Australian Government
Productivity Commission

SHIFTING THE DIAL

5 YEAR PRODUCTIVITY REVIEW

SUPPORTING PAPER NO. 6

IMPACTS OF HEALTH RECOMMENDATIONS

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The Productivity Commission

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long-term interest of the Australian community.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

Further information on the Productivity Commission can be obtained from the Commission's website (www.pc.gov.au).

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1 Introduction

The Productivity Commission's health policy recommendations are intended to improve the quality and quantity of life of Australians through reform of the health sector.

Based on what has already been achieved within Australia and more broadly, the Productivity Commission has indicated the nature and quantum of impacts that the recommended reforms may have (chapter 2 of the inquiry report). In this paper the Commission explains how these impacts are estimated.

In this exercise, the Productivity Commission stresses that the numbers are only indicative. It is not possible to assess and measure all the factors that will have a significant impact on future developments. Further, for the sake of simplicity or due to lack of data, the Commission has excluded some factors that are likely to be significant in the future. For example, the ageing of Australia's population and any dynamic effects of integrated care on the development of new technologies are not incorporated.[1] Other dynamic factors that are excluded from the calculations are:

- any impacts from investment in prevention that could potentially substantially increase the estimated net benefit[2]
- the impacts from increasing the longevity of Australians, including the higher cost of providing services to older Australians and the benefits to Australians from living longer.

The numbers should therefore be understood as a guide to some of the impacts that could eventuate and as a rough indication of the relative size of those particular impacts.

2 The quadruple aim: a framework for measuring impacts

Understanding the impacts of health reform is much more than counting the costs. It is about the quantity and quality of good health that is achieved for a given health expenditure. This is aptly expressed in the integrated health care literature in terms of four aims of health policy: improving population health, enhancing the patient's experience of care, lowering health care costs and supporting the wellbeing of health care providers (whose decisions can profoundly shape the future health of patients and whose wellbeing

1 There is evidence that technological innovations can reduce health system costs, after allowing for the time it takes to learn the new technology (for example, Bradford 2001; Ford et al. 2011). But while potentially very important, there is little Australian data to inform the quantification of such an effect.

2 For example, unpublished estimates by the Western Sydney Diabetes program indicate that while a program aimed at prevention involves greater upfront investment costs, the longer term benefits are ultimately significantly greater than a program of disease management (Western Sydney Diabetes initiative, pers. comm., 15 March 2017).

can therefore be closely interlinked with the wellbeing of patients).[3] The Productivity Commission's estimates include elements of each of these four aims as follows.

- Improving population health is estimated broadly in terms of a percentage improvement in the health of those who would otherwise be in poor or fair health.
- Enhancing the experience of patients is partially represented by estimating the value of the reduction in the time that patients spend waiting in waiting rooms for a medical appointment.[4]
- Lowering health care costs (without compromising health or the quality of service) is estimated in terms of the impacts on total health care expenditure, irrespective of who is paying and therefore includes savings to patients, to providers, to insurers and to governments.
- Supporting the wellbeing of people providing health care is partly considered. The Productivity Commission has limited its considerations to people providing health care without pay, whose caring responsibilities are reduced if patient health improves. This goes beyond the concerns about paid professionals, which was the focus of Bodenheimer and Sinsky (2014).

3 Possible impacts under the Productivity Commission's package of health policy initiatives

Many of the Productivity Commission's recommendations are interdependent and this affects the estimates of the possible impacts (table 1). Briefly, several reforms are needed to free up innovative Local Hospital Networks (LHNs) and Primary Health Networks (PHNs) in the health sector and allow them to invest in health care improvements. Conditional on those reforms, further measures are required to provide all other LHNs and PHNs with incentives to adopt best practice integrated care. Related to these are a number of reforms to ensure the patient is at the centre of the health care system. Building on all of these reforms are a number of steps towards providing PHNs and LHNs with the capacity to pursue greater efficiency gains across the broader health budget.

Some reforms can be implemented independently of other reforms. These include the removal of the private health insurance rebate on ancillaries, and a number of other reforms that have not been quantified in this exercise, such as reform of alcohol taxation.

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3 The first three aims were popularised by the Institute for Healthcare Improvement, beginning with the work of Berwick, Nolan and Whittington (2008). Bodenheimer and Sinsky (2014) proposed the fourth aim, including because the burnout of health care professionals has been found to undermine the care given to patients.

4 Timeliness of service is one measure of the quality of a service in the seminal work of Parasuraman, Zeithaml and Berry (1985).

