Report prepared for the Canterbury District Health Board

Benchmarking the resource allocation of Canterbury District Health Board

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sapere research group

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Background

Canterbury District Health Board (DHB) has undertaken a benchmarking exercise in which its expenditure per capita in a range of service areas in 2009/10 and 2015/16 is compared with the equivalent national average expenditure for that finanical year. The analysis has been standardised for age and sex, where readily available data exists to enable this.

We have been asked to comment on this analysis, to draw out some insights and to offer some broad conclusions. Our approach to this work has followed a series of steps.

- We begin by considering what a well-performing DHB funding function would look like, in terms of its resource allocation role and how its performance could be assessed.
- We then present and summarise the results of the benchmarking exercise and offer a simple framework to help interpret those results and to draw out some key insights about Canterbury's performance.
- Finally, we draw on some wider evidence to take a closer look at two specific areas of variance from the benchmark. Our focus is on community-based services that have the potential to reduce demand elsewhere within the health system.

Funding context

DHBs are subject to legislative requirements to promote the integration of health services and to seek the most effective and efficient delivery of services to meet population needs. CDHB has set its own priorities as strategic objectives, which have been consistently articulated since its 2008 Health Services Plan as:

- People are healthier and take greater responsibility for their own health;
- People stay well in their own homes and communities; and
- People with complex illnesses have improved health outcomes.

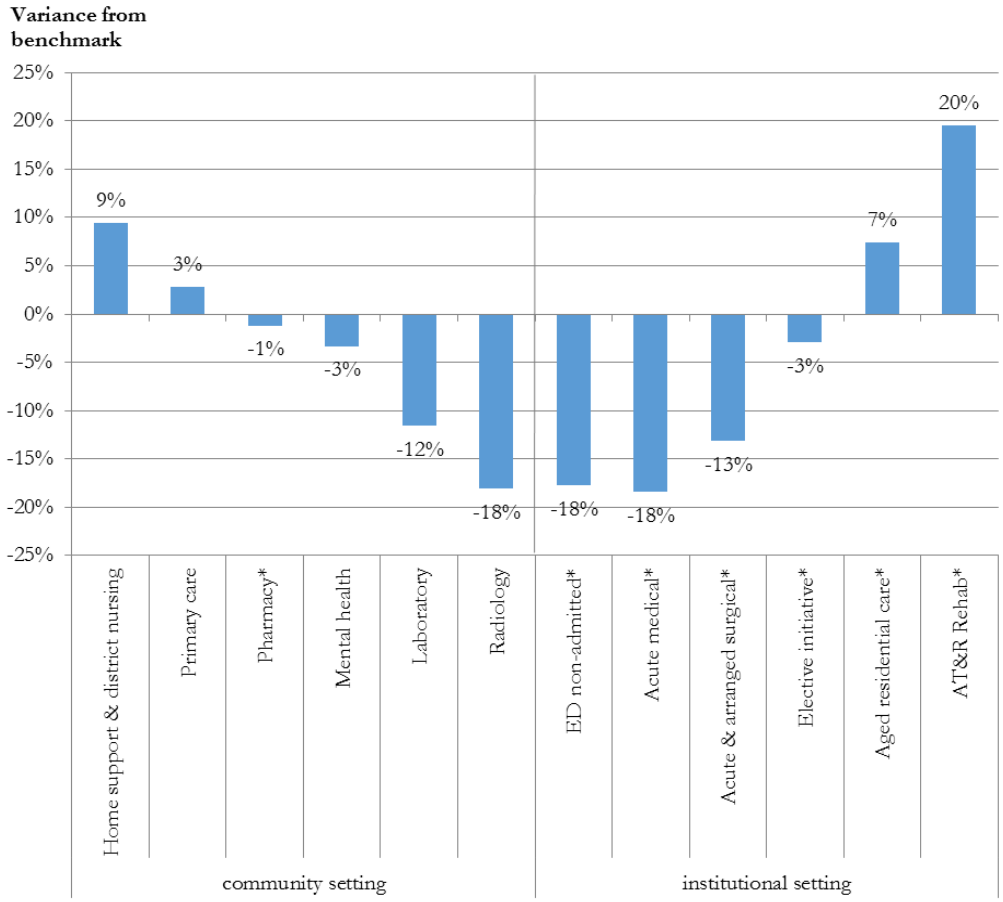
Against this background, performance against the DHB's own outcome indicators points to a low rate of acute medical admissions, and to a gradual increase in the proportion of older people living in their own home. Equally, the Treasury has found that in terms of the proportion of spending allocated to external contracts, as a broad measure of investment in community-based service capacity, Canterbury is well above the national average, which suggests a focus on non-provider arm services.

Taken together this suggests we should expect the results of the benchmarking exercise to show that Canterbury is spending relatively more in areas that have the potential to avoid acute medical admissions and the use of residential care.

Benchmarking results

Canterbury DHB analysts calculated standardised expenditure for age and sex in the finanical years 2008/9 and 2015/16, where sufficiently detailed national data and local data were available. The results for 2015/16 are summarised in the graph below:

2015/16 expenditure comparison, CDHB to New Zealand



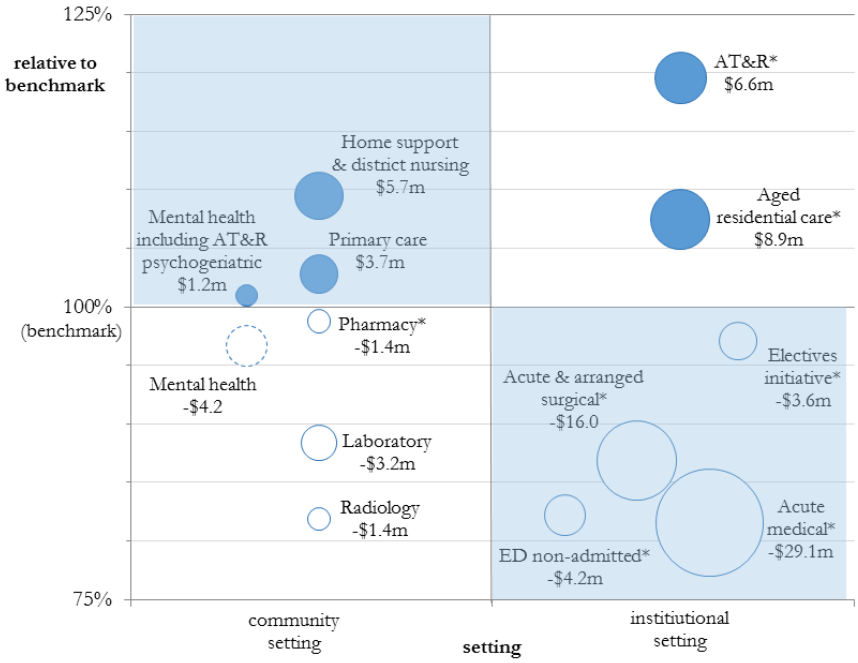
Interpreting results

Spending under or over a benchmark is not inherently a good or bad thing – the interpretation firstly depends upon assumptions of technical efficiency, and then upon the context for investment. In some circumstances DHBs have a high level of control over their expenditure (for example in commissioning a specific service), whereas in other areas there is relatively little short-to-medium term control (e.g. services driven by demand for acute care). The diagram below indicates questions which we suggest are important in scrutinising results for expenditure on particular services which are above or below comparable national levels.

