

# District Health Board Financial Performance to 2016 and 2017 Plans

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THE TREASURY  
Kaitohutohu Kaupapa Rawa

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# Executive summary

This report provides an update on district health board's (DHB) financial performance, capital management, and productivity up to the last complete financial year, 2016, and discusses their 2017 plans. A further non-financial performance report will be provided later in the year.

Table 1 provides a summary dashboard of performance against our key financial indicators. Upward arrows indicate an improved rating since last year's report and downwards arrows a worse rating. The first three indicators are continued from last year, productivity has been slightly changed, and repairs and maintenance is new. Summary comments by DHB are provided in appendix 1.

**Table 1: Summary of performance against key indicators**

Overall rating	Net deficit	Balance sheet	Planning	Productivity	Repairs and maintenance
Auckland					
Bay of Plenty					
Canterbury					
Capital and Coast ↓					
Counties Manukau					
Hawke's Bay					
Hutt ↑					
Lakes					
MidCentral					
Nelson Marlborough					
Northland					
South Canterbury ↓					
Southern					
Tairāwhiti					
Taranaki ↓					
Waikato					
Wairarapa					
Waitemata					
West Coast				n/a	
Whanganui					

International comparisons show that, at a high level, New Zealanders have similar health outcomes to people in other countries and that our health system achieves reasonably good results, although there is room for improvement in some areas, including health equity. The comparisons also show that funding levels alone are not a reliable indicator of health system performance and that focusing on increasing service quality and accessibility is important.

Government health spend has increased in real terms over time. It has fallen as a proportion of the economy in recent years, however, attracting criticism from some quarters. There is an ongoing debate about whether the system is adequately funded.

Forecast demographic changes are expected to lead to increasing demand for health services and rising expenditure. After several years of spending restraint, a number of DHBs are showing signs of financial pressure and some are having difficulty meeting their planned financial targets. Rising provider-arm (hospital) expenditure has been a key cost driver, mainly resulting from increasing personnel costs.

Capital expenditure is another significant cost for DHBs and the need for additional Crown support is expected to continue. Some DHBs look to be sweating their assets and under-funding repairs and maintenance to help balance their books. The overall quality of capital management and planning is mixed.

Hospital outputs (including electives) have increased over time, but the story on hospital productivity is less clear. Once population and cost growth is taken into account, overall hospital productivity has been broadly stable, although there is a relatively long tail of lower productivity in some smaller DHBs. The variability in results between DHBs suggests there may be room for improvement. There is limited information about wider health system productivity.

# Section 1: Introduction

*References to years throughout this report are to financial years (ending 30 June). Figures for years up to and including 2016 are actuals. Figures for 2017 and out-years are taken from annual plans. Annual plans for Canterbury and Capital & Coast are not yet finalised.*

This report provides an overview of government health spending and DHBs' financial performance and productivity. A further non-financial performance report will follow later in the year once data is available.

This is the third report we have produced following reports in 2014 and 2016. The underlying analysis forms part of the Treasury's monitoring of health sector performance and will inform our analysis of DHB annual plans for the coming financial year (2018). Our work is intended to complement more detailed monitoring undertaken by the Ministry of Health, which has primary oversight of the sector. It is not part of the formal performance management and accountability framework for DHBs. Nor are many of the metrics we use.

Throughout this report, we use a traffic light system to rate DHB performance. In many cases, we measure performance relative to other DHBs rather than against an objective standard and the report is calibrated so that a number of DHBs will always have green, amber and red ratings. A green rating indicates that we have no particular concerns about a DHB's performance. An amber rating indicates that we have some concerns. A red rating indicates that a DHB was among the worst performers against a particular metric or that we have concerns about its performance.

## Section 2: New Zealand health expenditure in context

This section provides context for our subsequent analysis of DHB financial performance and productivity. We summarise some reports comparing New Zealand health outcomes and system performance to other countries. We also look at trends in New Zealand's health spending and discuss the usefulness or otherwise of comparing health expenditure to gross domestic product (GDP).

### International comparisons help us understand the relative health of New Zealanders and our health system's performance

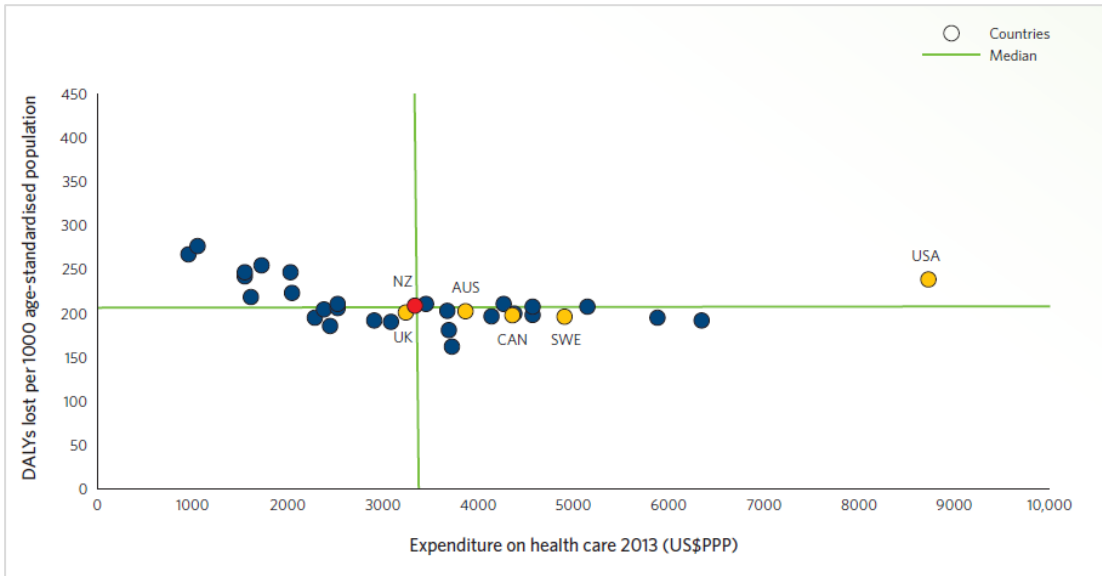
While we have not undertaken a comprehensive review of international data for the purpose of this report, we think a brief discussion of international comparisons provides useful context. We approach this at two levels:

- ▶ High-level health-outcomes measures versus expenditure per capita, to assess overall performance and value for money.
- ▶ More detailed comparisons of different aspects of health-system performance and types of outcomes, to help identify opportunities for system improvement and areas where we are doing relatively well.

### Our high-level health outcomes and expenditure are similar to other nations...

New Zealand has around median levels of both health loss rates and health expenditure per capita, compared to a group of 33 OECD nations reported by the Health Quality and Safety Commission (HQSC) (figure 1). Health loss is sourced from the Global Burden of Disease Study using disability adjusted life years (DALYs). DALYs include both years lost from death and health loss from illness and disability.

**Figure 1: DALYs lost per capita versus health spend per capita (source Health Quality and Safety Commission)**



**...although the performance of New Zealand’s health system varies across indicators**

Table 2 provides provides a more detailed view of New Zealand's comparative performance. We perform well in areas such as effective care, coordinated care and efficiency. We do less well in some other areas, particularly health equity (in this case defined as achieving equal results for those who are less financially well-off). In part, this probably reflects long standing inequality for Māori and Pacific Island people, which we have discussed in previous reports.

The 11 countries in table 2 have been selected as relevant for comparison to the United States. While they are mostly a subset of the 33 countries reported in figure 1, they have relatively high health expenditure levels compared to OECD countries in general, and have higher levels of per capita income than New Zealand.












We note that, while the comparative information in table 2 is useful, many of the results are based on doctor and patient survey data and that further analysis would be of value to explore some of the findings.



**Table 2: International comparison of health system performance and outcomes (Commonwealth Fund)**

**COUNTRY RANKINGS**

Top 2*
Middle
Bottom 2*

											
	AUS	CAN	FRA	GER	NETH	NZ	NOR	SWE	SWIZ	UK	US
<b>OVERALL RANKING (2013)</b>	4	10	9	5	5	7	7	3	2	1	11
<b>Quality Care</b>	2	9	8	7	5	4	11	10	3	1	5
Effective Care	4	7	9	6	5	2	11	10	8	1	3
Safe Care	3	10	2	6	7	9	11	5	4	1	7
Coordinated Care	4	8	9	10	5	2	7	11	3	1	6
Patient-Centered Care	5	8	10	7	3	6	11	9	2	1	4
<b>Access</b>	8	9	11	2	4	7	6	4	2	1	9
Cost-Related Problem	9	5	10	4	8	6	3	1	7	1	11
Timeliness of Care	6	11	10	4	2	7	8	9	1	3	5
<b>Efficiency</b>	4	10	8	9	7	3	4	2	6	1	11
<b>Equity</b>	5	9	7	4	8	10	6	1	2	2	11
<b>Healthy Lives</b>	4	8	1	7	5	9	6	2	3	10	11
<b>Health Expenditures/Capita, 2011**</b>	\$3,800	\$4,522	\$4,118	\$4,495	\$5,099	\$3,182	\$5,669	\$3,925	\$5,643	\$3,405	\$8,508

Notes: \* Includes ties. \*\* Expenditures shown in \$US PPP (purchasing power parity); Australian \$ data are from 2010.

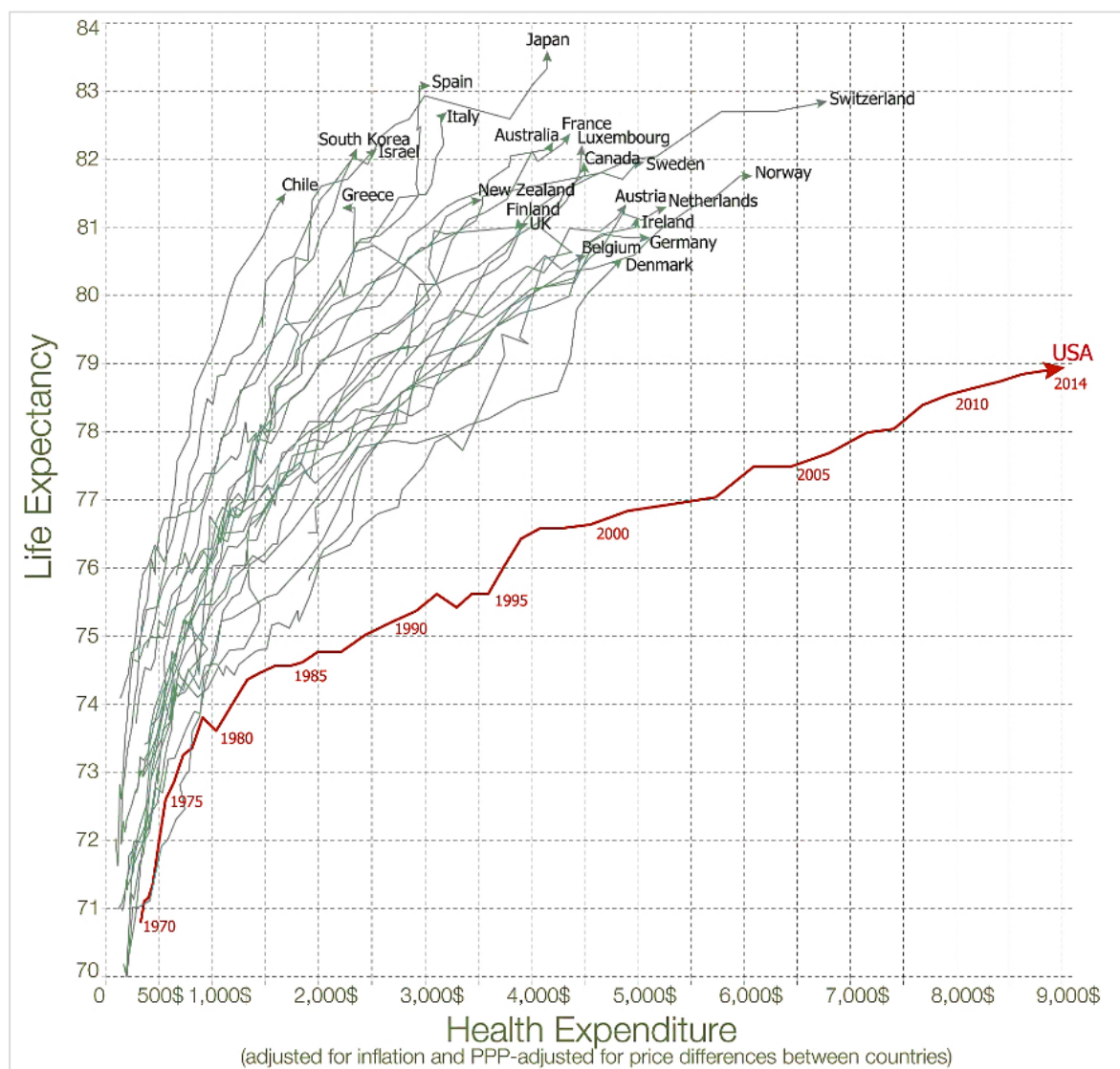
Source: Calculated by The Commonwealth Fund based on 2011 International Health Policy Survey of Sicker Adults; 2012 International Health Policy Survey of Primary Care Physicians; 2013 International Health Policy Survey; Commonwealth Fund *National Scorecard 2011*; World Health Organization; and Organization for Economic Cooperation and Development, *OECD Health Data, 2013* (Paris: OECD, Nov. 2013).

## Higher funding levels do not guarantee better health outcomes

The Commonwealth Fund rankings above (table 2) do not show a strong linkage between health system funding and performance. The United States has the lowest ranking despite having the highest expenditure per capita. In contrast, the United Kingdom has the highest ranking while having the second lowest spend. Figure 2 below shows a pattern of poorer health outcomes in the United States (measured as life expectancy) occurring over time.

The United States' results may be affected by high inequality; the "inverse care law" argues that access to treatment tends to reduce as health need rises, particularly in private market health systems where access levels are linked to employment.

Figure 2: Life expectancy versus health expenditure per capita over time (source Our World in Data)



The relatively weak linkage between health spend and outcomes indicates that system development and monitoring to ensure that cost-effective, high quality services are delivered to those most in need is important. It is also important to bear in mind that modifiable health outcomes are largely driven by factors outside the health system (social determinants of health). Ongoing work is therefore required to increase collaboration across agencies and careful consideration is required of the balance between Vote Health funding and wider opportunities to improve health (such as through housing and education).

### New Zealand health spending as a proportion of GDP is comparable to other OECD countries...

New Zealand health expenditure as a percentage of GDP is close to the OECD average, although it is lower than some of the more wealthy countries in the Commonwealth Fund analysis above.

**Table 3: Health expenditure as a percentage of GDP (source OECD data for 2015)**

	Total	Public	Private
New Zealand	9.4%	7.5%	1.9%
OECD	9.0%	6.6%	2.4%
Australia	9.3%	6.2%	3.1%
Canada	10.1%	7.2%	3.0%
France	11.0%	8.6%	2.4%
Germany	11.1%	9.4%	1.7%
Netherlands	10.8%	8.7%	2.1%
Norway	9.9%	8.5%	1.5%
Sweden	11.1%	9.3%	1.8%
Switzerland	11.5%	7.8%	3.7%
United Kingdom	9.8%	7.7%	2.0%
United States	16.9%	8.4%	8.6%

Note 1 The OECD measures health expenditure using its System of Health Accounts. This is a different (broader) measure to core Crown health expenditure discussed later in this report.

