental fashion. If relapse occurs, resume previous level of therapy

**SMART therapy ('Single combination ICS/LABA inhaler Maintenance And Reliever Therapy') is the use of budesonide/formoterol 100µg/6µg turbuhaler as both maintenance and reliever therapy in children. At the moment, there is insufficient evidence to recommend SMART therapy as first line therapy in children 11 years and under, but it may be considered on specialist advice in select children who are poorly controlled on Steps 3 - 5.*

ALGORITHM FOR COMMUNITY MANAGEMENT OF ACUTE SEVERE ASTHMA IN CHILDREN LESS THAN 11 YEARS

IMMEDIATELY

ASSESS SEVERITY

MILD
- Able to talk
- $SpO_2 \geq 92\%$
- PEF ≥ 50% best or predicted
- No increase in resp rate
- Mild expir wheeze and/or mild dyspnoea

TREAT
- **Give 2 x 100µg salbutamol via MDI and spacer**
- **Prednisone not required**
- **Discharge with advice**

MODERATE
- Able to talk
- $SpO_2 \geq 92\%$
- PEF ≥ 50% best or predicted
- Increased resp rate
- More than mild expir wheeze and/or mild dyspnoea

TREAT
- **Give 6 x 100µg salbutamol via MDI and spacer**
- **Age ≥ 5y prednisone 1 mg/kg (max 40mg)**

SEVERE
- Too breathless to talk
- Obvious accessory muscle use
- $SpO_2 < 92\%$
- PEF 30 - 50% best or predicted

TREAT
- **Oxygen as required**
- **Give 6 x 100 µg salbutamol via MDI & spacer OR salbutamol 2.5 mg nebulised with oxygen**
- **Give prednisone 1mg/kg (max 40mg)**

LIFE-THREATENING
- SPO2 < 92%

Plus ANY of:
- Exhaustion, agitation or altered consciousness
- Cyanosis or silent chest
- PEF < 30% best or predicted

TREAT
- **Oxygen as required**
- **Give continuous salbutamol 2.5 mg nebulised with oxygen**
- **Ipratropium bromide 0.25 mg nebulised**
- **Hydrocortisone IV 4mg/kg (max 100 mg)**

ARRANGE URGENT TRANSFER TO HOSPITAL VIA AMBULANCE
- All patients will require hospital admission

REFER TO RESUC/HDU/ICU
- Oxygen as required
- Give salbutamol 2.5mg nebulised with oxygen, frequency determined by response, up to continuously
- Ipratropium bromide 0.25mg nebulisesd 4 hourly till improved
- Consider IV magnesium sulphate, salbutamol, aminophylline as per local protocol

15-60 MINS

REASSESS

GOOD RESPONSE
- Consider ICS and oral prednisone if not given above

DISCHARGE
- Once pre-discharge conditions are met. Continue prednisone 3-5 days. Follow up within 1 week*

REMAINS MODERATE
- Repeat 6 x 100 µg salbutamol via MDI & spacer
- Age ≥ 5y, give prednisone 1mg/kg (max 40 mg) if not given above

SEVERE
- Oxygen as required
- Give 6 x 100 µg salbutamol via MDI & spacer or salbutamol 2.5 mg nebulised with oxygen up to 3 times per hour over 1st hour
- Ipratropium bromide 4 x 20 µg via MDI & spacer or 250 µg nebulised
- **Use life-threatening path if any life-threatening features**

1-2 HRS

REASSESS

STABLE
- No signs of moderate or severe asthma

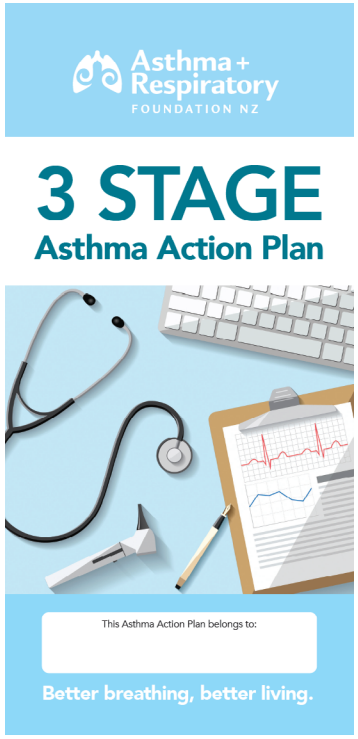
DISCHARGE
- Once pre-discharge conditions are met. Continue prednisone 3-5 days. Follow up in 1 week*