The top-left quadrant represents service areas where, arguably, the DHB has made a choice to allocate resource in response to local need and with a view to reduce demand pressures downstream, in more expensive institution-based services. The bottom-right quadrant represents service areas where demand may be lower than would otherwise be the case, as a result of proactive spending upfront in community settings. This still needs to be tested against other possible explanations, such as evidence of under-servicing (i.e. unmet need).

	Degree of DHB control over a resource allocation to a service area in the short term	
	Tend to have more control	Tend to have less control
Spending more on a service relative to the benchmark	• Is there evidence that the DHB has made a choice to allocate resource in response to local need and/or to reduce demand pressures elsewhere?	• Is there evidence of high demand arising from lower spending in other areas that might otherwise reduce demand upfront?
Spending less on a service relative to the benchmark	• Is there evidence of lower spending, as a result of resource constraints, in a service area that might otherwise offer a pay-off of reduced demand elsewhere?	• Is there evidence of reduced demand on the service as a result of proactive spending elsewhere? • Is there evidence of under-servicing and unmet need?

The diagram below sets out graphically where a number of community and institutional services lie relative to the national benchmark.



The main points about these results are as follows.

- Canterbury appears to spend a higher-than-average amount in the areas of primary care and home support and district nursing, which have the potential to moderate acute hospital presentations admissions downstream.

- Consistent with this higher-than-average spending on these community-based services, Canterbury appears to spend less in acute hospital-based services, and in particular on acute medical and emergency department services.
- Canterbury's spending on aged residential care has historically been relatively high and contributes to a higher proportion of Canterbury's expenditure being on externally-contracted services. The benchmarking analysis shows that, on an age-adjusted basis, spending per capita on age residential care has been reduced from being 120% of the national average in 2009/10 to 107% in 2015/16.
- Pharmacy, radiology and laboratory services are below national benchmarks, probably as a consequence of drives within the primary care community to use these community services more efficiently.
- The result for mental health is somewhat difficult to interpret. The comparison of Canterbury's spending per capita on mental health with that of the national average may not be useful, as some DHBs code their spending on (AT&R) psychogeriatric services to mental health whereas this spending is coded separately in Canterbury. This may explain why Canterbury appears to be relatively high relative to the national average for spending on Assessment, Treatment and Rehabilitation (AT&R) psychogeriatric services.
- Spending on hospital-based AT&R general services appear higher than the national average and does not seem to fit with the broader picture. Further analysis is needed to understand the drivers of this.

We looked more specifically at two key areas, the provision of acute demand management in the community, and the provision of comprehensive services in the community to avoid need for aged residential care. Overall, the data supplied by Canterbury suggests that the strategy of providing acute demand services in the community is likely to be having a substitution effect for resources demand in the hospital setting. This individual case is consistent with the wider strategy of keeping people at home in their own communities, and doing so by reallocating the balance of resources across the community and institutional settings. In aged residential care, we find that Canterbury has a distinctly different pattern from other South Island DHBs, and that the reduction from 120% of the benchmark to 107% suggests an avoided cost of $25.4 million per annum, from a relatively small investment in home based and community rehabilitation services of approximately $5.7 million above the national benchmark. The trend seems to suggest that continued reductions in rest home level care can be expected.

Overall, the comparison of Canterbury and national expenditure suggests that the DHB is making allocative decisions which are in line with its long-term planning objectives, and with the objectives set by legislation. The pattern in general seems to match that which would be expected from a comprehensive range of investments across the health system in order to keep people well at home, at lower cost than in institutional care. The exception to this pattern is the high level of expenditure on hospital-based AT &R services, which should be subject to further investigation.

1. Purpose and our approach

Canterbury District Health Board (DHB) has undertaken a benchmarking exercise in which its expenditure per capita in a range of service areas in 2009/10 and 2015/16 is compared with the equivalent national average expenditure for that finanical year. The analysis has been standardised for age and sex, where readily available data exists to enable this. As an output of this work, Canterbury's spending in each service area is rated as being above or below the national average, in percentage terms.

We have been asked to comment on this analysis, to draw out some insights and to offer some broad conclusions. Our approach to this work has followed a series of steps.

- We begin by considering what a well-performing DHB funder arm would look like, in terms of its resource allocation role and how its performance could be assessed. This is to provide some context and to help interpret the results of the benchmarking work.
- We then present and summarise the results of the benchmarking exercise and offer a simple framework with four quadrants to help interpret those results and to draw out some key insights about Canterbury's performance. As part of this step, we have held discussions with planning and funding staff to inform our understanding of the method behind this work as well as the local planning context.
- Finally, we draw on some wider evidence to take a closer look at some of the variance from the benchmark, particularly where Canterbury spends more than the national average. Our focus is on community-based services that have the potential to reduce demand elsewhere within the health system. Some of the evidence we cite is in publicly-available reports; in other cases we analyse or cite service and finanical data, provided by Cantebury DHB in response to our requests.

The report concludes with some reflections on the method, some broad conclusions and some suggestions for future work.

2. Context – funder arm role and Canterbury's priorities

2.1 The role of a DHB funder

DHBs are responsible for purchasing health services for their population and, via their provider arm, also providing some of those services. The objectives for DHBs are set in legislation and, in addition to improving and promoting the health of their population, require a DHB to focus on service integration and using resources efficiently, for example:

- promoting the **integration** of health services, especially primary and secondary care services,
- seeking the **optimum** arrangement for the most effective and **efficient** delivery of health services in order to meet local, regional, and national needs.[1]

Accordingly, the key tasks for a DHB funder include:

- undertaking a health needs assessment, including a projection of future demand;
- strategic planning for how services will be arranged and purchased in the short and medium term to meet the projected demand;
- setting priorities for allocating new funds in line with those strategic plans;
- taking a leadership role across the local system with respect to setting priorities for how providers are to work toegether across the boundaries of the traditional settings for delivering care.

Assessing the performance of a funder is a complex and typically time-intensive task, best suited to agencies with an ongoing monitoring role and access to detailed data. Some of the key dimensions of a performance assessment are likely to include:

- Planning – strategy documents show clear priorities and coherent plans in response to current and projected local health needs;
- Resource allocation – resources at the margin go towards supporting those priorities, particularly towards cost-effective services that delivered are in community settings;
- Efficient management of resources, including contracting for services in a way that provides value for money, and working within the overall budget constraint;
- Improvements from a patient perspective – including better access to care and gains in overall population health outcomes over time.

For the purpose of this report, we take a look at Canterbury's stated priorities and some broad measures of allocation of resources across service areas – as context for the results of the benchmarking work being considered later in the report.

