

INQUIRY INTO HEALTH IMPACTS OF AIR POLLUTION IN THE SYDNEY BASIN

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Summary



Submission

BY

Asthma Foundation New South Wales

TO

**The NSW General Purpose Standing Committee
No 2**

**“Inquiry into and report on the health impacts of
air pollution in the Sydney Basin”**

August 4 2006

Asthma and Air Pollution

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4 August 2006

The Director
General Purpose Standing Committee No 2
Parliament House
Macquarie Street
SYDNEY NSW 2000

Dear Sir/Madam

Re: NSW Parliamentary Inquiry

Please find attached a submission on behalf of the Asthma Foundation NSW, in relation to your *Inquiry into the health impacts of air pollution in New South Wales*.

The Asthma Foundation NSW has a profound interest in this inquiry, as the links between asthma and air pollution are well established. Air pollutants such as airborne particles, sulphur dioxide, nitrogen oxides and ozone are common triggers for asthma and contribute to increased hospitalisations and mortality for people with asthma. As the leading asthma consumer organisation in NSW, we are committed to making NSW a healthier and safer place for people living with the disease.

The submission deals primarily with the health impact of current air pollution levels in the Sydney Basin on people with asthma, and proposed methods for improving the health outcomes for people with asthma.

We look forward to the outcomes of the inquiry.

Yours faithfully

Greg Smith
Chief Executive Officer

1. Introduction

The Asthma Foundation NSW is a community based organisation committed to eliminating asthma as a major cause of illness and disruption to the community.

Australia has one of the highest prevalence rates of asthma in the world with 1 in 6 children and 1 in 9 adults diagnosed with asthma. Asthma currently affects 2.2 million Australians. While the overall asthma mortality rate is declining, people continue to die unnecessarily from the disease. In 2003, 314 Australians died from asthma.

Air pollution is a major contributor to asthma related hospitalisations and mortalities. Our role as the representative voice for asthma consumers in NSW is to advocate for cleaner air and educate the general public about the risks of air pollution.

Asthma Foundation NSW provides consumer information through community programs, an information line, website, brochures and newsletters on how best to reduce the effects of air pollution for people with asthma.

This document will outline the causes of air pollution in the Sydney Basin, the impact this has on people with asthma and what we believe needs to be done to improve current air pollution levels to improve health outcomes for people living with asthma.

2. Causes of air pollution in Sydney Basin over the past three decades

The causes of pollution in the Sydney Basin are manifold. Domestic activities such as using wood burning stoves, commercial activities such as driving goods from A to B, industrial processes such as incineration and smelting and conservation measures such as fire hazard reduction (burn-off) as well as a significant increase in population and car ownership all contribute to the problem.

The major sources of air pollution in the Sydney Basin area that most affect people with asthma are principally man-made pollutants and include: motor vehicle emissions, bush fires, woodsmoke and tobacco smoke. Scientific studies have proven that these all have adverse health effects. This submission will concentrate only on these sources of pollution as they are the most significant to people with asthma.

Although overall pollution levels have decreased during the past three decades, pollution caused by motor vehicle emissions remains high. Certain pollutants such as ozone and particulate matter smaller than 10µm (PM₁₀) and particulate matter smaller than 2.5 µm (PM_{2.5}) are of major concern in the Sydney Basin because their peak concentrations exceed the National Environment Protection Measure (NEPM) standards¹. Worryingly, there is no pollution monitoring in the heart of Sydney CBD ² and the monitoring equipment used in other parts of the city is only capable of

¹ Department of the Environment and Heritage April 2004, State of the air: national ambient air quality status and trends report 1991 – 2001.

² “Auditor-general pulls veil on Sydney's dirty air”
by Anne Davies, Sydney Morning Herald - April, 2005

registering pollution particulate of PM10.³ Research has shown that it is smaller particles of PM2.5 that reach the lungs and lodge in the respiratory tracts that increase asthma exacerbations and admissions to hospitals and are credited with killing more people in Sydney each year than car accidents.⁴

2.1 Man Made Pollutants

Air pollution is made up of a range of pollutants including; particles, sulphur dioxide, nitrogen oxides, ozone, carbon monoxide and lead. Of these pollutants a number have been shown to have direct health effects on people with asthma.

The following table⁵ outlines the pollutants with known health effects on people with asthma and their primary source.

| Pollutant group (primary source) | Known health effects |
|--|---|
| <i>Airborne particles</i> (primarily from combustion sources such as power stations, petrol and diesel – powered motor vehicles, wood heaters, fireplaces and incinerators) | <ul style="list-style-type: none"> • PM10 deposit in respiratory tract • PM2.5 penetrate deep into the smaller airways • Exacerbation of respiratory diseases • Increase in asthma requiring hospital admission |
| <i>Sulphur dioxide</i> (combustion of sulphur containing fossil fuels) | <ul style="list-style-type: none"> • Respiratory tract irritation • Triggers asthma episodes |
| <i>Nitrogen Oxides</i> (measured as nitrogen dioxide) (biomass and fossil fuel consumption, tobacco smoke and exhaust fumes) | <ul style="list-style-type: none"> • Respiratory tract infection, especially in children • Exacerbation of asthma • Increase in asthma requiring hospital admission |
| <i>Ozone</i> (reaction product of sunlight and vehicle pollutants; hydrocarbons and oxides of nitrogen) | <ul style="list-style-type: none"> • Respiratory tract infection, especially in children • Exacerbation of asthma • Increase in asthma requiring hospital admission • Reduced exercise capacity |

High levels of particulate matter and ozone in the environment remain a concern for people with asthma and we believe it is vital that strategies are employed to reduce these levels to meet the NEPM standards.

