

VERSION 2.0

# POPULATIONS

*Aboriginal and Torres Strait Islander peoples*

This PDF is a print-friendly reproduction of the content included in the *Populations – Aboriginal and Torres Strait Islander Peoples* section of the *Australian Asthma Handbook* at [astmahandbook.org.au/populations/indigenous-people](http://astmahandbook.org.au/populations/indigenous-people)

Please note the content of this PDF reflects the *Australian Asthma Handbook* at publication of Version 2.0 (March 2019). For the most up-to-date content, please visit [astmahandbook.org.au](http://astmahandbook.org.au)

Please consider the environment if you are printing this PDF – to save paper and ink, it has been designed to be printed double-sided and in black and white.

## ABBREVIATIONS

<b>CFC</b>	chlorofluorocarbon	<b>LTRA</b>	leukotriene receptor antagonist
<b>COPD</b>	chronic obstructive pulmonary disease	<b>MBS</b>	Medical Benefits Scheme
<b>COX</b>	cyclo-oxygenase	<b>NHMRC</b>	National Health and Medical Research Council
<b>DXA</b>	dual-energy X-ray absorptiometry	<b>NIPPV</b>	non-invasive positive pressure ventilation
<b>ED</b>	emergency department	<b>NSAIDs</b>	nonsteroidal anti-inflammatory drugs
<b>EIB</b>	exercise-induced bronchoconstriction	<b>OCS</b>	oral corticosteroids
<b>FEV<sub>1</sub></b>	forced expiratory volume over one second	<b>OSA</b>	obstructive sleep apnoea
<b>FEV<sub>6</sub></b>	forced expiratory volume over six seconds	<b>PaCO</b>	carbon dioxide partial pressure on blood gas analysis
<b>FSANZ</b>	Food Standards Australia and New Zealand	<b>PaO</b>	oxygen partial pressure on blood gas analysis
<b>FVC</b>	forced vital capacity	<b>PBS</b>	Pharmaceutical Benefits Scheme
<b>GORD</b>	gastro-oesophageal reflux disease	<b>PEF</b>	peak expiratory flow
<b>HFA</b>	formulated with hydrofluoroalkane propellant	<b>pMDI</b>	pressurised metered-dose inhaler or 'puffer'
<b>ICS</b>	inhaled corticosteroid	<b>PPE</b>	personal protective equipment
<b>ICU</b>	intensive care unit	<b>SABA</b>	short-acting beta <sub>2</sub> -adrenergic receptor agonist
<b>IgE</b>	Immunoglobulin E	<b>SAMA</b>	short-acting muscarinic antagonist
<b>IL</b>	interleukin	<b>SaO<sub>2</sub></b>	oxygen saturation
<b>IU</b>	international units	<b>SpO<sub>2</sub></b>	peripheral capillary oxygen saturation measured by pulse oximetry
<b>IV</b>	intravenous	<b>TGA</b>	Therapeutic Goods Administration
<b>LABA</b>	long-acting beta <sub>2</sub> -adrenergic receptor agonist		
<b>LAMA</b>	long-acting muscarinic antagonist		

## RECOMMENDED CITATION

National Asthma Council Australia. *Australian Asthma Handbook*, Version 2.0. National Asthma Council Australia, Melbourne, 2019.

Available from: <http://www.asthmahandbook.org.au>

ISSN 2203-4722

© National Asthma Council Australia Ltd, 2019

## SPONSORS

National Asthma Council Australia would like to acknowledge the support of the sponsors of Version 2.0 of the *Australian Asthma Handbook*:

- Boehringer Ingelheim Australia
- Novartis Australia

## NATIONAL ASTHMA COUNCIL AUSTRALIA

ABN 61 058 044 634

Suite 104, Level 1  
153-161 Park Street  
South Melbourne VIC 3205  
Australia

Tel: 03 9929 4333

Fax: 03 9929 4300

Email: [nac@nationalasthma.org.au](mailto:nac@nationalasthma.org.au)

Website: [nationalasthma.org.au](http://nationalasthma.org.au)

## DISCLAIMER

The *Australian Asthma Handbook* has been compiled by the National Asthma Council Australia for use by general practitioners, pharmacists, asthma educators, nurses and other health professionals and healthcare students. The information and treatment protocols contained in the *Australian Asthma Handbook* are based on current evidence and medical knowledge and practice as at the date of publication and to the best of our knowledge. Although reasonable care has been taken in the preparation of the *Australian Asthma Handbook*, the National Asthma Council Australia makes no representation or warranty as to the accuracy, completeness, currency or reliability of its contents.

The information and treatment protocols contained in the *Australian Asthma Handbook* are intended as a general guide only and are not intended to avoid the necessity for the individual examination and assessment of appropriate courses of treatment on a case-by-case basis. To the maximum extent permitted by law, acknowledging that provisions of the Australia Consumer Law may have application and cannot be excluded, the National Asthma Council Australia, and its employees, directors, officers, agents and affiliates exclude liability (including but not limited to liability for any loss, damage or personal injury resulting from negligence) which may arise from use of the *Australian Asthma Handbook* or from treating asthma according to the guidelines therein.



## Asthma in Aboriginal and Torres Strait Islander peoples

### In this section

---

#### *Cultural considerations*

Cultural and psychosocial considerations when providing care for Aboriginal and Torres Strait Islander people

<http://www.asthmahandbook.org.au/populations/indigenous-people/cultural>

#### *Diagnosis and assessment*

Considerations for diagnosis and assessment in Aboriginal and Torres Strait Islander people

<http://www.asthmahandbook.org.au/populations/indigenous-people/diagnosis>

#### *Management*

Caring for Aboriginal or Torres Strait Islander people, including cultural considerations and considerations for diagnosis, assessment and management


<http://www.asthmahandbook.org.au/populations/indigenous-people/management>

# Cultural and psychosocial considerations when providing care for Aboriginal and Torres Strait Islander people

## Recommendations

---


Health professionals should ensure that they and their staff have information and training on how to provide culturally secure care to Aboriginal and Torres Strait Islander people.

 *How this recommendation was developed*

### Consensus

Based on clinical experience and expert opinion (informed by evidence, where available).

Where appropriate and possible, work with an interpreter who speaks the person's first language.

 *How this recommendation was developed*

### Consensus

Based on clinical experience and expert opinion (informed by evidence, where available).

## More information

---

### *Culturally secure asthma care for Aboriginal and Torres Strait Islander people*

Primary care services can aim to deliver healthcare that is culturally secure. However, only the Aboriginal or Torres Strait Islander person themselves can determine whether their care is culturally safe or respectful.<sup>1</sup>

Making the healthcare system a secure environment for Aboriginal and Torres Strait Islander peoples involves cultural respect, which involves not only respecting cultural difference but recognition, protection and continued advancement of the inherent rights, cultures and traditions of Aboriginal and Torres Strait Islander peoples.<sup>2</sup>

Cultural awareness (or 'cultural sensitivity') among individual health professionals involves sensitivity to the similarities and differences between different cultures to enable effective communication with members of another cultural group.<sup>3</sup>

Training in cultural awareness and 'cultural safety' is available for non-Indigenous health professionals who provide healthcare for Aboriginal and Torres Strait Islander people.

- ▶ Go to: Australian College of Rural and Remote Medicine's [Cultural awareness module for PIP Indigenous Health Incentive](#)
- Go to: RACGP's [Cultural awareness and cultural safety training](#)

### *Involvement of Aboriginal and/or Torres Strait Islander health workers and health practitioners in asthma care*

Aboriginal and Torres Strait Islander health workers and Aboriginal and Torres Strait Islander health practitioners can provide self-management education for people with asthma and parents of children with asthma. Culture-specific programs may be more appropriate than mainstream programs for Aboriginal and Torres Strait Islander people.<sup>4</sup>

An education program (three sessions) conducted by Aboriginal and Torres Strait Islander health workers in primary health care in the Torres Strait region reduced the number of school days missed due to wheezing among school-aged children, and increased carers' knowledge of asthma, the contents of the child's written asthma action plan, and where the written asthma action plan was kept.<sup>5</sup> However, it did not reduce the rate of asthma flare-ups, compared with children whose families did not participate.<sup>5</sup>

Aboriginal and Torres Strait Islander health workers and practitioners can provide health care services that are reimbursable through

## References

---


1. National Aboriginal Community Controlled Health Organisation. *Creating the NACCHO Cultural Safety Training Standards and Assessment process. A background paper*. National Aboriginal Community Controlled Health Organisation, Canberra, 2011. Available from: <http://www.csheita.org.au/wp-content/uploads/2015/11/CSTStandardsBackgroundPaper-NACCHO.pdf>
2. Australian Health Ministers' Advisory Council Standing Committee for Aboriginal and Torres Strait Islander Health Working Party. *Cultural respect framework for Aboriginal and Torres Strait Islander health, 2004 -2009*. Department of Health South Australia, Adelaide, 2004. Available from: <http://www.sapo.org.au/pub/pub2142.html>
3. Thomson N. Cultural respect and related concepts: a brief summary of the literature. *Australian Indigenous Health Bulletin*. 2005; 5: 1-11. Available from: <http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.499.6685>
4. Bailey EJ, Cates CJ, Kruske SG, *et al*. Culture-specific programs for children and adults from minority groups who have asthma. *Cochrane Database Syst Rev*. 2009; Issue 2: CD006580. Available from: <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD006580.pub4/full>
5. Valery PC, Masters IB, Taylor B, *et al*. An education intervention for childhood asthma by Aboriginal and Torres Strait Islander health workers: a randomised controlled trial. *Med J Aust*. 2010; 192: 574-9. Available from: <https://www.mja.com.au/journal/2010/192/10/education-intervention-childhood-asthma-aboriginal-and-torres-strait-islander>
6. Australian Government Department of Health. *Chronic Disease Management (CDM) Medicare Items*. Australian Government, Canberra, 2013. Available from: <http://www.health.gov.au/internet/main/publishing.nsf/Content/mbsprimarycare-chronicdiseasemanagement>
7. Australian Government Department of Health and Ageing. *Medicare Health Assessment for Aboriginal and Torres Strait Islander People*. Australian Government, Canberra, 2013. Available from: <http://www.health.gov.au/internet/main/publishing.nsf/Content/mbsprimarycareATSIMBSitem715>

# Diagnosing and assessing asthma in Aboriginal and Torres Strait Islander people

## Recommendations

---

Ask all patients whether they smoke or are exposed to other people's tobacco smoke.