### ...and we have a relatively high proportion of government health funding

We have a relatively high proportion of public (versus private) health funding and health makes up the highest percentage of total government spending in the OECD. Our high government health spend comes within total government expenditure that is close to the OECD median percentage of GDP.

**Table 4: New Zealand health expenditure ranked against 35 OECD countries (source OECD)**

	Data year	NZ's rank
Health spend per capita (adjusted for purchasing power parity)	2015	19
Total health spend as a percentage of GDP		15
Government funded health spend as a percentage of GDP		13
Percentage of health spend government funded		11
Health as a percentage of total government expenditure <sup>1</sup>	2013	1

<sup>1</sup> We could not locate 2015 OECD data for this metric. More recent World Bank data (2014) also reports New Zealand as having the highest percentage in the OECD.

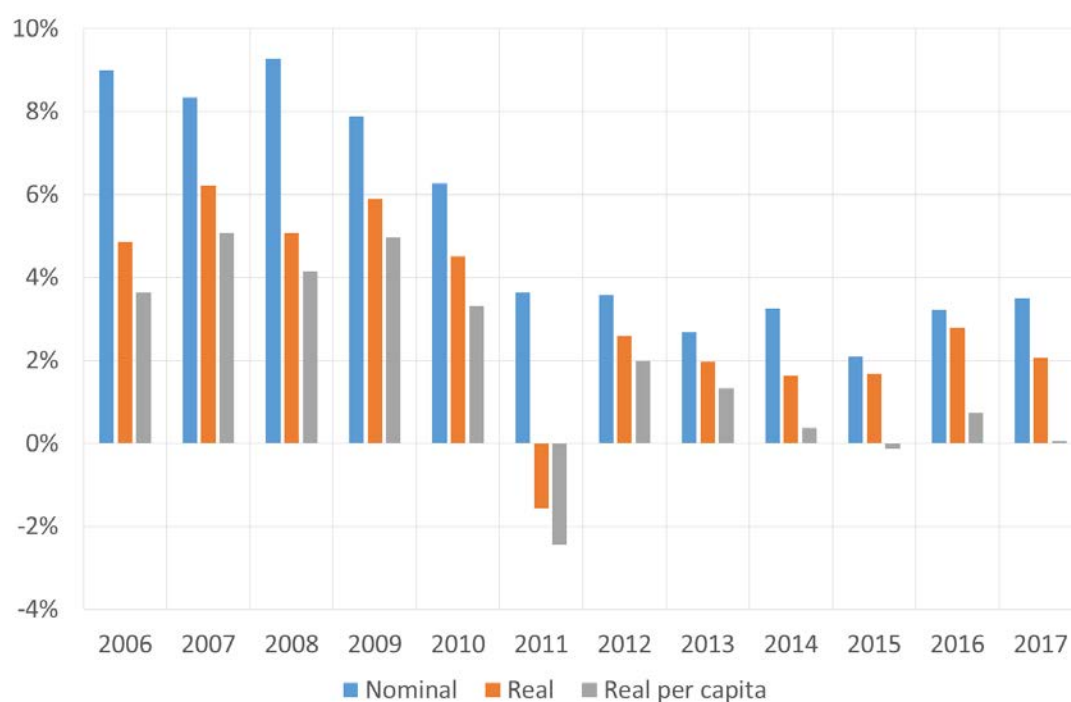
### There is ongoing debate about if the New Zealand health system is adequately funded...

There has been some debate recently about the extent to which government health spending is (and should be) keeping pace with economic growth (GDP). In May 2016, representatives of the Association of Salaried Medical Specialists (ASMS), the Council of Trade Unions (CTU) and others published an editorial in the New Zealand Medical Journal pointing out that Vote Health operating expenditure had fallen as a percentage of GDP since 2009/10 and arguing that the sector is underfunded. The editorial also accused successive governments of misrepresenting health spending for political reasons.

### ...health spending has continued to increase in real terms...

Health spending has increased every year in nominal terms. It has also increased in real (CPI adjusted) terms and real per capita terms in most years, albeit at a lower rate and with occasional reductions. Figure 3 provides a summary, with more detail in appendix 2. Ministry of Health figures (based on historical cost weights by age, ethnicity and deprivation) generally suggest that health spending growth has kept pace with demographic cost pressures, but has only made a contribution to other cost pressures, although this analysis does not include funding for new initiatives.

**Figure 3: Vote Health (operating) expenditure, annual growth**

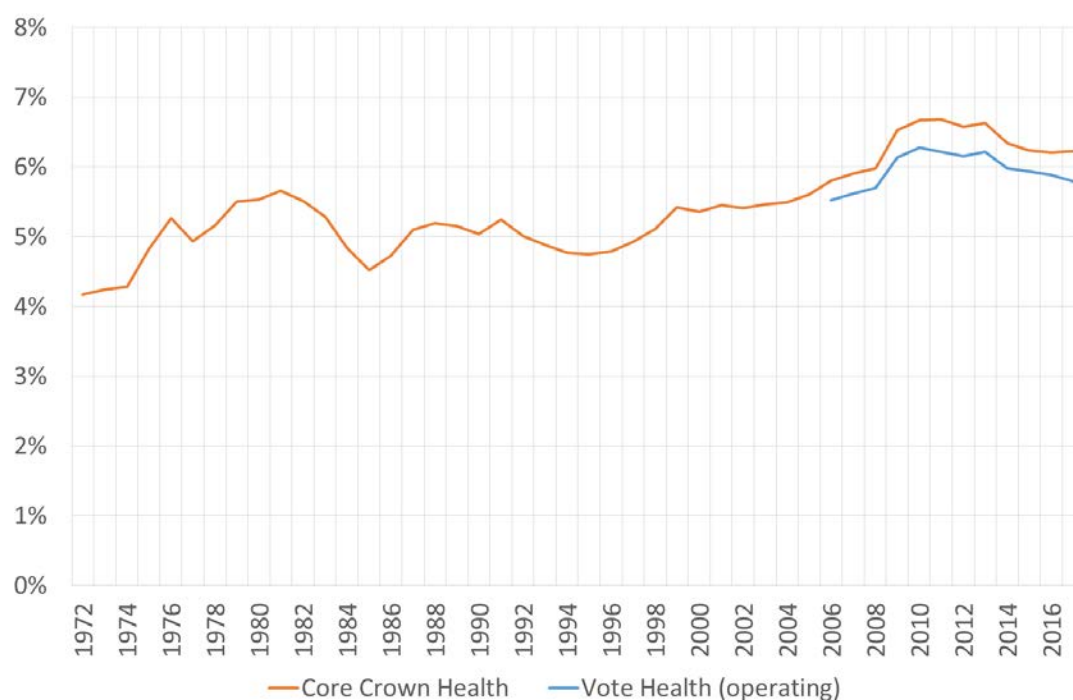


### ...and Government health expenditure has increased as a proportion of the economy over time...

Government health expenditure has tended to increase as a proportion of the economy over a long period. Figure 4 shows core Crown health expenditure as a percentage of GDP from 1972 (4.2%) to 2017 (6.2%). For comparison, Vote Health operating expenditure is also shown for later years. (There are various differences between core Crown and Vote Health expenditure. Health-related expenditure within Vote ACC is included as part of core Crown health expenditure, for example).

Over the long-term, we think it is useful to look at health spending as a percentage of GDP. This gives a picture of the overall affordability of the health system and its size relative to other areas of economic activity (including other areas of government expenditure). It also allows for cross-country comparisons.

**Figure 4: Government health expenditure as a percentage of GDP**

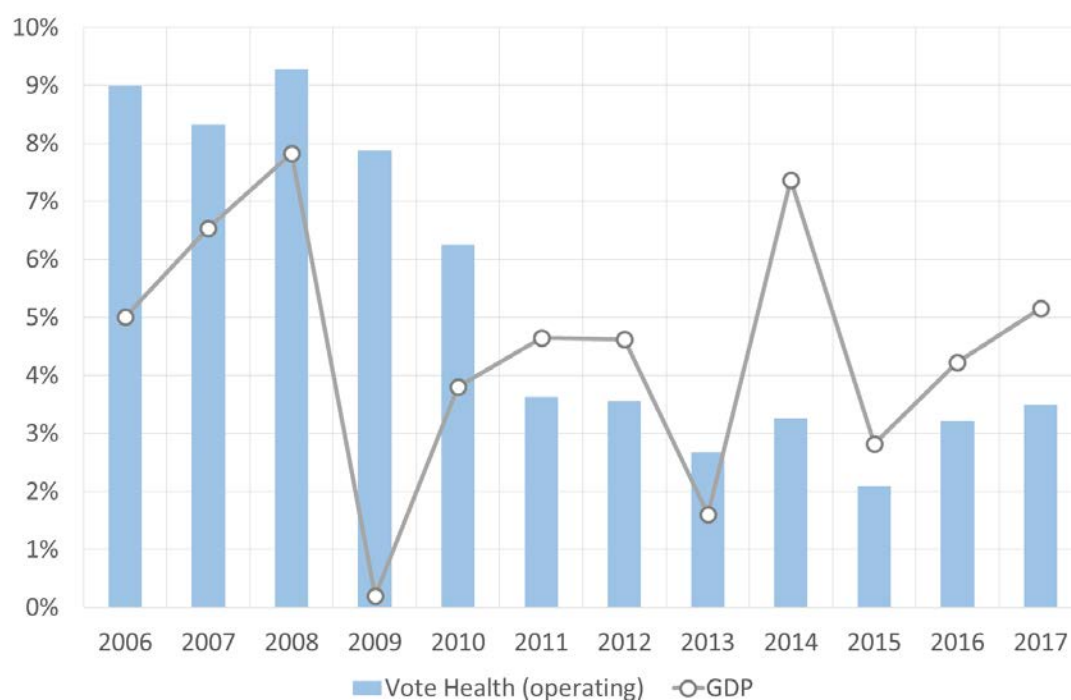


**...although we do not recommend setting annual health budgets as a percentage of GDP...**

Measuring health expenditure as a percentage of GDP is less useful in the short to medium-term. There are both practical and fiscal policy reasons why we do not want to tie health expenditure growth directly to the economic cycle. Revenue growth would become more volatile, making planning by the sector more difficult. Government expenditure would also become more pro-cyclical. The logic of tying health expenditure growth to economic cycles would require cutting nominal health funding during economic recessions.

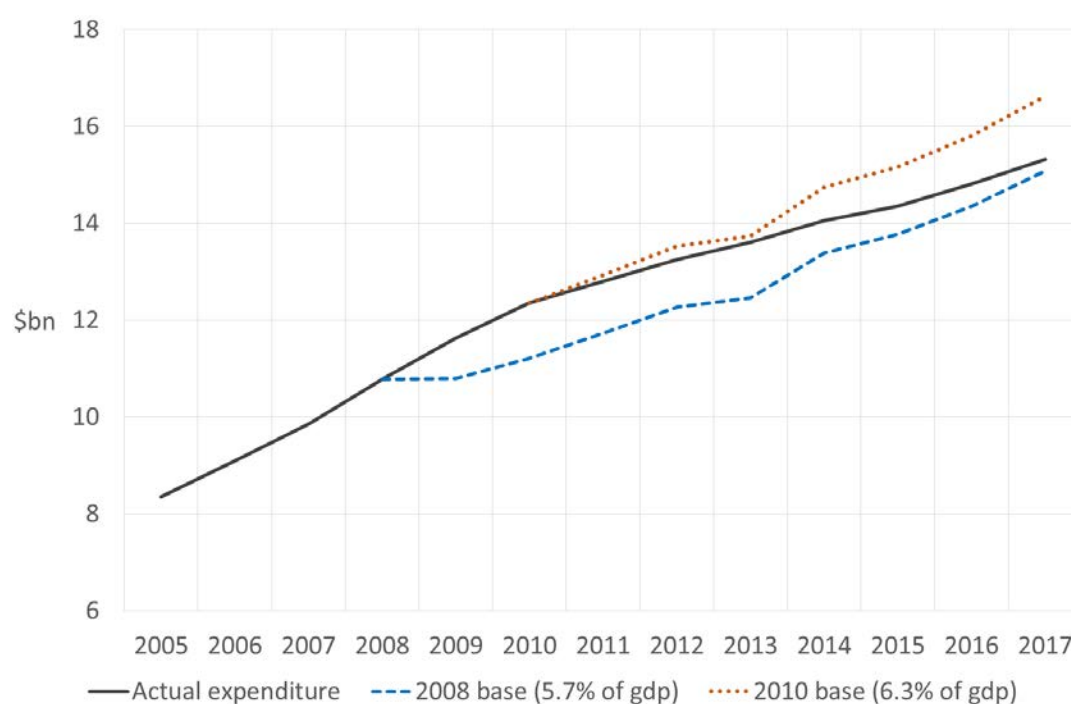
The decline in government health spending as a percentage of GDP since 2009/10 reflects the combination of fiscal restraint and steady economic growth. This followed several years of rapidly rising expenditure and a sharp economic slowdown, which pushed up health spending as a share of the economy. Figure 5 illustrates these trends.

**Figure 5: Annual growth of Vote Health (operating) and nominal GDP**



It is probably no coincidence that ASMS / CTU chose 2009/10 as the starting point for their analysis. As figure 6 shows, the choice of base year is critical for deciding whether health spending has “kept pace” with economic growth or not. For example, using 2007/08 as the base year – before the economic contraction, when Vote Health (operating) was around 5.7% of GDP – suggests that health spending has more than kept up.

**Figure 6: Vote Health (operating): actual versus fixed percentage of GDP**



### ...and health outcomes depend on more than funding levels

None of this information tells us whether health funding is sufficient to meet the objective needs of New Zealand's population. This is a difficult question to answer given that (i) demand for health services is not fixed and will likely expand to match available supply, and (ii) we have limited information about the extent to which baseline funding is being used efficiently. Typical analysis by the Ministry of Health and others takes existing (or historical) baselines as the starting point and assumes that these represent the "correct" level of health funding for the population at that time. Cost pressures are then calculated by reference to demographic growth, wage and price inflation, and sometimes other factors such as population ageing and increased technology costs. Those pressures are compared to the actual funding path to determine the level of "underfunding" (or efficiency gains, depending on your point of view). Although, as discussed above good results depend on more than funding levels and system development and monitoring is important to help ensure that we have an effective mix of health (and other related services) delivered to those most in need.



