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Estimating the impact of selected National Health and Hospitals Reform Commission (NHHRC) reforms on health care expenditure, 2003 to 2033

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This report represents the views of the Institute, and does not necessarily reflect the views of the NHHRC or the Australian Government.

1 Introduction

To give an indication of the medium- to long-term effects of certain proposed National Health and Hospitals Reform Commission (NHHRC) reforms on growth in health expenditures, the Australian Institute of Health and Welfare (AIHW) developed estimates of the expenditure effects of selected reform proposals. This was achieved by factoring those reforms into the model that the AIHW had previously developed to project health expenditures to 2032–33 (the 'baseline projections').

The AIHW health and aged care expenditure projection model

The original baseline projection model is described in a discussion paper released on the NHHRC and AIHW websites in November 2008 titled *Projections of Australian health care expenditure by disease, 2003 to 2033* (Goss 2008). This report provided projections of expenditure by disease for Australia for the period 2002–03 to 2032–33.

The projection model combined:

- demographic factors of population ageing and population growth
- non-demographic factors of changes in disease rates
- volume of services per treated case
- treatment proportions (i.e. the proportion of cases that receive treatment) and
- excess health price inflation (i.e. the difference between health inflation and general inflation).

Assumptions about future changes in these factors were applied to current health and high-care residential aged care expenditure to estimate expenditure for each disease and disaggregated by the different areas of expenditure (such as hospitals, out-of-hospital medical services and pharmaceuticals). It should be kept in mind that it is not certain that the projected expenditures will be realised; there are many unknowns that simply cannot be modelled.

The NHHRC's reform proposals would impact on two of the factors in the projection model —disease rates and the volume of services per case of disease. In broad terms, the projections of expenditure following the reforms were derived by changing these two factors which were inputs to the projection model.

The translation into the input factors for the model was based on advice from the NHHRC on the nature of the reform proposals. The specification of input factors was also informed by a review of the literature or consultation with experts. More details of the technical assumptions are provided in Chapter 3.

The results of the baseline projection, by disease category, are summarised in the following table.

Table 1: Baseline projections of health and aged care expenditure

	Expenditure (millions of 2006–07 dollars)				Change 2002–03 to 2032–33 (%)
	2002–03	2012–13	2022–23	2032–33	
Cardiovascular	9,329	12,535	16,781	22,559	142%
Respiratory	7,188	9,679	14,483	21,947	205%
Injuries	6,650	8,134	10,555	14,353	116%
Dental	5,888	7,705	10,766	14,925	153%
Mental	5,147	6,670	8,998	12,109	135%
Digestive	4,877	6,916	10,612	16,488	238%
Neurological	4,727	7,358	12,095	21,560	356%
Dementia	3,847	6,033	9,889	17,837	364%
Parkinson's	323	488	825	1,399	334%
Other neurological	557	837	1,380	2,325	317%
Musculoskeletal	2,636	3,642	5,640	8,859	236%
Genitourinary	4,411	6,289	9,567	14,234	223%
Cancer	3,678	4,966	7,272	10,857	195%
Sense disorders	3,487	5,128	7,807	10,112	190%
Endocrine, nutritional and metabolic	2,584	3,322	4,602	6,395	147%
Skin	2,373	3,309	5,012	7,767	227%
Maternal	2,150	2,427	3,167	3,953	84%
Infectious	1,890	2,427	3,359	4,673	147%
Diabetes	1,607	2,831	5,007	8,610	436%
Type 2 diabetes	1,296	2,427	4,495	8,041	520%
Neonatal	631	724	952	1,185	88%
Congenital	310	369	492	633	104%
Other	15,500	21,041	30,564	44,837	189%
Total health and aged care expenditure	85,063	115,471	167,729	246,056	189%
GDP[(a)] ($b)	**919**	**1,235**	**1,582**	**1,981**	
Total as per cent of GDP	**9.3%**	**9.3%**	**10.6%**	**12.4%**	

(a) Calculated from Intergenerational Report (Treasury 2007:29) which is the source for GDP growth rates and ABS national accounts data which is the source for the baseline GDP data.