Table 1 **The relationship between the Productivity Commission's recommendations and the estimated impacts**

Description	*Recommendations*	*How the Commission quantifies the impacts*
Free up innovators	Recommendation 2.1: greater autonomy at regional level including funding flexibility	Impacts on the health and personal welfare of those in poor or fair health; impacts on hospital costs and impacts on the Australian workforce that can be associated with the first five per cent of Local Hospital Networks who implement an integrated approach
Disseminate best practice, including in integrated care	Recommendation 2.1: disseminate lessons learnt by innovative regions Recommendation 2.2: reduce low-value health interventions Recommendation 2.3: publish results so all can see how the system is working Recommendations 2.4: use information better, including 'Champions Program'	Impacts on the health and personal welfare of those in poor or fair health; impacts on hospital costs and impacts on the Australian workforce that can be associated with the remaining Local Hospital Networks
Patient-centred approach to care	Recommendation 2.3: make the patient the centre of care	Impacts on the time patients spend waiting in the waiting rooms of GPs and specialist clinics
Empowering PHNs and LHNs to pursue efficiency in broader health budget	Recommendation 2.1: formal collaboration at regional level and resourcing PHNs	Impacts on health costs outside of the hospital sector from reducing low value care
Remove the tax rebate on the private insurance of health ancillaries	Part of recommendation 2.2	Budget impact of removing tax rebate
Other recommendations	Recommendation 2.5: better use of technology in pharmacy Recommendation 2.6: amend alcohol taxation arrangements	Impacts not quantified

The net present value of the future stream of economic impacts over twenty years is estimated at about $140 billion (in 2016 prices). This presupposes that 2020 is the first year that LHNs and PHNs implement integrated care and that it takes a further twenty years for all LHNs and PHNs to adopt integrated care. Were Australian governments to achieve the uptake of integrated care by all LHNs and PHNs within ten years (instead of within twenty years) and if the effectiveness of LHNs and PHNs was to range from 30 per cent to 45 per cent (instead of from 17 per cent to 45 per cent), then the stream of net economic benefits could be over $200 billion.

Over ninety per cent of these measured gains are conditional on first freeing up innovative and effective LHNs and PHNs to implement an integrated system of care (table 2).

Table 2 **Estimated stream of impacts of recommendations**
2016 prices

	Net present value over twenty years
	$m
Free up innovators	17 000
Disseminate best practice	91 000
Patient-centred	2 000
Improving efficiency across broader health system	23 000
Remove tax rebate on Private Health Insurance ancillaries	10 000
Total	144 000

Source: Productivity Commission estimates, explained below.

The nature of impacts estimated include the direct health impacts, personal welfare gains, broader workforce impacts and the health expenditure dividend (table 3).

Table 3 **Estimated net annual impacts of recommendations**
2016 prices

	Units	*2020*	*2025*	*2030*	*2040*
Improvement in health of those in poor or fair health	%	2	11	19	30
Personal welfare gains from better health	$m	14	76	141	274
Personal welfare gains from less waiting	$m	28	162	300	584
Workforce impact on GDP	$m	16	397	1 455	4 170
Health expenditure dividend	$m	1 825	7 909	15 134	33 441

Source: Productivity Commission estimates, explained below.

The health of Australians in poor or fair health is ultimately estimated to improve by up to 30 per cent. In practical terms, this could be understood as a marked improvement in blood sugar levels, blood pressure and other measures of the health of people, so as to reduce the average patient's reliance on health services by up to 30 per cent.

As a result of better health, Australians in poor or fair health will be able to spend more time at work, in home-based production and in leisure. It is estimated the value of these personal gains could amount to close to $300 million a year.

Integrating care around the patient will benefit all Australian patients. For example, by giving greater weight to the time of patients, an integrated system of care will reduce the time that patients spend waiting in the waiting rooms of GPs and specialists. It is estimated that implementing the Productivity Commission's recommendations could benefit Australian patients by about $600 million each year by reducing the time they spend waiting for GP and specialist appointments.

More broadly, the level of Australia's GDP will also be enhanced by the greater participation of those whose health is improved and by the greater participation of their voluntary carers. The Productivity Commission estimates this GDP effect could rise to over $4 billion a year.

The Productivity Commission estimates the health spending dividend (irrespective of source) from the package of reforms could rise to 6.5 per cent of total annual health spending once rolled out across Australia. This would amount to over $33 billion (in 2016 prices) if real health expenditure were to grow by 4.7 per cent a year, that being the historical rate of growth in total health spending in the ten years to 2014-15 (AIHW 2016b).[5]

Behind the numbers

The estimates of the direct health improvements and the subsequent economic impacts are based on a number of assumptions, drawing on Australian data and Australian studies. How these estimates are derived is explained in this section.

For the reader's convenience, a summary of the key calculations is in box 1 and a summary of the key assumptions in box 2. The workings are provided on the Productivity Commission's website as a separate excel file, entitled 'Health impacts workbook'.

Estimating the impact on health

The national rate of improvement in the health of those (otherwise) in poor or fair health is assumed to be the same as the national average rate of effectiveness of integrated care, which in turn depends on the rate that integrated care is adopted and the effectiveness of PHNs and LHNs in implementing integrated care (table 4).

Table 4 **Deriving the impact of integrated care on health**

	Unit	*2020*	*2025*	*2030*	*2040*
National rate of improvement in health of those in poor or fair health	%	2	11	19	30
National average rate of effectiveness of integrated care	%	2	11	19	30
National rate of adoption of integrated care (as a share of LHNs)	%	5	30	55	100
Effectiveness of LHN-PHN partnerships	%	45	38	34	30

Source: Productivity Commission estimates.