## Section 3: Population characteristics

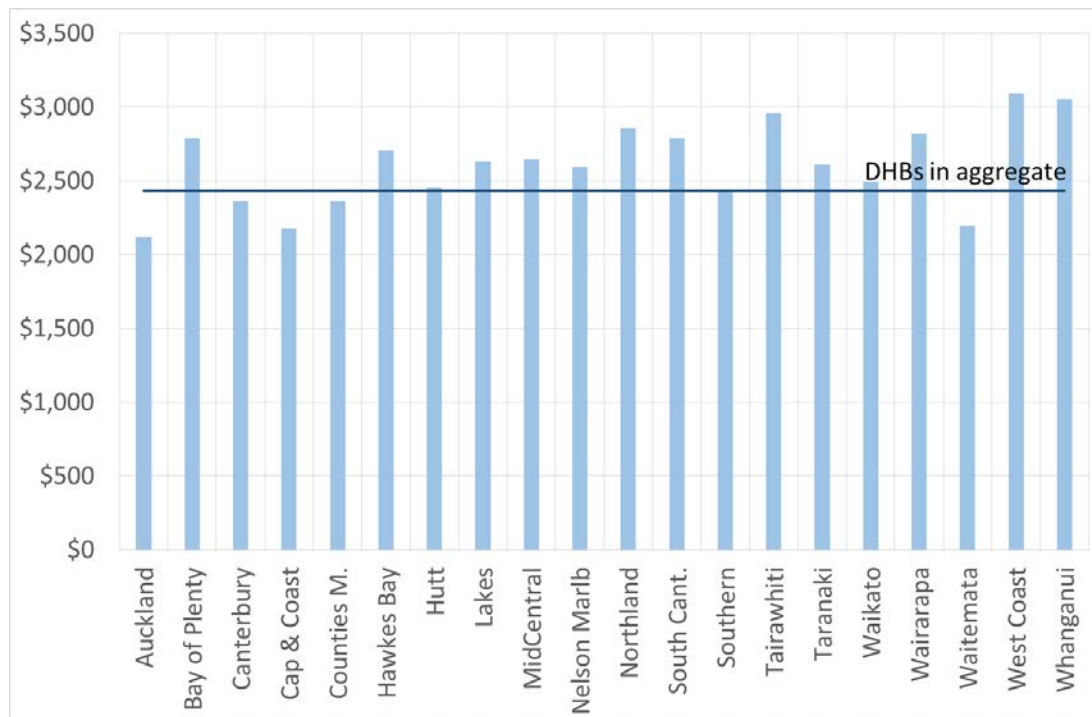
### DHBs populations vary significantly which is reflected in their funding formula...

Variation in the populations DHBs serve is reflected in the population based funding formula (PBFF) which assigns greater weighting to people with higher health needs for example older people, Māori, Pacific Island people, and people who are financially less well off. The resulting variation in per capita funding is shown in figure 7 below. PBFF funding makes up about 75% of DHB revenue.

Relatively higher PBFF funding levels in some DHBs are influenced by:

- ▶ older populations in Bay of Plenty, Nelson Marlborough, South Canterbury, Wairarapa, and Whanganui, and
- ▶ larger Māori and/or Pacific Island populations in Counties Manukau, Hawkes Bay, Lakes, Northland, Tairāwhiti, and Whanganui.

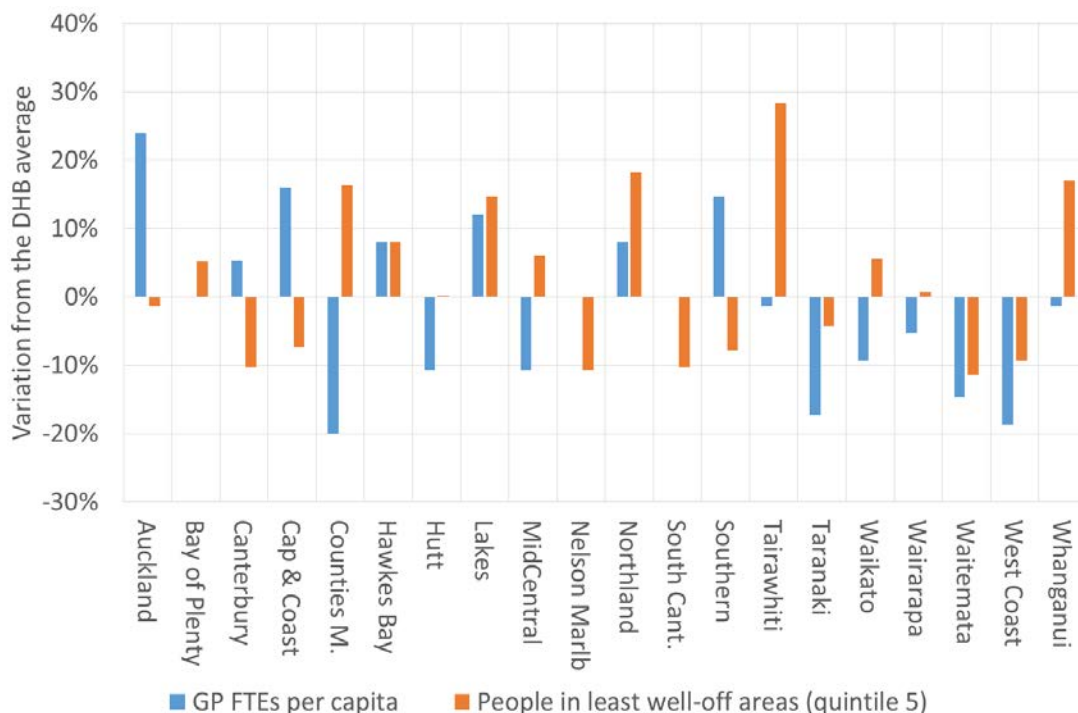
**Figure 7: PBFF funding per capita**



Although less well-off people have higher health service need (all else being equal) in some cases there may be greater access in better-off areas. For example, figure 8 shows that some DHBs have both relatively low GP levels and less well-off populations (such as Counties Manukau and MidCentral) while others have the reverse (such as Capital & Coast and Southern).



**Figure 8: Variation from the average GP FTEs per capita and % of people living in the least well-off areas (quintile 5)**



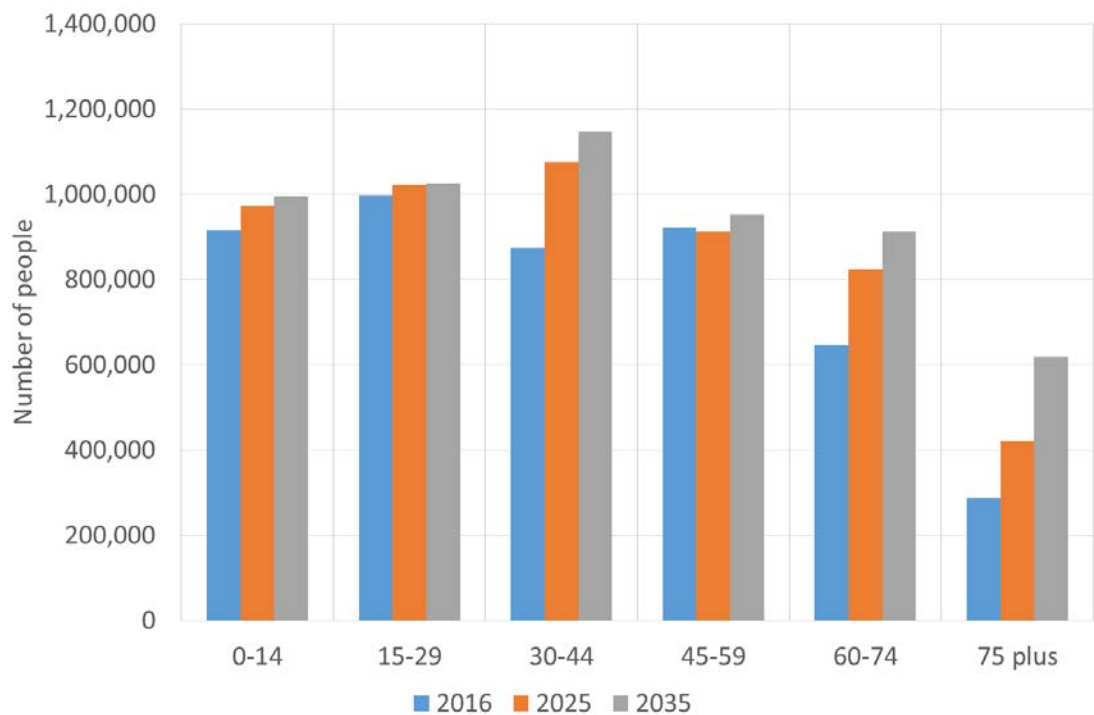
### ...and forecast demographic changes will also play out differently across the DHBs

Forecast population changes are also expected to vary significantly by DHB. A rising share of PBFF funding should give DHBs most affected by these changes some flexibility in how to respond, whereas DHBs with stable or falling populations (and therefore limited funding growth) will still need to manage a high level of fixed costs.

New Zealand's population is expected to age significantly over the next 20 or so years, with the number of people 75 years or over forecast to increase from 290,000 in 2016 to 620,000 in 2035 (figure 9). Health care needs rise significantly with age, so encouraging healthy aging and planning for increased provision of elderly care and related services is likely to be important. We report age groups 75 years and over as increased health need is more apparent in this group than others such as 65 years and over.

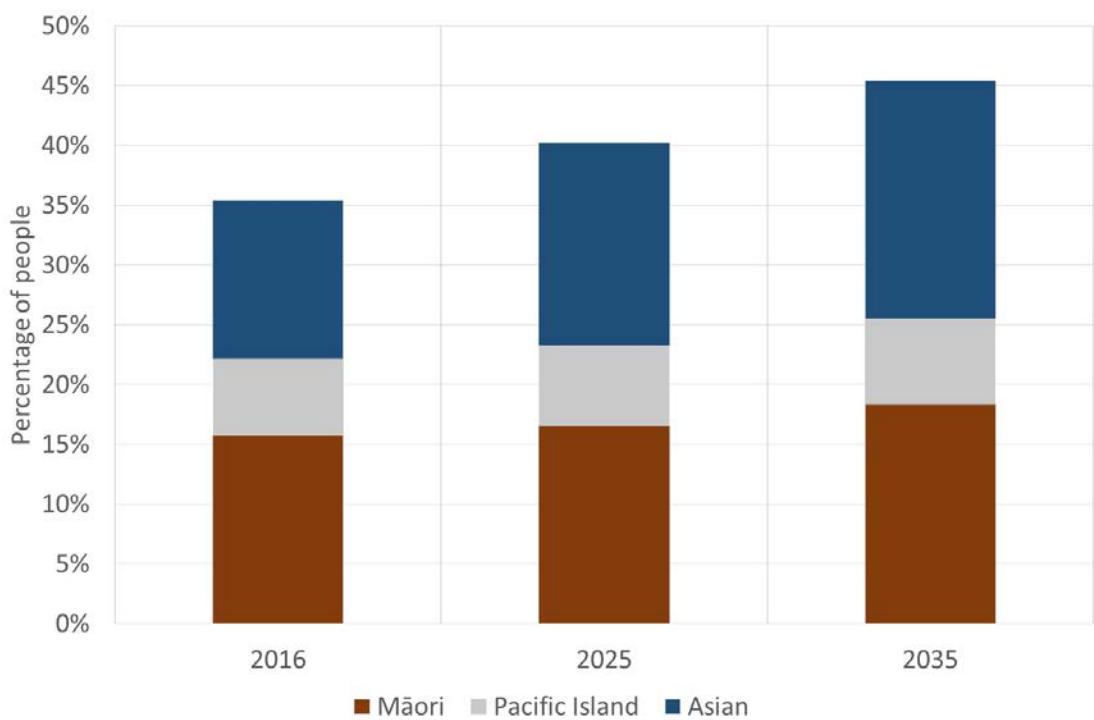
In terms of absolute numbers, the highest increases in people aged 75 years and over are expected in the three Auckland region DHBs as well as Canterbury, Waikato and Southern. Some of the smaller DHBs are forecast to serve a relatively high percentage of older people by 2035; notably Hawkes Bay, Nelson Marlborough, Northland, South Canterbury, Wairarapa, West Coast and Whanganui.

**Figure 9: Actual and forecast New Zealand population by age band**



The percentage of people of Māori, Pacific Island and Asian ethnicity is also forecast to increase (figure 10). If persistent patterns of health inequity for Māori and Pacific Island people remain, this will increase health service demand over time. A changing mix of ethnicities also has implications for health workforce cultural competency requirements as people of some ethnicities (for example Māori women and Asian people) report lower confidence in their interactions with health professionals.

**Figure 10: Actual and forecast New Zealand population by ethnicity**



## Section 4: Financial management and efficiency

**The financial performance of the sector has deteriorated in the last couple of years, with a number of DHBs running net deficits...**

Similarly to last year's report, our core metric for assessing DHBs' financial performance is net surplus / deficit as a proportion of total revenue. Table 5 summarises performance on this measure along with planned results for the current year. Overall performance in 2016, with 13 DHBs in deficit, was similar to 2015 which saw a deterioration after several years of improvement. Planned results for 2017 show a number of DHBs expecting to remain in deficit.

Compared to last year, our rating reduced for three DHBs (Capital & Coast, Lakes and South Canterbury) and improved for two (Nelson Marlborough and Whanganui). Some red rated DHBs (Capital & Coast, Lakes, Southern and Tairāwhiti) have worsening deficits in 2016. Canterbury's lower 2016 deficit reflects additional Crown support rather than an improvement in financial performance.

### Rating system for table 5: Net surplus/deficit as a % of total revenue

We rated DHBs according to their actual results over the three years to 2016 and their planned results for 2017. Red-rated DHBs reported an actual or planned deficit of more than 1% of total revenue in at least two years. Amber rated DHBs reported a deficit of at least 0.5% of total revenue in at least one year. Other DHBs are rated green.

At the time of writing, the numbers for Canterbury and Capital & Coast are still draft as their annual plans have not yet been finalised. Canterbury's plan has been provisionally agreed with the Ministry of Health (subject to Ministerial approval) and Capital & Coast's remains under discussion.

