NZIER
NEW ZEALAND INSTITUTE OF ECONOMIC RESEARCH

Community pharmaceuticals

Expenditure trends

NZIER report to Medicines New Zealand

December 2018

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Authorship

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Executive summary

The report highlights that the amount of investment in medicines as a percentage of total DHB funding was estimated to be 8.1% in real terms in 2007, but since then has fallen. Investment as a percentage of DHB funding declined sharply in 2017/18 from 2016/17. In 2017/18, the level of investment was 4.7% in real terms despite the increased funding announcements made in 2016 and 2017.

This report identifies a $375 million investment gap in medicines that are government-funded and made available through the public health system in New Zealand. This gap in medicines' funding appears to have been growing year-on-year since 2006/07 in real terms, i.e. when taking population growth and inflation into account. This is the amount of additional investment that would be required on top of the current budget to have the same level of investment in medicines as in 2006/07 in real terms.

Budget 2018 announced a $3.2 billion[1] injection into the health sector over the next four years. In future, the Combined Pharmaceutical Budget (CPB) will be redefined to also include the remainder of DHB hospital medicines. Budget documents indicate that savings in this expenditure category will be returned to Vote Health to be reprioritised to other areas.[2] That Budget data shows that overall expenditure on pharmaceuticals will reduce, and reduce as a part of Vote: Health. Given the level of savings forecast, this is likely to include those within the current CPB too, and make the gap worse.

One solution to the investment gap may be to include a 'corrective real terms adjustment' to maintain stability in pharmaceutical investment relative to other investments.

This report does not factor in other key influencers such as an ageing population and the burden of chronic diseases, which could further increase the level of investment required in medicines. The report however, suggests that investment in medicines may not be keeping up with population growth or inflationary pressures.

This is the last time such a report will be produced due to the new definition of the CPB and the method used to collect data on PHARMAC's expenditure trends.

1 https://www.budget.govt.nz/budget/2018/at-a-glance/rebuilding-critical-public-services.htm

2 https://treasury.govt.nz/sites/default/files/2018-08/b18-3922457.pdf

Glossary

Combined Pharmaceutical Budget (CPB)

This budget is for subsidies for community medicines and some medical devices (those medicines dispensed by your pharmacist), vaccines, haemophilia treatments, nicotine replacement therapy and cancer medicines which are sometimes given in hospitals. It does not include other hospital medicines and devices, which are funded from DHB hospital budgets.[3]

Community Pharmaceutical Expenditure

Expenditure on pharmaceuticals and some medical devices dispensed at community pharmacies. Does not include vaccines, haemophilia treatment, nicotine replacement therapy, pharmaceutical cancer treatments, or medical devices not dispensed at community pharmacies.

Net

For the purposes of this report, "net" means net of rebates where a rebate is the difference between a subsidy paid by PHARMAC and a lower price agreed between PHARMAC and the pharmaceutical supplier. For example, the net CPB is the CPB after rebates are subtracted.

Discretionary Pharmaceutical Fund (DPF)

This fund can be used to provide additional funding to DHBs. The fund was established by the Minister of Health to enable retention of pharmaceutical funding across financial years. This allows PHARMAC to take advantage of investment opportunities that might not otherwise be able to be funded in that year, as well as deal with the sometimes lumpy effects of growth in pharmaceutical usage.

[3] PHARMAC.

Key points

Changes in scope complicates expenditure analysis

Since 2010/11, budget transfers from DHBs and Ministry of Health (MOH) to the Combined Pharmaceutical Budget (CPB) used for pharmaceutical cancer treatments, vaccines and haemophilia treatments have been included in the CPB and the total amount of these additional investments has grown in value, obscuring the fact that, in nominal terms, the amount of expenditure (net of rebates and movements in the discretionary pharmaceutical fund (DPF)) on community pharmaceuticals has fallen.

In addition to the increase in additional investments since 2010/11, rebates have nearly quadrupled over the same period, resulting in a wider gap between gross and net expenditure.

Community pharmaceutical expenditure is not keeping pace with inflation and population growth

Based on net values for the CPB and community pharmaceutical expenditure, and after adjusting values for inflation, using the Consumer Price Index (CPI) as well as population growth, real population-adjusted expenditure on community pharmaceuticals has fallen significantly since 2006/07 while the CPB overall has increased.

If only the health component of the CPI is used to adjust for inflation alongside population adjustment, the rate of decrease in pharmaceutical expenditure is greater.

Community pharmaceutical expenditure is not keeping pace with other health expenditure and is likely to get worse

The CPB and community pharmaceutical expenditure were also analysed as a proportion of Vote Health (Budget estimate) and as a proportion of DHB funding (Budget estimate) for the period 2006/07 to 2017/18. After adjusting all values for inflation and population growth, both the CPB and community pharmaceutical expenditure have fallen significantly compared with Vote Health and DHB funding.

The 2017/18 CPB is equal to 7.8% of DHB funding (after adjusting for CPI-Health and population), whereas the 2010/11 and 2006/07 CPB levels were both 8.1% of DHB funding. To return to the 2011 CPB level from the 2018 CPB level, an additional investment of $360m would be required and an additional investment of $375m would be required to return to the 2007 CPB level.

The overall increase in Vote: Health, plus changes in the way pharmaceuticals expenditure is structured, announced in the 2018 Budget, mean that the gap will get bigger.

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1. Introduction and context

This report is an update to the report released in 2017, which analysed PHARMAC's expenditure trends. It includes expenditure data for the years 2016/17 and 2017/18. This report describes the analysis of trends in the Combined Pharmaceutical Budget (CPB) and the community pharmaceutical expenditure component of the CPB. This expenditure data was based on publicly available information from Vote Health Budget Estimates, Official Information Act (OIA) responses received by Medicines New Zealand from PHARMAC, press statements from the Minister of Health on PHARMAC budgets (2017 and 2018) and PHARMAC annual reports. Expenditure data was checked for accuracy against PHARMAC annual reports and, in the case of Vote Health Estimates, against estimates published on the NZ Treasury website.

The objective of the analysis was to identify changes in the absolute and relative levels of expenditure on the CPB and community pharmaceuticals net of rebates and movements in the Discretionary Pharmaceutical Fund (DPF), taking into account inflation and population growth, and in comparison, with other measures of health expenditure.

The analysis does not assume that there is a 'right' amount to spend on pharmaceuticals, but intends only to provide information for decision-making.