2.2 Natural Pollutants

Natural pollutants are important to mention here because although they are difficult to control, they have a significant effect on people with asthma

³ “State of the air: national ambient air quality status and trends report 1991-2001” - Department of the Environment and Heritage <http://www.deh.gov.au/atmosphere/airquality/publications/status/index.html>

⁴ “Pollution is killing hundreds” by Sharri Markson 28/5/2006 Sunday Telegraph

⁵ Adapted from Tord E Kjellstorm, Anne Neller and Rod W Simpson, Air Pollution and its health impacts: the changing panorama MJA 2002; 117

Bushfires are a natural phenomenon, which create an increase in particulate matter, causing an increase in respiratory admissions to hospital^{6 7}. Back burning measures used to control bush fires are also responsible for increases in air pollution. Over the last three decades, air pollution from bush fires is commonly experienced every summer in Sydney, most significantly in 1994 and 2002 during large scale bushfires.

Thunderstorms in rural NSW are responsible for concentrating grass pollens in the air which in summer and spring may be responsible for up to 50% of asthma exacerbations in the area.

While controlling air pollutants caused by natural phenomena is difficult, health promotion campaigns which educate people on how to best protect themselves from these pollutants are essential to reduce asthma exacerbations and hospitalisations.

3. Health impact of air pollution on people with asthma

The health impact from air pollution may have both short and long term effects. The short term effects caused by variations to pollution exposure may result in exacerbations of pre-existing illness, admission to hospital and in some cases death. It is speculated that ongoing exposure to certain air pollutants could result in a decline in lung function.

A review study by the American Thoracic Society showed that the respiratory health effects from air pollution include more than just the clinical outcomes (such as hospital admissions, loss of lung function and mortality); they also include diminished quality of life and are the cause of symptoms which interfere with daily activities.

The following list outlines the adverse respiratory effects of air pollution as reported in the review paper:

- Increased mortality.
- Increased incidence of lung cancer.
- Increased frequency of symptomatic asthma attacks.
- Increased incidence of lower respiratory tract infections.
- Increased exacerbation of chronic cardiopulmonary or other diseases, reflected in various ways, including reduced ability to cope with daily activities, increased hospitalisation, increased physician visits and medication, and decreased pulmonary function.
- Reduction of forced expiratory volume in one second (FEV1) or forced vital capacity (FVC)
- Increased prevalence of wheezing
- Increased incidence of chest tightness
- Increased cough/ phlegm production requiring medical attention
- Increased upper respiratory tract infections
- Eye, nose and throat irritations that may interfere with normal activities.

⁶ Cooper C, Mira M, Danforth M, Abraham K, Fasher B and Bolton P. Acute exacerbations of asthma and bushfires. *Lancet* 343:1509 1994

⁷ Jalaludin B, Smith M, O'Toole B and Leeder SR, Acute effects of bushfires on peak expiratory flow rates in children with wheeze: a time series analysis. *Australian and New Zealand Journal of Public Health* 24: 174-77 2000.

Local studies are consistent with overseas studies showing both an increase in hospitalisations and mortality due to air pollution in Sydney^{8 9}.

3.1 Exhaust Emissions

The link between air pollution and a worsening prevalence of asthma and death has been made by a plethora of recent international and Australian studies. While pollution levels in the Sydney Basin may not be high by international standards, the same patterns of ill health, high health costs and fatalities are already evident and will continue to rise, unless urgent remedial action is taken.

A significant proportion of the air pollution affecting the Sydney Basin is due to exhaust emissions from cars, which release nitrogen oxides and ozones into the air - the major pollutants in what is known as smog. Studies suggest these pollutants both worsen asthma symptoms and trigger asthma attacks. Exposure to nitrogen oxides causes infection in the airways, especially in children. A 2004 Department of Environmental Health study done by the University of Washington in America concluded,

“Air pollution is convincingly associated with many signs of asthma aggravation. These include pulmonary function decrements, increased bronchial hyper responsiveness, visits to emergency departments, hospital admissions, increased medication use and symptom reporting, inflammatory changes, interactions between air pollution and allergen challenges, and immune system changes.”

A 2002 study by the University of Southern California¹⁰ went further and suggested that air pollution causes asthma and other diseases in children. The study followed 3,500 children in 12 communities over five years to determine potential health damage caused by growing up in polluted air. Six communities had higher than average ozone concentrations; whilst the other six were lower than average. Children in the higher ozone communities who played up to three team sports developed asthma at a rate three times higher than children living in the lower ozone communities. The study concluded that smog can trigger attacks in asthmatics, but that ozone, another constituent of smog, can cause asthma.

Major results of the study:

- Children living in high ozone communities who actively participate in several sports, are more likely to develop asthma than children in those communities not participating in sports.
- Children living in communities with higher concentrations of nitrogen dioxide, particulate matter, and acid vapor have lungs that develop and grow more slowly and are less able to move air through them. This decreased lung development may have permanent adverse effects in adulthood.

⁸ Morgan G, Corbett S, Wlodarczyk J, Air pollution and hospital admissions in Sydney, Australia 1990 to 1994, American Journal Public Health 1998 Dec; 88(12):1761-64

⁹ Morgan G, Corbett S, Wlodarczyk J, Lewis P, Air pollution and daily mortality in Sydney, Australia, 1989 through 1993, American Journal Public Health 1998 May; 88(5):759-64

¹⁰ “Study Links Air Pollution, Ozone, and Asthma”
Sinus News 1/2/2002
<http://www.sinusnews.com/Articles2/air-pollution-ozone-asthma.html>

- Children who moved away from study communities had increased lung development if the new communities had lower particulate pollution, and had decreased lung development if the new communities had higher particulate pollution.
- Days with higher ozone concentrations resulted in significantly higher school absences due to respiratory illness.
- Children with asthma who are exposed to higher concentrations of particles are much more likely to develop bronchitis.