2 Impact of selected NHHRC reforms on health expenditure

The Institute modified its original baseline projection model to produce new estimates of health and residential aged care expenditure to 2032–33 assuming implementation of a number of the reforms recommended by the Commission. Specifically, AIHW modified the projection model to reflect the following changes:

- More sub-acute care; and subsequent reduction over time in the proportion of hospital bed days which are for acute care.
- Constraint in the increase in obesity rates.
- Faster decline in smoking rates.
- Encouragement of the delivery of primary care services through one provider so as to improve care coordination ('health care home' proposal).
- Change in aged care places.
- Impact of implementation of 'Denticare Australia' on hospital admitted patient costs.
- Improved treatment of diabetes.
- Implementation of personal electronic health records.
- Improvements in safety and quality of care.

Details of the assumptions used in modifying the model are in Chapter 3.

The modelling of these changes was conservative in that not all savings that would arise from these interventions were able to be costed in the time available, and where there was a choice of assumptions, the assumption which showed lower savings was chosen. Thus these numbers are a lower bound of the net savings that would arise from these interventions.

Results of modelling (summarised in Table 2 below) indicate that these selected Commission reform proposals would result in somewhat lower expenditure of $4.1 billion per annum (in 2006–07 dollars) in 2032–33. This is 12.2% of GDP rather than the 12.4% of GDP estimated in the baseline projection model.

Table 2: Estimated net savings due to selected NHHRC reform proposals

	2002–03	2022–23	2032–33	Change 2002–03 to 2032–33
Original projected total health expenditure ($m)	77,535	150,191	216,331	
Original projected residential aged care (high care) expenditure ($m)	7,528	17,538	29,725	
Original projected health and residential aged care (high care) expenditure ($m)	**85,063**	**167,729**	**246,056**	**189%**
Total health and (high care) aged care expenditure as per cent of GDP	**9.3%**	**10.6%**	**12.4%**	
Less net savings due to interventions				
Improved availability of sub-acute care		–127	–190	
Reduced rate of increase in obesity		–624	–2,566	
Faster decline in smoking rates		–363	–262	
Patient enrolment with a primary health care service (Health care home)		–380	–635	
Reforms to aged care		–519	1,412	
Improved access to basic dental care		–73	–110	
Improved treatment of diabetes		–125	–188	
Implementation of personal electronic health records		–430	–627	
Improved safety and quality of care		–660	–976	
Total net savings		*–3,301*	*–4,142*	
Net savings in health		*–2861*	*–5029*	
Net savings in residential aged care		*–440*	*887*	
Total health and residential aged care expenditure after net savings from selected NHHRC reforms ($m)	**85,063**	**164,428**	**241,914**	**183%**
Total as per cent of GDP	**9.3%**	**10.5%**	**12.2%**	

The estimates produced by the modified projection model can be compared with the original projections of expenditure by disease type to assess the overall impact of these selected NHHRC reforms by disease (Table 3). Thus, for example, this comparison shows the impact on:

- Cancer expenditure resulting from sub-acute reforms, reduced smoking rates, improved primary care and personal electronic health records.
- Diabetes expenditure from slower growth in obesity, sub-acute reforms, improved primary care and personal electronic health records.
- Cardiovascular disease expenditure resulting from improved treatment of diabetes, slower growth in obesity, reduced smoking rates, improved primary care and personal electronic health records.
- Injury expenditure resulting from sub-acute reforms, safety and quality improvements, decline in smoking and obesity, improved primary care and personal electronic health records.
- Mental health expenditure resulting from sub-acute reforms, improved primary care and personal electronic health records.
- Dementia expenditure resulting from residential aged care reforms.

