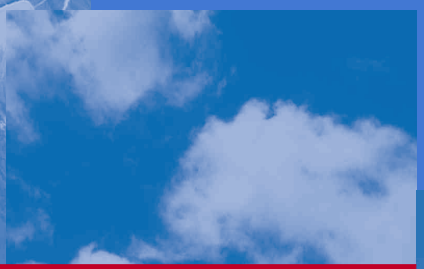

The National Environmental Health Strategy

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Foreword

The public health movement was founded in Australia on what is now known as the 'sanitation movement'. During this century this movement has brought about huge reductions in premature morbidity and great increases in life expectancy through improving living conditions.

This movement ensured that communities had access to clean water, waste removal and sewerage; services which are now often taken for granted. It is clear from these advances in health that environmental health is indeed a cornerstone of public health, providing the foundations on which modern society is built.

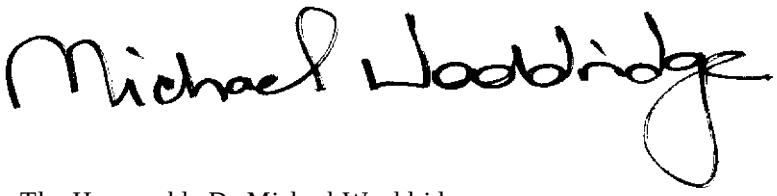
Despite important victories over many illnesses, challenges remain to safeguard peoples' health from hazards in the environment. Increasing urbanisation, population pressure, and industrial and agricultural activity are just some of the matters which continue to have impacts on health and wellbeing.

All Australians are entitled to live in safe and healthy environments and the development of this National Environmental Health Strategy is a major step forward in reaching that goal.

Crucial to the success of such a strategy is an emphasis on a national approach, which means that authorities across all jurisdictions will be working on environmental health issues in a collaborative and consistent way.

The Strategy also recognises that Australia has global responsibilities and that, as a leading nation in this Region, Australia can contribute to better environmental health outcomes for our neighbours through sharing information and education.

I congratulate all those people who played a part in this publication, in particular the members of the National Environmental Health Forum and the many members of the community who contributed ideas and comment during the Strategy's development.



The Honourable Dr Michael Wooldridge
Minister for Health and Aged Care

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Executive Summary

Environmental health is the cornerstone of public health. It provides much of the basis for modern society.

Improvements in sanitation, drinking water quality, food safety, disease control, and housing conditions have been central to the massive improvement of quality of life and longevity experienced this century.

However, life in Australia is changing. Our society has become increasingly urbanised, more populous, more complex. In supporting contemporary lifestyles we have increased air, water and soil contamination, persistent chemical pollutants have become widespread, and global climate change presents new environmental health hazards. These factors are contributing to respiratory and cardiovascular diseases, physiological and neurological disorders, and increased incidences of a range of cancers.

Environmental health is highly intersectoral, embracing a broad range of subject areas and involving a wide variety of stakeholders. The purpose of this strategy is to enhance environmental health management nationally by providing a framework to bring these stakeholders together across the range of issue which encompasses environmental health.

This Strategy will bring about:

- Better management
- Better health outcomes
- Increased capacity to address new and emerging issues
- More effective use of valuable resources.

The Australian Charter of Environmental Health

Australians are entitled to live in a safe and healthy environment. This concept forms the basis of the Australian Charter for Environmental Health which is at the heart of this strategy.

The Charter sets out the basic entitlements and responsibilities for individuals and communities, business and industry to live in safe and healthy environments. It emphasises the particular responsibilities of governments at all levels to deliver services and provide leadership and direction. By having both entitlements and responsibilities, the Charter encourages people to become involved in the promotion and protection of their own health.

Strategic Management of Environmental Health

Environmental health outcomes are often achieved by the combined efforts of a number of sectors throughout the community. No single organisation has the capacity to manage environmental health in isolation. Successful management of environmental health must harness all the relevant players.

All stakeholders and affected groups need to recognise their common aspirations, develop common goals, strengthen their communication and links, and to forge partnerships on common actions.

Good communication is particularly important to environmental health because of the wide range of issues covered and stakeholders involved. Communication underpins all aspects of environmental health, for example:

- It is a key activity and skill for enviornmental health practitioners
- It is an integral part of risk assessment and management
- It is central to community participation
- It enhances service delivery.

A New National Direction for Environmental Health

Australia's ability to predict and reduce environmental threats to health has been impeded by the fragmentation of management across government and key organisations. Different jurisdictions have differing operational approaches to environmental health, resulting in reduced awareness of existing activities, lack of coordinated actions and duplication of effort.

This Strategy launches the National Environmental Health Council. This peak environmental health advisory group for Australia will provide national leadership and a focus for cooperation on all environmental health issues. Improving environmental health in Australia requires a well planned and sustained team effort from all partners. The Council will provide the leadership necessary to achieve this and will actively pursue strategic partnerships across the wide range of stakeholders.

Investment in Environmental Health

Australia has made a massive investment in environmental health infrastructure. This encompasses water supply and waste water management, the built environment, and the control of air pollution. In the face of increasing environmental degradation and population pressure, it is essential that this investment is maintained and enhanced.

The costs of prevention are less than the cure and it is obvious that investment in infrastructure now will prevent the high costs of ill health in the future.

Environmental Health Justice

Environmental health is by its nature equitable. It is a population based approach which aims to increase the positive health outcomes people can derive from their environment.

A long, healthy life is an achievable goal for most Australians. However, parts of the population are disadvantaged and as a result have a higher than average level of morbidity and mortality.

These populations suffer a disproportionate impact from both increased exposures to environmental hazards and decreased access to environmental health services. This strategy recognises that policies and actions contribute to this inequity in environmental health outcomes. It is essential that environmental health justice is integrated into all government policies, programs and activities.

Nowhere else is the gap between the current situation and what is outlined in the Australian Charter for Environmental Health wider than it is for rural and remote indigenous communities. Most of these struggle to reach the basic level of environmental health that has been achieved by the rest of our population.

This strategy calls on government at all levels, indigenous organisations and communities to work together to address the key environmental health inequities facing these communities.

Enhancing Environmental Health Capacity

Environmental health is changing. Australia needs to enhance its environmental health capacity in order to meet current and new challenges. We need to do this by increasing our knowledge base, by developing our workforce, and better harnessing the full potential of our communities.

A major problem in the management of environmental health in Australia is that far too little systematic effort is made to measure accurately and use information to improve policy and practice. Good information systems need to be built to enhance the knowledge base supporting environmental health decision making.

The Environmental Health Workforce

It is often not recognised that Australia has an extensive environmental health workforce. This includes environmental health officers, environmental health workers, epidemiologists, toxicologists, researchers, academics, policy officers, urban planners, engineers, administrators, allied health professionals and other professionals, and managers.

Increasing the capacity of this workforce, both by increasing the numbers of practitioners and improving their training is critical to the success of this strategy. The role of environmental health practitioners is changing and needs to be supported through effective under - and post-graduate education, research, and continuing professional development. Because of the impact of their decisions and actions, it is essential that other professionals have a strong understanding of the principles of environmental health.

Improving Environmental Health Practice

Traditionally, the role of environmental health has been strongly centred around the enforcement and monitoring of legislative requirements. However, new focuses, methodologies and technology are altering the way issues are managed. Approaches that have proved effective in the past are not necessarily the way of the future. With change comes opportunity, in particular the opportunity to question and evaluate current approaches and adopt new ones.

In order to improve environmental health, environmental health practitioners must understand the best practice available to them. Best practice in health risk assessment, health impact assessment, legislation and service delivery.

Risk Assessment and Management

Humans face specific risks from a variety of environmental hazards. Protection of health involves analysing the risks, evaluating interventions and developing appropriate management strategies. Risk management uses risk assessment and other information as the basis of strategies aimed at minimising harm to individuals and communities. In order to ensure a coordinated approach to risk assessment and management the national environmental health council should develop a national framework.

Health Impact Assessment

Many developments and policies with significant positive or negative potential to affect health proceed with minimal consideration of these affects. Health impact assessment is a formal process that allows potential health impacts to be considered. It seems obvious that health considerations should form part of any impact assessment for development or decisions that could have health consequences.

Legal Instruments

The approach, application and enforcement of environmental health legislation is different in every State and Territory in Australia. While recognising the need for flexibility to deal with regional issues, there needs to be a greater level of harmonisation and consistency in environmental health legislation across Australia. In particular there needs to be increased acknowledgement of the roles of environment protection in environmental health legislation, and of both public and environmental health in environment legislation.

Environmental Health Service Delivery

Best practice environmental health service delivery improves environmental health outcomes by building on existing procedures and adopting innovative approaches. High quality service delivery should be underpinned by good communication, freely accessible information and a true partnership approach.

Ongoing evaluation of current practices is paramount in the development of enhanced service delivery. Current methods being used in the delivery of environmental health services should be assessed for their efficacy, efficiency and ability to increase health outcomes.

The Human-Environment Interface

There is a growing understanding that good health and well being are linked with the state of the environment. People need protection from hazards in their environment that pose a risk to their health. There is a growing appreciation of the interaction between human lifestyles, consumption patterns and urban settlements with the state of the environment. Additionally there is increased recognition that environmental degradation and overload may lead to new hazards and diseases. As well as minimising health hazards, good management of the environment can make a strong contribution to increasing health and well being.

This Strategy explores the relationship between our health and the environment by focusing on:

- Water
- Air
- Food
- Contaminated Land
- Waste Management
- Vector Borne Diseases
- Built Environment

Australia's Global Environmental Health Role

This strategy recognises that Australia is a global citizen with global responsibilities. In particular, environmental health management in the Southeast Asian and Western Pacific regions impacts on our own health. As a leading nation in this region Australia can ensure better environmental health outcomes by providing environmental health education to international workers, sharing information and encouraging sustainable development.

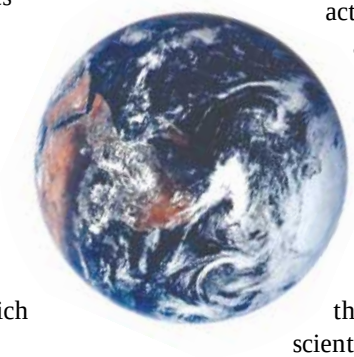
Chapter 1

Introduction and Background

1.1 Introduction

What is Environmental Health?
This is the first question that this Strategy must answer.

For many people, environmental health means the health of the environment. It conjures images of wilderness, forests, rivers and oceans - it is a term somehow synonymous with environmental protection. For others, environmental health is recognised as human health issues associated with poor living conditions, contaminated water and vermin infestation - all old battles which were fought and won over the last hundred years.



Both of these views are wrong. Environmental health is not synonymous with the health of the environment and environmental protection, and it is not restricted to the epidemic diseases of the last century. Environmental health is about creating and maintaining environments which promote good public health.

Life in Australia is changing; our society has become increasingly urbanised, more populous, and more complex. Whilst many of the epidemic diseases of previous eras have been successfully tackled, other environmental health hazards have emerged. In supporting our lifestyle we have increased air, water and soil contamination, persistent chemical pollutants have become widespread, and global climate change presents new environmental health hazards. These factors are contributing to respiratory and cardiovascular diseases, physiological and neurological disorders, and increased incidences of a range of cancers. There is even a real risk that the diseases of poverty and overcrowding that we thought we had conquered, or that were purely of third world concern, such as tuberculosis and malaria, will once again emerge in Australia.

Environmental health seeks to combat these threats. It is the most fundamental of population health issues, providing the foundation for modern society. Effective environmental health management is what allows civilisation to be civilised.

In order to prevent environmental hazards from diminishing the quality of our lives, we have to ensure that a comprehensive range of effective environmental health management programs exists throughout Australia. Whilst the important traditional roles of prescriptive regulation and law are recognised, this Strategy heralds a new approach to environmental health management.

A broader approach which will encourage effective and cooperative action by governments, industry and individuals, increase education and awareness, and improve coordination of all environmental health activities.

1.2 Aim

The fragmented management of environmental health across three levels of government and a wide range of stakeholders, impedes Australia's ability to predict and manage environmental threats to health. A new and actively collaborative approach is needed to address this. This National Environmental Health Strategy will drive the policy and provision of environmental health services in Australia into the future. The Strategy provides a unified and strategic approach to environmental health by involving; Commonwealth, State/Territory and Local government agencies, industry and business, the non-government sector, the health and scientific communities and the general public.

This Strategy aims to do this through:

- The development of an implementation framework which identifies effective initiatives and sets achievable targets
- Providing clear directions for action in key environmental health areas
- Ensuring a well equipped environmental health workforce
- Recognising that States/Territories and Local government have their own priorities
- Building on experience and successes to date
- Focusing more clearly on strategic planning of environmental health programs and activities
- Clarifying roles and responsibilities.

A key aspect of this Strategy is the active pursuit of strategic partnerships across the wide range of stakeholders. Partnerships between:

- All levels of government
- Governments, communities and industry
- The research and education communities
- Australia and the international community
- All governments and the environmental health and health workforces
- Stakeholders and people involved and impacted upon by environmental health issues.

The objectives of this Strategy are listed in Note 1.1.

Note 1.1 Objectives

The Strategy will increase our national ability to identify and manage environmental health problems through:

Improving Collaboration – through:

- Increasing support for partnerships
- Engaging stakeholders as partners
- Increasing participation in decision making

Improving Management Practices – through:

- A national approach to risk assessment and risk management
- Developing national standards and guidelines
- A mechanism for setting priorities in environmental health
- Better coordination

Improving Decision Making Ability – through:

- Strengthening the evidence base
- Providing a sound economic basis
- Developing a comprehensive information system

Improving Communication – through:

- Raising the awareness of environmental health issues
- Consultation on environmental health policy
- Education opportunities
- Risk communication

Increasing the Capacity of the Environmental Health Workforce – through:

- Improved research and development
- Improved workforce development and training
- Planning to meet future needs

Promoting Healthy Environments – through:

- Recognising the central role of sustainable development and the interrelationship of health and environment
- Facilitating community participation in decision making on environmental health issues

1.3 Scope

The need for a National Environmental Health Strategy has become increasingly clear to those involved in the management and provision of environmental health in Australia. This Strategy sets future directions for the development of environmental health which different stakeholders can use, individually and collectively, to improve environmental health outcomes across Australia.

Central to this Strategy is the Australian Charter for Environmental Health (Chapter 2) which sets out the environmental health entitlements and responsibilities for individuals, communities, business and industry, and government. Subsequent chapters outline ways to achieve the entitlements set out in the Charter. Chapter 3 describes a new national management structure. Chapter 4 looks at issues relating to the equitable delivery of environmental health services, including those issues relevant to Indigenous Australians. Chapters 5, 6 and 7 look at different pressures for change and seek to improve Australia's capacity to manage current environmental health problems, as well as increasing our flexibility to deal with new and emerging issues. Chapter 8 considers the international context in which Australia must function.

As environmental health is a wide ranging, multidisciplinary field, there are already a range of strategies and plans operating in related areas. The subject matter covered in these existing strategies will not be duplicated here. However, this Strategy aims to build on existing actions and achievements, and seeks to take into account many of the recommendations from these key documents. A list of key strategies and plans that have strong links to the National Environmental Health Strategy can be found in Appendix 1.

1.4 Environmental Health in Australia

1.4.1 What is Environmental Health?

Across Australia the various jurisdictions and levels of government each use different operational definitions of environmental health. Environmental health is encompassed within the broader area of public health. It is distinct from environmental protection, but the two do overlap in some areas (Figure 1.1).

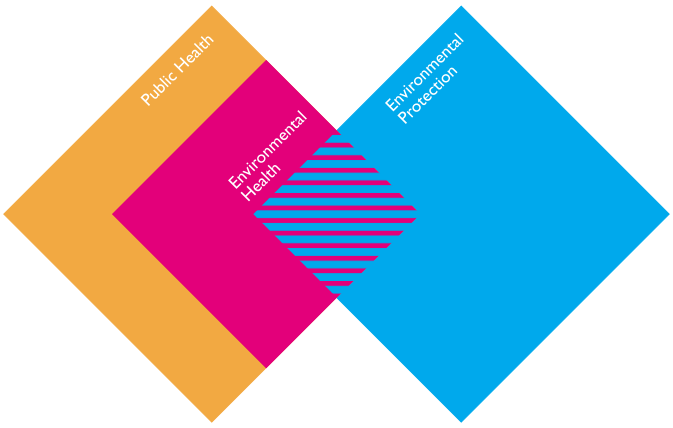


Figure 1.1: *The relationship between public health, environmental health and environmental protection*

While the difficulty in defining environmental health is acknowledged, this Strategy nevertheless requires some working definitions.

Health

Health is a state of complete physical, mental and social well being and not merely the absence of disease or infirmity (1).

Environmental Health

Those aspects of human health determined by physical, chemical, biological and social factors in the environment.

Environmental health practice covers the assessment, correction, control and prevention of environmental factors that can adversely affect health, as well as the enhancement of those aspects of the environment that can improve human health. It encompasses all the measures necessary to deal with issues such as environmental degradation and climate change, and hazards including contaminated water and food, and chemical exposure. Environmental health practice also provides opportunities to enhance health by planning for improved health outcomes and working towards health promoting environments. An indicative range of environmental health activities occurring across all levels of government is illustrated in Note 1.2.

1.4.2 Effects of Environmental Hazards and Degradation on Health

Central to environmental health is the understanding that our health is dependent upon our physical and social environment. We must also be aware that the adverse health effects of environmental change are not always immediate and localised, they can be long-term, diffuse and global. For example, while microbial contamination of food or water results in direct and immediate effects, exposure to asbestos fibres can cause mesothelioma decades after exposure – a long-term hazard.

Note 1.2 Environmental Health Activities

Develop Strategies and Standards

- Population safety
- Public consultation and risk communication
- Protecting health in emergency situations
- Environmental health impact assessments
- Surveillance, monitoring and standard setting
- Housing and accommodation standards
- Health promotion

Develop and Provide Environmental Health Advice

- Provide information to the public on environmental health
- Environmental health research
- Environmental health education

Environmental Health Regulations

- Review and develop environmental health and related legislation (food, air, water, waste management, planning)
- Enforcement of legislation
- Surveillance and monitoring
- Investigation of complaints and nuisances

Management of Physical Environment

- Water safety
- Recreational water safety
- Food safety
- Air quality
- Waste management
- Occupational health and safety
- Injury prevention
- Noise control
- Radiation health

Management of Biological Hazards

- Control of insects and other pests
- Vector-borne disease control
- Microbiological control

Management of Chemical Hazards

- Development of chemical safety standards for air, water, waste water, soil and food
- Health risk assessment and management of contaminated sites
- Pesticide safety
- Control of drugs, poisons and therapeutic goods
- Toxicology
- Tobacco control

Whilst these activities are necessary for all communities, there are additional issues that are critical for improving the health of Indigenous communities:

- Access to nutritious food
- Housing and overcrowding
- Adequate water supply
- Adequate sanitation and waste disposal

Estimating the potential health impacts due to a range of environmental hazards and degradation is often difficult because:

- Long time frames are often involved.
- Environmentally related illness and disease is often caused, or contributed to, by multiple factors. For example, chronic bronchitis can be caused or exacerbated by a wide range of air pollutants.
- Exposure to a specific environmental hazard may lead to a range of different health problems. For example, high exposure to lead in adulthood can damage the blood, kidneys and reproductive system, in addition to causing impairment of hearing, vision and muscle coordination.

