

The Economic Contribution of the Health Sector to the SA Economy

presented to

the SA Department of Health

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EXECUTIVE SUMMARY

The South Australian Department of Health commissioned the Australian Institute for Social Research and the School of Commerce at The University of Adelaide to undertake a project designed to quantify the direct contribution of the health sector to the SA economy and to identify the likely indirect contributions, based on a review of existing literature and data.

A key challenge for the research team was to determine the boundaries of the health sector. Not only is this sector characterised by complexity due to the range of stakeholders who plan, fund, regulate and deliver health-related services, but the achievement of good health in the population depends on a range of direct and indirect inputs. A narrow definition of the health system, that is confined to regulated activities, and recognised in standard data sets (for example, those provided by the Australian Bureau of Statistics) lends itself more easily to quantification.

However, such a focus fails to acknowledge the input of activities that support health (for example, sanitation infrastructure and services), or promote good health (for example, exercise and nutrition). In addition, the health system is best understood in terms of two parallel spheres – traditional health services and treatments, which are recognised in schemes such as Medicare and the Pharmaceutical Benefits Scheme, and complementary and alternative health services and treatments. Our analysis recognises both spheres, although data on the complementary health sector are more difficult to obtain.

The relationship between health and the economy

Our review of the literature identified numerous research studies, based on sound methodologies, that link human capital (based on population health and education) to economic growth and wealth (see *Section 3 of the report*) due to the positive association between health, education and workers' productivity (Laplagne *et al*, 2007: xiii). In addition, there is substantial evidence of a strong, positive and two-way correlation between adult health and education (Freedman and Martin: 1999; Suhrcke *et al*, 2005: 57).

Health itself has been found to be one of several key determinants of economic development, for example -

- o Changes in health have been found to increase the pace of growth in 10 industrialised countries (including Australia) over the course of 100-125 years by **30% to 40%** (Arora: 2001).
- o A one year improvement in a population's life expectancy has been found to contribute an increase of **4%** in GDP (ILO: 1997; Bloom *et al*: 2001, 2004).

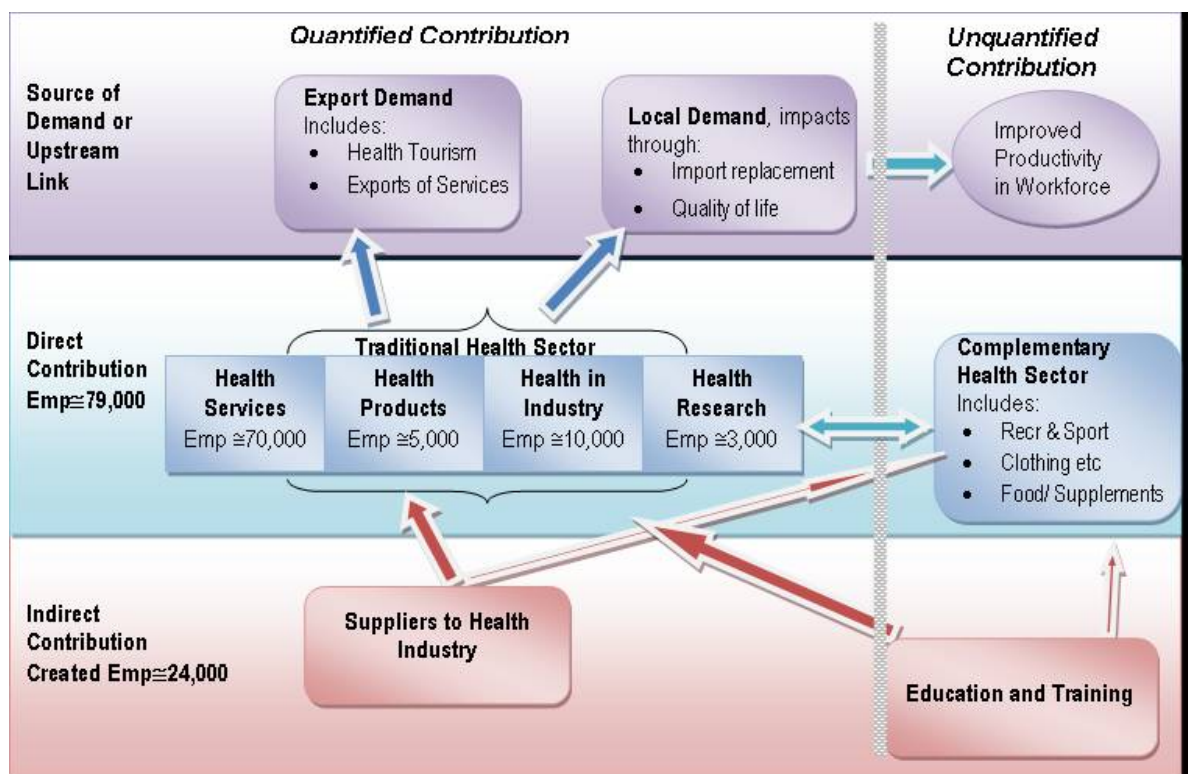
Research has also documented the negative economic impact of illness – for example, a reduction of 10% of cardiovascular disease mortality in the working age population of high income countries has been found to be associated with a 1% growth in per capita GDP. Treatment of cardiovascular disease is responsible for 11.8% of Australian health system costs. Prevention of this and other lifestyle-related diseases makes good economic sense.

Health has been conceptualised as contributing to economic outcomes (for individuals and for nations) in high income countries through four main channels –

- o **Higher productivity** – healthier people can be expected to produce more (physically and mentally) in terms of hours worked, and to be able to make better use of equipment, machinery and technology.
- o **Higher labour supply** – good health reduces the number of days lost to illness and increases the days available for work or for leisure.
- o **Higher skills due to greater participation in education and training** – more educated people are considered to be more productive, and obtain higher earnings. Children with better health and nutrition tend to achieve higher educational attainment, to have less health-related school absenteeism, and less likelihood of early drop-out.
- o **More savings available for investment in physical and intellectual capital** – people in good health are likely to have longer life expectation and an accompanying higher savings ratio compared with those in poor health (Bloom *et al*: 2001; Suhrcke *et al*, 2005: 21 - 23).

The health sector and the South Australian economy

The contribution of the health sector to South Australia can be depicted diagrammatically as follows:



The “traditional” or mainstream health sector is estimated as supporting *directly and indirectly* some **100,000 jobs** in South Australia, and contributing approximately **\$6.5 billion** to GSP. This currently represents between **10% and 13%** of economic activity within the State. If data were available to quantify the complementary or alternative health care sector, this estimate would increase, and available research indicates that this sector is growing significantly, nationally and in South Australia. More specifically:

- o The *direct* value of health the health sector in terms of value added (or share of GDP) it is estimated at **\$4.6 billion**, and in terms of wage and salary income it is estimated as **\$4.2 billion**. Flow through impacts result in the higher value of impact as above, or \$6.5 billion overall.
- o As a service sector, health has a much higher proportion of wages in its input cost structure than for the economy as a whole – with wages representing a high proportion of total costs (of the order of 70%). Therefore, it has a high impact locally.
- o Most of the remaining costs (almost 30% - as other value added is relatively low in the sector, due to the fact that investment is dominated by government) are intermediate inputs (materials and services). The health sector purchases two thirds of its intermediate inputs locally. This compares to a ratio of 50% for industry as a whole. The major local inputs include business and property services (31% of local intermediate goods), machinery and equipment (9.2%), trade sector services (9.3%), communications (8.7%), personal services (7.6%), finance and insurance (7.3%), chemicals (ie pharmaceuticals) (4.8%) and transport and storage (4.2%). Therefore all these sectors “benefit” from the operations of the local health services sector. Note that this does not include the investment contribution itself – the construction impact in building hospitals etc.

Investment through expansion of the health sector

Expansion of the South Australian health sector offers significant direct opportunities in terms of its economic contribution and in terms of the substantial benefits for the community as a whole.

- o A \$10 million expansion in **health service exports** is estimated to generate directly and indirectly a \$15.1 million increase in value-added or contribution to GSP; a \$10.1 million increase in wages and salaries; and an employment outcome of 190 FTE positions.
- o Health **products** are obviously linked to health services, but provide opportunities for more innovative approaches to external activity. A \$10 million expansion in health products exports is estimated to generate a \$7.1 million increase in value-added or contribution to GSP; a \$4.2 million increase in wages and salaries; and an employment outcome of 82 FTE positions.
- o Health **research** is a long term strength of the State and should be fostered and further redeveloped due to the broad range of benefits it can generate. A \$10 million expansion in health research exports is estimated to generate a \$11.2 million increase in value added or contribution to GSP; a \$7.5 million increase in wages and salaries paid; and an employment outcome of 130 FTE positions.

The differences in these outcomes are based on wages and salary differences within the sector, the proportion of intermediate inputs, and leakages in imports etc. These are industry averages, and individual projects can obviously produce different benefits. Neither does this allow for intangible benefits (eg the connection between health research and health outcomes).

Where should South Australia invest with regard to health dollars?

There is strong evidence that early intervention, through health promotion and prevention activities, will achieve long term positive health outcomes, and there is also evidence that

supports investment in quality primary health care. Allocation of resources to these activities should be regarded as an investment rather than expenditure that brings no return.

Given that the burden of disease in developed countries like Australia arises mainly from lifestyle factors, the importance of preventive and health-promoting actions needs to be a cornerstone of policy. This in turn requires long term planning and early intervention in the life cycle, and recognises the investment nature of targeted health expenditure.

Similarly health research provides significant traditional benefits (employment creation) but also many indirect benefits in terms of access to better services and higher quality outcomes locally, and should also be a focus of investment.

The importance of cross-agency and cross-government health policy

The range of influences on health requires that the health sector work closely with other sectors and that other sectors take into account the possible health impact of their decisions. The complex relationship between health and the economy, and the impact of health across a range of sectors together with the impact of policy made outside of the health sector on health, means that an integrated policy response is required to ensure that the health-economy relationship is positive and mutually reinforcing. It also means identifying the impact (direct or indirect) on health of other policies during their development phase.

Research and data collection to assess the impact of the complementary health sector

There is a need for research in relation to complementary medicine and therapies, particularly regarding their cost effectiveness relative to traditional health services and treatments, and relative to health promotion and prevention of illness (Herman *et al*: 2005; White & Ernst: 2000; Xue *et al*: 2006).

This gap in research is accompanied by a gap in data collection that would quantify the extent and impact of the complementary health sector. At national level, there is a need for the Australian Bureau of Statistics to structure its Census questions in a way that would enable accurate measurement of the usage of complementary health treatments and of the complementary health workforce. The questions that have been placed in the South Australian Omnibus survey have been important and should be continued. There would also be benefit in undertaking South Australian research to quantify the complementary health sector – its treatments, products, workforce and linkages to the 'mainstream' health sector.

1 INTRODUCTION

The South Australian Department of Health commissioned the Australian Institute for Social Research and the School of Commerce at The University of Adelaide to undertake a project designed to quantify the direct contribution of the health sector to the SA economy and to identify the likely indirect contributions, based on a review of existing literature and data.

1.1 Project Objectives

The project is designed to -

- 1 Increase understanding of the core characteristics of the health sector as it currently exists in South Australia, including:
 - o Size in terms of employment and incomes and skill and occupation sets; and
 - o Corporate or business structures in the sector.
- 2 Increase understanding of the linkages between the sectors (both inputs and networks).
- 3 Identify core opportunities for the sector from an economic development context.
- 4 Identify key constraints on the sector from an economic development context.
- 5 Identify key policy implications of the project's findings.

1.2 Project Methodology and Outputs

There were two main components of the project methodology –

- I A review of key research and data to identify the relationship between health and the economy.
- II An analysis of available data that would assist in identifying the size and composition of the health sector in South Australia.

A review was undertaken of the literature (primary research and relevant data collection) relating to the direct and indirect effects of the health sector on the economy. The review had three main components:

- o Identification and review of key studies quantifying the impact of the health sector on the economy.
- o Identification and review of public (ABS) and other data sets that may be available.
- o Identification of data gaps and preliminary issues.

Identifying studies that have quantified or examined in depth the relationship between health and the economy was not a straightforward task. We searched the Cochrane Library and the research collections of the Australian Institute for Health and Welfare, and the Australian Productivity Commission, as well as the Australian Bureau of Statistics and the

research collection of the OECD and the World Health Organisation. We also ‘snowballed’ by reading the bibliographies of reports from studies of the health-economy relationship.

An analysis was undertaken of key data sets in order to quantify the size and composition of the sector. There is limited publicly available data from which to evaluate the contribution of the health sector, with the most detailed being ABS Census data. The ABS has also undertaken specific health sector surveys, but these are now well out of date. What is available has been consolidated through interpretation in an input output modelling framework to help describe the industry structure.

The project has provided three reports –

- ⇒ A Literature Review Report
- ⇒ A Mapping Report, based on review and analysis of available data
- ⇒ A Final Report.

The Project Team also presented findings from the first two reports to South Australian ‘Thinker in Residence’, Dr Ilona Kickbusch and representatives from the Department of Health, and have incorporated findings from that discussion into the Final Report.

1.3 Project Team

The project team had these members –

- o Dr Kate Barnett, Senior Research Fellow, Australian Institute for Social Research
- o Associate Professor Barry Burgan, Head, School of Commerce
- o Associate Professor John Spoehr, Executive Director, Australian Institute for Social Research

South Australian Department of Health officers providing guidance and support to the project –

- o Dr Mark Mackay, Principal Project Officer, Policy and Legislation Unit
- o Dr Helen van Eyk, Director Policy & Legislation Unit

2 DEFINING THE HEALTH SYSTEM

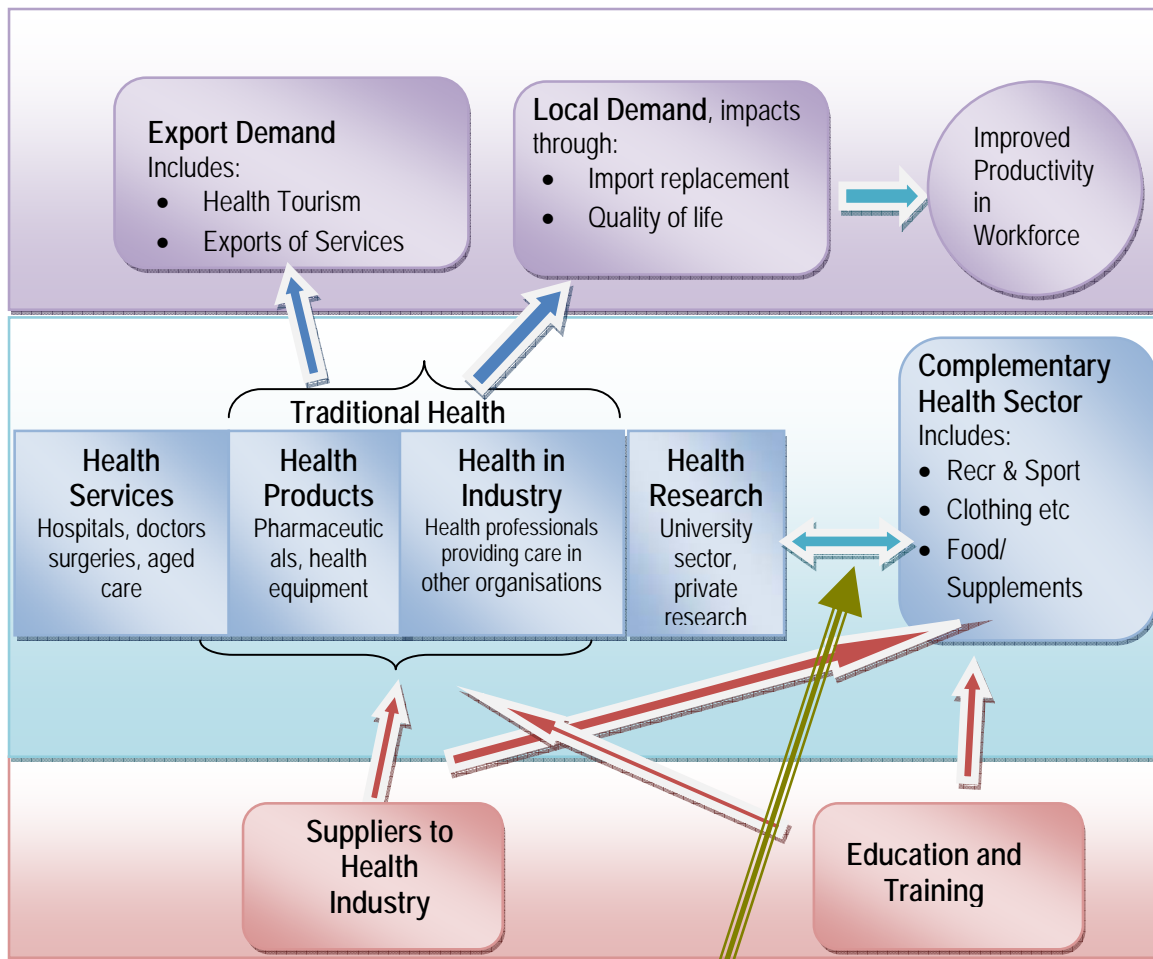
The Australian health system is not easily defined, in part because the concept of 'health' can be measured in either narrow terms - for example, in terms of life expectancy or adult mortality, and the absence of illness or other limiting conditions – or more broadly, in terms of well-being. The complexity of the sector due to the range of stakeholders at policy and delivery level, the involvement of three levels of government, and of the private and public sectors, as well as the range of funding sources, also makes definition difficult.