Table 3: Change in projected expenditure in 2032–33 by disease category given implementation of selected NHHRC recommendations

Disease category	Admitted	GP	Other medical	Pharma-ceuticals	Residential aged care (high care)	Total health and aged care	
	$m	$m	$m	$m	$m	$m	Percent change from baseline model
Cardiovascular	–160	59	–69	68	171	68	0.3%
Respiratory	–171	83	–47	37	30	–68	–0.3%
Injuries	–855	–45	–174	–29	–32	–1,135	–7.9%
Dental	–120	2	0	0	0	–119	–0.8%
Mental	–84	22	–53	23	69	–23	–0.2%
Digestive	–175	21	–45	32	9	–158	–1.0%
Neurological	–44	5	–7	19	681	654	3.0%
Dementia	–30	3	–4	2	636	607	3.4%
Sense disorders	–68	21	–63	13	9	–89	–1.0%
Musculoskeletal	–93	16	–34	20	129	37	0.3%
Genitourinary	–125	26	–57	9	3	–144	–1.3%
Cancer	–153	6	–18	11	5	–149	–1.5%
Endocrine, nutritional and metabolic	–27	17	–35	31	3	–12	–0.2%
Skin	–42	31	–29	7	4	–29	–0.4%
Maternal	–67	4	–8	0	0	–72	–1.8%
Infectious	–37	31	–18	7	2	–15	–0.3%
Diabetes	–1,020	–132	–519	–529	–134	–2,334	–27.1%
Type 2 diabetes	–1,017	–132	–517	–532	–134	–2,332	–29.0%
Neonatal	–23	1	–1	0	0	–22	–1.9%
Congenital	–11	0	–2	0	1	–11	–1.8%
Contact with health system and other expenditures	–511	42	–221	–55	223	–523	–1.2%
Total	**–3,785**	**207**	**–1,401**	**–337**	**1,172**	**–4,142**	**–1.7%**

Overall this work indicates that the net effect of these selected reforms would be to deliver a somewhat different mix of health services at a 2% lower cost than in the baseline projection model.

3 Technical assumptions used in modelling the impact of NHHRC reform proposals

For each of the selected NHHRC reform proposals, this chapter outlines

- the relevant baseline projection;
- the translation of the reform proposal into the input factors of the projection model and the information used to formulate the translation;
- the expenditure change that is estimated to flow from the reform proposal.

More sub-acute care and subsequent reduction over time in the proportion of hospital bed days which are for acute care

In 2007–08 83% of hospital bed days (patient days) were for acute care and 15% for sub-acute care. The AIHW baseline projection model projected these proportions forward with adjustment for the impact of the ageing of the patient population.

Moving patients to sub-acute care from acute care for rehabilitation and other care will, in general, save resources. The NHHRC recommendations will move about 531,000 bed days from acute care to sub-acute care (National Health and Hospitals Reform Commission 2009:253).

The average cost of an acute care patient day is about $1,100, compared to the average cost of a sub-acute day of about $550, but the amount saved by moving the person to sub-acute care is not $1,100 – $550 = $550 per day, as the days saved are towards the end of the acute stay, and these days are less expensive than an average day. By examining the cost components of an average day from the National Hospital Cost Data Collection (NHCDC) data, it is estimated that the costs of those acute days saved when one moves from acute care to sub-acute care, are about two-thirds of the cost of an average acute day. So for every day moved from acute care to sub-acute care about $180 is saved.

The NHHRC recommendations would save $127 million in 2022–23 rising to annual savings of $190 million in 2032–33.

Constraining the increase in obesity rates

The Institute baseline projection model incorporates a very substantial growth in Type 2 diabetes disease rates due to a projected increase in obesity. It was estimated that if obesity rates continued to increase as they had in the past two decades, then Type 2 diabetes would increase from 1.07 million prevalent cases in 2003 to 3.4 million cases in 2033. This increase in the cases of disease was a major driver in the expected increase in Type 2 diabetes expenditures from $1.3 billion in 2003 to $8.0 billion in 2033 (Goss 2008).

The impact of constraining the growth in obesity rate on the increase in diabetes rates was estimated. The constraint on increase in obesity was taken from the targets set in the Intergovernmental Agreements. This assumption consequently leads to no growth in Type 2 diabetes age-standardised disease rates in the period going forward from 2013, although there would be growth until then. Consequently the number of cases of Type 2 diabetes is projected to only increase to 2.3 million cases in 2033.