Several studies have demonstrated a higher prevalence of chronic cough among children living close to main roads. Sydney researchers revealed this week that they had detected a link between higher pollution levels and reduced birthweight in babies in the metropolitan area, suggesting the noxious effects of traffic fumes may cross the placenta to the developing foetus¹¹.

Researchers from Taiwan have shown that chemicals in vehicle exhausts lead to an increased risk of respiratory disorders in children living in heavy traffic areas and support the increasingly popular hypothesis that exposure to traffic pollution modifies children's susceptibility to allergens. Boys exposed to high levels of traffic pollution had a 16% higher risk of hayfever, which is linked to the development of asthma, while girls had a 17% increase¹². Children may be more vulnerable than adults because they spend more time outdoors, breathe in more air pound for pound than adults and their airways are more efficient in trapping pollutants. Because of this, air pollution can affect children up to nine times more harshly than adults¹³.

Air pollution, including particulates from traffic fumes, could be responsible for one in six cot deaths caused by Sudden Infant Death Syndrome. According to a 2004 study by the Foundation for the Study of Infant Deaths in America, air pollution could also be responsible for nearly a quarter of all respiratory disease deaths of normal birth-weight babies under one year old.¹⁴ An Asthma UK survey found that 81% of people with asthma said air pollution brought on their asthma symptoms.

Exhaust emissions don't just cause and exacerbate respiratory conditions, they kill too. The emissions from car exhausts are responsible for more deaths than road accidents, according to World Health Organisation (WHO) research. A study in France, Austria and Switzerland found that the number of people dying from respiratory or cardiovascular problems which could be attributed to car fumes far outweighed the death toll from crashes.¹⁵

¹¹ "Car fumes driving us to early grave" by Alexandra Smith and Julie Robotham, 30/7/2005, Sydney Morning Herald
<http://www.smh.com.au/news/national/car-fumes-driving-us-to-early-grave/2005/07/29/1122144024506.html>

¹² "Traffic fumes shown to raise asthma risk in children"
 REUTERS NEWS SERVICE May 28, 2003
<http://www.planetark.org/dailynewsstory.cfm/newsid/20951/story.htm>

¹³ Today@UCI article "Air Pollution from Fires May Affect Children More Harshly" quoting atmospheric expert Dr Robert Phalen http://today.uci.edu/news/tipsheet_detail.asp?key=163#large

¹⁴ Transport 2000 briefing UK – 28/5/2004
<http://www.transport2000.org.uk/news/maintainNewsArticles.asp?NewsArticleID=168>

This rather alarming conclusion is supported by recent statistical data from Australia. In the first study of its kind, the Bureau of Transport and Regional Economics found that in 2000, air pollution from cars caused between 900 and 2000 early deaths and contributed to between 700 and 2050 asthma attacks in Australia. About 4500 people are thought to be treated in hospital each year as a result of car-related pollution. The Federal Government estimates the health impact costs at around \$2.7 billion a year.¹⁶

These findings are borne out by statistics in Sydney. A recent NSW Government report confirmed more people are dying from heavy air pollution on Sydney's roads than are killed in car accidents. The latest data revealed there were 267 deaths from car accidents in 2000 while vehicle-generated air pollution was associated with between 339 and 762 deaths.¹⁷

These statistics appear to fly in the face of the Auditor General's report, released in April 2005 which stated that air quality had improved in Sydney during the past decade thanks to cleaner fuels and better car technology. Sulphur dioxide, lead and carbon monoxide levels have been dramatically reduced in Australia and other developed countries in recent years, but ozone and particles, two ingredients of photochemical smog with strong links to asthma, are still present in high quantities. The reason for the discrepancy between the pollution levels and the health statistics is that better motor engines haven't reduced the number of particles, but have just made them smaller and more harmful. Importantly current pollution monitoring methods are not able to detect them.

Air particles are of particular concern because they cause breathing problems, exacerbate respiratory diseases such as asthma and are not detected by current pollution monitoring. The method used to determine the number of particles in the air is PM10, which measures all particles less than 10 microns in diameter. What is really doing the harm are the smaller particles, those which are PM2.5 [2.5 microns or less]. Almost all diesel exhausts are PM1 or less. They enter the lungs, and the finest particles penetrate the cells of the lungs. Anything bigger than PM2 is caught in the nasal passages. The smaller particulates are not stopped in the nose or throat like the larger ones, but are actually small enough to enter into the lower respiratory tract where they accumulate as the body is unable to remove them. It is for this reason that pollution continues to cause illness and death. The Environmental Protection Authority (EPA) measures particulate matter by weight rather than particle size and does not distinguish between the larger particle sizes and the smaller more harmful particulates. This is disturbing as when fuel combusts, the predominant particulate sizes that are released are PM0.1 and PM0.03.¹⁸

¹⁵ <http://news.bbc.co.uk/1/hi/health/369169.st> BBC News, June 15, 1999

¹⁶ "Car fumes driving us to early grave" by Alexandra Smith and Julie Robotham, 30/7/2005, Sydney Morning Herald
<http://www.smh.com.au/news/national/car-fumes-driving-us-to-early-grave/2005/07/29/1122144024506.html>

¹⁷ "Pollution is killing hundreds" by Sharri Markson 28/5/2006 Sunday Telegraph

¹⁸ "Car fumes driving us to early grave"
by Alexandra Smith and Julie Robotham, 30/7/2005, Sydney Morning Herald
<http://www.smh.com.au/news/national/car-fumes-driving-us-to-early-grave/2005/07/29/1122144024506.html>

An estimated 70 per cent of vehicle emissions are of this smaller particulate matter and the number is increasing with new motor technology development. We believe the EPA should urgently develop standards for these small and highly dangerous particulates so that pollution information is meaningful.¹⁹ It is worth noting that despite the size of the pollution problem there are no monitoring sites currently operating in the CBD. The one site that was located on George and Market streets was shut down with the claim that the technology had become obsolete. It has not been replaced. It has also been reported that recent budget cuts had caused the Environment Department to cut the number of stations monitoring air quality by 25 per cent²⁰.

