

Changing Approaches to Asthma Management in Australia

Effects on Asthma Morbidity

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Abstract

Asthma is an important public health issue in Australia and is responsible for significant morbidity and mortality in the community. Recognition of the impact of asthma on the health of Australians, and the apparent failure of new medications to reduce mortality and hospital admission rates resulted in a major review by the stakeholders in asthma care. This led to new approaches to asthma management based on strategic use of asthma medications and the development of the Asthma Management Plan (AMP). The AMP drew together current understanding of asthma to develop a simple stepwise approach to management that could be readily applied in patient management.

The National Asthma Campaign (NAC), a coalition of the major stakeholders in asthma care, was launched in 1990 to lead the dissemination of the AMP. In association with other organisations interested in asthma care in Australia, the NAC has developed the AMP, and co-ordinated a decade of education and advocacy about asthma that targeted doctors, health professionals and the general

public. These activities have been successful in raising awareness about asthma in the community. However, recent research, while demonstrating the continued uptake of written asthma action plans for asthma and decrease in use of inhaled bronchodilator medications, reported a decrease in use of preventive therapy by people with asthma.

These activities have had a sustained impact on asthma-related health outcomes with mortality at the lowest level since 1960 and a decline in hospital readmission rates. This is useful information because there is sound evidence that the prevalence and possibly severity of asthma in children has increased. However, review of management in primary care and among people who present to emergency services with acute asthma suggest that many people continue to manage their asthma poorly. Continued education is needed to build on the progress that has been made. There are opportunities to do this through efforts to integrate general practitioners into the wider health system through the formation of Divisions of General Practice. Recognition of asthma as a health priority area at a national level will help to enhance and maintain awareness of the public health importance of asthma and facilitate the further development of the initiatives begun during the last decade or more.

The National Asthma Campaign (NAC), launched in 1990, was an initiative of the stakeholders in asthma care (Thoracic Society of Australia and New Zealand, Royal Australian College of General Practitioners, Pharmaceutical Society Australia, and all state Asthma Foundations) with support from the pharmaceutical industry to promote common approaches to asthma management in Australia. It comprised a public health strategy, largely funded from the private sector, based on innovative use of mass communications and social marketing principles to increase the awareness of asthma in Australia.^[1] Its educational strategy was based on the principles outlined within the Australian Asthma Management Plan (AMP).^[2]

The NAC has now overseen a decade of activity that has included public education, advocacy, policy development and strategic planning. The aim of this paper is to review changing approaches to asthma management in Australia during this period and the effects of these changes on the management of asthma and on related morbidity. The context of asthma in Australia, within which the NAC has operated, is examined with a review of the prevalence of asthma in Australia. That the AMP, which provides a stepwise approach to care, is dynamic and is able to adopt new treatments for which there is

good evidence is discussed. Evaluation of the uptake of these guidelines has demonstrated changes in management practices. The final section of the paper examines evidence of the impact of the sum total of activities conducted by the NAC and other organisations during this period on asthma health outcomes in Australia.

1. Asthma in Australia

Asthma is a common condition in Australia and those who have a diagnosis of asthma frequently report symptoms. International population-based studies using standard techniques suggest that the prevalence of asthma in Australia is one of the highest observed in the world.^[3] Population-based surveys indicate a prevalence of asthma of 17 to 20% in children^[4,5] and 7 to 10% in adults.^[4,6-8] Self-report of symptom frequency indicates that 21% of children and 18.4% of adults experienced an episode of wheeze during the last year, and half of the children experienced more than 4 episodes in the last 12 months. Of those with asthma, 23.4% of children and 39.5% of adults reported wheeze more than once a week.^[4] In addition, the prevalence of asthma has increased since the 1970s.^[9,10]