The analysis also did not include any consideration of: outcomes of pharmaceutical investment; effectiveness of PHARMAC's functions or of funded pharmaceuticals; effects of changes in the price of pharmaceuticals; the level of need for funded pharmaceuticals; the difference between the relative effectiveness of pharmaceuticals and other health services; or changes in the specific composition of community pharmaceutical expenditure. Interpretation of results may require that these additional issues be considered.

2. Baseline data

The expenditure data used for this report were obtained from a spreadsheet supplied by Medicines New Zealand, and PHARMAC annual reports. Medicines New Zealand's spreadsheet was based on PHARMAC expenditure data extracted from responses to requests for information under the OIA about PHARMAC's CPB and expenditure on community pharmaceuticals. The Vote Health figures in the spreadsheet represent the estimated appropriations from the Budget released publicly by Treasury.

As a first step the values obtained from PHARMAC through requests for information under the OIA were checked against PHARMAC's annual reports and against the Treasury's published estimates. The data obtained under the OIA, which is attached to the PHARMAC annual reports, is publicly available. Checks for internal consistency with regards to gross and net values of the CPB and community pharmaceuticals were also performed.

Minor issues were identified in the OIA responses provided to Medicines New Zealand:

- The amount of community pharmaceutical expenditure for 2007/08 in the OIA responses provided was not found in PHARMAC's 2008 Annual Report
- The "additional rebates" included in the OIA responses provided were not found in PHARMAC's annual reports.

Also, it was noted that the Vote Health figures represented the estimated appropriations (Budget figures), not actual expenditure which is available from the Supplementary Estimates published by the Treasury later in each financial year. This is not expected to have a major impact.

The calculation of net values of CPB and community pharmaceutical expenditure appeared to be accurate and these were used in the analysis for this report.

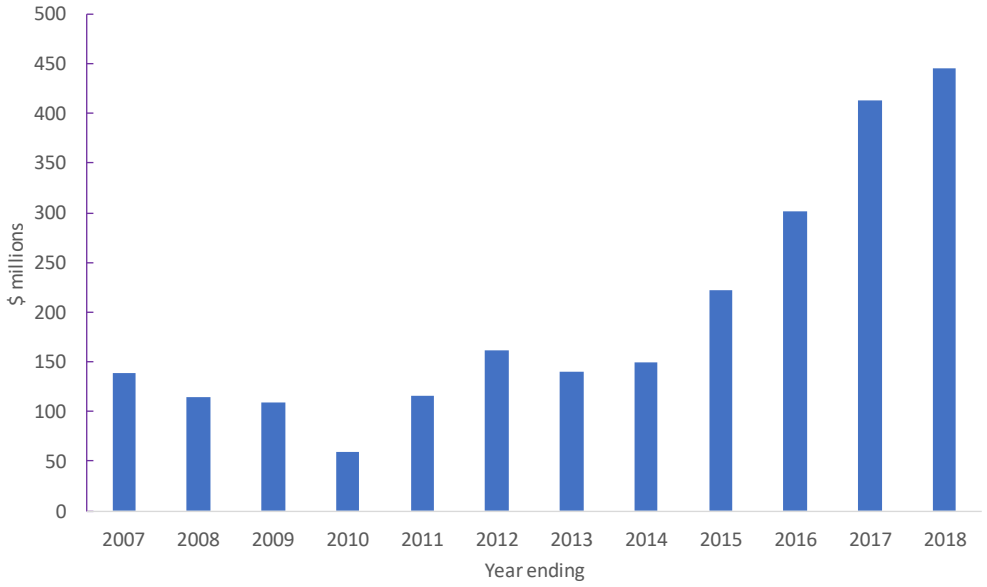
Data sources can be found in Appendix B.

3. Pharmaceutical rebates

When analysing pharmaceutical expenditure trends, the total amount of rebates[4] is important to consider because rebates represent amounts paid by pharmaceutical companies back to DHBs (via PHARMAC). The higher the total amount of rebates, the greater the difference between gross expenditure and net expenditure, with net expenditure being a truer representation of cost.

Pharmaceutical rebates have experienced significant growth over time, particularly since 2013/14, as shown in Figure 1 below. This sharp rise is due to the inclusion of vaccine rebates, which were not included in previous years.

Figure 1 Value of rebates



Source: NZIER, Data obtained from OIA responses, PHARMAC Annual Reviews and Vote Health Budget Appropriations.[5]

Because rebates have varied considerably, and grown rapidly since 2013/14, values of community pharmaceutical expenditure and the CPB analysed for this report are the net values (after subtracting rebates).

4 See the definition of "net" in the Glossary.

5 Years ending 2015 and 2016 rebate values are higher due to gross (not net) numbers for rebates provided in the OIA responses.

4. The net CPB and community pharmaceutical expenditure

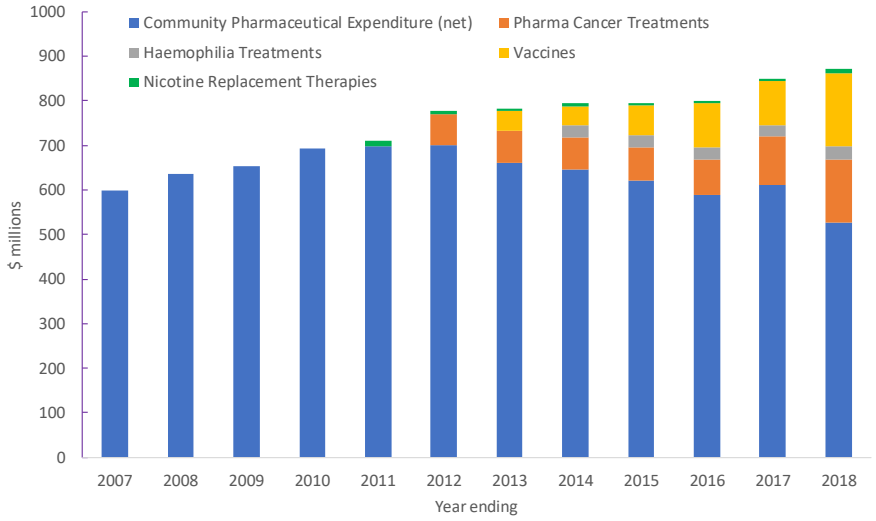
From 2006/07 to 2009/10, the net (after subtracting rebates and movements in the DPF) CPB expanded from $599 million to $694 million.