3.2 Underground traffic tunnels

Since the 1990s underground cross-city traffic tunnels have been seen as a panacea for Sydney's growing traffic problems and worsening pollution. The main selling point for building tunnels was their ability to move traffic more quickly across the city and because they would prevent traffic congestion, they were also considered greener and cleaner. While few would dispute the fact that tunnels have improved traffic flow, many questions have been raised about the air quality in the tunnels themselves and the impact their effluent has had on the health of people in the surrounding suburbs.

The controversy centres on the exhaust stacks that carry concentrated fumes and pollutants into the upper atmosphere. Critics such as Residents Against Polluting Stacks (RAPS) claim the NSW Government built the tunnels "on the cheap", refusing to instal state-of-the-art filtration systems, as used in Japan and Norway, preferring to build taller stacks to pump the unfiltered pollution skyward in the most densely populated areas of Sydney. They also charge that the stacks have been positioned wrongly - close to housing and in valleys where the pollution cannot be adequately dispersed and that growing numbers of Sydneysiders living near tunnels, particularly those near exhaust stacks, are increasingly suffering from asthma, heart problems, respiratory diseases and headaches.²¹

Christian Democrat MP, Reverend Fred Nile, who has asthma, has gone on the public record on the question of tunnels.

"As honourable members know, I suffer from asthma so I am sensitive to any pollution... I have driven through the [Cross City] tunnel a number of times. However, for health reasons I decided not to use it any more... The Minister for Roads said, "It is only haze." It is fog; it is pollution. You can see it as you are driving through it."²²

¹⁹ NSW Legislative Assembly Hansard
Speaker: Ms Clover Moore "Cross-city tunnel air filtration" Page: 17655

²⁰ "Auditor-general pulls veil on Sydney's dirty air" by Anne Davies
Sydney Morning Herald April 7, 2005

²¹ "Car fumes driving us to early grave"
by Alexandra Smith and Julie Robotham, 30/7/2005, Sydney Morning Herald
<http://www.smh.com.au/news/national/car-fumes-driving-us-to-early-grave/2005/07/29/1122144024506.html>

²² 29th March, 2006 "Nile Condemns Government for Tunnel Vision"
<http://www.christiandemocratic.org.au/fed/mr/060329ff.asp>

However, there have been no Australian studies done on cross-city tunnels to test the merits of these various claims. The Lane Cove tunnel study, announced in May 2006 will be the first and will hopefully provide much-needed specific data on cross-city tunnels and their impact on those people with asthma and other respiratory diseases.

In considering the second report on the Cross City tunnel, the Joint Select Committee agreed that it was not enough for the NSW government to say to people with asthma “wind up your windows and close your air vents.” They concluded that warning notices advising people with respiratory conditions to take adequate precautions should be prominently displayed outside the tunnel²³.

While this pre-emptive action is welcome, AFNSW believes that the NSW government could initiate a number of other measures, which would cut air pollution, provide better, more accurate research data and educate and make people with asthma more aware of the dangers that air pollution presents.

- Reinstatement of air pollution monitoring to the Sydney CBD that can measure pollution particles smaller than PM10 to enable researchers to build an accurate picture of Sydney’s pollution and its effects on health.
- Set up a dedicated inquiry to examine pollution levels in the Sydney traffic tunnels and assess the need for retrofitting them with state-of-the-art air filtration systems.
- Institute a high profile public information campaign to warn people with asthma and other respiratory conditions about the dangers of air pollution and what can be done to mitigate the effects of pollution if entering traffic tunnels.
- Increase spending on public transport, consider tax credits for those using it and introduce congestion charges on cars entering the Sydney CBD like those in Edinburgh and London, which has cut congestion by 30%²⁴.

There is convincing documentary evidence that cutting car use will also cut asthma rates. For example, during the 1996 Summer Olympics, the city of Atlanta, fearing gridlock, took extraordinary measures to reduce traffic. For the 17 days of the games, auto use dropped 22.5 percent. Daily ozone concentrations dropped almost 30 percent. The benefit to asthma sufferers was direct and dramatic. During that period, the number of asthmatics who saw a doctor dropped by 40 percent, the number admitted to hospital dropped 19 percent, and the number who were admitted to the emergency room dropped 11 percent²⁵.

The Auditor General was quoted as saying that the NSW Government’s failure to get people out of cars and onto public transport was the prime reason that Sydney would not meet its own national air quality and greenhouse emission targets. Instead, private car use is growing faster

²³ Joint select committee on the Cross City tunnel – Second Report – The cross city tunnel and public private partnerships. 08/05/2006
[http://www.parliament.nsw.gov.au/prod/parlment/committee.nsf/0/f412e826bc3dfd5bca2571720010fc97/\\$FILE/Final%20Second%20Report.pdf](http://www.parliament.nsw.gov.au/prod/parlment/committee.nsf/0/f412e826bc3dfd5bca2571720010fc97/$FILE/Final%20Second%20Report.pdf)

²⁴ City Mayors archive (London, UK), March 2004
http://www.citymayors.com/report/congestion_charge.html

²⁵ “Driving and Asthma” by Ryan O’Greal, 29/6/2006
<http://www.raisethehammer.org/blog.asp?id=251>

than the population. In 2001-2002 every car in NSW travelled 15 per cent more than the year before²⁶.

3.3 Bushfires

The Sydney Basin is bound to the north, south and west by large expanses of national parkland. Periodically, bushfires devastate property and take lives, but the air pollution they generate can also exacerbate respiratory conditions such as asthma. Until recently, bushfires were regarded as a natural phenomenon, but police and fire services report the incidence of arson has increased from 30 to 60 per cent of all bushfires²⁷. The increasing probability of bushfires and the threat to Sydney has necessitated fire reduction measures, such as annual burn-offs, which mean most suburbs in the Sydney Basin will be affected by smoke pollution at some point each year.

