

Evaluating ACT hospital development planning

Little Company of Mary
Health Care Ltd

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Glossary

| | |
|---------|---|
| ABS | Australian Bureau of Statistics |
| AGO | Auditor-General's Office |
| ACT | Australian Capital Territory |
| ACTCOSS | ACT Council of Social Services |
| AIHW | Australian Institute of Health and Welfare |
| ALOS | average length of stay |
| AMA | Australian Medical Association |
| CH | Calvary Public Hospital |
| CHC | Calvary Health Care |
| CHH | Clare Holland House |
| CMD | Chief Minister's Department (ACT Government) |
| DOHA | Department of Health and Ageing (Australian Government) |
| ED | emergency department |
| GST | goods and services tax |
| ICT | information and communication technology |
| ICU | intensive care unit |
| HSMR | hospital standardised mortality ratio |
| LCMHC | Little Company of Mary Health Care |
| LASCACT | Legislative Assembly Standing Committee for the ACT |
| MRI | magnetic resonance imaging |
| NH | northern hospital |
| NSW | New South Wales |
| PC | Productivity Commission |
| RLB | Rider Levett Bucknall |
| SCG | Save Calvary Group |
| SQM | status quo model |
| SRG | service related group |
| TCH | The Canberra Hospital |
| VMOA | Visiting Medical Officers Association |

Note: 'bed' in the report may also refer to bed-equivalents as appropriate; LCMHC is used in the report in reference to LCMHC, incorporating Calvary Health Care.

Executive Summary

Deloitte Access Economics was commissioned in March 2011 by the Little Company of Mary Health Care Ltd (LCMHC) to undertake an evaluation of hospital development planning in the Australian Capital Territory (ACT). The review addressed four main issues.

- First, we reviewed modelling that LCMHC has commissioned from Aurora commenting on the reasonableness of any assumptions made, the methods and modelling parameter values used, and the findings.
- Second, we compared and contrasted the findings of the Aurora modelling with that of the ACT Government, as summarised in the two recent papers released into the public domain (ACT Health, 2011; ACT Treasury, 2011).
- Third, we compared and contrasted the findings of the current ACT Government modelling with that of the ACT Government previously in the context of the potential sale of the LCMHC public Calvary hospital.
- Finally, we drew conclusions from the analysis regarding the use of public funds and the relative cost effectiveness of various possible hospital solutions for the ACT.

The Aurora modelling uses standard assumptions and the same demographic (Hardes) data as used by the ACT Government. The techniques used to estimate services and bed requirements are best practice. They (1) estimate base level services utilisation based on historical trends, segregating day-only and overnight, (2) extrapolate per capita rates to future demographic data, (3) make adjustments for any impacts on services delivery or other factors over the period, and (4) convert services to beds using standard benchmarks from existing broader-based hospital utilisation rates. The modelling is presented in a clear manner, with a consistent discussion and presentation of methodology e.g. in relation to sources for empirically based benchmarks. Some sensitivity analysis was undertaken.

Deloitte Access Economics assessed the AltusPageKirkland costings outsourced by Aurora as reliable given that: (1) the company is an experienced, multi-disciplined property specialist, operating across 11 countries globally; (2) the modelling was well set out with parameter estimates based on 30 years experience in cost management and quantity surveying, an intimate knowledge of local conditions, and empirical data covering the service spectrum of feasibility analysis, capital planning and life cycle costing; (3) the square metreage was based on real design constructs; and (4) all the cost parameters are intended to be used for potential real world application where there would be substantial risk to the proponent in any mis-estimation.

Aurora costed options show how an additional 200 beds (169 acute and 31 sub-acute) could be provided at CH for \$257 million and 400 beds (342 acute and 58 sub-acute) for \$405 million.