[5] Growth in government expenditure on health over the period to 2040 has been estimated to range between 2.8 and 3.8 per cent a year on average, depending on policy settings (Australian Government 2015; PC 2013).

Box 1 The calculations behind the numbers: A summary

National rate of improvement in the health of those in poor or fair health = National average rate of effectiveness of integrated care

*National average rate of effectiveness of integrated care = Effectiveness of LHN-PHN partnerships * Assumed national rate of adoption of integrated care*

Effectiveness of LHN-PHN partnerships = Weighted sum of the assumed effectiveness of the various LHNs-PHNs that have adopted integrated care

*Personal benefit from additional employment (or home based production or leisure) = Additional days of good health * Proportion of additional days of good health allocated to that activity * A proportion of the average wage (as specified below)*

Additional days of good health = Reduction in hospital bed days

Total workforce effect on GDP = GDP impact from those whose health has improved + GDP impact from freeing up carers

*GDP impact from those whose health has improved (as a percentage change from counterfactual) = Assumed GDP health elasticity * National rate of improvement in the health of those in poor or fair health*

*GDP impact from freeing up carers = GDP impact from those whose health has improved * Days carers spend caring as a ratio to days spent in hospital * Assumed participation rate of carers*

*Hospital recurrent spending dividend = Number of people whose health improves * Hospital recurrent spending dividend per patient*

*Number of people whose health improves = National population assumed to be in poor or fair health * Assumed national rate of adoption of integrated care*

Hospital recurrent spending dividend per patient = Averted hospital recurrent cost per patient – Assumed cost of integrated care per patient

*Averted hospital recurrent cost per patient = Assumed hospital recurrent cost per patient * Effectiveness of LHN-PHN partnerships*

*Other health recurrent spending dividend = Other health recurrent spending for those in poor or fair health * National average rate of effectiveness of integrated care*

*Hospital capital spending dividend = Reduction in beds required * Assumed hospital capital cost per bed*

*Reduction in beds required = Reduction in hospital bed days/365.25 * Assumed occupancy rate*

*Reduction in hospital bed days = Reduction in hospital separations * Assumed average length of stay*

*Reduction in hospital separations = Assumed potentially preventable hospitalisations * National average rate of effectiveness of integrated care*

*Reduction in low value hospital care = 10 per cent of counterfactual public hospital spending * National average rate of effectiveness of integrated care*

*Reduction in low value care (other than public hospital care) = 10 per cent of counterfactual spending for private hospitals, primary health care (other than dental and non-PBS medications), patient transport, aids and appliances and capital * National average rate of effectiveness of integrated care*

Box 2 Key assumptions behind the numbers: A summary

National rate of adoption of integrated care reflects the rate of adoption of health pathways by LHNs (box 3).

National population in poor or fair health remains a constant proportion of the population equal to that in 2014-15 from the ABS' 2014-15 National Health Survey.

Effectiveness of LHN-PHN partnerships reflects how quickly they adopt integrated care. The first five per cent of LHN-PHN partnerships to adopt integrated care have 45 per cent effectiveness; the next 15 per cent to adopt integrated care have 30 per cent effectiveness; the next 60 per cent have 30 per cent effectiveness and the last 20 per cent have 17 per cent effectiveness (table 5). The rates of effectiveness reflect the range of reductions in hospital utilisation reported in Australian integrated care studies (table 6).

GDP health elasticity is based on the general equilibrium results of Verikios et al. (2015) and the age cohort workforce shares in the 2014-15 National Health Survey of ABS.

Participation rate of carers is based on ABS Cat. No. 4430.0 Disability, Ageing and Carers, Australia: Summary of Findings, 2015, 18 October 2016, table 36.3.

Days voluntary carers spend caring for patients is assumed to be half the days that patients spend in hospital.

Australia's population growth and GDP growth assumptions are taken from Gabbitas and Salma (2016).

Counterfactual health spending grows by the real growth in total health spending between 2004-05 and 2014-15 in AIHW (2016b).

Cost of integrated care per patient is the simple average of program costs in two of the Australian integrated care projects, Western Sydney Diabetes and Mt Druitt HealthOne (table 6).

Hospital recurrent cost per patient is the simple average of averted hospital costs in three of the Australian integrated care projects, The Diabetes Care Project, Western Sydney Diabetes and Inala Chronic Disease Management Service (table 6).

Hospital capital cost per bed in 2016 is based on the Victorian Government Department of Health and Human Services' (2016) hospital capital planning module and grows with the assumed real growth in total health spending.

Occupancy rate of 88 per cent based on the 2014-15 national rate in AIHW (2016c).

Average length of stay for each episode of care of those in poor or fair health is four days, calculated by dividing the number of potentially preventable hospitalisation bed days in 2013-14 in National Health Performance Authority (2015) by the number of *potentially preventable hospitalisation separations* in 2014-15 in AIHW (2016a).

Potentially preventable hospitalisations in 2016 equals that of 2014-15 in AIHW (2016a) and subsequently grows with the assumed number of people in poor or fair health.