Smoke from bushfires is made of tiny particles of water vapour and gases including, carbon dioxide, carbon monoxide, nitrogen oxides and volatile organic compounds. These fine particles affect the human breathing system when inhaled and can aggravate existing respiratory conditions such as asthma. When sunlight combines with the nitrogen oxides and hydrocarbons in the smoke, the resulting chemical reactions form ozone. These enhanced concentrations of ozone can blow around for several weeks²⁸.

An Australian study conducted in Darwin between April and October 2000²⁹, confirmed the findings of overseas studies that found that a period of continuous bushfire activity was followed by a substantial rise in the number of hospital visits by people suffering from worsening asthma symptoms. In the United States, after widespread forest fires, there was a 40% increase in patients presenting to hospital with asthma, while, in Singapore, the pollution generated by forest fires in Kalimantan and Sumatra in 1997 was associated with a 19% increase in attendances for asthma.

Darwin was chosen as it has no other significant source of air pollution. The method used to determine the number of particles in the air was the standard PM10, which measures all particles less than 10 microns in diameter. The normal amount of PM10 in the air was under 10 µg/m³. Only when it rose above 40 µg/m³ was there a significant rise in people presenting at hospitals with asthma symptoms. The Darwin study found that the concentration of PM10 levels rose above the 40µg/m³ threshold six times in the seven months of the study, with the maximum being 70 µg/m³. On those six occasions, the authors found that asthma presentations increased by nearly 2.4 times.

The Australian National Environment Protection Council's target for maximum mean PM10 concentration is set at 50 µg/m³ in a 24-hour period. The Indonesian forest fires in 1997 produced

²⁶ "Auditor-general pulls veil on Sydney's dirty air"
by Anne Davies, Sydney Morning Herald - April, 2005

²⁷ Rural Fire Chief, Phil Koppenberg quoted on ABC's "Four Corners" 25/2/2003

²⁸ "Fires, floods and mudslides" Today@UCI
http://today.uci.edu/news/tipsheet_detail.asp?key=163#large

²⁹ "Exposure to bushfire smoke and asthma: an ecological study." by Johnston FH, Kavanagh AM, Bowman DM, Scott RK. The Medical Journal of Australia, 3/6/2002
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=12064985&dopt=Abstract

maximum daily PM10 averages of over 1500 µg/m³. During Sydney's Christmas 2001 bushfires, PM10 levels above 150 µg/m³ were sustained for 10 days. In Sydney's 1994 bushfires, the peak PM10 was 210 µg/m³, compared with background levels of about 30 µg/m³.

A recent report of the Australian National Environment Protection Council (NEPC) suggests that each increase of 10 µg/m³ in the ambient concentration of respirable particulates is associated with a 3.0% increase in exacerbations of asthma. Therefore, ensuring the public is aware of the effects of bushfires is as important as other forms of pollution.

To date, other than information and media campaigns run by Asthma Foundation NSW and NSW Health, little has been done to inform the general public of the perennial dangers of bushfires. Asthma Foundation NSW recommends that the NSW government encourage media outlets, especially television, to broadcast details of suburbs affected by fire reduction or bushfires during the main months of the bushfire season (October to March). This could be done during popular weather reports and used as an opportunity to remind people with respiratory conditions of a few simple measures to avoid exacerbations of asthma. These include:

- Staying indoors with all doors and windows closed
- Staying in air-conditioned premises
- Avoiding strenuous exercise outside during high pollution days
- Wear a mask outside covering nose and mouth designed to filter out fine pollution particles.
- Keep medications close at hand and use as prescribed. Do not take more medication to alleviate severe symptoms.³⁰

Other immediate measures that could be introduced are:

- Embark on a high profile media campaign, including TV and radio Community Service Announcements, to warn and educate the public about the effects of air pollution from bushfires and what measures they can take to avoid exacerbating their asthma.
- Extend the education campaign through established networks like the Asthma Friendly Schools program, which now extends to over 50% of all primary and secondary schools in NSW, to ensure that children with respiratory conditions do not, for example, take part in school sporting activities during high pollution days and are allowed to remain indoors during breaks.

3.4 Wood-burning Heaters

Woodsmoke caused by wood-burning heaters is now recognised as a major pollution problem. In fact, during winter, wood heaters can produce two to three times as much particle pollution as cars³¹. A recent review estimated that health costs of PM2.5 emissions in urban Australia range from \$100 to \$300 per kilogram of particles. A typical woodheater (emitting 20 kg of these particles every winter) therefore generates \$2000–\$6000 in health costs - considerably more than

³⁰ NSW Health http://www.health.nsw.gov.au/pubs/factsheet/pdf/bushfire_fs.pdf

³¹ “Why is woodsmoke a problem?” Environmental Protection Agency website <http://www.environment.nsw.gov.au/woodsmoke/index.htm>

switching to non-polluting heating.³² They are harmful to health because they emit a number of noxious gases (including carbon monoxide, nitrogen oxides and a range of organic compounds, some of which are toxic or carcinogenic) and fine particles, of PM2.5 which go deep into the lungs. In Sydney, solid fuel heaters contribute 40% of air particle pollution at certain times of the year. On a winter weekend it can be as high as 50%. In colder rural areas the contribution of woodsmoke to pollution is even higher.³³

The simple answer would seem to be to inform the public about the problem of woodsmoke and introduce legislation to phase out their use as has been done in the past with coal. Such an approach does pay immediate health dividends. PM2.5 pollution was reduced in Dublin by banning non-smokeless coal in 1990. There were 2154 fewer deaths in the first 6 years of the ban than in the previous 6 years (15.5% fewer respiratory deaths per year)³⁴.