 *How this recommendation was developed*

**Adapted from existing guidance**

Based on reliable clinical practice guideline(s) or position statement(s):

- Zwar *et al.* 2011<sup>1</sup>

For all Aboriginal and Torres Strait Islander adults and children, take a comprehensive respiratory health history.


 *How this recommendation was developed*

**Consensus**

Based on clinical experience and expert opinion (informed by evidence, where available), with particular reference to the following source(s):

- Chang *et al.* 2010<sup>2</sup>

For Aboriginal and Torres Strait Islander children and adults, routinely ask about coughing (frequency and type), and carefully observe for cough, even if parents or carers do not mention cough.


 *How this recommendation was developed*

**Consensus**

Based on clinical experience and expert opinion (informed by evidence, where available), with particular reference to the following source(s):

- Morey *et al.* 2013<sup>3</sup>

When cough is present (especially wet or productive cough), consider the possibility of other chronic lung disease (e.g. bronchiectasis, chronic suppurative lung disease and COPD) as an alternative or coexisting diagnosis in Aboriginal and Torres Strait Islander adults and children with respiratory symptoms.


 *How this recommendation was developed*

**Consensus**

Based on clinical experience and expert opinion (informed by evidence, where available), with particular reference to the following source(s):

- Chang *et al.* 2003<sup>4</sup>
- Chang *et al.* 2008<sup>5</sup>
- Chang *et al.* 2012<sup>6</sup>
- Craven and Everard, 2013<sup>7</sup>

In Aboriginal and Torres Strait Islander adults in whom bronchiectasis cannot be ruled out, arrange high-resolution computed tomography and offer referral to a specialist if possible.


 *How this recommendation was developed*

**Adapted from existing guidance**

Based on reliable clinical practice guideline(s) or position statement(s):

- Chang *et al.* 2008<sup>5</sup>

In children with symptoms and signs that suggest chronic suppurative lung disease, offer referral to a specialist if possible.


 *How this recommendation was developed*

**Adapted from existing guidance**

Based on reliable clinical practice guideline(s) or position statement(s):

- Chang *et al.* 2008<sup>5</sup>

Consider and investigate any other comorbid conditions (e.g. diabetes, cardiovascular disease, kidney disease, ear problems).

 *How this recommendation was developed*


**Consensus**

Based on clinical experience and expert opinion (informed by evidence, where available), with particular reference to the following source(s):

- Australian Institute of Health and Welfare, 2013<sup>8</sup>

Include a thorough respiratory check-up when performing a Health Assessment for Aboriginal and Torres Strait Islander People (MBS Item 715).

► **Go to: National Aboriginal Community Controlled Health Organisation and Royal Australian College of General Practitioners' [National guide to a preventive health assessment for Aboriginal and Torres Strait Islander people](#)**

 *How this recommendation was developed*

**Adapted from existing guidance**

Based on reliable clinical practice guideline(s) or position statement(s):

- National Aboriginal Community Controlled Health Organisation and Royal Australian College of General Practitioners, 2012<sup>9</sup>

## More information

---

### *Culturally secure asthma care for Aboriginal and Torres Strait Islander people*

Primary care services can aim to deliver healthcare that is culturally secure. However, only the Aboriginal or Torres Strait Islander person themselves can determine whether their care is culturally safe or respectful.<sup>10</sup>

Making the healthcare system a secure environment for Aboriginal and Torres Strait Islander peoples involves cultural respect, which involves not only respecting cultural difference but recognition, protection and continued advancement of the inherent rights, cultures and traditions of Aboriginal and Torres Strait Islander peoples.<sup>11</sup>

Cultural awareness (or 'cultural sensitivity') among individual health professionals involves sensitivity to the similarities and differences between different cultures to enable effective communication with members of another cultural group.<sup>12</sup>

Training in cultural awareness and 'cultural safety' is available for non-Indigenous health professionals who provide healthcare for

Aboriginal and Torres Strait Islander people.

- ▶ Go to: Australian College of Rural and Remote Medicine's [Cultural awareness module for PIP Indigenous Health Incentive](#)
- Go to: RACGP's [Cultural awareness and cultural safety training](#)

### *Involvement of Aboriginal and/or Torres Strait Islander health workers and health practitioners in asthma care*

Aboriginal and Torres Strait Islander health workers and Aboriginal and Torres Strait Islander health practitioners can provide self-management education for people with asthma and parents of children with asthma. Culture-specific programs may be more appropriate than mainstream programs for Aboriginal and Torres Strait Islander people.<sup>13</sup>

An education program (three sessions) conducted by Aboriginal and Torres Strait Islander health workers in primary health care in the Torres Strait region reduced the number of school days missed due to wheezing among school-aged children, and increased carers' knowledge of asthma, the contents of the child's written asthma action plan, and where the written asthma action plan was kept.<sup>14</sup> However, it did not reduce the rate of asthma flare-ups, compared with children whose families did not participate.<sup>14</sup>

Aboriginal and Torres Strait Islander health workers and practitioners can provide health care services that are reimbursable through Medicare.<sup>15, 16</sup>

### *Asthma prevalence in Aboriginal and Torres Strait Islander people*

Asthma prevalence is higher among Aboriginal and Torres Strait Islander people than non-Indigenous Australians, based on the findings of various surveys.<sup>8, 17, 18, 19</sup>

Based on data from the 2004–2005 National Aboriginal and Torres Strait Islander Health Survey and the Australian Centre for Asthma Monitoring:

- The estimated overall asthma prevalence in Aboriginal and Torres Strait Islander people is 16.5%, compared with 10.2% among non-Indigenous Australians.<sup>19</sup>
- The estimated asthma prevalence in Aboriginal and Torres Strait Islander adults (aged 18 years and over) is 17.5%, compared with 9.8% among non-Indigenous adults.<sup>19</sup>
- The estimated asthma prevalence rates are similar in Aboriginal and Torres Strait Islander children (13.5%) and non-Indigenous children (11.2%).<sup>19</sup>

Fewer Aboriginal and Torres Strait Islander people living in remote areas (9%) report that they have asthma than those living in non-remote areas (17%).<sup>17</sup> Torres Strait Islander people living in the Torres Strait Island region report a relatively low prevalence of asthma (5%).<sup>17</sup>

The rate of hospitalisation for asthma is approximately twice as high among Aboriginal and Torres Strait Islander people, compared with other Australians.<sup>20</sup>

### *Risk factors for asthma in Aboriginal and Torres Strait Islander people*

Compared with the whole Australian population, Aboriginal and Torres Strait Islander people have higher rates of some risk factors for developing asthma or for poor asthma control.

- ▶ See: [Primary prevention of asthma](#)
- See: [Preventive healthcare in people with asthma](#)

### **Smoking and smoke**

Rates of tobacco smoking are high among Aboriginal and Torres Strait Islander people:<sup>8, 21, 22, 23</sup>

- Approximately 45% of Aboriginal and Torres Strait Islander people aged 15 years and over smoke daily (more than twice the rate among non-Indigenous Australians).
- Approximately half of Aboriginal and Torres Strait Islander mothers smoked during pregnancy (3.7 times the rate among non-Indigenous mothers).
- Approximately 65% of Aboriginal and Torres Strait Islander children live households with someone who smokes daily (approximately twice the rate among non-Indigenous children).

- ▶ See: [Smoking and asthma](#)

Many Aboriginal people are also frequently exposed to smoke from outdoor vegetation fires and cooking fires, particularly in remote regions.

### **Allergies**



Limited available data suggest that sensitisation to house dust mite is increasing among rural and remote Aboriginal communities, correlating with adoption of urban lifestyles.<sup>24</sup>

Factors contributing to an increase in allergic disease may include dietary changes and reductions in parasitic infestation and exposure to some bacteria.<sup>24</sup>

► See: [Allergies and asthma](#)

## Dietary factors

Low fruit and vegetables intakes are more common among Aboriginal and Torres Strait Islander people than non-Indigenous Australians.<sup>8</sup>

Increasing intake of pro-inflammatory fats and low intake of antioxidant-rich fruits and vegetables may be contributing to an increase in allergic asthma among Aboriginal and Torres Strait Islander people.<sup>24</sup>

► See: [Healthy eating for asthma](#)

## Obesity

The rate of obesity among Aboriginal and Torres Strait Islander adults (approximately 34%) is almost twice the rate in non-Indigenous adults (approximately 18%).<sup>8</sup>

Among Aboriginal and Torres Strait Islander people aged 18 years and over living in non-remote areas, rates of overweight and obesity increased between 1995 (51%) and 2004–05 (60%).<sup>8</sup>

► See: [Obesity and asthma](#)

## Socioeconomic risk factors

Traditional markers of socioeconomic status (e.g. education, income and employment status) are not strongly associated with asthma risk among Aboriginal and Torres Strait Islander peoples,<sup>18</sup> unlike the associations between socioeconomic status and asthma risk in non-Indigenous Australians, and the risk of other chronic diseases such as diabetes and kidney disease in Aboriginal and Torres Strait Islander people.<sup>18</sup>

In the 2000–2002 Western Australian Aboriginal Child Health Survey, Aboriginal children aged 0–17 years living in areas with highest socioeconomic status were more than nine times more likely to have ever had asthma than those living in the lowest socioeconomic status areas.<sup>25</sup> However, when socioeconomic status was measured by parental, family and household indicators rather than by area, it was less strongly associated with asthma.<sup>25</sup>

## *Respiratory disease in Aboriginal and Torres Strait Islander peoples*

Morbidity and mortality from respiratory diseases among Aboriginal and Torres Strait Islander people is higher than among non-Indigenous Australians across all age groups and regions.<sup>26</sup> Among Aboriginal and Torres Strait Islander people living in remote areas, the rate of hospitalisation for respiratory disease is approximately three times the rate among Aboriginal and Torres Strait Islander people living in major cities.<sup>17</sup> However, from 1997 to 2010 there was a 39% reduction in deaths due to respiratory disease among Aboriginal and Torres Strait Islander people.<sup>8</sup>

Detection, diagnosis and management of asthma may be complicated by increased rate of respiratory infections and chronic lung disease in rural remote Aboriginal and Torres Strait Islander communities.