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1 New Zealand Public Health and Disability Act 2000 s.22(1); see also http://www.health.govt.nz/new-zealand-health-system/key-health-sector-organisations-and-people/district-health-boards

2.2 Canterbury's priorities

Canterbury DHB's annual plan for 2015/16 outlines its three strategic objectives:

- People are healthier and take greater responsibility for their own health;
- People stay well in their own homes and communities; and
- People with complex illnesses have improved health outcomes.[2]

The second objective, that "people stay well in their own homes and communities", involves a focus on community-based services providing integrated care for patients. The rationale is that people being supported to remain in the community will require fewer hospital-level or long-stay interventions – resulting in better patient outcomes, reduced pressure on hospitals and freed up resources. In achieving this objective, the annual plan points to the roles for:

- general practice as the point of continuity, especially for improving the management of care for people with long-term conditions and reducing the chance of acute episodes; and
- other health professionals (including midwives, community nurses, social workers, allied and personal health providers and pharmacists) – who bring prevention, early intervention and restorative perspectives and link people with social services that can further support them to stay well and out of hospital.

Canterbury measures progress against this objective by reporting against two overarching outcome indicators:

- *A reduction in acute medical admission rates* – in 2015/16 acute medical admission rates increased slightly for Canterbury, as they did across the country, although at 5,341 per 100,000 people, Canterbury DHB's rate remains among the lowest and well below the national rate (7,644).
- *More people living in their own home* – in 2015/16 the proportion of people in Canterbury aged 75+ years who were living in their own homes continued to increase slightly, to 87.6%, bring the DHB into line with the rest of the South Island. Alongside this, Canterbury reported that fewer older people were admitted into aged residential care.[3]

Taken together, these results suggest that we should expect the results of the benchmarking exercise to show that Canterbury is spending relatively more in areas that have the potential to avoid acute medical admissions and the use of residential care. External observers have also commented on Canterbury's efforts to reduce acute medical admissions. The King's Fund, in its 2013 case study, suggested that the evidence point to the Canterbury health system as having "good-quality general practice that is keeping patients who do not need to be in hospital out of it; is treating them swiftly once there; and discharging them safely to good community support". Evidence cited includes: (1) low rates for acute medical admissions compared to other DHBs; (2) an average length of stay for medical cases that "is not the lowest in New Zealand, but it is low"; and (3) a low rate of acute readmissions.[4]

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2 Canterbury DHB (2015) *Annual Plan 2015/16,* p.17

3 Canterbury DHB (2015) *Annual Report 2015/16,* p.10

4 Timmins, Nicholas and Chris Ham (2013) *The quest for integrated health and social care A case study in Canterbury, New Zealand.* The King's Fund, p.4

2.3 Resource allocation to external providers

The Treasury notes that the funder role of DHB should create an incentive to fund care at the most cost-effective point and minimise cost escalation from delayed treatment. On the other hand, the fact that DHBs are also a service provider raises the risk of funding being prioritised for their own provider-arms at the expense of externally-provided services.[5] A counterargument is that a DHB is in a position to plan services across the system and, if it chooses, is able to work directly with hospital services and clinicians in a way that may not be achievable from outside the hospital environment. This reduction of information asymmetry between hospital services and the system planner can, in this light, be seen as an advantage.[6]

The Treasury reports to ministers on DHB plans monitor the split of provider arm and external contract spending (excluding inter-district flows). The implicit assumption is that maintaining or increasing the share of spending on external contracts is broadly desirable and consistent with funding health care at the most cost-effective point. The Treasury notes that at, an aggregate level, external provider expenditure has been increasing in real terms but falling slightly as a percentage of total expenditure, being below the amount planned to be delivered. Treasury notes this indicates a gradual shift toward a greater proportion of funding committed to hospital services.[7] Within this analysis, it is noticeable that:

- Canterbury allocates a relatively high share of its spending to external contracts (being the third-highest in 2015/16 at 35%, compared with the national average of 30%); and
- Canterbury's share of spending on external contracts with increased by ~0.5% in 2015/16, although the net change over the five years prior had been a decrease of ~2%.

2.4 Summary of key points

- DHBs are required under legislation to promote the integration of health services and to seek the optimum arrangement for effective and efficient delivery of services.
- Canterbury's own vision has three strategic objectives, of which one is that people stay well in their own homes and communities. Performance against its outcome indicators points to a low rate of acute medical admissions and a gradual increase in the proportion of older people living in their own home.
- In terms of the proportion of spending allocated to external contracts, as a broad measure of investment in community-based service capacity, Canterbury is well above the national average, which suggests a focus on non-provider arm services.
- Taken together this suggests we would expect to see the results of the benchmarking exercise to show that Canterbury is spending relatively more in areas that have the potential to avoid acute medical admissions and the use of residential care.

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5 New Zealand Treasury (2017) *District Health Board Financial Performance to 2016 and 2017 Plans*. A report prepared for the Ministers of Finance and Health, pp.23

6 Love (2015), *Case Study: People Centred Health Care in Canterbury, New Zealand*. A report prepared for the World Bank. Sapere Research Group, p.19

7 New Zealand Treasury (2017), pp.23-25

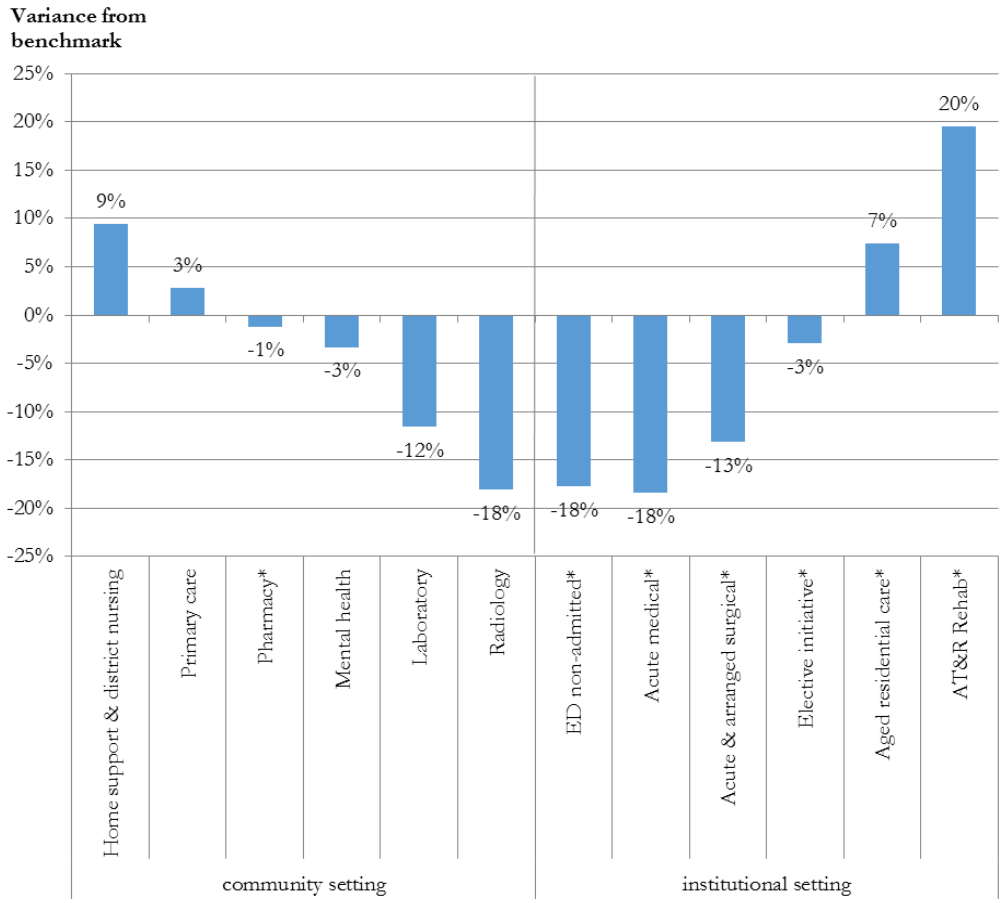
3. How does Canterbury compare in allocating its resources?