“The Australian health system is a complex system characterised by differing roles and responsibilities of different levels of government, along with a mixture of service providers and types of services, and with a unique balance between public and private sector involvement.” (NHPC, 2004: 9)

In addition, definition of the health system can be confined to regulated activities (see *Section 2.3.2*) without reference to the wide array of unregulated activities, and to the provision of health services without reference to the range of activities that support health (eg effective sanitation) or promote good health (eg exercise and nutrition). The narrower the focus, the more manageable the definition, but the less useful it is in terms of analysing the impact of the health system on the economy. Therefore, in this paper, we will be pursuing a wider focus.

Our approach to determining what constitutes the health system conceptualises two parallel sectors with bridges between both growing, and expected to continue to become increasingly interlinked. The two sectors involve what is understood as the 'traditional' health sector, and the emerging 'complementary' health sector. The former is more easily recognised (for example, through recognition in definition as Medicare based services) and easily quantified (for example, through Australian Bureau of Statistics data), while the latter is less easily defined. The diagram below illustrates this interplay.

The health sector and the South Australian economy



Links between the traditional and complementary sectors are multi-faceted – much of the spending in the complementary sector can be considered “preventive” (eg spending on health and dietary products, exercise, ‘sun smart’ clothing), and therefore increasing demand for complementary products can ultimately reduce demand for traditional sector products. However it also draws on products of the traditional sector – including research and information, network development etc. We note other differences as well, such as the complementary sector being less ‘government-centric’ (eg in relation to its regulation and funding). Furthermore, there is the contribution of legislation to health outcomes that is not considered in these relationships (eg anti-smoking advertising).

2.1 Exploring the concept of 'health'

It is useful to begin the definition process by exploring the concept of 'health'. There has been a significant amount of research material devoted to this issue and a summary is provided here. In 1946 the World Health Organisation (WHO) defined health as a '*state of complete physical, mental and social well-being and not merely the absence of disease or infirmity*'. This definition applied an ideal standard to defining health and the Australian Institute for Health and Welfare (AIHW) notes that this means the WHO embedded a goal within its definition. More recently, the definition has been expanded –

"A state of complete physical, social and mental well-being, and not merely the absence of disease or infirmity. Health is a resource for everyday life, not the object of living. It is a positive concept emphasizing social and personal resources as well as physical capabilities."

(<http://www.emro.who.int/mei/mep/Healthsystemsglossary.htm>).

The WHO definition remains widely used and presents health as –

- ⇒ an important part of, and contributor to, wellbeing;
- ⇒ more than the absence of illness or injury involving degrees of both good and bad health; and
- ⇒ needing to be seen in a broad social context (AIHW, 2000: 4-5).

Lalonde (1974) identified that disease and health are the result of the interaction between human biology, lifestyle and environmental factors, modified by health care. This view is now part of accepted policy and health care. Over time increasing attention has been paid to wider social and economic influences on health and lifestyle. The various causes and effects of health and disease interact in a complex way and can be shaped by prevention, health promotion, treatment and rehabilitation, which in turn, are supported by research and evaluation. All of these elements are reflected in and shape the health sector.

The complexity of health means that the health sector is affected by and affects other sectors. In relation to the economic sector, the interaction can be seen as two-way. The health sector is an intervention mechanism that shapes the economy, but is also shaped by the economy. This relationship was evident in the Council of Australian Governments' (COAG) *Report on Human Capital Reform* (COAG: 2006) and associated Communiqués on the Human Capital Stream of the *National Reform Agenda*.

"... COAG accept[s] the principle that improving the effectiveness of the health sector is necessary to enhance significantly overall productivity, given the health sector accounts for nearly 10 per cent of GDP, and is expected to grow as a proportion of GDP" (COAG, 2006)

The interrelationship between the health sector and the economy is discussed further in *Section 3*.

2.2 An evolving health system

The health system is an evolving rather than static entity, and this also needs to be reflected in any definition. The sector is driven by the underlying demand for good health and the benefits this brings, and the outcomes vary substantially over time with the

introduction of new or improved products, of technological innovation and broader influences like prices and income levels.

There is a growing demand for new health care services and health promoting products in the areas of fitness, well-being and nutrition. This in turn is generating growth, employment and more revenue through taxes and contributes to macroeconomic growth. New jobs are emerging in the health care sector together with new vocational training opportunities. New fields of work are opening up in research and development. Consequently, health care is a growth industry (Henke, date unknown). Analysis by the Department of Employment & Workplace Relations (DEWR, 2005: 8-9) identifies the Australian Health and Community Services industry as one of five demonstrating the greatest employment growth in the past decade, and having the most growth of these five industries.

2.2.1 Technology-driven change

The health care system is shaped by the development of new technologies and methods of treating and preventing disease. Biotechnology, genetic engineering, stem cell research and nanotechnology all offer new approaches to treatment and prevention and thus are shaping the sector continuously.

New synergies are anticipated between providers (for example, between pharmaceutical companies and food producers, and between physicians and textile manufacturers to create 'intelligent' clothes that monitor the wearer's health status). As a result, the health sector will be characterised by 'convergence markets', that is, markets that bring together a range of occupations and industries and satisfy a range of needs (Sigrist, date unknown: 3). For example, recreational and health focused tourism is a growing market for the 'Baby Boomer' generation.

Information and communication technologies (ICTs) are also changing the way in which consumers interact with health systems. Using the Internet, people can assess their health, manage a chronic condition, make choices about treatments and consult a health provider from home. The number of health-related websites is believed to considerably exceed the 19,000 health sites indexed on Yahoo! In May 2001 (Eng, 2001). Regardless of the quality of information provided, eHealth is now a feature of health provision and is accessed by both health providers and health consumers. Driven primarily by for-profit companies who provide products, it is increasingly being adopted by mainstream health providers as part of their overall delivery of care.

The health sector ... is more appropriately conceptualised as a knowledge economy in which fundamental changes are taking place in the location and possession of expert knowledge....

Knowledge is no longer located in health 'experts', if it ever was. People get information from pharmacies, personal links to providers, social networks and the media. Users of health services are now better regarded as eclectic consumers of many different sources of information rather than as repositories of 'traditional' knowledge or skills (Standing & Bloom, 2002: 3).

The 'digital divide' (that is, inequitable access to ICTs) acts to separate consumers in terms of their ability to be informed about health and this represents a significant equity gap. Being informed about health issues and health services plays a key role in preventive and health-promoting behaviours, and in obtaining desired outcomes from health services. Kickbusch (2001) has identified 'the three divides: health, education, and digital', noting the compounding impact of education and general literacy on population health. She argues for

the specific identification of 'health literacy' as a gateway to positive health outcomes, and proposes a set of indicators to quantify this. The 'health literacy index' would provide a composite measure of health promotion and prevention outcomes for individual countries. 'Health literacy' has been defined as the ability to '... read, understand, and act on health care information' (Centre for Health Care Strategies Inc: 2000, cited by Kickbusch, 2001) and is of increasing importance to consumers.

2.2.2 Consumer-driven change

Changing consumer expectations and behaviours also play a role in the evolution of the health system. The key influence of lifestyle on health is changing common understanding of health and its vulnerability to different environmental and social determinants. Consequently, 'patients' are becoming 'consumers' seeking to be healthy by accessing a range of products and services within the traditional health sector and in new and emerging health care provision.

There are also more providers entering the health 'market' as consumers seek to prevent disease and maintain health. Many of these newer providers cross a number of sectors – for example, health tourism and health-promoting recreation and leisure. The situation has been compared to that of the Internet sector prior to the 'dot com' boom (Sigrist, date unknown: 2).

"... health is becoming something that can be made, and so can be bought and sold like a consumer product. Patients are becoming self confident consumers who want to see not only their illnesses cured but also their aspirations satisfied (Sigrist, date unknown: 2).

2.2.3 The complementary health sector

'Complementary' health services include a diverse range of health-related therapies and products that are considered to be outside of traditional or mainstream health care, and this is evident in their exclusion from the Medicare and Pharmaceutical Benefits payment schemes (but most are recognised in private health insurance schemes). Although it would appear that Australia has a health system divided into parallel streams of conventional and complementary treatments and learnings, a degree of convergence is becoming increasingly evident (NHMRC, 2006: 3).

The complementary health sector is a growing and significant component of the Australian health system. However, it is difficult to quantify. The Australian Bureau of Statistics does not recognise a separate complementary medicines sector when compiling market data, with information being contained within a number of categories such as, food, pharmaceutical and cosmetics sectors. Many complementary health companies are privately owned, and there is no single representative body that collects industry data. Nevertheless, the following information has been provided about the sector –

- o the consumer healthcare product sector of the Australian medicines manufacturing industry has domestic sales of approximately \$1.5 billion per annum;
- o pharmacy sales of dietary supplements were estimated to have increased by 10.4% in the 12 months to December 2002; (Expert Committee on Complementary Medicines in the Health System, 2003: 37).
- o It has been estimated that nearly 60% of Australians use some form of complementary healthcare (NSW Health, 2002: 1).

- o More than \$2 billion per year is estimated to be spent on complementary medicines and other products, and this is expected to increase as more consumers regard complementary healthcare as playing a key role in their personal health and wellbeing (NHMRC, 2006: 2; NSW Health, 2002: 11).
- o Nearly 75% of Australian adults use at least one complementary health product, and 25% use complementary medicine services (NHMRC, 2006: 2).

South Australian research (MacLennan, Myers & Taylor: 2006; Zue, Zhang, Lin & Story: 2006) has provided some indication of the usage of complementary and alternative medicine (CAM) in this State. MacLennan *et al* (2006: 30) collected data via the *Health Omnibus Survey*¹ and found that in 2004, 52.2% of the South Australian population used CAMs and 26.5% visited CAM therapists. Self-prescribed vitamins were the most frequently used products, followed by herbal medicines, and these were taken because consumers believed they were good for their general health.

Extrapolating to the national level, the overall expenditure on complementary medicines had decreased from \$2.3 billion in 2000 to \$1.8 billion in 2004 – with this decline being attributed to the Pan Pharmaceutical crisis. It had been estimated that this company manufactured some 40% of CAMs on the Australian market. At the same time, there had been little change in the number of consumers of CAMs and it was concluded that they were using less products. However, a steady increase was found in the use of CAM therapists over the previous ten years, with chiropractors having the highest usage rates, followed by naturopaths, then acupuncturists (2006: 30).

The significance of the sector became increasingly apparent following the establishment by the Australian Government of the *Expert Committee on Complementary Medicines in the Health System*. This was prompted by the suspension of Pan Pharmaceuticals in April 2003 when consumer safety issues were evident, and most of the Committee's recommendations have been accepted. One of their key recommendations was that government play a more active role in ensuring that consumers can access reliable information to support informed health decisions (Expert Committee on Complementary Medicines in the Health System, 2003: 22).

2.2.4 The evolving health sector workforce

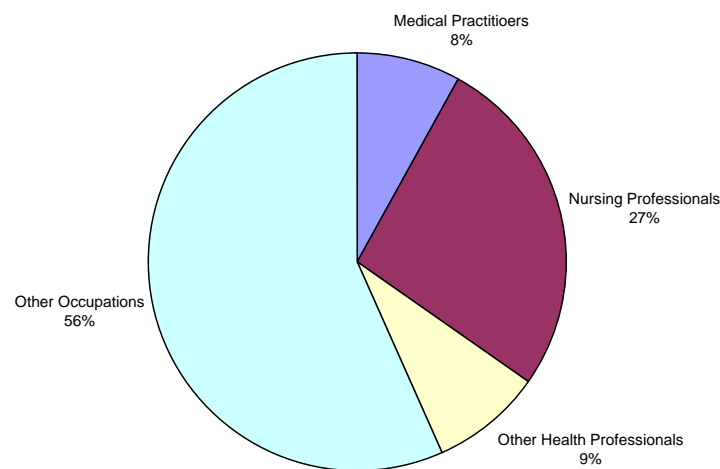
The Australian health sector is highly labour intensive, providing more than 700,000 jobs with continuing growth in evidence (Productivity Commission, 2005: 10). The health workforce involves some 450,000 health professionals of whom over 50% are nurses, 12% are medical professionals and 9% are allied health professionals. A further 200,000 are employed as administrative and service workers, and there is a sizeable volunteer workforce whose contribution is essential to the continuing function of the sector. There are shortages in workforce supply, yet the workforce has grown by over 11% between 1996 and 2001, nearly double the 6% growth rate of the population (Productivity Commission, 2005: 10). *Refer to Section 4.2 for further discussion of the health sector workforce.*

The Australian health workforce is also extremely diverse, ranging from family caregivers receiving government income support for this role, to workers with low level formal qualifications working in home based settings, to highly qualified specialists working in technology-intensive hospital environments. Most health care services require a range of labour inputs and some require a wide range of skills and experience. The composition of the workforce is not uniform across jurisdictions (AHWAC, 2005: 5).

¹ An annual survey undertaken in South Australia with a large representative population

The workforce has evolved in response to changing health care needs, and will continue to do so. Projected demand, based on increasing 'lifestyle' health problems (eg diabetes II, obesity) and an ageing population (eg dementia and chronic conditions), will see the health workforce responding to a changed mix of disease burden. It will also evolve as technological change affects health care treatment and spending, and as the population's expectations for timely and quality health care increases with rising incomes (Productivity Commission, 2005: xvii). The Productivity Commission notes the need for health system data to be designed to measure the productivity of the Australian health workforce and the health system itself (Productivity Commission, 2005: 26).

Number of Persons Working in the Health Sector 2001



n=557,662

Source : S Duckett (2004) The Australian Health System. 2nd Edition. Oxford University Press, Australia. Cites unpublished ABS data.

