



Asthma Model of Care

Respiratory Health Network

August 2012

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Asthma Model of Care Review Working Group members

Ms Charlotte Allen	Clinical Nurse Specialist- Asthma, Princess Margaret Hospital
Dr Rhonda Clifford	Associate Professor of Pharmacy Practice, School of Medicine and Pharmacology, University of Western Australia
Dr Kevin Gain	Chief Pulmonary Physiologist, Royal Perth Hospital
Ms Nicole Deprazer	Development Officer, Health Networks Branch, Department of Health WA
Clinical Associate Professor Peter Kendall	Head of Department, Respiratory Medicine, Fremantle Hospital Co-Lead Respiratory Health Network
Professor Lou Landau	Professor, Paediatrics & Child Health
Professor Stephen Stick	School of Paediatrics and Child Health, University of Western Australia Head of Department, Respiratory Medicine, Princess Margaret Hospital for Children NHMRC Practitioner Fellow Co-Lead Respiratory Health Network
Ms Lisa Terlick/ Leith Mete; Ms Donna Howe	Health Services Manager; Senior Training Officer, Asthma Foundation of WA
Ms Leanne Ross & Ms Liz Whitehurst	Respiratory Nurse Educator, Geraldton Hospital
Ms Kim Watkins	Pharmacist
Dr David Whyatt	Project Officer, Asthma Intervention and Education Study

Refer to [Appendix 1](#) for a list of those involved in the development of the 2008 Asthma Model of Care.

Executive Summary

Asthma is a chronic condition with attacks occurring at varying intervals and with varying degrees of severity. Asthma in Australia is a major health, social and economic burden for the individual and the community¹.

The Asthma Model of Care is an articulation of best practice care for those at risk of or diagnosed with asthma across the continuum of care. The Model of Care represents a fundamental shift away from an acute focus which is consistent with the Chronic Lung Condition Model of Care and the [WA Chronic Health Conditions Framework 2011-2016](#)². The focus is on optimal pathways of care and the management of long-term conditions through self-management, disease and case management.

The Model builds on the knowledge and capacity underpinning current services for people with Asthma and evidence-based best practice as documented in the WA Chronic Respiratory Disease Service Improvement Framework (CSIF) November 2005. The CSIF approach has been endorsed by Health Networks and sets out ten standards each relating to a stage in the disease continuum:

1. Reducing the risk of asthma
2. Early diagnosis of asthma
3. Asthma self-management
4. Assessing asthma severity
5. Preventing acute exacerbation of asthma
6. Stabilising chronic asthma
7. Management of the acute episode in the Emergency Department
8. Management of the transition of care/ discharge planning
9. Paediatric asthma management, and
10. Asthma education

The objectives of the Asthma Model of Care are to:

- I. Outline a Model of Care to facilitate the implementation of the ten Asthma standards focusing on:
 - The development and dissemination of child and adolescent asthma guidelines
 - The development and dissemination of adult asthma guidelines
 - Workforce education
 - Consumer education
 - Optimised access to and use of appropriate equipment and devices
- II. Briefly outline current service delivery and report on the implementation of the ten standards for Asthma as set out in the CSIF

The Model seeks to improve access to services for people in both metropolitan and rural WA.

The key recommendations of the Model of Care are:

- Reducing the risk of asthma (CSIF Standard 1) by developing a coordinated plan to address smoking, particularly amongst target populations including Aboriginal communities, people with mental health issues, pregnant women, low socio-economic populations and prisoners. This can be achieved by improving access to community-based smoking cessation programs population based health awareness

campaigns recommend people seek early medical advice if they have respiratory symptoms, especially smokers.

- That the **asthma guidelines** (CSIF Standards 3-9) and Asthma Action Plans for children and adolescents and adults are endorsed, distributed and implemented across WA.
- Increase access to spirometry for the **early diagnosis** (CSIF Standard 2) of respiratory conditions including COPD through identification and training for spirometry providers.
- **Management of asthma** (CSIF Standards 3-9) through access to integrated and coordinated services with a focus on consumer education and statewide referral pathways.
- That best practice, evidence based, **consumer education** (CSIF Standard 3) is universally accessible state wide to all people with asthma and their carers/parents to support consumer decision making and self-management.
- That workforce education and training should be provided to all health professionals, based on a minimum set of standards for training and syllabus content of asthma education and delivered through various media including online self-directed learning courses. Options for credentialing of asthma educators as a mechanism to maintain quality standards should be investigated.
- That guidelines to ensure correct use and maintenance of equipment, devices and technology are developed, disseminated and implemented state-wide across the primary, secondary and tertiary settings.
- Support the development of **information, communication technology** to enable multi-disciplinary care planning (ie Telehealth) and ensure all patients with asthma have better access to, and control of their personal and health care information (ie. hand held records and/or e-health records).

1. Introduction

1.1 Diagnosis and definition of asthma

Asthma is a chronic condition with attacks occurring at varying intervals and with varying degrees of [severity](#). In order for comparisons to be valid, a consistent definition of asthma needs to be applied. The following descriptive ‘definition’ of asthma has been widely adopted since 1997:

“Asthma is a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role, in particular, mast cells, eosinophils, T lymphocytes, macrophages, neutrophils and epithelial cells. In susceptible individuals this inflammation causes recurrent episodes of wheezing, breathlessness, chest tightness and coughing, particularly at night or in the early morning. These episodes are usually associated with widespread but variable airflow obstruction that is often reversible either spontaneously or with treatment. The inflammation also causes an increase in existing bronchial hyper responsiveness to a variety of stimuli”³.

For population surveillance purposes, an operational definition for current asthma has been recommended in the [Review of Proposed National Health Priority Area Asthma Indicators and Data Sources](#)⁴.

The following definition can be used in large population surveys to identify people who have been diagnosed with and still experience asthma:

‘Current asthma’ is applied to people who report ever being told they have asthma by a doctor or nurse and who additionally report that they have had symptoms of asthma or taken treatment for asthma in the last 12 months.

A clinical diagnosis of asthma is often prompted by symptoms such as episodic breathlessness, wheezing, and chest tightness. Seasonal variability of symptoms and a positive family history of asthma and atopic disease are also helpful diagnostic guides. Measurements of lung function, and particularly the reversibility of lung function abnormalities, does however, greatly enhance diagnostic confidence. Importantly the absence of abnormal spirometry results or lack of reversibility does not exclude a diagnosis of asthma.

In the case of infants and young children who are not able to use a spirometer or peak flow meter reliably, a therapeutic trial of a beta2 agonist may support the diagnosis.

For the purposes of this Model of Care, ‘[severity of asthma](#)’ refers to the intrinsic intensity of the disease and ‘[control of asthma](#)’ is a function of the degree of individual responsiveness and adherence to treatment over the degree of severity, impairment and risk.

1.2 Asthma contributing factors

The following are risk factors which have been identified as triggering or contributing to the disease⁵. These factors are important for identifying people most at risk of developing asthma and for whom prevention strategies may be effective. They are:

- Parental smoking (post natal)
- Maternal smoking (in utero)
- Family history of asthma
- Exposure to infections early in life
- Pre-term birth
- Low birth weight
- Occupational exposure to pollutants

The following is an incomplete list of triggers, which may induce or aggravate asthma:⁵

- Cigarette smoke
- Foods, especially nuts
- Occupational sensitisers
- Viral respiratory infections
- Exercise
- Emotions e.g. anxiety, stress, laughter
- Exposure to known allergens e.g. dust mite, pollens, animal dander, moulds
- Drugs e.g. aspirin, Non Steroidal Anti Inflammatory Drugs (NSAIDs), beta blockers and some complementary medicines
- Food additives e.g. colourings, metabisulfite, monosodium glutamate
- Gastro-oesophageal reflux, allergic rhinitis or sinusitis
- Exposure to irritants e.g. industrial chemicals, cleaning agents, pressure pack products

2. Methodology

2.1 Initial Model of Care development

In July 2008, the Respiratory Health Network of the Department of Health WA released the Asthma Model of Care. This document articulated best practice care for those at risk of or diagnosed with asthma across the continuum of care. It was prepared by a multidisciplinary Working Party convened by the Respiratory Health Network and the WA Child and Youth Health Network in September 2007 (see [Appendix 1](#) for a full list of members).

The 2008 Asthma MOC was developed around the ten standards for asthma from the WA Chronic Respiratory Disease Clinical Service Improvement Framework (CSIF)⁶ November 2005 (which aligns with the [National Chronic Disease Strategy](#)⁷). The WA Chronic Respiratory Disease CSIF was developed by leading WA respiratory clinicians to improve the delivery of services for Western Australians affected by chronic respiratory disease, specifically chronic obstructive pulmonary disease (COPD) and asthma.

A supporting document was developed alongside the 2008 Asthma MOC which included several guidelines and resources for the treatment of asthma. Specifically, the WA Child and Youth Health Network Acute Respiratory Conditions Working Group developed the Asthma Action Plan for Children, the clinical guidelines for the Management of Acute Asthma in Children and Adolescents in General Practice and the Management of Acute Asthma in Children and Adolescents in the Emergency Departments which were included in the document. A guideline for the Management of Acute Severe Asthma in Adults was also presented.

2.2 Model of Care update process

In January 2011, several members of the original Asthma Model of Care Working Group along with additional representatives came together to form the Working Group that would oversee the update of the 2008 Asthma Model of Care (see [Acknowledgements](#) for a list of Working Group members). The purpose of the update was to:

- Ensure the Model of Care is consistent with the current evidence based best practice for the prevention and treatment of Asthma
- Review the implementation of the Model of Care recommendations

The updated Asthma Model of Care is still written in such a way that it aligns to the ten standards for asthma of the WA Chronic Respiratory Disease CSIF⁶, which include:

1. Reducing the risk of asthma
2. Early diagnosis of asthma
3. Asthma self-management
4. Assessing asthma severity
5. Preventing acute exacerbation of asthma
6. Stabilising chronic asthma
7. Management of the acute episode in the Emergency Department
8. Management of the transition of care/discharge planning
9. Paediatric asthma management, and
10. Asthma education.

Four key priority areas were identified that would contribute most to the implementation of the CSIF ten standards for asthma. They are:

- Reduce the exposure of newborns, infants and children to second hand smoke and a new paradigm in smoking prevention and cessation focusing on nicotine addiction interventions
- The development of asthma guidelines for children and adolescents and adults
- A focus on workforce and consumer education
- A focus on equipment, devices and technology

Stakeholders were provided with the opportunity to provide feedback electronically at the onset of the update process to report on the implementation of the Model of Care recommendations. The draft document was released for broad consultation to allow for further comments and feedback before it was finalised. The Respiratory Health Network Executive Advisory Group endorsed the final draft of the updated Model of Care.

To ensure a consistent approach to asthma prevention, management and treatment at a state and national level in Australia, the Asthma Model of Care is informed by the following key documents:

- [Asthma Management Handbook, National Asthma Council 2006](#)⁸
- [Global Strategy for Asthma Management and Prevention \(Updated 2011\), Global Initiative for Asthma \(GINA\)](#)⁵
- [National Asthma Strategy 2006-2008, Australian Health Ministers' Conference](#)⁹
- [National Service Improvement Framework for Asthma, Australian Health Ministers' Conference 2005](#)¹⁰
- [National Tobacco Strategy 2004–2009, Ministerial Council on Drug Strategy](#)¹¹ and [WA Tobacco Action Plan 2007 - 2011, Department of Health WA](#)¹²
- [WA Chronic Conditions Framework 2011-2016, Health Networks Branch, Department of Health WA](#)²
- WA Chronic Respiratory Disease Clinical Service Improvement Framework (CSIF) November 2005, Western Australian Health Respiratory Reference Group, Department of Health WA⁶
- [Draft WA Health Promotion Strategic Framework 2012-2016, Chronic Disease Prevention Directorate, Department of Health](#)¹³
- [Framework for the Treatment of Nicotine Addiction, Respiratory Health Network, Department of Health WA](#)¹⁴

3. Progress since the 2008 Asthma Model of Care

What has happened since the 2008 Asthma Model of Care?