3.1 Results of the benchmarking exercise

The results of Canterbury's benchmarking exercise are summarised in Figure 1, and show how Canterbury's spending per capita varies from the national average. The analysis is focused on how Canterbury allocates resources to its own population. The service areas are grouped into two broad settings – community and institutional (hospital and residential care facilities). A service with a positive variance indicates that Canterbury spends more than the national average whereas a negative variance suggests spending is lower than that average.

Among services delivered in community settings, the analysis indicates that Canterbury spends more on home-based support and district nursing (9%) and on primary care (3%). Conversely, Canterbury appears to spend slightly less on community pharmacy (-1%) and noticeably less on community laboratory (-12%) and community radiology services (-18%).

Figure 1: Canterbury spending per capita – variance from national average, 2015/16



Note: * denotes services where the comparison has been standardised for age and sex
Source: Canterbury DHB benchmarking analysis; Sapere chart

In some cases age standardising was not feasible with the data available and so some crude comparisons have been made. As a test we calculated Canterbury's comparison to the national rate for acute medical admissions both crudely, and after standardisation for age and sex. The difference in Canterbury's comparison with the national rate is a 2% increase when moving from standardised to unstandardised measures. This finding suggests that:

- it would be reasonable to assume that the crude calculations slightly overstate Canterbury's portion relative to the benchmark;
- Canterbury's spending on home-based support and primary care, currently above the benchmark, may reduce by something similar, while still remaining above the national level (the effect will depend on the service involved, noting that home-based support differs in that its services are for older people); and
- the results for community labs and radiology expenditure could further decrease to be even lower than the benchmark than they already are.

Table 1 provides available data for 2009/10 and suggests that, in the case of community pharmacy, Canterbury has moved from spending more than the national average (104%) to spending slightly less in 2015/16 (99%). Canterbury's spending relative to the benchmark on community laboratory services has also decreased (91% to 88%). This finding is consistent with two of Canterbury's primary care investments: HealthPathways which supports more standardisation of primary care responses; and the Pegasus education programme, which has a demand management focus within a clinical peer group environment.

The variance in spending for primary care in 2015/16 suggests that Canterbury spends about $3.7 million more on its population than that the national average. This is likely to be driven, in part, by spending on the Acute Demand Management Service (ADMS), which totalled $6.6 million in 2015/16. This service enables primary care to coordinate packages of care to treat people in their own homes and is discussed further below. Similarly, the variance in spending for home-based support and district nursing, of $5.7 million in 2015/16, is likely to be driven by the spending of $7.7 million on the Community Rehabilitation Enablement & Support Team (CREST) for older people to be given rehabilitation services in their own, thereby enabling earlier discharge or avoiding admissions in the first place.

It should also be noted that the comparison for primary care spending in this exercise may understate the extent to which Canterbury spends more than the national average – notwithstanding the earlier point about the crude unstandardised approach used here. This is because there are very few Very Low Cost Access (VLCA) general practices in Canterbury, as a consequence of general practitioners' stance on the VLCA funding scheme. The impact of this is that the additional VLCA funding which the Ministry of Health provides to DHBs to pass on to practices is a very minor effect in Canterbury, with only six VLCA practices. Nationally, approximately one third of practices receive VLCA funding.

Within services delivered in institutional settings, the analysis points to Canterbury spending less on hospital care, including emergency department non-admissions (-18%), acute medical admissions (-18%), acute and arranged surgery and elective surgery (-3%). Conversely, Canterbury appears to spend more on assessment treatment and rehabilitation services for older people in a hospital setting (20%). Similarly, Canterbury also spends more on age-related residential care (+7%).

As for the trends over time for hospital-based services, the following points are apparent.

- Canterbury's spending on surgery has been increasing relative to the national average over this period, for acute & arranged (+1%) and elective cases (+4%).
- Conversely, spending on acute medical admissions has decreased slightly, from 84% to 82%. There has been no change with respect to emergency department services.

The first point is consistent with Canterbury's efforts to improve access to elective surgery. The latter findings appear to be consistent with ongoing efforts to better manage some acute presentations to primary within the community via the ADMS (discussed in Section 4.1).

Table 1: Ratio of Canterbury spending relative to national average, 2009/10 & 2015/16

Setting	Service area	Ratio to national average 2009/10	Ratio to national average 2015/16	Change in ratio	Variance in spending 2015/16 ($ million)
community settings	Primary care	-	103%	-	$ 3.7
	Pharmacy*	104%	99%	-5%	-$1.4
	Laboratory	91%	88%	-3%	-$3.2
	Radiology	-	82%	-	-$1.4
	Mental health	-	97%	-	-$4.2
	Home support/district nursing	-	109%	-	$5.7
institutional settings	Acute medical admissions*	84%	82%	-3%	-$29.1
	AT&R general*	120%	120%	-1%	$6.6
	AT&R psychogeriatric*	227%	255%	27%	$5.5
	ED non-admitted*	82%	82%	0%	-$4.2
	Aged residential care*	120%	107%	-13%	$8.9
	Surgical – acute & arranged*	86%	87%	1%	-$16.0
	Surgical – elective initiative*	94%	97%	4%	-$3.6

Note: * denotes services where the comparison has been standardised for age and sex; - denotes n/a
Source: Canterbury DHB benchmarking analysis; Sapere table

The direction of travel for aged residential care is also notable, with the position relative to the national average changing from 120% in 2009/10 to 107% in 2015/16. In part this position is due to historic patterns of access to residential care in the district. Some of this spending on aged residential care will be responsible for the relatively high proportion of Canterbury's spending being allocated to external providers, as noted in the Treasury report cited above. We understand that Canterbury has been managing access to rest home beds in

residential care facilities while offering more services to support older people to stay in their own homes for longer. This is being enabled by a combined home-based support and district nursing service and the CREST initiative – the programme that supports early discharge from hospital, wraps a range of services around a patient and their family, helps restore health and function in a community setting – with aims of reducing hospital readmission and residential care entry. These services and their impacts are discussed in Section 4.2.