There is significant diversity in the number and type of complementary health care practitioners, which includes those trained outside of conventional health professions as well as those, increasingly, who were trained in traditional fields but either incorporate complementary treatments into their own services or seek to be sufficiently informed to manage the needs of clients seeking services in both sectors. However, it is difficult to obtain reliable data on the composition of the complementary health workforce and it is difficult to obtain comprehensive information on their representative organisations (Expert Committee on Complementary Medicines in the Health System, 2003; 12, 123). Rough estimates have identified approximately 4,700 complementary healthcare practitioners in Australia (1996 Census of Population and Housing) while another survey undertaken in 2003 identified 1,750 herbalists and naturopaths providing 1.9 million consultations annually (cited in Expert Committee on Complementary Medicines in the Health System, 2003; 122).

There is a lack of reliable data on the qualifications of the complementary health workforce. A 2002 survey undertaken by the Australian Natural Therapists Association found that 20% of its members had a Bachelors or Masters degree in complementary medicine, and 71% held a Diploma or Advanced Diploma – indicating that most education and training is undertaken in the vocational education and training (VET) sector. In addition, national

training packages for some complementary medicines have been developed within the VET sector (Expert Committee on Complementary Medicines in the Health System, 2003; 126).

Many of the training programs for traditional health professions are incorporating complementary medicine and therapies into their undergraduate and in-service curricula. The Australian Medical Association and the Australian Medical Council have both identified the growing use of complementary treatments and the need for medical graduates to have an understanding of these, and postgraduate courses in complementary medicines and therapies for medical practitioners are becoming increasingly available at Australian tertiary institutions. A similar integrative trend is evident in nursing and in pharmacy. Given the high proportion of community pharmacists who provide complementary medicines and products, the Pharmaceutical Society of Australia has adopted the policy of requiring those pharmacists to provide information and advice to consumers in the same way as occurs with prescription medicines, and complementary medicine is a component of the Society's professional education provision (Expert Committee on Complementary Medicines in the Health System, 2003; 124-125).

2.3 Approaches to defining the 'health sector'

2.3.1 Definitions

The literature yields a number of definitions of the health system that, taken together, are useful in understanding what is meant by the Australian health sector in terms of roles and functions. Examples appear in the box below.

"The people, institutions and resources, arranged together in accordance with established policies, to improve the health of the population they service, while responding to people's legitimate expectations and protecting them against the cost of ill-health through a variety of activities whose primary intent is to improve health.... Health systems fulfil three main functions: health care delivery, fair treatment to all, and meeting non health expectations of the population. These functions are performed in the pursuit of three goals: health, responsiveness and fair financing." (www.emro.who.int/mei/Healthsystemsglossary.htm)

"The health sector consists of organized public and private health services (including health promotion, disease prevention, diagnostic, treatment and care services), the policies and activities of health departments and ministries, health related non-government organisations and community groups and professional associations." (www.health.nsw.gov.au/public-health/health-promotion/aboutp/glossary3.html)

Less clear, are the **boundaries** of that sector. To a large extent, much depends on the **purpose** of the intervention. For example, policies and programs designed to promote health can traverse a range of activities, while those focused on the delivery of acute care will have more narrowly determined boundaries. The Australian Institute of Health and Welfare notes that the multiple range of influences on health mean that the health sector must work collaboratively with other sectors and that other sectors need to take into account the possible health impact of their decisions (AIHW, 2000: 5).

The health care sector can also be distinguished by '**primary**' and '**secondary**' **health care markets**. The primary market has been defined as comprising all services covered by statutory health insurance companies (and is financed by taxes and national health

insurance contributions) while the secondary market involves private consumption (and is financed by the general cost of living and individual demand for specific services and products) (Henke: date unknown).

2.3.2 Funding and regulatory arrangements supporting the health sector

The funding and regulation of the health sector in Australia reflects the complexity of the sector itself. In brief, State and Territory governments are primarily responsible for the management and delivery of healthcare (including public health) and for the regulation of health professionals. The Commonwealth funds most medical services provided out of hospitals and most health research. The Commonwealth, State and Territory governments jointly fund public hospitals and community care for older people and people with a disability (AIHW, 2000: 7).

The funding of health care in Australia involves a complex interrelationship between the public and private sectors, and although there has been more private sector involvement (for example, through publicly funded and contracted delivery of services by the private sector), the public sector has the main share of funding responsibility (DoHA, 1999: 1; AHWAC, 2005: 22). Despite the high proportion of government funding and provision compared with many other industries, the private proportion of total health care expenditure is higher than in most other OECD countries and the public-private balance varies significantly from one sector of the health industry to another (AHWAC, 2005: 22).

The health system is regulated in various ways. Private hospitals are licensed by State and Territory governments. Medical practitioners and other health professionals are registered for practice in each State and Territory. The Commonwealth's regulatory roles include overseeing safety and quality issues in relation to pharmaceutical and therapeutic goods and appliances, and regulating the private health insurance industry (AIHW, 2000: 8).

Apart from statutory regulation the second approach involves self-regulation and this is usually associated with the complementary health sector with few of its practitioners being regulated under State and Territory legislation. The *Therapeutic Goods Act 1989* provides a national framework for the regulation of therapeutic goods in Australia, and the Australian Register of Therapeutic Goods maintains a database which identifies some 16,000 complementary medicines (Expert Committee on Complementary Medicines in the Health System, 2003: 12).

The growth of the complementary health sector is recognised in Australian government regulatory initiatives. These include the establishment in 1999 of the Office of Complementary Medicine in the Therapeutic Goods Administration and of the Complementary Healthcare Consultative Forum. The Australian Government also provided funding in 2002 to assist five complementary healthcare professional associations to form national professional registration systems for acupuncture, naturopathy and herbal medicine practitioners. In response to a Productivity Commission enquiry the fragmentation of health profession regulation was acknowledged by the Council of Australian Governments when its July 2006 Communiqué established a single national cross profession registration board and a single national cross professional accreditation body.

Australian government funding is based on three arrangements that have become central to Australia's health care system. This involves two national and universal subsidy schemes that subsidise payments for medical services and a high proportion of prescription medications purchased from pharmacies, as well as a share of hospital care –

- 1 **Medicare (MBS)**
- 2 **Pharmaceutical Benefits Scheme (PBS).**
- 3 Australian and State and Territory governments jointly fund **hospital services** so that they are provided free of charge to patients (AIHW, 2000: 7).

The Australian government allocates funding to the States and Territories, private and non-government service providers and private health insurers in the form of –

- ⇒ Grants to the States and Territories under the Australian Health Care Agreements and other specific purpose payments.
- ⇒ Subsidies for the delivery of medical services under the Medical Benefits Schedule (MBS).
- ⇒ Subsidies for pharmaceuticals under the PBS.
- ⇒ Direct grants to non-government organisations for the provision of health care.
- ⇒ Public Health Outcome Funding Agreements (PHOFA) to States and Territories to undertake particular public health activities.
- ⇒ Rebates to help offset the cost of purchasing private health insurance (NHPC, 2004: 9-11).

Australian governments fund 68% of expenditure (some \$53 billion), with the rest funded by patient contributions (\$15.9 billion), private health insurers (\$5.6 billion) and others -such as, compulsory motor vehicle, third party and workers' compensation insurers (\$3.6 billion).

- o The Australian government's contribution includes direct expenditure on health programs such as, Medicare, the Pharmaceuticals Benefits Scheme, residential aged care, and programs designed to improve access to health services in particular locations, for example, rural and remote or for particular groups, for example, Indigenous Australians.
- o State and Territory governments' expenditures fund the public hospital system (in combination with assistance from the Australian Government), and a range of community-based and other health care services.
- o Private health insurance provides most of the funding for private hospitals and for private patients in public hospitals. This involves health insurance organisations making payments for hospital care, and individuals making payments for the premiums that provide this insurance.
- o In terms of 'traditional' health services (that is, those at recognised by the MBS or PBS) out of pocket expenditure by individuals is mainly spent on pharmaceuticals, services, aids and equipment, dental and some medical services (Productivity Commission, 2005: 155, citing Australian Institute of Health and Welfare 2004 data). Individuals also make payments for health insurance that provides for private hospital services, a range of allied health services, and in some cases, ambulance services.

This analysis does not take into account the significant expenditure on complementary or "alternative" health providers and products – a significant industry in its own right – and illustrates the difficulty in defining the industry and the large number of players once analysis extends beyond 'traditional' health provision.

The private and non-government sector provides some 60% of health services and is also a major funder through private health insurance, workers' compensation, compulsory motor vehicle third party insurance, pharmaceuticals, and individual out of pocket expenses

(NHPC, 2004: 9; DoHA, 1999: 12). In addition, health funds have become increasingly involved in providing products and services (through ancillary benefits cover) that have a preventive health focus. These include health promotion activities (for example, fitness, nutrition), early detection and intervention programs, and disease management programs (eg asthma management, arthritis management) (DoHA, 2001: 33). Private health funds also provide cover for a range of complementary health services, including chiropractor, osteopathy, acupuncture and naturopathy.

2.3.3 Service provision

Type of service

The health sector can also be defined by distinguishing between **treatment** services and health **promotion and prevention** activities and services. Health promotion and prevention are part of a group of activities generally referred to as 'public health' or 'population health'. These include population screening (eg for breast or bowel cancer), mass immunisation, water fluoridation, food inspection, quarantine, communicable disease control and surveillance, mental health promotion, consumer product safety, and health promoting communications. Population health interventions are characterised by their three part focus on –

- (i) prevention, promotion and protection - as against treatment
- (ii) population groups - rather than the individual and
- (iii) factors that affect health and the causes of illness (AIHW, 2000: 306).

Public health services are provided at all three levels of government in Australia and include activities to ensure food quality, immunization services and other communicable diseases control, public health education campaigns, environmental monitoring and control, and screening programs for diseases such as breast cancer. Public, occupational and environmental health interventions are delivered in many ways including through information in the media, regulation, improved water sewerage and transport infrastructure, and infectious disease identification and containment programs (AIHW, 2000: 232). **This highlights the fact that not all health-related services occur within the health system itself.**

Accessing health services

Consumers' initial point of contact with the (traditional) health system is usually a general practitioner (GP) who can refer them to specialist medical practitioners, other health professionals, hospitals or community-based health care organisations for specialized care (AIHW, 2000: 7-8). Pharmacies and hospital emergency department admission provide additional key points of entry. Dentists and other private sector health professionals are also part of the health system and their costs are met by the patients themselves (unless they are accessing publicly funded services of this nature) or with the support of private health insurance.

There is no single or usual point of entry for consumers accessing complementary health services, and the development of information and community technologies has seen an increasing trend for consumers to seek health-related information through the Internet. The power of such information cannot be under-estimated.

Health service settings

The delivery of health services can occur in a range of **settings** including hospitals, community health centres, GPs' rooms, health clinics, aged care services, hospices, rehabilitation centres, community centres, ambulatory care services, health professionals' rooms, the workplace or home. Increasingly, telemedicine services are being used to access health services and information, particularly in remote locations.

Increasingly, a number of hospital treatment services can be provided in the consumer's home or in an aged care facility. In South Australia, several programs have been developed for this purpose. For example, *MetroHomeLink* provides a range of services in the home that have traditionally been provided in hospital settings, while *Advanced Care in Residential Living* provides these services in residential aged care settings. These programs are designed to avoid hospital admissions, or to reduce length of stay in hospital when a patient admission is required. Programs of this nature tend to blur the health system's delivery boundaries, and reflect the aim to contain rising acute care costs and to provide care in non-institutional settings.

In the past two decades or so, there has been a movement away from institution-based aged care, disability and mental health services and towards care in the home and community. The demographic trend to an ageing of Australia's population, combined with the need for resource efficiencies in relation to hospital beds and residential aged care places, has brought increased pressure at the boundaries of the health and aged care sectors. At the same time, the significant and growing expansion of the community care system means that this sector is playing an increasingly central role in delivering health care, and reducing pressure on the residential care system. It is therefore important to consider the **interface** between the health and community care sectors when determining the boundaries of both.

Agencies supporting the health system

The health service system is supported by many other agencies. These include –

- ⇒ Research and statistical agencies providing information for prevention, detection, diagnosis, treatment, care and policy development.
- ⇒ Manufacturers of medical products and equipment.
- ⇒ Consumer and advocacy organisations who contribute to policy development and evaluation.
- ⇒ Professional associations for medical and health practitioners and others who assist in setting professional standards, clinical guidelines, service design and policy.
- ⇒ Universities and hospitals who provide training for health professionals.
- ⇒ Voluntary agencies whose various roles include fund raising, health and education programs and coordination of voluntary care.

Although not defined as part of the health system, many other government and non-government organisations play a role because of their influence on health and the health system. Examples include the food industry, the media and transport and environment agencies (AIHW, 2000: 8).

2.3.4 Definition by industry sector and occupational group

The Australian health system can also be understood in terms of the different **industries** that are involved in meeting health-related needs. The Australian Bureau of Statistics (ABS) defines the different industries on the basis of the *Australian and New Zealand Standard Industrial Classification* (ANZSIC). This was developed for use in both countries in the production and analysis of industry statistics.

Attachment I summarises the industry sub-divisions that relate to health care, beginning with those that are directly involved in health care provision and moving to those that support the health care system.

It is also possible to identify **occupations** through use of the *Australian and New Zealand Standard Classification of Occupations* (ANZSCO) which reflect the predominant skill levels applying to each group and excludes skill levels that apply to only a few occupations in each group.

Attachments II and III provide information about health care related occupations by industry.

3 THE RELATIONSHIP BETWEEN HEALTH AND THE ECONOMY

Numerous research studies have identified that health needs to be seen as one of several key determinants of economic development, rather than as a by-product of economic development, although the health-economy relationship is two-way rather than one-way in its influence. The European Communities major international review of evidence identified health (measured as life expectancy or adult mortality) as being –

... a very robust and sizeable predictor of subsequent economic growth in virtually all studies that explored the issue in explaining differences in growth between rich and poor countries. (Suhrcke et al, 2005: 63).

3.1 Health as human capital

There is a substantial body of research that recognises human capital as a key contributor to economic growth and wealth. Health and education are both regarded as key contributing factors to human capital, and human capital is recognised as a key determinant of individual labour market outcomes because of its positive association with workers' productivity (Laplagne *et al*, 2007: xiii). However, it is only recently that health has been more widely recognised as also playing this role, in contrast to education which has long been accepted as enhancing productivity (Suhrcke *et al*, 2005: 16, 19).

The role of health as an important component of human capital had been introduced by Grossman (1972) who distinguished between health as a consumption good (valued by individuals because it enables well-being) and as a capital good (valued because it enables individual participation in work and leisure). The European Union undertook a major study demonstrating the relationship between health and the economy that reviewed all of the available evidence for both developed and under-developed countries. Its authors describe health in human capital terms –

*Individuals inherit an initial stock of health that depreciates with time, but they can invest to maintain and increase this stock.... The demand for healthcare is therefore a derived demand for health
Since human capital matters for economic outcomes and since health is an important component of human capital, health also matters for economic outcomes. At the same time, economic outcomes matter for health (Suhrcke et al, 2005: 20).*

Human capital theory draws an association between productivity, and higher earnings. Good health in childhood enhances cognitive function and school participation and achievement. Healthier people with a long life expectation are seen to have greater incentive to invest in education and training. It is also presumed that savings increase with the prospect of a longer and healthier life, including in planning for retirement. However, there are few research studies in higher income countries to confirm this. (Suhrcke *et al*, 2005: 11-13).