The ACT Government demographic projections are considerably higher than the ABS Series B (mid-case) demographic projections, with nearly 50,000 extra people by 2020 – 12.4% higher than the ABS with over double the growth projected (14.5% compared to 7.2% over the coming decade). ACT Government estimates of bed numbers are not replicable and are substantially higher than Deloitte Access Economics estimates based on ABS demographic projections. The analysis underlying the bed projections appears to lack the rigour that

would normally be associated with projections released into the public domain for general consideration, and on which a Government decides an option affecting long term capital investment decisions and health outcomes affecting a generation of residents.

The ACT Government options analysis is missing the option of 400 new beds in CH. Failure to consider phasing issues, lack of net present value analysis, and exclusion of write-offs for sunk and transition costs present serious concerns regarding the reliability of the cost estimates. There are numerous fatal flaws in data and methods that preclude any reliance on the costing analysis.

According to RLB (the capital cost modellers) any of the estimates could be up to half or double the numbers presented in the ACT Government papers. With such margins of error, any option could be best or least socially preferred and no confidence or decision should take into consideration the numbers presented in the papers.

The Victorian Government (2011) states the redevelopment costs of an existing hospital will typically cost 30-90% of an equivalent new hospital and only in exceptional circumstances is it likely to be cheaper to build from new. A reality check of recent and current developments revealed that the greenfield hospital developments were on average 37% more expensive in terms of cost per bed than the brownfield hospital developments.

The non-cost analysis is described as 'quantitative and qualitative' but it appears neither. Rather, it is simplistic, subjective conjecture – lacking in evidence and open to substantial bias. If outcomes other than cost such as efficacy and safety are important, and they are, then cost effectiveness analysis is the appropriate analytical tool – routinely employed across the health sector.

The ACT Government began negotiating the transfer of ownership of CH with the LCMHC in August 2008. A key motivator for single management of ACT hospitals expressed by the ACT Government (2009) was the view that the Government alone should control public hospitals. Hence, after consideration of options, in-principle agreement was reached in October 2009 for the ACT Government to purchase and operate CH. However, developments concerning the accounting and legal circumstances of the agreement between the ACT Government and LMCHC led to the conception of a further four options in 2010. Following the four-option inquiry and consultation process, the ACT Government (2010b) rejected the option for a new hospital on systemic and cost grounds, and concluded that it would continue to operate Calvary public hospital in accordance with the current agreements,

In general, there has been a lack of public transparency in relation to the ACT Government making its methods of assessment of hospital options clear and available for public analysis and informed comment. This has substantially limited the ability of the broader Canberra community to independently assess options in 'consultation' processes. As with the ill-fated ACT power station proposal, lack of transparency regarding touted benefits, gross failings in analytical rigour, and inadequacy in consultation processes is not a recipe for consistent, sound policy formulation or for economically and socially desirable outcomes.

Of the many options floated in recent years, there is relatively scant support for a ‘third hospital’ option, with rejection historically not just from the ACT Government, but also from numerous stakeholders – including the clinicians represented by the Australian Medical Association (AMA) ACT and the Visiting Medical Officers Association (VMOA), consumer and patient groups, and the ACT Council of Social Services (ACTCOSS). The third hospital model has been criticised by these stakeholders on the basis of unnecessary duplication, inefficiency through dilution of specialist caseloads, logistical impacts from dissemination of services, and fragmentation of service delivery. In contrast, role delineation is well-defined in the current two-hospital model with TCH acting as the regional referral centre and provider of level 5/6 services, while CH caters to level 3/4 and some 4/5 level services in specific areas, such as ICU. As a national acute care provider nearly five times the size of ACT Health, LCMHC also enjoys economies of scales and can pass on the efficiencies from its broader experience. Evidence of this is provided in CH taking on patients from TCH’s elective surgery waiting lists.

The Productivity Commission (PC, 2010) found that public contract hospitals (like CH), in comparison to Government-administered public hospitals, had higher output and input efficiency, giving a significantly better average efficiency overall. The PC also found that there was no consistent evidence to support a trend between specialisation of hospitals and efficiency. Overall, having public contracted hospitals provides comparable quality of care at a greater level of efficiency. At a strategic level, when considering the efficiency of care and quality of service using comprehensive analysis, the option relating to major expansion of CH would be likely to score well on a PC scorecard.