- Approximately 30% of Aboriginal and Torres Strait Islander people report respiratory problems.<sup>5</sup>
- Chronic cough in Aboriginal and Torres Strait Islander children may be under-reported because it is so common that is considered normal by parents and caregivers.<sup>3</sup>
- Pneumonia and COPD are the most common causes of hospitalisation for respiratory disease among Aboriginal and Torres Strait Islander people.<sup>17</sup> The prevalence of COPD among Aboriginal and Torres Strait Islander people cannot be accurately estimated.<sup>27</sup> Aboriginal and Torres Strait Islander people are more than 2.5 times more likely than non-Indigenous Australians to die from chronic lower respiratory disease (includes asthma, bronchitis, bronchiectasis, emphysema, and other COPD).<sup>28</sup>
- The prevalence of bronchiectasis is disproportionately high in remote Aboriginal communities, particularly in Central Australia, but is underdiagnosed.<sup>5,4</sup> High-resolution computed tomography of the chest is necessary to diagnose bronchiectasis in adults.<sup>5</sup> In Aboriginal and Torres Strait Islander adults, it may be difficult to distinguish between asthma, COPD and bronchiectasis.<sup>27</sup> Bronchiectasis is associated with relatively rapid decline in lung function.<sup>5</sup> †
- Chronic suppurative lung disease is highly prevalent among Aboriginal and Torres Strait Islander children in remote communities.<sup>5</sup> The diagnosis of chronic suppurative lung disease is made in children who have symptoms and signs of bronchiectasis without radiographic features of bronchiectasis.<sup>5</sup> In Aboriginal and Torres Strait Islander children, it may be difficult to distinguish between asthma and bronchiectasis or chronic suppurative lung disease.<sup>27</sup> ‡
- Protracted bacterial bronchitis is often misdiagnosed as asthma,<sup>7,29</sup> but can also co-occur with asthma.<sup>29</sup> Protracted bacterial

bronchitis might precede chronic suppurative lung disease, but this is not yet well understood.<sup>29</sup> Inadequate treatment of protracted bacterial bronchitis might put Aboriginal and Torres Strait Islander children at risk for chronic suppurative lung disease.<sup>29</sup> Recurrent episodes of protracted bacterial bronchitis that does not resolve after treatment (e.g. a 14-day course of antibiotics) require investigation for chronic suppurative lung disease, bronchiectasis and aspiration.<sup>29</sup>

► See: [Diagnosing asthma in children](#)

Go to: Multidisciplinary consensus group position statement [Management of bronchiectasis and chronic suppurative lung disease in Indigenous children and adults from rural and remote Australian communities](#)

Go to: Thoracic Society of Australia and New Zealand and Lung Foundation Australia position statement [Chronic suppurative lung disease and bronchiectasis in children and adults in Australia and New Zealand](#)

#### Notes

† Chronic suppurative lung disease is defined as a clinical syndrome of respiratory symptoms and signs due to chronic endobronchial suppuration, including continuous, wet or productive cough > 8 weeks, with or without other features (e.g. exertional dyspnoea, symptoms of reactive airway disease, recurrent chest infections, growth failure, clubbing, hyperinflation or chest wall deformity).<sup>2</sup>

‡ Bronchiectasis is diagnosed in patients with both chronic suppurative lung disease and the presence of radiological features on a chest high-resolution computed tomography scan.<sup>2</sup>

Last reviewed version 2.0

### *Non-respiratory comorbidity among Aboriginal and Torres Strait Islander peoples*

Aboriginal and Torres Strait Islander peoples have a high burden of chronic diseases that may affect asthma control and management, including:<sup>8</sup>

- diabetes
- cardiovascular disease
- kidney disease
- ear disease
- mental health problems.

► See: [Comorbid conditions and asthma](#)

### *Australian government health initiatives for Aboriginal and Torres Strait Islander people*

#### **Asthma Spacer Ordering System**

The Asthma Spacer Ordering System provides Aboriginal and Torres Strait Islander health services with access to low cost asthma spacers for their clients.

► Go to: Asthma Australia's [Asthma Spacer Ordering System](#) page

#### **Health Assessment Medicare items**

The MBS Health Assessment for Aboriginal and Torres Strait Islander People (MBS Item 715) reimburses health professionals for health assessments for (any of):<sup>16</sup>

- Aboriginal and Torres Strait Islander children (<15 years)
- Aboriginal and Torres Strait Islander adults (≥15 years and < 55 years)
- Aboriginal and Torres Strait Islander older people (≥ 55 years).

This item is linked to follow-on item numbers to support follow-up care by allied health professionals and Aboriginal/Torres Strait health workers and practitioners to manage asthma and comorbid conditions.

► Go to: [Medicare Health Assessment for Aboriginal and Torres Strait Islander People](#)

#### **The Indigenous Chronic Disease Package**

The Indigenous Chronic Disease Package provides a range of supports to Aboriginal and Torres Strait Islander people with chronic disease or at risk of chronic disease. The package includes:<sup>30</sup>

- subsidy of PBS medicines (reduced copayments for Aboriginal and Torres Strait Islander people with chronic disease)
- orientation and training for Aboriginal and Torres Strait Islander Outreach Workers in Aboriginal community-controlled general practices
- professional development scholarships and clinical placement scholarships for nurses working in Community Controlled Aboriginal/Torres Strait Island Health Services
- general practitioner registrar training posts for Aboriginal Medical Services
- Practice Incentives Program Indigenous Health Incentive to support general practices and Indigenous health services to provide

care for people with chronic disease

- increased access to specialist medical and allied health care
- GPs can access these services to overcome barriers to health care for Aboriginal and Torres Strait Islander people.

► Go to: [Closing the Gap Indigenous Chronic Disease Package](#)

## National immunisation program

Additional vaccinations are recommended and reimbursed for Aboriginal and Torres Strait Islander people. Refer to national guidelines.

► Go to: [Australian Immunisation Handbook](#)

## Other resources

► Go to: Australian College of Nursing's [Australian Government scholarships](#) web page

Go to: [General Practice Education and Training Limited](#)

Last reviewed version 2.0

## Asthma–COPD overlap

Distinguishing between typical allergic asthma (childhood-onset allergic asthma) and typical COPD (emphysema in a heavy smoker) is straightforward.<sup>31</sup> However, it can be difficult to distinguish COPD from asthma in adults who have features of both conditions.<sup>32, 33</sup> These people are described as having asthma–COPD overlap.<sup>32, 31, 34</sup>

Asthma–COPD overlap is not a single, well-defined disease entity, but includes a range of airway disease phenotypes with different causal mechanisms.<sup>32, 35</sup> Features of both asthma and COPD have been described in:<sup>34, 36, 37, 38</sup>

- people with current asthma (allergic or non-allergic) who have had significant exposure to tobacco smoke
- people with longstanding asthma or late-onset asthma who have become persistently short of breath over time
- people with significant smoking history and symptoms consistent with COPD who also have a history of childhood asthma
- people who present in middle age or later with shortness of breath, with a history of childhood asthma but no or few symptoms in between, and little smoking history.

### Figure. Development of asthma, COPD and asthma–COPD overlap

Please view and print this figure separately: <http://www.asthmahandbook.org.au/figure/show/108>

People with asthma–COPD overlap often have poor disease outcomes, including:<sup>32, 39, 40, 41, 42</sup>

- high need for healthcare services
- worse quality of life, more wheezing, dyspnoea, cough and sputum production, and more frequent and severe respiratory exacerbations and hospitalisations, than people with COPD or asthma alone
- worse lung function demonstrated by spirometry than those with COPD alone, despite lower average exposure to tobacco smoke.

### Features of asthma, COPD and asthma–COPD overlap

If several features of both asthma and COPD are present and neither condition is strongly favoured, respiratory disease should be managed according to recommendations for asthma–COPD overlap.

**Table. Features that, when present, favour asthma or COPD**

Clinical feature (if measured/relevant)	Asthma more likely	COPD more likely
Age of onset	Before 20	After 40
Pattern of symptoms	Variation in respiratory symptoms: <ul style="list-style-type: none"><li>• changes over minutes, hours or days</li><li>• worse at night or early morning</li><li>• triggered by exercise, emotions, airborne pollutants or allergens</li></ul>	Persistence of respiratory symptoms despite treatment Symptoms every day, including exertional dyspnoea History of chronic cough and sputum

Clinical feature (if measured/relevant)	Asthma more likely	COPD more likely
		unrelated to specific triggers, before onset of dyspnoea
Lung function	Expiratory airflow limitation* is variable# Lung function normal between symptoms	Expiratory airflow limitation* is persistent† Lung function abnormal between symptoms
History	Previous diagnosis of asthma Family history of asthma and allergies§ (allergic rhinitis or eczema)	Previous diagnosis of COPD, chronic bronchitis or emphysema Heavy exposure to tobacco smoke or biomass fuels
Long-term disease trajectory	Seasonal or yearly variation in symptoms Improvements (spontaneously or in response to medication) last for weeks	Slowly worsens over years Relief in response to medication is limited and short term
Chest X-ray	Normal	Severe hyperinflation‡

Features that, when present, increase the probability of either typical asthma or typical COPD. None of these features is essential to make the diagnosis of asthma or COPD, with the exception of persistent airflow limitation for making the diagnosis of COPD.

\* Expiratory airflow limitation: indicated by a reduced ratio of forced expiratory volume in one second (FEV<sub>1</sub>) to forced vital capacity (FVC) on spirometry (FEV<sub>1</sub>/FVC less than the lower limit of normal (i.e. less than the 5th percentile of normal population). Typical FEV<sub>1</sub>/FVC values derived from population studies are > 0.75 in people aged 40–59 years and > 0.70 in people aged 60–80 years.