The positive correlation between health and income involves a causal link that runs in two directions – from income to health and from health to income. Higher income provides access to goods and services that promote better health and to quality health care, while better health has been found to increase income because it enables higher levels of labour force participation, enhances the incentive to invest in education and skill development, and thus increases national productivity. The reverse also holds true – with poor health being

linked to low income levels and low income being related to poor health (Bloom & Canning, 2000: 1207; Bloom, Canning & Jamison, 2004: 11-13).

Although the literature identifies a two-way relationship between health and labour force participation, there is no consensus about the direction of the influence of labour status on health (Laplagne *et al*, 2007: 10). Each or both can be influenced by common third factors, as explained by the European Commission study -

*The most common hypothesis in the literature is that due to boredom, a general lack of activity, and a low self-esteem, health deteriorates in individuals that exit the labour market. Yet it could also be argued that bad working conditions or work-related stress cause deterioration in health.... As a result ... the impact of health on labour force participation could therefore be underestimated or overestimated, depending on whether working has a negative or a positive effect on health (Suhrcke *et al*, 2005: 55).*

Health has been conceptualised as contributing to economic outcomes (for individuals and for nations) in high income countries through four main channels –

- o **Higher productivity** – healthier people can be expected to produce more (physically and mentally) in terms of hours worked, and to be able to make better use of equipment, machinery and technology.
- o **Higher labour supply** – good health reduces the number of days lost to illness and increases the days available for work or for leisure. If good health raises life expectancy, individual need for lifetime consumption increases, leading to a higher labour supply. However, being healthy may also enable higher lifetime earnings, and therefore, an earlier withdrawal from the labour force. Consequently, the effect of health on labour supply can be both positive and negative, but is usually regarded as positive.
- o **Higher skills due to greater participation in education and training** – more educated people are considered to be more productive, and obtain higher earnings. Children with better health and nutrition tend to achieve higher educational attainment, to have less health-related school absenteeism, and less likelihood of early drop-out. If good health links to higher life expectancy, it is assumed that healthier people have a greater incentive to invest in education and training.
- o **More savings available for investment in physical and intellectual capital** – people in good health are likely to have longer life expectation and an accompanying higher savings ratio compared with those in poor health. This is seen to link to a higher likelihood of investing in physical or intellectual capital (Bloom *et al*: 2001; Suhrcke *et al*, 2005: 21 - 23).

3.1.1 Health and education

A large number of studies have found evidence of a strong and positive correlation between adult health and education (Freedman and Martin: 1999; Suhrcke *et al*, 2005: 57). As with the health-work relationship, the relationship between health and education is two-way. Grossman (1972) had identified the role of education in producing health-related and other goods, and many earlier studies had focused on education's role in enhancing health outcomes (Suhrcke *et al*, 2005: 57). However, more recent studies have explored the role played by health in relation to educational outcomes.

For example, Case *et al* (2004) found that British children with poor health had significantly lower educational attainment. Using panel data from the 1958 National Child Development Study which followed all children born in Great Britain born in the first week of March 1958 until they reached the age of 42, and sought information at six intervals of time. Lower educational attainment was found for those with low birth weight, with mothers who smoked during pregnancy, with lower than average height at the age of 16, and with physician-assessed chronic health conditions observed at ages 7 and 16. Using the same data set, Gregg and Machin (1998) found that school attendance was lower for those who had been ill, and that having minor or serious ailments in the last school year reduced the probability of continuing at school after the compulsory school leaving age.

The Australian Productivity Commission has undertaken research to quantify the increase in labour force participation that can be expected from meeting targets for illness reduction and educational improvement (Productivity Commission: 2006). A more recent report, designed to increase understanding about the effects of health and education on labour force participation, used an integrated model of labour force participation that estimated different effects in a consistent framework (Laplagne *et al*, 2007: xiv). The authors offered these cautions in interpreting research on the role of health and education on productivity:

- o health and education are 'imperfect proxies' for human capital because not all indicators will be true for all people;
- o some elements of human capital are not readily observed – for example, motivation;
- o quality of individual health may be a consequence as well as a cause of participation in work;
- o self-assessed health, a key indicator of health, may be prone to bias.

The Productivity Commission (Laplagne *et al*, 2007: xv) applied three models of labour force participation using data from the Household Income and Labour Dynamics in Australia (HILDA) survey for 2001-2004, and undertook a comparative analysis across a number of dimensions, including health and education. Measurement of the impact of changes in the variables of health and education was based on –

- (a) the onset of one of six health conditions – cancer, cardiovascular disease, mental illness, major injury, diabetes and arthritis;
- (b) changes in a person's educational attainment from Year 11 or lower to either Year 12, diploma or certificate, or university degree or higher.

A positive association was confirmed between better health and greater involvement in the labour force. With all three models, a lasting mental health condition emerged as the pre-eminent health reason for reduced labour force participation, for both men and women (Laplagne *et al*, 2007: 9-10). The second highest factor was diabetes, followed by major injury (see Section 3.2, *Figure 5* for details). Labour force participation was found to vary within age groups by level of education, increasing as the level of education rises. Having a degree or higher emerged as the major education factor that increased the probability of being in the labour force, especially for women (Laplagne *et al*, 2007: 14-15).

The findings also confirmed a health-education relationship. Previous research (eg Arendt: 2005), has indicated that education seems to be positively related to health, and numerous explanations of how this occurs have been proposed by a number of researchers. The Productivity Commission summarised those assumptions as involving –

- o those with higher levels of education being more likely to engage in positive health behaviours and reduced negative behaviours, such as, smoking;

- o increased financial returns from higher education levels facilitate greater access and willingness to use health services;
- o healthier working environments are associated with occupations associated with higher education levels;
- o higher education leads to the development of social skills and networks that reduce the mental health issues associated with social isolation;
- o a health problem may limit the ability to acquire education, leading to adverse labour market outcomes (Laplagne *et al*, 2007: 19-20).

The ... results ... suggest that better education leads to a better overall self-assessed health status, which in turn, leads to higher labour force participation (Laplagne et al, 2007: xvii).

3.2 The negative economic impact of ill-health

In the literature reviewed, the impact of health was more frequently measured by analysing the economic consequences of ill-health than of good health. There are numerous *cost of illness* studies in high income countries and these have measured the quantity of (financial) resources used to treat disease and the size of the negative economic consequences (in terms of lost productivity) brought by illness.

Cost of illness studies estimate the financial resources needed to treat a disease and the lost productivity of illness, and in measuring the economic burden of ill health, demonstrate the substantial impact for the economy. These studies separate the costs of illness into three groups –

- o *Direct* costs affecting the health sector for prevention, diagnosis and treatment of disease.
- o *Indirect* costs that measure lost productivity of people who are too ill to work or who die prematurely (in other words, a human capital analysis).
- o *Intangible* costs that seek to identify the psychological dimensions of illness (eg pain, loss, anxiety) to the person concerned and their family. This is the most difficult to cost to measure (Suhrcke *et al*, 2005: 29).

Several studies have found that poor health has a negative impact on wages and earnings (Suhrcke *et al*, 2005: 39 – 42; Bloom, Canning & Jamison, 2004: 12-15) and on labour force participation (Suhrcke *et al*, 2005: 45 - 48). For example, a study based on Irish data found that the probability of labour force participation was 61% lower for men and 52% lower for women with a chronic illness or a severe disability compared with those without such a condition, after controlling for differences in age, education and marital status (Gannon & Nolan: 2003). People with a long standing illness were found to have a higher probability of being unemployed and economically inactive, based on data from the Swedish Surveys of Living Conditions which involved interviewing a sample twice with an eight year interval (Lindholm *et al*: 2001).

Researchers have also identified that physiological proxies for health (such as, height or body mass index) have a significant impact on earnings and wages. Height (linked to nutrition) tends to affect labour market outcomes positively while a higher body mass index (linked to overweight and obesity) appears to depress wages and earnings, more for women than for men. However, it is difficult to separate physiological from social factors (eg stigma in the case of obesity, affecting perceived employability) in establishing causality.

Lower life expectancy has been found to discourage participation in education and training, and unchecked communicable diseases damage the development of industry and hence reduce economic performance. Countries with weak health and education systems find it more difficult to achieve sustained economic growth (OECD Observer: 2004).

A number of studies have measured both the direct and indirect costs of these five illnesses that are of critical importance to the economies of developed countries, including Australia:

- o **Cardiovascular disease.** This emerges as the most costly disease of those for which measurement has been applied (Suhrcke *et al*, 2005: 31). For example, the economic burden arising from coronary heart disease in the United Kingdom was found to have cost the National Health Service in 1999 EUR 2.5 billion, plus EUR 3.5 billion in informal care, and EUR 4.2 billion in lost productivity. This equated to almost **11%** of total national health expenditure for that year (Liu *et al*: 2002). Using panel regressions for the period 1960 – 2000 for 26 high income countries, the cardiovascular disease (CVD) mortality of the working age population was found to be a robust predictor of subsequent economic growth. A reduction of CVD mortality at working age of **10%** was associated with an increase in the growth rate of per capita GDP by **1 percentage point** (Suhrcke & Urban: 2005).
- o **Mental illness.** Mental and addictive disorders are usually recurring and chronic illnesses whose onset often occurs in later adolescence to early adulthood – in other words, during peak years of human capital development and peak earning years. This stands in contrast to many other disability-related conditions that occur later in life. Mental illness has been found to make a major contribution to the overall burden of disease in high income countries (Suhrcke *et al*, 2005: 32 – citing Ezzati *et al*: 2004). It has been found to reduce earnings initially by as much as **24%** and its negative effects can continue for as long as 15 years after diagnosis (Bartel & Taubman: 1986).
- o **Obesity.** The National Audit Office estimated that obesity in England accounted for 18 million days of sickness and 30,000 premature deaths in 1998, and involved a cost to the National Health Service of EUR 715 million to treat obesity. Costs to the economy in terms of lost productivity were estimated to involve a further EUR 2.8 billion each year (Suhrcke *et al*, 2005: 34).
- o **Diabetes.** The International Diabetes Federation estimated the annual worldwide healthcare costs of diabetes to be at least EUR 127 billion and possibly as much as EUR 238 billion. Diabetes incurs costs for the illness itself and for its role in other diseases, such as, renal failure, blindness and ischaemic heart disease. The proportion of health care budgets in 2025 allocated to diabetes has been estimated to be between 7% and 13%, with estimates of indirect costs being at least as high, if not higher, than direct costs (Suhrcke *et al*, 2005: 35).
- o **Tobacco.** The cost of tobacco-related disease is very high in developed countries and is one of the leading causes of premature death and disability. Combined direct and indirect costs of smoking in the European Union have been estimated to involve EUR 97.7 billion to 130.3 billion in 2000. Smoking plays a key role in lost productivity due to sickness absence and smoking breaks. Broader costs attributed to smoking include 20% of all garbage in the USA involving cigarette butts and the annual cost of fires caused by smoking estimated to be USD 27 billion (EUR 20 million) (Suhrcke *et al*, 2005: 36).

The Australian Institute of Health and Welfare (2000: 248-251) has analysed direct health system costs of injury and disease in Australia for 1993-94 based on definitions of injury and disease according to the International Classification of Diseases, and found that the six disease groups accounting for the most health expenditure in Australia were those summarised in *Table 1* below.

Table 1: Cost of six major illnesses in Australia

Disease	Cost (\$ billion)	% of total health system costs
Cardiovascular	3.7	11.8
Digestive system (includes dental)	3.7	11.8
Mental	3.0	9.6
Musculoskeletal	3.0	9.6
Injury and poisoning	2.6	8.3
Respiratory	2.5	8.0

SOURCE: AIHW: 2000

As *Table 2* indicates, all of the conditions studied by the Productivity Commission (cancer, cardiovascular disease, mental illness, major injury, diabetes and arthritis) will reduce the probability of labour force participation, and having more than one condition further reduces participation. Overall, the labour force participation rate for people with two or more health conditions was found to be 52.5% compared with the 75.1% rate for people with one condition (Laplagne *et al*, 2007: 10).

Table 2: Australian labour force participation rates by health condition, 2001–2004

Condition	Cancer	Cardiovascular	Mental	Major injury	Diabetes	Arthritis
	%	%	%	%	%	%
Does not have condition	80.3	82.0	80.7	80.2	80.7	82.6
Has condition	68.6	64.0	39.3	60.1	56.6	63.1

SOURCE: Productivity Commission, Laplagne *et al*, 2007, Table 2.1, page 9

Research by Lechner and Vazquez-Alvarez (2004) used data from the German Socio-Economic Panel and found that becoming disabled involved a significantly lower probability (up to 9.6% lower) of being employed. Economic modelling by Dockery *et al* (2001) sought to estimate the potential net gain from increasing the participation of people with a disability in the Australian vocational education and training (VET) system. This was based on the assumption that differences exist in earnings and costs (related training and workplace accommodation) for VET qualified and unqualified people with disabilities.

The researchers undertook their analysis in relation to two scenarios based on ABS data for 1998 that indicated that a) 16.7 % of working age Australians had a disability and b) people with disabilities comprised only 3.6% of the VET student population. If people with disabilities had the same age-specific participation rates in VET as the wider population, they would comprise 12.9% of the VET population. Based on these two scenarios, and

using indicative cost estimates for training and workplace accommodation and support, and basing the estimate of the earnings gain from completing a VET qualification on existing estimates for people without disabilities, Dockery *et al* found that these gains were possible:

- a) to achieve 12.9% representation in the VET population, the *gross* gain is estimated at \$3.7 billion, and the *net* gain at **\$2.5 billion**;
- b) to achieve equal overall representation (16.7%) within the VET population, the *gross* gain is estimated to be \$5.9 billion, and the *net* gain to be **\$4.1 billion**.

3.2.1 The impact of ill-health on early retirement

A large number of studies have found a significant relationship between ill health and the decision to retire from the labour force (Suhrcke *et al*, 2005: 49 - 51). For example, Bound *et al* (2003), using data from the US Health and Retirement Study, estimated that people in poor health are 10 times more likely than people in average health to retire before becoming eligible for pension benefits. Regression analysis undertaken by Siddiqui (1997), using data from the German Socio Economic Panel found that being disabled or having a chronic illness significantly increased the probability of early retirement. Deterioration in health was found to be an important predictor of retirement in Great Britain, based on data from the British Household Panel Survey 1991 - 1998 (Disney *et al*: 2003).

Ill health has been found to affect the person affected as well as other household members. Men appear to reduce their labour participation in response to wives' illness while the reverse applies to women who tend to increase their participation. This difference is likely to reflect gender-based patterns of participation in the labour force. The availability of health insurance also plays a key role in the response to a spouse's ill health (Suhrcke *et al*, 2005: 11-13).

3.3 Quantifying the relationship between good health and economic growth

A number of research studies have sought to quantify the relationship between health and the economy, using a number of variables to measure health, over time, and often across countries. These variables include life expectancy, height at adulthood, infant mortality rate, crude death rates, and investment in medical research. In terms of macroeconomic impact, historical research studies exploring the role of health over one or two centuries have identified that health plays a major part in the current economic strength of a country. That is, past health achievements have a long term effect on the economy (Suhrcke *et al*, 2005: 11-13; Bloom, Canning & Jamison, 2004: 10-11).

Historic studies of the role played by health in a given country over one or two centuries have demonstrated that a significant component of economic strength is directly linked to previous population health (Suhrcke *et al*, 2005: 62). For example, Fogel (1994) found that improvements in health and nutrition had accounted for some 30% of the United Kingdom's income growth, equating to approximately **1.15%** of annual per capita development in the 1780-1980 period. This finding was based on a historical time series study using life expectancy as the health proxy.