Because many environmental health problems involve complex interactions, the breakdown of management systems can result in significant incidence of human disease, economic loss and the need for expensive remediation. The outbreak of hepatitis A linked to consumption of oysters from Wallis Lake demonstrated the complex interaction between waste disposal, urban planning, water management and disease surveillance (see Case Study 1).

The practice of environmental health focuses on solving potential health problems by utilising skills available from a wide range of disciplines.

1.5 Environmental Health and Environmental Protection

The maintenance and improvement of health should be at the centre of concern about the environment and development. Yet health rarely receives high priority in environmental policies and development plans, rarely figures as an important item in environmental or development programmes, despite the fact that the quality of the environment and the nature of development are major determinants of health (2).

Environmental health and environmental protection are different, but have common elements. They have considerable overlap as the protection and enhancement of human health is often an interdependent goal.

Protecting the environment for the sake of human safety, and protecting the environment for the benefit of the biosphere, are not mutually exclusive (3). This is encapsulated by the first principle of the Rio Declaration of Environment and Development which states:

Human beings are at the centre of concern for sustainable development. They are entitled to a healthy and productive life in harmony with nature (4).

The environment and heath sectors often work towards the same outcome, even if it is for different reasons. On other occasions, such as the broad-scale use of insecticides to control mosquitoes, the outcomes sought by the environment and health sector can be different.

Environmental protection actually developed in order to protect public health. In 1974 The Commonwealth Environment Protection (Impact of Proposals) Act defined the environment as:

'...all aspects of the surroundings of human beings, whether affecting human beings as individuals or in social groupings.'

Case Study 1

Hepatitis A Outbreak-Wallis Lake Oysters

Between February and April of 1997, oysters which had been contaminated by human sewage were harvested from Wallis Lake, on the mid-north coast of New South Wales. Consumption of these oysters caused a large outbreak of hepatitis A, an illness which is spread through the faecal-oral route. A total of 444 cases were reported Australia-wide, with 274 occurring in New South Wales. Environmental investigations could not identify any single source for this contamination, numerous potential sources were found.

Wallis Lake is the premier oyster growing region in New South Wales. The outbreak caused a 90 per cent drop in oyster sales and a 50 per cent drop in seafood sales in New South Wales. This drop persisted for some months. Industry losses alone amounted to over $10 million. Wallis Lake was not reopened for oyster harvesting until the sewage sources were contained, a quality program had been introduced, and oysters and water from the area were found to be clear of hepatitis A. However, investigations have shown that the currently accepted methods of sewage disposal, monitoring of microbial agents, and oyster depuration may not provide adequate protection against the risk of food borne disease.

Review of Oyster Safety

Wallis Lake should not be considered an isolated incident. As coastal developments continue to intrude upon previously pristine catchments, a wide-ranging review of oyster safety is needed to prevent future epidemics. This review will need to address two broad issues:

1. The monitoring and maintenance of water quality in oyster growing estuaries.

2. Mandating shellfish quality assurance programs in each estuary in New South Wales.

Implications

All estuaries in New South Wales are affected to some degree by sewage contamination- both from discharges from treatment plants and from unsewered developments along their reaches. The enormous capital investment required to contain these contamination sources must be weighed up against the value and viability of aquaculture industries.

Outcomes

Soon after the incident, the New South Wales Government approved a $200 million expansion of the County Towns Sewage Scheme, which provides reticulated sewage to small communities. Funds have also been provided to local authorities to develop risk management plans to identify and eliminate possible sources of local contamination. More recently, a health risk assessment accompanying a development proposal for a sewage treatment plant suggested that the proposed form of sewage treatment -ultraviolet disinfection- was inadequate to address the downstream risks to oyster growing areas. The recommended upgrade of the disinfection system added $3 million to the cost of the development.

Prepared in conjunction with NSW Health.

More recently, the environment sector has expanded this perspective. The proposed Commonwealth Environment Protection and Biodiversity and Conservation legislation defines the environment as (5):

'...environment includes:

(a) ecosystems and their constituent parts, including people and communities; and
(b) natural and physical resources; and
(c) the qualities and characteristics of locations, places and areas; and
(d) the social, economic and cultural aspects of a thing mentioned in paragraph (a), (b) or (c).'

The health sector manages health outcomes and sets national standards for health in Australia. It has the sole aim of protecting and promoting human health. The health sector bears the cost of treatment and care of people exposed to environmental hazards and has an obligation to investigate and set health-based exposure standards to ensure public health and safety.

Integrating sustainable development into decision-making requires the open and careful reconciliation of economic development, health and social needs and environmental quality through the use of the best available tools and information.

1.6 The Relationship Between Public and Environmental Health

Prevention is generally cheaper than treatment, although its benefits may not always accrue in the short term, and its effects are not always immediately obvious or politically expedient (6).

Public health is defined as the science and art of preventing disease, prolonging life and promoting health (7). Environmental health sits within the broader scope of public health. (Figure 1.1). Critical to the pursuit of public health is the relationship of human populations to their environment.

For much of its development, public health and environmental health were synonymous (see Note 1.3). In the last few decades there has been a divergence which has seen public health move away from a focus on prevention of disease to a much stronger focus on the Ottawa Charter health promotion principles driven by the social, behavioural and educational factors influencing health (8).

This divergence has resulted in different approaches being used by the public health workforce and the environmental health workforce. For instance whilst environmental health mostly uses the same tools as public health (eg. surveillance, monitoring, epidemiology, biostatistics, health economics, etc.) it also utilises a specific set of tools such as environmental health impact assessment and quantitative and qualitative risk assessment.

Traditional environmental health interventions have been used to provide protection from disease through the provision of clean water, waste disposal, safe food, safe living and working conditions. Much of this has been achieved through public health legislation and regulation, in response to specific problems, which impose restrictions or requirements on individuals or organisations. In order to ensure that our basic health requirements, such as clean water, clean air, safe food etc are maintained, it is essential that these fundamental environmental health activities are supported.

Note 1.3 Environmental and Public Health Historical Background

Public Health Measures (Early Australia)

In the mid 1850s, the first Public Health Act in Australia was passed in the gold-rich colony of Victoria. The Victorian authorities were forced to act when the influx of migrants, attracted by gold, resulted in highly unsanitary conditions in Melbourne and the canvas towns of the goldfields, leading to concern about epidemic diseases. By the turn of the century, all Australian colonies had public health legislation based on the classic English mould - prevention of disease through better sanitation, and backed by a publicly funded water and sewage system. Infectious disease was controlled through notification, inspection and isolation.

Federation and Division of Health Responsibilities

The Australian Constitution was constructed to protect the interests and powers of the States while ensuring the establishment of a national market, creation of a national defence system and realisation of a national restrictive immigration program. The powers of the new Commonwealth in health and welfare matters were limited to old age pensions and quarantine (9). Responsibility for health was therefore divided between the States/Territories and Commonwealth, a situation that still exists today.

Environmental Health and Chronic Disease

Throughout the late 1800s and into the early part of this century, most public health efforts focused on the control of infectious diseases, particularly epidemics. Thanks to clean water, adequate sanitation and waste management, reduction in overcrowding and the provision of a safe and nutritious food supply, the levels of major infectious diseases fell rapidly during the early part of this century. The advent of antibiotics and the increasing development of vaccines hastened this fall. By the middle of this century diseases which had plagued the human race for centuries were under control. The causes of death and morbidity shifted from infectious to chronic diseases such as cardiovascular and respiratory diseases, diabetes, stroke and cancer.

While environmental health and public health were previously synonymous, environmental health has now become a more clearly defined sector within public health. For many decades the true contribution of environmental factors in many of these chronic diseases was not fully understood. With increasing research the roles of toxic and other environmental hazards is becoming clear.

Health promotion has much to offer environmental health. The development of environmental health policies that not only focus on preventing disease, but actively encourage supportive environments will contribute to better health outcomes for individuals and the population.

Promotion and raising awareness is seen as being a more sustainable approach to the way health can be managed. By making information accessible to communities and individuals there is a move away from the purely enforcement and instruction approach, to one that equips people with the knowledge and skills necessary to make their own informed decisions. Such participative approaches have worked well in the area of skin cancer protection and the use of shade. (As illustrated by Case Study 2).

Case Study 2

Shade Creation Policy in Local Government

The statistics regarding skin cancer in Australia are alarming. We have the highest mortality rate from skin cancer in the world (10), and two out of every three people will contract some form of skin cancer at some stage in their lives (11). This epidemic is costing Australia $400 million per annum in treatment costs alone.

There is comprehensive research linking skin cancer with overexposure to ultraviolet radiation (UVR). Research also indicates that exposure to UVR in childhood and teenage years is linked to the development of skin cancer (12).

Promotional campaigns encouraging people to 'cover up' have been useful in raising people's awareness of the causes of skin cancer, but have not been truly effective in changing their behaviour. More sustainable strategies combine individual and community responsibility for preventing skin cancer. Community responsibility includes the development of policies that encourage supportive environments through interventions such as the creation of shade.

Local Governments and Shade Creation Policy

Local governments are best placed to implement shade creation policies because they are more aware of the geographic and demographic needs of their residents. Research conducted by the School of Public Health at the Queensland University of Technology (QUT) has identified a number of local councils that have adopted - or are contemplating adopting - a shade creation policy. At present, there is no legislative mandate covering shade creation. Therefore, the research undertaken at the QUT also aimed to identify factors that facilitated or impeded the implementation of a shade creation policy. This was achieved through interviews with key Local government officers and elected representatives, community members and public health professionals not affiliated with Local government. A series of shade audits was also conducted to identify baseline levels of shade at public facilities. The research found that the factors critical to the success of adopting healthy policy where no legislative mandate exists include:

- Support from elected representatives
- Quarantined funding for provision of natural and manufactured shade at public facilities
- Appointing one Local government officer to facilitate action emanating from the shade creation policy while maintaining a collaborative approach with all Local government departments
- Transferring responsibility for shade creation to other parties. For example, including shade creation as a minimum condition of approval for development applications for facilities to be used by the public
- Actively including community members and groups within the policy development, adoption and implementation phases of the policy

Additional Benefits

As well as achieving the aim of reducing exposure to UVR, the research found that shade creation policies were successful in placing health on the agendas of many Local government officers; such as engineers, planners, parks and gardens officers, finance managers, chief executive officers and environmental health practitioners.

Prepared in conjunction with Queensland University of Technology.

Chapter 2

Australian Charter for Environmental Health

People are entitled to an environment which promotes good health. The charter identifies the basic entitlements and responsibilities required to maintain and improve the quality of health for all Australians.

This Strategy emphasises that people share responsibility for securing good health with their government, and cannot merely depend on others for their own protection. No single organisation has the capacity to fulfil the Charter's objectives. Recognising environmental health as an entitlement helps encourage stakeholders to become involved in the cooperative management of problems.

Although not all of the entitlements can be met at this stage, it should be the aim of the Australian people that strategies are developed to ensure that all aspects of the Charter are eventually met.

Environmental health entitlements cannot be absolute, as the total absence of risk is not possible. The entitlements spelt out in this Charter only extend to what can be practically achieved. The principles that underpin this Charter and guide actions arising from the Strategy are shown in Note 2.1.

Note 2.1 Guiding Principles

- Protection of Human Health

  Protect human health by identifying threats posed by environmental hazards as early as possible and by introducing appropriate safeguards. Ideally, these should be sustainable and cost-effective.

- Interrelationship between Economics, Health and Environment

  Economic development, human health and environmental protection are inextricably linked. Economic development should proceed hand-in-hand with measures to protect the environment and promote high standards of environmental health.

- Sustainable Development

  Future human health requires that development meets the needs of the present without compromising the ability of future generations to meet their own needs (13).

- Local and Global Interface

  Changes to local and global environments are interactive and have a significant ability to impact on human health. Environmental health programs need to take into account that global environment protection requires local action and that local actions impact globally.

- Partnership

  Planning, implementing and evaluating environmental health programs requires that all involved work together: the general public, Commonwealth, Local, State and Territory governments, industry and business, non-government agencies, and the health and scientific communities. This cooperation should extend to include policies and programs that are not environmental health specific, but which have an environmental health component or impact.

- Risk-Based Management

  Risk assessment and management are tools used to address existing or potential environmental threats to human health and the adverse effects on people, communities and economic interests. Risk management includes assessing the likely impact of these threats and the development and implementation of strategies for their prevention, minimisation or removal.

- Evidence-Based decisions

  Decisions and deliberations must be based on a careful analysis of available scientific evidence about potential environmental risks to human health. However, absence of conclusive evidence is not an excuse for inaction.

- Efficiency

  Improving the delivery of environmental health services, encouraging innovation, and careful examination of how environmental health services are provided - including the relative costs and benefits of each alternative - are important considerations for optimal environmental health outcomes.

- Equity

  Socioeconomic status and other social factors such as access to community networks, family support and education, are key determinants of health. Providing all Australians with access to appropriate environmental health services will help reduce the gaps in health status between different population groups.

**Whilst WHO uses the term sustainable development it is often referred to in Australia as Ecologically Sustainable Development ESD.*

Charter of Entitlements and Responsibilities for Individuals, Communities, Business and Government

2.1 Individuals and Communities

Entitlements

Individuals and communities are entitled to live in a safe and healthy environment. This includes:

- Safe and adequate supplies of water
- Safe and nutritious food
- Safe and adequate sanitation
- Clean air
- Safe and sustainable shelter
- Urban and housing designs that promote environmental health
- Environmental management systems that protect environmental health
- Safe occupational environments and work practices
- Safe and adequate recreational facilities, including water
- Information about environmental health issues
- Being consulted on plans, decisions, and activities likely to affect both the environment and health, and to open and transparent decision making on these issues.

Responsibilities

Individuals and communities are responsible for:

- Ensuring their own actions contribute to the protection of the environment in the interests of their own health and the health of others
- Participating in decision-making processes on matters likely to affect both the environment and health
- Ensuring its environmental health services are delivered to a high standard.

2.2 Business and Industry

Entitlements

Business and industry are entitled to:

- Management systems (legislative, regulatory and other) that:
  - promote health and the environment while recognising business interests
  - recognise industry capacity for self management in a co-regulatory environment
  - provide access to appropriate support, advice and information on environmental health
  - provide information on environmental hazards
- Consultation on environmental health decisions that affect business
- Guidelines and standards which:
  - place a reasonable regulatory burden on industry
  - support industry capacity to manage environmental health
  - are developed transparently
  - are consistently and fairly applied.

Responsibilities

Business and industry are responsible for ensuring that they:

- Use opportunities and practices that minimise adverse impacts on human health
- Seek and use alternatives to hazardous agents and practices wherever possible
- Reduce levels of pollution and waste wherever possible
- Maintain a high level of occupational health and safety
- Ensure consumer and product safety
- Have a contemporary knowledge of the potential environmental health risks arising from their processes
- Recognise that they are an integral part of the community and therefore have community obligations.

2.3 Government

Responsibilities

While the Charter recognises the responsibilities of individuals, communities and business, government has an obligation to make a major contribution to progressing this Charter. Government has been and remains responsible for most of the investment in the infrastructure that underpins the delivery of environmental health services.

Government at all levels is responsible for providing direction and leadership in environmental health policy and management through:

- Setting clear management standards that are consistent across governments
- Ensuring effective mechanisms for linkages between agencies to achieve improved environmental health outcomes
- Ensuring appropriate environmental health infrastructure and services are available and effective
- Ensuring seamless transition between jurisdictions and agencies, especially in management of environment and environmental health issues
- Ensuring that planning and regulatory decisions recognise that the integrity and sustainability of the ecosystem must be maintained
- Transparent and consultative decision-making processes
- Development of consistent legislation, standards, and approaches to enforcement
- Planning, preparing and responding to environmental health challenges
- Aiding community involvement
- Facilitating investment in strategic environmental health research.

Chapter 3

Strategic Management of Environmental Health

Environmental health outcomes are often achieved by the combined efforts of a number of sectors throughout the community. Sometimes sectors are easily recognised, such as environmental health units in health departments or environment protection authorities setting health-based outcomes. Other times, the influence on environmental health is less obvious, for example, the transport industry's impact on air quality, the impacts of economic reform, or the impact of urban planning practices. Successful management of environmental health must harness all the relevant players.

Progress in environmental health will be dependent on:

- Achieving better intersectoral links
- Enhancing the skills and the capacity of both the environmental health workforce and other professionals whose work impacts on environmental health
- Increasing the evidence base to better inform those involved in the development of environmental health programs.

3.1 Intersectoral Links

Environmental health is highly intersectoral in nature. Effective environmental health management requires collaboration between government, community, industry and academia at all levels and throughout the country.

Improving environmental health in Australia requires all stakeholders and affected groups to recognise their common aspirations, develop common goals, work to strengthen their communication and links, and to forge partnerships on common actions. This applies equally to local issues as it does to larger and national concerns. Lack of complete 'ownership' of an issue is not an excuse for inaction, but a challenge to develop collaborative approaches.

A commitment to partnerships is essential to improving Environmental Health.

3.2 National Management of Environmental Health

A major impediment to better environmental health management is the fragmentation of responsibility across a large range of groups. Additionally, each of these groups has varying degrees of responsibility (Appendix 2). These groups often have dissimilar or contradictory roles. This makes it almost inevitable that certain issues do not receive the dedicated attention that they deserve.

This Strategy proposes the development of a National Environmental Health Council the ENHealth Council as the peak environmental health advisory group for Australia. The primary task of this Council will be to provide leadership and a focal point for cooperation on all environmental health issues.

The ENHealth Council will be Australia's premier environmental health committee.

3.2.1 The National Environmental Health Council

The ENHealth Council needs to draw on the views, expertise and perspective of industry, the community and professionals (in particular, environmental health practitioners). This will be achieved by having representation from a range of sectors on the committee, complemented by partnerships and drawing on specific expertise when dealing with particular issues.