In 2010/11, expenditure on nicotine replacement therapy was added to expenditure on community pharmaceuticals and was subsequently reported as a CPB. Expenditure on nicotine replacement therapy has tended to decrease over time from its initial funding of nearly $13 million in 2010/11 to just under $6 million in 2016/17 then rising slightly to just under $8 million in 2017/18.

In 2011/12, pharmaceutical cancer treatments were transferred from DHBs to the CPB. Unlike, nicotine replacement therapy, pharmaceutical cancer treatment expenditure has expanded from $68.5 million to over $140 million in 2017/18 with expenditure increasing by 75% in the last two years alone. In 2012/13, vaccines were transferred from MOH to the CPB, increasing from just over $43 million in the first year to $165 million in 2017/18. Expenditure on vaccines has increased by 70% in the last year alone. Finally, in 2013/14, haemophilia treatments were transferred from DHBs/hospitals to the CPB, remaining fairly constant at $27 to $28 million per year from 2013/14 to 2016/17 then rising slightly to $29m in 2017/18.

Figure 2 below shows the growing importance of these additional investments ($12.92 million in 2010/11 to $343.2 million in 2017/18) as they contributed to the overall growth of the CPB, observed as continued annual increases. Community pharmaceutical expenditure declined in nominal terms by 25% since 2010/11.

Figure 2 Breakdown of the net CPB (unadjusted)



Source: NZIER, Data obtained from OIA responses, PHARMAC Annual Reviews and Vote Health Budget Appropriations.[6]

[6] Years ending 2015 and 2016 vaccine rebate values are higher due to gross (not net) numbers for vaccine rebates being provided in the OIA responses.

5. Expenditure adjusted for population growth and inflation

The results presented so far are based on nominal values unadjusted for population growth. But over the 11 years of this dataset, the effects of inflation and population growth will have meant that, ceteris paribus, the same level of funding would not deliver the same value of pharmaceutical investments.

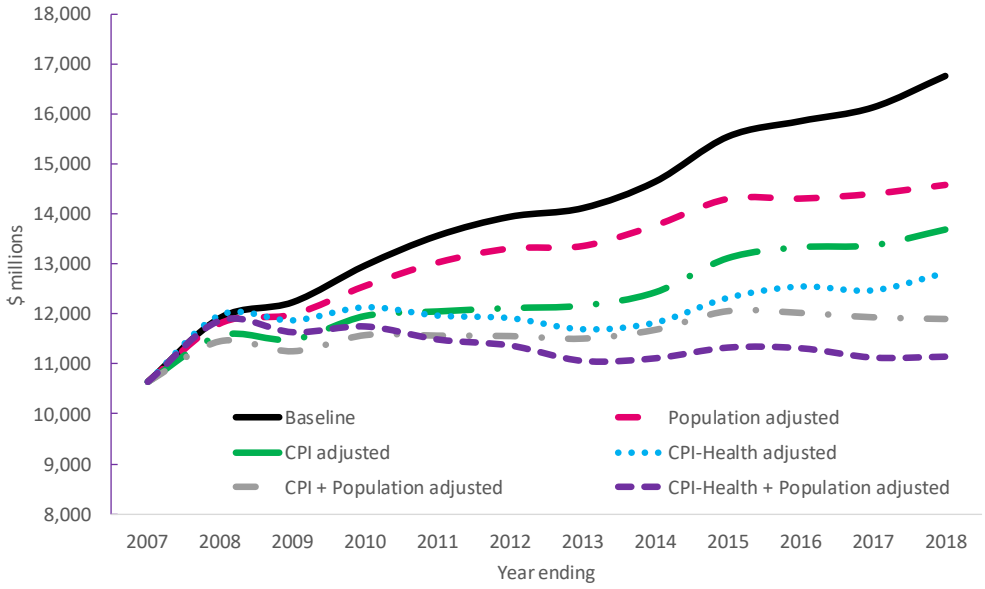
To get a more meaningful indication of the growth of Vote Health, the CPB and community pharmaceutical expenditure, the amount of expenditure on each was adjusted for:

- Inflation – using the Consumer Price Index (CPI) or the health component of the CPI (CPI-Health), the latter reflecting a greater rate of inflation, and
- Population growth – using Statistics New Zealand's population estimates.

Adjusting for inflation and population growth result in a more modest pattern of growth in Vote Health budgets, with price-related adjustments having a greater effect than the adjustment for population growth, and the health component of the CPI having the greatest effect of the two inflation adjustments.

Figure 3 below shows the effects of these adjustments, using the Vote Health Budget estimate for illustration purposes. Adjusting for population growth alone has the least effect. Adjusting for inflation using the health component of the CPI (CPI-Health[7]) has a greater effect than using all components of the CPI. Unsurprisingly, the combined effects of population growth and health-related inflation cause the greatest erosion of values, resulting in Vote Health having an almost flat profile over time. Because all adjusted 2017/18 values of Vote Health have increased relative to 2006/07, one would expect, ceteris paribus, that the Vote Health would deliver at least as much value in 2017/18 as it did in 2006/07.

Figure 3 Effect on Vote Health (Budget estimate) of adjusting for inflation and population growth[8]



Source: NZIER, Statistics NZ, Data obtained from OIA responses, PHARMAC Annual Reviews and Vote Health Budget Appropriations.

7 This index comprises of pharmaceutical products, therapeutic appliances and equipment, medical services, dental services, paramedical services, hospital services and other medical products. But relates to out of pocket expenditure by consumers – rather than the full cost of these items. See more at: http://datainfoplus.stats.govt.nz/Item/nz.govt.stats/8b0860b8-cf63-4f12-a578-8eed8ba69ac3#/nz.govt.stats/a4ae9211-0415-4ef3-bf3e-46fef770e8c1/3