Studies in children, using identical objective

measures, indicate that report of 'wheeze during the past 12 months' (10.4 to 27.6% in Belmont and 15.5 to 23.1% in Wagga Wagga) and bronchial hyperresponsiveness [BHR] (9.1 to 19.8% in Belmont and 11.7 to 18.1% in Wagga Wagga) doubled between 1982 and 1992. This research also indicated that the increase occurred mainly among children with atopy (tested using skin prick reaction to common allergens), although the prevalence of atopy did not change. Follow-up of adults over a 9-year period (1981 to 1990) revealed an increased prevalence of wheeze, hay fever and diagnosis of asthma among young persons but no change in sensitisation to common allergens (atopy) or BHR.^[8]

Explanations for the observed increase in asthma prevalence suggest that a true increase in prevalence, increased awareness of asthma and an increased willingness to diagnose asthma have all contributed to the emerging pattern of the disease. Among adults the first two explanations are supported by study results.^[8] For children, an increase in both symptoms and BHR suggests that something else is happening that is either sensitising children to the development of asthma, or inducing asthma and allergy among those who are likely to be susceptible.^[10] The change is likely to be exposure to environmental factors rather than other factors such as genetic susceptibility.

Two current theories attempt to explain the increase in prevalence. The first emphasises the role of allergy to indoor environmental factors.^[11] Comparative studies of asthma prevalence in countries with either high or low industrial pollution suggests that outdoor environmental factors have a limited role in the aetiology of asthma in circumstances where genetic factors were not an issue.^[12,13] On the other hand there is good evidence that supports the role of exposure to indoor environmental factors: indoor allergens (house dust mite^[14] and domestic pets) and parental smoking^[15] may provoke asthma, whereas breast-feeding and certain aspects of diet^[16] such as the consumption of oily fish may be protective.

The other explanation, the hygiene theory, suggests that the relative absence of infection during infancy through smaller families, improved hygiene and not attending day care are factors favouring the onset of asthma.^[17-19] It has been proposed that early exposure to infection in infants may protect against asthma in childhood. One manifestation of this is that early infection stimulates Th1 lymphocyte response [immunoglobulin (Ig)G] that is protective against initiation of asthma. No early exposure to infection leads to a Th2 lymphocyte response, which produces IgE.^[17,20] It is not yet clear whether this theory is correct and whether genetic tendencies or microbial factors explain these changes. In particular, admission to hospital with respiratory syncytial virus (RSV) infection is a risk factor for development of asthma, suggesting that it may be an over simplification to regard all childhood viral infections as protective against asthma.

2. Management Strategies

2.1 Prevention of Asthma

Currently there are no recognised cures for asthma. However, opportunities for primary prevention are emerging through the reduction of exposure to or removal of allergens, and a number of trials are underway.^[15,21] These interventions are targeting risk factors where there is good evidence for their role in the genesis of asthma and where exposure can reasonably be controlled. It is too early to comment on whether primary prevention is realistic. Indeed the hygiene theory creates some controversy as to what the appropriate strategy should be. Secondary prevention through avoidance of known risk factors for asthma or through the strategic use of medication, for example to prevent exercise-induced asthma, is possible. However, there is limited evidence of the efficacy of these approaches. Treatment strategies currently focus on tertiary prevention of symptoms through the judicious use of management practices and medication.

2.2 Medication to Treat Asthma

Approaches to asthma therapy have mirrored an understanding of the pathogenesis of asthma. The first effective treatments began to emerge during the early part of the twentieth century. Adrenaline (epinephrine) was first used for asthma in 1903 and as an inhaled preparation in 1929;^[22] theophylline was initially used for asthma in 1922;^[23] and an adrenal cortex substance, first suggested as early as 1900, was developed as an effective oral therapy during the 1950s.^[24] The development of medications was further helped by the development of inhaler devices, first developed by an American engineer Philip Maschberg in 1956,^[25] that enabled effective treatment with less systemic adverse effects. These early attempts at asthma treatment have heralded the development of new generations of well tolerated and effective treatments that are administered directly to the lungs by inhalation and minimise the adverse effects associated with oral administration of early prototypes.^[25,26]

Medications for asthma currently form 3 major groups: preventers, relievers and symptom controllers.