3.5 Environmental Tobacco Smoke

Air pollution in the form of environmental tobacco smoke (ETS) has a profoundly negative impact on asthma sufferers, including an increased likelihood of asthma developing, worsening of existing asthma symptoms, as well as an increased number of asthmatic attacks.³⁵ It can also cause critical deterioration in already poor lung function for both adults and children with asthma, and it can worsen symptoms such as chest tightness, coughing, and wheezing. Of the known asthma triggers in adults, tobacco smoke is one of the most common.

While there is no scientific proof that tobacco causes asthma, the links between asthma and smoking are well established through a plethora of Australian and international research. As far back as 1986, the Australian National Health and Medical Research Council conducted an inquiry into asthma and adults. They concluded that:

“The epidemiological evidence shows that the inhalation of passive smoke by healthy individuals and those with a pre-existing respiratory disease commonly causes acute irritant effects in the upper and, to a lesser extent, the lower respiratory tracts. There is sufficient data to indicate that asthmatics may suffer acute effects following exposure to passive smoking.”³⁶

In 1993, the National Health and Medical Research Council followed this inquiry up with a study entitled, *The Health Effects of Passive Smoking*. This study reiterates their previous research, claiming: “For people with a pre-existing disease – especially asthma... the effect of exposure to

³² “Clinicians prescribing exercise: is air pollution a hazard?”

Medical Journal of Australia, 06/02/2006

http://www.mja.com.au/public/issues/184_03_060206/letters_060206_fm-3.html

³³ Robinson DL. Air pollution in Australia: review of costs, sources and potential solutions. *Health Promot J Aust* 2005; 16: 213-220

³⁴ Rissel CE. Clinicians prescribing exercise: is air pollution a hazard [letter; with other letters by du Plessis and Sharman] *Med J Aust* 2005; 183: 334-336.

³⁵ CMPMedica Australia, April 2006, *Asthma and Smoking*. Viewed 26 March 2006,

<http://www.mydr.com.au/default.asp?article=2389>

³⁶ National Health and Medical Research Council (NHMRC). *Effects of Passive Smoking on Health*. Canberra: NHMRC, 1986: 44.

ETS may accentuate... already marginal lung function resulting in critical additional deterioration in lung function and symptoms.”³⁷

Concentrated ETS in an enclosed area can exacerbate existing asthma symptoms, and ultimately provoke a potentially fatal attack. In 2003 314 people died from asthma in Australia.³⁸

Environmental tobacco smoke is a major source of indoor air pollution. In fact, indoor air pollution from ETS can have a worse effect on passive smokers, than the act of smoking has on the actual smoker. According to the National Tobacco Strategy Fact Sheet, “the particles in the unfiltered smoke that drifts from burning cigarette tips can be finer and more concentrated, meaning that they can be inhaled deeper into the lungs and stay longer in the body of the passive smoker.”³⁹

Children exposed to ETS are proven to be 40% more likely to suffer from asthma than those children who are not exposed. Further, an estimated 8% of childhood asthma (46,500 children) in Australia is caused by passive smoking.⁴⁰ Exposure to tobacco smoke can result in children developing asthma because their airways and lungs are smaller in size, and they have less developed immune systems than adults.

The 1993 National Health and Medical Research Council study revealed the links between asthma and children. The study stated, “Children exposed to environmental tobacco smoke are estimated to be about 1.4 times as likely to suffer from asthma symptoms than those who are not exposed. Passive smoking also aggravates pre-existing asthma in children.”⁴¹

ETS also has a negative effect on the developing foetus in the womb. If an unborn baby is exposed to passive smoking, not only do they have an increased risk of stillbirth and premature birth, but they can suffer reduced lung growth and have a higher chance of developing asthma later in life.

Exposure to ETS, particularly in enclosed areas, can have extremely hazardous and potentially fatal effects on both adults and children. It is therefore absolutely essential that the NSW Government takes steps to minimise their citizens’ exposure to ETS.

³⁷ National Health and Medical Research Council (NHMRC). The Health Effects of Passive Smoking: A Scientific Information Paper. Canberra: NHMRC, 1997: 93.

³⁸ Australian Centre for Asthma Monitoring (2005 edition) *Asthma in Australia* pg. Xviii

³⁹ Australian Government Department of Health and Aging, 23 April 2004, *National Tobacco Strategy – the dangers of passive smoking*, Viewed 6 April 2006
[http://www.health.gov.au/internet/wcms/publishing.nsf/content/health-publhlth-strateg-drugs-tobacco-resources.htm/\\$file/tobcfacts_passive.pdf](http://www.health.gov.au/internet/wcms/publishing.nsf/content/health-publhlth-strateg-drugs-tobacco-resources.htm/$file/tobcfacts_passive.pdf)

⁴⁰ State Government of Victoria, 16 February 2006, *Tobacco Reforms*. Viewed April 3 2006
<http://www.health.vic.gov.au/tobaccoreforms/new.htm>

⁴¹ National Health and Medical Research Council (NHMRC). The Health Effects of Passive Smoking: A Scientific Information Paper. Canberra: NHMRC, 1997: 93.

3.5.1 Smoke-free Legislation

In light of overwhelming scientific evidence that ETS is harmful, AFNSW is calling for a complete ban on smoking indoors in all pubs and clubs. Whilst we support a total ban on smoking in all public places, it is essential we focus on key areas where legislation can (and has been proven to) make a difference – in this case, hotels, pubs and clubs. The current legislation is of great concern to us as it will effectively define largely indoor areas as “outdoors” because 25% of the room will be essentially ‘open’.