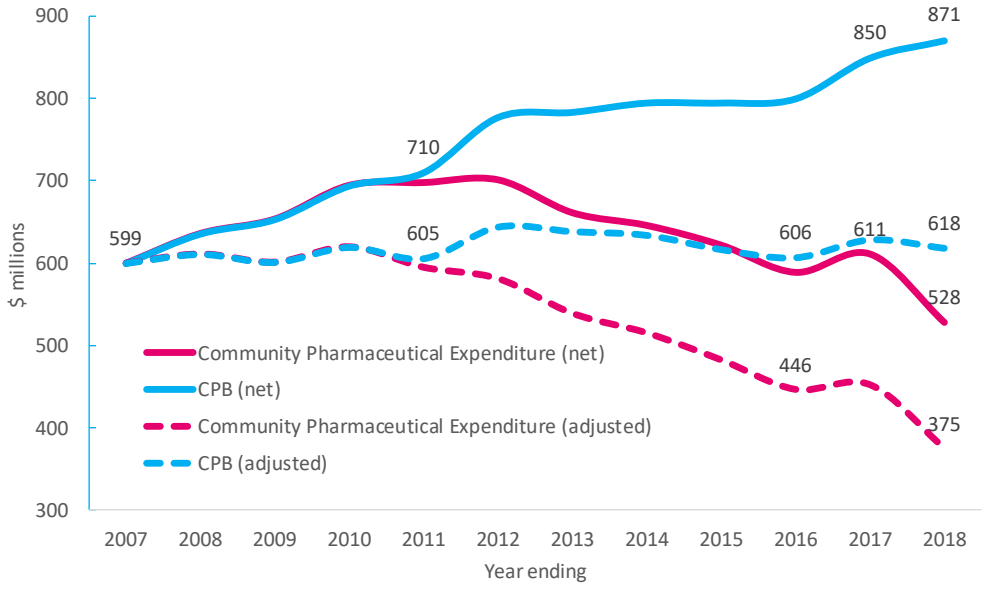
8 Differences between the series are small as proportion of the total. The vertical axis has been truncated so that small proportionate differences can be seen more clearly.

5.1. CPI and population adjusted CPB and community pharmaceutical expenditure

Adjusting for population growth and inflation (using the CPI), as shown in Figure 4 below, reveals that the growth in the net CPB (dotted blue line) has not been as significant as suggested by the unadjusted values of the net CPB (solid blue line). In fact, after adjusting for inflation (using the CPI) and population growth (dotted pink line), expenditure on community pharmaceuticals was considerably lower in 2017/18 than in 2006/07, whereas the unadjusted values suggest only a slight decline.

The CPB, on the other hand, was slightly higher in 2017/18 than in 2006/07 after adjusting for inflation and population growth (dotted blue line). The CPB rose in unadjusted and adjusted values in 2016/17. On the other hand, the unadjusted (solid pink line) and adjusted (dotted pink line) values of community pharmaceuticals declined in 2017/18. This decline could reflect the growing importance of the additional investments, i.e. pharmaceutical cancer treatments, vaccines and haemophilia treatments, as the proportion of the CPB allocated towards these additional investments is increasing.

Figure 4 Adjusted and unadjusted CPB and community pharmaceutical expenditure (CPI+Pop growth)[9]



Source: NZIER, Statistics NZ, Data obtained from OIA responses, PHARMAC Annual Reviews and Vote Health Budget Appropriations.

[9] Differences between the series are small as proportion of the total. The vertical axis has been truncated so that small proportionate differences can be seen more clearly.

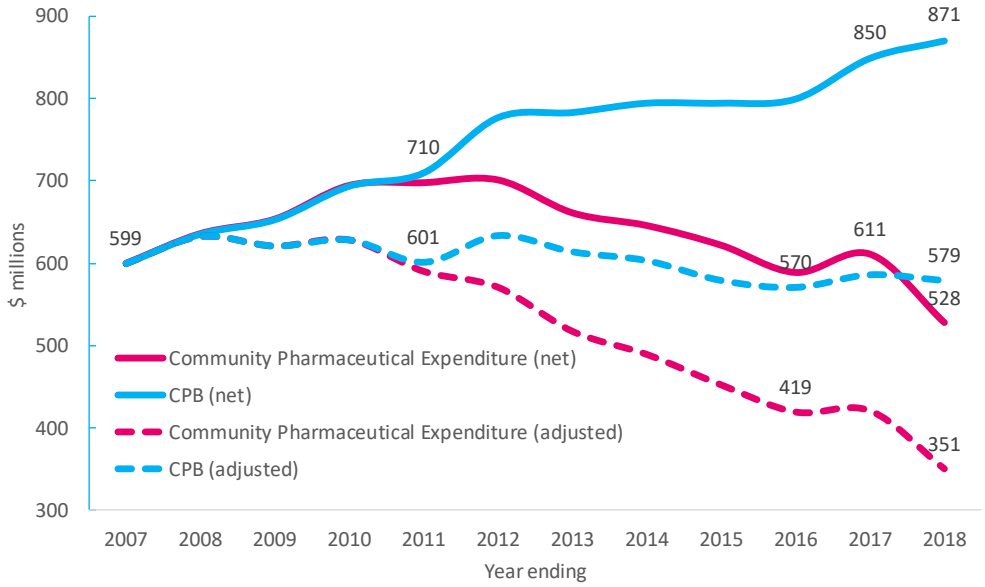
5.2. CPI-Health and population adjusted CPB and community pharmaceutical expenditure

Performing the same adjustment as in the previous section, but using only the Health component of the CPI along with adjustment for population growth, results in slightly different values, as shown in Figure 5 below.

As health-related price inflation has been higher than general inflation, the decrease in the adjusted value of community pharmaceutical expenditure (dotted pink line) is greater – a reduction of almost 40% in real terms – while the growth in the net CPB is also negative (dotted blue line).

The CPB, in unadjusted values (solid blue line), rose in 2016/17 and 2017/18 while the unadjusted (solid pink line) and adjusted (dotted pink line) values of community pharmaceutical expenditure declined sharply in 2017/18. This decline could reflect the growing importance of the additional investments, i.e. pharmaceutical cancer treatments, vaccines and haemophilia treatments, as the proportion of the CPB allocated towards these additional investments is increasing.

Figure 5 Adjusted and unadjusted CPB and community pharmaceutical expenditure (CPI-Health+Pop growth)[10]



Source: NZIER, Statistics NZ, Data obtained from OIA responses, PHARMAC Annual Reviews and Vote Health Budget Appropriations.

[10] Differences between the series are small as proportion of the total. The vertical axis has been truncated so that small proportionate differences can be seen more clearly.

6. Net CPB and community pharmaceutical expenditure relative to Vote Health

PHARMAC's budget is a component of Vote Health and, at a basic level, might be expected to reflect overall trends in health expenditure.