2.2.1 Preventive Therapy

Preventive therapy is prescribed on the basis that it will abolish or reduce symptoms and airway inflammation, and is regarded as first line therapy for children and adults with moderate to persistent asthma.^[27] The major group of preventer medications is inhaled corticosteroids and 3 main aerosol preparations are now available: beclomethasone, budesonide and fluticasone propionate. All have considerable advantages over earlier oral medications. Their clinical efficiency in the lungs is similar, there is lower absorption systemically and few adverse effects.^[28] A number of studies comparing the efficacy of these drugs and method of delivery suggest each drug has slightly differing metabolism, affinity for the corticosteroid receptor and absorption, and hence risk of adverse effects.^[29,30]

The inhaled nonsteroidal anti-inflammatories include two chemically distinct agents: sodium cromoglycate and nedocromil. Sodium cromogly-

cate may act by preventing the release of inflammatory mediators from sensitised cells during an allergic reaction while nedocromil prevents BHR through inhibition of early and late phase reactions.^[31] They have a variety of uses in the treatment of asthma: as initial preventive therapy for children, before exercise to prevent exercise-induced asthma in adults and children, and before allergen exposure in susceptible individuals. A new class of preventer medications is the anti-leukotriene drugs (montelukast, zafirlukast). Leukotrienes are synthesised by inflammatory cells and have a role in the inflammatory process that is associated with the pathogenesis of asthma.^[32] These drugs act competitively with leukotrienes to block their receptors. While they have a demonstrated role in the treatment of asthma, their position in the therapeutic armamentarium is still being established.^[32,33]

Two distinct approaches to the use of preventer medications have developed over the years. The first is the stepwise approach where the initial preventer used is nonsteroidal. If this is insufficient, inhaled steroids are substituted. The other approach is use of inhaled steroids as initial preventer medication. The choice between these two different strategies needs to be most commonly made in children with frequent episodic asthma.

2.2.2 Relievers

The short acting β_2 -agonists salbutamol and terbutaline are widely used for asthma as the mainstay for the acute relief of symptoms. There has been controversy about the regular use of these medications in recent years because of loss of symptom control and reduced protection against bronchoconstriction.^[34,35] Current guidelines recommend their use for symptom relief only. Theophylline has been used for asthma as an oral preparation since 1944. It is a weak bronchodilator at therapeutic concentrations but may have some anti-inflammatory activity.^[36] Adverse effects above its narrow therapeutic range have reduced its use in recent years. An inhaled anticholinergic bronchodilator with few systematic effects is ipratropium bromide. Although the addition of ipratropium bromide to β_2 -agonist therapy in acute asthma shows

Table I. The six-step asthma management plan. Reproduced with permission of the National Asthma Campaign^[31]

1	Assess asthma severity	Assess overall severity when the patient is stable, not during an attack
2	Achieve best lung function	Treat with intensive asthma therapy until the 'best' lung function is achieved Back titrate to lowest dose that maintains good symptom control and best lung function
3	Maintain best lung function Avoid trigger factors	Identify and avoid trigger factors and inappropriate medication
4	Maintain best lung function with optimal medication	Treat with the least number of medications and use the minimum doses necessary Ensure the patient understands the difference between 'preventer', 'reliever', and 'symptom controller' medications. Take active steps to minimise the risk of adverse effects from medication
5	Develop an action plan	Discuss and write an individualised care plan for the management of exacerbations Detail the increases in medication doses, and include when and how to gain rapid access to medical care
6	Educate and review regularly	Ensure patients and their families understand the disease, the rationale for their treatment and how to implement their action plan Emphasise the need for regular review, even when asthma is well controlled Review inhaler technique at each consultation Review compliance at each consultation

an additive effect, opinion differs as to whether the regular use of an anticholinergic in combination with a β_2 -agonist in patients with acute asthma is warranted.^[37]