The ENHealth Council will be a formal subcommittee of the National Public Health Partnership Group and will provide the Australian Health Ministers, through the Partnership Group with advice on environmental health issues. Under the direction of the National Public Health Partnership Group the terms of reference for the ENHealth Council are presented in Note 3.1.

Note 3.1 The ENHealth Council – Terms of Reference

- Provide national leadership on environmental health issues by:
  - coordinating and facilitating environmental health policies and programs
  - establishing strategic partnerships between environmental health stakeholders
  - setting priorities for national environmental health policies and programs

- providing an open consultative system for policy development
- facilitating cost effective use of environmental health resources
- driving the implementation of the National Environmental Health Strategy
- advising the Commonwealth, States and Territories, Local government and other stakeholders on national environmental health issues
- coordinating the development of environmental health action plans at local, state and national levels
- promoting and developing model environmental health legislation, standards, codes of practice, guidelines and publications
- strengthening the national capacity to meet current and emerging environmental health challenges.
- providing a pivotal link between international fora and environmental health stakeholders in Australia and strengthening Australia's collaboration with countries in the Asia-Pacific region.

3.2.2 Who will sit on the ENHealth Council?

The ENHealth Council will consist of:

- Chair agreed by the Australian Health Ministers Conference
- Commonwealth, State and Territory government representatives
- Deputy Chair nominated by the National Public Health Partnership Group
- A representative from the Australian Institute of Environmental Health
- A representative from the Australian Local Government Association
- Representatives from:
  - the community (both the indigenous community and consumers)
  - public health sector
  - the Environment sector (Environment Australia)

This structure will provide a broad base for national environmental health advice, drive a strong inclusive policy development process, and will increase the capacity for coordinated and targeted action.

The ENHealth Council will also have an operational role in coordinating Commonwealth, State, Territory and Local government management issues.

The ENHealth Council will be supported by the development of mechanisms to effectively involve other key stakeholders not formally represented on the Council. Those bodies include industry, academia, medicine and transport for example. The involvement of these groups at an issue-specific or project level ensures targeted consultation and involvement at an appropriate level of detail.

3.2.3 A Communication Strategy for the ENHealth Council

As Australia's premier environmental health committee, the ENHealth Council will need to take the lead role in providing effective communication with its key stakeholders and the community. It must ensure that it uses best practice models for consultation, the development and dissemination of information and guidelines, and for developing partnerships and collaborations.

Considering the diverse nature of environmental health, this will be a difficult task. A well planned and sustained team effort is required by all partners to improve environmental health management through greater intersectoral and interagency collaboration. The ENHealth Council must provide the leadership necessary to achieve this goal.

The new council needs to establish effective national strategies and policies for communication.

3.3 Community Participation

The community, government, industry and academia need to work in partnership to deal with environmental health issues, and in order to do this all partners must be well informed. In particular, the community must be provided with appropriate information and be given the opportunity to participate at all levels of policy development and decision making (as outlined in the Australian Charter for Environmental Health).

Traditionally government has had the role of convening public opinion. With an increasingly informed and scientifically literate community, this role is changing. Many local communities show great initiative and imagination in using a range of approaches to mobilise people to promote and protect their health.

The implementation and development of new, sustainable environmental health policies requires the involvement of a critically informed public. There are a number of reasons why this can be difficult to achieve:

- The community is not always aware of many environmental health issues until there is a break down in management, or a change in conditions and a problem arises
- Many environmentally related health problems result from multiple factors
- Specific environmental exposures may have a range of different health effects, many of which are developed over a long period of time
- Governments do not always clearly articulate the role of environmental health, either generally or in relation to specific issues
- There is a high degree of fragmentation and specialisation in environmental health. Many practitioners perceive themselves as being advocates for only one aspect of environmental health, rather than for environmental health as a whole.

While the inclusion of the community and other stakeholders on national committees is critical to the success of such policies and guidelines, it is by no means the entire answer.

The community and appropriate stakeholder groups are to be engaged at all levels in policy, standard and intervention decisions.

3.3.1 Strategies for Community Participation

There are three key strategic areas which can enable the community to become involved in environmental health issues:

1. A health promotion approach
2. Development of infrastructure which enables community participation
3. Provision of information and development of appropriate skills.

These areas are intertwined and are not separate.

A Health Promotion Approach

The Ottawa Charter for Health Promotion provides a model of best practice, where communities are supported to take control of their health, healthy public policies are developed with community input and environments are created which support community health.

Health promotion works through concrete and effective community action in setting priorities, making decisions, planning strategies and implementing them to achieve better health. At the heart of this process is the empowerment of communities, their ownership and control of their own endeavours and destinies (8).

Development of Infrastructure Which Enables Community Participation

Experience has clearly revealed that more healthy lives can be achieved by informing, motivating and supporting individuals, groups and societies. Community empowerment can often provide both a powerful stimulus for change, as well as a powerful ally for health and a buffer against the forces that threaten it.

Intersectoral approaches that reduce barriers to participation and support the community to be part of the solution should be actively sought out and supported. In Australia a range of such approaches already exists (eg. Local Agenda 21, Healthy Cities, Municipal/Community Health Plans - Case study 3 provides a good example of the development of a community health plan).

3.3.2 Communication and the Community

Communication is a two way process. In order to make decisions wisely, industry, academia, community groups and individuals need to understand the risks and benefits associated with alternative courses of action. They must also recognise the limitations of both their own knowledge, and of the advice offered by experts (16).

Environmental health is an important factor in human health. This message needs to be communicated to stakeholders (including health professionals), and the community more effectively. In addition, increased awareness will allow well-informed debate on important issues, and will encourage interested community members to participate in the process of policy development.

There are a number of ways in which this message can be promoted:

- Health promotion in different settings (for example, schools)
- Providing information to health professionals and environmental health practitioners
- The Internet
- The full range of media.

Information forms the basis for education, education allows informed dialogue, which enables people to become meaningfully involved in decision-making processes.

Case Study 3

Healthy Sustainable Gold Coast: A Community Health Plan for the Gold Coast

The Healthy Cities and Shires Queensland, and Griffith University received a grant from the Queensland Health Department in 1994 to work with Local government to improve the health of communities through the development of Municipal Public Health Plans.

In 1995, the Gold Coast City Council applied for and received an encouragement award being offered by the Queensland Health Department to enable the Council to undertake development of the health plan. Local government is the level of government closest to the people and should be at the forefront of planning for enhanced health and well being.

The plan, Healthy Sustainable Gold Coast – A Community Health Plan (1997-2000) was based on concepts derived from the World Health Organization (WHO) Healthy Cities approach (14) (15). The aim of the Community Health Plan was for Council to work collaboratively with other government and non-government service providers, community groups and individuals to:

- Positively influence the health status of Gold Coast people
- Improve coordination and targeting of activities by organisations and individuals working for the community's health
- Expand the opportunities for genuine participation by local communities in the decisions that affect their health
- Define a new facilitatory role for Council in planning for the community's health.

In developing this plan, the Council actively encouraged and facilitated community input. The Plan recognises that cooperation and coordination are the prerequisites of success.

Process

The Community Health Plan consisted of several predetermined stages.

Stage 1: Preliminary Groundwork

Stage 2: Data Collection / Literature Review

Stage 3: Community Consultation

Stage 4: Strategy Development

Stage 5: Production of Community Health Plan

Stage 6: Implementation, monitoring and review.

The plan has delivered many outcomes. These include better collaboration and cooperation between health service providers, creation of collaborative local solutions for public and environmental health issues and collaborative community partnerships through twelve community reference committees. The process has allowed for the identification and documentation of health needs and has contributed to better health outcomes by enhancing funding opportunities. More importantly priority health issues have been broken down into small manageable projects scheduled to be completed over a three-year period.

Prepared in conjunction with Griffith University and Gold Coast City Council

This information must be 'user-friendly' and languages other than English may be required. Many environmental health problems are complex and large amounts of highly technical information can disenfranchise rather than empower communities.

Information in the absence of its immediate relevance, and the opportunity for its application, likely disempowers more than enables behavioural change. (17)

A large amount of information on environmental health - ranging in nature from technical advice to general information for the public - already exists. Much of this information has been developed at the local level and could be integrated and shared on a larger scale.

3.4 Investing in Environmental Health

3.4.1 Environmental Health Infrastructure and Economic Development

Environmental health infrastructure provides the basis on which civilisation depends. Australia has made a massive investment in water supply and waste water management, the built environment, and the control of air pollution. In the face of increasing environmental degradation and population pressure it is essential that this investment is maintained and enhanced. The costs of prevention are less than the cure and it is obvious that investment in infrastructure now will prevent the high costs of ill health in the future.

Australia's environmental health infrastructure needs to be enhanced to meet current and future challenges.

3.4.2 Valuing Environmental Health

Australia has made a significant investment in environmental health in the past. The question now is how much do we need to invest for the future? This requires economic tools to weigh costs against benefits. Health economics is generally based on a clinical framework that considers the burden and cost of disease on the individual, the impact on the community, and the cost of interventions. In many areas of environmental health this cost-burden approach has limited applicability because environmentally related disease is caused by, or associated with multiple factors.

In many ways, recent developments in environmental policy are also relevant for environmental health policy and planning.

Economics has developed a strong framework for valuation of the environment, thereby providing models to justify expenditure to maintain and protect this valuable resource. Health could be addressed in a similar manner. The contingent valuation of health, coupled with a traditional health economics approach, should provide a better framework to evaluate the cost and value of environmental health services.

A new paradigm of environmental health economics which merges environment and health economics should be developed.

3.4.3 Economic Perspectives on Environmental Health

The economic dimensions of environmental health were the subject of a recent WHO (European region) discussion leading up to the third Ministerial Conference on Environment and Health (18). The WHO put forward three spheres of particular economic influence and impact on environmental health:

1. The Economic Benefits of Mitigating Environmental Health impacts
2. Economic Determinants of Environment and Health Issues
3. Economic Instruments for Environment and Health Issues.

These spheres apply equally in Australia as they do in Europe and the rest of the world.

The Economic Benefits of Mitigating Environmental Health Impacts

Ill health has measurable personal economic consequences. Illness can mean a loss of income and additional expenditure to the individual and to government. It can also result in a loss in productivity and profit to industry. In addition to direct impacts, the perception of harm from environmental health breakdowns can also incur enormous costs. These costs are illustrated in Case Studies 4 and 5. These case studies demonstrate that failures in environmental health controls have substantial costs to industry; costs which in most cases are borne by the whole industry and dwarf the actual health costs.

Economic evaluations may provide a benchmark for the cost of environmental ill health. Though currently imprecise, these evaluations can estimate both the costs of environmental illness as well as the benefits and costs of mitigation. It is essential that techniques for economic analysis are developed in order to provide quantitative

arguments in support of policy decisions. Such arguments will provide impetus for mitigation as well as aid prioritisation for action by demonstrating which improvements are most highly valued.

A better understanding of the economics – costs and benefits – of environmental health should be obtained through:

- **economic evaluations of major environmental health issues**
- **valuation techniques that value health rather than cost ill-health**
- **economic models applicable to the full range of environmental health problems**

Economic Determinants of Environmental Health

The prices we pay for products and services to a large extent determines how much they are used. Currently market prices for products such as water, electricity and fossil fuels rarely reflect the environmental health costs associated with their use. Without using the full economic value when determining a price, products and services are essentially being subsidised. This represents a distortion in the pricing system which, directly and indirectly, adversely impacts on environmental health.

In the absence of a pricing system which incorporates the full environmental health costs, neither producers nor consumers have any economic incentive to alter their use of resources and reduce their impact on environmental health. Nor are they encouraged to consider their effects when making decisions about investment and lifestyle.

Unless the pricing system is changed, the above situation will continue to result in consumption patterns that are unsustainable and aggravate environment related health problems.

Economic Instruments

Economic instruments, such as tradeable emission permits, taxes and subsidies, can assist in overcoming the skewed relationship between the product price and environmental health cost. Economic instruments can use market forces to balance the price system so that it more accurately reflects the true costs of the production and consumption process. An example of the successful application of an economic incentive to overcome environmental health concerns is presented in Case Study 6 (lead in petrol).

In this case study, a pricing differential was used to encourage consumers to switch from leaded to unleaded petrol, so reducing the load of lead, a toxic heavy metal, in the environment.

There is a range of economic and fiscal instruments that affect environmental health outcomes, with most originating in the environment protection sector. The move towards the polluter-pays principal, with load-based licensing for polluting industries and substantial penalties for breaching licensing conditions, will decrease health hazards in the environment. These fiscal reforms have the potential to reduce tax distortions on labour and income, (thereby increasing economic activity) by directing producers and consumers towards more efficient use of resources.

Despite widespread debate over many years, the economic reforms needed to develop a pricing system which fully reflects environmental health costs still represent a radical departure from current practice. In Europe, the WHO has stated that governments need to herald these changes and begin to make appropriate plans for their progressive introduction. This will send a clear signal to industry and the community that investments and practices will need to account for their environmental health impacts in the future, thus encouraging environmentally friendly long-term choices and strategies.

3.4.4 Environmental Health and Industry

Good environmental health practice is integral to the viability and competitiveness of industry. Industry's ability to deliver consumer protection, attain a high level of occupational health and safety, ensure the efficient and safe management of waste, and reduce negative impacts on the environment, incurs significant costs. However, delivering a competitive advantage through consumer confidence and good 'green' credentials can more than offset these costs.

The damage to industry's reputation and the cost to both industry and the community of a breakdown in environmental health management can be substantial. One company with poor health protection practices can bring down an entire industry. There has been a series of high profile cases of food contamination which highlight this point. One of these is described in Case Study 4, the 1995 mettwurst contamination incident in South Australia.

Recent economic trends, the National Competition Policy, and the need for regulatory impact statements, are indicative of a move toward outcome-based performance management.

Case Study 4

The Mettwurst Contamination Incident

During January and February of 1995, there was an epidemic of haemolytic uraemic syndrome in South Australia. An inquest into the death of one of the 23 children affected concluded that she died because of an illness contracted by eating contaminated mettwurst produced by one company. The epidemic was seen as a major health crisis, raising issues about the manufacture and distribution of food, particularly manufactured meat products and the adequacy and effectiveness of enforcement of relevant legislation and regulations.

As a result, the manufacturer of the contaminated mettwurst had to cease operating. The inquest noted that 'this involved the downfall of one of the largest producers of smallgoods in South Australia, and the loss of more than 100 jobs, and has had a deleterious effect on several other producers of smallgoods in this State.'

The inquest found that the company involved had no system of quality control for the source meats and no written specifications or standard operating procedures for the manufacture of their product.

The mettwurst contamination incident triggered a substantial review of the food standards and quality assurance and inspection programs for small goods manufacturers. The results of this were that the Australia New Zealand Food Authority published a new Code of Hygienic Production for such products and changed the labelling requirements so that products must have labels indicating how they have been prepared (22). State and Commonwealth primary industry ministers also developed a new Australian Meat Standard (23).

The Meat Research Corporation analysed the costs on implementing the standards in Australia and found that the capital costs for compliance were $199 million, implementation costs were $70 million and increases to annual operating costs were $89 million.

The mettwurst contamination incident has had long-term economic impacts on the meat and smallgoods industry. The National Meat Industry Association (NMIA) continues to provide considerable time and resources to investigating improvements to processing. The industry has commissioned CSIRO to investigate the best technology to promote food safety. This work will be ongoing over the next few years. The NMIA had estimated that sales of mettwurst were reduced by more than 20 per cent for several years following the incident.

This recognises industry's capacity to deliver outcomes through cooperative means rather than just through prescriptive regulation.

Whilst such an approach has the potential to provide benefits to both industry and environmental health practitioners, it needs to be recognised that this system is capable of being abused. Often there still needs to be a legislative framework that can be used by either party when an outcome based performance approach does not work.

Another important trend has been the preparedness of the courts to hold company directors and governments liable when negligence has lead to break downs in environmental health. This gives company directors and governments a strong economic imperative to ensure an adequate level of investment in environmental health infrastructure.

Case Study 5

The Financial Costs of the 1997-98 Cryptosporidiosis Outbreak in ACT Swimming Pools

In December 1997 the ACT Department of Health and Community Care recorded an unusually high incidence of cryptosporidiosis in the Canberra region. By the 13th of February 1998, 161 cases of the disease had been confirmed, and approximately 60% of those infected had reported swimming in one of two public pools. A total of six were closed during the outbreak investigation. These pools were closed as the result of a Territory-wide testing program that was implemented to identify other possible sources of infection. Over 400 people were infected during the outbreak.

Loss of Income by Industry

The outbreak occurred in the peak of the 1997/98 swimming season with several days reaching temperatures above 35^{O}C. This combination of unusually hot weather and the school holidays ensured that the losses associated with the closures were higher than normally expected. However, estimates based on the same period in the previous year place the loss in gate takings for the six closed pools at $117 900.

Consumer confidence in the safety of the public pool system also declined dramatically for the remainder of the season with all public pools reporting declines in business of up to 95%. Only six of the fourteen pools in the Canberra district were closed by the outbreak but approximately 91 percent of the decline in income associated with the outbreak was borne by those not infected.

It was estimated that $361 300 was lost in gate takings for all Canberra pools as a result of the outbreak to bring the total industrial costs to $679 000 costs as a result of closure and clean up.

Monitoring and Testing Costs

In addition to the costs incurred by the swimming pool industry a significant amount of time and resources were used by the ACT Department of Health and Community Care in testing and monitoring the outbreak. Thus any time spent on the outbreak had an opportunity cost equal to the costs of not undertaking their standard practices.

Five full time, and six part time staff were assigned to the outbreak over a three month period and 110 hours of over time was recorded. Approximately 38 water tests were also conducted during the course of the outbreak and a total of $128 200 was spent by the Department.

Direct Medical Expenditure

Over 400 people were infected and seven individuals were hospitalised during the course of the outbreak. A total of 17 bed days could be attributed to the infection and each bed day costs approximately $594 per patient, resulting in a total hospital expenditure of $10100. Furthermore, GP visits by those infected (but not hospitalised) were costed at about $17100 and when this is combined with hospital stays, approximately $27 200 was spent on treating those infected.

A further 2065 faecal tests were also ordered by local practitioners as news of the outbreak spread, and based on the standard schedule fee set by Medicare, a total of $115 400 was directly attributable to the outbreak. The total cost of this outbreak including gate takings, clean up, and associated medical costs was approximately $919 500.

Prepared in conjunction with ACT Department of Health & Community Care

Case Study 6

Lead in Petrol

Lead has been linked to a reduction in the IQ levels of children, reduced vitamin D formation, negative effects on the peripheral nervous system, marginal effects on blood pressure, possible effects on fetal development, and anaemia.