When considering the use of public funds, the PC’s approach – derived from its major national review of the efficiency of public and private hospitals – is considered superior to the ACT Government’s tick-box approach. Applying the PC approach in the ACT suggests that the ‘missing’ option of locating up to 400 extra beds in CH would rank highest of the (then) six options in terms of efficiency, by 2% over Option D (and with Options E and A also performing better than Option D). This is in line with the Aurora calculations, which suggest that up to 400 extra beds at CH would be cheaper per bed than any of the ACT Government options – at around \$1.01 million per bed compared to \$1.72 million for the proposed Option D (*without* land).

Deloitte Access Economics

1 Background

Deloitte Access Economics was commissioned in March 2011 by the Little Company of Mary Health Care Ltd (LCMHC) to undertake this evaluation of hospital development planning in the Australian Capital Territory (ACT).

Calvary is a healthcare service complex situated at Bruce, in northern Canberra. Established in 1979, Calvary Public Hospital (CH) has 222 publicly funded beds across acute, non-acute and day bed provision. In addition, CH has 22 treatment spaces in the emergency department (ED), and a 19 bed palliative hospice, Clare Holland House. CH provides general medical and surgical services as well as intensive and high dependency care, extensive orthopaedic surgery, obstetric and neonatal care, mental health for adults and older people, as well as aged care and rehabilitation. CH provides the following outpatient services:

- antenatal
- preadmission clinic
- chemotherapy
- renal dialysis
- diabetes education
- cardiac rehabilitation
- pain management
- breast care (post surgery)
- physiotherapy
- nutrition
- neurology

Outpatient and ambulatory services are facilitated through:

- an ambulatory care centre
 - antenatal clinic rooms
 - two rooms for diabetes education, cardiac rehabilitation nurse, pain manager, breast care nurse and neurology
 - pre-admission rooms
- other outpatient services
 - Zita Mary Clinic for cancer services
 - Physiotherapy, through two gyms and private cubicles
 - Fresenius (a private contractor) for renal dialysis services
- day surgery
 - public patient recovery area
 - private patient day surgery beds
- the Calvary clinic
 - private outpatient medical consulting suites

- other additional services
 - imaging facilities
 - pharmacy services
 - pathology services provided through a private contractor

Calvary Private Hospital is co-located with CH, and is also owned and operated by LCMHC. Calvary Private has 82 beds, consisting of a maternity unit (17 beds), a day surgery unit (10 beds), a medical and surgical unit (48 beds) and a private mental health unit (20 beds).

Context

The ACT Government recently released a set of five proposed options for development of the two existing hospitals (CH and The Canberra Hospital, TCH) and novel hospital facilities in Canberra (ACT Treasury, 2011). TCH is a tertiary level referral hospital with 600 beds while CH is a general acute hospital that delivers 30% of ACT's public hospital services. The ACT Government has modelled growth in public hospital service provision on the basis of economic and demographic drivers, including demand pressures such as population growth and ageing, service development (including spatial delivery and introduction of new models of care), and service organisation factors e.g. care coordination and meeting minimum service levels.

The ACT Government has made projections for Canberra public hospital service demand from 2009-10 through to 2021-22, estimating growth in demand of 272 acute beds north-side, and a total of 164 sub-acute beds across the ACT, rising from 88 currently (ACT Health, 2011). An additional paper released by ACT Treasury (ACT Treasury, 2011) estimated the demand increase for the same period across the whole of Canberra to be 350 acute beds and 50 sub-acute beds.¹

LCMHC commissioned Aurora Projects Pty Ltd (Aurora) to model capital investment strategies at Calvary hospital, in response to these demand projections proposed by the ACT Government. The Aurora report concludes that CH has the capacity and space for up to the entire 400 additional beds proposed by the ACT Government in meeting future public hospital demand projections, and proposes lower alternative cost estimates for the options.

Report structure

This review addresses four main objectives and tasks.