Obesity also has many other significant costs, including increasing the rates of heart disease, stroke, colorectal cancer and breast cancer (Begg et al 2007:79–80). Due to time constraints only the impact of obesity on diabetes has been modelled, as this is the highest cost of the impact of obesity. Diabetes accounts for 63% of the burden of disease that is attributable to high body mass.

The estimate of diabetes costs that are saved due to constraining obesity includes not only the direct costs of diabetes itself, but also the costs of the sequelae including cataracts, diabetic retinopathy, foot problems and chronic kidney disease.

However, in addition, diabetes increases the chance of heart disease and stroke. The savings in heart disease and stroke expenditure if the rate of growth of diabetes is reduced are not estimated, so this costing is a significant underestimate of the health system costs that would be saved if obesity was constrained.

The constraining of the rise in obesity and consequent reduction in diabetes leads to an estimated reduction in expenditure in 2022–23 of $624 million and a reduction in 2032–33 of $2.6 billion.

Faster decline in smoking rates

The AIHW projection model assumed that tobacco consumption will continue to decline at the rate at which it has declined in previous years.

However the Intergovernmental Agreements aim for a smoking rate of 10% by 2018 which is about 2 percentage points lower than the predicted national smoking rate in 2018 if current trends continue.

The Lewin Group report for the Commonwealth Fund estimated, based on work by Barendregt JJ et al (1997), that an 18.8% reduction in tobacco smoking in the USA would lead to a reduction in health system costs of the amounts specified in Table 4 (Lewin Group 2009).

The amount saved peaks at 0.65% of health costs, 8 years after the smoking is reduced, but then starts to decline, as a reduction in smoking increases life span and so leads to an increase in health costs in later years which counteracts the reduction in costs due to reduction in treatment for heart disease, lung cancer etc.

As discussed above, the target of a 10% smoking rate by 2018 is 2 percentage points faster then the trend decline. This represents about an 11% reduction in smoking beyond the trend decline, so the percentage reductions in Table 4 above are reduced by a ratio of 11/18.8 and these changes are applied to the Australian projection model. These changes are spread across all diseases.

The net costs of inducing a faster decline in smoking are assumed to be zero, on the assumption that one of the interventions used to reduce smoking rates is an increase in tobacco tax, which will increase Government revenue, and this increased revenue will be used to fund other programs to reduce smoking rates.

This more rapid decline in smoking rates led to an estimated reduction in expenditure in 2022–23 of $363 million and a reduction in 2032–33 of $262 million.

Table 4: Reduction in USA health costs due to 18.8% reduction in smoking

Year	$ billion	Per cent
2010	5.2	0.19%
2011	11.7	0.39%
2012	15.3	0.48%
2013	18.9	0.55%
2014	22.4	0.62%
2015	25.1	0.65%
2016	27.3	0.65%
2017	29.1	0.65%
2018	30	0.63%
2019	32.4	0.63%
2020	30.7	0.57%
2021	24.7	0.43%
2022	16	0.26%
2023	9.2	0.14%
2024	2.8	0.04%

Source: Lewin Group 2009

Encouragement of the delivery of primary care services through one provider so as to improve care coordination

The Institute projection model assumes a continuation of past trends, so it implicitly assumes a reduction in the number of solo General Practitioners. This may need lead to somewhat greater delivery of primary care services organised through the one provider.

Evidence as to the impact of a 'health care home' on service use is mixed. Some studies have shown no decrease in service use when medical services are better coordinated through such arrangements. Other studies have shown a significant decrease. For these costings, the study by Momany et al (2006) was used.

It was assumed that the NHHRC proposals would result in only half the effect suggested by the Momany study, partly to allow for the fact that not all Australians would have incentives to choose to have services organised through one primary care provider.

It was therefore assumed a health care home as proposed by the NHHRC would result in a 4% increase in GP costs, a 2% increase in pharmaceutical costs but a 1.3% reduction in admitted patient costs and a 4% reduction in specialist and imaging and pathology costs.