# Variable expiratory airflow limitation: variation beyond the range seen in healthy populations. It is indicated in adults by any of the following:

- a clinically important increase in FEV<sub>1</sub> (change in FEV<sub>1</sub> of at least 200 mL and 12% from baseline) 10–15 minutes after administration of bronchodilator
- clinically important variation in lung function (at least 20% change in FEV<sub>1</sub>) when measured repeatedly over time (e.g. spirometry on separate visits)
- a clinically important increase in lung function (at least 200 mL and 12% from baseline) after ≥ 4 weeks' treatment trial with an ICS
- clinically important variation in peak expiratory flow (diurnal variability of more than 10%, calculated over 1–2 weeks as the average of daily amplitude per cent mean)
- a clinically important reduction in lung function (decrease in FEV<sub>1</sub> of at least 200 mL and 12% from baseline on spirometry, or decrease in peak expiratory flow rate by at least 20%) after exercise (formal laboratory-based exercise challenge testing uses different criteria for exercise-induced bronchoconstriction)
- a clinically important reduction in lung function (15–20%, depending on the test) during a test for airway hyperresponsiveness (exercise challenge test or bronchial provocation test) measured by a respiratory function laboratory.

The greater the variations, or the more occasions excess variation is seen, the more confidently the diagnosis of variable expiratory airflow limitation consistent with asthma can be made.

† Persistent expiratory airflow limitation is indicated by reduced post-bronchodilator FEV<sub>1</sub>/FVC\*

§ Lack of history of atopy does not exclude non-allergic asthma.

‡ Chest X-ray may be normal in a patient with COPD

Adapted from

Global Initiative for Asthma, Global Initiative for Obstructive Lung Disease. *Diagnosis and initial treatment of asthma, COPD and asthma-COPD overlap*. Updated April 2017. Global Initiative for Asthma and Global Initiative for Obstructive Lung Disease; 2017.

**Table. Spirometry findings in asthma, COPD and asthma–COPD overlap**

Finding	Consistent with		
	Asthma	COPD	Asthma–COPD overlap
Normal FEV <sub>1</sub> /FVC before of after bronchodilator	Yes	No	No *
Abnormal lung function (post-bronchodilator reduced FEV <sub>1</sub> /FVC and FEV <sub>1</sub> < lower limit of normal)	Yes #	Yes	Yes
Airflow limitation with greater bronchodilator reversibility than in healthy population (post-bronchodilator FEV <sub>1</sub> increase ≥ 12% and 200mL from baseline)	Yes ‡	Yes	Yes
Marked bronchodilator reversibility (FEV <sub>1</sub> increase ≥ 12% and 400mL from baseline)	Yes	Possible but unusual †	Possible §

FEV<sub>1</sub>/FVC: ratio of forced expiratory volume in one second (FEV<sub>1</sub>) to forced vital capacity (FVC), either before or after bronchodilator

\* Normal FEV<sub>1</sub>/FVC is not consistent with COPD unless there is other evidence of chronic non-reversible expiratory airflow limitation.

# This finding is consistent with asthma that is poorly controlled or measured during a flare-up, or can be seen in some patients with longstanding asthma.

‡ The greater the variation, and the more times variation is seen, the more likely the diagnosis of asthma. However, some patients with longstanding asthma may develop persistent airflow limitation.

† Marked reversibility strongly favours asthma and is generally inconsistent with COPD, but does not rule out asthma–COPD overlap.

§ This finding may be seen in patients with asthma–COPD overlap, or occasionally in COPD, especially when FEV<sub>1</sub> is low.

#### Sources

Global Initiative for Asthma, Global Initiative for Obstructive Lung Disease. *Diagnosis and initial treatment of asthma, COPD and asthma-COPD overlap. Updated April 2017*. Global Initiative for Asthma and Global Initiative for Obstructive Lung Disease; 2017. Available from: <http://ginasthma.org/gina-reports>

Woodruff P, van den Berge M, Boucher R *et al*. ATS-NHLBI Asthma COPD Overlap (ACO) Workshop Report. *Am J Respir Crit Care Med* 2017; 196:375-381. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/28636425>

#### Treatment for patients with asthma–COPD overlap

Inhaled corticosteroid treatment at low–moderate doses is essential to reduce the risk of potentially life-threatening flare-ups, even if

asthma symptoms appear mild or infrequent.<sup>32, 43</sup>

Most patients also need treatment with a long-acting bronchodilator (either long-acting beta<sub>2</sub> agonist or long-acting muscarinic antagonist) in addition to an inhaled corticosteroid. Long-acting beta<sub>2</sub> agonists and long-acting muscarinic antagonists should not be used by people with asthma or asthma–COPD overlap unless they are also taking an inhaled corticosteroid (either in combination or separately).

**Table. Long-acting bronchodilators for asthma–COPD overlap**

<i>Class</i>	<i>Dosing frequency</i>	<i>Agent</i>	<b>Brand name</b>
<i>ICS-LABA combinations</i>	Once daily	Fluticasone furoate + vilanterol	<i>Breo Ellipta 100/25 microg</i> <sup>†</sup>  • Do not prescribe 200/25 microg formulation <sup>#</sup>
	Twice daily	Budesonide + formoterol	<i>Symbicort Rapihaler</i> <i>Symbicort Turbuhaler</i>
	Twice daily	Fluticasone propionate + formoterol	<i>Flutiform</i>
	Twice daily	Fluticasone propionate + salmeterol	<i>Fluticasone and Salmeterol Cipla</i> <i>Seretide Accuhaler</i> <i>Seretide MDI</i>
<i>LABAs*</i>	Once daily	Indacaterol	<i>Onbrez Breezhaler</i>
	Twice daily	Formoterol	<i>Oxis</i> <i>Foradile</i>
	Twice daily	Salmeterol	<i>Serevent Accuhaler</i>
<i>LAMAs*</i>	Once daily	Glycopyrronium	<i>Seebri Breezhaler</i>
	Once daily	Tiotropium	<i>Spiriva</i> <i>Spiriva Respimat</i>
	Once daily	Umeclidinium	<i>Incruse Ellipta</i> <sup>‡</sup>
	Twice daily	Acclidinium	<i>Bretaris Genuair</i>
<i>LABA-LAMA combinations*</i>	Once daily	Indacaterol + glycopyrronium	<i>Ultibro Breezhaler</i>
	Once daily	Olodaterol + tiotropium	<i>Spiolto Respimat</i>
	Once daily	Vilanterol + umeclidinium	<i>Anoro Ellipta</i> <sup>‡</sup>

Class	Dosing frequency	Agent	Brand name
	Twice daily	Formoterol + aclidinium	Brimica Genuair

- \* Ensure that patient is also using regular long-term ICS. LABAs and LAMAs should not be used by people with asthma or asthma-COPD overlap unless they are also taking an ICS, in combination or separately)
- Advise patients/carers that inhalers should be stored below 30°C and should not be left in cars.

† The inhaler must be discarded 1 month after opening the package and removing device from tray. When first opened, patients should write the discard date on the label in the space provided. If stored in the refrigerator, inhaler should be taken out and allowed to return to room temperature for at least an hour before use.

‡ The inhaler must be discarded 6 weeks after opening after opening the package and removing device from tray. When first opened, patients should write the discard date on the label in the space provided. If stored in the refrigerator, inhaler should be taken out and allowed to return to room temperature for at least an hour before use.

# Only the 100/25 microg dose of fluticasone furoate/vilanterol is TGA-approved for treatment of COPD. The higher dose (200/25 microg) is not TGA-approved for the treatment of COPD, so it should not be used in people with asthma-COPD overlap.

High doses of ICS (alone or in combination) are not recommended in patients with COPD and should therefore be used with caution in patients with asthma-COPD overlap, because of the risk of pneumonia.

Refer to PBS status before prescribing.

Last reviewed version 2.0

Asset ID: 105

Management should also include smoking cessation, treatment of comorbid conditions, physical activity, pulmonary rehabilitation, vaccinations, self-management (including a regularly updated action plan) and regular follow-up.<sup>32</sup>

- ▶ Go to: [Asthma action plans](#)
- Go to: [COPD action plans](#)

Respiratory tract infections should be monitored carefully because people with asthma-COPD overlap have high morbidity rates and because ICS treatment is associated with increased risk of non-fatal pneumonia in people with COPD.<sup>44</sup> Most of the available evidence is from patients treated with fluticasone propionate, particularly at higher doses. Increased pneumonia rates have also been observed in studies of patients with COPD using fluticasone furoate/vilanterol. The higher dose of fluticasone furoate/vilanterol (Breo Ellipta 200/25 microg) is not approved for patients with COPD, so it should also not be used in patients with asthma-COPD overlap.

Specialist referral should be considered for patients with atypical symptoms or symptoms that suggest an alternative diagnosis, persistent symptoms or flare-ups despite treatment, or complex comorbidities.