In absolute terms, Vote Health expenditure (Budget estimates) has experienced annual increases from 2006/07 to 2017/18, from $9.7 billion to $16.1 billion. Budget 2018 announced a $3.2 billion[11] injection into the health sector over the next four years.

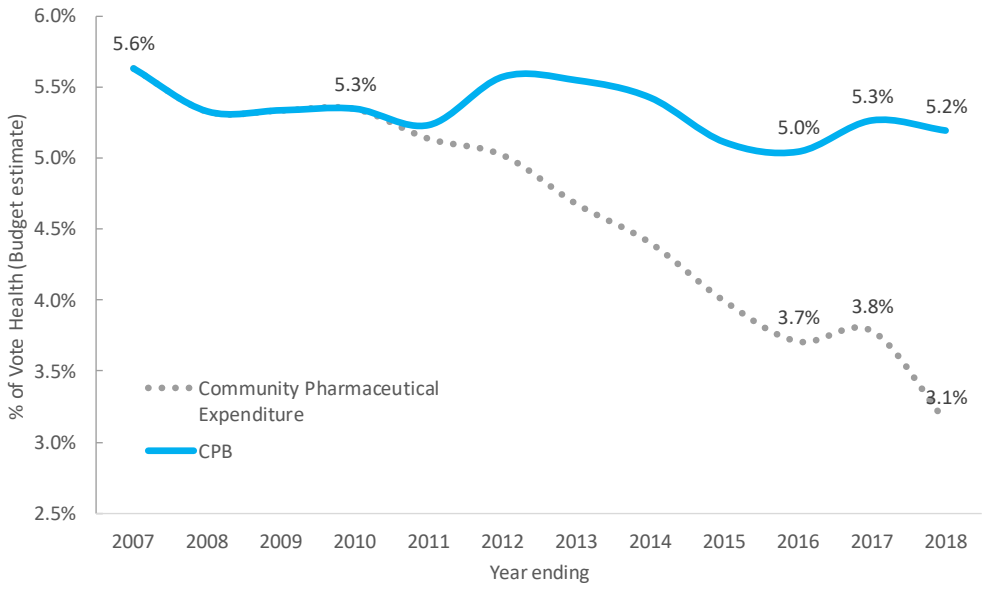
From the beginning of the 2018 government financial year, the CPB will be redefined to also include the remainder of DHB hospital medicines. Budget documents indicate that savings from the new combined pharmaceutical budget will be returned to Vote Health to be reprioritised to other areas.[12] That Budget data shows that overall expenditure on pharmaceuticals will reduce, and reduce as a part of Vote Health. Given the level of savings included, this is likely to include those within the current CPB too. This means that the proportion of health expenditure on community pharmaceuticals is likely to further reduce.

Figure 6 on the next page, shows that, unadjusted expenditure on community pharmaceuticals as a proportion of Vote Health (Budget estimates), has fallen by 2.5 percentage points from 5.6 percent of Vote Health to 3.1 percent of Vote Health. The addition of nicotine replacement therapy, pharmaceutical cancer treatment, vaccines and haemophilia treatment into that budget means the effect will be even more marked than evident in the raw data. In 2017/18 the CPB was less than one percent below the 2006/07 level.

11 https://www.budget.govt.nz/budget/2018/at-a-glance/rebuilding-critical-public-services.htm

12 https://treasury.govt.nz/sites/default/files/2018-08/b18-3922457.pdf

Figure 6 Unadjusted net CPB and community pharmaceuticals as a proportion of Vote Health[13]



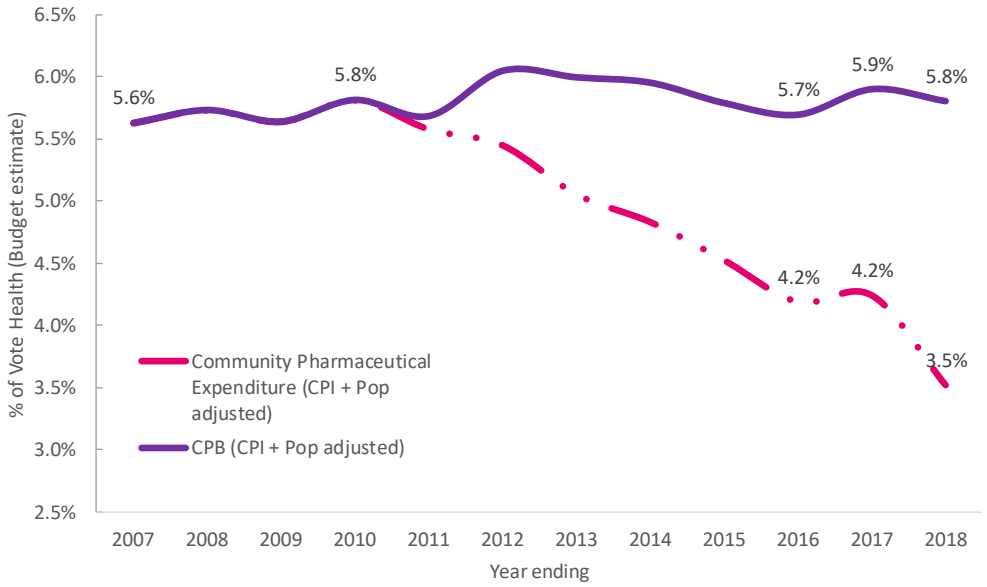
Source: NZIER, Data obtained from OIA responses, PHARMAC Annual Reviews and Vote Health Budget Appropriations.

The CPB rose as a proportion of Vote Health in 2016/17 before dropping slightly in 2017/18 while the community pharmaceuticals as a proportion of Vote Health fell sharply in 2017/18. This decline could reflect the growing importance of the additional investments, i.e. pharmaceutical cancer treatments, vaccines and haemophilia treatments, as the proportion of the CPB allocated towards these additional investments is increasing.

[13] Differences between the series are small as proportion of the total. The vertical axis has been truncated so that small proportionate differences can be seen more clearly.

Figure 7 below shows the effect of adjusting for population growth as well as for inflation using the CPI. These adjustments show that the CPB has almost had a flat profile since 2006/07. This suggests that CPB has kept up with Vote Health even after adjusting for population growth and inflation using the CPI. Community pharmaceutical expenditure has continuously declined since 2011/12 and is now 3.5 percent of Vote Health in 2017/18. But the adjustments clearly show that both the CPB and community pharmaceutical expenditure have done a better job of keeping up with Vote Health in real terms than in nominal terms (Figure 6 on the previous page).