The two most significant sources of lead in the Australian urban environment are leaded petrol and leaded paint. Since 1986 all new Australian cars have been fitted with catalytic converters requiring the use of unleaded petrol. However, the switch to unleaded petrol was slower than predicted because economic recession slowed the rate at which older cars were replaced by new ones.

In June 1993, NHMRC revised its Guidelines for Lead in Australians and set a goal of achieving a blood lead level of below 10 micrograms per decilitre (19). The NHMRC emphasised that 'there is particular urgency in reaching this level in children aged one to four years because of the adverse effects of lead exposure on intellectual development'.

In 1994 a national campaign, supported by governments, industry and community organisations, asked motorists to switch to unleaded petrol as soon as possible. An excise differential was placed on petrol from 1 February 1994, which has encouraged about half a million motorists to make the switch. In addition, the lead content of leaded petrol was reduced. Levels of lead in air dropped significantly in all capital cities as a result of these initiatives.

A survey by the Australian Institute of Health and Welfare was completed in 1995 and showed that the NHMRC target (that 90 per cent of children should have blood levels of below 10 micrograms per decilitre by 1998) had already been met by 1995 (20).

At present, leaded petrol accounts for only 30 per cent of petrol sold in Australia. The government has now brought forward its target date of 2010 for the complete phasing out of leaded petrol use, and will be negotiating with the oil industry on a new date. The oil industry forecasts that leaded petrol is likely to be withdrawn between 2003–2005 based on declining demand.

The NEPM on Ambient Air Quality states that due to a continued reduction in the use of leaded petrol, no further specific actions to reduce lead emissions from mobile sources need be adopted to achieve compliance with the standard within the ten-year implementation period (21).

The key health impact of the reduction of lead in petrol has been the reduction of blood lead levels in children, with benefits for IQ levels and learning abilities.

Chapter 4

Environmental Health Justice

According to the Australian Charter for Environmental Health all Australians are entitled to live in a safe and healthy environment, regardless of their age, race, ethnicity, or socio-economic status. Environmental health is by its nature equitable – that is, environmental health provides population based approaches aimed at increasing the positive health outcomes all people can derive from their environment.

Environmental Health justice is the right to a safe, healthy, productive and sustainable environment.

Environmental Health justice requires the pursuit of equal justice and protection in legislation, regulations, government policies and actions.

This term acknowledges that environment and health programs have had inequitable outcomes for different groups of Australians.

A long, healthy life is an achievable goal for most Australians. However, parts of the population are disadvantaged, including many ethnic and minority groups and Indigenous communities, and as a result suffer higher than average levels of morbidity and mortality.

There is ample evidence that these populations suffer a disproportionate impact from both increased exposures to environmental hazards and decreased access to environmental health services.

Some communities lack basic environmental health infrastructure, such as adequate sanitation, water supplies and appropriate housing. This is especially true for remote communities, in particular isolated Indigenous communities.

Within the Australian population there are individuals who have greater susceptibility to specific or general environmental health hazards. Reasons for this include: age, gender, genetics, existing health problems or prior exposure to environmental chemicals. People who are immuno-suppressed or who are unusually sensitive to chemicals are also at greater risk. Reducing their exposure to environmental hazards below levels tolerated by the general population could significantly reduce their risk of adverse health outcomes.

Disadvantaged communities often are exposed to multiple sources of numerous environmental hazards which diminish the quality of their lives (24) (25). Many of these communities are located near chemical and industrial - or formerly industrial - areas. Others are located near major roads or airports which are associated with increased levels of air and noise pollution.

Governments need to recognise that their policies have contributed to inequitable environmental health outcomes and must work to increase environmental health justice throughout Australia.

All government agencies must ensure that no person or group of people should shoulder a disproportionate share of the negative environmental health impacts resulting from implementation of government policies and programs.

The ENHealth Council should work to ensure environmental health justice is integrated into government policies, programs and activities.

4.1 Socially and Economically Disadvantaged Populations

Social, economic, demographic, cultural and behavioural factors of communities and individuals affect health outcomes. These factors must be taken into account when managing environmental health problems.

Implementation of programs in Environmental Health should take into account the social context of the target community and may need to contain components addressing different groups within that community.

Higher infant mortality, higher rates of disease and lower life expectancy are typical of the poorer outcomes experienced by socio-economically disadvantaged groups.

There are many reasons for these health inequalities, including access to:

- Education
- Type of employment
- Income
- Use of services
- Housing and work environments
- Diet
- Individual behaviours such as smoking.

Cultural factors are also significant as they effect how groups use the environment and how they approach health and health services. A similar consideration applies for demographic factors, such as the age and sex distribution of a community.

Good social support networks - particularly for family and friends - are associated with better health outcomes.

Socioeconomically disadvantaged communities have a reduced capacity to remedy local Environmental Health problems.

Socioeconomically disadvantaged populations are also the least informed about the potential health consequences of exposure to environmental hazards. Part of the solution to this problem is the education and empowerment of such communities to meet the level of entitlements outlined in the Charter, as well as access to appropriate levels of infrastructure and services.

In summary, they need:

- Local opportunities for community empowerment
- Increased environmental health awareness
- Increased community participation in planning processes
- Increased environmental health education for allied professionals located in the community.

4.2 Children and Environmental Health

Unlike adults and communities, children have less capacity to make decisions about their environment and their health, and cannot be empowered and informed about the consequences of these decisions. For this reason the health of children needs to be protected by their families, communities and governments.

Physiologically, children are very different from adults. They are in a dynamic state of growth, with their cells multiplying and organs developing at a rapid rate – in the first 4 months an infant more than doubles its weight. At birth they are more sensitive to environmental hazards because their nervous, respiratory, reproductive and immune systems are not yet fully developed. Young children breathe more rapidly and take in more air (and therefore more contaminants) in proportion to their body weight than do adults. They also have higher metabolic rates and proportionate intake of food and liquid than adults (26).

Children are also at greater risk of exposure to environmental hazards than adults because of behaviours such as crawling, hand to mouth and pica (eating of non-food substances) which can result in the direct ingestion of contaminants.

In the USA there has been a growing recognition of susceptibility of children to environmental health problems.

'Children especially bear the brunt of environmental pollution in our most polluted environments and they must be protected' (26).

All governments and agencies should take into account children's special vulnerability to environmental hazards when developing and reviewing their Environmental Health programs.

The interaction between schools and young people, and the overall experience of attending school provides unique opportunities for health promotion which can be sustained and reinforced over time (27).

This Strategy supports the idea that school health promotion and education programs should be holistic and based on partnerships between teachers and students, parents, health practitioners, relevant agencies,

government and the local community. As part of its communication strategy the ENHealth Council should look to increase links and support for the health promoting schools approach.

4.2.1 Indigenous Children

Each year, Indigenous children are exposed to environmental hazards that are antecedents of adult diseases, such as chronic renal disease, and diabetes with complications such as skin infections. Overcrowding and malnutrition exacerbate these problems.

It is important to acknowledge that there will be a long lag period before considerable improvements in Indigenous health can be secured. The urgency to address the key elements of Indigenous ill-health is even greater now that there is growing international evidence that childhood environments are a significant determinant of chronic diseases in adults. Even the best primary health care cannot reverse these diseases once they occur (28).

4.3 Environmental Health Justice for Indigenous Australians

Despite significant improvements over the past two to three decades, infant mortality rates in Indigenous communities are about three times higher than rates for non-Indigenous infants. In 1992-94, life expectancies for Indigenous men and women were 10 to 15 years below that of other Australians. This lowered life expectancy was partly the result of higher mortality rates in the 24 to 54 year age group, which were five to seven times higher than for other Australians of the same age (29).

Environmental health issues (Note 4.1) are among the many factors responsible for these poor health outcomes (Note 4.2). Isolated Indigenous communities struggle to reach the basic level of environmental health that has been achieved by the rest of our population. Nowhere else in Australia is the gap between the current situation and what is outlined in the Australian Charter for Environmental Health wider.

Indigenous communities, Indigenous organisations and government at all levels need to collaborate to address the key environmental health determinants of Indigenous ill health. In particular, the domestic environment (housing and overcrowding), adequate, safe water and food supplies and waste disposal should be priorities.

The national commitment and approach to providing Indigenous Australians with a basic level of environmental health infrastructure needs to be increased. Without sustained healthy eating, clean water and adequate sanitation, all other health prevention and clinical interventions will be seriously undermined.

Current lines of responsibility for Indigenous environmental health are fragmented and therefore need to be clarified, including the roles and responsibilities of the key managers.

Mechanisms that enable better collaboration and integration with key stakeholders and managers need to be developed.

Because access to good nutrition is a major issue affecting Indigenous Australians, the Office of Aboriginal and Torres Strait Islander Health (Commonwealth Department of Health and Aged Care) is developing a national strategic approach to this issue. This is being addressed within the context of the National Food and Nutrition Strategy.

Indigenous communities have the lowest socioeconomic status in Australia and suffer serious social impacts stemming from dispossession. Considerable investment in the 'health hardware' of these communities is needed, but particular attention must also be paid to the impact of social environments, as these can be equally beneficial in improving health outcomes. Community ownership and participation in the development of any intervention is essential to ensure success.

Although environmental health is obviously more of a problem for remote communities without adequate water and sanitation facilities, the environment of Indigenous Australians living in urban and metropolitan areas is also an issue. Although urban Indigenous communities have access to water and sanitation facilities, access to appropriate housing is still a problem for some. Social, cultural and historical environmental factors are likely to be as pressing for Indigenous Australians in towns and cities as they are in rural and remote communities.

Note 4.1 Key Environmental Health Determinants of Indigenous Australians' Ill Health

Water

In 1989, 54,000 Indigenous Australians were served by reticulated water designed to supply less than 1000 people. Additionally, the capacity of water schemes provided to 19,000 Indigenous Australians were insufficient to meet the reasonable water demands of their communities. A significant number of Indigenous Australians use water of a quality less than the accepted Australian standard. 17% (14, 616) of people living in discrete communities relied on water not complying with 1987 NHMRC guidelines on water quality (30)(31).

Housing

Indigenous Australians are 20 times more likely to live in a house with four or more people per bedroom. According to the 1996 census, Indigenous Australians made up 90% of all Australian 2-3 bedroom households that accommodate 12 people or more, even though Indigenous Australians represent 2% of the population. It has been estimated that one third of Indigenous Australians are either homeless or living in inadequate conditions (32).

Affordable Healthy Food

One third of Indigenous Australians living in rural areas are worried about going without food (33). In 1991, it was estimated that 20% of children from the Top End of the Northern Territory aged two or less were malnourished (34). This led to wasting (12%), stunting of growth (3%) or both (5%). Remote community stores offer only a very limited variety of foods compared with rural towns and urban centres. Perishable items such as dairy products, fruit and vegetables are frequently in short supply and remoteness also results in higher food prices (35).

The Costs of Failed Prevention

The costs associated with not acting urgently to address environmental health standards are considerable. Investing early in health typically pays off later in life. In the absence of effective prevention strategies, there is real potential for Indigenous Australians to develop high cost health problems in the future.

4.3.2 Aboriginal and Torres Strait Islander Legislation Reform Issues

The National Public Health Partnership reviewed Australian public health law and found that (26):

- There was a need for a national review of the application of public health and environmental health laws to Indigenous communities
- Little is known about the impact of public health laws on Indigenous communities, particularly those in remote areas
- Problems can arise because public health standards can be inappropriate for remote and culturally different communities. A lack of enforcement leading to serious health problems is also being ignored
- Specific concerns include the application of public health legislation to areas such as building infrastructure and standards, sexual health, liquor laws, and the role of Indigenous Environmental Health Workers.

A national review of the application of Public Health and Environmental Health laws to Indigenous communities needs to be undertaken.

Note 4.2 Indicators of Poor Environmental Health in Indigenous Communities

Respiratory Conditions

Respiratory disease is one of the main causes of hospitalisation in both young and old Indigenous Australians. Overcrowding in dwellings or a lack of shelter are significant contributing factors for respiratory disease. The 1997 Environmental Health Needs Survey in Western Australia demonstrated that 20% of dwellings in Indigenous communities are inadequate (ie., improvised shelters or caravans). Overcrowding is common due to inadequate, inappropriate or poorly maintained housing stock within Indigenous communities.

Urinary Calculi in Indigenous Children

There is evidence that Indigenous children have a higher rate of urinary tract infections, urinary calculi and glomerulonephritis than non-Indigenous children. The most common presentations of urinary calculi in Indigenous children are urinary tract infections and a failure to thrive. Most children present at a young age (average 2.1-2.8 years) and renal scarring and hypertension are reported as sequelae of this condition. Nearly 80% of a series of Indigenous children with urinary calculi in South Australia required major surgery. Dehydration and recurrent infectious disease are well known antecedents of urinary calculi. The 1997 Environmental Health Needs Survey showed that 7% of Indigenous communities have an unsatisfactory source of water, 75% do not have their water disinfected, and 64% do not have the quality of their water supplies checked routinely.

Intestinal Worms

Poor housing, sanitation and overcrowding contribute to infection by intestinal worms. Intestinal worms lead to anaemia in children. In the East Kimberley, of those over 5 years who participated in a Health Department of WA screening program; 13% were anaemic and 24% had significant intestinal parasite burdens. Further north, screening of children in a coastal Indigenous community revealed a significant prevalence of iron deficiency anaemia in the 5-14 year age group. 93% of this group had hookworm infection. In children less than five years, 72% were anaemic. In contrast, the highest prevalence of iron deficiency anaemia recorded in a survey of Sydney preschool children was 3% of 2-3 year old children.

Trachoma

In Australia, trachoma almost exclusively affects the Indigenous population. In comparison, Indigenous populations in the USA, Canada or New Zealand are not listed by the WHO as having a significant trachoma problem. Poverty is a risk factor for trachoma and in societies where there has been socioeconomic development, trachoma is decreasing. This is mainly because these developments have lead to better housing and sanitation (reticulated water) which results in better hygiene practices. In overcrowded homes, siblings can spread trachoma, especially to younger children.

Infectious Diarrhoeas

Infectious diarrhoeas, for example salmonellosis, giardiasis and shigellosis, are a particularly common and pervasive problem in Indigenous communities, particularly among the young and the aged. Inadequate sanitation, overcrowding and poor hygiene are contributing factors.

Prepared in conjunction with the National Aboriginal Community Controlled Health Organisation and the Health Department WA

Chapter 5

Enhancing Environmental Health Capacity

Our society is increasingly urbanised, more populous, and more complex. We have increased air, water and soil contamination, persistent chemical pollutants have become widespread, and global climate change presents new environmental health hazards. The role of government is also changing. Where government was once the major provider of health services, this is no longer always the case. Australia needs to enhance its environmental health capacity in order to meet this range of challenges. We need to do this by increasing our knowledge base, by developing our workforce, and better harnessing the full potential of our communities.

5.1 Environmental Health Information Systems

A major problem in the management of environmental health in Australia is that, far too little systematic effort is made to measure accurately and use information to improve policy and practice. To support environmental health management, quality information is needed to:

- Help identify and prioritise current and emerging problems
- Help specify safe exposure limits
- Assist in the development of guidelines and standards
- Define, evaluate and compare any interventions taken
- Meet the needs and expectations of the community
- Inform the community and stakeholders
- Provide a rational framework for discussion and debate
- Guide the research and development needed for the future (38).

Given the very broad range of environmental health issues, diverse information sources are needed. The type of information needed includes:

- Scientific research on environmental hazards and potential human exposure to them
- Epidemiological research on the links between exposures and health outcomes
- Ongoing surveillance of environmental hazards and health outcomes
- Ongoing monitoring of hazard reduction methods
- Information about the processes and practices undertaken by environmental health managers
- Evaluation of environmental health interventions.

In many areas, the reporting, evaluation and collection of information is neither sufficient nor coordinated enough to meet these needs. In some areas, basic research into environmental hazards and exposures is still required. In many areas the links between potential environmental hazards and health outcomes are also not well established. And when the links are known, the proportion of any health outcome that can be attributed to a specific environmental hazard may not be known. Many hazard reduction methods and environmental health interventions have been implemented without being adequately evaluated.

Good information systems need to be built to enhance the knowledge base supporting environmental health decision making. This would involve bringing together currently available information, setting up useful surveillance systems and conducting new research as required. Currently, large amounts of information on environmental hazards are collected at the Local government and industry level, but these are not consolidated or linked to health outcomes. Health outcomes such as cancers are also measured, but are not linked to environmental hazards. An environmental health surveillance system, that uses scientific and epidemiological research as evidence, would bring these together in a functional way. The surveillance system would need to be simple enough for data collection, compilation and analysis to be achievable. The surveillance system must provide useful information about how to better manage environmental hazards to reduce adverse health outcomes to be worthwhile.

The key to the effectiveness of any information system is the ability to evaluate and disseminate the information collected. Relevant and timely information needs to be made available to environmental health managers, decision makers and the community. The information needs to be in a useable form and readily understandable.

Australia needs to establish an effective environmental health information system to meet the needs of environmental health practitioners and environmental managers, health professionals, policy makers, researchers and the general community.

In the short term, an audit and analysis of existing information pertaining to environmental health in Australia should be conducted. This would include:

- A review of the evidence base of environmental health which supports existing hazard reduction methods and environmental health outcomes
- Identifying and collating existing information systems (including measures of hazards, exposures, health outcomes and management processes)
- Evaluating the quality, uniformity and usefulness of existing systems, and identifying where potential exists for linkages between them
- Identifying where information is not available and what information is required
- Prioritising information needs.

In the longer term, a national information system needs to be established to allow informed decisions to be made regarding environmental health management, priority setting and research and development. This system could include:

- A national environmental health surveillance system
- An environmental health information clearing house
- An environmental health management research centre.

5.1.1 Environmental Health Indicators

Environmental health indicators are measurements that provide information on environmental hazards, health outcomes or management processes. They should be based on evidence of their value and should be useful to environmental health managers and the community.

There are three general types of environmental health indicators:

- Exposure-based indicators measure the level of exposure to a potentially hazardous substance
- Health outcome indicators look at outcomes associated with environmental hazards
- Process indicators measure the performance of key processes involved in environmental health management.

Indicators provide a means of analysing environmental health information in a way that makes it useable, especially for managers, policy makers and politicians. As a matter of urgency, indicators need to be developed in order to provide an ongoing assessment of environmental health in Australia.

Such development will provide a means for evaluating the impact and efficacy of environmental health programs, as well as measuring the impact of this national Strategy.

Environmental Health indicators need to be developed.

5.2 Research and Technological Development

Environmental health management is changing to meet the challenges of the new millennium. This requires a strong research base which, first and foremost, should be used to determine management strategies and methodologies. Identifying emerging hazards is the second major goal of this research.