- First, we review modelling that LCMHC has commissioned from Aurora commenting on the reasonableness of any assumptions made, the methods and modelling parameter values used, and the findings.
- Second, we compare and contrast the findings of the Aurora modelling with that of the ACT Government, as summarised in the two recent papers released into the public domain (ACT Health, 2011; ACT Treasury, 2011).

¹ The numbers in the Government reports do not always reconcile. For example, 164 minus 88 is not 50.

- Third, we compare and contrast the findings of current ACT Government modelling with that of the ACT Government previously in the context of the potential sale of the LCMHC public Calvary hospital.
- In the final chapter, we draw conclusions from the above analysis regarding the use of public funds and the relative cost effectiveness of various possible hospital solutions for the ACT.

This report presents the analysis and findings from the review, with the four following chapters sequentially covering each of the four tasks outlined above.

2 Aurora modelling and report

2.1 Summary of the Aurora modelling and findings

2.1.1 Overview of the options modelled

Aurora was initially commissioned by LCMHC in 2007-08 to prepare a report, *Calvary Hospital ACT 15 Year Capital Investment Strategy*, outlining options for capital investment at CH. These options are structured around both Calvary and ACT Government population projections to 2021-22. The report has been updated to March 2011, incorporating the most recent Hordes data, taking a base year of 2007-08 (Aurora, 2011).

The options for capital investment described in the Aurora report (option 1a, 1b, 1c, 1d, 1e) provide modelling for growth in bed numbers at CH, and are outlined in Figure 2.1. Each option is associated with modelled growth in provision of public hospital services at CH to 2021-22, comprising estimates of increases in ambulatory, surgical, clinical support and facility support services. Capital cost estimates range from \$243 million for growth of 169 acute-only beds, to \$405 million for 342 acute and 58 sub-acute beds (Figure 2.1).

Figure 2.1: Aurora proposed options for capital investment

| Option | 1a | 1b | 1c | 1d | 1e |
|---|----------------------|----------------------|--------------------------------|--------------------------------|-----------------------------|
| Description | Acute bed growth | Acute bed growth | Acute and sub-acute bed growth | Acute and sub-acute bed growth | Private Hospital components |
| Projection model | Calvary | ACT Govt. | Calvary | ACT Govt. 400 bed model | |
| Acute bed growth | 169 | 272 | 169 | 342 | 70 |
| Sub-acute bed growth | - | - | 31 | 58 | n/a |
| Total beds on Calvary Hospital campus | 391 | 494 | 422 | 621 | 70 |
| Gross floor area (new build plus refurbishment) | 64,414m ² | 83,227m ² | 66,241m ² | 99,605m ² | 12,417m ² |
| Capital value (incl. escalation) | \$243m | \$323m | \$257m | \$405m | \$73m |

Source: Aurora (2011).

The report notes the early priorities to expand capacity to accommodate carparking, emergency medicine, day surgery services and the implementation of ambulatory models of care including expansion in demand for allied health services.

- Option 1a models growth of 169 acute-only beds, based on population projections developed at Calvary.²
- Option 1b models growth of 272 acute-only beds, based on population projections developed by ACT Health (2011).
- Option 1c incorporates growth of 169 acute beds and 31 sub-acute beds, based on population projections developed at Calvary. This option responds to the ACT Government option for 200 bed expansion at Calvary hospital.
- Option 1d incorporates growth of 342 acute beds and 58 sub-acute beds, based on population projections developed by ACT Treasury (2011). This option accommodates the entire 400 beds proposed for future ACT public hospital services provision, consistent with ACT Treasury (2011) projections for 350 acute and 50 sub-acute beds by 2021-22.
 - Projected increases in acute and sub-acute bed numbers in option 1d are derived from proportional increases in services from the Hardes data, as derived by Calvary. These projections are consistent with numbers modelled in the ACT Government paper (ACT Treasury, 2011) describing a 75% acute / 25% sub-acute bed growth split, as extrapolated from the ACT Government's in-house service planning figures.
- Option 1e supplements options 1a-d, identifying growth in private hospital service provisions in addition to public hospital service provision at CH. The focus in this case is on generation of a fully integrated public-private healthcare campus. The components of 'new build' identified in Option 1e can sit alongside any of the components of capital provision identified for Options 1a through 1d.