Figure 7 Adjusted net CPB and adjusted net community pharmaceuticals as a proportion of Vote Health (CPI + pop growth)[14]

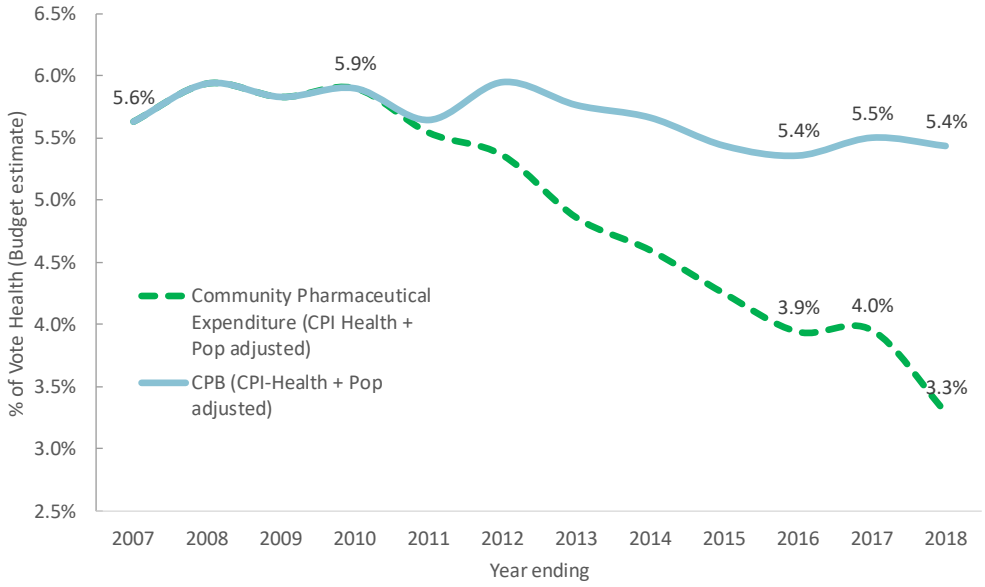


Source: NZIER, Statistics NZ, Data obtained from OIA responses, PHARMAC Annual Reviews and Vote Health Budget Appropriations.

[14] Differences between the series are small as proportion of the total. The vertical axis has been truncated so that small proportionate differences can be seen more clearly.

Figure 8 below shows how using the health component of the CPI (CPI-Health) affects these figures. These adjustments show that the CPB has almost had a flat profile since 2006/07. This suggests that CPB has kept up with Vote Health even after adjusting for population growth and inflation using the health component of CPI. The decline in the value of community pharmaceutical expenditure is more significant than when the health component of the CPI is used to adjust for inflation because health-related inflation has been relatively high. Despite the greater decline due to health-related inflation, both the CPB and community pharmaceutical expenditure have done a better job of keeping up with Vote Health in real terms than nominal terms (Figure 6 on earlier page).

Figure 8 Adjusted net CPB and adjusted net community pharmaceutical expenditure as a proportion of Vote Health (CPI-Health+pop growth)[15]



Source: NZIER, Statistics NZ, Data obtained from OIA responses, PHARMAC Annual Reviews and Vote Health Budget Appropriations.

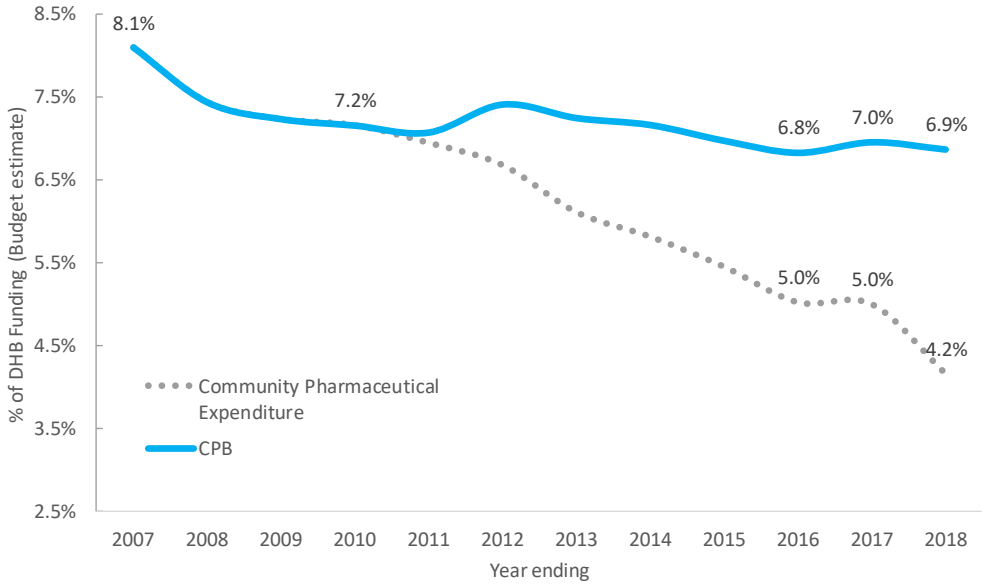
[15] Differences between the series are small as proportion of the total. The vertical axis has been truncated so that small proportionate differences can be seen more clearly.

7. Net CPB and community pharmaceutical expenditure relative to DHB funding

Vote Health includes funding for administrative expenses (departmental appropriation). As an alternative point of reference, DHB funding (Budget estimate) was used to highlight trends in the CPB and community pharmaceutical expenditure. We think DHB funding is a better measure of how health care is funded, which is a better reference point for pharmaceutical spending.

Figure 9 below unsurprisingly shows that the CPB and community pharmaceuticals have been a greater proportion of DHB spending than of Vote Health. However, as a proportion of DHB spending, the CPB has declined from 8.1 percent to 6.9 percent and expenditure on community pharmaceuticals has declined from 8.1 percent to 4.2 percent. There was a sharp decline in community pharmaceuticals as a proportion of DHB funding in 2017/18 which could reflect the growing importance of additional investments, i.e. pharmaceutical cancer treatments and vaccines, as the proportion of the CPB allocated towards these additional investments is increasing.