If there is to be a focus on using reliable scientific data to make decisions regarding environmental health policies and management, environmental health training must include a strong research focus. Environmental health training sits largely within the applied health science disciplines, interfacing with environmental management and health. The training programs of the present and future must provide for an environmental health workforce that is research literate. There should also be stronger links and data transfer between existing research centres and environmental health practitioners in order to improve evidence-based practice.

Research used in environmental health management is carried out through a number of different approaches:

- Cooperative research centres (CRCs)
- NHMRC National Research Centre in Environmental Toxicology
- University schools of applied science and public health
- Consultants
- Environmental health practitioners
- Governments.

Government research is mostly used to evaluate programs and management options for specific environmental health issues. However, much of the information obtained from this research remains largely untapped. In particular, the investigation and management of issues at Local government level is under-utilised. Research from all sources needs to be fostered and actively used in evidence-based decision making in environmental health.

The research capacity and output of government, particularly Local government, should be formally recognised and harnessed as part of the national environmental health evidence base.

The imbalance of funding for environmental health research also needs to be addressed. Applications for funding for environmental health research from traditional government research programs - such as the NHMRC and Australian Research Council (ARC) - have met with little success. Highly relevant environmental health proposals often fail to meet the requirements of major funding programs because they straddle health and non-health disciplines (eg, environment, housing, transport, engineering). Applied research geared towards the development of strategic management and interventions has generally had poor success accessing funding from health research programs[1].

Research into all facets of environmental health should be funded through a combination of government, public and private sector funding. The NHMRC should increase the opportunities for environmental health proposals to be funded.

Much of the research vital to the development of environmental health interventions occurs within non-health disciplines. Urban planning, engineering and environmental management include many topics relevant to environmental health management, and have led to the development of well established planning, design and research frameworks. However, as the research is geared towards the perspective of the specific discipline, there is often insufficient attention paid to the health impacts of a particular issue. The health sector must work with non-health disciplines to ensure that relevant research is integrated into the evidence base for environmental health decisions.

The establishment of a cooperative research centre in environmental health management should be investigated as a means of providing a focus for applied research. Other avenues of funding that should be investigated include the ARC's Strategic Partnerships with Industry Research and Training (SPIRT) and the NHMRC's Network Grants.

Environmental health research in Australia must also be strongly linked to international research in order to benefit from work conducted overseas, and should contribute to the international research effort on both local and global problems.

Active dissemination of research findings to environmental health practitioners should be strengthened to foster and support evidence-based decision-making.

5.3 The Environmental Health Workforce

5.3.1 Who are Environmental Health Practitioners?

Many different disciplines contribute to environmental health. Basic sciences - such as chemistry, microbiology, engineering, statistics, physiology, epidemiology, toxicology, virology and sociology - form the skill base upon which environmental health is built.
By incorporating skills from the communication, health promotion, law, management, planning and finance sectors, comprehensive community programs are designed.

The environmental health workforce includes environmental health officers, environmental health workers, researchers, academics, policy officers, urban planners, engineers, administrators, allied health professionals, other professionals, and managers.

[1]At the time of the writing of this Strategy, the federal government is conducting a strategic review of health and medical research in Australia (the 'Wills Report') (39). This review may have a significant impact on the future of environmental health research in Australia.

5.3.2 The Changing Role of the Environmental Health Practitioner

Traditionally, the role of environmental health has been strongly centred around the enforcement and monitoring of legislative requirements. The duties of environmental health officers, therefore, involved the technical aspects of monitoring and surveillance of environmental health issues such as; food safety, waste management, management of water quality and pest control.

There is a wide range of factors causing major shifts in the way that environmental health is now approached. The key agents for change include:

- Moves away from government regulation to co-regulation
- Performance-based management
- The outsourcing of services
- Third-party compliance
- The broadening of environmental health
- Local government mergers and downsizing.

There is also a tendency to decrease the amount of 'hands-on' work environmental health practitioners perform and to increase the time spent in direct or indirect management of issues.

The undergraduate training of environmental health officers (EHO) provides a broad scientific base and equips them well to perform in areas of environmental health practice. However, few people could foresee the extent and speed at which this area would change. The question that now arises is whether EHO courses provide the appropriate skill base for future environmental health management. Changes to both undergraduate and postgraduate courses and the provision of additional training is addressing some of these issues, but there remains a significant capacity to better align the changes in environmental health training with practice.

There is an increasing need for EHOs to concentrate on areas of speciality, such as food safety or waste management. Consequently there is a growing need for postgraduate studies that can support EHOs in their increasingly specialised tasks.

While environmental health training should continue to be structured to provide multiskilled environmental health practitioners, there needs to be a review of environmental health training to ensure maximal links between current training and future practice.

5.3.3 Continuing Professional Development

As with most professions there needs to be a strong recognition that environmental health practitioners need to constantly update and adjust their skills and knowledge base. Individuals currently do this by studying and attending workshops, conferences and courses.

The Australian Institute of Environmental Health (AIEH) provides a non-compulsory continuing professional development program. Employer organisations also offer professional development ranging from computer training through to encouraging staff to undertake university courses. Universities across Australia are beginning to meet these needs.

As most current environmental health practitioners have already completed their training, there needs to be a more rigorous continuing professional development program to enhance their skills, performance and career opportunities. This training should be aimed at providing all environmental health practitioners with a high level of support through the major changes they face in their work practices.

In order to better support the future needs of the whole environmental health workforce, the level of continuing professional development needs to be increased. The current AIEH program should be improved and extended to provide a program which meets the changing requirements of all environmental health practitioners.

5.3.4 Postgraduate Research Training

There has been significant growth in the number and type of postgraduate course work degrees in environmental health, and related fields.

Postgraduate research, however, is comparatively underdeveloped. This is particularly obvious when it is compared to research and coursework in other fields of study, where honours, masters and PhD research provides a significant proportion of Australia's research efforts.

Increasing the number of students undertaking postgraduate research will increase the research base for environmental health.

Postgraduate research training needs to be further developed.

5.3.5 Allied Professionals

In order to maximise environmental health outcomes, the different skills of professionals and practitioners from a wide range of sectors need to be acknowledged and fully utilised. One of the key ways to achieve this is to ensure that all relevant professionals have a strong understanding of the philosophy and practice of environmental health. Such an understanding would result in environmental health issues being introduced early in the development of plans, proposals, and actions of a wide range of agencies and at all levels of government.

There are two main ways of achieving this:

1. Raise the profile of environmental health.
2. Provide environmental health training to allied professionals such as urban planners, environmental officers and other health professionals.

5.3.6 Environmental Health Workers

Western Australia, the Northern Territory and Queensland have established Indigenous environmental health worker (EHW) training programs, which have been designed to meet the needs of each region. On the whole, EHW programs have been very beneficial and are well run (see Case Study 7). However, a number of problems still remain:

- Poor environmental health conditions can overwhelm the capacity of the workers: The burden of environmental health needs in many remote Indigenous communities can tax the capacity of EHWs. Support from Local government and other agencies is needed to integrate and sustain the role of EHWs and community self-help programs. Environmental health improvements are more likely to be achieved and maintained under these conditions.
- Poor career paths: EHWs do not have defined career paths after their training. Even in States/Territories where EHW training is offered in stages, opportunities for promotion are not based on increasing levels of competence.
- Status in community: While EHWs gain suitable qualifications through their training, this level of expertise is not necessarily recognised in their community. In some cases, this makes it difficult for EHWs to have their recommendations implemented.
- Professional recognition: EHWs are still struggling to achieve recognition for their expertise and qualifications from workers in other fields.
- Competency levels: The courses developed around Australia all differ. (This is also the case for EHOs - although all EHO courses have to be endorsed by the AIEH). This means that there is very little portability between regions. Core competency levels need to be developed to increase the portability of this training.
- Ongoing professional development: There is little offered in terms of ongoing professional development outside of the formal EHW training. The potential for such ongoing training needs to be investigated - including the option of making some aspects of environmental health training available through other Indigenous health care worker training programs. This would be advantageous for smaller communities that are unable to support an EHW, and may provide additional avenues for more women to take up some level of environmental health training.
- Prior learning: EHW training needs to be recognised as prior learning for admission to other areas of study, especially undergraduate environmental health training.
- Level of support: EHWs sent to work in remote communities often have little support. More consideration should be given to how to best support EHWs in their work–this may also impact on their level of acceptance in the community.

Environmental health worker positions should be developed and funded, and all levels of government need to develop strategies to overcome the problems facing environmental health workers.

Case Study 7

Profile of an Environmental Health Worker - Julius Barker

Environmental health workers (EHWs) are a valuable community resource who organise essential health services such as; refuse collection and disposal, and pest and dog control. They organise or effect repairs to damaged infrastructure - such as water or sewage systems - and are well placed to deliver ongoing health education and create partnerships with other environmental health practitioners. These men and women are employed - at various levels - by Local governments, public health units and Indigenous communities, medical services and resource agencies.

Julius Barker

Julius Barker is a 33 year old EHW with a strong reputation for hard work and innovation. He has earned the highest respect from his colleagues, communities, environmental health practitioners, governmental agencies and Local government.

Julius was born in Roeburn and has lived and worked his whole life in the Pilbara region. After completing year 9, he began his working life as a station hand and labourer, and in 1988 was employed as a Police Aid in Port Hedland and Nullagine. In 1991 he became a station hand and manager at a station community. It was here that Julius became aware of the environmental health worker training program. In his spare time he assumed the role of EHW, undertaking his first year of training in 1992.

In this same year he was employed as an Environmental Health Field Support Officer with the Pilbara Public Health Unit (PPHU). Julius completed his training in 1993 and in 1995 assumed responsibility for the major Aboriginal environmental health role of the unit. In 1997 he was promoted to the position of Regional Aboriginal Environmental Health Coordinator. Although his work was rewarding, Julius always felt that he could offer communities more. He had already conceived of a better way of providing environmental health services to Indigenous communities in 1993 - while on a field research trip to the Anangu Pitjantjatjara lands in South Australia, in particular the Umawa community.

On his return to Pilbara he began to lobby funding bodies and stakeholders to form a central resource unit to support EHWs and their communities. The initial, unanimous response was that it would cost too much. However, Julius and his team persisted and enlisted the support of Dr Moira McKinnon, the then Director of the PPHU. Ultimately, they were able to attract external funding to assist in forming the Marlba Environmental Health Resource Unit, in March 1998. This unit aims to provide Aboriginal communities and EHWs in the Pilbara region with the kind of support that has long been absent. In particular, Marlba proposes to:

- Provide field support for community EHWs
- Represent EHWs at State or national forums
- Liaise with community councils to raise support for, and the profile of, EHWs
- Assist EHWs in developing community environmental health evaluations
- Conduct regular seminars for remote EHWs
- Provide resources to deal with environmental health crises in communities
- Assist communities to access resources for long-term environmental health solutions

The formation of the Marlba unit is a major achievement, and largely resulted from the vision and persistence of Julius Barker and his team. However, Julius is conscious of the need for more Aboriginal environmental health practitioners, and role models. He is now enrolled in the Bachelor of Applied Science (Environmental Health) course offered by the University of Western Sydney.

Prepared in conjunction with Health Department of WA

Chapter 6

Improving Environmental Health Practice

Human health ultimately depends on society's capacity to manage the interaction between human activities and the physical and biological environment, in ways that safeguard and promote health but do not threaten the integrity of the natural systems on which the physical and biological environment depends (2).

Many health outcomes are dependent on our capacity to prevent and manage environmental health problems. If we are to have good health outcomes, then our environmental health management must work to prevent or reduce exposures to health hazards, or where they occur, to provide the best possible health intervention. In order to achieve this environmental health practitioners must understand the best practice available to them (eg legislative instruments, national standards, risk assessment framework etc).

6.1 Improving Risk Assessment and Management

The world is full of risks, and no activity, process or product is without risk (40). Humans face specific risks from a variety of environmental hazards, ranging from risks resulting from personal choices such as not using sun screen to risks associated with everyday practices, such as inhaling air pollutants in cities.

Protection of health involves analysing the risks involved, evaluating interventions and developing appropriate management strategies. Risk assessment provides a systematic approach for characterising the nature and magnitude of the risks associated with environmental health hazards. The ultimate aim of risk assessment is to provide the best possible scientific information about the risks, so that these can be discussed more broadly and the best decisions made as to what to do about them.

A fundamental principle that is often misunderstood is that whilst risk assessment and risk management are linked they are separate processes. Risk assessment identifies risks by assessing hazards and their associated exposures; risk management uses this (and other) information as the basis of strategies aimed at minimising harm to individuals and communities (41).

6.1.1 Risk Assessment and Management in Australia

In Australia, risk assessment and risk management techniques are used by environmental health practitioners to develop management strategies for the risks arising from a wide variety of health hazards.

It is important that this work stem from a common understanding of the risk assessment and risk management processes. Whilst there are core definitions, considerable confusion has developed, both nationally and internationally in applying the basic concepts and views.

An integral part of risk assessment is to detail the assumptions and evaluate the uncertainties and assumptions for each stage of the risk assessment process.

Risk assessment provides a basis for risk management, but is only a component of the total information risk managers need to make their decisions. Risk management requires a broad evaluation of the results of the risk assessment and also needs to take into account social, economic and political considerations. It is important that the basis of decision making is clearly documented.

Risk assessment approaches and methodologies sometimes differ in different jurisdictions, leading to inconsistencies in risk management strategies. In the absence of clear national guidance, some jurisdictions have used risk assessment methods from other countries, where conditions and values may be quite different from Australia's.

Unless there is full understanding of how risk assessment has been undertaken, including the data and assumptions underlying the risk assessment and risk management, decisions from other countries should not be used.

In order to ensure a coordinated approach to risk assessment and management the ENHealth Council should develop a national framework.

This framework needs to:

- Be sufficiently flexible
- Be reviewed regularly and updated to take into account new information.
- Be able to be used by all types of risk managers (from the private to the public sector)
- Recognise and encourage contributions from all stakeholders.

6.1.2 Risk Communication

An integral part of risk assessment is risk communication. If environmental health risks are to be fully assessed and managed effectively, full and frank communication between risk assessors, managers and the community is essential. It is not enough to 'communicate' the results of this process to individuals and the community.

In order to be effective risk communication must occur through all stages of the risk assessment and risk management processes.

A USA report into risk management highlighted the concept that stakeholders, particularly, the broader community, are at the centre of any environmental health problem, and should also be at the centre of any risk assessment or risk management process (42).

Not just because they have a right to know, but also as a recognition that …local people often have valuable information about sources of exposure, patterns of behaviour, cultural practices, and local concerns that generic risk assessments and models would miss.

Such information can provide guidance for the risk assessment and the development of cost effective options for action. (42)

All stakeholders have their own perception of risk.

Good risk communication minimises the mismatch between these perceptions of risk and assists in efficient risk management. It helps to address outrage and will highlight risks that may not be apparent to the stakeholders.

6.2 Health Impact Assessment

Environmental impact assessment (EIA) has been a feature of planning processes in Australia for the last two decades, and has been of benefit in assessing the potential environmental damage from a proposed development. This includes damage to the physical environment, the biological environment and the affect on land use.

However, the effects on social structure and cohesion, education, employment, community structure and infrastructure, recreation opportunities, and spiritual factors are not well addressed in conventional EIAs. There also appears to be little to no formal process for examining the health impact of new and existing government policy.

As a result, many developments and policies with significant potential for adverse health effects proceed with minimal consideration of these effects.

It is imperative that Health Impact Assessment (HIA) be used to provide a better appreciation of the human costs and benefits of developments. This will lend financial and political power to the EIA process, and will result in a clearer appreciation of the best decision for the public good.

The recent *Tasmanian Environmental Management and Pollution Control Act 1994* (43) provides the best practice model for the rest of Australia (Case Study 8). In this legislation, any activity of significance to public health that requires an EIA must also include an HIA to determine the impact of the proposed activity on health. Within this framework, environmental and health impact assessment are conducted in one procedure, and concerns for health form part of the evidence considered when assessing the proposal (36).

It seems obvious that health considerations should form part of any impact assessment for a development that could have adverse health consequences (44). As Tasmania and Victoria are the only States which formally recognise the need for HIA in their legislation, there needs to be a strong political commitment to formally introduce HIA into the EIA process. This will require changes in legislation, training, nationally accepted guidelines and standards, and adequate resourcing to conduct the assessments.

All States and Territories should consider including Health Impact Assessment in their Environmental Impact Assessment procedures and should change their legislation and financial processes accordingly.

6.3 Environmental Health Standard Setting

Environmental health standards are criteria that protect the community from exposure to environmental hazards that have adverse health outcomes. Standards may be used by State or Territory governments as a basis for legislative regulations, and can be used by industry, Local government and the community to assess and manage environmental health issues. There is no national public health legislation, and standards need to be reflected in State or Territory legislation and/or Local government regulations, to be enforceable.

Environmental health standards should be based on all the available scientific evidence on the risks to health and best practice in risk reduction.

Standards have provided environmental health practitioners with a powerful tool which can be used to guide best practice, ensure industry and communities stay within acceptable health parameters and increase the confidence of communities and industry by promoting consistency across Australia.

Traditionally, legislation and regulations have prescribed standards in absolute terms. However, there is increasing pressure for standards to reflect the capacity for co-regulation or self-regulation to provide desired health outcomes. But this does not mean that standards will not play a key role. They are still required to provide a health benchmark, and to underpin both a self-regulatory and a co-regulatory approach.

Australia strongly requires a body of standards that cover priority areas of environmental health practice.

Responsibility for standard setting in Australia is fragmented. Standards can be set at the National, State, Territory or Local level. In some areas there is a single authority, while in others components may be managed by different agencies. In addition, standards that have significant implications for environmental health can be set through different sectors, in particular the environment, primary industry and urban planning sectors. Through this fragmented approach there is considerable potential for gaps and inconsistencies.

Historically, the NHMRC set national health guidelines for a number of areas of environmental health that were used by States and Territories for the basis of their standards. Many of these areas are now managed by different national authorities, and the NHMRC's role is changing to reflect this altered framework. These statutory and national bodies include:

- Australia New Zealand Food Authority (food legislation)
- National Occupational Health and Safety Commission (occupational standards and the regulation of industrial chemicals through the National Industrial Chemical Notification and Assessment Scheme)
- National Registration Authority for Agricultural and Veterinary Chemicals (registration and regulation of agricultural chemicals - such as pesticides - and veterinary chemicals, with advice from the Therapeutic Goods Administration)
- Therapeutic Goods Administration (regulation and administration of therapeutic goods, drugs and poisons)
- Standards Australia (a range of issues)
- Australian Radiation Protection and Nuclear Safety Authority (radiation standards)
- National Environmental Protection Council (national, whole-of-government approach to the setting of environmental standards through the development of National Environmental Protection Measures [NEPM]).