The result for mental health is somewhat difficult to interpret. The comparison of Canterbury's spending per capita on mental health with that of the national average may not be useful, as we understand that some DHBs code their spending on assessment, treatment and rehabilitation (AT&R) psychogeriatric services to mental health whereas this spending is coded separately in Canterbury. If few DHBs are coding their AT&R psychogeriatric spending separately, this may explain why Canterbury appears to be relatively high relative to the national average for AT&R psychogeriatric (being 255% or $5.5 million higher than the benchmark in 2015/16, as shown in the table above).

On the other hand, if Canterbury does have a lower level of spending on mental health, it is plausible that this arises from supply-side constraints. In particular, we understand that Canterbury DHB has had some difficulties in recruiting suitably skilled mental health staff for delivering community-based services.

It should be noted that the table also shows that the size of a service budget matters too. Although AT&R rehab (120%) had a higher variance than aged residential care (107%) in 2015/16, the variance in spending is larger in monetary terms for aged residential care ($8.9 million compared with $6.6 million) care due to the larger budget in this service area.

3.2 Interpreting the benchmarking results

Canterbury's expenditure per capita on a given service being placed above or below a benchmark of the national average is not, in itself, obviously a positive or negative result. Some investigation is needed to interpret that position, for example, the profile of local health need the DHB's priorities and medium-term strategy, and the efficiency of purchasing and service delivery arrangements. Furthermore, the extent to which a DHB can influence resource allocation in the short term is also a factor. Whereas some resource allocation may occur via active decisions involving discretionary investment at the margin, some resource allocation is likely to a function of existing capacity and current patterns of demand.

To help interpet the results we offer a simple framework that considers two key dimensions: (1) the position of a service relative to the national average; and (2) the extent to which a DHB has some direct control over resource allocation to a service area, in the short run. Figure 2 below shows this framework as a matrix of four quadrants.

- Vertically, the top two quadrants are for service areas where Canterbury spends more than the national average (i.e. being above the benchmark of 100% of the national average). The lower quadrants are where Canterbury spends less than this benchmark.
- Horizontally, the left two quadrants contain services where the DHB has more control in the short term, where there is scope to intervene upfront, and the cases may be less acute. This tends to cover services delivered in community settings. Conversely, the right two quadrants involve care that is typically responding to presenting needs and dealing with downstream or acute effects – typically in institutional settings such as a hospital or residential care facility.

Figure 2: A framework for interpreting the benchmarking results

	Degree of DHB control over a resource allocation to a service area in the short term	
	Tend to have more control	Tend to have less control
Spending more on a service relative to the benchmark	• Is there evidence that the DHB has made a choice to allocate resource in response to local need and/or to reduce demand pressures elsewhere?	• Is there evidence of high demand arising from lower spending in other areas that might otherwise reduce demand upfront?
Spending less on a service relative to the benchmark	• Is there evidence of lower spending, as a result of resource constraints, in a service area that might otherwise offer a pay-off of reduced demand elsewhere?	• Is there evidence of reduced demand on the service as a result of proactive spending elsewhere? • Is there evidence of under-servicing and unmet need?

The top-left quadrant represents service areas where, arguably, the DHB has made a choice to allocate resource in response to local need and with a view to reduce demand pressures downstream, in more expensive institution-based services. The bottom-right quadrant represents service areas where demand may be lower than would otherwise be the case, as a result of proactive spending upfront in community settings. This still needs to be tested against other possible explanations, such as evidence of under-servicing (i.e. unmet need).

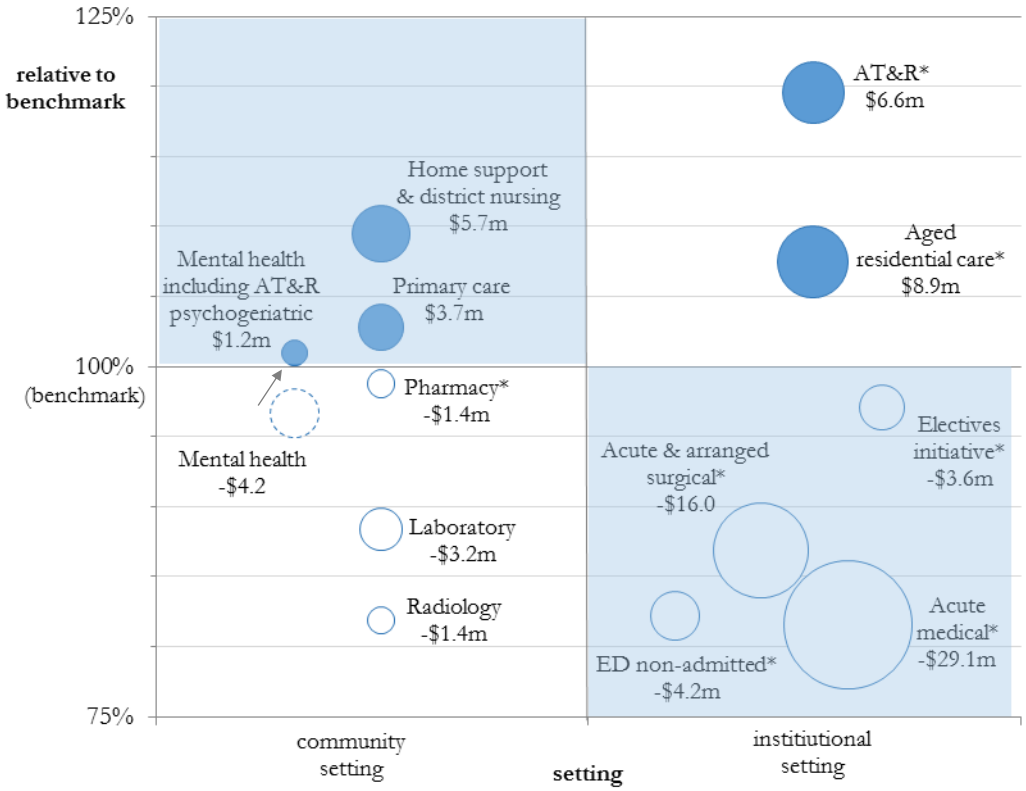
Figure 3 presents the benchmarking results against this framework, under the assumption that a DHB has more control, in the short-run, over the costs of services delivered in the community. A further assumption is that results in the top left – bottom, right axis may represent evidence of investment upfront that can allow acute demand downstream may be lower than would otherwise be the case. The results show that, broadly:

- Canterbury appears to spend a higher-than-average amount in the areas of primary care and in home support and district nursing, which have the potential to moderate acute presentations and admissions downstream; and
- Consistent with this, Canterbury appears to spend less in acute hospital-based services, and in particular on acute medical and emergency department services.