Figure 9 Unadjusted net CPB and community pharmaceutical expenditure as a proportion of DHB funding (unadjusted)[16]

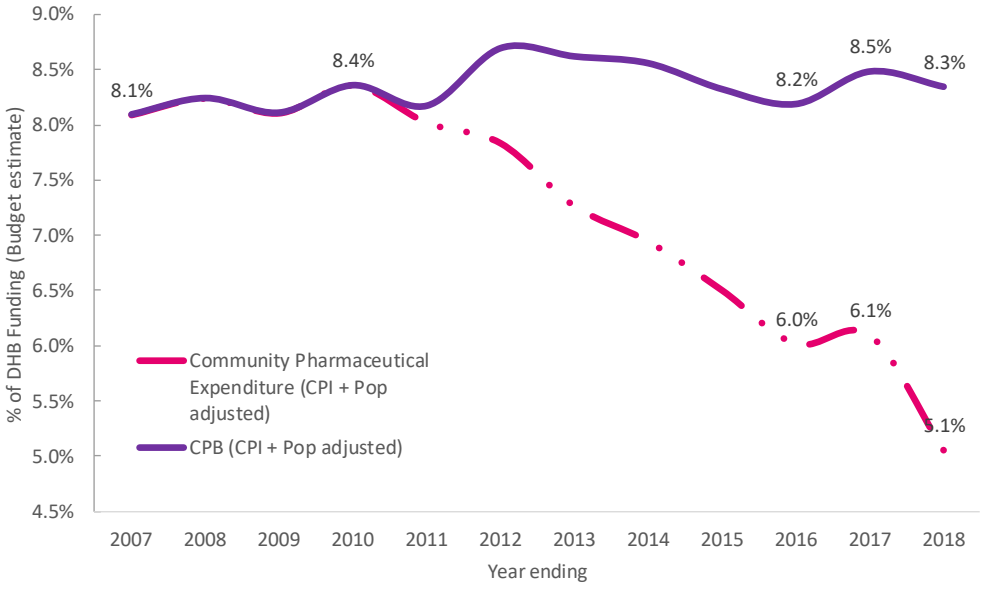


Source: NZIER, Data obtained from OIA responses, PHARMAC Annual Reviews and Vote Health Budget Appropriations.

[16] Differences between the series are small as proportion of the total. The vertical axis has been truncated so that small proportionate differences can be seen more clearly.

Figures 10 below and 11 on the next page show the effects of adjusting for population growth and inflation using the CPI (Figure 10) or using the health component of the CPI (Figure 11). Using DHB funding as a reference point, the CPB has maintained an almost flat profile, suggesting that it has kept up with other output-related investments even after adjusting for population growth and either measure of inflation. Community pharmaceutical expenditure has declined over time suggesting it has not kept up with other output-related investments. But, community pharmaceutical expenditure has done a better job of keeping up with DHB funding in real terms (adjusting for population growth and either inflation measure) than in nominal terms (Figure 9 on previous page).

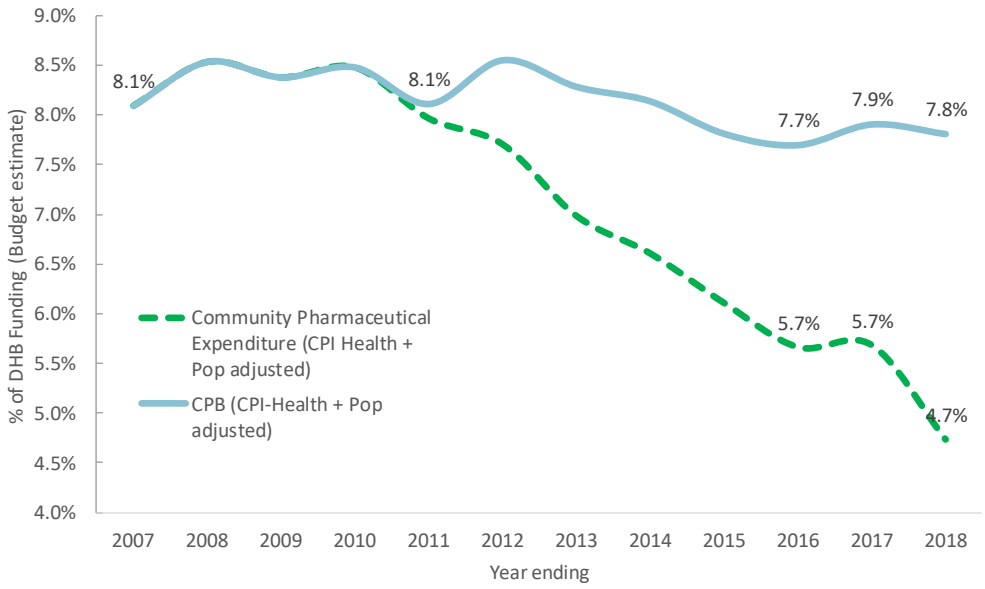
Figure 10 Adjusted net CPB and community pharmaceutical expenditure as a proportion of DHB funding (CPI + pop growth)[17]



Source: NZIER, Statistics NZ, Data obtained from OIA responses, PHARMAC Annual Reviews and Vote Health Budget Appropriations.

[17] Differences between the series are small as proportion of the total. The vertical axis has been truncated so that small proportionate differences can be seen more clearly.

Figure 11 Adjusted net CPB and community pharmaceutical expenditure as a proportion of DHB funding (CPI-Health + pop growth)[18]



Source: NZIER, Statistics NZ, Data obtained from OIA responses, PHARMAC Annual Reviews and Vote Health Budget Appropriations.

[18] Differences between the series are small as proportion of the total. The vertical axis has been truncated so that small proportionate differences can be seen more clearly.

8. Compound annual growth

To compare the growth rates of different series of values that have grown at different rates over time, an overall measure of growth for each series is needed. Compound annual growth rates (CAGRs) are an appropriate measure in this context.

CAGRs are essentially mean annual growth rates over a period of time longer than one year. CAGRs provide a more meaningful picture of growth over a period in a series that has seen volatility from year to year. The CAGR is calculated by spreading the difference between expenditure in the first year of the series and expenditure in the last year of the series, evenly across all years.

CAGRs were calculated for the net CPB (2006/07-2017/18), net expenditure on community pharmaceuticals (2006/07-2017/18) and Budget estimates of Vote Health (2006/07-2017/18). These are shown in Table 1 below.