There have been a number of improvements in the area of smoking cessation including:

- The [Framework for the Treatment of Nicotine Addiction](#) was released by the Respiratory Health Network in November 2010 to provide a state wide approach across primary, secondary and tertiary settings to deliver comprehensive and integrated smoking cessation treatment and support services.
- New restrictions outlined by the [Tobacco Products Control Amendment Act 2009](#) (the Amendment Act) commenced on 22 September 2010. The new Act prohibits:
 - display of tobacco products, packages and smoking implements at point of sale;
 - smoking “between the flags” at a patrolled swimming area on a beach;
 - smoking in outdoor eating areas;
 - smoking within 10 metres of playground equipment in a public place; and
 - smoking in or on vehicles if someone under 17 years old is in or on the vehicle.
- The [Rockingham Kwinana Division of General Practice Living Well Without Smoking Program](#) and the [Goldfields Esperance GP Network Butt Out Nicotine Addiction Program](#) have had over 700 people participate in the programs since May 2008. These 12 week intensive programs, designed to assist clients with nicotine addiction, were initially funded through the Australian Better Health Initiative Nicotine Addiction Treatment Project and achieved approximately 60% abstinence rates at the end of the program. An evaluation report of the program is now available.
- The [Asthma Foundation WA](#) runs a number of initiatives including the [Newborns Asthma and Parental Smoking \(NAPS\) Project](#) ‘Care for my air!’ and ‘Fresh air grows solid babies!’ and the Indigenous Women’s Project which are aimed at two important target populations. They are continuing to be rolled out and brief intervention training is being delivered to numerous health professionals and promoted in community settings.

In terms of progress with guidelines and resources:

- The short acting beta-agonists (reliever) guidelines (SABA guidelines) for pharmacists have been released in WA and are soon to be released nationally.
- The SABA guidelines were launched with the Asthma Action Plan Card. This card brings the community Pharmacist into the circle of health professionals managing asthma, recognising the frequency of contact with patients.
- The Asthma Action Card has been revised since its initial launch to ensure it is easy to understand and use (see [Celebrating Achievements: Case studies](#)).
- There is ongoing collaboration between the Respiratory Health Network and the University of Western Australia in researching pharmacy practice.

Areas for improvement

Although a range of education services is available free of charge, uptake of and referral to education services (i.e. those provided by AFWA) remains low and there are limited services in rural and remote areas.

Engagement between the Area Health Services and community pharmacy needs improvement. This lack of engagement contributes to pharmacists acting in isolation as primary care practitioners. A two way referral system would be of benefit to patients. This is part of a wider deficit in chronic disease management capability in WA.

Celebrating achievements: Case studies

Asthma Action Plan Cards

The implementation of the Card took a multidisciplinary, collaborative approach involving Pharmaceutical Society of WA, the Asthma Foundation WA (AFWA) and WA Health Networks and University of WA.

Over 30, 000 cards have been delivered to community pharmacists, along with a comprehensive instructional campaign that included a booklet, one on one education, lectures, seminars, web information and newsletters. Medical practitioners received information via newsletters, detailing and web information. The AFWA informed consumers, Asthma Educators and Medical Practitioners using similar methods.

A working group was convened to revise the card to make it more user-friendly and the updated version is now available. Initial feedback suggests the traffic light colour coding and the step-by-step layout is easier to understand.

Refer to the [fact sheet](#) for more information and ordering instructions.

Nicotine Addiction Treatment Project

Two 12 week intensive programs, designed to assist clients with nicotine addiction, were funded through the Australian Better Health Initiative Nicotine Addiction Treatment Project. The [Rockingham Kwinana Division of General Practice Living Well Without Smoking Program](#) and the [Goldfields Esperance GP Network Butt Out Nicotine Addiction Program](#) offered clients either face to face or phone support fortnightly of up to 5 hours. At week 7 clients were offered a healthy lifestyle assessment. This was an opportunity to evaluate the clients' risk of chronic disease and provide referral into appropriate services. At week 12 the client was given an hour session of relapse information and formally graduated from the program. Follow ups were provided to participants by phone at both 3 and 6 months. The table below provides a summary of the program evaluation results.

	Living Well Without Smoking Program	Butt Out Smoking Cessation Program
Number of referrals	595	680
Main source of referrals	GP (78%)	Promotions & pit stops (54%)
Number of participants	426	269
Quit rate by participants	61%	49%

4. Asthma Model of Care

Focus areas of the Asthma Model of Care

Based on the current service provision in WA and the gaps that have been identified, the Asthma Model of Care will focus on four major areas that will result in an integrated Model of Care across the continuum of care and facilitate the implementation of the WA Chronic Respiratory CSIF 10 standards for asthma. They are:

- Reduce the exposure of newborns, infants and children to second hand smoke and a new paradigm in smoking prevention and cessation focusing on nicotine addiction interventions
- The development of asthma guidelines for
 - Children and adolescents
 - Adults
- A focus on workforce and consumer asthma education and information
- A focus on equipment, devices and technology

Refer to [Section 6](#) for a discussion of the current services and gaps in asthma service provision.

Guiding principles and enablers

The Asthma Model of Care takes a holistic, consumer-centred, lifespan approach to the provision of services for patients with asthma. It builds on the knowledge, best practice, service delivery models and capacity of existing programs and services. It outlines best practice through the application of a set of service principles across identified clinical streams and patient flow continuums.

It aligns with the Chronic Lung Condition Model of Care which describes the common core service components of the existing respiratory Models of Care, and thus sits hierarchically above the [Asthma](#), [COPD](#) and [Cystic Fibrosis](#) Models of Care. The generic nature of the Chronic Lung Condition Model of Care provides a blueprint for implementing consumer-focussed health services for addressing more than one chronic lung condition and implementing more than one Model of Care however it does not replace the detail provided by the condition-specific Models of Care.

The Model of Care aims to ensure patients receive:

“The **right care**, at the **right time**, by the **right team**, in the **right place**”

All of the Respiratory Health Network Models of Care are underpinned by four guiding principles as outlined by the Chronic Lung Condition Model of Care and the WA Chronic Health Conditions Framework 2011-2016. The principles are:

1. **Integration and service coordination**
2. **Interdisciplinary care planning and case management**
3. **Evidence-based, consumer-centred care**
4. **Health literacy and self-management for chronic health conditions**

In WA health, system wide reform and improved health outcomes is dependent on a number of key enablers including:

- Quality and safety
- Financing and system performance
- Infrastructure including clinical service planning and strategic partnerships
- Information technology including eHealth
- Skilled workforce and capacity including education and professional development
- Research and innovation

For a more detailed exploration of the guiding principles and system enablers refer to the Chronic Lung Condition Model of Care (draft) and the [WA Chronic Health Conditions Framework 2011-2016](#)².

An important aspect of workforce capacity specific to asthma is the involvement of **General Practitioners (GP) and pharmacists** as primary health providers. They have a number of key roles including the prevention, early identification and diagnosis of asthma. For those with asthma, the GP has three key roles:

- to meet general health needs,
- to conduct regular monitoring and surveillance of the disease and ensuring the completion of an Asthma Action Plan for each patient and
- case management, coordination and referral to specialist services as appropriate.

The Pharmacist has a “new” duty of care in providing over-the-counter medicines, such that:

- the medication is for the right person, for whom such treatment is indicated
- the medication is used correctly
- the patient is referred to their doctor when the asthma is poorly controlled
 - The SABA guidelines clearly and simply outline the key signs of poor asthma control although pharmacists still need to be aware of the other signs of poor asthma control as outlined by the [NAC Asthma Management Handbook 2006](#).
- the patient is provided with an Asthma Action Plan and encouraged to speak with their GP about it

Another pertinent issue for those with asthma and others with chronic respiratory diseases is the **transition from paediatric to adult services** for adolescents and young adults. This needs to be planned as part of the overall asthma care plan. Successful transition to adult care is associated with improved health outcomes. Health professionals working with adolescents and young adults need to be aware of the impact of adolescence on the management of chronic disease, as well as the impact of chronic disease on normal adolescent development. Increasing independence, challenging of authority and experimenting with health-risk behaviours are features of normal adolescent development which may have a significant impact on asthma care. Training in adolescent health can help professionals to engage well with adolescents and young adults, in order to improve health outcomes for this group. The Child and Youth Health Network have developed the [Paediatric Chronic Diseases Transition Framework](#) which extends prior work and provides a new focus on improving the transition of young people with chronic disease and disability from paediatric to adult care. Its impact is yet to be measured.

4.1 Reducing harm and prevalence of smoking and second hand smoke

As outlined previously in the Model, tobacco smoking is one of the major factors for developing asthma and triggering or worsening symptoms. This can be caused by both active smoking and exposure to environmental tobacco smoke in people with asthma. In-utero exposure, that is direct exposure of the foetus to products of tobacco smoke, is the major risk factor for wheeze in children in the first five years of life¹⁵. The most overwhelming fact is that a reduction in the smoking rate will result in a reduction in the incidence of asthma both in adults and children.

A holistic approach targeting the general and at risk populations, tobacco legislation and regulation, taxation and restrictions on smoking in public and assessment of smokers in hospitals is needed. Population based efforts to reduce the uptake and prevalence of smoking and reduce exposure to environmental smoke are supported by this Model of Care. Such efforts are outlined in the draft WA Health Promotion Strategic Framework 2011-2016 and the [WA Tobacco Action Plan 2007-2011](#)¹². This Model of Care also supports the view that smoking is an addiction which requires support and treatment to overcome in many cases. A detailed exploration of the treatment of nicotine addiction is out of scope for this Model of Care as it is covered by the Respiratory Health Network's [Framework for the Treatment of Nicotine Addiction](#). Of particular relevance to reducing the risk of asthma are campaigns to reduce or eliminate maternal smoking and smoking in homes and cars¹⁶.

4.2 Asthma guidelines

The Children and Adolescent guidelines and the Adult guidelines outlined in the Asthma Model of Care supporting document have been developed to support the implementation of the Model of Care. They represent best practice and are based on the [NAC Asthma Management Handbook 2006](#).

4.2.1 Children and adolescent asthma guidelines (CSIF Standard 9)

The WA Child and Youth Health Network Acute Respiratory Disease Working Party has developed the child and adolescent guidelines (see Section 2 in supporting document) in consultation with key clinical and stakeholder groups.

The guidelines include the:

- Clinical Guidelines for the Management of Acute Asthma in Children and Adolescents in General Practice
- Management of Acute Asthma in Children and Adolescents in Emergency Departments.
- Asthma Action Plan for Children (and spacer use document)

4.2.2 Adult asthma guidelines (CSIF Standards 3-8)

The Clinical Guidelines for the Management of Acute Asthma in Adults (see Section 3 in supporting document) are a revision and update of a widely used guideline developed by a health system-wide group of key stakeholders including emergency department, allergy and immunology and intensive care physicians as well as nurses, pharmacists and GPs. It is consistent with the [NAC guidelines](#) and the general principles can be translated into any health setting. It does differ from other national guidelines as it has had the input of emergency departments (ED) and intensive care units (ICU) and there

is the potential for earlier intervention with adrenaline. Likewise, local guidelines for transfer to secondary or tertiary services will apply.

The Model of Care recognises that how the guidelines are applied in practice may differ depending on the individual patient. For example, an individual patient may not be able to manage a breath hold if presenting with an acute attack. The guidelines also take into account the patient's comfort levels. For instance, allowing for brief pauses between salbutamol administrations.

4.2.3 Asthma Action Plans

A written Asthma Action Plan is an integral tool in the management of asthma and enables people with asthma to manage and respond appropriately to the onset of symptoms. This Model of Care proposes that every person with asthma should have a current Asthma Action Plan and be trained to use it based on the principles of self management. The Asthma Action Plans for children and adolescents and adults have been developed to support the guidelines and optimise self management and best practice in the management of any deterioration and action. (See Section 1 and 4 in supporting guidelines).

The Children and Adolescent Asthma Action Plan includes detailed information on spacer technique as regular use can have a significant positive impact on chronic asthma management.

The [Adult Asthma Action Plan](#) includes a section for use by community pharmacists, reinforcing the multidisciplinary nature of community asthma management.