One exception is AT&R general services, where Canterbury spends more than the national average on this hospital-based service in a way that does not fit with the broader picture. Another exception is aged residential care, which may be a lag from historic access patterns, with the long length of stay meaning that changes take time to work through the system.

One change in he presentation of initial results is that AT&R psychogeriatric ($5.47 million above benchmark) has been added to community mental health (-$4.24 million) to derive a net position of $1.2 million. As noted above, some DHBs code the equivalent of AT&R psychogeriatric services to mental health the approach here is to form and an overall picture. We note that this is an area that would benefit from further, and more detailed, analysis.

Figure 3: Canterbury spending differential suggested by benchmark result, 2015/16



Note: * denotes services where the comparison has been standardised for age and sex
Source: Canterbury DHB benchmarking analysis; Sapere chart

3.3 Summary of key points

- Canterbury appears to spend a higher-than-average amount in the areas of primary care and home support and district nursing, which have the potential to moderate acute hospital presentations admissions downstream.
- Consistent with this higher-than-average spending on these community-based services, Canterbury appears to spend less in acute hospital-based services, and in particular on acute medical and emergency department services.
- Canterbury's spending on aged residential care has historically been relatively high and contributes to a relatively higher proportion of Canterbury's expenditure being on externally-contracted services. The benchmarking analysis shows that, on an age-adjusted basis, spending per capita on age residential care has been reduced from being 120% of the national average in 2009/10 to 107% in 2015/16.
- The comparison of Canterbury's spending per capita on mental health with that of the national average may not be useful, as some DHBs code their spending on (AT&R) psychogeriatric services to mental health whereas this spending is coded separately in Canterbury. This may explain why Canterbury appears to be relatively high relative to the national average for spending on AT&R psychogeriatric services.

  Spending on hospital-based AT&R general services appear higher than the national average and does not seem to fit with the broader picture.

4. A closer look at two service areas

We take a closer look at some of the variance from the benchmark – where Canterbury spends more than the national average – with a focus on community-based services that have the potential to reduce demand elsewhere within the health system. We focus on two areas: (1) the ADMS; and (2) home-based support services (including CREST).

4.1 Acute demand management service

The ADMS supports general practice and acute community nursing providers to deliver packages of care to treat people in their own homes – when the plausible counterfactual is that they would otherwise present at the hospital emergency department and, possibly, be admitted for an acute medical event. The service has operated since 2000 and was recently reviewed as part of a study on people-centred health care.[8] The key findings from that case study include the following.

- The services span: practice support; mobile nursing service; home IV therapy; logistical support; extended care management; urgent tests/investigations, doctor visits; and home support.
- ADMS differs from 'hospital at home' schemes implemented in a number of other health jurisdictions in that it is firmly managed by primary care services, rather than implemented as an outreach programme from a hospital-based service.
- Informants for the case study strongly and consistently expressed the view that ADMS sent a signal of faith in primary care, specifically allowing front line clinicians to be responsible for making clinical decisions which were best for a patient, while also taking responsibility for managing the resources involved in doing so.
- Hospital clinicians interviewed for the case study felt that ADMS was an important component of the overall Canterbury health system, that ADMS had improved trust between primary and secondary care clinicians, and that by managing acute demand from the population in a different way, ADMS played an important part in maintaining the viability of acute hospital services.[9]

A recent report by the Nuffield Trust in the UK finds that where schemes have been most successful at shifting the balance of care to the community, they have: targeted particular patient populations (such as those in nursing homes or the end of life); improved access to specialist expertise in the community; provided active support to patients including continuity of care; appropriately supported and trained staff; addressed a gap in services rather than duplicating existing work.[10] The ADMS appears to fit several of these dimensions (i.e. providing active support to patients including continuity of care and addressing a gap in services rather than duplicating existing work).

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8 Love (2015), *Case Study: People Centred Health Care in Canterbury, New Zealand*. A report prepared for the World Bank. Sapere Research Group, p.18

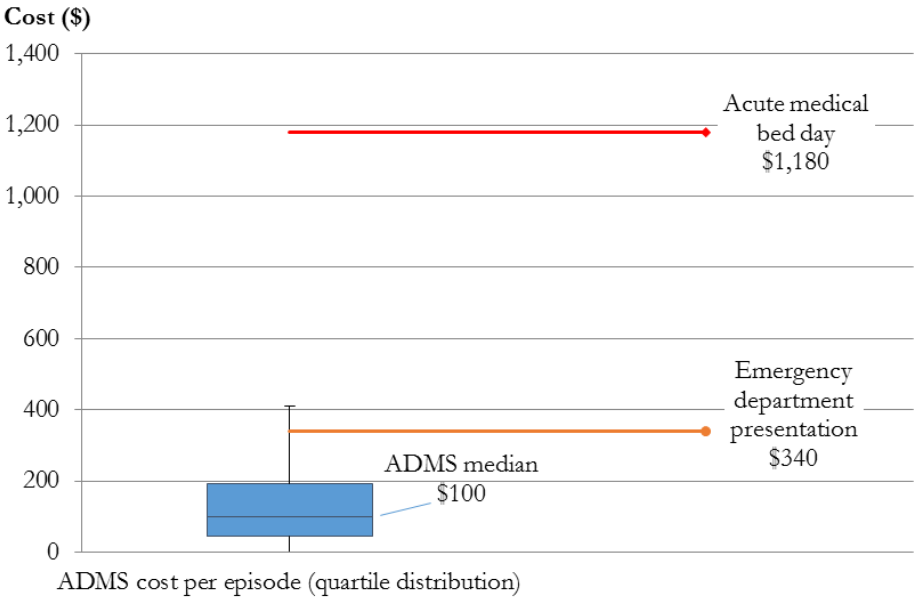
9 Love (2015), p.19

10 Imison et al (2017) *Shifting the balance of care. Great expectations.* Nuffield Trust, pp.4-6

The ADMS provided 33,000 packages of care to people in 2015/16. The average cost per episode handled via the ADMS was $140 in 2015/16. Figure 4 distributes the cost per episode across quartiles, using a box and whisker chart. This shows that 75% of costs are $191 or less per episode with the median cost per episode being $100. Many of these ADMS episodes featured older people with 32% of people aged 65 years and over in 2015/16.

These costs compare favourably with an average cost for an emergency presentation of $340 and an acute medical admission that has an average cost of $1,180 per bed day. These figures are cited as comparators here because the plausible counterfactual is, in the absence of the ADMS, these patients would otherwise present at the hospital emergency department and, possibly, be admitted for an acute medical event. At these levels of cost, crudely, ADMS will be cost-effective for Canterbury health system as a whole if one-in-three ADMS episodes avoids an ED presentation, or if one-in-ten episodes avoids an acute medical bed day.