The NHMRC has also developed a number of joint guidelines with the Australia New Zealand Environment and Conservation Council (ANZECC) and the Agricultural Resource Management Council of Australia and New Zealand (ARMCANZ). In particular, these have focused on environmental and water quality issues. However, while the NHMRC still provides health-based advice, input into joint standards or guidelines, and endorses recommendations from a health perspective, they no longer play a leading role in the development of environmental health standards across the board.

There is an ongoing need for a well-managed and appropriately funded system for setting environmental health standards.

The ENHealth Council has a lead role in coordinating and, where necessary, setting environmental health standards to ensure consistent coverage for all areas of Environmental Health practice.

Maximising national consistency will provide for economic and administrative efficiency. This will require cooperation and information sharing between the jurisdictions with the authority to set standards.

Case Study 8

Health Impact Assessment in Tasmania

In January 1996, Tasmania introduced a formal and explicit requirement for health impact assessment (HIA) through the *Environmental Management and Pollution Control Act 1994* (EMPCA). It stated that all proposed developments which require environmental impact assessment (EIA) also must be the subject to an HIA.
To date, no other Australian State/Territory has introduced a similar requirement.

Explicit incorporation of HIA in EIA reflects that:

- Human health and the environment are interdependent
- Most changes to local or global environments are likely over time to affect human health
- Human health is a fundamental issue for sustainable development
- Decision-makers have a responsibility to involve potentially affected communities in decisions which have an impact on their health.

The aims of HIA are:

- To identify potential health impacts of a proposed development
- To identify mechanisms which will prevent negative health impacts and promote positive health impacts of a proposed development
- To provide sufficient information to decision-making authorities and the public for them to make an accurate assessment of the health impacts of a proposed development.

For HIA to be effective, it must be concerned not just with potential biophysical hazards—such as the release of toxic substances—but with the range of other potentially significant impacts on health. These include changes in community employment and income, changes in recreational facilities, etc. Incorporating community views and concerns are also central to the process. It is also important that it is linked to, not separate from, EIA.

HIA basically consists of applying the range of public health tools and approaches in new ways. National HIA Implementation Guidelines currently being developed by the Tasmanian Public and Environmental Health Service funded by the Commonwealth Department of Health and Aged Care, will help those already undertaking HIA to do it better, while helping other jurisdictions to introduce this approach themselves. Routine use of HIA by all Australian jurisdictions - not only for planning decisions, but also for policy development and other issues - will produce real public health benefits.

Prepared in conjunction with Tasmanian Department of Health & Human Services

The ENHealth Council system for administering environmental health standard setting should:

- Be adequately funded
- Review and update existing standards to maximise consistency between sectors and jurisdictions
- Identify gaps in standards, and issues that are not covered
- Identify where health and other sectors may not be in accord, and ensure that the protection of health is not diminished as a result
- Address the emergence of new issues and hazards in a timely way by ensuring new standards are developed as required.

The community and other stakeholders should participate in the development of environmental health standards.

Pressures for economic competitiveness and efficiency have resulted in the review of all standards and regulations (Note 6.1.). While it is important that standards and regulations are reviewed, with the aim of rationalising and reducing the burden on industry and society, their capacity to protect health and satisfy community expectations, as established by the Australian Charter for Environmental Health, must not be impaired.

6.4 Legal Instruments

Legislation and regulations concerning environmental health are complex, and are spread throughout a range of Commonwealth, State and Territory Acts covering health, environment protection, planning and Local government.

The Australian Constitution provides the Commonwealth with a range of specified powers that do not include public health. State and Territory governments make laws concerning public health in general, as well as laws empowering and directing Local government to conduct activities for public health. Therefore, Local government has a fundamental role in implementing and enforcing public health laws, and retains some ability to develop local laws relating to public health and planning matters (36).

6.4.1 Harmonisation of Environmental Health Legislation

The approach, application and enforcement of environmental health legislation is different in every State and Territory in Australia. What is considered legal in one State, may not be in another.

While recognising the need for flexibility to deal with regional issues, there needs to be a greater level of harmonisation and consistency between environmental health legislation throughout Australia. This can be achieved through:

- Increasing communication, particularly during the development of legislation
- All governments being committed to increasing harmonisation and consistency between their public health Acts (to some extent this is being addressed through the National Public Health Partnership)
- Reviewing the whole of an Act provides an excellent opportunity to increase environmental health harmonisation (eg as part of National Competition Policy, States and Territories are in the process of reviewing all legislation).

6.4.2 The Relationship Between Environmental Health and Environment Protection

It is difficult to separate environmental health and environment protection issues, yet legislation for the two areas is quite independent. Environment protection legislation around Australia takes a range of factors into account, but there is often little explicit recognition of public health as a principal outcome. This has seen a weakening in the focus on health as the principal concern of environmental legislation.

The current Intergovernmental Agreement on the Environment - which sets out general principles of environmental impact assessment - emphasises that human health is an issue of importance in protecting the environment (45). And in their 1997 review of public health law in Australia, Bidmeade and Reynolds concluded that:

The interdependence of public health and environmental protection should be strongly emphasised in governmental practice and decision making, and a dichotomy between the two should not be allowed to exist. We believe that administrative and operational links between the two areas should be explored and developed. (36)

While this seems obvious, it is not current practice. There needs to be an increased acknowledgment of the roles of environment protection in environmental health legislation, and of both public and environmental health in environment legislation. Health and Environment Departments should develop legislation which recognises their common goals and supports the ability to work together, not at cross-purposes.

The recent Tasmanian legislation concerning Environment and Health Impact Assessment - which is referred to in both the Public Health and the Environment Acts - is a good example of this. All governments need to have a strong commitment to breaking down barriers between environmental health and environment protection and ensuring this is reflected in legislation.

6.4.3 Fines and Penalties in Environmental Health Legislation

The penalties for persons committing offences under environment protection laws are substantially higher than under public health law. Significant monetary penalties - from hundreds of thousands of dollars to one million dollars - are common for the most serious categories of environmental offences. In contrast, penalties for public health offences - even in extreme cases - are generally much lower. They are rarely more than $50,000, and are typically less than $10,000 (36).

While there are many theories as to why this disparity has arisen, there is probably no one reason. The existing situation is incongruous and can result in companies being fined more for damaging plants or animals than putting human lives at risk.

Fines and penalties must reflect the value we, as a community, place on our health and wellbeing.

6.4.4 Development of Best Practice Models

The development of best practice models of legislation - which can be used by all jurisdictions - is pivotal to providing legislation that is understandable, appropriate, current and cohesive. The use of such models would also go a long way towards greater harmonisation and consistency between jurisdictions. The development of these models should take into account who does the work, and at what level of government. They must also encompass innovative solutions and approaches.

The ENHealth Council and the Legislation Reform Working Party of the National Public Health Partnership should develop best practice models for environmental health legislation, especially models that increase the links between environment and public health.

6.5 Enhancing Environmental Health Service Delivery

Environmental health service delivery is under a wide range of pressures. Those with particular impact in this area are: the drive for increased efficiency; the trend to corporatisation/commercialisation; and the outsourcing of a wider range of services.

Some of the changes in environmental health services resulting from these pressures include:

- a shift in the environmental health practitioner's role from operational to management
- increasing use of the purchaser/provider split
- increased importance of cooperative approaches
- the use of regional or community health/environmental health plans
- the use of outcomes-based management
- the increased use of the private sector for service delivery.

The aim of environmental health service delivery must be to improve environmental health outcomes by building on existing procedures and adopting innovative approaches. High quality service delivery should be a synergistic relationship that is underpinned by good communication, freely accessible information and a true partnership approach (see Case Study 9).

Effective environmental health service delivery is about meeting people's needs and managing expectations. Service providers should inform the community of the full range of services they provide, the expected outcomes and the standards on which they are based. Service providers should encourage public participation in direct planning of service provision in their community. One of the key innovations of late is the increasing development of community health plans
(see Case Study 3 p.15).

Restricting service delivery to existing practices may impede the provision of better health outcomes, delivery of services should be accomplished through the best possible model, for the community. Innovation can lead to improved services - which can often be provided using the same, or reduced resources. However, adequate resources are required in order to provide an acceptable level of environmental health service. Although money is a key point, adequate resources is also about staff, training, equipment and infrastructure. In developing new approaches it must be recognised that:

1. There is often expense involved in establishing a new practice
2. There is a risk involved with innovation.

Ongoing evaluation of current practices is paramount in the development of enhanced service delivery. Current methods being used in the delivery of environmental health services should be assessed for their efficacy, effectiveness and their ability to increase health outcomes (see Note 6.2). Essential to such evaluation processes is information and the development of appropriate indicators. Evaluating the effectiveness of current interventions and services provides a mechanism for comparison. This will lead to the development of best practices for the full range of environmental health services.

A review of different modes of environmental health service delivery needs to be conducted with the view of determining best Australian practices.

Enhancing service delivery is dependent upon:

- Improving the environmental health workforce
- Increasing our knowledge base
- Improving our communication techniques.

Note 6.1 Compulsory Competitive Tendering

Compulsory competitive tendering (which is not the same as the National Competition Policy) has transformed the way Victorian councils operate, and is regarded as one of the most significant reforms in Local government practice. In 1994 legislation was passed, requiring all councils to submit a progressively increasing proportion of their expenditure to competitive tendering. In 1994-95, the legislation required that 20% of the total operating expenses of a council come under the competitive tendering process, and in 1996-97 this had risen to 50%. The work councils put out to tender does not necessarily have to be 'contracted out' to the private sector, as council staff and in-house teams can compete to win these tenders. This allows staff to prove that they operate efficiently and effectively, in terms of service, quality and cost. Other States/Territories are now looking at the possibilities for CCT in their jurisdictions.

Now that the system is operating and a fundamental change in service delivery has occurred in Victorian Local government, there are opportunities to learn by analysing and evaluating the process. This evaluation should focus on the strengths and weaknesses of different service delivery modes and recommend a framework for testing the appropriateness of implementation.

Case Study 9

Hunter Region Environmental Health Plan

The Hunter Region Environmental Health Plan (HREHP) was developed through a collaborative approach involving the Hunter Area Health Service, local councils, the New South Wales Environment Protection Authority (EPA), the Department of Land and Water Conservation, the Hunter Water Corporation, the Hunter Catchment Management Trust, the NSW WorkCover Authority, Newcastle Advanced Technology Centre, BHP Steel (Newcastle), Department of Geography, University of Newcastle, and community representatives (46). The model adopted follows the approach of the WHO which emphasises intersectoral collaboration and a holistic view of health.

The Hunter model identifies potential environmental hazards to health at a general level, their potential health effects, and levels of concern for health which act as triggers for action according to agreed protocols. It then goes on to assess these hazards according to both environmental and health indicators, identify programs and strategies necessary to address them, and determine the degree of involvement and the priority assigned to them by participating organisations. The overall emphasis is on prevention.

The plan recognises that the Hunter region is characterised by 13 Local government areas, a diverse economic base with mining, agriculture, power generation, tourism, education and commerce, and a broad industrial base. In this context, environmental hazards are the outcome of a complex, interdependent system, where change in one part of the system can have effects on others; the impact is likely to be on aspects of the environment, eg air, water or land, which are subject to overlapping management regimes; and reduction of the hazard is likely to impact on the activities of industry and other interest groups, whose cooperation is therefore required for an effective response to the hazard. In addition, the plan seeks to address the realities that many environmental hazards are poorly understood, and that disease has multifactorial causes, which are often difficult to separate, identify and quantify.

The HREHP is supported by the Public Health Unit Services Plan, which was developed as part of this broader intersectoral approach to health. The service plan lists those environmental programs relevant to the role of the health service and specifies objectives and process/outcome indicators for them. Those involved in developing the Environmental Health Plan say that a major benefit has been identifying the issues. In addition, the process has led to stronger networks between Local government areas, industry and other organisations, and significant capacity building: eg expertise identified in one location can be shared by another. Local government areas on the fringe of the Hunter region have also benefited from the plan and have expressed interest in future involvement in planning, monitoring and surveillance activities.

Chapter 7

The Human-Environment Interface

There is a growing understanding that good health and wellbeing are linked with the state of the environment. People need protection from hazards in their environment. Society has a growing appreciation of the interaction between human lifestyles, consumption patterns and urban settlements with the state of the environment. Additionally there is increased recognition that environmental degradation and overload may lead to new hazards and diseases. As well as minimising health hazards, good management of the environment can make a strong contribution to increasing health and well being.

7.1 Water Quality

7.1.1 Health Risks From Water Contamination

The greatest water-borne risk to human health is microbiological contamination of drinking water. Other water systems, such as those used in cooling towers (see Case Study 10), can also cause disease. Additional risks to human health in water include chemical and radiological contamination. Risks are reduced by using barriers to prevent contamination of water supplies at all stages, and by treating and disinfecting drinking water.

There are gaps in our knowledge of water-borne health risks. For example, the proportion of human disease that can be attributed to water in Australia is unknown, and the importance of some micro-organisms and chemicals to human health is unclear. In 1995, the Cooperative Research Centre for Water Quality and Treatment was established to address some of these issues. The Centre brings together industry, government and researchers to focus on issues relating to water quality management and health risk reduction.

Australia has a massive investment in the infrastructure of water management, which centres around the removal of possible contaminants from water we use. This infrastructure, which includes catchments, dams, bores, pipelines, treatment systems, stormwater drains, sewerage systems and waste disposal, has been responsible for many of the health gains made early this century.

Water contamination has the potential to present a significant risk to human health, and the greatest risk comes from contamination of drinking water. Contamination of recreational water sources also represents a significant but lower risk. Water sources, including oceans and estuaries, may affect human health through other means, such as via the food chain. However, compared with other media such as food and air, drinking water is a minor source of most pollutants, although it is our principal source of exposure to some micro-organisms, and to the by-products of water disinfection (40).

7.1.2 Drinking Water

There are two aspects to the delivery of good quality drinking water:

1. Good management of catchment and storage areas
2. Good treatment, disinfection, testing and distribution systems.

Drinking water should be free of harmful levels of disease-causing micro-organisms, chemicals and radiological contamination. In other words, it should be safe to use. The 1996 *Australian Drinking Water Guidelines* produced by the NHMRC and ARMCANZ provides best practice guidelines - but not mandatory standards - for acceptable drinking water quality.

Case study 10

Legionella in Water Systems

Legionnaire disease is a sometimes fatal, pneumonia-like illness caused by infection with *Legionella* bacteria. The bacteria are commonly found in fresh or brackish water, in coastal waters and in moist soil. The environment in air conditioning and water cooling systems, especially when poorly managed, are conducive to the proliferation of the bacteria. Legionellosis outbreaks can result in the infection of significant numbers of people, and often result in the closure of buildings while the bacteria is eradicated and the water cooling system improved. These events, which can be very costly for the business responsible, can be avoided through good environmental health management practices. Good design, sitting and correct installation, proper operation and maintenance can reduce contamination of water cooling systems. These measures prevent the multiplication of bacteria, minimise aerosols and reduce the likelihood of *Legionella* outbreaks.

Although there is a need for improvements in some areas of Australia, the overall quality of our drinking water quality is very high (47). This does not mean that our water is always safe. Recently, potential new threats to our health have been found in drinking water supplies, as illustrated by the contamination of Sydney water with the parasite, *Cryptosporidium*.

Australians have been flushing their wastes into our waterways for years, which has resulted in the increased contamination of many of our water sources. The more water we use, and the more wastewater we generate, the greater we increase the pressures on our already stressed sewerage systems and waterways. One of the keys to maintaining the quality of our water supply is to reduce our rate of consumption.

Additionally, the areas surrounding our waterways heavily influence the quality of water. To avoid contamination of our water supplies from these sources, we must utilise good practices in catchment management.

Water catchment management is a key health issue.

Failures in the treatment or disinfection of drinking water can result in its contamination - although this can occur at any point in the water supply chain. The protection of water catchments and storages, types of water treatment and distribution systems differ across the country. Rural and remote areas are less likely to have well-protected water sources and fully treated water. Water quality monitoring is therefore essential to ensure the water supply is safe. Drinking water management needs to look at health outcomes as well as the presence of contaminants.

Routine monitoring of water quality alone is not a reliable indicator of treatment failure or brief disturbances of raw water quality. The development of risk management strategies such as Hazard Analysis and Critical Control Point (HACCP) which focus on the integrity of control measures should be fostered in the water industry.

Responsibility for the monitoring of water quality is spread across many different authorities in our States and Territories. Water monitoring in rural and remote areas tends to be of a lesser quality, due to fewer resources and testing difficulties.

We need to ensure that water treatment and monitoring provide consistently safe, good quality drinking water for all Australians.

7.1.3 Water Supply

The ownership and oversight of water utilities is changing rapidly. These changes present challenges to all tiers of government and to water agencies to ensure human health is adequately protected.

In addition, changes in technology in water testing and treatment have affected how water resources are managed. In particular, the increasing trend towards wastewater reuse is an emerging health issue.

Water Reuse

There is an increased awareness of the need for water conservation, with strategies for conservation including reduced consumption and water reuse. Water reuse schemes vary from recycling of 'grey' water for urban gardens, to the reuse of treated sewage in agriculture and urban irrigation. The feasibility of using reclaimed water for potable use is currently being examined in a number of areas.

Water resources in Australia need to be managed in a sustainable way without compromising health.

The National Water Quality Management Strategy, an initiative of the NHMRC, ARMCANZ and ANZECC, has produced Draft Guidelines for Sewerage Systems - Use of Reclaimed Water (48). However, these guidelines do not cover small-scale recycling or recycling water for potable use. Further research and the development of guidelines into the health consequences of these systems are required.

Guidelines need to be developed for small-scale wastewater treatment and reuse, and for potable reuse of wastewater.

7.1.4 Recreational Water

In Australia, fresh and salt water are used for a variety of recreational purposes – such as swimming, waterskiing, surfing, sailing and fishing. Although the overall quality of our lakes and oceans is high, people may be exposed to small amounts of waterborne pollutants during recreational activities in certain areas.

Microbial contaminants such as bacteria, viruses and algal blooms from sewage pose the greatest potential health risk to natural recreational water users.

Other common sources of contamination include: industrial waste, chemical contaminants, agricultural runoff, urban runoff, storm water runoff, faeces, oil and petroleum spills from boats and marinas and pollution from boaters.

Contamination of swimming pools (see Case Study 6) and spa pools usually occurs post–tap, and this is where management focus should lie. Consideration should also be given to adopting a HACCP approach for risk management of recreational water quality.

There is a strong need for the development and maintenance of national recreational water guidelines which cover the full range of water bodies including artificial swimming pools and recreational activities.