2.2.3 Symptom Controllers

Long acting β_2 -agonists, salmeterol and formoterol are a new class of β_2 -agonists which induce bronchodilation for up to 12 hours after administration. They are recommended as an adjunct to regular preventive therapy for people who have residual symptoms of asthma when taking moderate doses of preventive medication. Research suggests that these medications improve control of symptoms, increase lung function and provide better relief when used instead of increasing the dose of inhaled corticosteroid.^[38,39]

3. Asthma Management Plan (AMP)

Despite the availability of effective, well-tolerated medication, high morbidity and mortality from asthma suggested that more structured approaches to management were needed to address a number of issues with management including underuse of preventive therapy, limited knowledge of asthma, failure to recognise worsening symptoms and ineffective management strategies. The AMP was developed by the Thoracic Society of Australia and New Zealand as a multifaceted approach

to asthma management in Australia.^[40] The AMP has achieved wide consensus and has been followed by other national^[41,42] and international plans.^[43] The AMP is a simple set of guidelines for the management of asthma that aims to achieve and maintain disease control (table I). It was designed to assist doctors to develop good asthma management practices based on the availability of well tolerated and effective medication to prevent the symptoms of asthma, and to treat acute exacerbations of the disease.

The AMP represented a compilation of expert opinion at the time.^[44] A number of studies have now been conducted that investigate the effectiveness of aspects of the plan. Evidence based review (based on randomised, controlled trials) has demonstrated the efficacy of some aspects of the plan but could find no evidence in favour of other aspects (table II).^[45] For example, there is good evidence of the effectiveness of preventive medication, reliever medications and symptom controllers in the treatment of asthma. The evidence for alternative therapies and for avoidance of triggers of asthma is not strong. Importantly, the review found strong evidence for the provision of training in self-management involving self-monitoring of symptoms, regular medical review and use of written asthma management plans in adults.^[46] However, provision of information alone without active

Table II. Summary report, 1999 evidence-based review of the Australian Six Step Asthma Management Plan. Reproduced with permission of NSW Health and the National Asthma Campaign^[45]

Step 1	Assess asthma severity	No evidence
Step 2	Achieve best lung function:	
	Adults, FEV ₁ ≤ 80% predicted, ICS < 800µg	Effective
	Adults, FEV ₁ ≤ 80% predicted, ICS > 800µg	Effective
	Adults, FEV ₁ ≥ 80% predicted, ICS < 800µg	Effective
	Adults, FEV ₁ ≤ 80% predicted, ICS > 800µg	Effective
	ICS for children not responsive to SCG	Effective
Step 3	Maintain best lung function – identify and avoid trigger factors:	
	House dust mite control measures	No effect
	Reduction of cat dander by HEPA filter	No effect
	Pollens, animals, moulds	No evidence
	Influenza vaccinations	No evidence
	Use of antibacterials without evidence of bacterial infection	No effect
	Allergen immunotherapy	Effective
	Reflux therapy	No effect
	Nedocromil for exercise-induced asthma	Effective
	Avoidance of food allergens and additives	No evidence
	Avoidance of drugs, emotional states, irritants, occupational sensitisers or temperature changes	No evidence
Step 4	Maintain best lung function – optimise medication program:	
	Metered dose inhalers and spacers vs nebulisers	Equivalent effect
	Anti-cholinergic drugs for wheeze in children under 2 years	Effective
	Addition of formoterol to ICS in mild-moderate asthma	Effective
	Methotrexate as a steroid-sparing agent	Effective (with risks)
	Long-acting β ₂ -agonists vs theophylline	Effective (fewer risks)
	Alternatives to Pharmacotherapy:	
	Physical training	No effect
	Acupuncture	No evidence
	Family therapy as an adjunct to medication	Effective
	Homeopathy	No evidence
	Spleleotherapy	No evidence
	Primary prevention of ingested allergens	No long term effect
Step 5	Develop an action plan:	
	Provision of an individualised written action plan	Effective
Step 6	Educate and review regularly:	
	Provision of information alone (structured or unstructured program)	No effect
	Information alone in the emergency department	Possibly Effective
	Information coupled with self-monitoring, regular review and a written action plan	Effective
	Doctor-managed vs self-managed asthma	Equivalent effect