- ▶ Go to: National Asthma Council Australia's [Asthma-COPD overlap](#) information paper

For information on diagnosis and management of COPD, refer to the COPD-X Concise Guide for Primary Care.<sup>45</sup>

- ▶ Go to: Lung Foundation Australia's [COPD-X Concise Guide for Primary Care](#)

Last reviewed version 2.0

## References

1. Zwar N, Richmond R, Borland R, *et al.* *Supporting smoking cessation: a guide for health professionals*. Updated 2012. The Royal Australian College of General Practitioners (RACGP), Melbourne, 2011. Available from: <http://www.racgp.org.au/your-practice/guidelines/>
2. Chang AB, Bell SC, Byrnes CA, *et al.* Chronic suppurative lung disease and bronchiectasis in children and adults in Australia and New Zealand. *Med J Aust.* 2010; 193: 356-65. Available from: <https://www.mja.com.au/journal/2010/193/6/chronic-suppurative-lung-disease-and-bronchiectasis-children-and-adults-australia>
3. Morey MJ, Cheng AC, McCallum GB, Chang AB. Accuracy of cough reporting by carers of Indigenous children. *J Paediatr Child Health.* 2013; 49: E199-203. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/23438209>
4. Chang AB, Masel JP, Boyce NC, *et al.* Non-CF bronchiectasis: clinical and HRCT evaluation. *Pediatr Pulmonol.* 2003; 35: 477-83. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/12746947>
5. Chang AB, Grimwood K, Maguire G, *et al.* Management of bronchiectasis and chronic suppurative lung disease in indigenous

- children and adults from rural and remote Australian communities. *Med J Aust.* 2008; 189: 386-93. Available from: <https://www.mja.com.au/journal/2008/189/7/management-bronchiectasis-and-chronic-suppurative-lung-disease-indigenous>
6. Chang AB, Robertson CF, Van Asperen PP, et al. A multicenter study on chronic cough in children : burden and etiologies based on a standardized management pathway. *Chest.* 2012; 142: 943-50. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/22459773>
  7. Craven V, Everard ML. Protracted bacterial bronchitis: reinventing an old disease. *Arch Dis Child.* 2013; 98: 72-76. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/23175647>
  8. Australian Institute of Health and Welfare. *Aboriginal and Torres Strait Islander Health Performance Framework 2012: detail analysis.* Australian Institute of Health and Welfare, Canberra, 2013. Available from: <http://www.aihw.gov.au/publication-detail/?id=60129543821&tab=2>
  9. National Aboriginal Community Controlled Health Organisation, Royal Australian College of General Practitioners. *National guide to a preventive health assessment for Aboriginal and Torres Strait Islander people.* 2nd edn. Royal Australian College of General Practitioners, Melbourne, 2012. Available from: <https://www.racgp.org.au/clinical-resources/clinical-guidelines/key-racgp-guidelines/view-all-racgp-guidelines/national-guide>
  10. National Aboriginal Community Controlled Health Organisation. *Creating the NACCHO Cultural Safety Training Standards and Assessment process. A background paper.* National Aboriginal Community Controlled Health Organisation, Canberra, 2011. Available from: <http://www.csheic.org.au/wp-content/uploads/2015/11/CSTStandardsBackgroundPaper-NACCHO.pdf>
  11. Australian Health Ministers' Advisory Council Standing Committee for Aboriginal and Torres Strait Islander Health Working Party. *Cultural respect framework for Aboriginal and Torres Strait Islander health, 2004 -2009.* Department of Health South Australia, Adelaide, 2004. Available from: <http://www.sapo.org.au/pub/pub2142.html>
  12. Thomson N. Cultural respect and related concepts: a brief summary of the literature. *Australian Indigenous Health Bulletin.* 2005; 5: 1-11. Available from: <http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.499.6685>
  13. Bailey EJ, Cates CJ, Kruske SG, et al. Culture-specific programs for children and adults from minority groups who have asthma. *Cochrane Database Syst Rev.* 2009; Issue 2: CD006580. Available from: <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD006580.pub4/full>
  14. Valery PC, Masters IB, Taylor B, et al. An education intervention for childhood asthma by Aboriginal and Torres Strait Islander health workers: a randomised controlled trial. *Med J Aust.* 2010; 192: 574-9. Available from: <https://www.mja.com.au/journal/2010/192/10/education-intervention-childhood-asthma-aboriginal-and-torres-strait-islander>
  15. Australian Government Department of Health. *Chronic Disease Management (CDM) Medicare Items.* Australian Government, Canberra, 2013. Available from: <http://www.health.gov.au/internet/main/publishing.nsf/Content/mbsprimarycare-chronicdiseasemanagement>
  16. Australian Government Department of Health and Ageing. *Medicare Health Assessment for Aboriginal and Torres Strait Islander People.* Australian Government, Canberra, 2013. Available from: <http://www.health.gov.au/internet/main/publishing.nsf/Content/mbsprimarycareATSIMBSitem715>
  17. MacRae A, Thomson N, Anomie, et al. *Overview of Australian Indigenous health status.* Perth, 2012. Available from: <http://www.healthinonet.ecu.edu.au/health-facts/overviews>
  18. Cunningham J. Socioeconomic status and self-reported asthma in Indigenous and non-Indigenous Australian adults aged 18-64 years: analysis of national survey data. *Int J Equity Health.* 2010; 9: 1 - 11. Available from: <http://www.equityhealthj.com/content/9/1/18>
  19. Australian Centre for Asthma Monitoring. *Asthma in Australia 2011: with a focus chapter on chronic obstructive pulmonary disease.* Asthma series no. 4. Cat. no ACM 22. Australian Institute of Health and Welfare, Canberra, 2011. Available from: <http://www.aihw.gov.au/publication-detail/?id=10737420159>
  20. Australian Institute of Health and Welfare. *Asthma hospitalisations in Australia 2010-11.* Australian Institute of Health and Welfare, Canberra, 2013. Available from: <http://www.aihw.gov.au/publication-detail/?id=60129544541>
  21. Australian Bureau of Statistics. *National Aboriginal and Torres Strait Islander Social Survey, 2008.* Cat. no. 4714.0. Australian Bureau of Statistics, Canberra, 2009. Available from: <http://www.abs.gov.au/ausstats/abs@nsf/mf/4714.0/>
  22. Australian Bureau of Statistics. *National Aboriginal and Torres Strait Islander Health Survey 2004-05.* Cat. no. 4715.0. Australian Bureau of Statistics, Canberra, 2006. Available from: <http://www.abs.gov.au/ausstats/abs@nsf/mf/4715.0>
  23. Australian Bureau of Statistics (ABS), Australian Institute of Health and Welfare (AIHW). *The health and welfare of Australia's Aboriginal and Torres Strait Islander peoples 2008.* ABS and AIHW, Canberra, 2008. Available from: <http://www.aihw.gov.au/publication-detail/?id=6442468085>
  24. Walton SF, Weir C. The interplay between diet and emerging allergy: what can we learn from Indigenous Australians?. *Int Rev Immunol.* 2012; 31: 184-201. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/22587020>
  25. Shepherd CC, Li J, Zubrick SR. Socioeconomic disparities in physical health among Aboriginal and Torres Strait Islander children in Western Australia. *Ethn Health.* 2012; 17: 439-61. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/22292856>
  26. O'Grady KA, Revell A, Maguire GP, et al. Lung health care for Aboriginal and Torres Strait Islander Queenslanders: breathing easy is not so easy. *Aust Health Rev.* 2011; 35: 512-9. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/22126958>
  27. O'Grady KF, Revell A, Maguire G, et al. *Lung Health Services for Aboriginal and Torres Strait Islander Peoples in Queensland.* Queensland Health, Brisbane, 2010. Available from: <http://healthbulletin.org.au/articles/lung-health-services-for-aboriginal-and-torres-strait-islander-peoples-in-queensland/>
  28. Australian Indigenous HealthInfoNet., *Summary of Australian Aboriginal and Torres Strait Islander health status, 2017.* Edith Cowan University, Mount Lawley, WA, 2018.
  29. Chang AB, Redding GJ, Everard ML. Chronic wet cough: Protracted bronchitis, chronic suppurative lung disease and bronchiectasis. *Pediatr Pulmonol.* 2008; 43: 519-31. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/18435475>
  30. Australian Government Department of Health. *Closing the Gap: Tackling Indigenous Chronic Disease Package.* Australian Government,



Canberra, 2012. Available from: <http://webarchive.nla.gov.au/gov/20110313140138/http://www.health.gov.au/internet/main/publishing.nsf/Content/work-ab-gap>


31. Knorr, B, Matz, J, Bernstein, JA, *et al.* Montelukast for chronic asthma in 6- to 14-year-old children: a randomized, double-blind trial. Pediatric Montelukast Study Group. *JAMA*. 1998; 279: 1181-1186. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/9555757>
32. Zeiger, RS, Szeffler, SJ, Phillips, BR, *et al.* Response profiles to fluticasone and montelukast in mild-to-moderate persistent childhood asthma. *J Allergy Clin Immunol*. 2006; 117: 45-52. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/16387583>
33. Becker, A, Swern, A, Tozzi, C A, *et al.* Montelukast in asthmatic patients 6 years-14 years old with an FEV1 > 75%. *Curr Med Res Opin*. 2004; 20: 1651-1659. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/15462699>
34. Gibson PG, Simpson JS. The overlap syndrome of asthma and COPD: what are its features and how important is it?. *Thorax*. 2009; 64: 728-735. Available from: <http://thorax.bmj.com/content/64/8/728.full>
35. Stempel, D. A., Szeffler, S. J., Pedersen, S., *et al.* Safety of adding salmeterol to fluticasone propionate in children with asthma. *N Engl J Med*. 2016; 375: 840-9. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/27579634>
36. McDonald VM, Higgins I, Gibson PG. Managing older patients with coexistent asthma and chronic obstructive pulmonary disease. *Drugs Aging*. 2013; 30: 1-17. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/23229768>
37. Reed CE. Asthma in the elderly: diagnosis and management. *J Allergy Clin Immunol*. 2010; 126: 681-7; quiz 688-9. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/20673985>
38. Rabinovitch, N., Mauger, D. T., Reisdorph, N., *et al.* Predictors of asthma control and lung function responsiveness to step 3 therapy in children with uncontrolled asthma. *J Allergy Clin Immunol*. 2014; 133: 350-6. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC24084071/>
39. Lemanske RF, Mauger DT, Sorkness CA, *et al.* Step-up therapy for children with uncontrolled asthma receiving inhaled corticosteroids. *N Engl J Med*. 2010; 362: 975-985. Available from: <http://www.nejm.org/doi/full/10.1056/NEJMoa1001278#t=article>
40. Papadopoulos, N. G., Philip, G., Giezek, H., *et al.* The efficacy of montelukast during the allergy season in pediatric patients with persistent asthma and seasonal aeroallergen sensitivity. *J Asthma*. 2009; 46: 413-20. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/19484680>
41. Carroll, W. D., Jones, P. W., Boit, P., *et al.* Childhood evaluation of salmeterol tolerance—a double-blind randomized controlled trial. *Pediatr Allergy Immunol*. 2010; 21: 336-44. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/19725893>
42. Fogel, R. B., Rosario, N., Aristizabal, G., *et al.* Effect of montelukast or salmeterol added to inhaled fluticasone on exercise-induced bronchoconstriction in children. *Ann Allergy Asthma Immunol*. 2010; 104: 511-7. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/20568384>
43. Adler, A., Uziel, Y., Mei-Zahav, M., Horowitz, I.. Formoterol induces tolerance to the bronchodilating effect of Salbutamol following methacholine-provocation test in asthmatic children. *Pulm Pharmacol Ther*. 2006; 19: 281-5. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/16169761>
44. Pharmaceutical Benefits Scheme., *Post-market review. PBS medicines used to treat asthma in children. Report to PBAC. Final Report.* 2017.
45. Akashi K, Mezawa H, Tabata Y, *et al.* Optimal step-down approach for pediatric asthma controlled by salmeterol/fluticasone: A randomized, controlled trial (OSCAR study). *Allergol Int*. 2016; 65: 306-11. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/27155753>

# Managing asthma in Aboriginal and Torres Strait Islander people

## Recommendations

---


Consider whether the person has any comorbid conditions that may affect asthma management or be affected by asthma medicines.