7.2 Air Quality

7.2.1 Health Risks From Air Pollution

Air pollutants pose a risk both from direct inhalation and through indirect effects on the environment. The health effects linked with air pollution can include; asthma, airway inflammation and illnesses, heart disease, decreased lung capacity, and cancer.

Key air pollutants include carbon monoxide, nitrogen dioxide, photochemical oxidants (such as ozone), sulphur dioxide, lead, particles, biological agents, hazardous organic compounds, and metals.

Australia's air quality was assessed in the 1996 *State-Of-The Environment Report* was reported to be generally good, with the exception of major cities which experience increasing motor vehicle related pollution problems (smog episodes), and large point sources of pollution such as power stations and metal smelters (49). As our population and cities continue to expand, and motor vehicle numbers and travel distances increase, maintaining our air quality will become increasingly problematic.

As air pollution produced anywhere on the planet contributes to the total of worldwide greenhouse gas emissions and ozone layer depleting compounds, air quality epitomises the local-global link.

7.2.2 Ambient Air Quality

In June 1998, the National Environmental Protection Council agreed to establish a National Environmental Protection Measure (NEPM) on ambient air quality (21). For the first time, the new national standards will provide Australians with a common benchmark for urban air quality. The information gathered as a result of air quality monitoring is also expected to enhance Australia's capacity to carry out national studies on the health effects of air pollution.

The NEPM addresses human health based standards and focuses on the major threats to health from carbon monoxide, nitrogen dioxide, photochemical oxidants, sulfur dioxide, lead, and particles.

The ambient air quality measure was viewed as a priority because of:

- The importance of air quality to human health
- The need for a uniform set of national air quality standards to protect health
- The need to provide business with certainty, and prevent market fragmentation resulting from different standards in different jurisdictions
- The need to deal with particular air pollutants whose presence is an indicator of air quality.

Significant health benefits accrue from reducing emissions. The impact statement for the NEPM includes estimations of the associated health benefits as well as the costs incurred with the setting of the NEPM standards. Overall, the burning of fossil fuels by Australia's transport systems, and by electricity generation, makes up most of the emissions which give rise to air pollution.

Although industry emissions are subject to regulation by legislation, licensing, codes of best practice and accreditation schemes in the various jurisdictions, a recent survey of EPA licensees in Victoria showed that companies are often motivated to improve their environmental performance by factors such as:

- A corporate commitment to environmental excellence
- A desire to maintain good relations with their local community
- A desire to gain the benefits of waste minimisation and cleaner production.

Other initiatives to improve air quality in Australia have been the introduction of exhaust catalytic converters on cars - leading to the use of unleaded fuel in all cars made from 1986 onwards - and later reductions in the lead content of leaded petrol. The use of catalytic converters has reduced the emissions of carbon monoxide and nitrogen dioxide as well as a number of other organic pollutants not covered by the NEPM.

The level of air pollution is also affected by transport and land planning - planning cities to allow services, employment, educational and other facilities to be located close together or close to public transport encourages the use of walking or cycling. More work needs to be done to ensure that urban planning encourages lifestyles which lead to lower levels of air pollution (see Case Study No. 11).

7.2.3 Indoor Air

Despite the fact that most Australians spend about 90 per cent of their time indoors, at work, home and in transit, relatively little research has been done on the quality of our indoor air. The quality of air in our homes, schools, recreational buildings, restaurants, public buildings, residential institutions and inside cars and offices is of significant concern. Pollutants can reach far greater concentrations indoors than they can outside.

Examples of serious indoor pollutants include: tobacco smoke, products of combustion from the use of cookers and unflued gas heaters, volatile organic and inorganic compounds from cleaning materials, furniture, surface coatings and hobby products such as glues and paints.

In 1989, the NHMRC recommended that ambient air quality goals should also apply to the indoor environment. The reasoning behind this recommendation was that the adverse health effects of air pollutants would be the same indoors as for outdoors, if the same level of exposure occurred. Since 1989, the NHMRC has set air quality goals applying specifically to the indoor environment for volatile organic compounds and for radon.

Australia needs comprehensive strategies, which aim to reduce air pollution (ambient and indoor). These strategies need to take a holistic approach and cover all contributory areas.

7.3 Food

Australians main exposure to environmental contaminants is through food.

Food is big business: it is estimated that the Australian food industry is the largest sector of the manufacturing industry and turns over some 30 billion dollars per year. It is a comprehensively regulated commodity, originally to protect public health. While this has always remained the central object of food law, the public health basis for its future regulation is less obvious now than previously (3).

Food safety highlights the differing approaches to environmental health. At Local government level food safety is an integral part of environmental health, at the State/Territory level only some environmental health units handle food safety, while at the Commonwealth level food safety standards are being developed by the Australia New Zealand Food Authority (ANZFA), and the Office of Food Safety in the Department of Agriculture, Fisheries and Forestries is coordinating food safety approaches in the primary industry sector.

Food safety is coming to the fore in the review of the Australia New Zealand Food Standards Code. This review is a comprehensive assessment of the regulatory framework for food in both countries. The approach has been to consolidate requirements which apply generally to foods into broad horizontal standards that apply to all food.

In addition, specific additional requirements may be applied to particular foods, where justified on the grounds of public health and safety, consumer deception, or possibly on industry development grounds to ensure access to markets.

Many food contaminants pose a risk to human health, although the length of time before health effects appear can vary. For example, bacteria (such as *Salmonella* and pathogenic strains of *E.coli*) typically cause adverse affects within hours or days of exposure when ingested at sufficiently high levels. By contrast, some chemical contaminants may produce notable health effects only after decades of continuous exposure to elevated levels, or they may ultimately have no impact on our health at all (40).

7.3.1 Changes to Food Safety Management

On the whole Australia's food supply is one of the safest in the world (50). Nevertheless, Health Ministers have noted the varying approaches to food safety and requested ANZFA develop national standards.

The new food safety standards involve a three tiered approach. The first tier sets performance outcomes for buildings and equipment to ensure that these will support safe management of food. The second tier addresses food hygiene requirements by proposing a set of good hygienic practices for the preparation, transport, sale and handling of food. The third tier requires a detailed food safety plan based on HACCP principles for food businesses. This framework recognises that each food premise has a unique system for preparing food in which specific hazards may arise at certain points. It allows industries to systematically identify potential hazards and determine routine management options to control these.

Third party auditing will be used to assess compliance with the business food safety plan. In effect, the emphasis is on the business to manage food safety thoroughly, rather than relying on random checks of end product to demonstrate failure.

As this work is incomplete no comment is made about the likely impact of proposed changes. Instead readers are referred to Reynolds (3) and (36) and the report of the Blair review, the draft standards and discussion papers.

Because food safety is such a large part of Local Government environmental health business, any changes to food hygiene management will have a big impact on the environmental health workforce. Accordingly, the development and introduction of a national food hygiene system should be done with regard to the existing workload of environmental health practitioners. It should also be noted that, however, the food safety standards reflect a shift to regulatory approaches which are reliant on specified outcomes and require systematic management processes, with higher level auditing to ensure compliance with safety plans, rather than inspection and prosecution based on prescriptive regulation. This change is an exemplar of how management of food safety and other environmental health issues is evolving.

Major changes to food safety practices should be supported by appropriate levels of re-training and adequate funding to cover increases in the workload of environmental health practitioners.

As with air and water, the sustainable production of food is essential to minimising long term environmental degradation and associated health risks. Sustainable food production should include reduced use of resources, reuse of natural resources such as water, and a reduction in the amount of packaging.

Case Study 11

Air Pollution, Environmental Health, and Respiratory Diseases in Launceston and the Upper Tamar Valley, Tasmania

The Investigation

The 1991–93 investigation into air pollution, environmental health and respiratory diseases in Launceston and the Tamar Valley was the result of community concerns over the previous decade about a decrease in air quality, and visible pollution which discoloured buildings and led to respiratory illnesses in the winter months.

A working party established that the main cause of the pollution was the use of wood heaters in winter, exacerbated by unfavourable topographical and meteorological conditions, which could not be changed. Other significant influences were forestry burns, poor waste incineration in the timber industry, and rural and domestic burn-offs. The increase in the use of wood heaters since oil prices increased during the 1970s was seen as partly unavoidable, at least until alternatives to wood were more reasonably priced. However, the improper use of wood heaters played a significant role in the high level of smog encountered.

Community education and awareness and cooperation from State government bodies was necessary to reduce the pollution levels. The importance of air quality to public health had been made clear by recent research in Australia and overseas. These showed that particulate air pollution of the kind found in the Launceston area was associated with an increased risk of cardiopulmonary mortality, increased respiratory disease, exacerbation of asthma and restricted activity.

To educate the community about the effect of wood burning on the atmosphere and of the need to improve techniques of fuel combustion, the working party undertook a major public relations exercise, successfully enlisting the cooperation of the print and sound media, secondary school science teachers and university academics. Recommendations included emission stipulations for new wood heaters, subsidies for upgrading of heaters, quality controls on firewood, continuing community education, and encouragement of homeowners to insulate their houses.

The Response

The Local government response to the report has been one of education rather than enforcement. The local council has worked closely with an industry body, the Australian Solid Fuel Wood Heating Association Inc., which has adopted a proactive approach to educating the community by offering a free advisory service to any domestic consumer who has a problem with smoke from a wood heater.

However, the local council is also considering a change to By-Law No 575 (which controls the construction and use of incinerators), to restrict the operation of domestic incinerators to one or two days a month, and to ban on-the-ground burning. The council recognises that this is a long-term problem that requires a long-term solution. The cultural preference for the use of wood heaters is unlikely to change until there is a reasonably priced alternative. The Council is currently looking at the possibility of offering consumers three-year, interest-free loans to insulate their homes, or to replace around 10,000 older style wood heaters with later, more efficient models.

Prepared in conjunction with Launceston City Council

7.4 Contaminated Land

Land contamination has historically resulted from the manufacture, use and disposal of chemicals. As knowledge in this field has developed, it has become an increasingly important issue in the environmental health, environment protection and planning sectors. Major concerns are related to the residential development of contaminated sites, groundwater contamination, and abandoned industrial land and waste disposal sites.

Human exposure to contaminants can occur through; consumption or contact with polluted water, inhalation and ingestion of soil and through consumption of contaminated animals and plants (see Case Study 12). The extent of this problem in Australia is yet to be fully evaluated. Many contaminated land sites are now being developed for residential use. This raises concerns regarding the immediate and long-term effects on human health and the environment. Such concerns need to be adequately addressed.

The best management of contaminated land is through effective planning and prevention. Remediation strategies have been developed and following the use of these strategies, planning in consultation with health agencies can be used to control access to existing sites.

NEPC have developed a draft NEPM on contaminated sites - Assessment of Site Contamination (50). This seeks to establish a nationally consistent approach to the assessment of contaminated land and to ensure sound environmental management practices are used in the assessment process. The desired outcome of the NEPM is *…an efficient and effective national approach which allows for adequate protection of human health and the environment* (51). A key component of the draft NEPM, is the guidelines on health risk assessment methodology. These are taken directly from the National Environmental Health Forum (NEHF) publications Health-based Soil Investigation Levels and Exposure Scenarios and Exposure Settings (52) (53). The partnership between health and environment in the development of the draft NEPM exemplifies the value of intersectoral collaboration in environmental health management.

7.5 The Health Aspects of Waste Management

Waste management has provided some of the most significant advancements in public health outcomes this century (see Note 1.3 - Environmental and Public Health Historical Background). However, as with many of the longer established environmental health achievements, the health outcomes associated with waste management are often taken for granted.

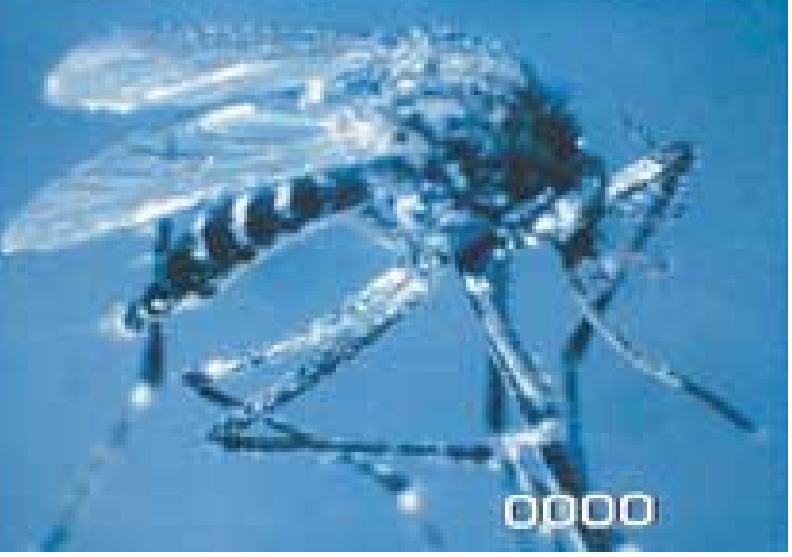
The assumption that most health hazards associated with waste are effectively managed, and the emergence of knowledge regarding environmental impacts of waste, has shifted the control of many waste management practices to the environment protection sector. Within public health, waste management has increasingly narrowed its focus to more recent issues, such as infectious waste.

It is important to remember that waste management areas regulated by the environment sector remain as potential sources of health hazards. Sanitation issues related to waste are numerous, examples include; putrefaction of waste versus service frequency, appropriateness of waste containers, suitability and effectiveness of on-site waste disposal, and effluent reuse methods (such as composting or sullage irrigation).

Waste management practices must ensure the protection of human health.

The primary purpose of waste management should be the protection of human health, whilst also addressing the concerns raised by environment protection and sustainability. However, this is not necessarily the case throughout Australia. Many areas do not receive routine waste collection or possess managed disposal sites. This is usually due to remoteness. In these areas, waste storage and disposal is often the responsibility of the individual or community rather than government. Lack of routine waste collection, storage locations and disposal sites in these communities can lead to adverse health outcomes.

Areas with limited access to waste services and facilities require environmental health action to prevent adverse health outcomes.



7.6 Vector-Borne Diseases

In Australia, six mosquito-borne viruses (otherwise known as **arbo**viruses ie. **ar**thropod-**bo**rne viruses) are major public health threats. In addition to the significant morbidity and mortality they can cause, large disease outbreaks can also have a substantial economic impact (including health care costs, loss of productivity, reduced tourism).

The six arboviruses are:

1. Murray Valley encephalitis
2. Kunjin
3. Japanese encephalitis
4. Dengue
5. Ross River
6. Barmah Forest

Vector-borne disease control has, in general, not received the equivalent level of investment as water and air quality. Nevertheless, several States and the Northern Territory, where infection rates are of concern do undertake significant disease surveillance and control work.

Generally, there are no 'conventional' disease control measures - vaccination or drugs – available to prevent or cure these arbovirus diseases (the exception being Japanese encephalitis, for which there is a vaccine). Therefore preventing contact with likely disease carrying mosquitoes is the best control strategy. This is usually based on the use of personal protection measures (avoidance of risk areas, use of long loose clothing, repellents etc) and mosquito control (insecticide spraying, prevention of breeding sites etc).

Effective control of outbreaks relies on an adequate control capacity, thorough planning, broad communication and information about issues including the prevalence of human disease, vector mosquito activity and weather.

Perhaps the most widespread vector borne disease threat is the Ross River Virus. This is a debilitating illness which can affect victims for weeks or even months.

Control pracitices aimed at the infective mosquito are often difficult because of the competing needs to protect public health and to sustain valuable ecosystems. This is illustrated in Case Study 13.

Although Australia is free of endemic malaria much of the tropics is not. Travellers to these areas should consider their risk of contracting the disease. The use of personal protection measures to avoid contact with disease carrying mosquitoes is the primary means of malaria prevention for such travellers. This is especially important given that the drugs to provide protection and/or cure the disease may not be completely effective and can cause adverse reactions.

Parts of Australia also remain at risk of the re-establishment of malaria, given the presence of potential vector mosquitoes and the likely entry of travellers carrying the disease. Preventing the re-establishment of malaria basically relies on timely surveillance and measures, if appropriate, to control mosquitoes.

In essence, protecting the community from the risks posed by vector-borne disease requires:

- Communication
- Emergency response capacity
- Surveillance

7.7 Built Environment

7.7.1 What are the Health Consequences of the Built Environment?

Because Australia is highly urbanised, most environmental hazards arise from the built environment. In their major work on the relationships between health and the environment, the Canadian Department of Health defined the built environment as (40):

'The built environment is part of the overall ecosystem of our earth. It encompasses all of the buildings, spaces and products that are created, or at least significantly modified by people. It includes our homes, schools and workplaces, parks, business areas and roads. It extends overhead in the form of electric transmission lines, underground in the form of waste disposal sites and subway trains and across the country in the form of highways'.

Case study 12

Arsenic in Mine Tailings

Many towns and cities in Victoria have a history of goldmining. Arsenic is a substance found naturally in rock, often near gold deposits. Gold mining activities bring the rock to the surface, for crushing to extract gold. The remaining crushed rock, which looks like fine clay or sand, is called mine tailings and often contains high levels of arsenic. Mine tailings have been spread over large areas of land, including land now used for housing and agriculture. About a third of Victoria may be affected in this way.

The health effects of arsenic depend on the amount ingested and the time over which this occurs. Large amounts of arsenic taken over a short time can cause severe health problems, or even death. Medium amounts of arsenic taken over a long time have been associated with skin changes, (thickened skin on the palms, soles and trunk of the body); damage to the heart, blood vessels, nerves, liver and kidneys; and some types of cancer including skin, liver, bladder, kidney and lung cancers. There have been no reports of arsenic-related health effects in people living in areas with mine tailings, but little research has been done. It is currently believed that there may be a very small health risk from being exposed to arsenic in mine tailings. Although the problem is generally considered to be small, children are at increased risk because they swallow more soil than adults due to an increased level of hand to mouth and pica (eating of non-food substances) behaviours.

The issue of arsenic in mine tailings has attracted media attention over the last two years, beginning with the deaths of dingo pups on a farm in central Victoria. The deaths were consistent with arsenic poisoning, and sand used for bedding showed high levels of arsenic. Other incidents include finding contaminated soil in a kindergarten in Stawell, contamination of schoolyards in central Victoria, potential contamination of residential properties at Diamond Creek, contamination of rural properties at Mount Egerton, and arsenic in mine tailings and calcined sands at Bethanga.

An Arsenic Task Force was established with representatives from the Victorian Department of Human Services (DHS), the Victorian Environment Protection Agency (EPA), and the Victorian Department of Natural Resources and the Environment (NRE) to develop a statewide management strategy for the investigation of arsenic contamination due to mine tailings and management of the risks to the public and environment.