Sources: ABS (2015); AIHW (2016b, 2016c); Gabbitas and Salma (2016); NHPA (2015); Verikios et al. (2015); Victorian Government Department of Health and Human Services (2016).

The Productivity Commission assumes that the improvement in health mainly affects those in poor or fair health. This reflects that the principal beneficiaries of an integrated system of care are those who are (or would otherwise be) frequent users of the health system,

particularly those with complex and chronic health conditions (section 3.4 of Supporting Paper 5 (SP 5)).[6] In ABS' (2015) National Health Survey, those with poor or fair health comprised 15 per cent of the Australian population. For simplicity, this proportion is assumed to remain unchanged over time — but for the recommended reforms. It is however more likely that that proportion will rise over time with the ageing of the Australian population and therefore that the Commission's estimates may understate the national health impacts of integrated care.

The national average rate of effectiveness of integrated care depends on the effectiveness of LHNs and PHN partnerships that have adopted an integrated approach to care.

The Productivity Commission assumes that the national rate of adoption of integrated care will grow by five percentage points a year, implying it would take twenty years before an integrated approach to care would be rolled out across all of Australia. This slow rate of uptake reflects the rate that LHNs have adopted health pathways, specifically the HealthPathways and Map Of Medicine packages (box 3) and is also consistent with the slow diffusion of integrated care best practice observed around the world more generally (chapter 10 of SP 5).

Box 3 The rate of adoption of health pathways in Australia

Health pathways are agreements between GPs and hospital physicians about how particular conditions should be treated in their respective sectors. Ideally they are based on the latest medical evidence and reflect the local context, including resource constraints. There are two online health pathway tools in Australia – HealthPathways, developed in Canterbury, New Zealand and Map of Medicine, developed in the United Kingdom.

Compared to the budget of a Local Hospital Network, there is little upfront cost to LHNs from adopting health pathways, particularly when most Primary Health Networks have already begun rolling out health pathways among GPs. But there are considerable benefits for patients through the more effective integration of primary and hospital care achieved by a joint commitment to evidenced based health pathways. Its adoption across Australia is therefore an indicator of how proactive Local Hospital Networks are in working with Primary Health Networks to deliver better health care.

Only a quarter of Local Hospital Networks have committed to the development and adoption of health pathways since the HealthPathways innovation became available in 2011.

Sources: HealthPathways Community (2017); South Eastern Melbourne PHN (2017); Timmins and Ham (2013).

The Productivity Commission assumes that the effectiveness of implementation of integrated care by PHNs and LHNs will vary from 45 per cent for the earliest adopters

6 Supporting papers are available on the Productivity Commission's website at www.pc.gov.au and are referenced throughout this paper using the abbreviation 'SP' and the relevant number.

down to 17 per cent for the last adopters (table 5). Therefore, the national average effectiveness of implementation declines over time.[7]

Table 5 **The rate of effectiveness in implementing integrated care is assumed to vary with the rate of adoption**

	The first 5 per cent to implement are the most effective	*The next 15 per cent are almost as effective*	*The next 60 per cent are moderately effective*	*The final 20 per cent are minimally effective*
Effectiveness of implementation by LHNs and PHNs	45 per cent	40 per cent	30 per cent	17 per cent

The assumed range of effectiveness of implementation of integrated care by LHNs and PHNs is based on estimated reductions in hospitalisation in Australian studies of integrated care (table 6). These studies have been selected because they report the impact of integrated care on hospitalisation, the cost of averted hospitalisation and/or the cost of the program.

Estimating the impact on the personal wellbeing of those in ill health

Improved health means additional days that can be used in productive activities (paid employment, home based production and leisure) instead of being lost to ill health, resulting in a welfare gain for patients (table 7). The additional days of health are based on the estimated reduction in the days of hospitalisation.

The personal benefit of spending that additional time depends on how much of the time is now spent in productive activities and on the value of those activities. It is assumed that the additional hours of improved health would be allocated to these activities of choice in accordance with how the average Australian allocated their time in ABS' 2006 survey (ABS 2006), as specified here.

- 14 per cent of the recovered time is given to employment.
- 14 per cent of the recovered time is given to home based production.
- 21 per cent of the recovered time is given to leisure.

The hourly value of the additional time allocated to these activities is estimated as follows.

[7] This decline in effectiveness over time is consistent with declining marginal returns as investors focus on the most promising investments first. Conversely, there is evidence in the literature that the gains from innovations rise in the medium term as a result of learning by doing effects (Bradford 2001).

- The opportunity cost of foregone employment is assumed to initially be $10 an hour, less than a third of the average adult wage, and is indexed to the growth in GDP per person.
- The hourly value of home based production is assumed to be half the hourly adult earnings of the average community and personal service worker in May 2016 ($16), indexed to the growth in GDP per person. The nature of the work of community and personal service workers is reflective of the nature of home based production and is marginally lower than the average adult wage.
- The hourly value of leisure is assumed to equal one third of the average adult wage between May 2015 and November 2016 ($12), indexed to the growth in GDP per person.