3.5.2 Definition of “Enclosed” Areas – The “25/75”

In October 2004, the then NSW Premier, Mr Bob Carr promised that indoor smoking in all workplaces would be phased out by 2007. He said, “For a person working in a bar for eight hours, that’s equivalent to smoking half a packet of cigarettes, and we can’t ask bar workers to put their health at risk.”⁴² Mr Carr’s sentiments were in line with The Environmental Act, which stipulates: “All enclosed areas of hotels, clubs, and nightclubs must be completely non-smoking.”⁴³ This promise was a massive leap forward for NSW and put health issues at the top of the political agenda. It seemed to indicate the long-standing concerns about ETS would finally be addressed. However, the re-defined areas of what constitutes “an enclosed area,” as defined by the 2006 Smoke-free Environmental Amendment (Enclosed Places) Regulation, means the promise of a complete ban of smoking in pubs and clubs will not be realised. In fact, for a person with asthma this legislation is largely irrelevant.

There are clear discrepancies between the NSW Governments stated policy to reduce people’s exposure to ETS, and legislation such as the Smoke-free Environmental Amendment (Enclosed Places) Regulation 2006, which changes the definition of what constitutes an “enclosed area”. We believe the new guidelines for indoor smoking bans in pubs and clubs do not align with the NSW Government’s stated priority of health and welfare. Under the new regulation, smoking will be allowed in areas that are “25%” open which effectively suggests that if a room is “25%” open, it is the same as being outside. We strongly argue this is not the case. Staff and patrons in clubs will still be substantially exposed to tobacco smoke, and an open window will do little to dispel the potentially fatal effects of tobacco smoke. Furthermore, this “25/75” legislation seemingly contradicts the Minister for Health’s recent statement that the NSW Government’s health priority is chronic illness - including asthma. Legislation and regulations should accord with the recommendations of the National Occupational Health and Safety Commission whose Guidance Note on ETS in the Workplace states that smoking should be permitted

⁴² BB News/ Asia and Pacific, Wednesday, 13 October, 2004, 07:16 GMT 08:16 UK, *Australian Smokers Face Bar Ban*, Viewed April 3 2006, <http://212.58.240.36/1/low/world/asia-pacific/3738534.stm>

⁴³ NSW Legislative Council, 2004, *NSW smoke-free environmental amendment act 2004*, Viewed March 31 2006 <http://www.health.nsw.gov.au/public-health/health-promotion/tobacco/legislation/sfeaa2004.pdf>

only in those areas with "full open-air natural ventilation". This would appear to rule out partly-enclosed spaces.⁴⁴

The first line in the 1999-2003/4 National Tobacco Strategy states: "Tobacco smoking is the single largest preventable cause of premature death and disease in Australia,"⁴⁵ yet the one thing that will ensure this prevention – a distinct smoke-free legislation – is not being implemented to its maximum affect. The best possible prevention of harm from tobacco smoke is for a complete ban on smoking in any indoor space, whether or not it contains 25% of windows or doors.

The "25/75" ruling is open to wide interpretation, and as such will be extremely difficult to police. Windows can be closed on wet or windy days with no assurance that smoking will cease if this is the case.

The hazardous effects of smoking linger long after the smoke has cleared. The harmful toxic substances in tobacco are retained in the carpet, curtains, and soft furnishings of a smoke-filled room. Breathing in toxins from second-hand smoke, which contains 133 known toxic substances (including carbon monoxide, arsenic, and cyanide), can be more hazardous than if these were smoked directly.⁴⁶ Such toxins can still trigger chronic asthma attacks.

Neither non-smoking areas nor ventilation can remove the threat of ETS. Having the presence of any form of tobacco smoke indoors, whether in a separated "smoke room" or not, has hazardous effects on the whole area. Having a designated "smoke-room" still has a profound impact on surrounding rooms that are, in all appearances, "smoke-free". A 2003 study by the South East Sydney Public Health Unit concluded that:

"Provision of designated "no smoking" areas in licensed (gaming) clubs in NSW provides, at best, partial protection from ETS – typically about a 50% reduction in exposure. The protection afforded is less than users might reasonably have understood and is not comparable with protection afforded by prohibiting smoking on the premises."⁴⁷

The 1986 National Health and Medical Research Council report stated that, "typical indoor ventilation and air-conditioning is inadequate to remove these pollutants."⁴⁸

⁴⁴ National Occupational Health and Safety Commission, October 2003, *Guidance note on the elimination of environmental tobacco smoke in the workplace*, page 6. Viewed April 2 2006
[http://www.nohsc.gov.au/PDF/Standards/GuidanceNotes/GN-NOHSC3019\(2003\).pdf](http://www.nohsc.gov.au/PDF/Standards/GuidanceNotes/GN-NOHSC3019(2003).pdf)

⁴⁵ Commonwealth Department of Health and Aged Care. National Tobacco Strategy 1999-2002/3. A Framework for National Action. Commonwealth Dept of Health and Aged Care, Canberra.

⁴⁶ The Cancer Council Australia, *Position Statement – Passive Smoking*, Viewed 3 April 2006
<http://www.cancer.org.au/documents/Position%20Statement%20Passive%20Smoking.PDF>

⁴⁷ Cains T, Cannata S, Poulos R et al. Designated "no smoking" areas provide from partial to no protection from environmental tobacco smoke. *BMJ, Tobacco Control* 2004; 13:17-22.

⁴⁸ National Health and Medical Research Council (NHMRC). *Effects of Passive Smoking on Health*. Canberra: NHMRC, 1986: 8

3.5.3 Making pubs and clubs completely smoke-free is where we can make a difference

The government can have a much greater impact by making pubs and clubs smoke free – not only would a significant number of young people no longer be exposed to ETS, but it would help to remove the association between socialising and smoking. This conclusion is supported by studies from countries where smoke-free legislation already exists and the sale of cigarettes has declined.