A number of studies have involved cross-country analysis to measure the health-economy relationship. Changes in health have been found to increase the pace of growth in 10 industrialised countries (including Australia) over the course of 100-125 years by **30% to 40%** (Arora: 2001). This cross country analysis used life expectancy at birth, and ages 5, 10, 15, 20 and height at adulthood as its proxies for health. Another cross-country analysis,

based on a 100 cross-country analysis over three periods between 1965 and 1990, found that a rise in **life expectancy** from 50 to 70 years (ie by 40%) raises the economic growth rate on impact by **1.4% per year** (Barro: 1999).

Other cross-country analyses over time have found a significant relationship between indicators of good health and economic growth. A study of 50 countries over the period 1965 to 1990, identified that improvements in health led to **11%** of income growth for the period, or **0.23% per year** (Jaminson *et al*: 2004). A cross country analysis of 84 countries found a strong and relatively robust relationship between health and income, based on life expectancy (Knowles & Owen: 1995). A statistically significant impact of health expenditures on economic growth and income levels was found from a cross-country analysis using life expectancy as the health proxy (Rivera & Currais: 1999).

A one year improvement in a population's life expectancy has been found to contribute an increase of **4%** in GDP. This finding was derived from analysis of panel data for 104 countries observed every ten years from 1960 to 1990, from GDP-Penn World Tables, from data on active labour force (ILO: 1997) and from life expectancy data (United Nations 1998) (Bloom *et al*: 2001, 2004). A panel cross country analysis for the period 1960-1995 found that a **1 percentage point** increase in adult survival rate (ASR) increases labour productivity by about **2.8%**, based on the indicators of life expectancy and adult survival rate (Bloom *et al*: 2001). Another study using four health variables (life expectancy, infant mortality rate, crude death rates and investment in medical research), and data examined over time from 1900, established a causal pathway from health to wealth (Brinkley: 2001).

3.3.1 Health care funding as an 'investment' rather than a 'cost'

Australian health care seems to deliver well, compared to other countries. Australians live longer than their counterparts in New Zealand, Canada, UK and the USA. Around 90% of these life years are lived without illness or disability which also compares favourably to other similar countries. Not only are these long, healthy lives achieved with relatively modest national spending on healthcare, the system appears to provide good access to services for low income groups, with a pro-poor bias in patterns of health service utilisation. ... yet increases in health care spending are seen as a problem rather than a source of economic growth (Hall: 2006a).

A major study by the World Health Organisation's Commission on Macroeconomics and Health (CMH: 2001) also found a strong economic case for investing in health. This study contributed significantly to a shift from valuing health as an outcome of economic development to understanding that health was one of several key determinants of poverty reduction and economic development. It found that investing in health in developing countries produced substantial economic benefits for people and for countries, and identified a number of cost-effective investments to save lives and produce economic growth (Suhrcke *et al*, 2005: 15, 26). However, it is also important to note that in developed countries like Australia, where population health and the economy are comparatively in much better condition, any additional investment can be expected to bring a lesser benefit than applies in less developed countries.

Part of the health investment process lies in preventive health and health promotion which involve early intervention rather than treatment in response to illness. The importance of primary health care has also been determined by researchers with evidence showing that primary care helps prevent illness and death (Starfield, Shi & Macinko: 2005). A time-series analysis (from 1970-1988) of primary care systems in 18 wealthy OECD countries found that strong primary health care systems were associated with improved population health

(Macinko, Starfield & Shi: 2003). **These findings underscore the importance of governments investing health dollars in health prevention, promotion and primary care services.**

3.3.2 Cost-effective healthcare expenditure

The health care investment is sustained by cost-effective expenditure, and this represents one of the largest challenges facing health sector managers. However, the European Commission review found few studies of cost-effectiveness to provide information on a broad range of interventions, with most focusing on the individual rather than the population as a whole. The authors note that the most comprehensive study assessing cost-effectiveness of a range of interventions, and over a number of regional settings, had been undertaken by the WHO-CHOICE (Choosing Interventions that are Cost Effective) project² (Suhrcke *et al*, 2005: 83).

They cite the success of Australian policy designed to reduce tobacco consumption and the positive impact this has had in terms of health benefits and reducing premature deaths from lung cancer, chronic obstructive pulmonary disease, and coronary heart disease. Also cited is the positive impact of policy encouraging women to have regular cervical screening and the cost per life saved which is estimated to involve some AUD \$30,000 (NHMRC: 1997). Other NHMRC data have identified that sustained campaigns to reduce road traffic injury and death have saved \$750 million AUD per year (Abelson: 2003; NHMRC: 1997).

Suhrcke *et al* note that there are few comparable analyses of preventive initiatives in Europe. They conclude that policy makers have good reason to invest in health in order to improve economic outcomes (2005: 84). Following their analysis of a wide number of studies focused on high income countries, the authors of the European Commission's study of the health-economy relationship drew these conclusions –

Taking the results at face value this suggests that (a) investing in health contributes to economic growth even in countries that presumably already have a high health status, and (b) investing in health is at the very least as important, if not more important, than investing in education (Suhrcke et al, 2005: 67).

The research reviewed ... supports the premise that improving the health status of a population can be beneficial for economic outcomes at the individual and the national level.... An immediate, if general, policy implication that derives from this conclusion is that policy-makers who are interested in improving economic outcomes ... would have good reasons to consider investment in health as one of their options by which to meet their economic objectives (Suhrcke et al, 2005: 73).

The OECD Health Project sought evidence to assist policy makers in promoting more value for money in the health sector while increasing the quality of care. A key finding from the Project was that investments in health, and the design of health financing strategies, need to reflect the interaction between health and the economy, and critical to this is the effectiveness of the health system.

Just as growth, income, investment and employment are a function of the performance ... of the economic system ... so health conditions (mortality, morbidity,

² The authors recommend that further information on this project be sought at <http://www.who.int/whosis/cea>

disability) depend not just on standards of living, but on the actual performance of health systems themselves (OECD Observer: 2004).

The OECD has identified that national income affects the development of health systems, through insurance coverage and public spending. The provision by governments of universal health care requires a strong fiscal base, and efficient fiscal systems can also support public health outcomes - for example, by increasing tobacco taxes and restricting smoking in public places (OECD Observer: 2004).

A local level study in Mississippi (Berry & Spurlock: 2002) explored the impact of the health sector on a rural economy, Pearl River County. The project was undertaken by a team of economists as part of a project called *Rural Health Works in Mississippi*. The authors note that in rural locations, the health care industry usually represents a proportionately larger share of the economy than in urban settings, and that its influence is often overlooked. Rural hospitals and associated health services are typically one of the largest employers, and their closure can bring both poor health and economic outcomes for the local population.

The project found that health care expenditure, in line with national trends in the USA, had more than doubled in the previous two decades and that health care services were a growing component of the State's economy. Average annual growth rate for health care services was greater than that for the total gross State product in the same period. These findings echoed those of similar research studies in other USA locations. Significant direct and indirect impacts on the local economy were found to have been generated by the provision to local residents (and possibly non-residents) of employment and income opportunities. In quantifying the impact of the health sector, the researchers found that –

- o The combined direct and indirect impact of the hospital component alone had been responsible for the employment of 3.7% of the county's total workforce and 2.1% of total earned personal income.
- o Adding other components of the health care sector to the hospital segment saw employment increase to 8.2% of the total county workforce being employed directly or indirectly because of the sector.
- o These caused personal income to increase to 4.3% of the county's total income, and indirect business taxes to increase to 4.0% of the county's total.

The authors drew this conclusion³ –

The results of research conducted on the Rural Health Works in Mississippi project quantify the importance of the health care sector in a rural economy. The economic viability of a community can depend on a strong and growing health care sector. The local health care sector can then be viewed as an economic development engine (Berry & Spurlock, 2002: 26).

3.3.3 Health expenditure and GDP

In their analysis of demand and supply factors underpinning the financing of health care systems, the European Commission identifies these demand-side factors –

- o The burden of diseases requiring treatment.

³ Additional reports for other counties in the State of Mississippi are at http://msucares.com/health/health/rh_economics.html

- o The extent to which care is provided informally – by family and friends.
- o The nature of community expectations – which are changing.
- o Cost-effectiveness issues, such as, population density against service location.

With regard to supply-side factors, the following are identified –

- o The cost of employing the healthcare workforce.
 - o The cost of pharmaceuticals and technology.
 - o The cost of capital, influenced by factors such as interest rates.
 - o The cost of research and development.
- (Suhrcke *et al*, 2005: 80).

In the European Union, the health sector accounts for some **7%** of GDP, which is larger than the contribution of the financial services sector, and of the retail trade sector (Suhrcke *et al*, 2005: 13).

A cross-country analysis of 19 OECD countries for the period 1971 and 1998 found that spending on health accounted for a much larger share of growth rates (between **16% and 27%**) than expenditures on education (around 3%) (Baraldo *et al*: 2005). The WHO Commission on Macroeconomics and Health found in a cross-country analysis involving 167 countries that while health expenditure is largely determined by national income, it increases at a rate faster than income (OECD Observer: 2004).

Expenditure on health can also be calculated in terms of expenditure per person which removes the complicating fact of GDP when comparing across countries. It is calculated allowing for different purchasing power per dollar in different countries. On this basis, Australia had the **fifth** highest per person expenditure on health services in 1997 (AIHW, 2006: 247).

Current expenditure on health care in Australia is **9.7% of GDP** and increasing (Productivity Commission, 2005: xiv). The ageing of the population, the increasing role of technology in health care, and increasing community expectations about health care, are expected to combine as demand factors that will see expenditure projected to involve some **16% of GDP** by 2044-45. Approximately 10% of this outlay will be provided by government (Productivity Commission, 2005: xviii). Annual real growth in health expenditure has averaged 4.8% in the last decade⁴, which far outstrips the 1.2% growth rate of the population (Productivity Commission, 2005: 10).

Increases in health expenditure can be attributed to several factors. Changes in behaviour that have brought increased ill health (for example, increased obesity and diabetes II levels) are one factor. Another is changes in medical technology which have resulted in annual per capita real growth in expenditure averaging some 1.9 points per year. Per capita real growth in expenditure can also be attributed to increased incomes, accounting for an average of some 1.5 points per year over the decade to 2002-2003. The fourth factor is population ageing.

3.3.4 The impact of population ageing on health sector expenditure

The ageing of Australia's population is often linked to increasing health costs. People with complex health needs, particularly those with chronic conditions or multiple health issues, require coordination of care from a number of different providers. The number of people in

⁴ The use of averages does not reflect the fact that growth rates are likely to be uneven.

this group is growing, partly because of ageing. To better meet their needs, and to maximise resource efficiencies, a number of new models of care have been piloted) and it is anticipated that the provision of care for complex and chronic health conditions will be a continuing challenge for the sector (AIHW, 2000: 317).

Current expenditure on those aged 65 and over is around 4 times more person than those under 65, rising to 6 to 9 times more for people over the age of 85. Rising healthcare costs are often attributed to the higher usage of services by older people. However, Australian Institute of Health and Welfare analysis indicates that ageing as a single variable adds **0.6%** to annual health sector expenditure, while changes in medical practice due to *technological innovation* add significantly to health costs – at an estimated rate of **1.9%** per person for the past 22 years (AIHW, 2000: 316). While ageing has been the smallest of the contributors to increased health expenditure, the impact of current ageing trends is in its early stage and is projected to have greater effect on the future rate of health expenditure (Productivity Commission, 2005: 20 - 23).

It is important to be cautious in predicting the future impact of an ageing population on health budgets, as much depends on the investment made in health services that are designed to support health promotion and prevention of ill health. The impact of new methods of managing and treating disease is difficult to ascertain given the rapid rate at which new treatments (for example, stem cell-related) are being developed. While the 'baby boomer' cohort will see a larger proportion of the population being 'old', the degree to which they add to overall health care costs will depend on new technologies and treatments and on health promotion and prevention – much of which is occurring now (for example, in relation to diet, exercise, information and education, and promotion of 'healthy ageing'). This emphasises the importance of viewing health promotion and prevention as investments for the future, rather than simply as costs.

4 QUANTIFYING THE HEALTH SECTOR IMPACT

4.1 Introduction

This section provides an assessment of the direct measurable impacts of the health sector – given the current data availability. Traditionally economic contribution is measured as job generation and incomes created, and this is the emphasis herein.

- Employment, incomes generated in the health services sector and supporting investments – health services will clearly include medical services, but also there is a possible need to consider more ancillary services including the health and rehabilitation aspects of the personal exercise industry.
- Employment and incomes generated in the health products sector – including health engineering, health foods etc.
- Health research – employment and incomes associated with the research sector (and links through to the service delivery component).
- Interactions between aspects in this context and with the broader economy.

4.2 The impact of the health sector in terms of workforce

4.2.1 The national health sector workforce

As one of the largest service industries, health is one of the most important sectors in developed economies. For example, approximately 9% of all EU workers are employed in the health and social work sector (Suhrcke *et al*, 2005: 13).

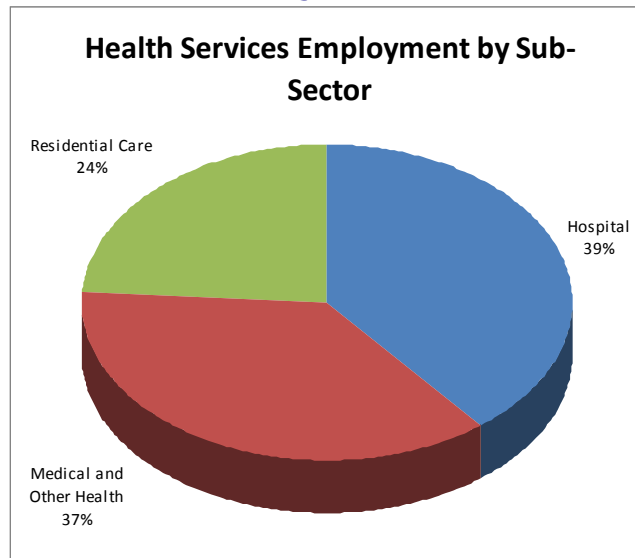
As discussed in *Section 2.2*, the Australian health sector provides more than **700,000 jobs** and adds some **\$78.5 billion** to the economy, and continues to grow strongly. The health workforce has grown by over **11%** between 1996 and 2001, nearly double the 6 per cent growth rate of the population (Productivity Commission, 2005: 10).

Expenditure on the workforce (through wages and salaries and employer contributions to workers' compensation and superannuation) accounts for an estimated 65% of the \$78.5 billion in total health care spending (AIHW, 2000: 258, citing ABS data). Although labour intensive, it is also a key user of, and contributor to, new technologies which assist in providing improved health care, but are also responsible for much of the growth in health expenditure (Hall: 2006; Productivity Commission: 2005).

4.2.2 The South Australian health sector workforce

The health and medical services sector – herein defined as hospitals, medical and other health and residential care - employs some **65,000** people here in South Australia (ABS: 2006 Census). This represents a very significant **9.5%** of the SA employed workforce. *Figure 1* below indicates the share of employment between hospitals, medical services and residential care. Hospitals and medical services are about equal size – almost 40% or 25,000 in each, while residential care is a little less.

Figure 1



There are an additional 3,700 people employed in health care and social assistance, not fully defined (nfd).