In total, the intervention saves $380 million in 2022–23 and $635 million in 2032–33 as compared to the AIHW projection model. This $635 million is 0.3% of total projected expenditure of $246 billion.

Change in aged care places

The AIHW projection model placed no limit on the number of aged care places. It assumed that places would increase according to need and demography. The model's expenditure estimates implied an increase in the number of high care places between 2012–13 and 2022–23 of 38% and an increase between 2022–33 and 2032–33 of 44%.

The NHHRC recommends that the allocation of subsidised residential aged care and other aged care places increases proportionally with the growth in the population 85 years and over. This would increase the number of funded places by about 37% from 2012–13 to 2022–23 and by about 51% from 2022–33 to 2032–33.

The NHHRC proposal would save some expenditure as compared to the health and aged care projection model in the period 2012–13 to 2022–23 as the growth for funded places under the NHHRC proposal would be less than the projection model. However for the period 2022–23 to 2032–33 the NHHRC proposal would result in more allocation to residential aged care expenditure than the expenditure projection model estimates. This extra allocation to residential aged care will not necessarily be completely used, so the estimated higher cost of the NHHRC proposals of $1.4 billion in 2032–33 is an upper limit. In 2022–23 the annual savings of the NHHRC proposals would be $519 million, but by 2032–33, the NHHRC proposals would be costing $1.4 billion more than the projection model estimates, assuming that the extra allocation to residential aged care expenditure implied by the NHHRC proposals is used.

Impact on hospital admitted patient costs of implementation of 'Denticare Australia'

The costs of financing Denticare Australia were examined in the NHHRC discussion paper *Costing a Social Insurance Scheme for Dental Care* by PriceWaterhouseCoopers. The discussion paper *Improving Oral Health And Dental Care For Australians* by Professor John Spencer and Dr Jane Harford estimated the impacts on oral health status of the current poor delivery of oral health services.

This costing examines the impact on potentially avoidable hospitalisations of Denticare Australia. Currently 55,184 hospital bed days are used for dental problems where the hospitalisations are avoidable (ICD-10 codes K02, K03, K05, K06, K08, K098, K099, K12 and K13). This represented 0.22% of total private and public hospital bed days in 2006–07 (AIHW Hospital morbidity database, accessed May 2009).

Almost all of these hospital bed days are avoidable if appropriate primary dental care is given. It is conservatively estimated that Denticare Australia will at least halve the number of these potentially avoidable hospitalisations, and this will reduce hospital admitted patient costs by 0.11%.

In total, the intervention saves $73 million in 2022–23 and $110 million in 2032–33 as compared to the AIHW baseline projection model.

Improved treatment of diabetes

The AIHW baseline projection model assumes some increase in the proportion of diabetes in the community that is treated by the health system, and assumes also some increase in amount of services provided per case of diabetes. This increased treatment would have some impact on the quality of life of people with diabetes.

The literature shows that the improved treatment of diabetes can have very significant impacts on the course of diabetes. Wagner et al (2001) showed that a group which had good control of blood sugars had 18.8% less hospital visits, 13.3% less specialist visits and 11% less GP visits than a group within the same Health Maintenance Organisation which did not have good control of blood sugar. This resulted in 17% less costs 5 years after baseline as compared to the group with poor control. Other studies have also shown significant cost savings if good blood sugar control is achieved but generally less than the Wagner study.

The Australian costing assumes that the benefits in terms of reduced hospital costs and reduced specialist, imaging and pathology costs were one-half the Wagner savings, and that in order to achieve good blood sugar control, the time spent by the GP with diabetic patients increased 10%.

In total, the intervention saves $125 million in 2022–23 and $188 million in 2032–33 compared to the AIHW baseline projection model.

Implementation of personal electronic health records

Personal electronic health records have the potential to improve the quality of care by allowing better coordinated care and to reduce costs by reducing unnecessary tests and procedures and by rationalising the use of pharmaceuticals.