Both Asthma Action Plans are designed to be completed (with the patient) by the GP or Specialist Physician. Individual hospital emergency departments may issue a temporary action plan (also known as an asthma management discharge plan or short term asthma management plan) that should not be confused with the individualised written action plan drawn up together by the doctor and patient.

An Asthma Action Plan can include information that is sometimes referred to as a personal health record. Ideally an electronic record would be appealing to many patients not willing to use "paper based" records. e.g. Applications for iPhones.

4.3 Consumer education and workforce education and training (CSIF Standard 3 & 10)

Asthma education is necessary to empower patients with the confidence, skills and motivation required to self manage their asthma and participate in decision-making about their care^{17 18}. The Model promotes a consumer focused service that includes self management programs, timely access to evidence based consumer education and information about services. To achieve this requires an informed, well educated, trained workforce.

The Asthma Action Plans describe the optimum management of asthma and consumer education should mirror these Plans.

To overcome the variability of content in consumer education and access to best practice education and training for health professionals, a comprehensive, coordinated approach to training and education is needed. This should include a centralised location, such as a website, where current best practice resources for both consumers and health professionals can be easily accessed.

4.3.1 Consumer information and education

Information and education for people with asthma and their family/carers is required for the optimal management of asthma. The current best practice education is based on [NAC Asthma Management Handbook 2006](#) and the collaborative [NAC and Department of Health and Ageing Asthma Cycle of Care](#).

Education should begin at the time of diagnosis and be a significant component of all subsequent consultations. Consumer education should be appropriate to the person's needs on the continuum of care and have a strong emphasis on self management. Health professionals should reaffirm prior education and information, reinforce and build on what has been provided.

Mainstream media coverage is another avenue to assist with promoting key messages (i.e. Encouraging people to use Asthma Action Plans) to the general public. Media interest in this condition is hard to attract, because it is perceived as mild and common and the fact that severe asthma exacerbations that are not recognised and treated appropriately can be fatal, may need to be reiterated.

Another message to promote through mass media is that people with asthma do not need to accept their symptoms as a part of life but rather should aim for better asthma control which can improve their quality of life.

Increasing awareness of consumer education information and services amongst health professionals and establishing referral processes will improve uptake of available services, particularly amongst those consumers who may not be self motivated. This is particularly important amongst highly accessible health professionals such as pharmacists.

This could include the introduction of formal referral forms which are quick and simple to use. Referral forms to education programs by Asthma Foundation WA can be accessed at <http://www.asthmawa.org.au/Health-Professionals/Referral-For-for-Asthma-Education/>

The following table sets out **key information and education components** by health care setting.

Table 1. Asthma education by health care setting

Asthma Education by health care setting	GP/Practice	Designated Asthma Educator	Community support service *	Emergency Department	Hospital inpatient
Brief intervention for tobacco smoking and health promotion/education on smoking	X	X	X	X	X
Check device technique	X	X	X	X	X
Discuss medications, compliance and side effects	X	X	X**	X	X
Discuss Asthma First Aid	X	X	X	X	X
Discuss importance of exercise	X	X	X		X
Asthma Cycle of Care	X				
Discuss ongoing self management	X	X	X		X
Discuss and develop Asthma Action Plan and review schedule	X	X	X***		
Provide written information on asthma management	X	X	X	X	X
Provide asthma discharge plan				X	X
Reinforce need for follow up and review by GP		X	X	X	X

*Community Support Services include: The Asthma Foundation of WA, Community-based Pharmacists, Community Health Nurses, School Health Nurses, Community-based Physiotherapists

** Pharmacists may undertake this education as part of the [Home Medicines Review](#) for eligible patients

*** The new SABA Guidelines and Asthma Action Plan dictate that pharmacists are required to discuss the Asthma Action Plan but not prepare one as such.

The [British Guidelines on the Management of Asthma 2011](#) suggest that the Buteyko breathing technique, which focuses on control of hyperventilation, may be considered as a tool to help patients to control the symptoms of asthma¹⁹. Four clinical trials suggest benefits in terms of reduced symptoms and bronchodilator usage but no effect on lung function²⁰⁻²³. It is important to note it should only be used as a tool, not an alternative means of treatment for asthma.

4.3.2 Workforce education and training

Access to competency based education and training for all health professionals delivering asthma care is critical to a competent workforce and ensures maintenance of best practice standards of care.

The curriculum content for health professionals should at a minimum be based on best practice in the content areas listed in Table 2. This information should be provided in various ways including written, verbal and online formats to ensure accessibility.

The key components of workforce education and training include the development of minimum standards in clinical competency and best practice management of asthma by health professional disciplines. The minimum competencies should include asthma

control and self management, brief intervention training for smoking cessation and spirometry measurement.

Improved access to education and training including online self directed learning, Telehealth and specialist clinical support, especially for rural health providers, should be developed and implemented. A useful online resource accessible by all health professionals is the [Online Brief Tobacco Intervention Training program](#) which is an evidence based training package developed by National Drug Research Institute for the Respiratory Health Network in support of the [Smoke Free WA Health Policy](#).

A barrier to accessing education for some health professionals is a lack of remuneration and options to improve access need to be explored. Medicare Locals may provide new opportunities for remuneration options and financial incentives for pharmacists to provide such services.

Pharmacists may become “accredited” to provide certain disease management services that link into existing health structures. As spirometry services have already been piloted in pharmacies it should be assumed this service will be offered to patients in the near future. Therefore, it is important to develop a plan on how best to include them in referral pathways, provide remuneration and appropriate quality training. Pharmacists may also be well-placed to assess asthma severity, as patients often only present to medical practitioners during exacerbations.

Table 2. Professional development curricula in health training

Content Area	Curriculum content
Health education and promotion	Healthy lifestyles (including brief intervention for tobacco smoking)
Biological sciences	Anatomy, physiology, immunology
Epidemiology	Burden of disease and trends
Evidence based practice and clinical guidelines	Paediatric and Adult Guidelines
Diagnosis	Differential diagnosis /Patient assessment Spirometry, pulmonary function testing
Management	Asthma Action Plans – managing <u>severity</u> , acute exacerbation Discharge plans Chronic disease management Self management and behavioural change Triggers and allergen avoidance Case management Assessment and treatment of nicotine dependence Exercise Spirometry
Pharmacology	Best practice Common use medications and dosages
Device Use	Training and competency in performing and delivering spirometry Device assessment and drug delivery Infection Control
Psychosocial issues	Living with asthma
Complementary and alternative therapies	Breathing techniques
Special Issues	Exercise induced asthma Paediatric asthma Occupational asthma Asthma in pregnancy Asthma in elderly Obesity Mental Health Allergy Transition from childhood to adulthood (risk taking)
Service directory and access to services/programs/information	Directory of services across the continuum of care State and National services/information

4.4 Equipment devices and technology

Assessing airway status

Best practice requires that all people with asthma over seven years of age should have quality spirometry performed in order to assess airway status and to measure [severity](#) of airway obstruction and minimise misdiagnosis⁸. Spirometry provides an assessment of the relationship between lung volume and airflow. Normal spirometric results do not exclude a diagnosis of asthma. Inspiratory loops are helpful in quality control and in detecting the presence of upper airway constriction²⁴.

Key indices used in assessing airway status are:

- Measured with a spirometer
 - Forced Expired Volume in 1 second (FEV₁)
 - Forced Vital Capacity (FVC)

In the debate regarding which tool to use, there is no 'gold standard' for asthma however, spirometry is the lung function test of choice⁸. The most important factor when using any tool is to understand what is being measured and quality assurance is central to good measurement.

Regardless of the methodology used to assess airway status, interpretation of results is affected by a number of factors including:

- the choice of predicted values for the population being studied²⁵
- the degree to which the patient matches the demographic for which the reference equations were derived
- the ability of the person doing the spirometry to accurately critique and interpret the data

Issues requiring further attention or clarification in relation to the diagnostic testing for asthma are:

- Consistency of bronchodilator dose and method of delivery
- The need for a clear definition of why bronchodilator testing is done
- Consistency in application of spirometry and the indices to be taken from it
- Advice as to where training in performing and interpreting spirometry is available and what should be expected in that training

The key features of spirometry derived measurements (FEV₁, FVC and PEF) versus Peak Flow meter derived Peak Expiratory Flow (PEF) are summarised in the table below. FEV₁ is less influenced by effort and a more reproducible measure than PEF and is the preferred method for assessing airway status. According to the [NAC Asthma Management Handbook 2006](#)⁸, PEF is not a substitute for spirometry in the diagnosis of asthma but in the absence of an acute bronchodilator FEV₁ response, monitoring of PEF over several days to weeks may be used, for example in occupational asthma. It is less important, however, whether a spirometer or peak flow meter is used to assess airway status than it is to ensure that the limitations of the chosen approach are understood and managed.

Table 3. Key features of spirometry vs. peak flow meter measures

Feature	FEV1 and FVC	Peak Flow
Availability	Increasingly available	Widespread
Ease of Use	Need training and experience for quality delivery	Simple
Patient effort dependence	Moderate	Very high
Airways that contribute to measurement	Conducting airways	Influenced more by major airways and muscle strength
Repeatability	Well defined: $\pm 150\text{ml}$	Not well defined: $\pm 40\text{ L/min}$
Good for diagnosis	Yes	No
Good for longer term monitoring	Yes	Only in selected people with asthma
Ease of quality assurance	Easy to critique test results	Very difficult to critique test results.
Reference values	Well established	Most useful reference is "personal best"

Bronchodilator reversibility

There are few, if any, evidence based guidelines for the assessment of bronchodilator reversibility yet it is viewed as a key tool in assessing airway function in asthma. There are a number of issues that need resolution if a consistent approach is to be developed:

- Dose of agonist to be delivered
- Method of delivery
- Withholding of medication prior to testing
- Definition of a significant response

Research is needed to develop an evidence-based approach that can be implemented across all settings.

Metered-dose inhalers and spacers

Currently, evidence-based best practice is to administer short acting bronchodilators via metered-dose inhalers (MDI) and spacers rather than nebulisers. The use of MDI and spacers in Emergency Departments and GP practices as first line treatment is an opportunity for people with asthma to learn correct technique from a health professional which will promote self management of exacerbations. The Therapeutic Goods Administration (TGA) directive regarding the reprocessing of single patient use items has significant ramifications when it comes to spacers.

There are various different types of spacers available, with paediatric specific versions, autoclavable, disposable and single patient use versions as well as large and small volume spacers.

Nebulisers

It is sometimes perceived as easier to use a nebuliser rather than an MDI/spacer in GP practices and hospitals, since the equipment may be ready at hand. However, this reduces the opportunity for people with asthma to learn correct technique of MDI/spacer with support from a health professional. It should also be noted that nebuliser bowls have a finite life as the geometry of the jet and baffles changes with use. This directly affects particle size and hence drug deposition.

Dry powder inhalers

As discussed for MDI/spacers and nebulisers, educational and promotional interventions to improve technique need to be supported.

Infection control

According to the [Australian Guidelines for the Prevention and Control of Infection in Healthcare \(2010\)](#) devices such as spirometers, spacers and nebulisers would be classified as semi-critical items by Spaulding's criteria as they have contact with intact mucous membranes or non-intact skin²⁶. Therefore, this equipment is required to be cleaned thoroughly and processed via steam sterilisation or if not heat tolerant, high level chemical or thermal disinfectant. All facilities should adhere to the infection control guidelines and procedures outlined in the [Australian Guidelines for the Prevention and Control of Infection in Healthcare \(2010\)](#)²⁶ and the [Australian Standards AS/NZS 4187-2003 Cleaning, disinfecting and sterilising reusable medical and surgical instruments and equipment and maintenance of associated environments in health care facilities](#)²⁷ whilst utilising a risk assessment approach. Particular aspects to note include:

- Spirometry: The use of a disposable mouthpiece and a barrier filter is recommended²⁸. The use of such filters has been shown to be cost effective²⁹.
- Spacers: Single patient use in hospitals and other clinical settings is recommended and disposable spacers should be provided. Spacers labelled "For single patient use" can not be re-processed for use on multiple patients. If re-usable spacers are purchased, as is the case in some primary care settings, they need to be reprocessed in accordance with above recommendations and a strict tracking system needs to be put in place to ensure the number of times they are re-processed does not exceed that stipulated by the manufacturer. Visual inspection for faults is also needed although there are risks involved with this process. Sterilisation needs to be performed in a TGA approved facility.
Washing in detergent and warm water, air drying and then wiping the mouth piece clean of detergent is suitable for home use by a single patient. All repeat use spacers need to have information on cleaning.
- Nebulisers: Single patient use for tubing and masks needs to be maintained and home use tubing hygiene needs to be addressed as there is a major risk of cross-infection with nebuliser use.