FEV₁ = forced expiratory volume in 1 second; **HEPA** = high-efficiency particulate arrest; **ICS** = inhaled corticosteroids; **NSW** = New South Wales; **SCG** = sodium cromoglycate.

follow-up does not appear to improve health outcomes in adults with asthma.^[47] This evidence is strongly supportive of the principles of the AMP, and underlines the need for continued effort to promote and disseminate it to doctors and people with asthma. Furthermore the AMP is a dynamic docu-

ment, which has been modified to reflect factors such as the availability of newer preventive agents and new formulations (e.g. chlorofluorocarbon free), trends away from nebulised to inhaled therapy, and accumulated evidence about use of written asthma management plans.

3.1 Dissemination

NAC was launched in 1990 to promote new approaches to asthma management in Australia through the dissemination of the AMP.

The NAC has included two major foci: communications strategies targeting health professionals and people with asthma, and advocacy around issues relating to asthma and its management. During a decade of activity the communications have targeted doctors through articles and editorial comment in professional journals and magazines and paid advertising; and people with asthma and the general public through the development and dissemination of information, support of partners and social marketing. The Asthma Management Plan Handbook, first published in 1990 and revised and updated, most recently in 1998^[2] was intended as a reference for doctors and other health professionals on the management of asthma.

Since 1993 the activities of the NAC have moved to advocacy, policy development and the development of the National Asthma Strategy.^[48-50] The goals of the strategy are to reduce asthma mortality and morbidity, identify and reduce risk factors for asthma and achieve planned and integrated care for asthma that includes integrated patient care, team-assisted management and asthma education.^[50]

3.1.1 Evaluation of the Campaign

Evaluation of the public education activities of the NAC and other organisations during 1991 to 1998 has shown that there is good public awareness of asthma in Australia with 71% of adults being aware of someone with asthma and good public awareness of media messages about asthma.^[51] Population-based studies of children and adults conducted to capture the impact of these activities have demonstrated a sustained increase in the use of asthma management plans between 1990 and 1998,^[4,52] and confirmed by independent study.^[53] Between 1990 and 1993, increased use of preventive medication for children (32.2% in 1990 to 41.3% in 1993, $p < 0.001$) and adults (33.4% to 39.4%, $p < 0.01$) was observed.^[4] Follow-up dur-

ing 1998 using identical methods indicated a decline in use of preventive therapy among children to 36%.^[52] Among children, the daily use of inhaled β_2 -agonist decreased from 48.8% in 1990 to 30.2% in 1993 ($p < 0.001$) and any use declined from 78.2% to 73.9% ($p < 0.01$). The decrease continued further in 1998 (57%).^[52]

These results suggest that sustained educational messages about asthma during the last decade have been successful in creating awareness of asthma and have induced increased use of asthma management plans and decreased use of inhaled β_2 -agonists. Further research is needed to investigate the significance of decreased use of preventive therapy. Although the use is higher than the 1990 baseline, possible explanations for the decrease from 1993 to 1998 are obscure. There are no obvious methodological differences in the surveys, no obvious changes in medical opinions about indications for preventive medications and no apparent shifts to other forms of therapy.

3.2 Impact of the AMP

3.2.1 Morbidity

The NAC was designed as a national organisation to provide education about the asthma management plan and to support associated organisations. As such, it was neither possible nor appropriate to design intervention activities that enabled comparison of the impact of activities between areas with differing exposure to educational activities. Consequently, no studies have been able to directly measure the impact of the NAC or component activities on asthma outcomes. On the other hand, the absence of any alternative explanations for these improvements, such as major changes related to the system of healthcare delivery provides some support for the view that the NAC has had a positive impact.