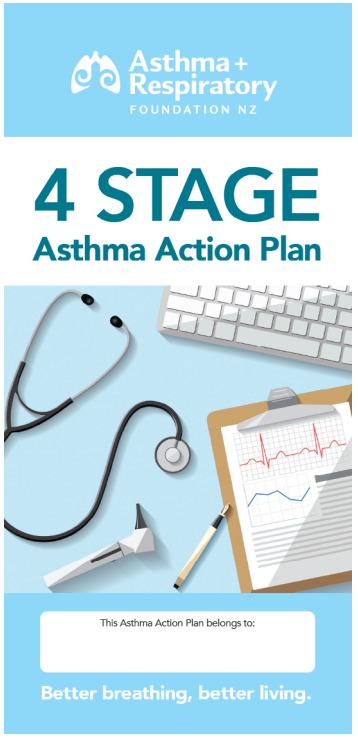
UNSTABLE
- Signs of moderate or severe asthma or PEF < 70%

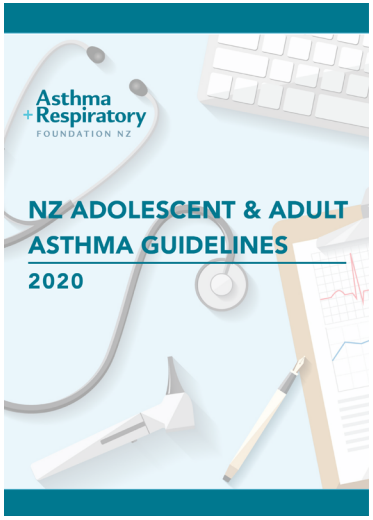
REFER TO HOSPITAL
- Continue management and transfer by ambulance

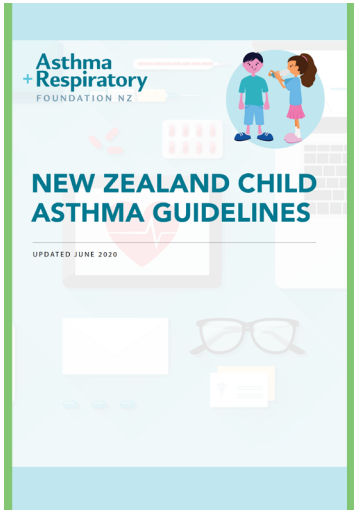
***FOLLOW UP: Wean reliever to as needed. Ensure ICS commenced. Check risk factors, compliance, education and action plan**

FURTHER ASTHMA RESOURCES AND TOOLS









All resources available at

asthmafoundation.org.nz/resources

- Full Asthma Guideline documents
- Asthma Action Plans + digital plans
- Asthma Symptom Diaries
- Educational Booklets
- My Asthma App

Abbreviations used throughout this guide:

AIR - Anti-inflammatory reliever

ABG - Arterial blood gas

ACT - Asthma Control Test

CXR - Chest X-ray

FEV_1 - Forced expiratory volume in one second

FVC - Forced vital capacity

ICS - Inhaled corticosteroid

LABA - Long-acting beta2-agonist

MDI - Metered Dose Inhaler

PEF - Peak expiratory flow

SABA - Short-acting beta2-agonist

SMART - Single combination ICS/LABA inhaler Maintenance And Reliever Therapy

SpO_2 - Oxygen saturation measured by pulse oximetry SpO_2 Oxygen saturation

U & E - Urea and electrolytes

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