The task force response included risk assessment, and the provision of public information pamphlets on risk management. The main targets were parents of younger children, other people living on contaminated land or near mine tailings and medical practitioners. Media releases and leaflets were distributed to members of the public through maternal and child health centres, libraries, councils, preschool centres and child care centres in relevant areas. Briefings have been provided to representatives of government agencies (Local government and regional offices of DHS, EPA and NRE).

Prepared in conjunction with Victorian Department of Human Services

Case study 13

The Dawesville Channel

The Peel region, south of Perth (WA), demonstrates the complex interaction between human settlement, land planning, engineering and ecology. The region contains the City of Mandurah which is surrounded by saltmarshes, including the Peel Inlet and Harvey Estuary. Leaching of nutrients from surrounding farmland has been degrading the ecology of the marshes since the 1960s and in particular promoting growth of toxic phytoplankton and microalgae. The odours from rotting algae reduced the amenity of the local area.

To tackle the algal problem the Dawesville channel to the ocean was built in 1994 to increase tidal flushing and thus reduce nutrient levels. While the aim seems to have been achieved the increased flushing also led to more flooding of the saltmarshes which exacerbated a mosquito problem that had already been described, as early as 1985, as severe.

Mosquito monitoring in the area began in 1987 (intensified in 1994). Major efforts to control mosquitoes through the aerial application of insecticide (larvicide to kill the immature stages) began in 1988. Once the channel opened spraying was required on a much more frequent and widespread basis. Larviciding increased from 2 to 3 times per year before the channel to 12 times in 1994–95, and is now carried out 17–18 annually. The number of Ross River virus (RRV) cases has been considerably higher since the opening of the channel.

Present spraying aims for about 90% control (total elimination of the mosquitoes is of course impossible). However, there is no simple solution, particularly given the huge area involved (600 hectares) and the risk of insecticide resistance developing. The Peel–Harvey estuary has also been designated an important wetlands area and controls must take account of our Ramsar Convention obligations.

There are also significant costs: the RRV/mosquito control program now costs about $650,000 annually and an average of $2600 per infected individual was estimated for the 1988–89 outbreak (in 1994 dollars). This comprises direct health care costs (including visits to GPs, specialists and allied health carers), costs of serological diagnosis, drugs and indirect costs of lost productivity. There are also negative impacts on tourism, land values and development.

Because of the complexity of health and environmental interests in the region the management program has, of necessity, been multifaceted—public education about the health risk posed by mosquitoes and how to avoid them (eg. preventing breeding sites around homes and the appropriate use of insect repellent etc), training of environmental health officers, habitat modification, research and closely managed use of insecticides. Good communication and coordination, which is essential for effective management of the program, also requires considerable attention to the wide range of interests involved (13 different agencies).

Prepared in conjunction with Health Department of WA

Aspects of the built environment that can affect our health include:

- Design and construction of homes, schools, workplaces and other buildings
- Urban planning (such as availability and design of housing, public transport, recreational facilities etc)
- Indoor air pollution
- Noise pollution
- The products we purchase, what we use them for and the waste they generate.
- Use of fertilisers/pesticides, both domestically and agriculturally
- Motor vehicle emissions that impact on indoor and outdoor air quality

These can cause a wide range of health effects such as headaches, eye strain, respiratory problems, communicable diseases, depression, stress, anxiety, injuries, car accidents, cancers, etc.

7.7.2 Healthy Planning

The shape of Australia's towns and cities is controlled by a range of plans, standards and codes. The key to creating healthy built environments is good planning that recognises potential health impacts from the outset.

Urban planning and building standards need to provide a framework that can be used to deliver safe and healthy environments in which individuals and communities can flourish.

There are a range of tools and practices (discussed in Chapter 6) that can be implemented to achieve healthy planning. These include—but are not limited to:

- A workforce aware of environment health issues
- Good environmental health information systems
- Good communication and consultation practices
- Community health plans
- Environmental health impact assessment
- Standards and codes that support healthy environments
- Legislation that supports healthy planning.

Urban planning needs to recognise all Australians, including those with special needs, by providing:

- Adequate public transport
- Housing designs that minimise levels of indoor pollutants/hazards
- The use of products that do not release toxic fumes/emissions
- Provision of shade in public areas
- Access to safe recreational areas/facilities etc.

On the whole, Australia has a good environmental health record, but our growing urbanisation means that the potential health problems resulting from our built environment are increasing. In order to safeguard the health of all communities, we need sustainable development. This requires an increased focus on health in all aspects of planning, design and building the environments we spend most our time in.

Chapter 8

Australia's Global Environmental Health Role

Globalisation, international commerce, and the rapid and widespread movement of peoples and goods, mean that Australia can no longer rely on its island nature to protect it from external hazards and trends. We must engage with the rest of the world to ensure our interests are protected.

Australia is a developed country with a strong scientific base, giving it both the capacity and responsibility to offer a major intellectual contribution to the development of international agreements affecting environmental health.

8.1 Australia's Regional Environmental Health Role

Australia provides significant financial, managerial, technical and scientific assistance to countries in the South East Asian and Western Pacific regions. We have a number of bilateral and regional agreements relevant to the management of environmental health issues.

8.1.1 Our Responsibility

As a leading nation in the region, Australia has a responsibility to:

- Help build technical capacity for environmental health
- Provide support, information and training in environmental health disciplines
- Share technical and industrial expertise in managing environmental health issues
- Encourage sustainable development in the region
- Provide environmental health leadership.

It is in Australia's strategic interest to work with other governments in the region to support these issues, and to ensure that health standards and infrastructure in the region are well managed and of a high standard (54).

Australia has a strong bilateral focus on countries in the Asia-Pacific region. Within these developing relationships there is an increasing emphasis on environmental health projects such as sanitation, clean water and waste management. Projects to build such infrastructure are accompanied by an environmental management plan. Potential projects are already subject to environmental assessment guidelines, and social impact guidelines are being developed. Both sets of guidelines should include a specific environmental health aspect (55).

Ways in which Australia can help to improve environmental health in the Asia Pacific include:

- Ongoing information sharing through collaborations
- Providing opportunities for environmental health practitioners from other countries to participate in Australian environmental health conferences and meetings
- Increasing the knowledge and awareness within Australia of regional and international initiatives
- Dissemination of information to the region that will build regional capacity
- Developing mechanisms for information-sharing that enables all countries in the region to benefit from work done in international forums and in Australia.

The ENHealth Council should promote Australia's collaboration with countries in the Asia Pacific.

8.2 Global Environmental Health Management

The impact of environmental issues on health extends beyond the local or national level.

Global issues include: climate change (in particular the greenhouse effect), ozone depletion, ocean and air pollution, loss of biodiversity, movement of hazardous products and wastes and the spread of diseases and their vectors.

It is important to recognise that management of our environment and environmental health issues has local, national and international implications. Australians contribute to ocean pollution, greenhouse gas accumulation and ozone depletion. Our health is also impacted upon by global problems.

Australia must - and has - recognised that it is a global citizen with global responsibilities.

8.3 Global Environmental Change and Environmental Health

Global climate change, as projected by climatologists, would pose a hazard to human health on a scale not previously encountered by settled human society (56).

We live in confusing times. Only 25 years ago an ice age was predicted. Northern hemisphere temperatures had been falling and it was thought that human activities might be involved. In more recent times, the opposite appears to be happening and a number of factors suggest that global temperatures are in fact rising. Global climate is changing and we will be required in future years to manage the environmental health consequences of this process.

The factors causing global climate change are of both natural and human (or anthropogenic) origin. For example, it is easy to conclude that air pollution is a product of modern technology. In fact air pollution started with fire, volcanoes and meteorite strikes, and has continued up to the present with the addition of anthropogenic inputs. Typical of this are the ways in which atmospheric aerosols might influence global temperatures. The mineral dust in aerosols was thought to have a net cooling effect and this is true in the visible spectrum. However, within the infrared section of the spectrum such aerosols have a net warming effect because mineral dust absorbs energy and acts much like a greenhouse gas in trapping outgoing radiation, thus warming the earth.

It is difficult to predict the magnitude and the time base of the changes that are taking place. Suffice to say, there is change and that the consequences upon health will be significant. As the environment and economic development are inextricably linked to health any reduction in the economic or ecological potential of our society will have a deleterious effect on health and well being (57).

Potential environmental health risks from climate change include:

- Increases in respiratory disease, such as asthma
- Increased extent of algal blooms in rivers
- Increased rainfall
- More frequent flooding in rural and urban areas, causing direct injuries and potential epidemics of water-borne diseases
- Increased range and frequency of outbreaks of vector-borne diseases
- Potential changes in distribution and frequency of extreme weather events, causing death and morbidity from heat stress, flooding, injuries etc
- Threats to water supply and quality
- Threats associated with sea level rise and associated storm surges
- Threats to the food security of many nations, particularly less developed countries.

At present there are indications that global climatic stability is also threatened. Although a warming trend has been forecast, this forecast is as yet unproven. Even if true the magnitude of change and the time base of change is impossible to accurately predict.

Environmental health units in all jurisdictions need to prepare long and short term strategies to cope. These strategies should be prepared in collaboration with other government agencies (such as emergency services and environment protection authorities) at all levels.

8.4 Australia's Global Involvement

Australia's current involvement in global environmental health activities includes:

- Active participation in world health and environment programs, including the WHO and the United Nations Environment Program (UNEP)
- Supporting the work of the International Programme on Chemical Safety, which is run jointly by WHO, UNEP and the International Labour Organization
- Contributing to the work of the Codex Alimentarius Commission, the international body which, in collaboration with WHO and other organisations, sets standards for foodstuffs in international commerce.

International conventions cover the trade and management of harmful chemicals. International treaties that provide an array of instruments for promoting environmental health include the:

- Framework convention on climate change
- Convention on biological diversity
- Vienna convention for the protection of the ozone layer
- Montreal protocol on substances that deplete the ozone layer
- Basel convention on the disposal of hazardous wastes and their movement across boundaries
- Rio Agenda 21 (4).

Australia often implements international environmental health programs. For example, the Rio Agenda 21 frameworks can provide an integrated planning approach for the management of environment and health. Similarly, the WHO's Healthy Cities is used in a number of Australian cities to provide a framework for local management and planning. The principles and practice of sustainable development underpin many government policies and programs across a range of different sectors.

As a member of the world community and a leader in the Asia Pacific region, it is important that Australia continues to support these initiatives and programs and seeks opportunities to enhance our involvement.

Working collaboratively with other countries on environmental health can provide substantial benefits. Environmental hazards in Australia are often similar to those in other countries and Australia can learn from, and contribute to, the development of international management practices.

Appendix 1

Key Strategies and Plans

Public Health

- National Communicable Diseases Surveillance Strategy
- Draft National Injury Prevention and Control Strategy
- National Public Health Nutrition Strategy
- Draft National Tobacco Strategy
- A National Aboriginal Health Strategy
- Eye Health in Aboriginal and Torres Strait Islander Communities
- The National Health Plan for Young Australians
- National Drug Strategic Framework 1998-99 to 2002-03
- Food and Nutrition Policy :The first three years implementation phase
- National Asthma Strategy: National Priority Area
- The Health of Young Australians: A national health policy for children and young people
- Developing and Active Australia: A Framework for Action for Physical Activity and Health
- National HIV/AIDS Strategy 1996-97 to 1998-99
- Effective School Health Promotion: Towards Health Promoting Schools (NHMRC)
- Health promoting sports, arts and racing settings: New challenges for the health sector (NHMRC)
- Promoting the health of Australians: A review of infrastructure support for national health advancement (NHMRC)
- Promoting the health of Indigenous Australians: A review of infrastructure support for Aboriginal and Torres Strait Islander health advancement (NHMRC)
- Primary prevention of skin cancer in Australia: Report of the Sun Protection Programs Working Party (NHMRC)
- The health effects of passive smoking: A scientific information paper (NHMRC)
- A Strategy for the Detection and Management of Hepatitis C in Australia (NHMRC)

Food Safety

- Australia New Zealand Food Authority - Development of food Safety
- Standards for Australia (Proposal P160 and Proposal P145)
- The National Food Regulation Review

Environmental Health

- National Framework for Environmental and Health Impact Assessment- NHMRC
- National Research Strategy for Occupational Health and Safety: A Framework for the Future-National Occupational Health and Safety Commission.
- Management of Agriculture and Veterinary Chemicals: A National Strategy

Environment Protection

- National Greenhouse Strategy
- Australia's National Strategy for Ecologically Sustainable Development
- Commonwealth Coastal Policy
- National Forest Policy Statement
- The National Waste Minimisation and Recycling Strategy
- State of the Environment Australia
- National Strategy for the Conservation of Australia's Biological Diversity
- Australia's Ozone Protection Strategy.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Appendix 2

Key Players in Environmental Health

National Public Health Partnership

State, Territory and Commonwealth Ministers for health have agreed to work collaboratively to improve and coordinate public health efforts across the country. The work of NPHP is managed through a subcommittee of the Australian Health Ministers' Advisory Council, which was established in October 1996. The partnership comprises the chief health officers or directors of public health in each jurisdiction, together with executive members of NHMRC and the Australian Institute of Health and Welfare.

ENHealth Council

The National Environmental Health Council will be Australia's premier environmental health committee (see Section 3.2.1).

National Health and Medical Research Council

The NHMRC has had a major role in developing environmental health advice, recommendations and guidelines. In the 1997–99 triennium, NHMRC has moved to a new structure where issue-based working parties, reporting to the Health Advisory Committee, develop recommendations and guidelines on a range of national environmental health issues, particularly drinking water guidelines, clinical and related wastes, reclaimed water management, and toxicity assessment of contaminated land. NHMRC also provides expert advice, and is represented on the working parties of other organisations addressing a range of environmental health issues.

National Environment Protection Council

NEPC is a ministerial Council which is chaired by the Commonwealth Minister for the Environment. NEPC has two primary functions: to make national environment protection measures (NEPMs), and to assess and report on their implementation and effectiveness. NEPMs have the objective of ensuring that:

- Australians are protected from air, water and soil pollution and from noise, wherever they live; and
- Decisions by businesses are not distorted and markets are not fragmented by variations between jurisdictions.

National Occupational Health and Safety Commission

NOHSC is a tripartite forum of government, employer and employee representatives which aims to establish more effective approaches to achieving occupational health and safety. NOHSC develops standards for occupational health and safety and codes of practice to provide a consistent national regulatory framework. NOHSC provides a national forum whereby key stakeholders come together to determine what action can best be carried out at a national level.

Australia New Zealand Food Authority

ANZFA is a partnership between the Australian Commonwealth, State and Territory governments and the New Zealand government. It develops and maintains food standards for both countries. It makes recommendations on food standards to the Australia New Zealand Food Standards Council, based on inputs from the food industry, government health departments, the public, consumer associations, the Australian Government Analytical Laboratories, the NHMRC and other professional bodies.

Australian Institute of Environmental Health

AIEH is a non-profit, registered company whose members are environmental health officers (EHOs). Membership depends on holding the qualification of Bachelor of Applied Science majoring in environmental health or its equivalent. The AIEH has committees that monitor and advise State/ Territory governments on relevant legislation and its administration. It also responds to Commonwealth and State/ Territory inquiries.

Australian Local Government Association

ALGA is the national representative body for Local government in Australia. ALGA was founded in 1947 as a federation of Local government associations in each of Australia's six States and the Northern Territory. The Association speaks on national issues for around 710 general purpose councils around Australia.

Standards Australia

Standards Australia is the peak standards setting body in the country. It responds to requests from governments, industry and community groups for standards, and investigates the necessity for proposed standards. If it determines that a standard is desirable, it forms a technical committee comprised of all stakeholders (eg industry, the medical profession, government, and community groups), and produces a draft standard for public comment. Following this process and any adjustments, the resulting standard can be mandatory or have best practice status.

Local Government

Australia has about 710 local government councils, which have zoning and land management responsibilities. Local government participates through the Council of Australian Government in the development of national environmental policies and is responsible for implementing these policies. Local government also participates through NEPC in the making of NEPMs.

Through their environmental and health responsibilities, local governments have a unique capacity to improve the health of their communities. Research suggests that they spend a greater proportion of total outlays on pollution abatement and control (water treatment, household and other garbage disposal, sewerage, urban stormwater drainage, other environmental protection) than either State/Territory or Commonwealth governments.

State and Territory Governments

Like the Commonwealth Government, every State and Territory has a number of departments that impact on environmental health management. Each has within its health department, an environmental health unit (although each unit has a different range of activities). Currently, the director of each of these units sits on the National Environmental Health Forum. The State/Territory environment protection agencies (or equivalent) are responsible for implementing national environment strategies. They are also responsible for environmental impact assessment of development proposals; preparation and coordination of environmental protection policies, including policies on waste management and pollution control for air, water and land; noise control; and the provision of expert advice and information to other government agencies, industry and the community.

Ministerial Councils

State/Territory environmental agencies also participate in the NEPC, the Australian and New Zealand Environment and Conservation Council, and in national strategies such as the National Greenhouse Response Strategy. Other State agencies such as departments of primary industry may also be involved in the management of environmental issues, depending on the allocation of responsibilities between portfolios.

Commonwealth Government

There are a number of Commonwealth government departments that have a major influence on environmental health. The Department of Health and Aged Care is responsible for developing national policy on public health matters including environmental health. Environment Australia is the lead Commonwealth agency on environmental matters. Agriculture, Fisheries and Forestry Australia also contributes to the development of national and international policies, many of which impact on environmental health, from the perspective of primary industries, including mining. Other agencies are involved on a case-by-case basis; eg the Department of Industry, Science and Resources may provide input from the perspective of business competitiveness; the Department of Foreign Affairs and Trade coordinates Australia's position on international environmental health issues such as climate change and biodiversity conventions.

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List of Acronyms

AIEH	Australian Institute of Environmental Health
ALGA	Australian Local Government Association
ANZECC	Australian New Zealand Environment and Conservation Council
ANZFA	Australia New Zealand Food Authority
ARC	Australian Research Council
ARMCANZ	Agricultural Resource Management Council of Australia and New Zealand
CRCs	Coorporative Research Centres
CSIRO	Commonwealth Scientific and Industrial Research Organisation
EHO	Environmental Health Officer
EHW	Environmental Health Worker
EIA	Environmental Impact Assessment
HIA	Health Impact Assessment
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NEHC	National Environmental Health Council
NHMRC	National Health & Medical Research Centre
NMIA	National Meat Industry Association
NPHP	National Public Health Partnership
PPHU	Pilbara Public Health Unit
RIS	Regulatory Impact Statements
SPIRT	Strategic Partnerships with Industry Research and Training
QUT	Queensland University of Technology
UNEP	United Nations Environment Program
WHO	World Health Organization