**Table 5: Net surplus/deficit as a percentage of total revenue**

	2012	2013	Years used for rating			
			2014	2015	2016	2017 plan
Auckland	0.04%	0.01%	0.01%	0.02%	0.14%	0.21%
Bay of Plenty	0.00%	0.01%	0.11%	(0.14%)	(0.18%)	0.42%
Canterbury	(0.00%)	16.01%	0.00%	(1.15%)	(0.03%)	(2.35%)
Capital and Coast ↓	(2.17%)	(1.15%)	(0.60%)	(0.40%)	(1.17%)	(1.54%)
Counties Manukau	0.39%	0.21%	0.21%	0.20%	0.19%	0.28%
Hawkes Bay	0.43%	0.44%	0.66%	0.62%	0.84%	0.94%
Hutt	0.02%	(0.65%)	(0.39%)	(1.57%)	(1.38%)	(0.48%)
Lakes ↓	(1.01%)	(0.56%)	0.83%	(1.22%)	(1.55%)	0.47%
MidCentral	1.21%	1.10%	0.34%	(0.31%)	(0.37%)	0.24%
Nelson Marlborough ↑	(1.28%)	(0.70%)	1.01%	0.39%	0.34%	0.85%
Northland	0.06%	0.08%	0.07%	0.07%	0.09%	0.33%
South Canterbury ↓	0.17%	0.41%	0.37%	0.09%	(0.61%)	0.69%
Southern	(1.58%)	(1.40%)	(2.04%)	(3.08%)	(3.71%)	(2.36%)
Tairāwhiti	0.02%	(0.96%)	0.09%	(1.81%)	(3.97%)	0.50%
Taranaki	0.06%	0.00%	(0.98%)	(1.10%)	(1.03%)	(0.55%)
Waikato	0.82%	0.18%	0.31%	(0.23%)	0.26%	0.33%
Wairarapa	(5.22%)	(2.53%)	(1.04%)	(2.41%)	(1.31%)	(1.05%)
Waitemata	0.35%	0.48%	0.24%	0.20%	0.19%	0.27%
West Coast	(3.75%)	(2.65%)	(0.79%)	(0.75%)	(0.63%)	(0.38%)
Whanganui ↑	(0.08%)	(0.84%)	(0.43%)	0.02%	(0.24%)	(0.42%)
Total deficit, % revenue	(0.18%)	1.89%	(0.05%)	(0.45%)	(0.39%)	(0.33%)
Total net result (\$m)	(23.42)	268.12	(7.36)	(65.84)	(58.03)	(50.18)

Note 1 Aggregate figures, and the numbers for Canterbury, are skewed in 2013 by one-off items associated with the rebuild.

Note 2 Capital & Coast received \$8 million in additional revenue in 2013, Auckland received \$10 million in 2015, and Canterbury received \$16 million in 2016 reducing their reported deficits. We have not adjusted (increased) reported deficits to account for this.

## Financial resiliency has also reduced for some DHBs...

Our financial resilience metrics are also continued from last year's report. As before, our risk rating is based on an assessment of the likelihood that each DHB may require an injection of new Crown equity to remain solvent. This is made by comparing each DHB's cash and accessible investments to annual expenditure to assess their ability to manage short-term financial stressors.

Our rating reduced compared to 2015 for three DHBs; Bay of Plenty, Capital & Coast and Taranaki. Seven DHBs were red rated, up from five in last year's report. These results are consistent with the tight financial position for some DHBs indicated in the previous section.

### Rating system for table 6: Cash and investments as a percentage of expenditure

DHBs reporting cash and investments less than 0.5% of total expenditure are red rated and less than 2% are amber rated. Other DHBs are rated green.

Where a DHB has a planned deficit in the current year (right-hand column), this has been taken into account in determining its rating: this is why Canterbury and Capital & Coast have been rated red and Hutt has been rated amber.

**Table 6: Cash and investments as a percentage of expenditure in 2016, and planned net result for 2017**

	Cash & investments (< 3m)	Long-term investments (>3m)	Total cash & investments		Planned result 2017
	\$m	\$m	\$m	% expend	
Auckland	32.4	20.0	52.4	2.6%	4.5
Bay of Plenty ↓	7.3	-	7.3	1.0%	3.1
Canterbury	13.5	1.0	14.5	0.9%	(38.5)
Capital and Coast ↓	12.9	-	12.9	1.2%	(16.0)
Counties Manukau	31.8	-	31.8	2.1%	4.5
Hawkes Bay	14.3	-	14.3	2.8%	5.0
Hutt	10.5	-	10.5	2.1%	(2.5)
Lakes	2.0	0.8	2.8	0.8%	1.7
MidCentral	26.0	16.5	42.5	6.9%	1.5
Nelson Marlborough	24.4	19.0	43.3	9.4%	4.0
Northland	2.6	15.0	17.6	3.1%	2.0
South Canterbury	19.2	12.8	32.0	16.9%	1.3
Southern	(9.9)	-	(9.9)	(1.1%)	(22.0)
Tairāwhiti	(6.8)	-	(6.8)	(3.9%)	0.9
Taranaki ↓	(8.2)	2.9	(5.2)	(1.5%)	(2.0)
Waikato	0.9	-	0.9	0.1%	4.5
Wairarapa	(1.2)	-	(1.2)	(0.8%)	(1.6)
Waitemata	55.7	36.0	91.7	5.8%	4.5
West Coast	11.9	-	11.9	8.3%	(0.6)
Whanganui	10.9	3.0	13.9	5.9%	(1.0)

Note 1 The following investments are excluded due to illiquidity: trusts, subsidiaries, associates, HBL & loans. The accounting codes included in this measure have changed slightly from last year for consistency with the approach used by the Ministry of Health for deficit support.

### ...and several DHBs had difficulty meeting their planned financial targets

To assess financial management and planning, we compare DHBs' 2016 actual and planned results for total revenue, total expenditure, and net result (table 7).

Performance compared to 2015 was mixed, with lower ratings for six DHBs and improved ratings for four. Most net-result variances from plan were adverse (13 out of 20 DHBs). As would be expected (due to the high certainty of DHBs' government revenue) this was almost all due to higher than planned expenditure. Capital & Coast, Lakes, Taranaki and Tairāwhiti had the largest variances; all of which also reported net deficits (table 5 above). Although Southern had a very large deficit, it is rated green on this metric as its reported deficit was less than planned.

#### Rating system for table 7: Variances to planned results

DHBs with a 2016 net result adverse to plan by up to 1% are rated amber and over 1% are rated red. Others are rated green.

To assess the quality of DHBs' longer term planning, we also looked at 2016 actuals against year two of the 2015 annual plans. Surprisingly, we found that variances on this two year

planning horizon were not worse overall than variances against the 2016 plans indicating that planning reliability may not increase one-year versus two-years out.

**Table 7: Variances to plan for 2016 results**

	Revenue		Expenditure		Net result vs 2016 plan		Net result vs 2015 plan	
	variance \$m	var as % of rev.	variance \$m	var as % of exp.	variance \$m	var as % of rev.	variance \$m	var as % of rev.
Auckland	16.5	0.8%	(16.0)	(0.8%)	0.5	0.0%	2.8	0.1%
Bay of Plenty	14.5	2.0%	(17.2)	(2.4%)	(2.7)	(0.4%)	(1.3)	(0.2%)
Canterbury	5.7	0.4%	(6.2)	(0.4%)	(0.5)	(0.0%)	(0.5)	(0.0%)
Capital and Coast ↓	18.6	1.8%	(32.0)	(3.1%)	(13.4)	(1.3%)	(11.9)	(1.2%)
Counties Manukau	18.1	1.2%	(17.9)	(1.2%)	0.2	0.0%	2.9	0.2%
Hawkes Bay	6.7	1.3%	(6.3)	(1.2%)	0.4	0.1%	1.4	0.3%
Hutt ↑	14.8	2.9%	(15.1)	(2.9%)	(0.2)	(0.0%)	(7.0)	(1.4%)
Lakes	6.0	1.8%	(11.9)	(3.5%)	(5.9)	(1.7%)	(5.3)	(1.6%)
MidCentral	15.0	2.5%	(19.4)	(3.2%)	(4.4)	(0.7%)	(3.3)	(0.5%)
Nelson Marlborough ↓	4.4	1.0%	(6.7)	(1.5%)	(2.3)	(0.5%)	(1.4)	(0.3%)
Northland ↓	9.1	1.6%	(9.7)	(1.7%)	(0.6)	(0.1%)	0.5	0.1%
South Canterbury ↓	0.6	0.3%	(2.2)	(1.2%)	(1.6)	(0.8%)	(1.3)	(0.7%)
Southern ↑	6.6	0.7%	(4.2)	(0.4%)	2.4	0.3%	(23.8)	(2.6%)
Tairāwhiti	0.9	0.5%	(7.8)	(4.5%)	(7.0)	(4.2%)	(6.7)	(4.0%)
Taranaki ↓	0.8	0.2%	(5.2)	(1.5%)	(4.4)	(1.2%)	(3.8)	(1.1%)
Waikato ↑	12.1	0.9%	(10.9)	(0.8%)	1.2	0.1%	3.2	0.2%
Wairarapa ↑	3.5	2.3%	(3.4)	(2.3%)	0.0	0.0%	(0.4)	(0.3%)
Waitemata	12.8	0.8%	(12.6)	(0.8%)	0.1	0.0%	3.0	0.2%
West Coast	(0.6)	(0.5%)	0.6	0.4%	(0.0)	(0.0%)	0.2	0.1%
Whanganui ↓	3.6	1.5%	(4.1)	(1.7%)	(0.6)	(0.2%)	(0.6)	(0.2%)
Negative number means actuals adverse to plan (expenditure higher, revenue and net surplus lower)								

## Section 5: Provider-arm vs non-provider arm expenditure

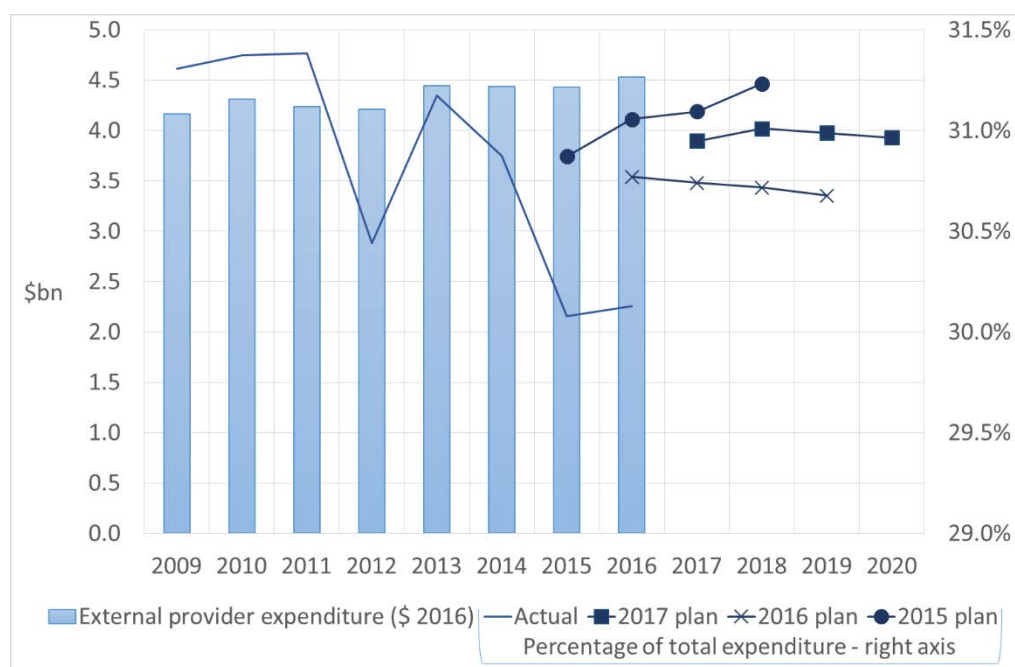
**DHBs' role includes funding a broad range of health care and providing hospital services...**

DHBs' role as funders of a broad range of health care (primary and community, secondary and tertiary level) should create incentives to fund care at the most cost-effective point in time and minimise cost escalation from delayed treatment. However, in combination with their other role as a health services provider, it raises the structural risk that DHBs prioritise funding for their own provider-arms (hospitals) at the expense of externally provided services (for example primary care). This risk may be particularly apparent when DHBs are under pressure to meet hospital output targets and avoid running deficits. Accordingly we monitor how DHBs split their spending between their provider-arms and external providers.

**...and in aggregate DHBs' funding balance has shifted toward their provider-arms (hospitals) over time...**

At an aggregate level DHBs' external provider expenditure has generally been increasing over time in real terms. However, it has been falling slightly as a percentage of total expenditure; and it has been below the planned percentage (figure 11). This indicates a gradual shift toward a greater proportion of funding committed to hospital services.

**Figure 11: External provider expenditure in \$2016 and as a percentage of total expenditure**



Note 1 Inter-district flows, which contain some external provider expenditure, are excluded (from the expenditure figures and the numerator of the percentages) as they mainly relate to provider-arm care.

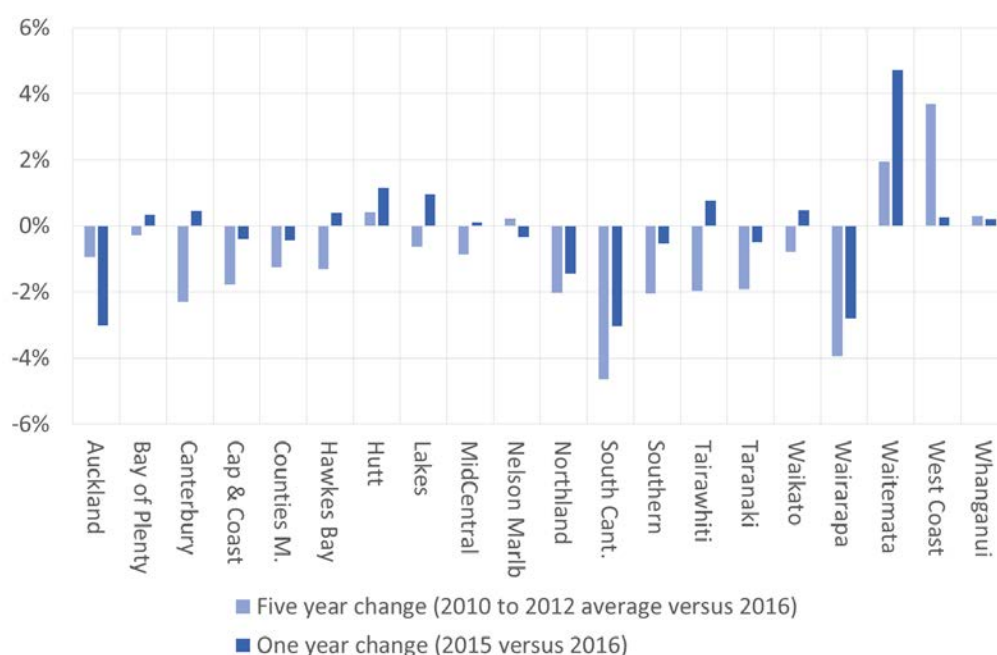


### ...this trend has occurred in most DHBs although there has been signs of change in the last year

We do not rate DHBs on their percentage of external expenditure as they vary significantly in their provider-arm service mix (and the associated funding requirements) and it is difficult to determine the most appropriate balance between levels of care. Instead we focus on how the balance of provider-arm and external expenditure has changed over time.

The pattern of falling external funding as a percentage of expenditure has occurred in most DHBs over the last five years (figure 12). There may be signs of change, however. Eleven DHBs increased their percentage of external expenditure for 2016 versus 2015, compared to two DHBs for 2015 versus 2014 (numbers not shown).