Figure 2.2 outlines in detail the facility requirements associated with accommodating between 200 and 400 bed expansion at Calvary hospital. The figure canvasses the ability of the Calvary site to accommodate expansion through both acute and sub acute bed numbers.

² Each option also establishes the details for the breakdown in bed numbers and concomitant growth in support and clinical services, as identified by Calvary.

Figure 2.2: Facility requirements at CH (ACT Government & Calvary demand projections)

| SERVICE GROUP | SERVICE ITEM | | Projection: Calvary 2021/22 | | | Projection: ACT Government 2021/22 | | Projection: ACT Government 2021/22 | | Existing unfunded |
|--------------------|-----------------------------|----------------------|-----------------------------|------------|------------|------------------------------------|------------|------------------------------------|------------|-------------------|
| | | | Bed Numbers Current | Provision | Increase | Provision | Increase+ | Provision | Increase | |
| Acute | Emergency | bays | 22 | 50 | 28 | 65 | 43 | 76 | 54 | |
| | ICU/HDU/CCU | beds | 14 | 20 | 6 | 26 | 12 | 29 | 15 | 2 |
| | Medical - general | beds | 43 | 118 | 75 | 154 | 111 | 183 | 140 | |
| | Maternity | beds | 20 | 15 | -5 | 20 | 0 | 20 | 0 | |
| | Neonates | cots | 10 | 11 | 1 | 14 | 4 | 14 | 4 | 2 |
| | Medical Assessment | beds | 10 | 15 | 5 | 20 | 10 | 22 | 12 | |
| | Surgical | beds | 30 | 41 | 11 | 53 | 23 | 60 | 30 | |
| | Surgical | day beds | 0 | 18 | 18 | 23 | 23 | 30 | 30 | |
| | Mental Health | beds | 20 | 50 | 30 | 65 | 45 | 77 | 57 | |
| | TOTAL ACUTE BEDS | | | 169 | 338 | 169 | 441 | 272 | 510 | 342 |
| Sub-acute | GEM++ | beds | 12 | 16 | 4 | 21 | 9 | 23 | 11 | |
| | Rehabilitation (inc. TLU) | beds | 28 | 48 | 20 | 54 | 26 | 61 | 33 | |
| | Mental Health - aged care | beds | 13 | 20 | 7 | 24 | 11 | 27 | 14 | 7 |
| | TOTAL SUB-ACUTE BEDS | | | 53 | 84 | 31 | 99 | 46 | 111 | 58 |
| TOTAL BEDS | | | 222 | 422 | 200 | 540 | 318 | 621 | 400 | 11 |
| Other | Renal dialysis | chairs | 10 | 30 | 20 | 38 | 28 | 46 | 36 | |
| | Endoscopy | bed days | 4 | 10 | 6 | 13 | 9 | 15 | 11 | |
| | Endoscopy procedure | rooms | 2 | 2 | 0 | 3 | 1 | 3 | 1 | |
| | Oncology | chairs / beds | 10 | 20 | 10 | 26 | 16 | 30 | 20 | |
| | Operating theatres | rooms | 5 | 7 | 2 | 9 | 4 | 10 | 5 2** | |
| | Recovery - first stage | bays | 20 | 14 | -6 | 18 | -2 | 20 | 0 | |
| | CSDD* | bed / m ² | | 212 | 488 | 277 | 636 | 321 | 737 | |
| | Pathology* | bed / m ² | | 220 | 462 | 287 | 603 | 327 | 688 | |
| | Pharmacy* | bed / m ² | | 220 | 462 | 287 | 603 | 327 | 688 | |
| | Birthing | rooms | 5 | 5 | 0 | 6 | 1 | 7 | 2 | |
| Medical consulting | rooms | 7 | 8 | 1 | 10 | 3 | 11 | 4 | | |

* CSDD/Pathology/Pharmacy at 2.3m² / 2.1m² / 2.1m² per respective bed

** These theatres are currently used for private lists

+ Sub-acute increase represents a proportional northside increase based on the number of existing Calvary sub-acute beds to TCH sub-acute bed

++ Geriatric evaluation and management

Note: numerical rounding may affect presentation of data.