As well as being a significant employer in aggregate, the sector has quite defined characteristics, which enhance the way in which it makes its contribution. The major factors that can be noted include:

- It has a much higher than average employment of **women**. Compared to 46% of the workforce in total being women, the proportion of women employed in the health sector is:
 - 81% in hospitals
 - 74% in medical services
 - 86% in residential care.
- Associated with this there is a higher than average contribution of **part time** employment. 41% of the work force in hospitals is employed part time, 44% in medical services and 59% in residential care. This compares to 32% for the economy overall.

It is also anticipated that the health sector makes a more significant contribution within regional areas, so represents a significant regional employer, providing benefits of regionalization (though of course largely following population trends in this regard).

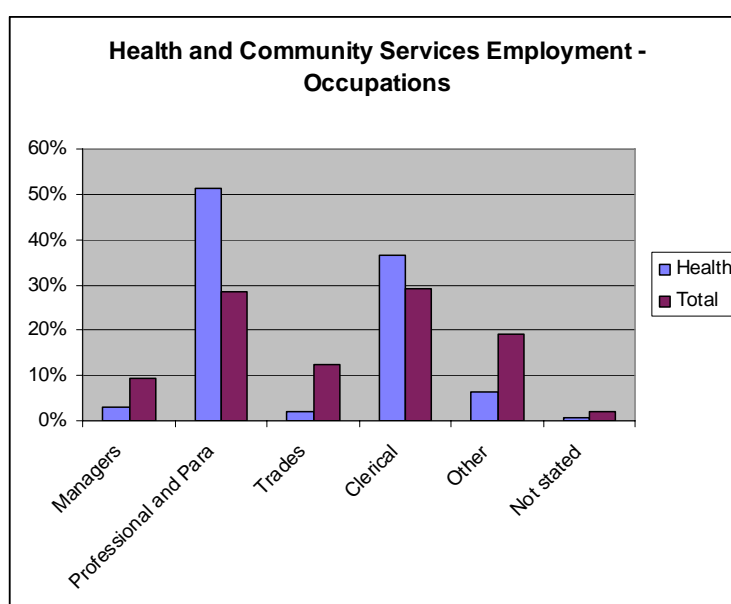
Table 3 below presents the employment of health care professional by industry of employment. It can be seen that 83% of the employment is in the three sectors above, while Social Assistance Services and Health Care and Social Assistance, nfd are also large employers (as would be expected). Together these sectors employ around 88% of health professionals, but it is noted that health care makes a significant contribution to other sectors – such as retail, insurance (rehabilitation, workers compensation etc) public administration, education and even manufacturing.

Table 3: Employment of Health Care Professionals by Industry

	Employed, worked full-time	Employed, worked part-time	Employed, hours not stated (a)	Total
Agriculture	5	4	0	9
Mining	28	3	8	39
Manufacturing	142	28	4	174
Retail and Wholesale	697	266	38	1001
Insurance and Super Funds	85	43	4	132
Education	171	138	16	325
Public Administration	478	166	46	690
Building and Construction	46	3	8	57
Hospitals	7009	5725	1074	13808
Medical/Other Health Care Services	4761	3300	530	8591
Residential Care Services	840	1202	132	2174
Social Assistance Services	352	307	58	717
Health Care and Social Assistance, nfd	347	343	77	767
Other	432	491	110	1033
Total	15393	12019	2105	29517

Figure 2 illustrates the distribution of occupations in health and community services, relative to that for total industry, showing the domination of professional occupations.

Figure 2: Occupations in the Health Sector



Industry Surveys

There are a number industry surveys of the health sector which provide more detail on operations and economic characteristics, but the problem with these is that they tend to be *ad hoc* and only relevant for small segments of the sector. However we note the following are available:

- 8550.0 Chiropractic And Osteopathic Services, 1997/98
- 8551.0, Dental Services, 1997/98
- 8553.0, Optometry And Optical Dispensing Services, 1997/98
- 8552.0, Physiotherapy Services, 1997/98
- 8689.0, Private Medical Practitioners, 2002

These surveys give some information on the number of businesses, wages paid, turnover etc.

Input Output Tables

Input output tables present the most comprehensive picture of an economy, consolidating data from a range of sources (and meshing them in use through the use of mathematical techniques), and showing the interconnections within the economy. The latest South Australian input output tables are for the year 2002/03. Unfortunately they are defined for 43 industry sectors, and given this level of aggregation they include health and community services as one sector.

Comparison of the table and the Census data above suggests that the health sector represents around three quarters of this industry sector. However using this broader level sector we can note the following characteristics of the sector:

- The direct value of health and community services turnover in the economy is estimated for 2002/03 at **\$4.8 billion annually**. In terms of value added (or share of GDP) it is estimated at **\$3.6 billion**, and in terms of wage and salary income it is estimated as **\$3.3 billion**. Like most service sectors, the dominant cost factor from an industry perspective is labour – meaning that the contribution to the broader economy is significant because of this characteristic.
- As a service sector, it has a much higher proportion of wages in its input cost structure than for the economy as a whole – with wages representing 68% of total costs (relative to 28% for the economy as a whole). Therefore, it has a high impact locally. Further, the wages paid are slightly higher than the economy as a whole (\$53,000 in 2002/03, relative to \$46,000 for the economy as a whole).

- Of its intermediate inputs purchased – it purchases two thirds locally (ie it purchases some \$1 billion from elsewhere in the economy). This compares to a ratio of 50% for industry as a whole.
- Of the \$1 billion of purchases the major local inputs produced include business and property services (31% of local intermediate goods), machinery and equipment (9.2%), trade sector services (9.3%), communications (8.7%), personal services (7.6%), finance and insurance (7.3%), chemicals (ie pharmaceuticals) (4.8%) and transport and storage (4.2%). Therefore all these sectors “benefit” from the operations of the local health services sector.
- The sector sells a very small proportion of its output to other industries, 59% to government (ie public health), 23% directly to households and 13% as exports interstate or overseas.

4.3 The impact of health products

Health related products include as examples the following:

- Pharmaceuticals – in the manufacturing sector (see Attachment 1)
- Optical products (e.g, lenses and frames)
- Health machinery and equipment (including wheel chairs, rehabilitation equipment).
- Areas that are considered complementary to the health sector but are included in data collections definitions in others sectors – such as food and clothing. Food in particular has a significant link in terms of health foods, healthy eating and lifestyle etc (in the ANZIC code – other food includes health supplements. This has links into, and provides opportunities for agriculture, and manufacturing – but also has provides niche or specialist opportunities for retail, wholesale and personal services. Similarly to the food aspect dietary assistance and nutritionists are in large part included in the personal care sector).

We know from the input output tables and from national surveys for the health sector that pharmaceuticals and health equipment supplied from local companies seem to be an important contributor in this sector.

Unfortunately the ABS data currently available do not allow any assessment of employment outcomes for these types of product types at sufficient detail at the State level. For example, with respect to pharmaceuticals, there were (in 2001) around 1600 people employed in the state in the Basic Chemicals and Chemical Products sector, but this would include other chemical products.

Industry Surveys

There are no industry surveys for this sector.

Input Output Tables

State input output tables do not have sufficient a degree of granulation to be able to provide information on these areas.

Conclusion

Therefore it would seem clear that little is directly known about how these increasingly significant health related activities link into the more traditionally defined health sector, and there is little statistical evidence of their size or economic performance and contribution in South Australia. Further, while as a sector much of it is focussed on supplying local markets, there would seem to be opportunities for developing export markets in some of these areas. However there are significant data gaps, and therefore it is suggested that there needs to be a survey/analysis of this sector and how it may contribute to the economy.

4.4 The impact of health research

Health research in Australia includes a range of activities from studies with a population health focus to medical research that includes the development of clinical interventions for diseases and injury prevention and treatment. During 1996-97, Australia invested \$853 million in health research and development. Government provides 38.3% (\$328 million) of this funding; \$268 million was funded by the higher education sector; business (including government business enterprises) provided \$134 million; and private non-profit organisations and overseas sources funded the remaining \$123 million (AIHW, 2000: 309).

The health research sector also contributes to the health workforce and provides an evidence base for health care services and treatments, with the goal of improving quality and effectiveness. The impact of research and development on health outcomes has been identified as significant in an analysis of the economic benefits of better health (Jamison, 2006: 21-22).

... if knowledge gains prove even partially as important for future health improvements as they have in the past century ... then investments in health research and development will continue to have high payoffs in health status and economic productivity (2006: 21).

South Australian medical research institutions have a long and well credentialed history in medical research outcomes. The State has a strong cohort of medical researchers employed across the University of Adelaide, Flinders University and the University of South Australia, and teaching hospitals such as the Royal Adelaide Hospital, the Flinders Medical Centre, the Women's and Children's Hospital and the Queen Elizabeth Hospital. Within these large research centres, there are a number of research entities specialising in world class research (with staff having some degree of interaction and cross engagement).

Industry statistics suggest that there are **in excess of 1,000 people** directly engaged in medical and health research in the state. Medical and health research is far more significant in a relative sense in South Australia than it is for Australia as a whole, as indicated below:

	Propn of total SA Higher Education R&D expenditure on Health	Propn of total Aust Higher Education R&D expenditure on Health	SA's share of total national expenditure on health by Higher education institutions
2000	37.4%	26.8%	11.2%
2002	35.2%	28.3%	9.4%

The health research specialty faces some challenges. Despite its above average contribution significance, the State has lost absolute share over recent years. Figures 3 and 4 indicate the order of magnitude of the decline over recent years in the relative share of NHRMC funds going to South Australia.

Figure 3
Proportional allocation of NHRMC funds by State
 (base year 1995)

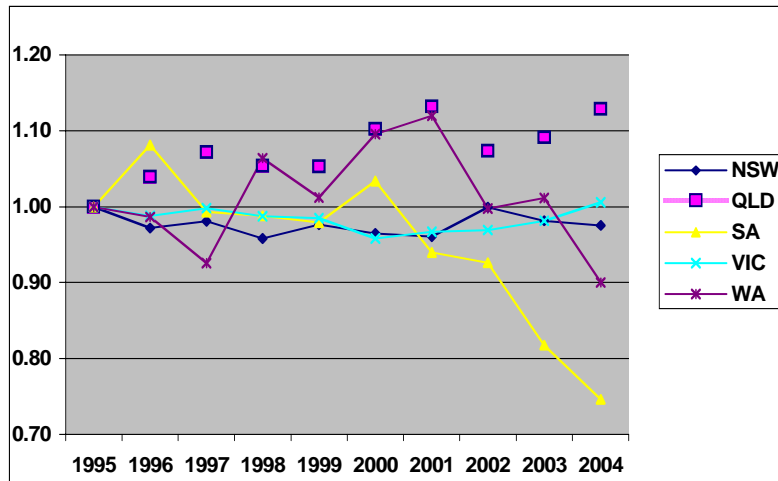
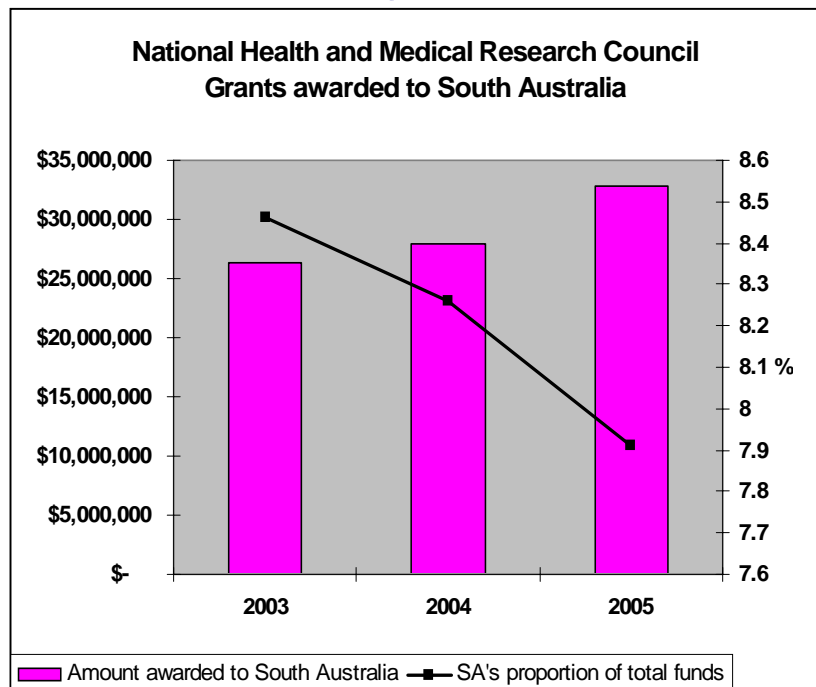


Figure 4



Absolute grant revenues from NHRMC sources in South Australia have increased in recent years, but the relative share of the pool has declined. A suggested reason for this decline is that other States have invested heavily in increasing the research pool.

The 2006 budget announced continued increases in the national funding. The budget statement notes that NHRMC grants have tripled over a decade (from \$126.5 million in 1995-96 to \$430.5 million in 2005-06). The 2006-07 budget included a further \$905 million over 4 years, made up of:

- \$500 million for the NHMRC
- \$235 million for medical research facilities
- \$170 million for a new health and medical research scheme

Key **benefits** of the presence of significant health research in the State include:

- **Direct benefits** – of employment and income generation⁵ in health research:
 - Generation of employment opportunities that would not otherwise occur in the state – and associated incomes.
 - Attraction of research grants associated with the above employment opportunities
 - Attraction of research students (i.e. PhD).
- **Indirect benefits for the existing medical research community:**
 - Networking and teaming providing increased research grant success for existing research institutions.
 - Improved attraction of international students (and economic spin-offs) due to capacity and reputation effects (guest lectures of centre researchers, increased supervision).
- **Indirect Benefits for the broader community**
 - Higher probability of the development of commercial spin-offs
 - Quicker access to health products etc from research outcomes
 - Indirect employment effects (outcomes from investment spend and support spend) – include discussion of resource reallocation outcomes
 - Public good aspects of space improvement.

4.5 The interrelationship between health and other industries

Recreation and entertainment

There is clearly a link between general recreation and well-being and health. In some cases, what is defined as recreation may cross over into health (often in a preventative health context). Exercise, and sport have health implications – on the one hand preventing health problems and limiting the need for health expenditure, and on the other hand, generating demand for health services in the treatment of injuries etc.

Employment within the sport and recreation sector is estimated under ABS Census data to amount to **3,700** people, and in addition there is a large volunteer component involved in

⁵ This concept of benefits is consistent with the perspectives of the State Plan which set economic and employment growth as key outcomes of the Plan. Further this is consistent with the view expressed by Access Economics that “there are weighty economic reasons for enhancing our health R&D investment, in particular balance of payments and employment multiplier arguments” (Access Economics, *Exceptional Returns: The Value Of Investing In Health R&D In Australia*, 2003)

the sector. While recognising this link and its importance to community outcomes, to add recreational employment into the contribution of health would double count to some extent, and in another perspective run the risk of over-assessing the role of the sector. Therefore, this contribution has been recognised in qualitative terms only.

Occupational Health and Safety (OH&S)

OH&S systems are a significant requirement on industry. It is noted above that employment of health professionals in other sectors makes a significant contribution, and at least part of this will be relative to achieving OH&S solutions (both formal and informal).

Worker Rehabilitation

Again in the figures above it is noted that employment of health professionals is significant in other industry sectors, and in this case specifically insurance – largely we expect a result of worker and accident rehabilitation activity. As well as generating employment outcomes as discussed above, this also has positive inputs from a broader community perspective.