Table 6 **Key estimates from Australian integrated care projects**
2016 prices

Project	*Unit*	*The Diabetes Care Project, 2011–2014*[a]	*HARP, 2004-05*	*Mt Druitt HealthOne, 2006–2012*	*Western Sydney Diabetes initiative, 2012–2016*[a,b]	*Inala Chronic Disease Management Service, 2007–2008*[c]
Scope of project		GP and allied health Patients with diabetes, particularly those with complex diabetes	Hospital and community care Patients at high risk of hospitalisation	All sectors Patients in need of complex, chronic and aged care	All sectors Patients admitted to hospital for diabetes related surgery	All sectors Patients with chronic and complex diabetes in need of acute care
Impact of project on hospital bed days	%	-17	-41	-41	-45	-46
Cost of project	$ per client	845	2 433	1 616	1 101	na
Cost of (avoided) hospitalisation	$ per client	4 303	na	na	11 432	8 432

a The estimated impact on hospital bed days is based on the reported impacts on average length of stay. **b** The estimated costs are based on unpublished data provided by the Western Sydney Diabetes initiative (pers. comm., 15 March 2017). **c** The estimated impact on hospital bed days is based on the reported impacts on admission rate. **na** Not available.

Source: Productivity Commission estimates.

Table 7 **The impact of integrated care on personal welfare of patients**
2016 prices

	Unit	*2020*	*2025*	*2030*	*2040*
Additional paid employment	$m	3	18	34	66
Additional home based production	$m	5	27	50	98
Additional leisure	$m	6	31	57	110

Source: Productivity Commission estimates.

Estimating the impact of saving patients' time

A key aspect of quality service is putting a high priority on the time of those being served. The Productivity Commission estimates here the value of the time of Australian patients that could be saved by more efficient service in the waiting rooms of GPs and specialists and by greater reliance on telehealth (table 8).

Based on the little data that are available, the Productivity Commission assumes that patients spend an average of 30 minutes in the waiting room of GPs and specialists, 18 minutes of which is assumed to be beyond what is reasonable. This assumption is based on Haas (2016) and Tonic Health Media (2017). A survey reported by Haas (2016) indicates patients spend about 26 minutes waiting for an appointment. Tonic Health Media (Tonic Health Media 2017) reports Australian patients spend an average of 35 minutes in the waiting room.

Table 8 **The impact of integrated care on patients' time**
2016 prices

	Unit	*2020*	*2025*	*2030*	*2040*
Personal welfare gains from less waiting	$m	29	162	300	584
from quicker service in GP and specialist waiting rooms	$m	22	120	222	432
from greater use of telehealth	$m	8	42	78	152

Source: Productivity Commission estimates.

Given the number of consultations reported in Medicare data for 2015-16, it is estimated that Australian adults spend 50 million wasted hours in GP and specialist waiting rooms every year. The Commission estimates that the annual costs for patients of excessive waiting times for attending GP and specialist clinics might amount to about a 0.1 per cent reduction in Australia's annual labour supply and a cost of the order of $900 million costs for patients — based on the average labour market status of Australian adults in 2015-16, and on the average adult wage between May 2015 and November 2016.

It is assumed that the proportion of unreasonable waiting time alleviated by implementing the Productivity Commission's recommendations is given by the national average rate of effectiveness of integrated care, ultimately delivering a benefit of $400 million a year.

The low use of telehealth also imposes a cost on patient time. On average, patients are assumed to spend about 35 minutes travelling to and from medical appointments that could otherwise be provided by telehealth. This is based on evidence for the United States where Ray et al. (2015) finds the average travel time for patients to be 37 minutes. Australian populations tend to be more concentrated in large cities, potentially adding to the time Australian patients may spend travelling. For example in Sydney, average daily commuting times for personal business, including medical appointments, was found to be 40 minutes (Bureau of Transport Statistics 2014).

In the absence of better information, the Productivity Commission assumes that about 10 per cent of consultations could be provided online or by phone. This is considerably lower — and arguably more plausible — than the share of 50 per cent cited by Griffith (2016).

Based on the average labour market status and average adult wage for 2015-16, the Productivity Commission values the patient time that could be saved by using telehealth at over $300 million a year. It is assumed that a proportion of this is achieved by a move to integrated, patient-centred care where the proportion is given by the rate of the national average rate of effectiveness of integrated care. This contributes a further benefit of over $100 million a year from implementing the Commission's recommendations.

Estimating the impact of workforce effects on GDP

By improving the health trajectory of those who would otherwise suffer from poor or fair health, a more effective system of care improves their capacity to work, leading to higher workforce participation (both for those whose health has improved and for those who voluntarily care for them), stronger employment outcomes and higher wages (Cai and Kalb 2006; Verikios et al. 2015). Aside from the personal income gains, there will be an overall improvement in GDP.

The Productivity Commission estimates a 0.2 per cent GDP gain could ultimately flow from a 30 per cent improvement in the health of those in poor or fair health, including the implications for their voluntary carers (table 9). Assuming an average rate of 2.1 per cent growth in GDP each year, this GDP gain is equivalent to about $4 billion (in 2016 prices) by 2040.