**Figure 12: Percentage change in external expenditure as a proportion of total**



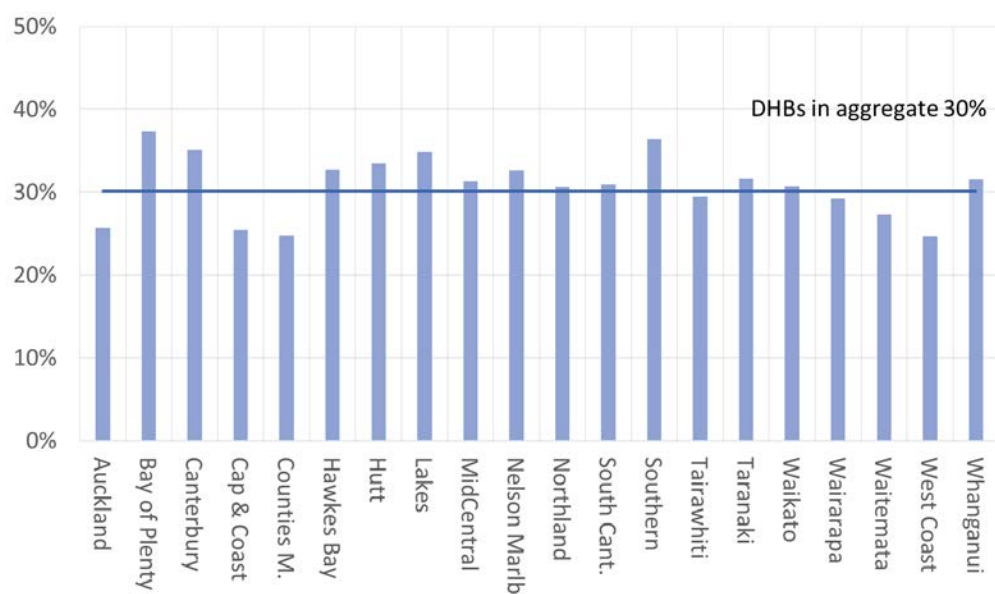
Note 1 Inter-district flows are excluded.

Note 2 Five year change has been calculated using the average of three years 2010 to 2012 (rather than a single year) to reduce the effect of variations in the denominator year when assessing longer term change.

For context, figure 13 shows the proportion of expenditure allocated to external providers in 2016. The horizontal line indicates the percentage for DHBs in aggregate, 30%. As discussed above, a fairly large amount of variation in this percentage is to be expected due to DHBs' different populations and service mixes.



**Figure 13: External expenditure as a percentage of total expenditure in 2016**



Note 1 Inter-district flows are excluded.

### Box 1: NZ Doctor opinion piece: hospital funding crowding out primary care

A December 2016 New Zealand Doctor magazine article (written by a primary health organisation [PHO] chief executive John Macaskill-Smith) discusses the debate around the correct balance between hospital and primary care funding. Recent health policies, both here and overseas, have called for an emphasis on primary care to keep people well and reduce demand for hospital care. Greater growth has occurred, however, in hospital doctor numbers than general practitioners (GPs). Similarly DHB expenditure growth has tended more toward hospital spending. The article argues that DHBs' dual role as funders and providers of health care tends to bias them toward increasing hospital funding resulting in insufficient primary care services.

The article states that all DHBs have reduced real funding for community based services over the last five years. Our analysis does not support this finding. For example, over the period 2011 to 2016, 18 of the 20 DHBs have increased real funding to primary care providers (GPs).

For context, the Royal New Zealand College of General practitioners (RNZCGP) reports that GP FTEs per capita reduced by 12% over the period from 1999 to 2012. This was due to a combination of a reduction in GPs' average hours worked and population growth exceeding growth in GP numbers. As discussed in section 3 above, access to GPs may also be affected by misalignment between GPs' location and higher needs patients.

Table 8 provides some information around GP practice ownership with the majority of GPs working in doctor-owned practices.

**Table 8: Percentage of GPs employed by practice ownership type (source 2016 RNZCGP survey)**

Ownership	Percentage of GPs
GPs who work in the practice	75%
Fully or partly corporate owned	8%
PHO or GP organisation	5%
Community	3%
Iwi	2%
University (student health)	2%
DHB	1%
Other	3%

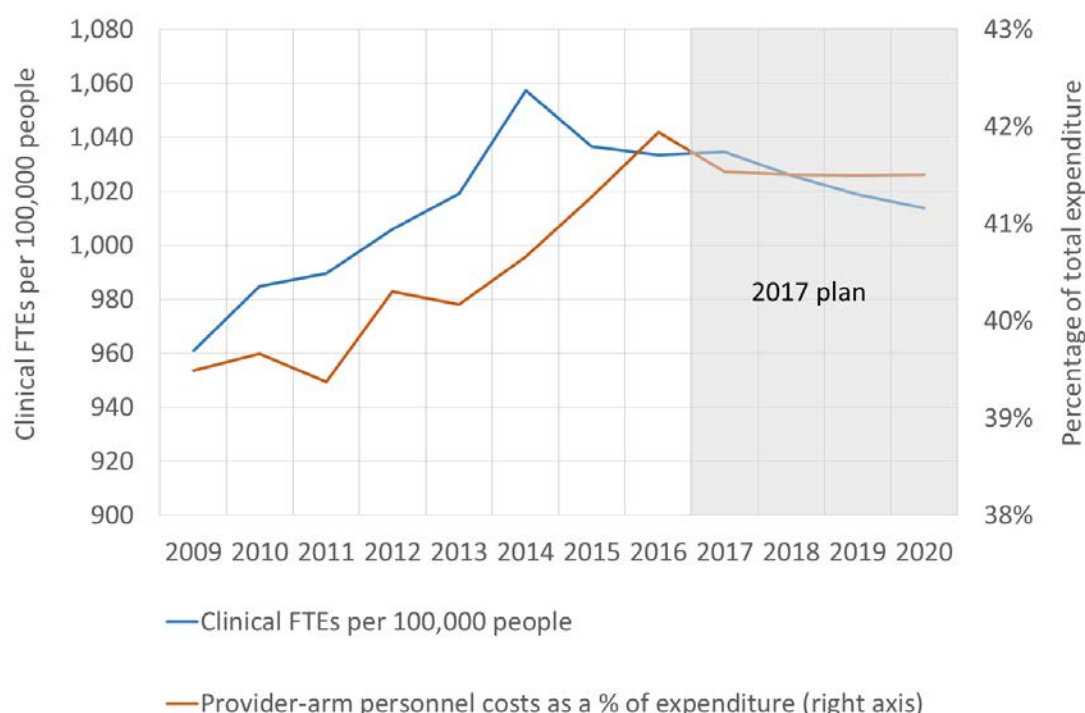
## Section 6: Provider-arm personnel expenditure growth and staffing profile

### Rising provider-arm expenditure mainly results from increasing personnel costs...

Provider-arm personnel expenditure is a significant cost driver for DHBs. This is due to a trend toward rising FTEs<sup>1</sup> per capita and rising costs per FTE (figure 14 and table 9). For FTEs per capita, this has changed somewhat in the last two years, however, due to population growth exceeding FTE growth (rather than a reduction in FTE numbers).

DHB's 2017 annual plans in aggregate assume a reduction in provider-arm wages as a percentage of expenditure. If this is not achieved, it may contribute to future adverse variance from plan (for example higher net deficit levels) in some DHBs; particularly Canterbury, Hutt, Lakes and Tairāwhiti.

**Figure 14: DHB provider-arm personnel costs as a percentage of total expenditure and clinical FTEs per 100,000 people**



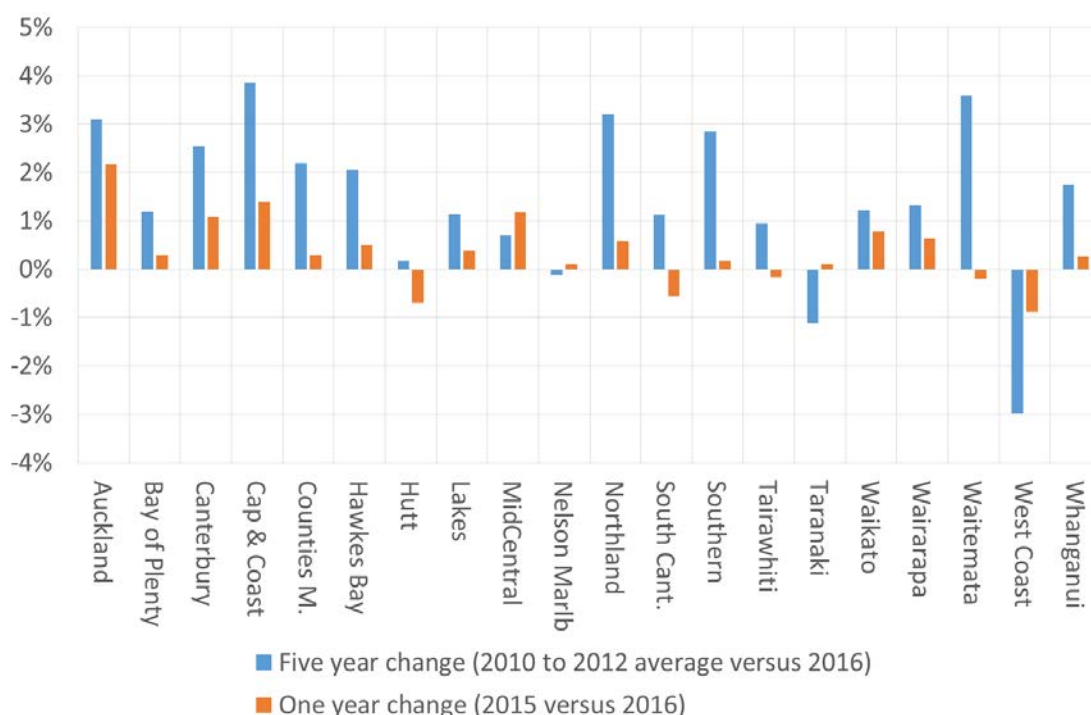
Note 1 Personnel costs include both staff employed by the DHB and outsourced services. Some outsourced services also include other costs from DHB contracted private providers.

Note 2 Clinical FTE numbers do not include outsourced services. Growth in FTEs per capita may be slightly overstated due to a small reduction in the percentage of outsourced services over time.

<sup>1</sup> Full time equivalent staff numbers (FTEs) are calculated using the Ministry of Health's "accrued" methodology which divides total hours worked by a number representing the hours worked by a fulltime staff member. The Ministry uses a number of FTE calculation methodologies and also reports different time periods. Accordingly, the FTE figures used for this report vary slightly from some Ministry publications.

As shown in figure 15, the pattern of rising provider-arm personnel costs has been consistent across the DHBs over the last five years with the exception of Nelson Marlborough, Taranaki and West Coast. West Coast's variation is most likely related to its transalpine collaboration with Canterbury to increase service access (and the reduction in provider-arm personnel spend is therefore probably offset by an increase in inter-district-flows).

**Figure 15: Change in provider-arm personnel costs as a percentage of total DHB expenditure**



...with the highest level of growth in wages and FTEs per capita occurring for medical staff (doctors)

Table 9 provides more detail on provider-arm wage growth. Over a five year period, medical staff (doctors) had the highest increases in both average wages and per capita staffing levels. The one year FTEs-per capita decreases do not represent a drop in FTEs rather population growth was slightly higher than FTE growth.

**Table 9: Average cost per FTE and number of FTEs**

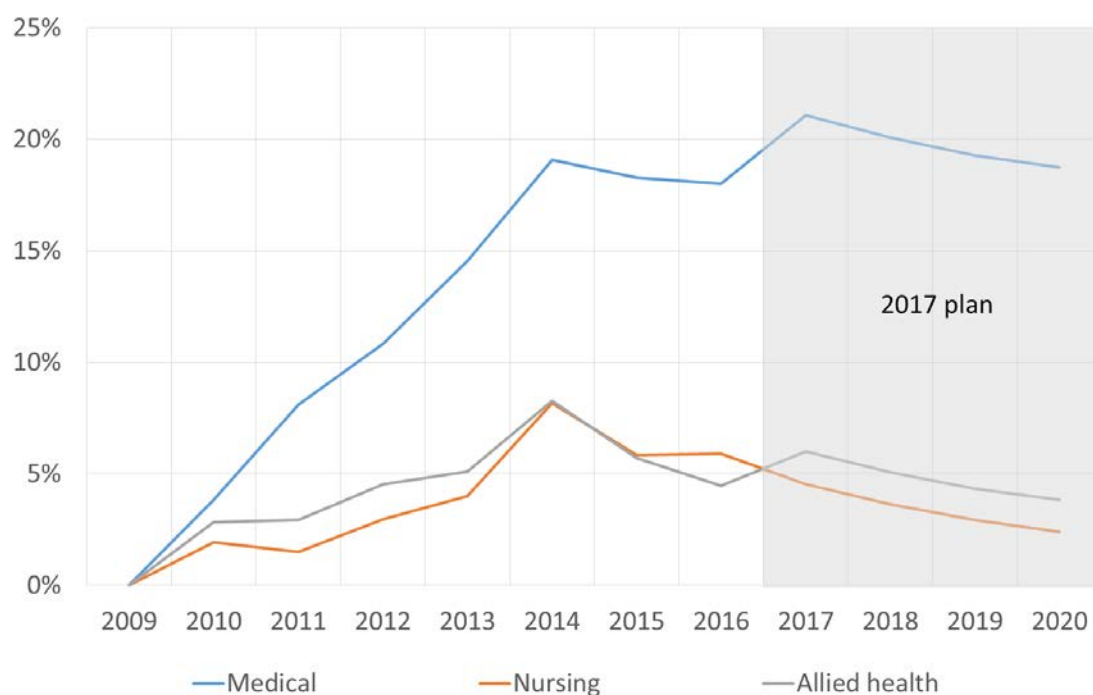
	Average cost per FTE			Number of FTEs		
	2016	Five year change (real)	One year change (real)	2016	Five year change num. per capita	One year change num. per capita
Medical	\$200,000	4.8%	3.0%	8,824	9.7%	(0.2%)
Nursing	\$80,000	2.9%	1.0%	27,077	3.7%	0.1%
Allied health	\$73,000	4.2%	1.2%	12,103	1.0%	(1.2%)

Note 1 Five year change is the average for 2010 to 2012 versus 2016. One year change is 2015 versus 2016.

Figure 16 shows growth in DHB provider-arm clinical FTEs from 2009. Consistent with earlier information in this section, FTEs have risen faster than population growth. Medical staff had

the highest increase rising about 18%. FTEs for the largest staff group, nursing, have increased by 6%.

**Figure 16: Change in DHB provider-arm clinical FTEs per capita since 2009**



Box 2 provides additional background information on the composition and demographics of the New Zealand health workforce.

## Box 2: New Zealand's health workforce

The Ministry of Health coordinates workforce development activities. Its role includes management of a Voluntary Bonding Scheme to help ensure coverage of all regions and required staffing types. Some key statistics are summarised in tables 10 and 11 (the numbers include both public and privately employed staff). It is noteworthy that:

- ▶ Workforce numbers have risen faster than population growth.
- ▶ The workforce is aging with an increase in the percentage aged 50 years and over.
- ▶ The majority of staff are female except for doctors (the gender balance of doctors is changing, however, with more female junior doctors in 2013).
- ▶ Māori and Pacific Island people, who make up 15% and 7% of the population respectively, are underrepresented.