Hand hygiene and compliance with manufacturer's specifications are also significant issues with all devices.

4.4.1 Summary

The common themes that emerge from the above discussion are the need for education and support for those performing spirometry and the provision of education in the use of devices and technology in the management of asthma. The means to address these, needs will vary from setting to setting although the core resource base is common to all settings.

5. Recommendations

Recommendation 1: Reducing the risk of asthma (CSIF Standard 1)

That a Statewide **coordinated plan is developed for implementation to reduce the prevalence of smoking** aimed at meeting the outcomes set out in the *draft* WA Health Promotion Strategic Framework 2011-2016. This will focus on **primary and secondary prevention** including the evidence based smoking cessation services that are accessible across the State. The plan will target at risk populations including Aboriginal communities, people with mental health issues, pregnant women, low socio-economic populations and prisoners. The plan will include strategies to:

- Improve access to evidence based smoking cessation programs in community settings and create links with these programs in inpatient settings. The learnings from the evaluation of the Nicotine Addiction Treatment Program should be promoted in an endeavour to adopt a similar model of smoking cessation program delivery by Medicare Locals across WA
- Develop culturally appropriate resources and support services for Aboriginal populations
- Ensure population based health awareness campaigns recommend people seek early medical advice if they have respiratory symptoms, especially smokers

Recommendation 2: Asthma guidelines (CSIF Standards 3-9)

That the asthma guidelines and Asthma Action Plans for children and adolescents and adults are endorsed, distributed and implemented across the primary care, public and private health system in WA.

That culturally appropriate educational materials and Asthma Action Plans for Aboriginal people are developed, endorsed, distributed and implemented across the primary care, public and private health system in WA.

Recommendation 3: Early diagnosis of asthma (CSIF Standard 2) and management of asthma (CSIF Standards 3-9)

That **access to spirometry is increased** for the early diagnosis of asthma and assessment of severity through:

- Identification and support of health service providers to establish spirometry diagnostic services in community settings.
- Training and ongoing clinical support to all spirometry providers to ensure the highest quality of testing and interpretation of results is achieved.

Recommendation 4: Management of asthma (CSIF Standards 3-9)

From diagnosis, that all people with asthma have access to integrated and coordinated services across the continuum of care by primary, secondary and tertiary providers, as appropriate. This includes a focus on consumer education including **self management and the use of asthma action plans and statewide referral pathways**.

Recommendation 5: Consumer education (CSIF Standard 3)

That best practice, evidence based, **consumer education** is universally accessible state wide to all people with asthma and their carers/parents to support consumer decision making and self management.

Recommendation 6:

That **workforce education and training** should be provided to all health professionals, based on a minimum set of standards for training and syllabus content of asthma education and delivered through various media including online self-directed learning courses.

Options for credentialing of asthma educators as a mechanism to maintain quality standards should be investigated.

Recommendation 7:

That guidelines to ensure correct use and maintenance of **equipment, devices and technology** are developed, disseminated and implemented state-wide across the primary, secondary and tertiary settings.

Recommendation 8: Information, Communication and Technology Requirements

That metropolitan Area Health Services establish dedicated clinical support services and Telehealth sessions to improve access to support for rural primary care and WACHS health service providers.

That support is provided for the development of Information and Communication Technology to enable multi-disciplinary care planning, supported by evidence-based guidelines and patient pathways, to be integrated across primary, secondary and tertiary health services to facilitate appropriate data exchange with external health care providers.

That all people with asthma have better access to, and control of their personal and health care information. This should include consumer hand held records and/or e-health records and shared databases for patient and service provider management.

5.1 Strategy for implementation

The Asthma Working Party understands these recommendations require different resource and time allocations for implementation. Given this, a strategy for the phased implementation of recommendations is proposed below:

- **Phase 1:** Achievable within existing resources and current service provision.
- **Phase 2:** Require further planning and development.
- **Phase 3:** Require additional human resources, funding and endorsement.

Phase 1: Achievable within existing resources and current service provision

Recommendation 1: Reducing the risk of asthma (CSIF Standard 1)

- Those involved in the delivery of the Australian Better Health Initiative (ABH)I funded Nicotine Addiction Treatment Project disseminate the results of the program evaluation and promote the adoption of this model of community based smoking cessation program delivery across all Medicare Locals in WA.
- Area Health Services have a responsibility to continue to support the implementation of the [Smoke Free WA Health Policy](#) to ensure patients, staff and visitors are protected from the harmful effects of second hand smoke. Focus areas for the immediate future include providing a consistent and appropriate level of support for nicotine dependent patients whilst in hospital and creating referral pathways to ensure this support is continued upon discharge. This can be achieved through the implementation of the [Clinical Guidelines and Procedures for the Management of Nicotine Dependent Inpatients](#).
- A Statewide Council of Australian Governments (COAG) Tackling Smoking Coordinator has been appointed in WA to oversee the implementation of the Tackling Smoking Initiative and support the local Tackling Smoking Coordinators. Current aspects of this project include the development of a service directory and also a framework for smoking cessation amongst Aboriginal people.
- Encourage further promotion and uptake of the [Online Brief Tobacco Intervention Training Program](#) developed by the National Drug Research Institute for Smoke Free WA Health. This includes liaising with the universities of WA to incorporate the training as a mandatory component of relevant courses.

Recommendation 2: Asthma guidelines (CSIF Standards 3-9) & Recommendation 4: Management of asthma (CSIF Standards 3-9)

- Following the initial launch of the Adult Asthma Action Plan, a working group was reconvened by the Respiratory Health Network to review the card and make amendments based on feedback received to date. Further promotion to maintain the momentum of the initial launch and raise awareness of the revised version is underway. There is a need to focus attention towards targeting GPs and hospital staff. A project team from the University of WA are conducting an evaluation of the effectiveness of the use of the Adult Asthma Action Plan from 2012 to 2015.

Recommendation 3: Early diagnosis of asthma (CSIF Standard 2) and management of asthma (CSIF Standards 3-9)

- There are a number of potential initiatives and actions that support the establishment of new spirometry services that should be explored.
- Princess Margaret Hospital (PMH) are taking the lead through new lung function tools to improve the diagnosis and monitoring of asthma in 0-4 year olds, who make up the majority of admissions to hospital.

Recommendation 7: Equipment, devices and technology

- That the Asthma Model of Care Equipment, Devices and Technology sub group in collaboration with TSANZ and Respiratory Scientists take guidelines and protocols from the [Australian and New Zealand Society of Respiratory Scientists \(ANZSRS\)](#) to ensure correct use and **maintenance of equipment, devices and technology**. These guidelines should be disseminated and implemented state-wide across the primary, secondary and tertiary settings. A systematic approach for disseminating information and encouraging change is needed for all areas of health reform.

Phase 2: Require further planning and development

Recommendation 5: Consumer education (CSIF Standard 3)

- Convene a stakeholder group to review the current content of consumer education and the way in which asthma education is delivered and strategies developed to ensure best practice, universally accessible education is provided.

Recommendation 6: Workforce education and training

- Convene an expert group comprising of education institutions, health professionals and consumers to develop an evidence-based best practice curriculum content for asthma education. This group should also consider appropriate modes of delivery of education and credentialing of health professionals.

Recommendation 8: Information, Communication and Technology requirements

- The WACHS Telehealth Development Group could be requested to assist in the development of access for WACHS and primary care providers, who are providing services to people with asthma and their carers and families in rural areas, to a metropolitan based specialist clinical support service.
- Support from the existing WA Health Information and Communication Technology groups to develop solutions to overcome current barriers to communication and data sharing across health sites and health providers including the ability to enable multi-disciplinary care planning, supported by evidence-based guidelines and patient pathways, to be integrated across primary, secondary and tertiary health services to facilitate appropriate data exchange with external health care providers.
- That all people with asthma have better access to, and control of their personal and health care information. This should include consumer hand held records and/or e-health records and shared databases for patient and service provider management.

Phase 3: Require additional human resources, funding and endorsement.

All recommendations will be analysed to determine where, if any, additional human resources or funding is required as part of the overall implementation planning process. Prioritisation is a key issue.

6. Current services for asthma and gaps in service provision

This section provides a brief overview of each of the CSIF 10 Standards for Asthma and information on the current service provision and gaps which substantiate the Asthma MOC.

6.1 Reducing the risk of asthma (CSIF Standard 1)

Current service provision:

Current activities that target smoking, which is a major risk factor for asthma, include:

- The [Framework for the Treatment of Nicotine Addiction](#) by the Respiratory Health Network provides a state wide approach across settings to deliver comprehensive and integrated smoking cessation treatment and support services.
- New restrictions outlined by the [Tobacco Products Control Amendment Act 2009](#) (the Amendment Act) commenced on 22 September 2010.
- The 12 week intensive nicotine addiction programs, [Rockingham Kwinana Division of General Practice Living Well Without Smoking Program](#) and the [Goldfields Esperance GP Network Butt Out Nicotine Addiction Program](#), have had over 700 people complete the courses since May 2008.
- The [Asthma Foundation WA](#) runs a number of initiatives including the [Newborns Asthma and Parental Smoking \(NAPS\) Project](#) 'Care for my air!' and 'Fresh air grows solid babies!' and the Indigenous Women's Project which are aimed at two important target populations. They are continuing to be rolled out and brief intervention training is being delivered to numerous health professionals and promoted in community settings.
- The [Smoke Free WA Health Policy](#) has been in place since January 2008 and states that smoking is not permitted on Department of Health grounds.
- The COAG Tackling Smoking Initiative is being rolled out across Australia.

Gaps in service provision to reduce the risk of asthma:

A state-wide, whole of health, multi-sectoral approach is required to target maternal smoking and exposure to environmental tobacco smoke (second hand smoke). Priority should be given to reducing the rate of maternal smoking during and after pregnancy to reduce asthma in children. Priority needs to be given to Aboriginal specific programs (such as [NAPS project](#)) to reduce the exposure of children to environmental tobacco smoke and this should be incorporated into the COAG Tackling Smoking Initiative.

Secondary prevention strategies and programs such as access to community, evidence based smoking cessation services are still somewhat limited.

Although progress has been made in establishing smoke free work environments, there are many circumstances where this still needs to be addressed and it should be done so within an Occupational Safety and Health regulatory framework.

While there is some workforce brief intervention training and education available in WA (ie. National Drug Research Institute (NDRI) [Online Brief Tobacco Intervention Training Program](#)), this need to be expanded to ensure consistent messaging in both tertiary and community based health and social service settings, particularly in primary care. For instance, a more targeted education and training program to pharmacists would be beneficial given their frequent engagement with people deciding to quit smoking.

6.2 Early diagnosis of asthma (CSIF Standard 2)

Early diagnosis of asthma is an opportunity for secondary prevention and early intervention to minimise the disease progression.

Current services for early diagnosis of asthma:

Given the high prevalence of asthma in children, the screening and initial diagnosis is of a high standard whether they first present in general practice, hospital outpatient clinics or emergency departments.

There is limited access to spirometry across the primary, secondary and tertiary sectors. Many GP practices have spirometers and are trained in their use and provide spirometry as an integral part of their practice. The tertiary hospitals have well-established spirometry services attached to the respiratory units, though the emphasis is on people with established disease rather than early diagnosis. In addition, there are private providers of spirometry services. A mobile spirometry service is provided on a private basis to some metropolitan secondary hospitals and at selected country locations. These services are available for direct referral by GPs but most referrals are from medical specialists involving people with established asthma. Spirometry services have been piloted in pharmacies and it is assumed will be offered in the near future.