Table 9 **Deriving the impact of integrated care on the workforce**
2016 prices

	Unit	*2020*	*2025*	*2030*	*2040*
GDP impact, total	$m	16	397	1 455	4 170
GDP impact, total	%	0.001	0.02	0.06	0.15
GDP impact, those in poor or fair health	$m	13	310	1 136	3 254
GDP health elasticity		0.0003	0.001	0.003	0.004
GDP impact, voluntary carers	$m	4	87	320	916

Source: Productivity Commission estimates.

The Productivity Commission's estimate depends on Verikios et al. (2015), a Centre of Policy Studies' analysis of the GDP implications for Australia of improving the health of unwell workers in two different age cohorts. Verikios et al. (2015) implement two simulations, the first estimating the GDP impact of a ten per cent improvement in the health of the unhealthiest 49-69 year olds and the second simulation estimating the GDP impact of a ten per cent improvement in the health of the unhealthiest 29-38 year olds. They find the GDP impact is much larger for the older cohort (0.1 per cent after 20 years) than for the 29-38 year old cohort (0.008 per cent after 20 years), which they attribute to the greater tendency of those near retirement to retire early in response to ill health. Their conclusion is consistent with the analysis of ill health and early retirement among older working individuals in the Household, Income and Labour Dynamics in Australia survey data by Zucchelli et al. (2010). Zucchelli et al. (2010) find that a deterioration in the health of those in the workforce aged over 50 years increases the risk of early retirement by between 50 and 320 per cent for men and between 68 and 74 per cent for women.

Based on this literature, the Productivity Commission assumes the GDP effect after twenty years of a one per cent improvement in health to vary by age cohort as follows.

- For those aged 15 to 44 years, the effect is assumed to be equal to the younger age cohort in Verikios et al. (2015).
- For those aged 45 to 64 years, the effect is assumed to be equal to the older age cohort in Verikios et al. (2015).
- For those aged 64 to 74 years, the effect is assumed to be equal to the younger age cohort in Verikios et al. (2015) given that many would already be in retirement, reducing the GDP impact.
- For those aged over 74 years, the effect is assumed to be zero.

The weighted average for all Australians in poor or fair health is based on the age cohort shares in ABS' (2015) National Health Survey. For the sake of simplicity, these shares are assumed constant despite the ageing of the Australian population over time. As the population ages, it is likely that the proportion nearing the age of retirement will rise (tending to increase the workforce-related GDP impact of improving health), and so will

the proportion above the age of retirement (tending to reduce the workforce related GDP impact of improving health). Thus the additional complexity of incorporating population ageing could result in a higher or lower GDP estimate, depending on the proportion of the population beyond the working age (which is itself likely to rise over time with the improved health and longevity of Australians). Nor does the Productivity Commission account for reductions in mortality rates that could be expected to be associated with improved health. Lower mortality rates could be associated with extended years of quality life for some, but with extended years of low quality life for others, which in turn may lead to higher demand for health care services.

Better health would also reduce the demands on the time of voluntary support carers, freeing them up to participate in the workforce.[8] This is incorporated into the Productivity Commission's estimate of the GDP effect by assuming that, on average, the impact of a carer's availability on the workforce is just under 30 per cent of the impact of the average patient's availability. This assumption is derived from the proportion of primary carers who participate in the workforce from the ABS' (2016) summary of the 2015 Survey of Disability, Ageing and Carers (56 per cent) and (in lieu of there being no publicly available data) by assuming that the average patient requires one day of voluntary care in their home for every two days spent in hospital care.

Estimating the health expenditure dividend

There are two broad means by which the proposed health reform agenda can deliver a substantial health expenditure dividend.

- They can reduce the demands on the health system by directly improving the health of Australians.
- They can reduce the provision of low value care, including the avoidance of waste such as duplication of services. Low value care are treatments that are ineffective for improving health (chapter 7 in SP 5).

The impact on hospital recurrent spending

The impact on health expenditure is best understood as the dividend that would be generated by implementing an integrated system of care. This dividend may be reinvested into further improving the health of Australians, which would lead to subsequent effects on health and on the economy. However for simplicity, the Productivity Commission only estimates direct impacts.

8 In 2015, 2.7 million Australians provided informal care, predominantly for family members (ABS 2016). This impacts on their capacity to participate in the workforce. For those aged between 15 and 64 years, the workforce participation rates of primary carers (56.3 per cent), and of other carers (77.2 per cent), are significantly lower than that of those without caring responsibilities (80.3 per cent).

The hospital recurrent spending dividend depends on the number of people whose health improves and on a per patient estimate (table 10). Those who experience an improvement in health are those of fair or poor health who reside in the Local Hospital Network regions that have adopted a system of integrated care – and therefore depends on the assumed rate that LHNs adopt integrated care as discussed above.

The hospital recurrent spending dividend for each patient depends on the averted hospital recurrent cost and on the assumed cost of integrated care, both of which are based on Australian studies of integrated care in table 6. The recurrent cost of hospitalisation is based on the three studies for which hospitalisation costs were available – the Diabetes Care Project, Western Sydney diabetes initiative and Inala Chronic Disease Management Service.