 *How this recommendation was developed*

**Consensus**

Based on clinical experience and expert opinion (informed by evidence, where available).

Consider using and providing asthma self-management resources that have been designed specifically for Aboriginal and Torres Strait Islander people, where appropriate.


 *How this recommendation was developed*

**Consensus**

Based on clinical experience and expert opinion (informed by evidence, where available).

Keep influenza and pneumococcal vaccination up to date, following immunisation guidelines for Aboriginal and Torres Strait Islander children and adults.

► Go to: [The Australian Immunisation Handbook](#)

 *How this recommendation was developed*


**Adapted from existing guidance**

Based on reliable clinical practice guideline(s) or position statement(s):

- Australian Technical Advisory Group on Immunisation of the Australian Government Department of Health and Ageing, 2013<sup>1</sup>

*Last reviewed version 2.0*


Provide a written asthma action plan that is culturally appropriate for each patient.

 *How this recommendation was developed*

**Consensus**

Based on clinical experience and expert opinion (informed by evidence, where available).

Where possible, involve Aboriginal health workers or Aboriginal and Torres Strait Islander health practitioners in Team Care Arrangements and Multidisciplinary Care Plans.

 *How this recommendation was developed*

**Consensus**

Based on clinical experience and expert opinion (informed by evidence, where available).

## More information

---

### *Culturally secure asthma care for Aboriginal and Torres Strait Islander people*

Primary care services can aim to deliver healthcare that is culturally secure. However, only the Aboriginal or Torres Strait Islander person themselves can determine whether their care is culturally safe or respectful.<sup>2</sup>

Making the healthcare system a secure environment for Aboriginal and Torres Strait Islander peoples involves cultural respect, which involves not only respecting cultural difference but recognition, protection and continued advancement of the inherent rights, cultures and traditions of Aboriginal and Torres Strait Islander peoples.<sup>3</sup>

Cultural awareness (or 'cultural sensitivity') among individual health professionals involves sensitivity to the similarities and differences between different cultures to enable effective communication with members of another cultural group.<sup>4</sup>

Training in cultural awareness and 'cultural safety' is available for non-Indigenous health professionals who provide healthcare for Aboriginal and Torres Strait Islander people.

- ▶ Go to: Australian College of Rural and Remote Medicine's [Cultural awareness module for PIP Indigenous Health Incentive](#)
- Go to: RACGP's [Cultural awareness and cultural safety training](#)

### *Involvement of Aboriginal and/or Torres Strait Islander health workers and health practitioners in asthma care*

Aboriginal and Torres Strait Islander health workers and Aboriginal and Torres Strait Islander health practitioners can provide self-management education for people with asthma and parents of children with asthma. Culture-specific programs may be more appropriate than mainstream programs for Aboriginal and Torres Strait Islander people.<sup>5</sup>

An education program (three sessions) conducted by Aboriginal and Torres Strait Islander health workers in primary health care in the Torres Strait region reduced the number of school days missed due to wheezing among school-aged children, and increased carers' knowledge of asthma, the contents of the child's written asthma action plan, and where the written asthma action plan was kept.<sup>6</sup> However, it did not reduce the rate of asthma flare-ups, compared with children whose families did not participate.<sup>6</sup>

Aboriginal and Torres Strait Islander health workers and practitioners can provide health care services that are reimbursable through Medicare.<sup>7,8</sup>

### *Risk factors for asthma in Aboriginal and Torres Strait Islander people*

Compared with the whole Australian population, Aboriginal and Torres Strait Islander people have higher rates of some risk factors for developing asthma or for poor asthma control.

- ▶ See: [Primary prevention of asthma](#)
- See: [Preventive healthcare in people with asthma](#)

### **Smoking and smoke**

Rates of tobacco smoking are high among Aboriginal and Torres Strait Islander people:<sup>9, 10, 11, 12</sup>

- Approximately 45% of Aboriginal and Torres Strait Islander people aged 15 years and over smoke daily (more than twice the rate among non-Indigenous Australians).
- Approximately half of Aboriginal and Torres Strait Islander mothers smoked during pregnancy (3.7 times the rate among non-Indigenous mothers).
- Approximately 65% of Aboriginal and Torres Strait Islander children live households with someone who smokes daily (approximately twice the rate among non-Indigenous children).

- ▶ See: [Smoking and asthma](#)

Many Aboriginal people are also frequently exposed to smoke from outdoor vegetation fires and cooking fires, particularly in remote regions.

### **Allergies**

Limited available data suggest that sensitisation to house dust mite is increasing among rural and remote Aboriginal communities, correlating with adoption of urban lifestyles.<sup>13</sup>

Factors contributing to an increase in allergic disease may include dietary changes and reductions in parasitic infestation and exposure to some bacteria.<sup>13</sup>

- ▶ See: [Allergies and asthma](#)

## Dietary factors

Low fruit and vegetables intakes are more common among Aboriginal and Torres Strait Islander people than non-Indigenous Australians.<sup>9</sup>

Increasing intake of pro-inflammatory fats and low intake of antioxidant-rich fruits and vegetables may be contributing to an increase in allergic asthma among Aboriginal and Torres Strait Islander people.<sup>13</sup>

► See: [Healthy eating for asthma](#)

## Obesity

The rate of obesity among Aboriginal and Torres Strait Islander adults (approximately 34%) is almost twice the rate in non-Indigenous adults (approximately 18%).<sup>9</sup>

Among Aboriginal and Torres Strait Islander people aged 18 years and over living in non-remote areas, rates of overweight and obesity increased between 1995 (51%) and 2004–05 (60%).<sup>9</sup>

► See: [Obesity and asthma](#)

## Socioeconomic risk factors

Traditional markers of socioeconomic status (e.g. education, income and employment status) are not strongly associated with asthma risk among Aboriginal and Torres Strait Islander peoples,<sup>14</sup> unlike the associations between socioeconomic status and asthma risk in non-Indigenous Australians, and the risk of other chronic diseases such as diabetes and kidney disease in Aboriginal and Torres Strait Islander people.<sup>14</sup>

In the 2000–2002 Western Australian Aboriginal Child Health Survey, Aboriginal children aged 0–17 years living in areas with highest socioeconomic status were more than nine times more likely to have ever had asthma than those living in the lowest socioeconomic status areas.<sup>15</sup> However, when socioeconomic status was measured by parental, family and household indicators rather than by area, it was less strongly associated with asthma.<sup>15</sup>

## *Asthma morbidity and mortality in Aboriginal and Torres Strait Islander people*

Among Australians aged 5 years and over, the rate of hospitalisation due to asthma is higher for Aboriginal and Torres Strait Islander people than non-Indigenous people.<sup>16</sup> Among Aboriginal and Torres Strait Islander people, asthma is the reason for approximately 11% of all hospitalisations.<sup>9</sup>

The rate of deaths due to asthma is approximately 2.5 times higher among Aboriginal and Torres Strait Islander people than non-Indigenous Australians.<sup>16</sup>

## *Respiratory disease in Aboriginal and Torres Strait Islander peoples*

Morbidity and mortality from respiratory diseases among Aboriginal and Torres Strait Islander people is higher than among non-Indigenous Australians across all age groups and regions.<sup>17</sup> Among Aboriginal and Torres Strait Islander people living in remote areas, the rate of hospitalisation for respiratory disease is approximately three times the rate among Aboriginal and Torres Strait Islander people living in major cities.<sup>18</sup> However, from 1997 to 2010 there was a 39% reduction in deaths due to respiratory disease among Aboriginal and Torres Strait Islander people.<sup>9</sup>

Detection, diagnosis and management of asthma may be complicated by increased rate of respiratory infections and chronic lung disease in rural remote Aboriginal and Torres Strait Islander communities.