2.1.2 Aurora modelling - contextual assumptions and data

Identified health priorities

The Aurora report identified several health priorities and health service needs for CH, with the following drivers influencing demand and models of care incorporated in modelling.

- Population growth and ageing, the key driver of demand for operational residential services.
- A shift in illness and disease patterns toward chronic and complex disease, resulting in a move from primarily acute episodic care to ongoing secondary and tertiary prevention³ sub-acute health services.
- Delivery of care in new ways through adaptation of new technology, across ICT, diagnostic and treatment modalities.
- An insufficient supply of health professionals in the ACT – particularly a problem in light of comments from consultation with Peter Hughes, 3/4/11, from the Visiting Medical Officers' Association (VMOA).
- Increasing emphasis on quality and safety in the delivery of health care services.
- A shift in the delivery of services to ambulatory care centres, reflecting consumer preferences for greater levels of community care (in contrast to institutional care).
- Increasingly flexible health insurance payment arrangements (including non-inpatient services).
- An increasing awareness of environmental issues, with action to ensure corresponding adoption of energy efficiency and recycling strategies.

Additional drivers specific to the ACT and relevant to CH were identified.

- A shortage of GPs in the ACT, relative to the national average.
- A reduction in the ACT population utilising private health insurance in 2008, with the percentage of public hospital admissions using private hospital insurance at 5.8%. For all hospitals (private and public), the share of private insurance admissions was 28.3% compared to the share of population with private health insurance of 55.3%⁴ (ACT Health, 2010d:84).
- An increasing proportion of public hospital separations from NSW residents.
- An increasing prevalence of cancer.
- Apparent difficulty in recruiting staff, and inadequate staff facilities.

³ A simple explanatory distinction is that primary prevention avoids risk factors such as obesity or high blood pressure (e.g. through diet and physical activity), while secondary prevention avoids disease once risk factors have emerged (e.g. by use of anti-hypertensive medications), and tertiary prevention avoids complications from chronic disease once it has set in (e.g. avoidance of the retinal and kidney complications of diabetes through insulin or other therapies).

⁴ In 2010, private health insurance coverage in the ACT was over 55%, the highest of all Australian States and Territories, and higher than the Australian average of 44.6%.

Aged care residential services in the ACT

The Aurora report notes that ACT's provision of aged care services is the lowest in Australia. The Department of Health and Ageing (DoHA, 2009) suggests that the benchmark for aged care places is 88 residential care places and 20 community care places per 1,000 population aged over 70 years, however, existing provision in the ACT is for a total of only 99.2 total places per 1,000 population aged over 70 years.

Using the DOHA benchmark for the CH primary catchment population aged over 70 years in 2007, Aurora established a requirement for 800 residential places and 200 community places. The Aurora report calculated these to rise toward a requirement of 1,624 residential places and 349 community places for the primary catchment population by 2019, applying the DOHA ratios to the projected over-70 population.

Calvary public and private hospital services overview

Separations at CH increased 15% from 15,604 in 2003-04 to 17,976 in 2007-08 i.e. 3% per annum. Same day separations represented 39.9% of separations and 10.7% of bed days in 2003-04, with the share of separations growing to 42.8% by 2007-08, but with the share of bed days fairly constant at 10.2% in 2007-08. Overall, bed days at CH increased 29% from 58,049 in 2003-04 to 75,118 in 2007-08.