4.6 A consolidated view

If we put this information together, collated from differing sources and with both measurement and interpretation issues, we can generate an overall picture of the contribution that the health sector makes to the South Australian economy, in terms of its economic effect. The order of magnitude outcomes are estimated in Table 4, below⁶. The indirect impacts are related only to an estimate of the components of activity that are generated from non-local demand – ie a result of exported product, or product that could be exported. This is perhaps a conservative view, but acknowledges that the flow-through effect is only really valid in this context.

⁶ The direct employment is based on the discussion in the earlier sections. So for example the 2006 ABS census suggests that there are 65,000 people working in the health and medical services sector – but the Census is generally understood to underestimate (relative to labour force survey) and also there is some growth from 2006 – so we have estimated 70,000 as an indicative number. FTE, Wage and Salary and Value Added estimates are taken from ratios of these factors to jobs in the State Input Output tables – with adjustments for nominal wage increases. Therefore there is a variation in the sectors between average wages. Note that the ratios for health products are the averages for machinery and equipment sectors, and other manufacturing.

Indirect employment is based on the relevant multipliers and the ratios for FTE's wages and salaries are those from the input output table for the state as a whole. It is indicatively assumed that only 25% of health services demand is import replacement or export oriented, and 60% demand in general (reflecting in the indirect effect of health in other industries). But in the research sector – there are assumed to be clustering and other benefits).

Table 4: Summary of Health Industry Contribution in Indicative Terms, 2007

	Employment	Employment (FTEs)	Wages & Salaries (\$ million)	Value Added (\$ million)
<i>Direct Impact</i>				
Health and Medical Services	70,000	57,000	3,680	3,940
Health Products	5,000	4,500	260	330
Health in Other Industries	3,000	2,500	150	250
Health Research	1,000	800	80	90
Total	79,000	64,800	4,170	4,610
<i>Indirect Impact</i>				
Health and Medical Services	11,000	9,200	500	840
Health Products	10,000	8,100	440	740
Health in Other Industries	2,000	1,800	90	160
Health Research	2,000	1,400	80	130
Total	25,000	20,500	1,110	1,870
<i>Total Impact</i>				
Health and Medical Services	81,000	66,200	4,180	4,780
Health Products	15,000	12,600	700	1070
Health in Other Industries	5,000	4,200	240	410
Health Research	3,000	2,200	160	220
Total	104,000	85,200	5,280	6,480

In short the measurable components of the health sector are estimated as supporting some 100,000 jobs in South Australia, and contributing of the order of \$6.5 billion to GSP. This represents of the order of 10-13% of economic activity within the State. However as noted, this does not represent the complete contribution, in that there are other components with direct health linkages that are not included in the above. Nor is the impact of the less measurable complementary health sector taken into account.

4.7 The impact of expanding the health sector

4.7.1 Growth in external demand or import replacement

While the current contribution is interesting, the real questions relate to the possible **future** contributions of the sector. As economies in the region grow in terms of income and population there is expected to be growth in demand for health services and products.

To provide an indicative estimate of the potential implications of South Australian success in providing such services we have used industry ratios and the input output table to estimate flow through effects.⁷

Health Service Exports

A \$10 million expansion in health service exports (or import replacements) is estimated⁸ to generate:

- A \$15.1 million increase in value added or contribution to GSP (\$7.3 million directly and the balance through flow through effects).
- A \$10.1 million increase in wages and salaries paid (\$6.7 million directly in the health sector).
- An employment outcome of 190 FTEs of employment (115 directly).

Health Products Exports

A \$10 million expansion in health products exports (or import replacements) is estimated⁹ to generate:

- A \$7.1 million increase in value added or contribution to GSP (\$1.7 million directly and the balance through flow through effects).
- A \$4.2 million increase in wages and salaries paid (\$1.2 million directly in the health sector).
- An employment outcome of 82 FTEs of employment (24 directly).

⁷ Input-output models are economy wide models based on some very simplifying assumptions. An input-output model can be used to assess economy wide impacts of changes in the level of activity in particular sectors. In addition, input-output models enable inferences to be made about other economic impacts such as whether supply constraints are significant (that is, whether supply factors will constrain economic impacts) and other macroeconomic effects, for example effects on the exchange rate or inflation. In practice, their application of input-output models is through the development of multipliers that are then used to assess the impacts of increased demand in a given sector. Computable General Equilibrium (CGE) models (eg The Monash Model) are economy-wide models based on an underlying input-output framework including supply side constraints, and a broader range of macro-economic linkages. While CGE models are theoretically much more sound than IO, they still have some limitations in their capacity to capture complex implications of projects such as changing economies of scale, the extent of macro-economic interactions allowed and the estimation of parameters, and they, like IO or any other modelling framework, are also highly dependent on the closure assumptions (ie what is an external input into the model and what is determined from within the modelling framework) that are used. Multi-region models are now common place and allow the shocking of a regional economy and modelling the impact at both a state and national level (including feed-back effects). There is no question that CGE based approaches are absolutely essential when considered economic outcomes of large programs, policies or projects at the national level and even more so when the issue is one of cost or supply side effects. For example, the application of CGE models, and have enhanced the understanding of the relationships involved in the market distortion effects of tariffs. Input-output tables would not have coped with this type of issue at the national level, but at the state level can be considered sufficient as order of magnitude estimates. Use of CGE frameworks can be undertaken by the research team, but are beyond the scope of this paper.

⁸ This assumes that the multipliers of the health and community services sector apply to the expansion. Where the impact is incremental rather than average (ie where there is not constant returns to scale, or where the expansion is in a sub-sector of the sector) these multipliers are less likely to apply.

⁹ This assumes that the average multipliers of the equipment and chemicals sectors apply to the expansion.

Health Research Exports

A \$10 million expansion in health research exports etc is estimated¹⁰ to generate:

- An \$11.2 million increase in value added or contribution to GSP (\$4.2 million directly and the balance through flow-through effects).
- A \$7.5 million increase in wages and salaries paid (\$3.6 million directly in the health sector).
- An employment outcome of 130 FTEs of employment (58 directly).

4.7.2 Improvements in local outcomes

As already themed within this paper, in addition to these activity-based benefits there are broader benefits to be considered from expanding or investing in the health sector. These include:

- Improved productivity in the labour force through healthier outcomes.
- Expansion of long term labour supply (retention and rehabilitation outcomes).
- Reduced costs of the health sector itself (through enhanced critical mass, and economies of scale).
- General quality of life (associated with improved health outcomes – the State (and nation) already have life expectancies at the upper end of the developed world, and this would further assist in this regard).

¹⁰ This assumes that the multipliers of the business services sector (ie include scientific research) are relevant to the expansion.

5 CONCLUSIONS AND POLICY IMPLICATIONS

Contribution of the SA health sector to the SA economy

The “traditional” health sector is supporting some 100,000 jobs in South Australia, and contributing approximately \$6.5 billion to GSP. This represents between 10% and 13% of economic activity with the State. With this base, we have calculated the potential impact of an expansion of the sector.

Research and data collection to assess the impact of the complementary health sector

It is important to understand the health sector for its continuum from prevention to health promotion, to primary care and beyond to various specialist treatment interventions. As our paper has indicated, it is also important to take into account the parallel ‘systems’ of traditional health care and complementary health care. Within both, there are emerging and new forms of health care, and there is a trend to build linkages across both systems.

The health sector’s contribution to the economy needs to be understood beyond treatment of illness or disease, to recognise the important roles of preventive and early intervention health care. Both systems offer scope for expansion (and therefore economic activity benefits), both domestically and in terms of export markets, as do new and emerging health care approaches within each system.

The information that was identified for this report indicated that complementary medicine and therapies are regarded by a significant number of consumers as part of their ongoing health care. It was evident that there is a need for research in relation to complementary medicine and therapies, particularly regarding their cost effectiveness relative to traditional health services and treatments, and relative to health promotion and prevention of illness (Herman *et al*: 2005; White & Ernst: 2000; Xue *et al*: 2006).

This gap in research was accompanied by a gap in data collection that would quantify the extent and impact of the complementary health sector. The questions that have been placed in the South Australian Omnibus survey have been important and should be continued. At the national level, there is a need for the Australian Bureau of Statistics to structure its Census questions in a way that would enable accurate measurement of the usage of complementary health treatments and of the complementary health workforce.

The health-economy relationship

In traditional share of GDP and employment measures the health sector makes a substantial contribution to the economy, with direct estimates suggesting that activity in the health sector represents in excess of 13% (10-13% in more traditional health related areas, and more in new and emerging health care). Further it is suggested that the sector provides significant opportunities for export development and expansion, discussed further below.

However while the sector is in all measures significant in this context, such a perspective is actually somewhat limited. Our review of the literature (see *Section 3*) has identified numerous research findings, based on sound methodology, that link human capital (based on population health and education) to economic growth and wealth. Research has also documented the negative economic impact of illness (see *Section 3.2*). Prevention of this and other lifestyle-related diseases makes good economic sense.

Where should South Australia invest with regard to health dollars?

There is strong evidence that early intervention, through health promotion and prevention activities, will achieve long term positive health outcomes, and there is also evidence that supports investment in quality primary health care. Given that the burden of disease in developed countries like Australia arises mainly from lifestyle factors, the importance of preventive and health-promoting actions needs to be a cornerstone of policy, and this in turn requires long term planning that recognises the investment nature of targeted health expenditure.

In order to safeguard that investment, policy makers need to make difficult decisions about how best to spend the health dollar. When viewed across a continuum from prevention of illness to treatment of illness, the importance of early intervention is evident from the research reviewed. This involves a focus on promotion of health and wellbeing, prevention of illness and primary health care.

In addition, it is important to acknowledge the provision of services that treat or manage ill health and disease, and the various infrastructures (such as, water and sewage, sport and recreation facilities) that support healthy living. Similarly health research provides significant traditional benefits (employment creation) but also many indirect benefits in terms of access to better services and higher quality outcomes locally, and should therefore be a focus of investment. Although health budgets are increasing, it is important to regard the funding of services and supporting infrastructure that promote population health as an investment. There is strong support in the literature reviewed for this approach, given the direct link between health and economic productivity and wealth.

The importance of cross-agency and cross-government health policy

The range of influences on health requires that the health sector work closely with other sectors and that other sectors take into account the possible health impact of their decisions. The complex relationship between health and the economy, and the impact of health across a range of sectors together with the impact of policy made outside of the health sector on health, means that an integrated policy response is required to ensure that the health-economy relationship is positive and mutually reinforcing.

As policymakers with public responsibilities, we must never forget that decisions taken in one sphere affect conditions, stakeholders and policies in another. We all want better health systems, but the impact of health on the economy should not be underestimated. Our challenge is to harmonise health and economic policies to improve health outcomes ... but also to minimise any negative impacts while promoting synergies wherever possible (OECD Observer: 2004).

... it is important that each and all of the various cogs which comprise the totality ... move in reinforcing directions (Productivity Commission, 2005: 26).

Although health services and programs are contained within the budgets of government health agencies, health promotion and prevention involves much wider responsibility. This supports the need for cross-portfolio and cross-government policy and a coordinated approach to health promoting and prevention activities. A framework for this has been developed by the Council of Australian Governments (COAG) through its 2006 *National Reform Agenda*, which includes a human capital group of reforms designed to bring about changes in health, education and work incentives. The Agenda recognises the central role

of human capital in labour market outcomes and provides a policy framework designed to increase labour force participation.

Investment through expansion of the health sector

It is clear that expansion of the health sector offers significant direct opportunities in terms of its economic contribution and in terms of the substantial benefits for the community as a whole (see *Section 4.7.1*).

- o A \$10 million expansion in **health service exports** is estimated to generate a \$15.1 million increase in value-added or contribution to GSP; a \$10.1 million increase in wages and salaries; and an employment outcome of 190 FTE positions.
- o A \$10 million expansion in **health products exports** is estimated to generate a \$7.1 million increase in value-added or contribution to GSP; a \$4.2 million increase in wages and salaries; and an employment outcome of 82 FTE positions.
- o A \$10 million expansion in **health research exports** is estimated to generate an \$11.2 million increase in value added or contribution to GSP; a \$7.5 million increase in wages and salaries paid; and an employment outcome of 130 FTE positions.

As well as generating economic activity outcomes, activity within all of these sectors produces a broader range of benefits related to community outcomes, including quality of life, enhanced wellness etc.

The evidence we have reviewed suggests that expansion of the sector has the potential to provide significant returns – and will assist in achieving the targets of the State Plan in terms of income growth, and employment outcomes.

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ATTACHMENT 1: ANZSIC industry-based definitions of the Australian health system

Group	Class	Primary Activities
Division Q- Health Care and Social Assistance – Sub-Division 84, Hospitals		
840 Hospitals	8401/Hospitals	Children’s; Day; ENT; General; Infectious Disease control; maternity; obstetrics, women’s hospital
	8402/Psychiatric Hospitals	Units providing psychiatric facilities; training of medical and nursing staff for these services
Division Q- Health Care and Social Assistance – Sub-Division 85, Medical and other Health Care Services		
851 Medical Services	8511/General Practice Medical Services	General Practice Medical Clinic Service, including flying doctor, and community health centres
	8512/Specialist Medical Services	Allergy, anaesthetist, dermatology, ENT, gynaecology, hair transplant, neurology, obstetrics, ophthalmology, orthopaedic, ophthalmology, paediatric, psychiatry, rheumatology, specialist medical clinic service, specialist medical practitioner service, thoracic, urology
852 Pathology & Diagnostic Imaging Services	8520/Pathology & Diagnostic Imaging Services	Diagnostic imaging service, medical laboratory service, pathology laboratory service , x-ray clinic service
853 Allied Health Services	8531/Dental Services	Dental services including out-patient dental hospital, dental practice, dental surgery, endodontic, oral pathology, oral surgery, orthodontic, paedodontic, periodontic, prosthodontic
	8532/Optometry & Optical Dispensing	Contact lens dispensing, eye testing (optometrist), optical dispensing, optician service, orthoptic service, spectacles dispensing
	8533/Physiotherapy	Physiotherapy services
	8534/Chiropractic & Osteopathic	Chiropractic services Osteopathic services
	8539/Other Allied Health	Acupuncture services, aromatherapy services, audiology services, clinical psychology service, dental hygiene service, dietician service, hearing and dispensing, herbalist service, homeopathic service, midwifery service, naturopathic service, nursing service, occupational therapy service, podiatry service, speech pathology service, therapeutic massage service
859 Other health care services	8591/Ambulance services	Ambulance services – including aerial ambulance service
	8599/Other health care services n.e.c	Blood bank operation, health assessment service, health care service
Division Q- Health Care and Social Assistance – Sub-Division 86, Residential Care Services		
860 Residential Care Services	8601/Aged Care residential services	Accommodation for the aged operation, aged care hostel operation, nursing home operation, residential care for the aged operation, provision of residential aged care services
	8609/Other residential care services	This class consists of units mainly engaged in providing residential care (except aged care) combined with either nursing, supervisory or other types of care as required (including medical). Includes community mental health hostel, hospice operation and respite residential care operation.
Division P – Education and Training - Sub-Division 81 Tertiary Education		
810 Tertiary Education	8101/Technical and Vocational Education and Training	Training of health workers.
	8102/Higher Education	Training of medical, nursing and related professions.
Division M- Professional Scientific and Technical Services– Sub-Division 69 Professional, Scientific & Technical Services		
691 Scientific Research Services	6910/Scientific Research Services	Consists of units mainly engaged in undertaking research in the agricultural, biological, physical or social sciences. Units may undertake the research for themselves or others. It includes biological, biotechnology, scientific and medical research services.
	6925/Scientific Testing and Analysis Services	Consists of units mainly engaged in providing scientific testing and analysis services such as physical or chemical testing, calibration testing, mechanical testing, thermal testing and biological testing (except medical or veterinary). The testing may occur in a laboratory or on site.