Figure 4: Distribution of ADMS episode costs with comparator costs, 2015/16



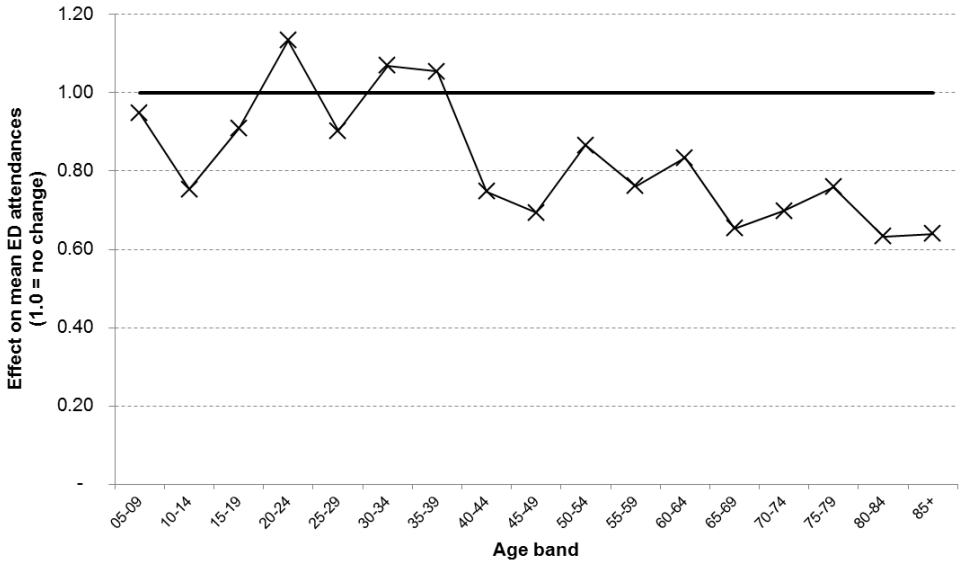
Source: Canterbury DHB cost data; Sapere chart

However, some caution is required here. The Nuffield Trust in the UK concludes that, despite the potential of initiatives aimed at shifting the balance of care to community settings, it seems unlikely that actual falls in hospital activity will be realised unless significant additional investment is made in out-of-hospital alternatives. As such, further research could usefully investigate the extent to which the ADMS leads to wider system benefits, such as demand pressures (and therefore long-run costs) being reduced on hospital facilities.

While robustly measuring the level of ADMS impact is difficult, a recent Canterbury DHB analysis found that general practices with the highest ADMS referral rates had fewer ED presentations in their populations, that this effect was stronger with increasing age, and in the elderly has an average impact of the order of 30% reduction, shown in Figure 5 below. While this is an ecological analysis, it is consistent with ADMS having a direct impact on ED utilisation among the practices that make the most use of it.

Overall, the data supplied by Canterbury suggests that the strategy of providing acute demand services in the community is likely to be having a substitution effect for resources demand in the hospital setting. This individual case is consistent with the wider strategy of keeping people at home in their own communities, and doing so by reallocating the balance of resources across community and institutional settings.

Figure 5: Population ED attendances for high vs low ADMS referrers



Source: Canterbury DHB

4.2 Home-based services

From a system perspective, effective home-based support and rehabilitation services have the potential to keep people well in their own homes – one of Canterbury's strategic goals – and to delay the point at which an individual may find themselves in need of residential care. This is an example of expenditure in a community setting that has the potential to reduce longer term demand for funding services in an institutional setting. The key initiatives which provide care to support older people to live in their own homes are set out in Table 2 below.

If this investment in the community has the intended impact, it would be expected that:

- Canterbury's historically high level of spending on aged residential care will reduce to the same or a lower level than the national average;
- Reductions will be seen in rest home-level care, which is where scope lies for home-based services to have an impact, rather than in hospital-level residential care, which is less likely to be affected by services provided in the home; and
- The average duration spent in rest home-level care before the client exits will decrease, indicating that clients are entering residential care at a later stage of their life, and living longer in the community.

Table 2: Expenditure on initiatives to support older people to remain in their home

Service	Expenditure 2015 /16 ($ million)
Home-based support – long-term	$22.223
Home-based support – short-term	$1.017
CREST	$7.720
Carer Support	$1.767
Day Care	$0.422
Respite	$4.333
Falls Prevention Programme	$0.565
Total	**$38,040**

Source: Canterbury DHB

In cost terms, the average annual cost in 2015/16 for a client receiving long-term home-based support was $2,718. The more intensive CREST service costs an average of $5,082 per client over a year (a client may have multiple episodes within 12 months). These figures can be compared with the $46,577 cost of funding a fully subsidised aged residential care client in rest home-level care for one year. Crudely, one year's worth of home-based support and CREST services combined represents a cost-effective shift of resources to the community if these services can delay entry to residential care by 60 or more days.

The benchmarking result found that Canterbury's expenditure on aged residential care had reduced from 120% to 107% of the national average rate. The graph below shows the trends in residential care expenditure for Canterbury, confirming that rest home-level care has decreased in absolute terms, and in context of the benchmark result, is likely to have decreased faster than national falls in rest home-level care.

In aggregate terms, if Canterbury were still at 120% of the national level of aged residential care expenditure, this would imply additional spending of $25.4 million in 2015/16. Canterbury has invested in the range of home-based support services to a level of 9% above the national benchmark, or $5.7 million in absolute terms in 2015/16 (as per Table 1), which can be counterbalanced against the improving trend in residential care.

Furthermore, this graph shows an absolute drop in rest home-level care, but a small and stready increase in hopsital level care, as the population continues to age (following some disruption post earthquake in early 2011). Dementia level care had been growing steadily, but has plateaued since 2013.

Figure 6: CDHB trends in aged residential care expenditure

Source: Canterbury DHB

The same graph for other South Island DHBs, below, shows some decrease in rest home-level care, but much less marked and consistent than in Canterbury. Hospital-level care has increased substantially and dementia level care has continued to increase steadily, giving an overall picture that is quite different from that in Canterbury. These two graphs tell a story that is consistent with the first two expectations, listed above, arising from investment in home-based support services and CREST.