Non-acute inpatient separations increased much faster (85%) than same-day acute separations (13%)⁵ over the same five year period. The top ten service related groups (SRGs) accounted for 77% of total same day separations, prominently including GIT endoscopy (16.8%) and ophthalmology (14.7%). For overnight separations, the top ten SRGs accounted for 74% of the total, prominently including obstetrics (13.5%), non-acute services (10.1%) and general medicine (8.3%).

ED presentations at CH increased 7.4% over the period 2007-08 to 2009-10, by 3,126 presentations to 45,228. Allied health occasions of service also demonstrated strong growth in the period, increasing 47.8% across all disciplines, led by robust growth in occupational therapy. In contrast, outpatient services experienced negative growth of 13.6%, particularly within palliative care, breast care and post natal services, and in the nursing discipline (-72.4%). Radiology imaging services also diminished, by 2.8% over the period.

2.1.3 CH projected services and beds: 2007-08 – 2021-22

Inpatient services

The Aurora report projected total public inpatient separations to increase by 13,886 or 74.7% in the period, to a total of 32,481. Total bed days were projected to expand by a similar degree, by 67.6% to 128,553. Day-only bed days and day-only separations reflected 11.4% and 45.1% of 2021-22 projected total bed days and separations, respectively.

The report found that by 2021-22 the average length of stay (ALOS) will be 6.4 days for overnight stays, largely driven by projected non-acute activity, with an estimated ALOS of

⁵ Bed days increased 129% and 17% respectively.

15.5 days, and accounting for 15.8% of separations and 25% of bed days. Services projected to experience growth of greater than 100% are listed in Table 2.1 (with an 'x').

Table 2.1: Services projected to increase by greater than 100%, 2007-08 to 2021-22

| Service | Separations day only | Separations overnight | Bed days day only | Bed days overnight |
|---|----------------------|-----------------------|-------------------|--------------------|
| Renal medicine+ | | X | | X |
| Cardiology | | X | X | X |
| Other medical | | X | X | X |
| Other surgical | X | | X | X |
| Total surgical | X | | X | X |
| Cancer services | | X | X | X |
| Rehabilitation and other non-acute services | X | X | X | X |
| Drug and alcohol+ | X | X | X | X |

Source: Aurora, 2011. "X" indicates change. + Numbers small.

Services estimated to grow by less than 25% were palliative care, gynaecology, obstetrics and neonatal services. The report indicated that the ageing population may in fact have a greater impact on gynaecology services than represented here, while a continuing diminution of overnight bed days for obstetrics was unlikely, in the face of population growth and recent birth rate increases.

In 2021-22, the top ten SRGs are expected to represent 70.6% of total separations, with leading services including ophthalmology (10%), GIT endoscopy (9.5%), general medicine (9%) and cardiology (8.9%). For bed day projections, the top ten SRGs are expected to represent 76.4% of the total, with leading services including non-acute services (24.9%), psychiatry (12.4%), general medicine (7.9%) and cardiology (6.2%).

Inpatient bed requirements

The Aurora report extrapolated inpatient bed requirements from the projected CH inpatient supply of public services, from 2007-08 to 2021-22.

Significant increases – of greater than 50% – for day-only facility requirements were estimated across surgical (103.7%), cardiology (53.7%) and GIT endoscopy (150%). Overall, an 80.9% increase in beds was projected to 2021-22, from 26 to 47 beds.

Significant increases (greater than 50%) for overnight facility requirements were estimated across surgical (77.5%), cardiology (81.3%), neurology (83.8%), haematology and medical oncology (110.9%), other medicine (102.3%), drug and alcohol (149.2%), psychiatry (97.2%) and non-acute rehabilitation (121.9%). Overall, a 67.9% increase in beds was projected, from 200 to 336 beds.

NSW Health suggests that 8.8 Intensive Care Unit (ICU) beds are required per 100,000 population. The Aurora report starts with a projected population increase in the Calvary primary catchment, and adds a 28% modifier based on broader catchment effects from

extra-primary catchment inflow, and interstate ICU demand. Together, these data result in an end-point requirement of 23 ICU beds when the broader catchment area is considered. As stated in the Aurora report, however, the CH executive indicated 20 beds are required at CH for 2021-22, based on the NSW Health criterion.