Group	Class	Description/Primary Activities
Division R- Arts and Recreation Services – Sub-Division 91, Sports and Recreation Activities		
913 Amusement & Other Recreation Activities	9139/ Amusement and Other Recreational Activities n.e.c.	This class consists of units mainly engaged in providing amusement and other recreational services not elsewhere classified. Included in this class are units that provide outdoor recreational services such as bungee jumping and white water rafting. Includes Bush walking operation, white water rafting operation, cave diving operation, outdoor adventure operation n.e.c., recreational activity n.e.c.
911 Sports and Physical Recreation Activities	9111/Health and Fitness Centres and Gymnasia Operation	This class consists of units mainly engaged in operating health clubs, fitness centres and gymnasia. Units in this class provide a range of fitness and exercise services. Includes Fitness centre operation, Gymnasia operation, Health club operation
	9112/Sports and Physical Recreation Clubs and Sports Professionals	This class consists of units mainly engaged in operating individual sports or physical recreation clubs or teams which provide sporting or physical recreation opportunities to participants, or entertainment for spectators. This class also includes sports professionals.
	9113/Sports and Physical Recreation Venues, Grounds & Facilities Operation	This class consists of units mainly engaged in operating indoor or outdoor sports and physical recreation venues, grounds and facilities (except health and fitness centres and gymnasia).
	9114/ Sports and Physical Recreation Administrative Service	This class consists of units mainly engaged in the administration and/or control of sports or physical recreation organisations. These units are responsible for the policies, rules and regulations governing the conduct of an individual sporting or physical recreation discipline.
Division S- Other Services – Sub-Division 95, Personal and Other Services		
951 Personal Care Services	9512/Diet and Weight Reduction Centre Operation	This class consists of units mainly engaged in operating diet and weight reducing centres. Includes Slimming service (non-medical), Weight loss centre operation (non-medical), Weight loss service (non-medical)
953 Other Personal Services	9531/Laundry and Dry-Cleaning Services	This class consists of units mainly engaged in providing a range of laundry and/or dry-cleaning services. The services provided may be operated by customers (i.e. coin-operated or similar self-service facilities) or may be operated by the units themselves. Also included are units mainly engaged in baby napkin, linen and/or uniform hire.
	9539/Other Personal Services n.e.c.	This class consists of units mainly engaged in providing personal services not elsewhere classified. Includes Personal fitness training service, Sauna bath operation, Turkish bath operation
Division C- Manufacturing – Sub-Division 24, Machinery and Equipment Manufacturing		
241 Professional and Scientific Equipment Manufacturing	2411/Photographic, Optical and Ophthalmic Equipment Manufacturing	This class consists of units mainly engaged in manufacturing photographic equipment (except sensitised photographic film, paper, plates or chemicals), optical instruments or equipment, or ophthalmic equipment. Also included are units mainly engaged in grinding optical lenses. It includes the manufacturing of contact lenses, microscopes, telescopes, ophthalmic articles, optical instruments and equipment, optical lens grinding, spectacle frames and lens grinding
	2412/ Medical and Surgical Equipment Manufacturing	Units mainly engaged in manufacturing medical, surgical or dental equipment, including dentures. It includes the manufacturing of artificial eyes, limbs, and joints; the manufacturing of dental amalgam, dental chair manufacturing (fitted with mechanical device), the manufacturing of dental instrument or equipment, dental plaster or cement manufacturing, dentures, electromedical equipment, first aid equipment, hearing aids, hypodermic needles/syringes, magnetic resonance imaging (medical) equipment, Medical equipment, Medical ultrasound equipment, Orthotics, Pacemaker, Respirators, Surgical equipment, Thermometers,
	2419/ Other Professional and Scientific Equipment Manufacturing	Units mainly engaged in manufacturing navigational, measuring or other professional and scientific equipment not elsewhere classified such as control or meteorological or surveying equipment or instruments, or specialised parts for such equipment. It includes Laboratory analytic instrument manufacturing and Magnetic resonance imaging (except medical) equipment manufacturing.
Division C- Manufacturing – Sub-Division 11, Food Product Manufacturing		
119 Other Food Product Manufacturing	Class 1199/Other Food Product Manufacturing n.e.c.	This class consists of units mainly engaged in manufacturing other food products not elsewhere classified. Included in this class are units mainly engaged in manufacturing coffee and tea, food flavourings, seasonings and colourings, frozen pre-prepared meals and health supplements.
Division C- Manufacturing – Sub-Division 18, Basic Chemical and Chemical Product Manufacturing		
184 Pharmaceutical and Medicinal Product Manufacturing	1841/Human Pharmaceutical and Medicinal Product Manufacturing	This class consists of units mainly engaged in manufacturing pharmaceutical and medicinal products for human use from both natural (plants) and synthetic sources (chemicals). Also consists of units mainly engaged in manufacturing diagnostic substances for antibodies, antigens and chemical/ diagnostic testing agents.

Group	Class	Description/Primary Activities
Division K- Financial and Insurance Services- Sub-Division 63 Insurance and Superannuation Funds		
632 Health and General Insurance	6321/ Health Insurance	This class consists of units mainly engaged in providing insurance cover for hospital, medical, dental, pharmaceutical or funeral expenses or costs.
Division F- Wholesale Trade- Sub-Division 34 Machinery and Equipment Wholesaling		
349 Other Machinery and Equipment Wholesaling	3491/Professional and Scientific Goods Wholesaling	Consists of units mainly engaged in wholesaling scientific, medical or other professional equipment (except photographic equipment). Includes Dental instrument or equipment, Medical equipment, Optical instrument, Professional equipment n.e.c., Scientific equipment, Surgical equipment, X-ray equipment or film wholesaling.
Division F- Wholesale Trade- Sub-Division 37 Other Goods Wholesaling		
372 Pharmaceutical And Toiletry Goods Wholesaling	3720/ Pharmaceutical and Toiletry Goods Wholesaling	Consists of units mainly engaged in wholesaling human pharmaceuticals, medicines, cosmetics, perfumes and toiletries. Also included are units mainly engaged in wholesaling veterinary drugs or medicines.
Division O - Public Administration and Safety - Sub-Division 75 Public Administration		
751 Central Government Administration	7510/ Central Government Administration	Health policy, program planning and purchasing units.
752 State Government Administration	7520/State Government Administration	
753 Local Government Administration	7530/ Local Government Administration	

Attachment II: Industry by Occupation Shares for People Employed in the Health Care Sector (2006 Census)

<i>Occupation</i>	<i>Hospitals</i>	<i>Medical and Other Health Care Services</i>	<i>Residential Care Services</i>	<i>Social Assistance Services</i>	<i>Health Care and Social Assistance, nfd</i>
Managers, nfd	23	51	19	52	21
Chief Executives, General Managers and Legislators	115	98	67	143	27
Farmers and Farm Managers	3	4	0	3	3
Specialist Managers	651	520	395	739	85
Hospitality, Retail and Service Managers	225	121	274	126	24
Professionals, nfd	49	35	12	30	12
Arts and Media Professionals	16	13	3	25	3
Business, Human Resource and Marketing Professionals	357	339	154	336	98
Design, Engineering, Science & Transport Professionals	406	560	4	23	18
Education Professionals	34	36	7	192	16
Health Professionals	13,808	8,591	2,174	717	767
ICT Professionals	95	89	22	47	9
Legal, Social and Welfare Professionals	490	522	275	1,314	80
Technicians and Trades Workers, nfd	11	14	4	7	0
Engineering, ICT and Science Technicians	429	985	33	36	36
Automotive and Engineering Trades Workers	41	31	0	21	6
Construction Trades Workers	42	11	20	26	9
Electrotechnology & Telecommunications Trades Workers	69	14	13	9	6
Food Trades Workers	292	31	379	216	33
Skilled Animal and Horticultural Workers	21	20	87	134	7
Other Technicians and Trades Workers	17	241	36	51	17
Community and Personal Service Workers, nfd	6	3	8	24	8
Health and Welfare Support Workers	1,746	1,944	1,542	1,424	234
Carers and Aides	1,419	2,130	7,043	7,947	708
Hospitality Workers	66	18	90	40	6
Protective Service Workers	23	13	9	40	6
Sports and Personal Service Workers	23	233	20	66	52
Clerical and Administrative Workers, nfd	11	10	0	4	0
Office Managers and Program Administrators	370	1,279	152	355	83
Personal Assistants and Secretaries	251	318	82	102	44
General Clerical Workers	812	764	262	434	133
Inquiry Clerks and Receptionists	917	3,454	166	260	152
Numerical Clerks	291	334	128	197	25
Clerical and Office Support Workers	153	304	14	64	14
Other Clerical and Administrative Workers	324	164	27	63	20

<i>Occupation</i>	<i>Hospitals</i>	<i>Medical and Other Health Care Services</i>	<i>Residential Care Services</i>	<i>Social Assistance Services</i>	<i>Health Care and Social Assistance, nfd</i>
Sales Workers, nfd	0	0	0	0	3
Sales Representatives and Agents	3	17	23	18	12
Sales Assistants and Salespersons	84	102	25	83	30
Sales Support Workers	13	26	0	80	8
Machinery Operators and Drivers, nfd	0	0	0	3	0
Machine and Stationary Plant Operators	143	53	3	44	10
Mobile Plant Operators	0	4	0	7	0
Road and Rail Drivers	10	26	21	56	10
Storepersons	98	38	14	40	10
Labourers, nfd	30	9	61	62	8
Cleaners and Laundry Workers	714	335	952	504	161
Construction and Mining Labourers	5	11	3	14	3
Factory Process Workers	8	14	44	835	16
Farm, Forestry and Garden Workers	8	3	35	46	8
Food Preparation Assistants	724	73	786	80	77
Other Labourers	98	48	170	148	19
Not stated / Inadequately described	94	101	41	166	136
Total	25,638	24,154	15,699	17,453	3,273

**Attachment III: People Employed in Health Sector Occupations, by Industry, South
Australia, 2006 Census**

<i>Industry</i>	<i>Health Professionals</i>	<i>Health and Welfare Support Workers</i>	<i>Carers and Aides</i>
Agriculture	5	0	22
Aquaculture	0	0	0
Forestry and Logging	0	0	0
Fishing, Hunting and Trapping	0	0	0
Agriculture, Forestry and Fishing Support Services	4	0	4
Agriculture, Forestry and Fishing, nfd	0	0	0
Coal Mining	0	0	0
Oil and Gas Extraction	11	0	0
Metal Ore Mining	20	0	0
Non-Metallic Mineral Mining and Quarrying	0	0	0
Exploration and Other Mining Support Services	5	0	0
Mining, nfd	3	0	0
Food Product Manufacturing	27	0	10
Beverage and Tobacco Product Manufacturing	4	0	4
Textile, Leather, Clothing and Footwear Manufacturing	0	0	0
Wood Product Manufacturing	10	0	6
Pulp, Paper and Converted Paper Product Manufacturing	7	0	0
Printing (including the Reproduction of Recorded Media)	0	0	0
Petroleum and Coal Product Manufacturing	4	0	0
Basic Chemical and Chemical Product Manufacturing	34	3	3
Polymer Product and Rubber Product Manufacturing	6	0	0
Non-Metallic Mineral Product Manufacturing	4	0	0
Primary Metal and Metal Product Manufacturing	9	0	4
Fabricated Metal Product Manufacturing	5	0	0
Transport Equipment Manufacturing	29	0	3
Machinery and Equipment Manufacturing	31	150	6
Furniture and Other Manufacturing	0	4	0
Manufacturing, nfd	4	3	5
Electricity Supply	5	0	0
Gas Supply	3	0	0
Water Supply, Sewerage and Drainage Services	8	3	0
Waste Collection, Treatment and Disposal Services	10	0	3
Electricity, Gas, Water and Waste Services, nfd	0	0	0
Building Construction	15	5	21
Heavy and Civil Engineering Construction	6	0	0
Construction Services	10	3	8
Construction, nfd	0	0	0
Basic Material Wholesaling	4	0	4
Machinery and Equipment Wholesaling	6	0	0
Motor Vehicle and Motor Vehicle Parts Wholesaling	0	0	0
Grocery, Liquor and Tobacco Product Wholesaling	8	3	3
Other Goods Wholesaling	38	3	3

<i>Industry</i>	<i>Health Professionals</i>	<i>Health and Welfare Support Workers</i>	<i>Carers and Aides</i>
Commission Based Wholesaling	0	0	0
Wholesale Trade, nfd	4	0	3
Motor Vehicle and Motor Vehicle Parts Retailing	0	0	0
Fuel Retailing	0	0	0
Food Retailing	19	3	14
Other Store-Based Retailing	918	11	49
Non-Store Retailing and Retail Commission-Based Buying and/or Selling	0	0	0
Retail Trade, nfd	4	4	3
Accommodation	7	46	39
Food and Beverage Services	10	6	36
Accommodation and Food Services, nfd	0	0	0
Road Transport	12	4	12
Rail Transport	0	0	0
Water Transport	6	0	0
Air and Space Transport	3	0	0
Other Transport	0	3	0
Postal and Courier Pick-up and Delivery Services	3	0	4
Transport Support Services	0	0	0
Warehousing and Storage Services	0	0	4
Transport, Postal and Warehousing, nfd	0	4	3
Publishing (except Internet and Music Publishing)	8	0	0
Motion Picture and Sound Recording Activities	0	0	4
Broadcasting (except Internet)	0	0	0
Internet Publishing and Broadcasting	0	0	0

Telecommunications Services	4	0	0
Internet Service Providers, Web Search Portals and Data Processing Services	0	0	0
Library and Other Information Services	0	7	0
Information Media and Telecommunications, nfd	0	0	0
Finance	5	3	15
Insurance and Superannuation Funds	117	9	49
Auxiliary Finance and Insurance Services	10	3	11
Financial and Insurance Services, nfd	0	0	0
Rental and Hiring Services (except Real Estate)	0	6	4
Property Operators and Real Estate Services	9	83	6
Rental, Hiring and Real Estate Services, nfd	0	0	0
Professional, Scientific and Technical Services (except Computer System Design and Related Services)	153	33	29
Computer System Design and Related Services	0	0	0
Professional, Scientific and Technical Services, nfd	0	0	0
Administrative Services	580	320	435
Building Cleaning, Pest Control and Other Support Services	6	9	111
Administrative and Support Services, nfd	0	0	0
Public Administration	574	970	433

<i>Industry</i>	<i>Health Professionals</i>	<i>Health and Welfare Support Workers</i>	<i>Carers and Aides</i>
Defence	49	31	7
Public Order, Safety and Regulatory Services	62	135	11
Public Administration and Safety, nfd	5	15	10
Preschool and School Education	80	68	4,691
Tertiary Education	170	30	206
Adult, Community and Other Education	50	25	122
Education and Training, nfd	25	28	139
Hospitals	13,808	1,746	1,419
Medical and Other Health Care Services	8,591	1,944	2,130
Residential Care Services	2,174	1,542	7,043
Social Assistance Services	717	1,424	7,947
Health Care and Social Assistance, nfd	767	234	708
Heritage Activities	0	0	4
Creative and Performing Arts Activities	0	0	4
Sports and Recreation Activities	8	17	95
Gambling Activities	0	0	0
Arts and Recreation Services, nfd	0	0	0
Repair and Maintenance	3	5	4
Personal Care and Other Services	135	234	196
Private Households Employing Staff	0	0	110
Other Services, nfd	0	0	0
Not stated / Inadequately described	86	42	307
Total	29,517	9,221	26,526