While the guidelines suggest management practices for people with asthma, it is less clear about the extent to which these practices will prevent persistent symptoms or will prevent acute exacerbation of asthma. This is in contrast to other preventive medications, for example, the oral

contraceptive pill, a commonly used preventive medication with a clearly defined desired outcome, namely the prevention of pregnancy. A number of possible outcomes for asthma could be suggested. One possible outcome is to prevent death from asthma. This is important but is hardly a useful outcome to monitor response to preventers on a daily basis. Another group of possible outcomes relate to improving background control of asthma. This might include a decrease in days of wheeze, better exercise tolerance, less sleep disturbance, less missed work or school, and less use of reliever medication. A third group of possible outcomes relate to decreasing frequency and severity of acute exacerbations and would include reduced attendances at emergency department and admissions to hospital. Although one might expect that preventer medication will prevent both acute exacerbations and background symptoms, some patients appear to show a differential response. For example, the underlying disease control, as measured by day-to-day symptoms, will show a marked improvement but the frequency and severity of individual attacks does not change.

Other outcomes to consider as a way of judging response to preventer medication are lung function tests, including peak flow and forced expiratory volume in one second. There are a variety of ways these can be used, such as single measurements, peak flow variability, response to bronchodilators and measurement of airway hyperresponsiveness. Has preventer therapy had the desired effect if there is excellent symptom control but lung function remains abnormal? The intense interest in airway inflammation in asthma has resulted in another possible outcome for monitoring asthma control, namely measurement of markers of airway inflammation, such as eosinophil percentages in induced sputum.

It could also be argued that the ideal preventer would abolish background symptoms, prevent all exacerbations, restore normal lung function and airway responsiveness, and reverse airway inflammation. By these criteria, we rarely if ever achieve ideal control of asthma.

Although a number of studies have examined outcomes for people with asthma in a specialist clinic situation and reported results of clinical trials of medication regimens, few community-based studies have examined changes in morbidity for people with asthma. We need to learn more about measuring progress for the majority of people who experience mild or moderate asthma. Current measures of progress, mortality and hospital admission are insensitive measures of the impact of changes in asthma management because both are relatively rare events. There are currently no reliable measures available from primary care.

3.2.2 Mortality

Mortality may reflect changes in disease management over time, provided there have been no major changes in disease classification.^[54] It is most clearly identified as a primary cause of death among people aged 5 to 34 years.^[55] During the later half of the 1980s increasing mortality was observed despite the availability of new treatments (fig. 1). Data for 1998 indicated that there were 685 deaths attributed to asthma, 58 of which occurred among 5- to 34-year-olds. Since the late 1980s there has been a steady decline in death rates due to asthma and overall trends since 1960 suggest that deaths are at their lowest level since that time.^[56] This is useful information and suggests that despite the increase in prevalence of asthma that has been observed over time, improved recognition and treatment has promoted a decrease in mortality. It is likely that this reflects the overall success of combined efforts to improve the awareness of and treatment of asthma in the community.

3.2.3 Hospital Attendance

Attendance at emergency department or admission may be a limited indicator of outcome of asthma care.^[57-60] For example, attendance may be appropriate for someone with severe asthma who is normally well managed but will indicate a need for improvements in management and review where management is sub-optimal. Further, hospital presentation and admission over time is influenced by factors independent of disease status including diagnostic practices, management

practices in emergency departments, changes in the access to services (such as availability of services, distance to health services, operating hours), financing of healthcare (gap payments), and in admission policies.^[61,62]

Readmission is a useful indicator of the adequacy of hospital care and of community-based care.^[61] Using hospital readmission as the indicator, a South Australian study^[61] has revealed a significant decline in readmission for asthma from 13.5% within 28 days and 50.1% within one year in 1989 to 9.1% and 34.1%, respectively, by 1996. These results suggest a positive change in management that is protective against readmission, but not first admission.