Where spirometry services are provided particularly in the primary sector, there is concern about the quality of the testing and interpretation of results.

Gaps in the early diagnosis of asthma:

In preschool children where the diagnosis is predominantly based on symptoms and response to therapeutic trials, protocols for early assessment and diagnosis are required to further improve diagnosis and consistency across the State.

Increased access to quality spirometry and lung function testing for all patients over eight years old with proven or suspected asthma is required to assist in the diagnosis and severity assessment of the disease.

6.3 Management of asthma (CSIF Standards 3 – 8)

The CSIF Standards 3 – 8 for asthma relate to the management of asthma across the continuum of care from self-management through to managing acute and chronic asthma, and as such, are inter-related. Asthma management involves a partnership between the patient and health care professional(s), with frequent revision and reinforcement. The aim is to give patients where possible the ability to control their own condition with guidance from health care professionals. More collaboration and communication is also required between health care professionals.

6.3.1 Asthma self-management (CSIF Standard 3)

Behaviour modification in asthma self-management, involving self-monitoring by either peak expiratory flow or symptoms, coupled with a written asthma Action Plan and regular medical review, has been shown to improve health outcomes for adults³⁰.

Like adults, children with asthma (and their parents) need to know how to self-manage their own condition. Simple educational interventions (designed to teach self-management skills) among children admitted to the hospital with asthma have been shown to significantly reduce the readmission rate and reduce morbidity³¹.

6.3.2 Assessing asthma severity (CSIF Standard 4)

The **severity** of every asthma patient should be assessed in order to individualise treatment. It should be assessed when the patient is stable according to the definitions of **severity** and **control** as per the [National Asthma Council Australia Asthma Management Handbook 2006](#)⁸. **Severity** is best assessed by a combination of a history of daytime or night-time symptoms, exacerbations and spirometry results³².

6.3.3 Preventing acute exacerbation of asthma (CSIF Standard 5)

It is important to recognise that any patient with asthma, however easy their disease is to **control** much of the time, may have a severe acute asthma exacerbation. Good asthma **control** is more likely to occur in the presence of genetic factors that positively influence response to treatment and good adherence while it is less likely in those with increased **severity** and frequency of symptoms. If severe asthma exacerbations are not recognised and treated appropriately, they can be fatal. Prevention of acute exacerbations relies on proper use of the Asthma Action Plan that will cover steps to take in the case of any deterioration and on regular review.

6.3.4 Stabilising chronic asthma (CSIF Standard 6)

A written Asthma Action Plan is an integral tool in the management of asthma. Educational material and information on self-management techniques, including an explanation of, and the need for adherence to an individualised written Asthma Action Plan, are essential prerequisites if patients are to retain **control** over their asthma.

6.3.5 Management of the acute episode in the Emergency Department (CSIF Standard 7)

Appropriate treatment protocols including fast symptom relief for the management of acute episodes of asthma should be in place at all emergency departments (ED) of hospitals. Once protocols are put in place there needs to be an evaluation to check concordance. If there is evidence this is not occurring then it needs to be addressed.

6.3.6 Management of the transition of care/discharge planning (CSIF Standard 8)

For those patients not requiring hospitalisation, follow-up care by the GP or treating specialist should include provision of a written Asthma Action Plan for the patient and carer. Multi-disciplinary support may also be required. Details concerning the type(s) of support required, appointment schedules, medication regimens, emergency contact details and other key measures, together with an individualised written Asthma Action Plan, should be included in the personal health record provided to the patient³³.

Patients discharged to primary or community-based care, should be provided with a written Asthma Action Plan, a copy of GP letter, ongoing medication and educational material outlining risk factors and avoidance strategies, and information on the most effective management of the disease. Ideally, every patient discharged should be seen by a pharmacist and asthma educator, either in the hospital or possibly referred to a community practitioner where they can better assimilate the information as written material alone may be inadequate.

The transition process also refers to the transfer of care from paediatric to adult services and this is discussed in the overview section on page 15.

Gaps in service provision:

Transition care is being organised without proper consultation with the primary sector, which is the sector most affected by inadequacies and inefficiencies.

6.3.7 Common factors between (CSIF Standards 3-8)

Three common factors emerge from these standards that support best practice in the management of Asthma:

- Active **self management** by people with asthma and their carers, supported by health professionals.
- An up to date individualised **Asthma Action Plan** to recognise deterioration, prevent acute exacerbations, keep the asthma stable, supported by **regular review** with appropriate health professionals using best practice, as set out in the Asthma Cycle of Care.
- Consistent state-wide evidence based, best practice **guidelines** used by health professionals across the primary, secondary and tertiary settings.

Self management

Current self management service provision:

The importance of self-management programs is recognised. Giving self management its full emphasis, however, requires a cultural change that has not yet been fully accepted and implemented. WA invested in self management through the Australian Better Health Initiative (ABHI) projects. Generic education and training for self management is carried out by many of the Non Government Organisations contracted by WA Health to undertake consumer education.

Gaps in self management service provision:

Access to self management programs is not universal. There is a need to improve consistency in the content of self management education and to ensure the principles and techniques of self management are embedded across all interventions. Not enough emphasis on self-management education and training has been placed in the primary sector. Therefore, many patients receive ad hoc and inconsistent advice from the primary sector and it is not until patients reach the secondary or tertiary sectors that they receive a formal self management program.

The role of GPs, practice nurses, pharmacists and other health care professionals in encouraging individuals to take responsibility for their own care needs to be clearly articulated in both education and practice.

Asthma Action Plan

Current status:

The short acting beta-agonists (reliever) guidelines (SABA guidelines) for pharmacists have recently been released and launched with the Adult Asthma Action Plan. The guidelines are an aid to the appropriate provision of short acting beta-agonists as a Pharmacist Only medicine and associated advice on asthma care.

Various versions of written Asthma Action Plans are used in paediatric and adult

patients with a lack of co-ordination between health care providers. This results in inconsistent messages and use of the Plans.

Education is provided by asthma educators and health professionals at the time of development of Asthma Action Plans and when reviewed. Many patients receive a written management plan on discharge from hospital (this is a short term plan) and confusion exists between these two Plans.

The Pharmaceutical Society of WA, the Asthma Foundation of WA and the Department of Health WA coordinated the launch of the WA Asthma Action Card developed as a result of this MOC in 2010. Cards were distributed to health professionals involved in asthma management including all pharmacies across WA. A revised, more user friendly version of the card has been developed and will be released in late 2011.

Gaps in service provision:

There is an urgent need for consensus by health professionals on the most appropriate Asthma Action Plan and the Asthma management plan (Discharge plan) to be used consistently across the State. The content of the information provided in the Plan should be consistent with the Paediatric and Adult Guidelines included in this Model of Care and have the principles of self management embedded in the Plan.

Despite the successful launch of the Asthma Action Plan card, more work with primary care practitioners to reinforce the message and maintain practice improvements is needed. An ongoing education program is required to sustain long term improvements.

There needs to be more collaboration between agencies and programs to ensure consistency of messages and to make sure the strength of the message is not “diluted”.

Regular review

Current practice:

The [Asthma Cycle of Care](#), a Medical Benefits Scheme (MBS) item used by GPs to manage and review asthma is used in an ad hoc way and does not always include all health professionals involved in an individuals asthma management. It is a problem that remuneration for asthma care only formally recognises GPs. For a more uniform and coordinated approach from pharmacists a clearly defined remuneration model, not reliant on product supply, but quality of service, needs to be offered.

Gaps in current practice:

The ad hoc use of the regular review provision in the management of asthma highlights the need for clear referral pathways and linkages between health professionals across the continuum of care. This will improve the uptake of Asthma Action Plans in the management of asthma and use of the MBS item by GPs. This requires recognition of roles and inter-professional communication. It also requires formal remuneration.

Asthma guidelines

Current use:

The majority of Perth metropolitan emergency departments and hospitals use **acute asthma guidelines** similar to the [NAC Asthma Management Handbook 2006](#) and [GINA Global Strategy for Asthma Management and Prevention 2010](#)⁵. However, there are many hospitals, mainly in rural areas, where no guidelines are used, or local versions have been developed.

Gaps in use of guidelines:

The lack of a statewide application of the paediatric and adult asthma guidelines could result in sub optimal care, particularly in rural areas. Further attention should be given to determining why this is the case and how it can be addressed. There is a lack of consensus around the terminology used in the [severity](#) assessment that needs to be addressed to provide a universally consistent approach to clinical management of asthma.

6.4 Paediatric asthma management (CSIF Standard 9)

Asthma remains one of the most common childhood illnesses, with frequent presentations to general practice and hospitals. The transition from paediatric to adult services brings an altered focus and intensity especially where associated with increased risk-taking behaviours in adolescence.

Current use of paediatric asthma guidelines:

The use of guidelines for the management of paediatric asthma is variable across primary, secondary and tertiary settings.

Gaps in service provision:

There is a need for universal consistent application of the Paediatric Asthma Guidelines.

6.5 Asthma education (CSIF Standard 10)

Education and training programs for both clinicians and patients have been shown to improve outcomes for asthma sufferers³⁴.

Current consumer education provision:

Consumer asthma education is provided opportunistically by a range of health care professionals across the continuum of care by Emergency Department clinicians, hospital based clinicians (including physicians, nurses and physiotherapists), GPs, practice nurses, community health nurses, and community pharmacists. The Asthma Foundation WA provides dedicated asthma consumer information and education, including self management.

Gaps in consumer education:

There are reported inconsistencies in the content of consumer education and the knowledge and skills of the health professionals in providing this service across the continuum of care.

There is a need to improve the content of consumer education. The NACs Short on Air Survey concluded that people with asthma were displaying asthma acceptance rather than asthma control. Education is clearly not providing high expectations with regard to quality of life.

Improvements are also needed in terms of the skills and knowledge of the workforce in the delivery of education. Improved communication, coordination and collaborative partnerships between health professionals, primary care (including Divisions of General Practice), non-government and community agencies across the continuum of care is required to reduce duplication and increase efficiency.

A further gap is the lack of access to culturally and linguistically appropriate and Aboriginal specific information.

Unless motivated, patients may not seek out education from agencies such as the Asthma Foundation WA. Therefore, more definite referral pathways would help those who are less proactive.

Current workforce education and training provision:

Training is developed and delivered:

- In modules during specific discipline-related training and usually forms part of the respiratory section of basic professional training. This varies according to the requirements for each profession.
- As short courses, updates and refreshers which are run by special interest organisations such as the NAC or the Asthma Foundation WA (AFWA). These vary in length and target audience.
- As post basic courses run by the professional bodies for the various health disciplines.
- By the AFWA who train health professionals to become asthma educators. They acquire the skills to plan, develop and implement asthma education programs within their workplace or community. Asthma educators are employed by area health services and the non government sector. There are currently over 200 asthma educators, the majority of whom work in primary and community settings and 60% are based in rural areas.
- As on the job training provided at the various health delivery sites, usually carried out by staff from the respiratory or medical department. Participation and attendance at much of this training is voluntary.

Gaps in workforce education

Training content is not standardised across institutions, levels of care or disciplines resulting in inconsistent clinical practice and passing on of inconsistent messages to the consumer. Gaps in the knowledge of workforce in the use of diagnostic equipment (eg spirometers) and devices (spacers) for the management of asthma have been identified that may lead to misinformation, poor diagnosis and interpretation of results and, in some instances, unnecessary presentations to emergency departments.

Barriers to participation in workforce education have been identified as the competing demands on time in the current environment of workforce shortages, inadequate or limited financial compensation for private providers such as GPs and community pharmacists and the lack of access to online self-directed learning. Appropriate remuneration linked to education and service provision would improve quality and consistency of care.

Asthma educators are specially trained and yet underutilised whilst, pharmacists and GPs are more accessible but undertrained. Targeted interdisciplinary workforce education and training programs are required to overcome the gaps in knowledge and skills.

The NAC course that has been available to GPs since the MOC was developed has interpretation as its focus and is not designed to teach the practice of spirometry. Few GPs do the course but practice nurses are sent in the belief that they will be taught all they need to know.