- Approximately 30% of Aboriginal and Torres Strait Islander people report respiratory problems.<sup>19</sup>
- Chronic cough in Aboriginal and Torres Strait Islander children may be under-reported because it is so common that is considered normal by parents and caregivers.<sup>20</sup>
- Pneumonia and COPD are the most common causes of hospitalisation for respiratory disease among Aboriginal and Torres Strait Islander people.<sup>18</sup> The prevalence of COPD among Aboriginal and Torres Strait Islander people cannot be accurately estimated.<sup>21</sup> Aboriginal and Torres Strait Islander people are more than 2.5 times more likely than non-Indigenous Australians to die from chronic lower respiratory disease (includes asthma, bronchitis, bronchiectasis, emphysema, and other COPD).<sup>22</sup>
- The prevalence of bronchiectasis is disproportionately high in remote Aboriginal communities, particularly in Central Australia, but is underdiagnosed.<sup>19, 23</sup> High-resolution computed tomography of the chest is necessary to diagnose bronchiectasis in adults.<sup>19</sup> In Aboriginal and Torres Strait Islander adults, it may be difficult to distinguish between asthma, COPD and bronchiectasis.<sup>21</sup> Bronchiectasis is associated with relatively rapid decline in lung function.<sup>19</sup> †
- Chronic suppurative lung disease is highly prevalent among Aboriginal and Torres Strait Islander children in remote communities.<sup>19</sup> The diagnosis of chronic suppurative lung disease is made in children who have symptoms and signs of bronchiectasis without radiographic features of bronchiectasis.<sup>19</sup> In Aboriginal and Torres Strait Islander children, it may be difficult to distinguish between

asthma and bronchiectasis or chronic suppurative lung disease.<sup>21</sup> ‡

- Protracted bacterial bronchitis is often misdiagnosed as asthma,<sup>24, 25</sup> but can also co-occur with asthma.<sup>25</sup> Protracted bacterial bronchitis might precede chronic suppurative lung disease, but this is not yet well understood.<sup>25</sup> Inadequate treatment of protracted bacterial bronchitis might put Aboriginal and Torres Strait Islander children at risk for chronic suppurative lung disease.<sup>25</sup> Recurrent episodes of protracted bacterial bronchitis that does not resolve after treatment (e.g. a 14-day course of antibiotics) require investigation for chronic suppurative lung disease, bronchiectasis and aspiration.<sup>25</sup>

► See: [Diagnosing asthma in children](#)

Go to: Multidisciplinary consensus group position statement [Management of bronchiectasis and chronic suppurative lung disease in Indigenous children and adults from rural and remote Australian communities](#)

Go to: Thoracic Society of Australia and New Zealand and Lung Foundation Australia position statement [Chronic suppurative lung disease and bronchiectasis in children and adults in Australia and New Zealand](#)

#### Notes

† Chronic suppurative lung disease is defined as a clinical syndrome of respiratory symptoms and signs due to chronic endobronchial suppuration, including continuous, wet or productive cough > 8 weeks, with or without other features (e.g. exertional dyspnoea, symptoms of reactive airway disease, recurrent chest infections, growth failure, clubbing, hyperinflation or chest wall deformity).<sup>26</sup>

‡ Bronchiectasis is diagnosed in patients with both chronic suppurative lung disease and the presence of radiological features on a chest high-resolution computed tomography scan.<sup>26</sup>

Last reviewed version 2.0

### Non-respiratory comorbidity among Aboriginal and Torres Strait Islander peoples

Aboriginal and Torres Strait Islander peoples have a high burden of chronic diseases that may affect asthma control and management, including:<sup>9</sup>

- diabetes
- cardiovascular disease
- kidney disease
- ear disease
- mental health problems.

► See: [Comorbid conditions and asthma](#)

### Written asthma action plans for adults

Every person with asthma should have their own written asthma action plan.

When provided with appropriate self-management education, self-monitoring and medical review, individualised written action plans consistently improve asthma health outcomes if they include two to four action points, and provide instructions for use of both inhaled corticosteroid and oral corticosteroids for treatment of flare-ups.<sup>27</sup> Written asthma action plans are effective if based on symptoms<sup>28</sup> or personal best peak expiratory flow (not on percentage predicted).<sup>27</sup>

#### How to develop and review a written asthma action plan

A written asthma action plan should include all the following:

- a list of the person's usual medicines (names of medicines, doses, when to take each dose) – including treatment for related conditions such as allergic rhinitis
- clear instructions on how to change medication (including when and how to start a course of oral corticosteroids) in all the following situations:
  - when asthma is getting worse (e.g. when needing more reliever than usual, waking up with asthma, more symptoms than usual, asthma is interfering with usual activities)
  - when asthma symptoms get substantially worse (e.g. when needing reliever again within 3 hours, experiencing increasing difficulty breathing, waking often at night with asthma symptoms)
  - when peak flow falls below an agreed rate (for those monitoring peak flow each day)
  - during an asthma emergency.
- instructions on when and how to get medical care (including contact telephone numbers)
- the name of the person writing the action plan, and the date it was issued.

#### Table. Options for adjusting medicines in a written asthma action plan for adults

Please view and print this figure separately: <http://www.astmahandbook.org.au/table/show/42>

## Table. Checklist for reviewing a written asthma action plan

- Ask if the person (or parent) knows where their written asthma action plan is.
- Ask if they have used their written asthma action plan because of worsening asthma.
- Ask if the person (or parent) has had any problems using their written asthma action plan, or has any comments about whether they find it suitable and effective.
- Check that the medication recommendations are appropriate to the person's current treatment.
- Check that all action points are appropriate to the person's level of recent asthma symptom control.
- Check that the person (or parent) understands and is satisfied with the action points.
- If the written asthma action plan has been used because of worsening asthma more than once in the past 12 months: review the person's usual asthma treatment, adherence, inhaler technique, and exposure to avoidable trigger factors.
- Check that the contact details for medical care and acute care are up to date.

Asset ID: 43

## Templates for written asthma action plans

Templates are available from National Asthma Council Australia:

- National Asthma Council Australia colour-coded plan, available as a printed handout that folds to wallet size and as the *Asthma Buddy* mobile site
- Asthma Cycle of Care asthma action plan
- A plan designed for patients using budesonide/formoterol combination as maintenance and reliever therapy
- Remote Indigenous Australian Asthma Action Plan
- Every Day Asthma Action Plan (designed for remote Indigenous Australians who do not use written English – may also be useful for others for whom written English is inappropriate).

Some written asthma action plans are available in community languages.

Software for developing electronic pictorial asthma action plans<sup>29, 30</sup> is available online.

- ▶ Go to: National Asthma Council Australia's [Asthma Action Plan Library](#)  
Download: Imperial College London's [Electronic Asthma Action Plan](#)

## *Asthma self-management resources for Aboriginal and Torres Strait Islander people*

Templates for written asthma action plans have been specifically designed for Aboriginal and Torres Strait Islander people. These include:

- Remote Indigenous Australian Asthma Action Plan
- Every Day Asthma Action Plan (designed for remote Aboriginal Australians who do not use written English).

- ▶ Go to: National Asthma Council Australia's [Library of written asthma action plan templates](#)

*Short wind* resources (booklets and flip chart) developed by Asthma Foundation Northern Territory explain:

- how asthma medicines are used
- how to take asthma medicine
- how to use puffers and spacers.

- ▶ Go to: Asthma Foundation Northern Territory [Short wind resources](#)

An online library of health promotion resources designed for Aboriginal and Torres Strait Islander people is available through LungInfoNet. LungInfoNet is the respiratory health stream of the Australian Indigenous HealthInfoNet from Edith Cowan University.

- ▶ Go to: [LungInfoNet](#)

## *Australian government health initiatives for Aboriginal and Torres Strait Islander people*

### **Asthma Spacer Ordering System**

The Asthma Spacer Ordering System provides Aboriginal and Torres Strait Islander health services with access to low cost asthma spacers for their clients.

- ▶ Go to: Asthma Australia's [Asthma Spacer Ordering System](#) page

## Health Assessment Medicare items

The MBS Health Assessment for Aboriginal and Torres Strait Islander People (MBS Item 715) reimburses health professionals for health assessments for (any of):<sup>8</sup>

- Aboriginal and Torres Strait Islander children (<15 years)
- Aboriginal and Torres Strait Islander adults (≥15 years and < 55 years)
- Aboriginal and Torres Strait Islander older people (≥ 55 years).

This item is linked to follow-on item numbers to support follow-up care by allied health professionals and Aboriginal/Torres Strait health workers and practitioners to manage asthma and comorbid conditions.

► Go to: [Medicare Health Assessment for Aboriginal and Torres Strait Islander People](#)

## The Indigenous Chronic Disease Package

The Indigenous Chronic Disease Package provides a range of supports to Aboriginal and Torres Strait Islander people with chronic disease or at risk of chronic disease. The package includes:<sup>31</sup>

- subsidy of PBS medicines (reduced copayments for Aboriginal and Torres Strait Islander people with chronic disease)
- orientation and training for Aboriginal and Torres Strait Islander Outreach Workers in Aboriginal community-controlled general practices
- professional development scholarships and clinical placement scholarships for nurses working in Community Controlled Aboriginal/Torres Strait Island Health Services
- general practitioner registrar training posts for Aboriginal Medical Services
- Practice Incentives Program Indigenous Health Incentive to support general practices and Indigenous health services to provide care for people with chronic disease
- increased access to specialist medical and allied health care
- GPs can access these services to overcome barriers to health care for Aboriginal and Torres Strait Islander people.

► Go to: [Closing the Gap Indigenous Chronic Disease Package](#)

## National immunisation program

Additional vaccinations are recommended and reimbursed for Aboriginal and Torres Strait Islander people. Refer to national guidelines.

► Go to: [Australian Immunisation Handbook](#)

## Other resources

► Go to: Australian College of Nursing's [Australian Government scholarships](#) web page  
Go to: [General Practice Education and Training Limited](#)

Last reviewed version 2.0

## Health system initiatives that support asthma care

### Chronic Disease Management Medicare items

Patients with asthma are eligible for Chronic Disease Management Medicare items.<sup>7</sup> These include:

- Preparation of a GP Management Plan (Item 721)
- Review of a GP Management Plan (Item 732)
- Coordination of Team Care Arrangements (Item 723) for patients who need ongoing care from a multidisciplinary team of at least three health or care providers
- Coordination of a Review of Team Care Arrangements (Item 732)
- Contribution to a multidisciplinary care plan being prepared by another health or care provider (Item 729)
- Contribution to a multidisciplinary care plan being prepared for a resident of an aged care facility (Item 731).

GPs can be assisted by practice nurses, Aboriginal and Torres Strait Islander health practitioners, Aboriginal health workers and other health professionals.<sup>7</sup>

► Go to: Australian Government Department of Health's [Chronic Disease Management \(CDM\) Medicare Items](#) webpage

### Asthma cycle of care

The *Asthma cycle of care* is an Australian Government initiative to support primary care health professionals (GPs, other medical practitioners and trainees) to provide asthma care. It is implemented through the *Practice Incentives Program (PIP) Asthma Incentive* and applies to the clinical care of people with moderate-to-severe asthma, generally defined as people with (any of):<sup>32</sup>

- symptoms on most days

- use of preventative medication
- bronchodilator use at least three times per week
- hospital attendance or admission following an acute asthma flare-up.