Table 1 CAGRs with different adjustments for inflation and population growth

	CPB net (2006/07-2017/18)	Community pharms (net) (2006/07-2017/18)	Vote Health Budget (2006/07-2017/18)
Unadjusted values	3.5%	-1.2%	4.8%
Population-adjusted	2.1%	-2.4%	3.4%
CPI-adjusted	1.6%	-3.0%	2.8%
CPI-Health-adjusted	1.0%	-3.5%	2.2%
CPI- and population-adjusted	0.3%	-4.2%	1.5%
CPI-Health and population-adjusted	-0.3%	-4.8%	0.9%

Source: NZIER, Statistics NZ, Data obtained from OIA responses, PHARMAC Annual Reviews and Vote Health Budget Appropriations.

As shown in Table 1, depending on the measure used to adjust for inflation, one or both categories of expenditure (net CPB and net community pharmaceuticals) shows negative annual compound growth, with the combination of adjustment using the health component of the CPI as well as population resulting in negative annual compound growth for both the CPB and community pharmaceuticals. Whereas, under all adjustment methods and unadjusted values, the CAGR for Budget estimates of Vote Health is positive. Under all adjustment approaches, and even unadjusted values, the CAGR of investment in community pharmaceuticals is negative.

9. Value of "missing" investment

Table 2 below shows:

- The total investment required in 2017/18 to return to 2010/11 and 2006/07 net CPB investment as a percentage of DHB funding (8.1 percent both in 2010/11 and 2006/07) – previously shown in Figure 11.
- The value of *additional* investment required over the actual 2018 net CPB values to return to the 2010/11 and 2006/07 net CPB investment as a percentage of DHB funding (8.1 percent both in 2010/11 and 2006/07) – previously shown in Figure 11.

Table 2 Net CPB investment required to return to 2006/07 and 2010/11 level of investment as a percentage of DHB funding

	Total investment required		Additional investment required	
To year	**2006/07**	**2010/11**	**2006/07**	**2010/11**
From year				
2017/18	$902m	$888m	$375m	$360m

Source: NZIER, Statistics NZ, Data obtained from OIA responses, PHARMAC Annual Reviews and Vote Health Budget Appropriations.

As seen in Figure 11, net CPB as a proportion of DHB funding remained relatively steady between 2006/07 and 2017/18. Consequently, the additional investment required to return to the 2006/07 and 2010/11 CPB levels are similar.

Appendix A Methods

Data originally commissioned by Medicines New Zealand

The expenditure data used for this report were obtained from PHARMAC annual reports and a spreadsheet supplied by Medicines New Zealand. The spreadsheet was based on PHARMAC expenditure data extracted from responses to requests for information under OIA about PHARMAC's Combined Pharmaceuticals Budget and expenditure on community pharmaceuticals. The Vote Health figures in the spreadsheet represent the estimated appropriations from the Budget released publicly by Treasury.

Additional data gathered for analysis

- Population, CPI and CPI-Health data obtained from Statistics NZ.
- DHB funding figures obtained from Treasury Vote history.

The data was then transformed to give a meaningful picture

As a first step the values obtained from PHARMAC through requests for information under the OIA were checked against PHARMAC's annual reports and against the Treasury's published estimates. This data obtained under OIA, which is attached to the PHARMAC annual reports is publicly available. Checks for internal consistency with regards to gross and net values of the CPB and community pharmaceuticals were also performed.

Minor issues were identified in the expenditure data provided by Medicines New Zealand:

- The amount of community pharmaceutical expenditure for 2007/08 in the spreadsheet provided was not found in PHARMAC's 2008 Annual Report.
- The "additional rebates" included in the OIA responses provided were not found in PHARMAC's annual reports.
- The spreadsheet included the DPF and figures for a net DPF, but the latter were not explained, nor was any explanation found in PHARMAC's annual reports.

The net CPB and net community pharmaceutical expenditure figures were then adjusted for inflation (CPI and the health component of the CPI) and population growth. These adjusted figures were expressed as proportions of Vote Health Budget and budgeted DHB funding. These formed the basis of the analysis in this report.

Appendix B Sources of data

Statistics NZ: http://www.stats.govt.nz/infoshare/

Treasury Vote history: http://www.treasury.govt.nz/budget/votehistory/health

OIA requests:
http://medicinesnz.co.nz/assets/Documents/2017-18-Service-Budget-Document.pdf

http://medicinesnz.co.nz/assets/Documents/2016-17-CPB-funding-docs-previously-released.pdf

http://medicinesnz.co.nz/assets/Documents/2017-18-CPB-Funding-Documents-Redacted.pdf

http://medicinesnz.co.nz/assets/Documents/2016-17-Budget-Bid-Documents-previously-released-resending-Redacted.pdf

http://medicinesnz.co.nz/assets/Documents/Response-to-04-11-2015-Medicines-New-Zealand-OIA-Request-for-Budget-Information.pdf

http://medicinesnz.co.nz/assets/Documents/Response-to-2016-12-19-Graeme-Jarvis-OIA-request.pdf

http://medicinesnz.co.nz/assets/Documents/2017-06-27-Medicines-NZ-OIA-Budget-Bid-documents-response-letter.pdf

http://medicinesnz.co.nz/assets/Documents/Response-to-2017-03-08-Graeme-Jarvis-OIA-clarifications.pdf

PHARMAC Annual Reports
https://www.pharmac.govt.nz/assets/annual-report-2006-2007.pdf

https://www.pharmac.govt.nz/assets/annual-report-2007-2008.pdf

https://www.pharmac.govt.nz/assets/annual-report-2008-2009.pdf

https://www.pharmac.govt.nz/assets/annual-report-2009-2010.pdf

https://www.pharmac.govt.nz/assets/annual-report-2010-2011.pdf

https://www.pharmac.govt.nz/assets/annual-report-2011-2012.pdf

https://www.pharmac.govt.nz/assets/annual-report-2012-2013.pdf

https://www.pharmac.govt.nz/assets/annual-report-2013-2014.pdf

https://www.pharmac.govt.nz/assets/annual-report-2014-2015.pdf

https://www.pharmac.govt.nz/assets/annual-report-2015-2016.pdf

https://www.pharmac.govt.nz/assets/annual-report-2016-17.pdf

https://www.pharmac.govt.nz/assets/annual-report-2017-2018.pdf