Table 4. Current snapshot of workforce education and professional development

Setting	Target Audience	Type of Education/Course
Educational Institution (University)	Pharmacy Students Year 1 to Year 4	Lectures on core asthma issues, pharmacology, therapeutics, inhaler devices and provided with NAC Asthma Management Handbook 2006
	Undergraduate Health Professionals, Graduate masters entry Physiotherapy	Lectures in areas of study eg anatomy, physiology, pharmacology, ages specific issues, self management & asthma education, spirometry, management of stable & acute asthma including Action Plans & discharge plans, case management, evidence based practice & clinical guidelines, allergens, exercise training, breathing, inhaler & devices, smoking cessation,
	Undergraduate Medical	As above with emphasis on anatomy & physiology and clinical guidelines and management of asthma.
Health Service/Hospital	Nurses, Ward staff, Discharge Team	Induction Course Refresher Course
	Doctors, Nurses, students on rotation, Registered Medical Officers	Respiratory Study Day including asthma management – core competencies
	All staff	Self directed learning and online training (ie. Online Brief Tobacco Intervention Training) Intranet respiratory medicine
	Nurses	Post Grad. Paediatric Nursing Emergency Department Course Managing medical emergencies
	All health professionals	NAC Asthma Management Handbook 2006
	Various health professionals targeted sessions	Ad hoc sessions on specific topics relating to Asthma
Primary Care & Divisions of General Practice	General Practitioners Practice Nurses Pharmacists	Asthma Management Courses Training in Spirometry National Prescribing Service Course
Asthma Foundation WA	Health Professionals	Lectures, interactive learning and case studies within a health professional seminar or tailored asthma training
	Asthma Educators	Lectures, interactive learning and case studies within a asthma educators course or asthma management course
	Teachers, Child Care Workers, Sports Coaches	Lectures, interactive learning and case studies within a Emergency Asthma Management course
	Midwives, Aboriginal Health Workers	Brief Intervention Training

6.6 Equipment, devices and technology

It is recognised that equipment, devices and technology impact across the continuum of asthma management, service provision and across all 10 asthma standards of care.

Current service provision:

Currently there is a wide range of people providing spirometry including GPs and Practice Nurses, Research Nurses, Medical staff and Nurses and Physiotherapists on wards in regional and metropolitan hospitals and Respiratory Scientists in metropolitan hospitals. This diversity of practitioners poses difficulties in terms of provision of consistent training and support. Further problems may arise in the future as pharmacists seek to become involved in this area of practice. Therefore it is perhaps even more urgent to provide accredited training and standards with consistent messages.

While many GPs are trained and undertake spirometry within general practice it is reported that as a diagnostic tool it is time consuming particularly as pre and post bronchodilator testing is required. Providing adequate training to pharmacists to undertake assessment is a possible solution to ease the burden on GPs. Reports outlining the results could be sent to GPs to further enhance communication and an integrated care approach. Other issues raised by GPs include the interpretation of the results that can affect the validity and quality of the results and maintenance of equipment.

Quality training in both the practice of spirometry and its interpretation³² is now available across the State and efforts should be made to ensure people are aware of these opportunities and they are accessible. For example, the [WA Spirometry Training Course](#) hosted by Asthma Foundation WA was developed by Senior Scientists from Royal Perth Hospital, Princess Margaret Hospital, Sir Charles Gairdner Hospital in conjunction with the Telethon Institute for Child Health and Research and is presented by leading respiratory scientists Graham Hall and Kevin Gain. It is endorsed by the Thoracic Society of Australia and New Zealand and the Australia and New Zealand Society of Respiratory Science.

There has been a major effort to encourage the provision of spirometry by GPs throughout the world and WA is no exception. The quality of GP provided spirometry is uncertain regarding both the application of spirometry to the patient group and the quality of the testing provided. A recent editorial in Thorax proposed “providing GPs with spirometry, not spirometers”³⁵. A recent study in Tasmania found that trained nurses visiting practices provided better quality spirometry and more consistent diagnoses than when spirometry was done in the practices as part of usual care.³⁶ Another paper reviewed the use of spirometry in the primary care setting in Poland and came up with similar conclusions³⁷

There have also been studies of a national pharmacy-based service for the care of patients with asthma and the results indicated improvements in clinical and humanistic outcomes³⁸. Given the accessibility of pharmacists and their opportune position to provide education in addition to a spirometry service, this option should be explored further. Several surveys have shown that laboratories in hospitals across Australia and New Zealand lack consistency in their administration of bronchodilators^{39 40}. International guidelines lack evidence based guidance on this issue at the present time.

7 Asthma: Epidemiology and costs

7.1 Asthma prevalence

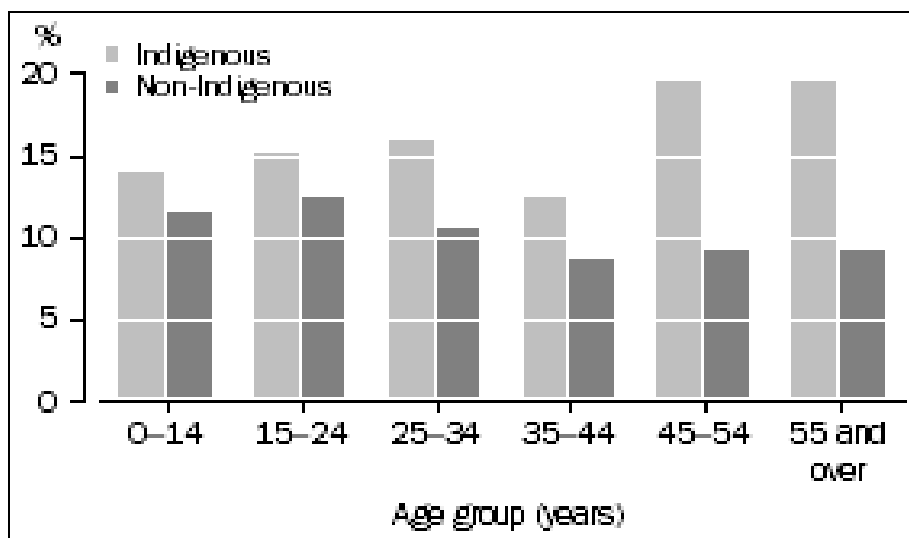
Asthma in Australia is a major health, social and economic burden for the individual and the community¹. International comparative studies in adults^{41, 42} and children⁴³ reveal that Australia has one of the highest prevalence rates in the world. The 2004/2005⁴⁴ and 2007/2008⁴⁵ National Health Surveys found that one in ten Australians reported asthma as a current condition, a bit less than the 11.6% reported in the 2001 Survey⁴⁶. In 2007/2008, asthma was slightly more prevalent among females (11.0% vs. 8.9% in males) and among those aged 15-24 years and 75 years and over, affecting 11% of Australians in these age groups⁴⁵.

Asthma is also more prominent among Indigenous Australians. The 2004/2005 National Aboriginal and Torres Strait Islander Health Survey (NATSIHS)⁴⁷ showed that 15% of Indigenous Australians reported asthma as a long-term health condition, which is 1.6 times the prevalence of non-Indigenous people after adjusting for age differences. In the Indigenous population, asthma was more common among females (20% vs. 12% for males) and among those aged 45 years and over, for whom asthma prevalence was double that observed in other Australians in the same age group (19% vs. 9%). Moreover, asthma was reported almost twice as often by Indigenous people living in non-remote areas (17%) as in remote areas (9%). The absolute number of Aboriginal people with asthma may be small, but the disease plays a significant role in the Indigenous community.

Interestingly, asthma prevalence is also higher among Australian residents in the top level of socio-economic disadvantage (11.9% vs. 7.6% among the least disadvantaged) but lower among those from non-English-speaking backgrounds (5.3% vs. 10.4%) and those who were born overseas and subsequently migrated to Australia (6.5% vs. 11.0%).⁴⁵

In Western Australia, the prevalence of current asthma in children (0-15 years) was around 8.3% in 2009, and more common among boys than girls (10.2% vs. 6.0%).⁴⁸ Among adult Western Australians (16 years and over), the overall reporting of current asthma was similar to the children's prevalence in 2009 (8.6%), but the condition was more common in adult females (10.0%) than males (7.1%).⁴⁹ This could be an indication that females tend to develop asthma later in life. However, it is also possible that males are more likely to develop other respiratory complications in adult life, which mask the underlying asthma symptoms.

Graph 1. Prevalence of asthma, Australia, 2004/2005



Source: Australian Bureau of Statistics. National Aboriginal and Torres Strait Islander Health Survey, 2004-05. Canberra: ABS; 2006

7.2 Smoking prevalence

As previously mentioned, smoking is an important contributing factor in the development or aggravation of asthma. Western Australia has been relatively successful in reducing the prevalence of tobacco smoking over the years through legislation, mass marketing and primary prevention/health promotion. According to the WA Health and Wellbeing Surveillance System, in 2010, 11.5% of Western Australians aged 16 years and above are daily smokers.⁵⁰

Of greater concern, smoking prevalence levels have been shown to be several times that of the wider adult population in certain high risk groups. For instance, in the Western Australian Indigenous population, the smoking rate is around 55% among those aged 25-44 years.⁵¹ In 2005, an audit of WA public hospitals revealed that 67% of mental health inpatients aged 14 years and over were current smokers.⁵² Additionally, smoking rates among WA prisoners are estimated to be around 80%.⁵³ High rates of smoking have also been found in groups of low socio-economic status. The National Health Survey 2007/2008 estimated the prevalence of current daily smokers among Australians in the highest tier of socio-economic disadvantage to be 27.8%, which is 2.5 times the 11.0% reported among the least disadvantaged Australians.⁴⁵

Hence, further efforts to reduce smoking prevalence, especially in these high risk groups, should help lessen the burden of asthma and other respiratory conditions in the community over time.

7.3 Mortality and burden of disease measures

Asthma is not a common cause of mortality. In Australia, it accounted for 385 deaths (0.3%) in 2007, the mortality rate having declined by 70% over the previous two decades due to advances in asthma management. In older people, attributing death to asthma is sometimes complex, however, as coexisting conditions such as chronic obstructive pulmonary disease (COPD) may lead to potential misclassification.⁵⁴

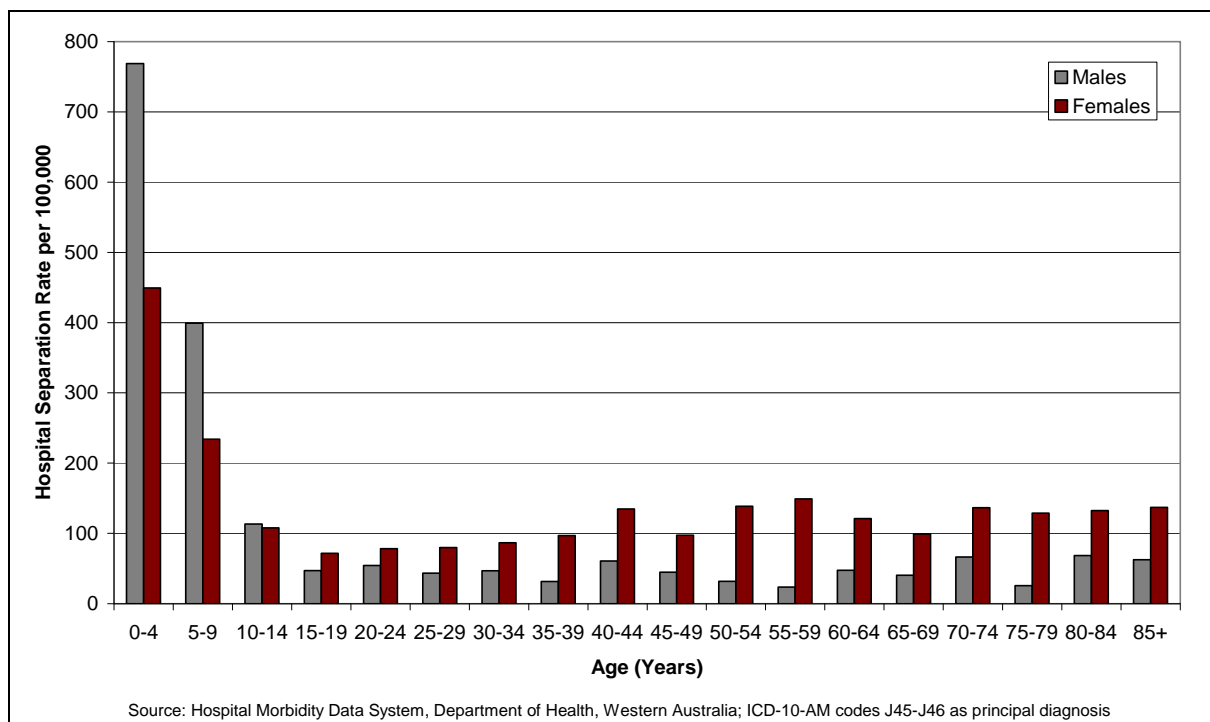
Asthma related deaths among children and young adults are now very rare. The “Disability Adjusted Life Year” (DALY) is a defined overall burden of disease unit used to attribute years of healthy life “lost” in a population due to death and disability. Based on 2003 data, 99% of nearly 4,000 DALYs due to asthma among Western Australian children aged 0-14 years were attributed to years of life lost to disability (YLD) rather than death. Despite low mortality figures, asthma was nonetheless the leading cause of disease burden in WA children in terms of DALYs. Thus, asthma does have a major impact on the life of WA children, not so much in terms of death but in terms of a reduced quality of life.⁵⁵