The *Asthma cycle of care* involves at least two asthma-related consultations within 12 months for a patient with moderate-to-severe asthma, of which at least one visit is a planned asthma review. Each consultation includes:

- documenting the diagnosis, assessing asthma severity and assessing level of recent asthma symptom control
- reviewing the patient's use of and access to asthma medicines and inhaler devices
- providing a written asthma action plan (or documented alternative, if the patient is unable to use a written action plan)
- providing asthma self-management education
- reviewing the written or documented asthma action plan.

- ▶ Go to: Australian Government Department of Health's [Asthma cycle of care](#)
- Go to: Medicare's [Practice Incentive Program \(PIP\)](#)

## The Personally Controlled eHealth Record System

The eHealth record is an electronic record for a patient that contains a summary of their health information. Patients can choose to register for an eHealth record. Authorised healthcare professionals can access a patient's record and upload information to the record if their healthcare organisation has registered for the eHealth record system.

- ▶ Go to: Australian Government Department of Health's [eHealth Resources for Healthcare Providers](#)

## Health system initiatives for Aboriginal and Torres Strait Islander people

Health system initiatives to support the care of Aboriginal and Torres Strait Islander people include:

- Health Assessment Medicare items
- The Indigenous Chronic Disease Package
- The Asthma Spacer Ordering System.

- ▶ See: [Asthma in Aboriginal and Torres Strait Islander peoples](#)

## References

1. Australian Technical Advisory Group on Immunisation (ATAGI), Department of Health and Ageing. *The Australian Immunisation Handbook*. 10th Edition. Department of Health and Ageing, Canberra, 2013. Available from: <http://www.immunise.health.gov.au/internet/immunise/publishing.nsf/Content/Handbook10-home>
2. National Aboriginal Community Controlled Health Organisation. *Creating the NACCHO Cultural Safety Training Standards and Assessment process. A background paper*. National Aboriginal Community Controlled Health Organisation, Canberra, 2011. Available from: <http://www.csheic.org.au/wp-content/uploads/2015/11/CSTStandardsBackgroundPaper-NACCHO.pdf>
3. Australian Health Ministers' Advisory Council Standing Committee for Aboriginal and Torres Strait Islander Health Working Party. *Cultural respect framework for Aboriginal and Torres Strait Islander health, 2004-2009*. Department of Health South Australia, Adelaide, 2004. Available from: <http://www.sapo.org.au/pub/pub2142.html>
4. Thomson N. Cultural respect and related concepts: a brief summary of the literature. *Australian Indigenous Health Bulletin*. 2005; 5: 1-11. Available from: <http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.499.6685>
5. Bailey EJ, Cates CJ, Kruske SG, et al. Culture-specific programs for children and adults from minority groups who have asthma. *Cochrane Database Syst Rev*. 2009; Issue 2: CD006580. Available from: <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD006580.pub4/full>
6. Valery PC, Masters IB, Taylor B, et al. An education intervention for childhood asthma by Aboriginal and Torres Strait Islander health workers: a randomised controlled trial. *Med J Aust*. 2010; 192: 574-9. Available from: <https://www.mja.com.au/journal/2010/192/10/education-intervention-childhood-asthma-aboriginal-and-torres-strait-islander>
7. Australian Government Department of Health. *Chronic Disease Management (CDM) Medicare Items*. Australian Government, Canberra, 2013. Available from: <http://www.health.gov.au/internet/main/publishing.nsf/Content/mbsprimarycare-chronicdiseasemanagement>
8. Australian Government Department of Health and Ageing. *Medicare Health Assessment for Aboriginal and Torres Strait Islander People*. Australian Government, Canberra, 2013. Available from: <http://www.health.gov.au/internet/main/publishing.nsf/Content/mbsprimarycareATSIMBSitem715>
9. Australian Institute of Health and Welfare. *Aboriginal and Torres Strait Islander Health Performance Framework 2012: detail analysis*. Australian Institute of Health and Welfare, Canberra, 2013. Available from: <http://www.aihw.gov.au/publication-detail/?id=60129543821&tab=2>
10. Australian Bureau of Statistics. *National Aboriginal and Torres Strait Islander Social Survey, 2008*. Cat. no. 4714.0. Australian Bureau of Statistics, Canberra, 2009. Available from: <http://www.abs.gov.au/ausstats/abs@.nsf/mf/4714.0/>
11. Australian Bureau of Statistics. *National Aboriginal and Torres Strait Islander Health Survey 2004-05*. Cat. no. 4715.0. Australian



- Bureau of Statistics, Canberra, 2006. Available from: <http://www.abs.gov.au/ausstats/abs@nsf/mf/4715.0>
12. Australian Bureau of Statistics (ABS), Australian Institute of Health and Welfare (AIHW). *The health and welfare of Australia's Aboriginal and Torres Strait Islander peoples 2008*. ABS and AIHW, Canberra, 2008. Available from: <http://www.aihw.gov.au/publication-detail/?id=6442468085>
  13. Walton SF, Weir C. The interplay between diet and emerging allergy: what can we learn from Indigenous Australians?. *Int Rev Immunol*. 2012; 31: 184-201. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/22587020>
  14. Cunningham J. Socioeconomic status and self-reported asthma in Indigenous and non-Indigenous Australian adults aged 18-64 years: analysis of national survey data. *Int J Equity Health*. 2010; 9: 1 - 11. Available from: <http://www.equityhealthj.com/content/9/1/18>
  15. Shepherd CC, Li J, Zubrick SR. Socioeconomic disparities in physical health among Aboriginal and Torres Strait Islander children in Western Australia. *Ethn Health*. 2012; 17: 439-61. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/22292856>
  16. Australian Centre for Asthma Monitoring. *Asthma in Australia 2011: with a focus chapter on chronic obstructive pulmonary disease*. Asthma series no. 4. Cat. no ACM 22. Australian Institute of Health and Welfare, Canberra, 2011. Available from: <http://www.aihw.gov.au/publication-detail/?id=10737420159>
  17. O'Grady KA, Revell A, Maguire GP, et al. Lung health care for Aboriginal and Torres Strait Islander Queenslanders: breathing easy is not so easy. *Aust Health Rev*. 2011; 35: 512-9. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/22126958>
  18. MacRae A, Thomson N, Anomie, et al. *Overview of Australian Indigenous health status*. Perth, 2012. Available from: <http://www.healthinonet.ecu.edu.au/health-facts/overviews>
  19. Chang AB, Grimwood K, Maguire G, et al. Management of bronchiectasis and chronic suppurative lung disease in indigenous children and adults from rural and remote Australian communities. *Med J Aust*. 2008; 189: 386-93. Available from: <https://www.mja.com.au/journal/2008/189/7/management-bronchiectasis-and-chronic-suppurative-lung-disease-indigenous>
  20. Morey MJ, Cheng AC, McCallum GB, Chang AB. Accuracy of cough reporting by carers of Indigenous children. *J Paediatr Child Health*. 2013; 49: E199-203. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/23438209>
  21. O'Grady KF, Revell A, Maguire G, et al. *Lung Health Services for Aboriginal and Torres Strait Islander Peoples in Queensland*. Queensland Health, Brisbane, 2010. Available from: <http://healthbulletin.org.au/articles/lung-health-services-for-aboriginal-and-torres-strait-islander-peoples-in-queensland/>
  22. Australian Indigenous HealthInfoNet. *Summary of Australian Aboriginal and Torres Strait Islander health status, 2017*. Edith Cowan University, Mount Lawley, WA, 2018.
  23. Chang AB, Masel JP, Boyce NC, et al. Non-CF bronchiectasis: clinical and HRCT evaluation. *Pediatr Pulmonol*. 2003; 35: 477-83. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/12746947>
  24. Craven V, Everard ML. Protracted bacterial bronchitis: reinventing an old disease. *Arch Dis Child*. 2013; 98: 72-76. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/23175647>
  25. Chang AB, Redding GJ, Everard ML. Chronic wet cough: Protracted bronchitis, chronic suppurative lung disease and bronchiectasis. *Pediatr Pulmonol*. 2008; 43: 519-31. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/18435475>
  26. Chang AB, Bell SC, Byrnes CA, et al. Chronic suppurative lung disease and bronchiectasis in children and adults in Australia and New Zealand. *Med J Aust*. 2010; 193: 356-65. Available from: <https://www.mja.com.au/journal/2010/193/6/chronic-suppurative-lung-disease-and-bronchiectasis-children-and-adults-australia>
  27. Gibson PG, Powell H. Written action plans for asthma: an evidence-based review of the key components. *Thorax*. 2004; 59: 94-99. Available from: <http://thorax.bmj.com/content/59/2/94.full>
  28. Powell H, Gibson PG. Options for self-management education for adults with asthma. *Cochrane Database Syst Rev*. 2002; Issue 3: CD004107. Available from: <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD004107/full>
  29. Roberts NJ, Mohamed Z, Wong PS, et al. The development and comprehensibility of a pictorial asthma action plan. *Patient Educ Couns*. 2009; 74: 12-18. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/18789626>
  30. Roberts NJ, Evans G, Blenkhorn P, Partridge M. Development of an electronic pictorial asthma action plan and its use in primary care. *Patient Educ Couns*. 2010; 80: 141-146. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/19879092>
  31. Australian Government Department of Health. *Closing the Gap: Tackling Indigenous Chronic Disease Package*. Australian Government, Canberra, 2012. Available from: <http://webarchive.nla.gov.au/gov/20110313140138/http://www.health.gov.au/internet/main/publishing.nsf/Content/work-ab-gap>
  32. Australian Government Medicare Australia. *Practice Incentives Program Asthma Incentives Guidelines - August 2011*. Medicare Australia, Canberra, 2011. Available from: <http://www.medicareaustralia.gov.au/provider/incentives/pip/forms-guides.jsp#N10068>