**Table 10: 2015 health workforce headcounts and percentage change since 2009**

	Headcount	Change in headcount from 2009	
		Nominal	Per capita
Nurses	52,729	15%	8%
Medical	14,678	17%	11%
Midwives	3,068	9%	2%
Allied health	22,702	n/a	n/a

Note 1 Headcount is 2014 for midwives.

**Table 11: 2015 health workforce demographics**

	Age 50 years or over		Female	Māori and Pacific Island
	Headcount % 2015	Headcount % 2009		
Nurses	45%	40%	91%	6.5%; 2.6%
Medical	40%	35%	42%	2.7%; 1.8%
Midwives	44%	n/a	100%	9%; n/a

Table 12 provides some international context. Doctor numbers are slightly below the OECD median but there has been strong growth since 2000. We have a high proportion of overseas trained medical staff and lower medical graduates per capita. While the average age of New Zealand doctors is increasing it is younger relative to other countries.

**Table 12: OECD data ranking New Zealand's health workforce against selected other countries**

Indicator	New Zealand's rank <sup>1</sup>
Nurses per capita	14 out of 43
Percentage of foreign trained nurses	1 out of 23
Doctors per capita	25 out of 43
Increase in doctor numbers 2000 to 2013	9 out of 34
Percentage of foreign trained doctors	2 out of 26
Medical graduates per capita	26 out of 33
Percentage of doctors under 55 years of age	4 out of 29

<sup>1</sup> The number of comparator countries varies depending on data availability.

# Section 7: Capital management, repairs and maintenance

## Capital management is an important part of DHBs' role and a major expenditure item

Good capital management and planning is an integral part of DHBs' sustainability and ability to meet future patient needs. Accordingly, we report five performance metrics in this area:

- ▶ Capital expenditure (capex) as a percentage of depreciation to assess if DHBs are investing to a level that matches their assets' book value.
- ▶ Capex variance from plan to assess DHBs' level of investment in their asset base.
- ▶ Change in current assets over time to evaluate if DHBs with lower capex levels are building liquid assets to fund future investment.
- ▶ Interest, capital charges and depreciation as a percentage of revenue to consider the effect of these charges on DHBs' financial performance.
- ▶ Repairs and maintenance expenditure versus plan to assess how well DHBs are maintaining their assets.

### Box 3: Office of the Auditor General (OAG) report on DHB asset management

A 2016 OAG report discusses the importance of asset management (eg hospitals and clinical equipment) to DHBs' role providing health services. It outlines that DHBs have assets of \$5.6 billion with \$6 billion of capital expenditure planned over the next 10 years.

The OAG raises concerns that

- ▶ many DHBs do not sufficiently monitor their asset condition, age, and performance
- ▶ there has been a significant pattern of under-budget capital spending indicating that "DHBs might not be investing the capital needed to deliver their services in the future", and
- ▶ DHBs are relying heavily on the Crown for additional funding to replace assets rather than financing them from operating surpluses.

The OAG concludes that:

"DHBs are strongly focused on delivering short-term results within a challenging operating environment and financial constraints. But the health system is facing serious challenges from a rising demand for services and for access to better technologies, exacerbated by an aging population. To deal with these challenges, the health sector and each DHB will need to take a longer-term perspective on health services and the associated capital investment and asset management."

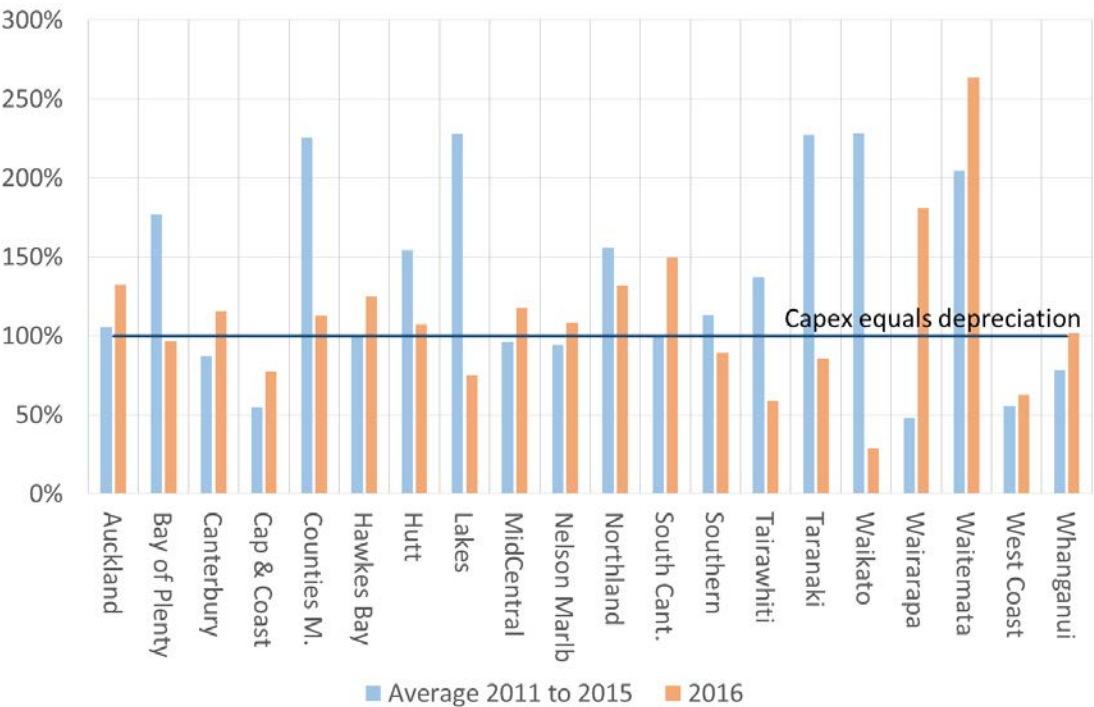
## DHBs have relatively high capital expenditure needs that vary significantly depending on their stage in the capital cycle

Our analysis of capex levels versus depreciation indicates that, as would be expected, DHBs have relatively high capex needs that often exceed depreciation (figure 17). We do not rate

DHBs on this metric as significant variation between them, depending on their stage in the capital cycle, makes comparison difficult.

A number of DHBs (Bay of Plenty, Counties Manukau, Lakes, Northland, Taranaki, Waikato, and Waitemata) have higher capex levels due hospital and other builds in the last six years (2011 to 2016). Others have lower levels due to builds before 2011 (for example Capital & Coast) or new builds to be completed in the near future (West Coast). Capex funding sources have been variable, with some DHBs (for example Northland and Waitemata) using their relatively strong financial positions to self-fund and others requiring more Crown support.

**Figure 17: Capex as a percentage of depreciation**



**There are strong indications that the requirement for additional Crown support for major capex projects will continue**

We consider two metrics to understand how well DHBs can support their capex needs. Our analysis of:

- ▶ variance from planned capex shows that the majority of DHBs underspent planned levels in 2015 and 2016 (figure 18), and
- ▶ change in current assets shows that there is not a strong pattern of DHBs with lower capex increasing liquid assets to fund future investment (table 13).

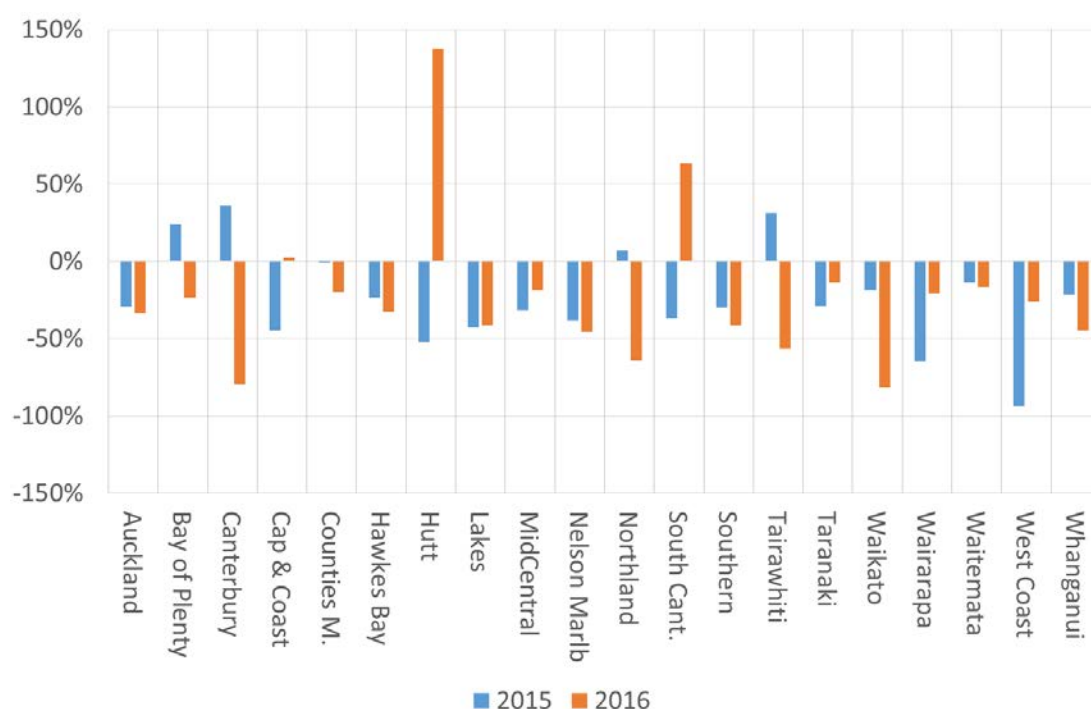
We do not rate DHBs on these two metrics due to the variation in DHBs’ stage in the asset cycle discussed above. Also, planned capex levels may not be high enough to meet long-term needs and reaching them may generate a false sense of adequacy.

These metrics results, along with the Crown’s approach of not funding the depreciation (non-cash) component of net deficits, indicate that the requirement for additional Crown support for major capex projects (for example hospital builds) is likely to continue in future. While DHBs



are expected to fund their own capex needs in principle, ongoing Crown support is likely to be a pragmatic response due to the very large, infrequent, costs associated with hospital builds.

**Figure 18: Capex variance from plan**



**Table 13: Capital as a % of total expenditure and change in current assets as a % of total revenue**

	Capex as a % of expenditure		Current assets as a % of total revenue		
	Avg. 2012 to 2016	2016	2016	Five year change	One year change
Auckland	2.4%	2.9%	7%	(3%)	(1%)
Bay of Plenty	3.8%	2.6%	5%	1%	(2%)
Canterbury	3.3%	4.1%	6%	(6%)	1%
Capital and Coast	2.1%	2.5%	7%	1%	(1%)
Counties Manukau	3.5%	2.3%	5%	2%	(2%)
Hawkes Bay	3.0%	3.3%	9%	3%	1%
Hutt	2.2%	2.8%	5%	(1%)	(1%)
Lakes	4.3%	2.3%	5%	(6%)	(1%)
MidCentral	2.5%	2.8%	9%	(2%)	(4%)
Nelson Marlborough	2.1%	2.5%	11%	0%	(3%)
Northland	3.1%	2.8%	7%	(4%)	1%
South Canterbury	2.2%	3.3%	14%	(4%)	(7%)
Southern	2.4%	2.0%	3%	(5%)	(1%)
Tairāwhiti	2.1%	1.0%	5%	(1%)	1%
Taranaki	7.8%	3.7%	5%	(9%)	(0%)
Waikato	4.6%	0.9%	4%	0%	(0%)
Wairarapa	0.8%	2.0%	4%	(3%)	1%
Waitemata	3.3%	4.6%	9%	2%	(4%)
West Coast	1.7%	2.0%	13%	5%	1%
Whanganui	1.8%	1.9%	9%	0%	(1%)

Note 1 Five year change is the average for 2010 to 2012 versus 2016. One year change is 2015 versus 2016.

## Variation in interest and capital charges is relatively modest between DHBs; variation in depreciation levels is higher

We also consider the extent to which financing and depreciation costs affect financial performance and operating flexibility. In 2016 DHBs paid an 8% capital charge on Crown equity and interest on Crown loans. The DHB financing approach changed in 2017 with the capital charge reduced to 6% from 1 January 2017 and Crown loans converted to equity (this change is not expected to materially affect DHBs' financing costs).

Table 14 indicates that variation in interest and capital charges as a percentage of revenue remains relatively modest between DHBs with a range from 0.7% to 2.8% although this could still materially impact on net results. Variation is higher once depreciation is included.

Depreciation expenses affect the bottom line but do not directly impact cash flow.

Higher depreciation levels in some DHBs (Taranaki, Capital & Coast, Lakes, Waikato and Bay of Plenty) are due to recent hospital builds. Canterbury's higher level partly relates to its accounting policy to depreciate assets relatively quickly (its 2016 result is not affected by Burwood hospital which transferred to its books this year, 2017). Canterbury's relatively low capital charge is partly due to the government holding some earthquake related funds on its books.

**Table 14: Interest, capital charge and depreciation expenditure in 2016**

	Interest & capital charge		Depreciation		Total	
	\$m	% of revenue	\$m	% of revenue	\$m	% of revenue
Auckland	56	2.7%	45	2.2%	101	4.9%
Bay of Plenty	16	2.2%	19	2.7%	35	4.8%
Canterbury	11	0.7%	58	3.6%	69	4.3%
Capital and Coast	22	2.2%	33	3.2%	55	5.4%
Counties Manukau	31	2.0%	31	2.0%	62	4.0%
Hawkes Bay	9	1.7%	14	2.6%	22	4.4%
Hutt	11	2.3%	13	2.6%	25	4.9%
Lakes	9	2.8%	10	3.0%	20	5.8%
MidCentral	14	2.3%	15	2.4%	29	4.7%
Nelson Marlborough	11	2.3%	11	2.3%	22	4.7%
Northland	11	1.9%	12	2.1%	23	4.0%
South Canterbury	3	1.4%	4	2.2%	7	3.6%
Southern	13	1.4%	21	2.3%	34	3.8%
Tairāwhiti	3	1.9%	3	1.8%	6	3.6%
Taranaki	8	2.4%	16	4.4%	24	6.8%
Waikato	28	2.1%	39	3.0%	66	5.1%
Wairarapa	1	0.9%	2	1.1%	3	2.1%
Waitemata	35	2.2%	27	1.7%	62	4.0%
West Coast	2	1.2%	5	3.2%	6	4.4%
Whanganui	5	1.9%	5	1.9%	9	3.8%

## Some DHBs have been underspending on repairs and maintenance and may be sweating their assets

We have a new metric this year, assessing repairs and maintenance against planned levels (table 15). This metric is important as too little expenditure may reduce assets' lifespan and increase medium to long term costs. Table 15 also includes net surplus / deficit information to help assess the relationship between DHBs' financial position and repairs and maintenance expenditure.

While our metric is fairly crude, and could benefit from a longer time series, the mixed results across DHBs provide some useful information. Ten DHBs are green rated with expenditure close to planned levels. Lower expenditure percentages at some of these DHBs (for example Bay of Plenty and Taranaki) may reflect newer buildings. Six DHBs are amber or red rated due to underspends and four due to overspends. A number of the DHBs with underspends also had net deficits (Canterbury, Lakes, Southern, Tairāwhiti and Wairarapa); some may be deferring repairs and maintenance and prioritising funds to other areas.