3.5.4 Public Compliance with a complete smoke-free ban

Recent surveys suggest the NSW Government would enjoy overwhelming public support if they were to implement smoke-free laws. In 2005 the Cancer Institute of NSW conducted a survey among both smokers and non-smokers and with regards to passive smoking they found that:

- 92% of people believed all indoor workplaces should be completely smoke-free
- 88% of non-smokers and 42% of smokers felt bothered by other people's smoke in public places
- 75% of people agreed that going smoke-free will make pubs and clubs safer places to be in.⁴⁹

Such statistics are broadly in line with overseas surveys. In 2005 a comprehensive survey in England, Scotland, Wales and Northern Ireland found 71% of people on average agreed with a proposal that would make all workplaces, including pubs, clubs and restaurants, smoke free. Asked specifically about pubs and clubs 67% said they would support a smoke-free law.⁵⁰

4. Effectiveness of current laws and programmes for mitigating air pollution

An extensive number of initiatives have been implemented within the *Action for Air* program to try to improve the air quality in Sydney's greater metropolitan region. Although many of these programs have been very successful, initiatives to reduce motor vehicle usage has had limited success.

During the period from 1991 – 1999 there was an 18% increase in the use of vehicles on the road⁵¹. The vehicle kilometres travelled over this time increased by 23%. We believe that the

⁴⁹ Cancer Institute NSW, 2005. Viewed 4 April 2006 http://www.health.nsw.gov.au/cancer_inst/index.html

⁵⁰ ASH, 30 December 2005, *Major New Poll Shows Public Support Across UK For Comprehensive Smoke Free Law*, Media Release.

⁵¹ Action for Air and Update September 2002, Published by the Environment Protection Authority September 2002.

NSW Government could do much more for people with asthma by providing a suitable public transport system which would encourage travellers to use public transport over private vehicles.

Whilst overall air quality has improved since the 1980s due to improved motor vehicle technology and fuel technology certain pollutants continue to pose a problem.

The following table summarises the current state of Sydney’s ambient Air Quality⁵².

| Pollutant | Status | Compliance with NEPM standards |
|--------------------|---|---------------------------------------|
| Carbon monoxide | 2 fold drop over last 20 years -due to improvements motor vehicle emissions | Met |
| Lead | 10 fold drop in over last 20 years- due to removal of lead from petrol | Met |
| Sulphur dioxide | 2 fold drop over last 10 years | Met |
| Nitrogen dioxide | Recent fall below NEPM standards – due to changes in air chemistry | Met |
| Ozone | Remains consistently high | Unmet |
| Particulate matter | Remains high due to bush fires and hazard reduction burning | Unmet |

The levels of ozone and particulate matter remain above the NEPM standards and are not being effectively dealt with under current environmental programs.

5. Strategies to reduce health impacts of air pollution

There are two key strategies in which we can reduce the health impacts of air pollution.

- Primarily the aim should be to reduce the level of pollutants in the air.
- Where pollutants still exist health outcomes could be improved through pollution avoidance measures.

Both these methods could be achieved through greater public education.

5.1 Government initiatives to reduce air pollution

The general public has the power to greatly reduce air pollution through better choices of transport and heating. The public needs to be informed through health promotion campaigns just how much they can do to help reduce air pollution. Government incentive and penalty programs, such as tax credits for using public transport and tolls for using cars in the CBD, need to be employed to motivate the public to change their ways and reduce their reliance on private vehicles which are the greatest contributors to air pollution.

⁵² ibid

5.2 Avoidance of air pollutants

Avoidance of air pollutants is essential for those whose asthma is triggered by pollution. Avoidance is necessary to reduce asthma exacerbations and hospitalisations. The NSW Government is failing people with asthma in NSW by not being able to accurately monitor small particle air pollution (MP2.5), not ensuring constructions such as the cross-city tunnels filter vehicle emissions and not providing sufficient public health warnings about the dangers of air pollution. Nor is their sufficient education on how people should best manage their asthma during high pollution spikes. Whilst limited information is available on the Environment Protection Authority (EPA) website⁵³, mass media campaigns are required. Air pollution avoidance measures also need to be disseminated through health promotion campaigns in conjunction with community organisations such as the Asthma Foundation NSW.

6. Conclusion

Although the ambient air quality has significantly improved over the last 20 years, pollutants which directly affect people with asthma still exist at dangerous and unacceptable levels. Air pollution is demonstrably responsible for a number of growing health problems, including asthma, a rise in hospitalisations and fatalities. We believe the NSW Government is failing in its responsibility to the citizens of NSW to guarantee a level of air quality that is safe for all and especially for people living with asthma and other respiratory diseases.

While the problem of naturally occurring pollutants cannot be controlled, the NSW Government can do much more to control man-made pollution. Specifically it can:

- Reinstating the CBD pollution monitoring that can accurately measure pollution and register particles of PM2.5 and smaller.
- Encourage people to use public transport by introducing a system of tax credits and traffic tolls.
- Hold an inquiry into air quality in cross-city tunnels and retrofit them with state-of-the-air filtration systems.
- Inform the public about the hazards of woodsmoke and introduce legislation to phase out wood-burning fires.
- Pass legislation to make hotels, pubs and clubs truly smoke free and bring NSW into line with other progressive states and overseas countries.

We also believe that the NSW Government should invest significant money in public health campaigns to raise awareness and educate people with asthma on how to avoid exacerbations and hospitalisations during air pollution spikes and periods when hazard reductions are being carried out.

Failure to reduce these pollutants, and inform the general public of the dangers of air pollution will result in continuing hospitalisations and mortalities directly attributable to air pollution.

The Asthma Foundation NSW supports any NSW Government initiatives by continuing to educate the general public on the dangers of air pollution through our information line, website and newsletters.

⁵³ Environment Protection Authority <http://www.epa.nsw.gov.au/index.htm>

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