Evidence suggests that a major reason for the failure of management to prevent a hospital admission is the failure to implement guidelines for asthma care.^[63] There are opportunities in the acute care setting to improve follow-up of patients through improved assessment and management while in the hospital, implementation of follow-up procedures and referral back to general practice.^[64-66]

3.2.4 Primary Care Management

For most people their asthma is a mild episodic condition and most management occurs in the gen-

eral practice setting where it accounts for 2.2% of the total problems managed in primary care (3.2 problems per 100 encounters, given that patients present with more than 1 problem).^[67] Although most general practitioners (GPs) are aware of management guidelines, there is wide variability in the use of these.^[68] Opportunities to improve asthma management in general practice through the implementation of and active review of asthma management plans, through regular review, have the potential to improve asthma management^[69] and are being trialed. These include the use of practice nurses to provide supplementary education and support,^[70] clinics in general practice staffed by nurses or GPs,^[71] and organised follow-up and planned review.^[46] Evaluation of these initiatives has demonstrated a variable impact on outcomes.

Divisions of General Practice in Australia programs have been developed and aim to integrate GPs with other health services and offer further potential opportunities to provide training or additional support to GPs interested in asthma.^[72] However, there are patient barriers that influence a patient's relationship with their GP and access to follow-up care that are independent of need for medical care. Strategies are needed in general practice to encourage patients to better value their health and to attend for review of their asthma even when they are well. This is one area where there are opportunities to develop further innovative approaches to asthma care.

4. Conclusions

Review of the impact of approaches to asthma management during the last decade on the health outcomes for people with asthma indicates that hospital readmissions and deaths attributable to asthma have declined significantly. That these have occurred against a background of increasing asthma prevalence, and possibly severity, is strong evidence that the dissemination of new and innovative approaches to asthma care have impacted on asthma-related morbidity in Australia.

Changing approaches to asthma management in Australia can be summarised into two streams. The



Fig. 1. Asthma mortality rates in Australia in the 5 to 34 years age group (data are age standardised and presented as a 3-year moving average). Reprinted with permission of Medical Journal of Australia.

first has involved the continued evolution (i.e. development through to integration into asthma care) of well tolerated and effective medications to prevent or relieve symptoms of asthma which are delivered directly to the lungs with the view to minimising systemic adverse effects. The second was the development and dissemination of the AMP. The Thoracic Society of Australia and New Zealand undertook initial work on this and the NAC, comprising the major stakeholders in asthma care in Australia, was formed to disseminate the plan. The NAC used social marketing principles funded from the private sector to disseminate information about improved management. The success of these activities is reflected in the sustained increase in use of the AMP and reduction in reliever use. However the decrease in use of preventive medications reported in 1998 indicates that a high level of activity is needed to maintain this progress. Addressing this may require new and innovative approaches to dissemination of messages about asthma care.

There are opportunities to do this. One approach is to build on the infrastructure provided by the Divisions of General Practice. These area-based organisations have been established in Australia as a vehicle to integrate GPs with other health services. Promotion of asthma management strategies through Divisions offers opportunities to effectively reach people with asthma because most care is delivered in the general practice setting and most people indicate that they have a regular GP or have seen a doctor in the last 12 months. Further, national recognition of asthma as the sixth National Health Priority Area in Australia will further support efforts to improve asthma care.^[73] This acknowledges the public health importance of asthma in Australia, particularly the high prevalence of the disease, the availability of well-tolerated and effective treatments, and the opportunities for the development of management strategies and plans to reduce the burden of illness. It will enhance the awareness of the public health importance of asthma and will enable the further devel-

opment of initiatives undertaken during the last decade by the NAC and others to continue.

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