High variance from budget for Capital & Coast reflected a very low planned amount for 2015 rather than a change in expenditure (Capital & Coast's percentage of expenditure on repairs and maintenance was relatively stable over the two years). Tairāwhiti's large fluctuation in expenditure (it had the lowest percentage in 2015 followed by the second highest in 2016) may potentially indicate problems from too little activity followed by a more costly catch-up period. Looking forward, there are indications that some DHBs may require significant additional Crown support for critical infrastructure replacement (for example Auckland).

### Rating system for table 15: Repairs and maintenance

Ratings are based on average variance from plan for the last two years (2015 and 2016). Red rated DHBs have a variance outside the range -20% to +40%. Amber rated DHBs have a variance outside -10% to +20%. Other DHBs are rated green.

Our rating range is more sensitive to underspends due to the higher chance of problems such as asset failures or cost escalation as damage increases over time. Overspends may also generate an amber or red rating as they may indicate expensive urgent work or inadequate planned expenditure levels.

**Table 15: Repairs and maintenance as a percentage of total expenditure and variance from plan**

	Percentage of expenditure		Average variance from plan 2015 and 2016	Net surplus / deficit as a % of total revenue	
	2015	2016		2015	2016
Auckland	1.0%	1.1%	2%	0.0%	0.1%
Bay of Plenty	0.5%	0.4%	14%	(0.1%)	(0.2%)
Canterbury	1.2%	1.2%	(56%)	(1.2%)	(0.0%)
Capital and Coast	0.7%	0.6%	47%	(0.4%)	(1.2%)
Counties Manukau	0.6%	0.5%	10%	0.2%	0.2%
Hawkes Bay	1.1%	1.1%	10%	0.6%	0.8%
Hutt	0.4%	0.7%	(0%)	(1.6%)	(1.4%)
Lakes	0.8%	0.7%	(17%)	(1.2%)	(1.6%)
MidCentral	1.6%	1.6%	15%	(0.3%)	(0.4%)
Nelson Marlborough	1.0%	0.9%	5%	0.4%	0.3%
Northland	0.7%	0.7%	11%	0.1%	0.1%
South Canterbury	0.4%	0.4%	47%	0.1%	(0.6%)
Southern	0.6%	1.0%	(24%)	(3.1%)	(3.7%)
Tairāwhiti	0.1%	1.6%	(13%)	(1.8%)	(4.0%)
Taranaki	0.5%	0.4%	(9%)	(1.1%)	(1.0%)
Waikato	0.8%	0.9%	(25%)	(0.2%)	0.3%
Wairarapa	0.8%	0.8%	(21%)	(2.4%)	(1.3%)
Waitemata	0.6%	0.6%	31%	0.2%	0.2%
West Coast	0.9%	1.3%	40%	(0.7%)	(0.6%)
Whanganui	1.3%	1.2%	5%	0.0%	(0.2%)
<i>Negative number means actuals below plan (R&amp;M expenditure and net surplus lower)</i>					

## Section 8: Productivity

### **DHB productivity matters for patients significantly affecting the level of services delivered**

Productivity measures are important to help understand if increased spending improves services to patients. We use two measures to assess productivity, trends in case weighted discharges (CWDs) and average length of inpatient hospital stay (ALOS).

### **Hospital productivity has remained relatively constant with activity (case weighed discharges) increasing in line with rising funding levels**

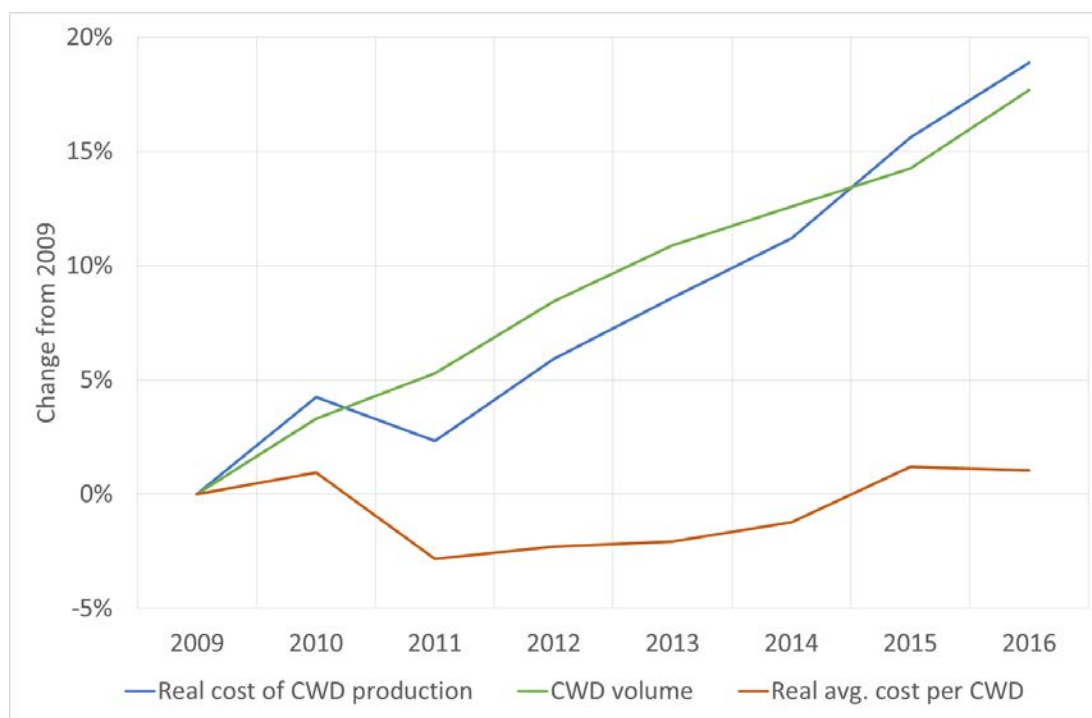
CWDs, which assign greater weight to more complex procedures, provide a standardised measure of DHBs' hospital inpatient activity volume (excluding mental health and disability support). We measure CWD volumes against the total cost of production (expenditure on medical and nursing personnel, clinical supplies, outsourced clinical services, interest, depreciation and capital charge).

Our CWD analysis indicates that DHBs' hospital productivity has remained relatively constant over the time period 2009 to 2016; with a 19% real increase in the cost of production matched by an 18% increase in CWD volume (figure 19). The small variation in the average-cost-per-CWD over the seven year period (1%) is calculated at a high level across a changing service mix and we would not put too much weight on it; it is within our assessment's margin of error if costs have changed or held stable by 2016.

We note that relatively stable productivity levels (real costs per CWD) may reflect a combination of savings from increased hospital efficiency being offset by provider-arm wage growth. Also, our analysis does not capture service quality. There may have been a pattern of increasing quality at a stable level of cost-per-CWD; we discuss this further below in our section on opportunities to develop improved metrics.

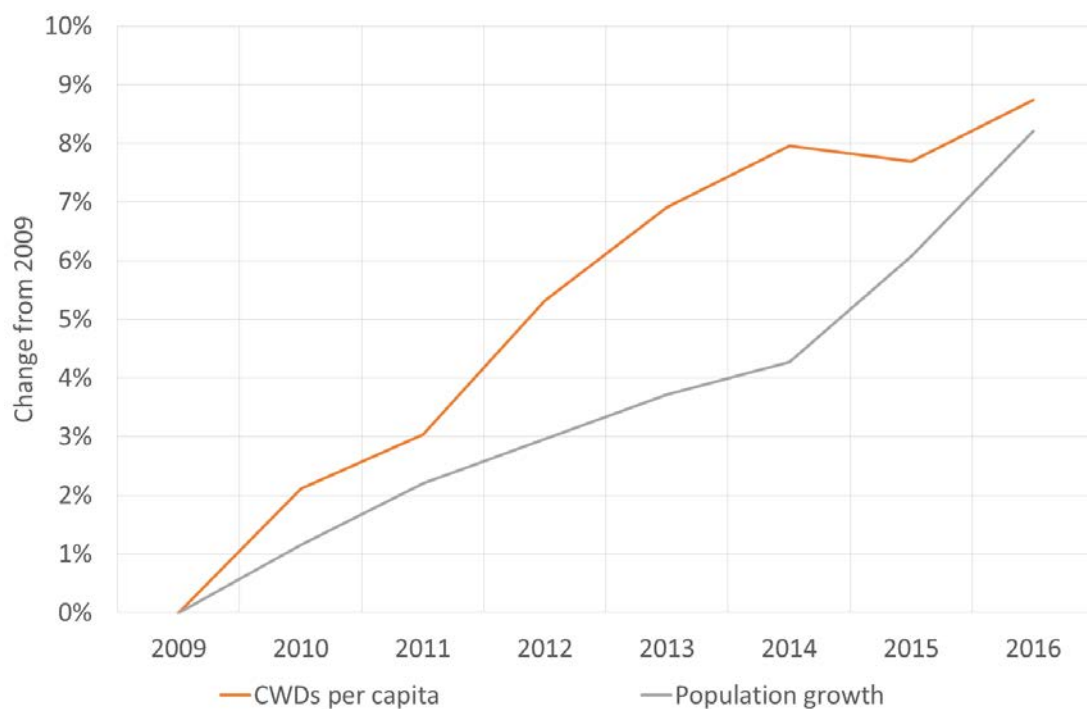
The 18% CWD volume increase from 2009 to 2016 can be mainly attributed to two factors; around half is due to population growth and the other half to increasing CWDs per capita (figure 20). Rising CWDs per capita may be the result of factors such as population aging and increased service availability.

**Figure 19: Percentage change in CWD cost of production, volumes and average cost per CWD**



Note 1 CWDs only capture inpatient activity.

**Figure 20: Factors affecting rising CWD volumes**



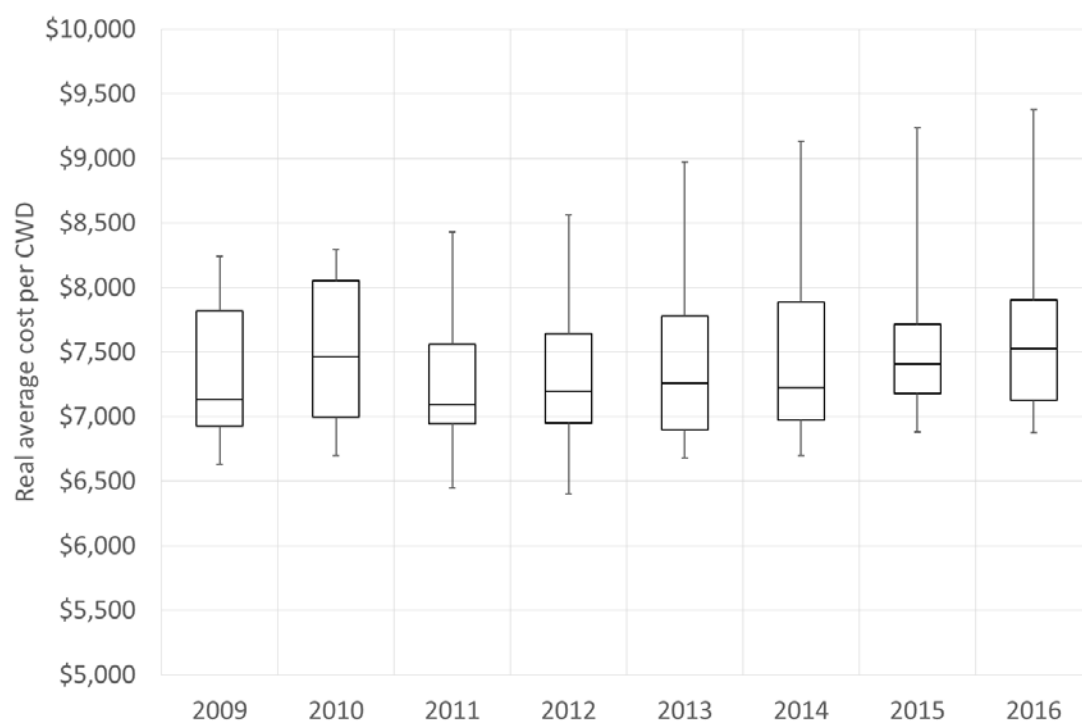
## Variability in costs-per-discharge between DHBs indicates there may be room for further productivity improvements

Figure 21 shows the distribution of real-average-cost-per-CWD by DHB<sup>2</sup> over time. It can be seen that:

- ▶ Median performance has been relatively stable in the years shown.
- ▶ There is a relatively large degree of variation between DHBs with the highest cost-per-CWD about 25% above the median in 2016.

Although our analysis is high level, the significant range of cost-per-CWD across the DHBs suggests that there may be opportunities to increase productivity.

**Figure 21: Distribution of real average cost per CWD across DHBs**



Note 1 The median DHB's performance is shown by the middle line within the box. The box represents the distribution of the nine middle performing DHBs and the bars the distribution of the five top- and five bottom-performing DHBs.

<sup>2</sup> The format of this graph has been updated from our report last year to show the average cost per CWD, rather than CWD per dollar.

Table 16 shows our productivity ratings by DHB. Bay of Plenty, Counties Manukau, Lakes and Waikato have good productivity track records across the years. Some smaller DHBs tend to have higher costs per CWD. Two of the red rated DHBs, Tairāwhiti and Taranaki, are also red rated for their net deficit: increased productivity (a reduction in costs per CWD) might improve their financial position.

#### Rating system for table 16: DHB productivity

DHBs are rated on 2016 performance. Green rated DHBs were either in, or within 5% of, the top five performers in that year. Red rated DHBs were in the bottom five performers and more than 5% worse than the remaining DHBs which were rated amber.

**Table 16: DHB hospital productivity rating and ranking**

DHB	2009	2010	2011	2012	2013	2014	2015	2016
Auckland	11	8	10	11	9	11	10	9
Bay of Plenty	3	5	4	3	2	2	3	1
Canterbury	10	6	7	8	8	7	8	5
Capital and Coast	15	16	16	13	13	13	11	11
Counties Manukau	1	2	1	1	1	1	1	3
Hawkes Bay	8	1	2	2	6	8	7	7
Hutt	7	7	6	5	3	4	5	6
Lakes	2	3	5	7	7	3	4	2
MidCentral	16	18	17	18	18	15	17	17
Nelson Marlborough	17	19	18	15	14	14	15	15
Northland	9	10	11	10	10	12	6	10
South Canterbury	5	9	12	14	15	18	18	18
Southern	13	11	8	9	4	5	9	8
Tairāwhiti	12	17	19	19	19	19	19	19
Taranaki	14	15	15	16	17	17	16	16
Waikato	6	4	3	4	5	6	2	4
Wairarapa	4	13	9	6	12	10	12	13
Waitemata	19	14	14	12	11	9	14	12
Whanganui	18	12	13	17	16	16	13	14

Note 1 A lower ranking indicates a lower average-cost-per-CWD. Blue shaded DHBs are in the five best performing in each year; grey shaded are in the five worst performing.

Note 2 Our metric has changed slightly to include outsourced services costs. Accordingly, we have not shown change arrows from last year's report.