7.4 Impact on health services

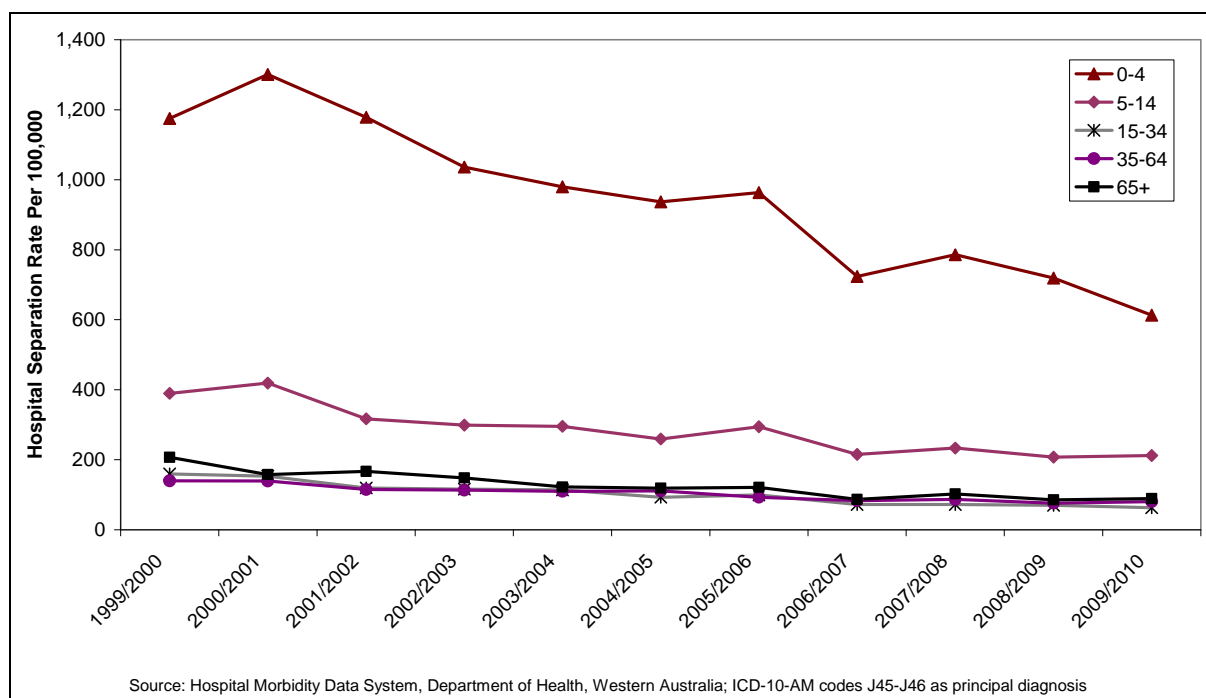
Health service utilisation figures are useful indicators of the impact of asthma in the population since people with asthma experience acute episodes, take medication, visit their doctor, attend hospital Emergency Departments or are admitted to hospital. Asthma is the seventh most common chronic problem managed by Australian General Practitioners, for instance, accounting for 3.8% of chronic problems encountered by GPs in 2009/2010.⁵⁶ Furthermore, in Australia, the direct health care expenditure allocated to asthma in 2004/2005 was \$593.9 million, of which 60% related to prescription pharmaceuticals.⁵⁷

In terms of hospital care, 37,492 hospitalisations in Australia (1 in 200) had asthma recorded as the principal diagnosis in 2007/2008. Despite substantial declines in the 1990s, hospitalisation rates in children (0-14 years) remain higher than in adults. As per asthma prevalence and rates of GP encounters, asthma hospitalisation rates are higher in boys than girls. However, in the older age groups, females have higher rates.⁵⁴

Graph 2. Age-specific rates of hospitalisation due to asthma by gender, Western Australia, 2009/2010



Graph 3. Age-specific rates of hospitalisation due to asthma, Western Australia

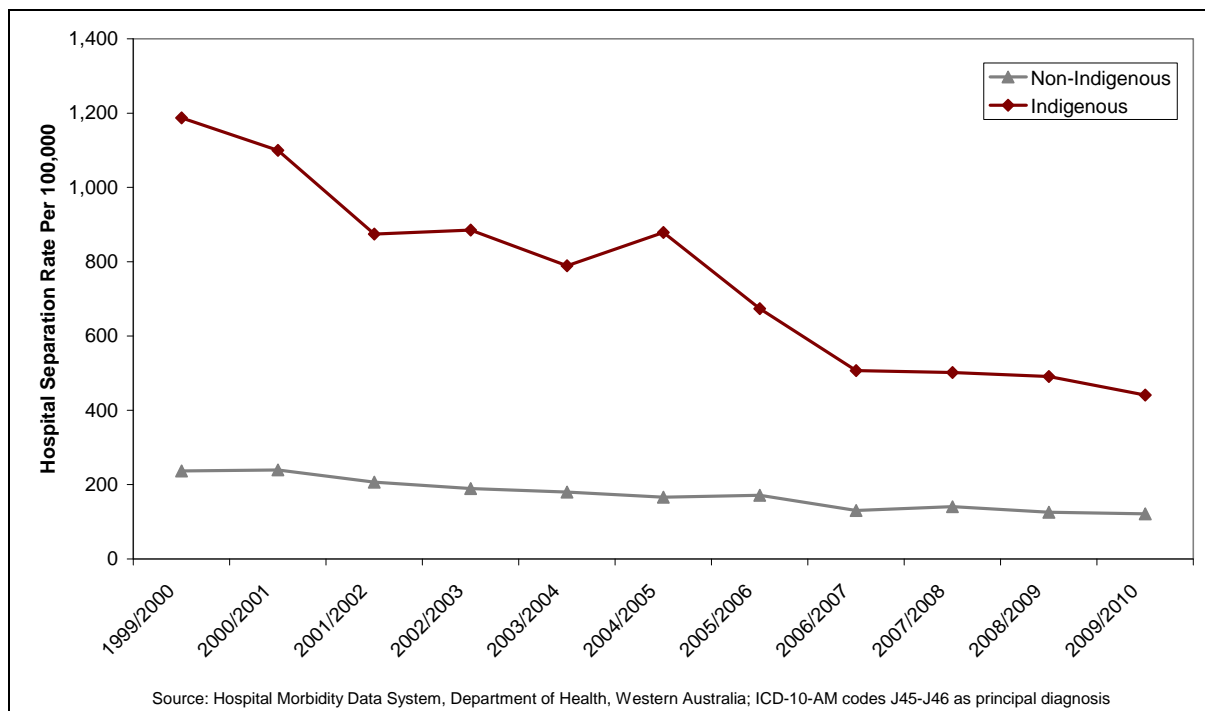


In Western Australia, 2,894 hospital separations with a principal diagnosis of asthma were recorded during the financial year 2009/2010. Of the 1,370 separations involving males, 965 (70.4%) related to children aged 0-14 years, compared to 564 (37.0%) of 1,524 separations among females.

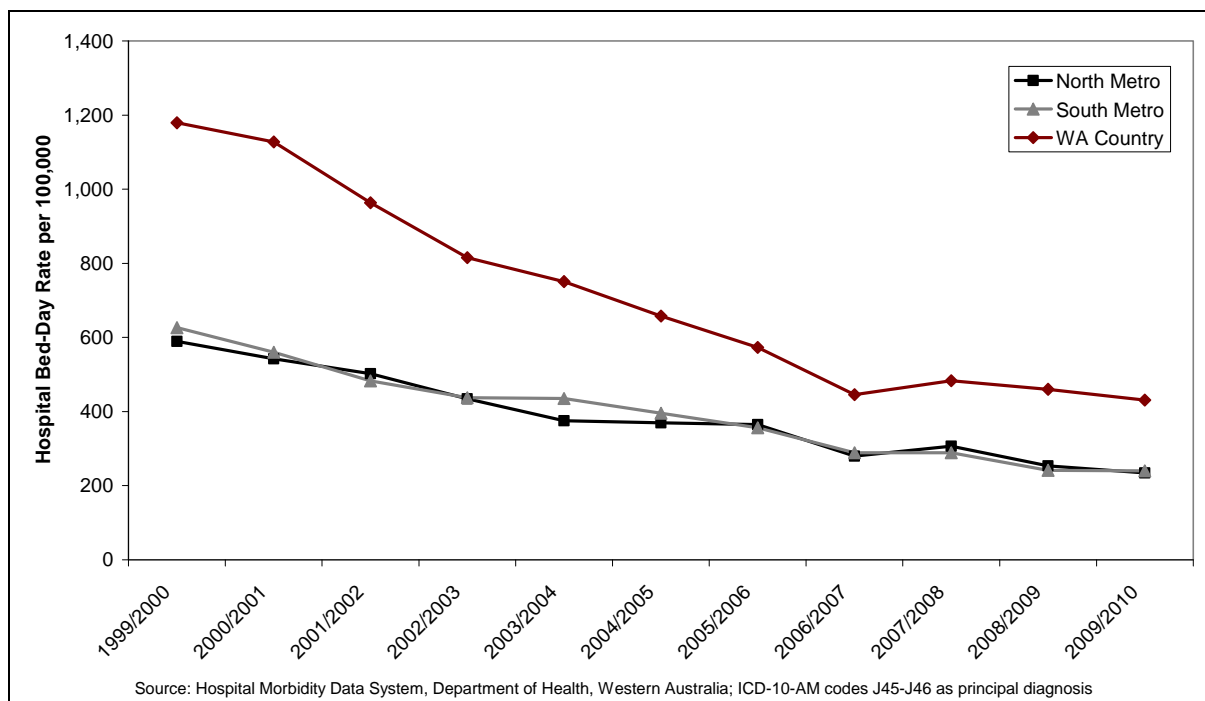
WA asthma hospitalisation rates have fallen significantly in the last decade from 257.9 to 130.6 per 100,000 persons between 1999/2000 and 2009/2010 (an average decline of 7.0% per year overall). However, as per Australian patterns, these rates remain considerably higher among young children. This is particularly apparent among WA males, whose asthma hospitalisation rate among 0-4 year-olds was 768.5 per 100,000 in 2009/2010, 16 times the corresponding rate among males aged 15-34 years. By comparison, the rate for girls aged 0-4 years was 613.0 per 100,000 in 2009/2010, 5.7 times the equivalent rate for 15-34 year-old females.