It is assumed that implementation of personal electronic health records will in the first 2 years add 10% to GP costs, but will result in a continuing reduction of admitted patient, pharmaceutical and specialist, imaging and pathology costs of 0.5%.

In total, the intervention saves $430 million in 2022–23 and $627 million in 2032–33 as compared to the AIHW projection model. This $627 million is 0.3% of total projected expenditure of $246 billion.

Improvements in safety and quality of care

The AIHW baseline projection model assumes a modest improvement in the safety and quality of health care, in line with modest reductions in falls that have occurred in the last 20 years.

The burden of disease study estimated that in 2003, of the 44,402 Years of healthy life lost due to disability (YLD) lost to injury, about 1,417 YLD were lost due to adverse events occurring due to medical treatment, and about 13,995 YLD were lost due to falls. This accounts for 31.5% of the YLD due to injury (Begg et al 2007 and University of Queensland and AIHW Burden of disease database). Various studies indicate that improvements in the

safety and quality of care can reduce adverse events by at least one-third, and can reduce falls in health and aged care such that total falls can be reduced by one-third.

This would reduce the overall burden of disease and injury by 11.6%, and would reduce the health system costs of treating injury by a similar amount, as injury expenditure is correlated with the YLD lost due to injury. Improving safety and quality programs in the health system would require an investment which is estimated to be one-third of the benefits gained from the programs.

The net benefit of an investment in these programs would be 7.7% of the existing cost of treating injury, which in 2012–13 was estimated to be $670 million and in 2032–33 would be $976 million.

References

Armstrong, K & Campbell M (PriceWaterhouseCoopers) November 2008. Costing a Social Insurance Scheme for Dental Care <http://www.nhhrc.org.au/internet/nhhrc/publishing.nsf/Content/16F7A93D8F578DB4CA2574D7001830E9/$File/Costing%20a%20Social%20Insurance%20Scheme%20for%20Dental%20Care%20-%20November%202008.pdf>

Barendregt JJ, Bonneux L Van Der Maas PJ 1997. The Health Care Costs of Smoking. The New England Journal of Medicine. Volume 337:102–1057.

Begg S, Vos T, Barker B, Stevenson C, Stanley L, Lopez AD, 2007. The burden of disease and injury in Australia 2003. AIHW cat. no. PHE 82. Canberra: AIHW. http://www.aihw.gov.au/publications/index.cfm/title/10317

Goss J 2008. Projections of Australian health care expenditure by disease, 2003 to 2033 (AIHW Health and welfare expenditure series, no. 36). AIHW cat. no. HWE 43. Canberra: AIHW. <http://www.aihw.gov.au/publications/index.cfm/title/10692 http://www.nhhrc.org.au/internet/nhhrc/publishing.nsf/Content/16F7A93D8F578DB4CA2574D7001830E9/$File/Projection%20of%20Australian%20health%20care%20expenditure%20by%20disease.pdf>

Lewin Group 2009. A path to a high performance US health system: Technical documentation. Final report for the Commonwealth Fund. Lewin Group <http://www.lewin.com/content/publications/LewinPATHTechnicalDocumentation.pdf>

Momany ET, Flach SD, Nelson FD & Damiano PC 2006. A cost analysis of the Iowa Medicaid primary care case management program Health Services Research 41:4 Part 1 (August 2006) 1357-1371.

National Health and Hospitals Reform Commission 2009. A healthier future for all Australians. Final report of the National Health and Hospitals Reform Commission. Canberra: Commonweatlh of Australia.

Spencer J. & Harford J. December 2008. Improving Oral Health And Dental Care For Australians. Prepared for the National Health and Hospitals Reform Commission. <http://www.nhhrc.org.au/internet/nhhrc/publishing.nsf/Content/16F7A93D8F578DB4CA2574D7001830E9/$File/Improving%20oral%20health%20&%20dental%20care%20for%20Aust.pdf>

Wagner, EH Sandhu, N. Newton, KM, McCulloch, DK et al 2001. Effect of improved glycemic control on health care costs and utilization JAMA. 285:182-189.