Note 3 West Coast is excluded as it has a substantially different service model.



## Average length of inpatient stay has been reducing which is most likely a good thing as longer stays tend to reduce patient welfare and increase costs

Average length of hospital stays (ALOS) provides another measure of hospital efficiency. ALOS can be reduced by measures such as advances in treatment technologies, more effective drugs, improved community and follow-up care, and more effective hospital administration.

Our ALOS analysis indicates that most DHBs have reduced inpatient stay times in 2014 and 2015 (figure 22). This is most likely a good thing as longer stays tend to reduce patient wellbeing and increase costs. Taking into account the relatively stable real-costs-per-CWD discussed above, DHB savings from reduced inpatient stay times may have allowed quality improvements through redeployment of staff time or been offset by rising provider-arm wage costs.

**Figure 22: Change in average length of stay**

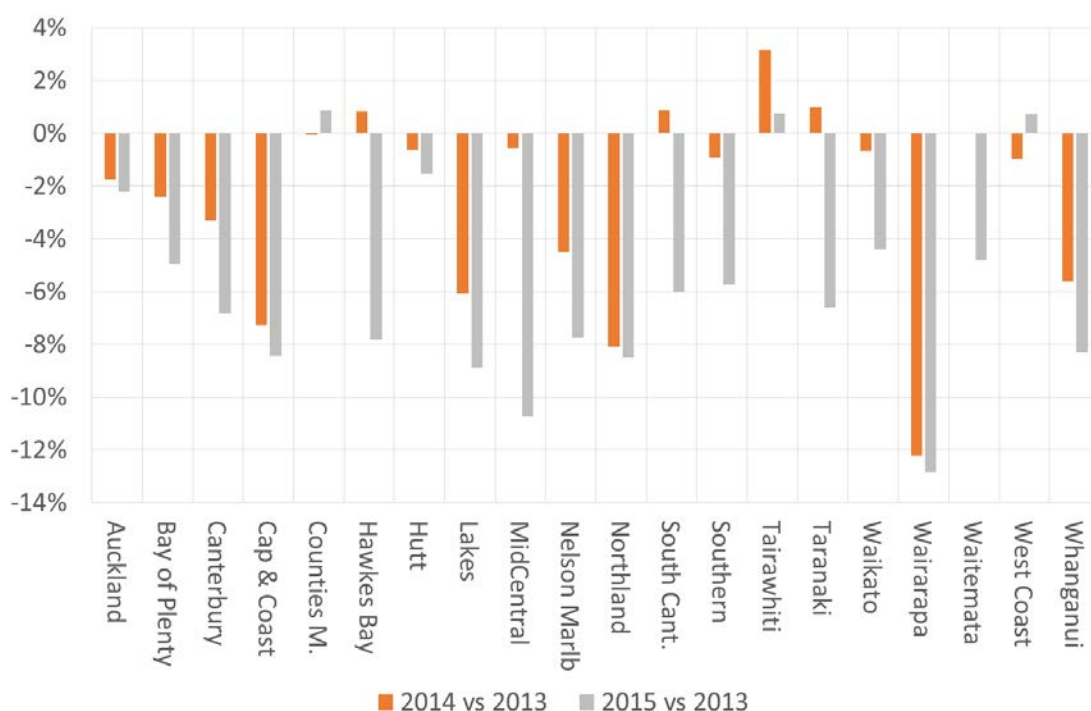
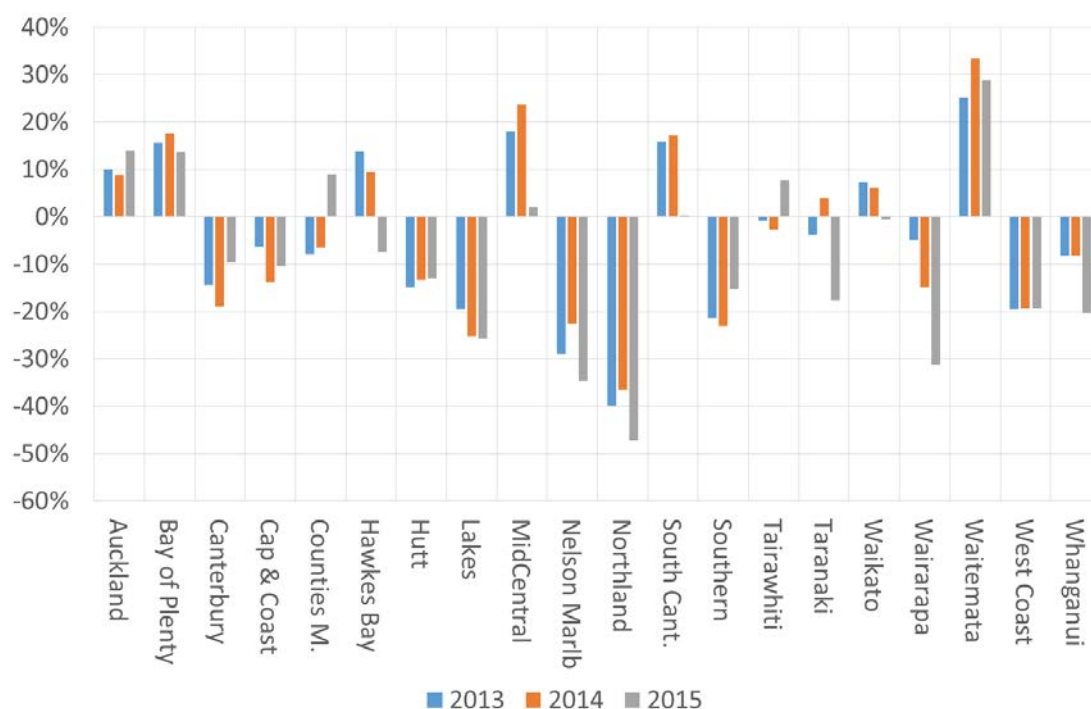


Figure 23 shows that most DHBs have lower ALOS than the level predicted by their case-mix. Further analysis in this area may be required to help understand the relationship between ALOS and costs-per-CWD. For example, Bay of Plenty has relatively long stays but the lowest average-cost-per-CWD.

**Figure 23: Average length of stay versus case-mix predicted level**



### Good opportunities exist to develop better health system productivity metrics

While useful, our productivity analysis is significantly incomplete. There is a mismatch between inputs and outputs because inpatient CWDs are a subset of hospital activity and we are not able to exclude provider-arm inputs that relate to other (non-CWD) activity. It tells us nothing about service quality and does not recognise the benefits of DHB programs such as “releasing time to care” which aim to improve hospital processes allowing staff to spend more time with patients. Our ALOS analysis could be strengthened by assessment of hospital readmission rates (readmission rates would be expected to remain the same or fall as length of stay reduces if the system is working well).

This opportunity for additional productivity metric development is a subset of the need for a more comprehensive monitoring framework covering the entire health system; we discuss this further in box 4 below.

#### Box 4: Opportunities for development of New Zealand's health monitoring framework

The New Zealand health system has a large number of performance indicators managed by organisations including the Ministry of Health, DHBs, and the Health Quality and Safety Commission. In common with other countries, while we have many metrics, they may:

- ▶ Often focus on one specific area and provide limited information around wider context.
- ▶ Cover only one part of performance (for example volume or cost).
- ▶ Rarely measure health outcomes for patients (volume measures normally count service output units).
- ▶ Not be used systematically at the centre to manage performance.

As a result it can be challenging to bring together a comprehensive, high level, overview of New Zealand health system performance. Further development of a monitoring framework that connects different service levels and includes more systematic metric coverage (including greater use of multiple types of metrics in each area) would be beneficial.

The Ministry of Health has lead responsibility for monitoring DHBs. The Ministry's health targets include the volume of elective discharges as a productivity measure. Volumes have been increasing. However, this is an incomplete measure of hospital activity that excludes non-surgical and non-hospital outputs. It does not provide information around levels of need, service quality, or productivity levels versus funds employed. Development of new metrics and continuation of the Ministry's past productivity assessments (such as those included in its 2012 annual report) would be valuable.

# Appendix 1: Summary comments and overall rating by DHB

*The following comments and overall ratings relate to actual performance up to 2016 and 2017 planned performance.*

**Auckland.** (Green.) Population large and growing, also young. High proportion of Pacific Island residents. Consistent financial performance, albeit assisted by additional revenue in 2015.

**Bay of Plenty.** (Green.) Medium-sized DHB with significant numbers of Māori and older residents. Small unplanned deficits in 2015 and 2016, but consistent financial performance overall. Relatively high proportion of provider-arm expenditure. Good hospital productivity track record.

**Canterbury.** (Red.) Large population with favourable demographics. Its weak balance sheet with large deficit forecast for 2017 indicates that improved financial management is required for it to manage within budget. Remains significantly affected by recent earthquakes. May be having trouble funding asset maintenance and repairs. High depreciation levels are likely to increase following transfer of Burwood Hospital to its books, but there may be some opportunity to reduce them by lowering its depreciation rate.

**Capital and Coast.** (Red.) Large to medium-sized population: quite young, with about average numbers of Māori and Pacific Island people. Relatively high unplanned deficit in 2016 and weak balance sheet. Further deficit planned for 2017. Lower capital expenditure in comparison to depreciation (in part due to higher depreciation from new builds) and spending is biased towards the provider-arm. High variances in spending against its repairs and maintenance budget may indicate planning issues.

**Counties Manukau.** (Green.) Population is large, growing and young. High numbers of Pacific Island people and Māori. Consistent financial performance. Good hospital productivity track record. Relatively low level of GPs per capita.

**Hawkes Bay.** (Green.) Medium-sized population: slow growing, ageing, with significant numbers of Māori. Consistent financial performance.

**Hutt.** (Amber.) Medium-sized, slow-growing population with significant numbers of Māori and Pacific Island people. Significantly higher than planned capital expenditure in 2016. Remains in deficit for 2016 with a smaller deficit planned for 2017. Relatively high level of provider-arm expenditure.

**Lakes.** (Amber.) Small to medium-sized and static population with a high proportion of Māori. Deficits in 2015 and 2016 and a track record of adverse net results to plan raise questions about its financial management and the planned return to surplus in 2017. Financing and depreciation expenses are significant. May be having trouble funding asset maintenance and repairs. Relatively high level of provider arm expenditure. Good hospital inpatient productivity track record.

**MidCentral.** (Green.) Medium-sized population with significant numbers of Māori. Small deficits in 2015 and 2016 but otherwise consistent financial performance and a robust

balance sheet. Hospital inpatient productivity may be lower relative to other DHBs. Lower level of GPs per capita in comparison to other DHBs.

**Nelson Marlborough.** (Green.) Medium-sized, ageing population. In deficit for a couple of years (2012 and 2013), but has run surpluses since then. The balance sheet looks healthy.

**Northland.** (Green.) Medium-sized population, with high numbers of Māori. Consistent financial performance.

**South Canterbury.** (Amber.) Small, older population. Unplanned net deficit in 2016 with a plan to return to surplus in 2017. May be having trouble funding asset maintenance and repairs. Hospital inpatient productivity may be lower relative to other DHBs.

**Southern.** (Red.) Large to medium-sized population with quite favourable demographics. Has run increasingly large deficits since 2012, with the planned deficit at 2% of total revenue in 2017. Weak balance sheet. May be having trouble funding asset maintenance and repairs. Relatively high level of provider arm expenditure. Work is underway for redevelopment of the Dunedin hospital which will require additional Crown funding.

**Tairāwhiti.** (Red.) Small, static population, with a higher proportion of Māori (50%) than any other DHB. Has a weak balance sheet and reported a net deficit in 2013, 2015 and 2016. May be having trouble funding asset maintenance and repairs. Adverse net results to plan in 2015 and 2016 raise questions about its financial management and planned surplus for 2017. Hospital inpatient productivity may be lower relative to other DHBs.

**Taranaki.** (Red.) Small to medium-sized and static population, with about average demographics. Ran a deficit in the last three years and has limited liquid assets on its balance sheet. Hospital inpatient productivity may be lower relative to other DHBs.

**Waikato.** (Amber.) Large to medium-sized population, with significant numbers of Māori. Mostly steady financial performance, although it had a small deficit in 2015 and its balance sheet contains relatively few liquid assets. May be having trouble funding asset maintenance and repairs. Good hospital productivity track record.

**Wairarapa.** (Red.) Small, older population. Has run material deficits for a number of years with another planned deficit in the current year. The balance sheet is weak. Has a high, but declining, allocation of resources to external providers. May be having trouble funding asset maintenance and repairs.

**Waitemata.** (Green.) Large, relatively young population. Consistent financial performance and a strong balance sheet. There has been a material shift of resources to the funder arm in the last year.

**West Coast.** (Amber.) Small population. Ongoing deficits despite significant, persistent “transitional” funding topping up its PBFF share.

**Whanganui.** (Green.) Small, older population, which includes significant numbers of Māori. Population numbers are expected to decline over the next decade, posing some particular challenges. Small deficit in 2016 planned to increase slightly in 2017.

## Appendix 2: Vote health (operating) and core Crown health expenditure growth

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>Vote Health, operating</b>												
Expenditure, \$bn	9.100	9.858	10.772	11.621	12.348	12.797	13.252	13.607	14.050	14.345	14.807	15.324
Expenditure, % GDP	5.53%	5.62%	5.70%	6.13%	6.28%	6.22%	6.15%	6.22%	5.98%	5.94%	5.88%	5.79%
% annual increase (nominal)	8.99%	8.33%	9.28%	7.88%	6.26%	3.63%	3.56%	2.67%	3.26%	2.09%	3.22%	3.49%
% annual increase (real)	4.85%	6.21%	5.06%	5.88%	4.52%	(1.56%)	2.58%	1.98%	1.62%	1.67%	2.79%	2.05%
% annual increase (real per capita)	3.65%	5.07%	4.14%	4.96%	3.31%	(2.45%)	1.99%	1.32%	0.38%	(0.13%)	0.73%	0.05%
<b>Core Crown Health</b>												
Expenditure, \$bn	9.547	10.355	11.297	12.368	13.128	13.753	14.160	14.498	14.898	15.058	15.626	16.490
Expenditure, % GDP	5.80%	5.90%	5.97%	6.53%	6.67%	6.68%	6.58%	6.63%	6.34%	6.23%	6.21%	6.23%
% annual increase (nominal)	8.33%	8.46%	9.10%	9.48%	6.14%	4.76%	2.96%	2.39%	2.76%	1.07%	3.77%	5.53%
% annual increase (real)	4.21%	6.34%	4.88%	7.45%	4.41%	(0.49%)	1.99%	1.69%	1.13%	0.65%	3.34%	4.06%
% annual increase (real per capita)	3.01%	5.20%	3.97%	6.51%	3.20%	(1.38%)	1.39%	1.04%	(0.11%)	(1.13%)	1.26%	2.02%

Note 1 Real expenditure means adjusted for CPI inflation. There are other measures of health inflation that may be higher.

Note 2 Per capita numbers are based on a simple count of total population. There is no adjustment for demographic factors, such as ageing, that could tend to increase costs per capita.