Western Australian asthma hospitalisation rates are also higher among Indigenous people and among those who reside in country areas. Although the gap has narrowed to a great extent since the early 1990s, the Indigenous rate was still 3.6 times that of non-Indigenous people in 2009/2010 (441.0 vs. 121.5 per 100,000, respectively). Similarly, the hospitalisation rate due to asthma among WA country residents remains about 75% higher than that of Perth metropolitan residents in 2009/2010, despite having more than halved in the last decade (from 414.6 per 100,000 in 1999/2000 to 193.3 per 100,000 in 2009/2010). In 2009/2010, the corresponding rates for Perth North and South Metro residents were 101.5 and 119.6 per 100,000, respectively.

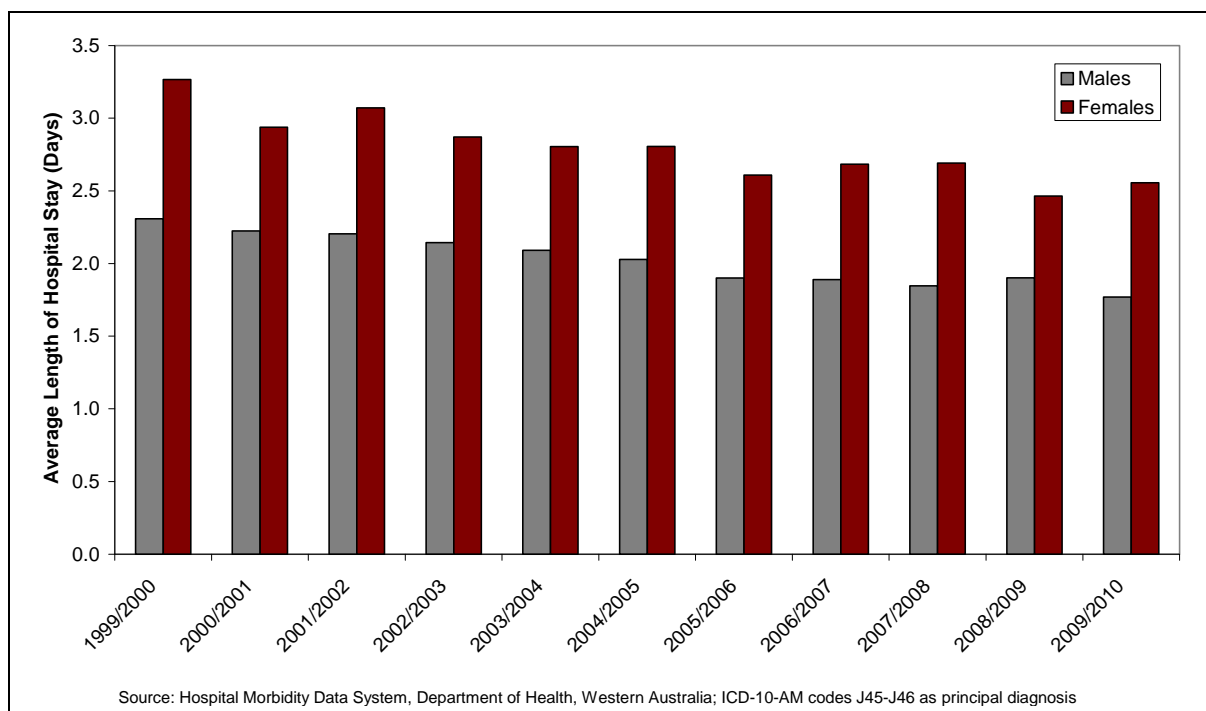
Graph 4. Age-standardised rates of hospitalisation due to asthma by Indigenous status, Western Australia



Graph 5. Age-standardised rates of hospital bed-days due to asthma by place of residence, Western Australia



Graph 6. Average length of stay for hospitalisation due to asthma by gender, Western Australia



In terms of bed usage, WA hospitalisations due to asthma accounted for 6,320 bed-days in 2009/2010, of which 3,895 (61.6%) involved female patients. Hospital bed-day rates due to asthma were higher for females than males (349.4 vs. 217.2 per 100,000); for Indigenous compared to non-Indigenous people (1,051.4 vs. 261.5 per 100,000); and for country dwellers as opposed to Perth North and South Metro residents (431.3 vs. 234.9 and 239.8 per 100,000, respectively). Like hospital separations, rates of hospital bed-days due to asthma have fallen significantly in the last decade, from 745.6 per 100,000 in 1999/2000 to 284.4 per 100,000 in 2009/2010 (an average reduction of 9.6% per year overall).

On average, asthma inpatients stayed in hospital 2.2 days in 2009/2010, a reduction from 2.8 days in 1999/2000. Hospital lengths of stay in 2009/2010 were similar for Indigenous and non-Indigenous people, and for city and country residents. However, females stayed in hospital significantly longer than males (average 2.6 vs. 1.8 days), in part due to the greater proportion of females in the older age groups.

8. Horizon scanning and evaluation

This Model of Care is a living document that will be reviewed as the evidence base alters what is 'best practice'.

The Asthma guidelines will be evaluated and reviewed on a regular basis or as new evidence based guidelines become available.

Abbreviations

ABHI	Australian Better Health Initiative
AFWA	Asthma Foundation WA
ANZSRS	Australian and New Zealand Society of Respiratory Scientists
COAG	Council of Australian Governments
CSIF	WA Chronic Respiratory Disease Clinical Service Improvement Framework
FVC	Forced Vital Capacity
FEV1	Forced Expiratory Volume in one second
FHHS	Fremantle Hospital and Health Service
GINA	Global Initiative for Asthma
MBS	Medical Benefits Scheme
NAC	National Asthma Council of Australia
NAPS	Newborns Asthma and Parental Smoking Project
NDRI	National Drug Research Institute
PEF	Peak Expiratory Flow
PMH	Princess Margaret Hospital
RPH	Royal Perth Hospital
SCGH	Sir Charles Gairdner Hospital
SpO2	Pulse Oximeter Oxygen Saturation
TGA	Therapeutic Goods Administration
TSANZ	Thoracic Society of Australia and New Zealand

Glossary

Definitions are taken from the [NAC Asthma Management Handbook 2006](#)⁸

<p>Control (Pg 17)</p>	<p>Good asthma control is defined as all of the following:</p> <ul style="list-style-type: none"> • Minimal symptoms during day and night • Minimal need for reliever medication • No exacerbations • No limitation of physical activity • Normal lung function (FEV1 and/or peak expiratory flow (PEF) > 80% predicted or best).
<p>Severity (Pg 9)</p>	<p>“Asthma severity” refers to the underlying, ongoing status of the stable asthma condition, as distinct from the severity of asthma exacerbations.</p> <ul style="list-style-type: none"> • A patient with mild persistent asthma might experience exacerbations ranging in severity from mild to severe. Severe exacerbations in a patient with mild persistent asthma usually occur in the context of multiple triggers, e.g. viral infections and exposure to airborne allergens. • Asthma classification is a subjective assessment, so there is potential for variation of opinion between doctors. Patients’ perceptions of their asthma severity may also differ from those of their health care providers.

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Appendices

Appendix 1: 2008 Asthma Model of Care Working Party members

The 2008 Asthma Model of Care was developed in consultation with clinicians, key stakeholder groups, consumers and carers. The Asthma Working Party members are:

Asthma Working Party Executive	
Professor Lou Landau	Professor, Paediatrics & Child Health
A/Prof Peter Kendall	Head of Department, Respiratory Medicine, FHHS, Co-Lead Respiratory Health Network
Ms Leanne Ross	Respiratory Nurse Educator, Geraldton Hospital
Dr Helen Bell	Respiratory Physician, SCGH
Dr Rhonda Clifford	Pharmacist/Senior Lecturer, School of Biomedical, Biomolecular and Chemical Sciences UWA
Dr Maree Creighton	Hospital Liaison GP, PMH
Ms Samantha Dowling	Senior Policy Officer, WAGP Network
Ms Rachael Dunn	Asthma Liaison Officer, PMH
Dr Kevin Gain	Chief Pulmonary Physiologist, RPH
Ms Piper Marsh	Health Services Manager, Asthma Foundation of WA
Ms Sharon McBride	Senior Portfolio and Policy Officer (Schools and Youth), Child and Adolescent Community Health Division
Ms Ailsa Mylotte	Clinical Nurse Consultant Respiratory Medicine, FHHS
Dr Richard Nolan	Consultant Immunologist, Pathwest/SCGH
Dr Andre Schultz	Paediatrician/Director of Clinical Training, PMH
Dr Quentin Summers	Respiratory Physician, RPH
Ms Carol Watson	Assistant Superintendent Physiotherapy, RPH
Dr David Whyatt	Project Officer, Asthma Intervention & Education Study
Dr Alan Wright	General Practitioner
Adult Guidelines Sub Group	
A/Prof Peter Kendall*-Chair	Co-Lead Respiratory Health Network
Dr Richard Nolan*	Consultant Immunologist, Pathwest/SCGH
Dr Quentin Summers*	Respiratory Physician, RPH
Dr Alan Wright*	General Practitioner
Dr Helen Bell*	Respiratory Physician, SKHS, NMAHS
Dr Richard Loh	Consultant Immunologist, PMH
Workforce Education Sub Group	
Dr Rhonda Clifford* (Chair)	Pharmacist/Senior Lecturer, School of Biomedical, Biomolecular and Chemical Sciences UWA
Ms Ailsa Mylotte*	Clinical Nurse Consultant Respiratory Medicine, FHHS
Dr Maree Creighton*	Hospital Liaison GP, PMH
Ms Samantha Dowling*	Senior Policy Officer, WAGP Network
Ms Rachael Dunn*	Asthma Liaison Officer, PMH
Ms Leanne Bassett*	Respiratory Nurse Educator, Geraldton Hospital

Ms Katie Beech	Consultant Pharmacist
Ms Maeva Hall	Acting Telehealth Manager WACHS
Ms Jo Jennings	Pharmacist
Ms Angeline Ong	Pharmacist
Mr Carl Schneider	Pharmacist
Consumer/Asthma Education Sub Group	
Ms Piper Marsh* (Chair)	Health Services Manager, The Asthma Foundation of WA
Ms Sharon McBride*	Senior Portfolio and Policy Officer (Schools and Youth), Child and Adolescent Community Health Division
Ms Carol Watson*	Assistant Superintendent Physiotherapy, RPH
Ms Sara Coleman	Asthma/Respiratory Educator, SCGH
Ms Guilia Strindberg	Clinical Nurse Practitioner, Asthma Educator, SKHS
Ms Paula Murray	Asthma Educator, Divisions of GP Bunbury
Ms Charlotte Allen	Asthma Liaison Nurse, PMH
Ms Lyn Sprigg	Community Health Nurse, AHS
Ms Yvonne Ashworth	Consumer Representative
Equipment, Devices & Technology Subgroup	
Dr Kevin Gain* (Chair)	Chief Pulmonary Physiologist, RPH
Dr David Whyatt*	Project Officer, Asthma Intervention and Education Study
Mr Bill Smith	Respiratory Scientist, FHHS
Mr Mike Das-Gupta	Senior Respiratory Scientist, RPH
Ms Suzanne Taylor	Chronic Disease Coordinator, WACHS Wheatbelt
Corresponding Members**	
Dr Gervase Chaney	Paediatrician PMH & Clinical Co Lead Child & Youth Health Network
Professor Stephen Stick	Co-Lead, Respiratory Health Network
Dr Jacquie Garton-Smith	General Practitioner
Dr Dominic Mallon	Clinical Immunologist, FHHS
Dr Michael Watson	Paediatric Infectious Diseases Microbiologist, SCGH & Clinipath
Dr Stephen Langford	Medical Director, RFDS
Mr Carl Graham	Clinical Psychologist, FHHS

* denotes Executive member

Prof Louis Landau and A/Prof Peter Kendall, Co Chairs of the Asthma Working Party and Belinda Whitworth, Senior Development Officer and Kim Goodman, Development Officer, Health Networks Branch, Department of Health WA, developed this MOC.

Australian Centre for Asthma Monitoring (ACAM) <http://www.asthamonitoring.org/>



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**Health Networks Branch
Department of Health WA
2C, 189 Royal Street
East Perth WA 6004**