The per patient cost to LHNs and PHNs of integrated care is the simple average of the cost of the Mount Druitt and Western Sydney diabetes programs (reported in table 6). While other programs report program costs, they do not all involve a model of care that integrates primary and hospital care. The Diabetes Care Program only involved primary care providers and the Hospital Admission Risk Program (HARP) only involved the state government health providers. GP-focused programs tend to be less costly and less effective – and hospital-focused programs more costly – than programs that integrate both GP and hospital care (appendix A of SP 5). The assumed cost of an integrated care program (which integrates across all sectors) is therefore based only on those studies of programs that integrated the care provided by GPs and hospitals.

Table 10 **Deriving the impact of integrated care on hospital recurrent spending**
2016 prices

	Units	2020	2025	2030	2040
Hospital recurrent spending dividend	$m	362	1 910	3 486	6 622
People whose health improves	‘000	146	936	1 827	3 725
National population aged 15+ in poor or fair health[a]	‘000	2 917	3 122	3 322	3 725
Adoption rate (share of LHNs)	%	5	30	55	100
Hospital recurrent spending dividend per patient[b]	$	2 482	2 040	1 908	1 778
Averted hospital recurrent cost per patient	$	3 970	3 707	3 776	4 122
Hospital recurrent cost per patient	$	8 823	9 885	11 075	13 903
Effectiveness of implementation by LHN/PHN	%	45	38	34	30
Cost of integrated care per patient	$	1 488	1 667	1 868	2 345

a The proportion of Australia’s population in poor or fair health (15 per cent) is assumed to remain equal to that reported in the ABS National Health Survey 2014-15. **b** This is estimated for patients who rely heavily on health services because of their poor health, represented in these calculations by those reported to be in poor or fair health.

Source: Productivity Commission estimates.

Outside of the hospital sector, it is assumed that improved health from the implementation of integrated care reduces recurrent spending by the national average rate of effectiveness. The dividend is around $3 billion after five years, rising to $12 billion by 2040.

The impact on hospital capital spending

The estimated hospital capital spending dividend is the reduction in capital expenditure as a result of improving the health of Australians through integrated care. The rate of reduction in capital spending is linked back to the national average rate of effectiveness of integrated care (boxes 1 and 2). Detailed calculations are provided in the excel workbook as earlier noted.

A key assumption is the capital cost of constructing or expanding a hospital per patient bed. This is assumed to be approximately $210 000 in 2016 based on the cost per hospital bed implied in Victoria's hospital capital planning module (Vic DoHHS 2016). The cost is assumed to rise over time in line with the assumed growth in total health spending.

The hospital capital spending dividend arises from avoiding the cost of additional beds. It is estimated that the size of this dividend could be about $1.5 billion by 2040 (table 11).

Table 11 **Deriving the impact of integrated care on hospital capital spending**
2016 prices

	Units	2020	2025	2030	2040
Hospital capital spending dividend	$m	36	239	531	1 483
Capital cost per bed	$	251 870	316 135	396 797	625 116
Reduction in beds required	No.	141	754	1 338	2 373

Source: Productivity Commission estimates.

The impact on low value care

In the absence of comprehensive Australian studies of the extent of low value (or ineffective) care, the Productivity Commission has relied upon a range of sources to assume that approximately ten per cent of health care services are of low value (box 4).

The Productivity Commission estimates that implementation of its recommendations could reduce low value care by a proportion that is represented by the national average rate of effectiveness of integrated care.

Based on this methodology, savings from reducing low value treatments in public hospitals could ultimately amount to over $4 billion per year and low value care outside of the

public hospital sector could ultimately be reduced by approximately $7 billion per year, freeing up that money for investment in other areas (table 12).

Table 12 **Deriving the impact of integrated care on low value care**
2016 prices

	Units	*2020*	*2025*	*2030*	*2040*
Total dividend from low value care	$m	349	2 193	4 587	11 428
from public hospital spending[a]	$m	139	873	1 826	4 548
from other services[a,b]	$m	210	1 320	2 762	6 880

a The dividend from reducing low value care is calculated as ten per cent of counterfactual spending multiplied by the national average rate of effectiveness of integrated care. **b** Other services included here are GPs, allied health, specialists, community health, pharmaceuticals, diagnostics, patient transport, aids and appliances.

Source: Productivity Commission estimates.

There is also a deadweight burden associated with raising the tax revenue to fund this low value care. Based on recent estimates, it is assumed the deadweight burden is about $295 million for every one billion dollars of tax revenue spent on low value care (box 5).

Box 4 Evidence of the extent of low value care in Australia

While there are currently no comprehensive estimates of low value care for Australia, there is clear evidence of overuse in Australia. Elshaug et al. (2012) identify the potential overuse of over 150 treatments funded by Australia's Medicare. One such treatment, for example, is arthroscopic surgery for knee osteoarthritis.