Figure 7: South Island (excl. Canterbury) trends in aged residential care expenditure

Source: Canterbury DHB

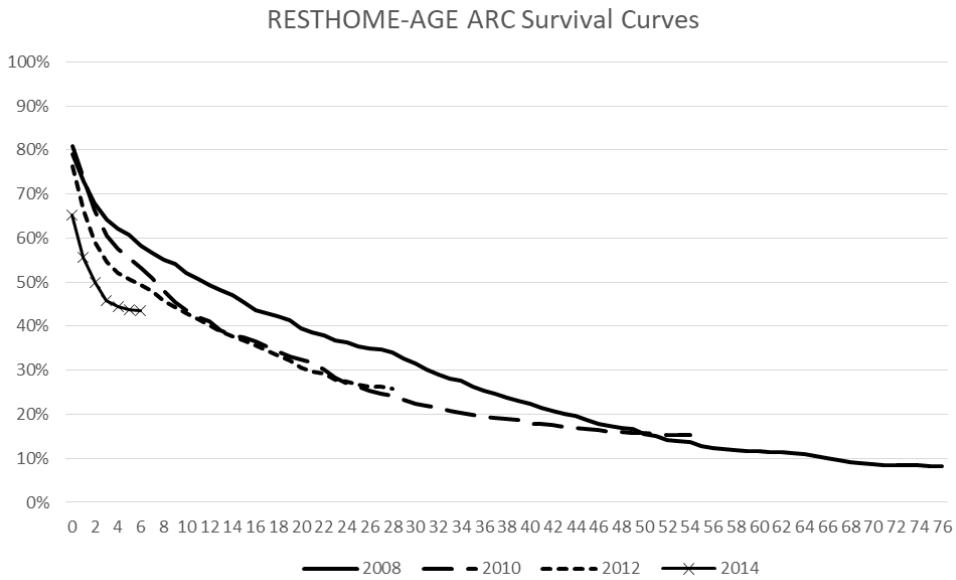
Figure 8 below shows survival curves (i.e. the time from entry to exit from the service) for rest home-level residential care in Canterbury for four years: 2008, 2010, 2012 and 2014. Note that this graph plots data only from after the first month from rest home entry.

- It is clear that, since 2008 clients have been exiting the service more quickly, resulting in the survival curve lowering in successive years.
- It is also the case that the number staying beyond the initial month has dropped markedly over the years.

These findings are consistent with the intention to support the elderly to stay well in the community, delaying the need for entry to rest home care until a later stage in their lives. As time elapses it will be possible to follow up cohorts over longer periods to establish the magnitude of the shift to later entry.

The long tail of people staying in rest homes for the long term from 2008 and 2010 also shows that a reduction in rates of entry will take some time, of the order of several years, to pass through the system. The trend graph for rest home-level care in Canterbury does not appear to show levelling off, so it seems possible that the trend will continue to or below the national level of aged residential care expenditure.

Figure 8: Canterbury aged residential care – survival curves for residents



Source: Canterbury DHB

Finally, we acknowledge that attribution is difficult, since there are other environmental effects and service impacts both locally and nationally, such as a more structured process for entering care, and structural changes in the residential care and supported living industry. However, the picture in Canterbury is consistent with something DHB specific – given that influencing a trend to spend less on aged care in institutional settings, and more on supporting people as they age in the community, is one of the DHB's strategic objectives.

5. Concluding remarks

The benchmarking exercise has followed a reasonable approach…

The benchmarking analysis considers how Canterbury's spending on services could look if the DHB had the same age structure as the national population. This gives an 'expected' level of expenditure that can be compared with the actual level of expenditure. The variance from this expected level of expenditure is then quantified in percentage and monetary terms.

The approach of standardising for age and sex addresses much of the difference in health need between the Canterbury population and the national population. However, this adjustment has only been possible for services where Canterbury has access to detailed data (i.e. hospital-based services, aged residential care and community pharmacy). As such, a margin of 1-2% for materiality for variance from the national benchmark seems reasonable.

The picture is consistent with strategic and legislative goals…

We noted above that Canterbury DHB has a legislative requirement to promote the integration of health services, and to seek the optimum arrangement for the most effective and efficient delivery of services. This is within a context of more recent policy direction from the Ministry of Health that encourages district health boards to invest funds in primary and community services. Beyond those national elements, Canterbury's specific strategic objectives are:

- People are healthier and take greater responsibility for their own health;
- People stay well in their own homes and communities; and
- People with complex illnesses have improved health outcomes.

The picture painted by the benchmarking exercise is one that is generally consistent with both the legislative goals with which Canterbury is charged, and with its own strategic objectives, which have been stated consistently for a decade. There has been a move towards investment in services in the community with the effect of reducing the amount of care that would otherwise be demanded in institutional settings. This allocative decision has been made within the context of improving technical efficiencies as seen, for example, in the national comparison of spending in a number of community-referred services such as laboratories, pharmaceuticals and radiology, which are all below national rates. The perspective offered by benchmarking is therefore consistent with the long-term planning process articulated by Canterbury since its Health Services Plan was produced in 2008.

Attribution is complex, and results have to be considered as a whole…

Health systems are complex, and consist of many interacting activities which impact upon each other. The task of influencing demand for care is complex rather than simple, and in the context of the policy literature constitutes a wicked problem. This means that trying to have influence is better done by attacking a problem on many different fronts at once, rather than expecting a single initiative to work in isolation. This, however, makes causality very difficult to pin down.

This complexity can be seen in the case, discussed above, of aged residential care. Most of the service investments intended to have an impact on delaying entry to residential care could also be expected to have an impact on acute medical admissions, so the true measure of impact may in fact be much wider than simply measuring entry to rest home care. In the

other direction, the multitude of different activities which have been developed to have an impact of residential care admission mean that identifying the effect of any one of them is very difficult, if not impossible (CREST, restructured home-based support services, new admissions mechanism, the falls programme etc). The contribution of the benchmarking approach across the whole range of services is that it supports stepping back and considering the overall position of investment across the range of activity funded by Canterbury – supported by case studies of specific service trends and impacts where these are available.

Proportions, not absolute expenditure…

A caveat to this approach is that the pattern of relative expenditure to national levels across a range of services shows something about the pattern of allocative decision making, but caution must be exercised about interpreting this in terms of Canterbury's financial position. Other effects, including operating costs associated with rebuilding hospital facilities, post-earthquake costs and need arising from the 2011 earthquake make absolute levels of cost comparison difficult. Moreover, the standardisation process undertaken here is based upon age and sex, but does not standardise for other factors associated with need such as ethnicity and deprivation. We have interpreted marginal changes in expenditure in different areas of activity over the years as allocative investments (or returns to those investments), and see patterns which are consistent with the objectives of the government and the DHBs, and with international literature. Issues around the overall need, funding and financial position of the Canterbury population are beyond the scope of this report.

The benchmarking results provide some useful insights and raise some questions…

Overall, this exercise sheds some light on how Canterbury DHB is allocating its resources across service areas relative to New Zealand as a whole. This highlights some useful observations – namely, that Canterbury appears to spend a higher-than-average amount in the areas of primary care and home support and district nursing, which have the potential to moderate acute hospital presentations admissions downstream. Consistent with this higher spending on these community-based services, Canterbury spends less in acute hospital-based services, and in particular on acute medical and emergency department services, while the trend is declining expenditure in aged residential care services. The Treasury had observed a relatively high level of community expenditure in Canterbury, and this analysis has fleshed out the particular shape and likely consequences of that observation.

The work could be taken further in several ways. Further analysis is needed to understand the higher in spending on hospital-based AT&R services and to factor in differences in how mental health spending is counted. Furthermore, while the national average provides an interesting comparator, DHBs with a tertiary-level hospital facility face a different profile of risk to those with secondary-level hospital facilities. Therefore, establishing a comparable peer group of larger, tertiary DHBs for Canterbury would be a useful extension for any further work in this area.

Appendix 1: References

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