Another is the overuse of antimicrobials, where, for example, approximately 75 per cent of acute bronchitis is treated with antibiotics despite evidence that indicates the rate should be near zero. In an international comparison, Australia's rate of dispensed antimicrobials is double that of the Netherlands, which has one of the lowest rates in the world, and is otherwise higher than Canada (by over 80 per cent), the United States (by over 40 per cent) and most European countries. Furthermore, within Australia, the rate that antimicrobials (including antibiotics) are dispensed varies by over 11 times between the area with the highest rate and the area with the lowest rate. Such a high rate of geographic variation is indirect evidence of overuse.

This and numerous other variations in specific types of health care are reported in the Australian Atlas of Healthcare Variation by the Australian Commission on Safety and Quality in Health Care. While variation can often reflect need, the sustained and high degree of variation in Australia indicates a significant proportion of the variation is unwarranted and thereby harming or not improving health and therefore diverting resources from more effective health care.

Duplication of medical tests is another example of low value care in Australia. The Commonwealth Fund's international health policy survey indicates that medical tests are duplicated for over 10 per cent of unwell adults. A higher proportion of unwell adults report that the results of their medical tests were not available in time for their GP appointment, detracting from the value of the tests.

US studies have estimated that overuse accounts for at least 6-8 per cent of total health care spending (based on direct measurement of overuse) and could be as high as 29 per cent (based on geographical variation). It is unlikely that the extent of overuse would be lower in Australia. Australia's internationally high rate of antimicrobial use has already been mentioned. It is also notable that Australia's recently released guidelines discouraging arthroscopic surgery for patients with knee osteoarthritis is well over a decade behind the United States and the United Kingdom.

Sources: ACSQHC (2015, 2017a, 2017b); Brownlee et al. (2017); CMS (2004); Elshaug (2012); Hansen et al. (2015); Mossialos et al. (2017); NICE (2008, 2014); Schoen et al. (2009).

The impact of removing the subsidy of PHI ancillaries

The Productivity Commission estimates the net economic impact of removing the subsidy of PHI ancillaries by estimating the deadweight economic burden associated with the subsidy and estimating the low value care that may be funded by the subsidy (table 13).

The value of the subsidy paid for PHI ancillaries is estimated by assuming that the subsidy accounts for almost 25 per cent of the budget item '*Private Health Insurance Act 2007* – incentive payments and rebate' reported by the Department of Health ((DoH 2017, table 2.4.1). This assumed proportion of the government rebate and incentive payment is, in the absence of better information, based on the share of ancillaries in the total benefits paid by Private Health Insurers in the twelve months to March 2017 reported by Australian Prudential Regulation Authority (2017). The value of the subsidy of ancillaries is assumed

to grow with the forward budget estimates to 2019-20, and then to grow with the real growth in total health expenditure. Under this assumption, the value of the subsidy is estimated to be $1.7 billion in 2020, rising to over $4 billion by 2040.

Box 5 The deadweight burden in the taxation system of low value care

Taxpayers bear any inflated costs when spending is publicly funded or subsidised. The second round effects of the taxes that must be levied to raise the required revenue frustrate investment and labour supply across the economy generally. Income taxes are generally the first resort for revenue shortfalls for the Australian Government under current policy settings, and the most recent estimates suggests that they impose about a $200–$390 million 'deadweight' economic burden for every one billion dollars of unjustified taxpayer funded expenditures — 'waste on waste'. State revenue is also a large source of funding for health care, and the taxes they impose are often also inefficient (such as insurance taxes and stamp duties). Therefore, even if the deadweight costs per additional dollar of tax collected were at the bottom end of the most recent estimates, it is plausible that there are hundreds of millions of dollars of hidden costs annually in addition to the direct costs of the waste itself.

Sources: Cao et al. (2015); Murphy (2016).

There is a deadweight burden associated with raising the tax revenue (via income taxation) to the estimated value of the subsidy of ancillaries. Drawing on the literature summarised in box 5 above, it is assumed that the deadweight burden amounts to $295 million for every one billion dollars of the subsidy. Based on this assumption, it is estimated that the gain from removing the deadweight burden could be approximately $400 million a year by 2020, rising to over one billion dollars a year by 2040.

Table 13 Deriving the net economic impact of removing the subsidy of PHI ancillaries

2016 prices

	Units	*2020*	*2025*	*2030*	*2040*
Economic impact of removing the subsidy	$m	611	767	963	1 516
from removal of deadweight burden	$m	444	557	699	1 102
from assumed low value care[a]	$m	167	210	263	415

[a] The dividend from reducing low value care is calculated as ten per cent of the estimated value of the government subsidy of ancillaries.

Source: Productivity Commission estimates.

A proportion of the subsidy of PHI ancillaries is likely to fund low value care. While that proportion could be significant, there is little information to indicate what that proportion may be. Therefore, the Productivity Commission assumes the proportion to be 10 per cent, consistent with the assumption made for other forms of health care spending. Low value care funded by the subsidy on ancillaries is therefore estimated to be almost $200 million in 2020, rising to about $400 million by 2040.

The net economic benefit of removing the subsidy on PHI ancillaries therefore rises from approximately $600 million initially, to about $1.5 billion by 2040 and continues to grow with the expansion of the economy.

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