Demand for ED, procedural and ambulatory care services

Using base year 2009-10 ED presentations of 45,228, the Aurora report models three scenarios based on different annual growth rates for population – 0.5%, 1.2% and 1.9%, through to 2021-22. Overall, ED presentations are projected to rise between 6% and 25% across the 12 year period, to between 48,018 and 56,689 presentations. Given NSW Health and Vic Health estimates of 1,460 and 1,300 presentations per treatment space, these ranges imply between 37 and 44 ED treatment spaces would be required at CH. In its report, Aurora implements Calvary hospital expectations to assume a maximum of 50 treatment spaces for capital planning assessments.

For operating theatre services, there were 7,221 surgical separations at CH in the base year of 2007-08, projected to increase 88.5% by 2021-22. Based on Victorian benchmarks of theatre throughput of 1,300 overnight surgery services annually per theatre, and 1,900 day surgery services annually per theatre, by 2021-22 total activity is projected to increase from an activity rate of 3.8 theatres to 6.8, while endoscopy suite activity is projected to double in the period.

Outpatient services are projected to grow at a compound rate of 3% to 2021-22 (from a base estimated as an average of the most recent three years), although 5% modelling was also provided, which generated a projected increase to 40,889 services. The report suggests that, at the Level 5 Victorian benchmark of 3,264 ambulatory care occasions per consult room per annum, CH would require between 8 and 12.5 consult rooms at 3% and 5% growth respectively.

Allied health was also modelled at both 3% and 5% compound growth rates (the latter in consideration of anticipated increases in ambulatory care services), with projected increases by 2021-22 to 16,952 and 21,353 outpatient services, respectively. Similarly, for allied health inpatient services, at 3% and 5% growth, projected services were 70,474 and 88,767 respectively by 2021-22. Given various treatment benchmarks, greatest projected growth was observed for physiotherapy (21.5%) and occupational therapy (21.9%).

Imaging services were also projected at 3% based on other State assessments, and were projected to grow from 38,527 services in 2010-11 to 53,331 in 2021-22.

Demand for specific services

Cancer services are projected to increase by 57% for total separations and 87% for total bed days by 2021-22, led by strong growth in haematology and medical oncology service provision. To accommodate projected chemotherapy requirements, cancer incidence rates were mapped to the projected population growth, with the Aurora report finding a growth in chair number requirements from 9 to 16.3 by 2021. The Aurora report also suggests two additional linear accelerators for the provision of radiation oncology treatments for ACT demand projected past 2012.

Mental health services are projected to increase some 72.1% to 964 separations, and 96.1% to 15,732 bed days by 2021-22. The ACT 2010-11 Health National Access Program Initiative has allocated funding for an additional seven beds at CH for the future provision of mental health services.

Renal dialysis chair requirements provision by CH is projected in the Aurora report to increase from a base need of 14.9 in 2008, to more than double (30.5) by 2021.

The Aurora report also suggests development of 6 coronary care unit beds based on 2021 Townsville Hospital and Tamworth Base Hospital benchmarks at Calvary hospital. The report further suggests development of a dedicated cardiac catheter lab, supporting inpatient and outpatient diagnostic angiography and percutaneous coronary intervention.

2.1.4 Calvary private projected activity: 2007-08 to 2021-22

ACT resident demand

Taking 2004-05 as a base year, ACT resident demand for private hospital services, both from within the ACT as well as supra-territory services, is projected to increase by 61.2% for total separations and 57.9% for total bed days by 2021-22. ALOS is projected to increase slightly for overnight stays from 4.5 days to 4.7 days during the same period. By 2021-22, the top ten SRGs are projected to account for 68% of total projected bed days, with over 4,000 bed days each for orthopaedics, psychiatry, obstetrics, respiratory medicine and general medicine. By 2021-22, 83% of total separations will be accounted for by the top ten SRGs. Same day separations are projected to be predominantly accounted for by ophthalmology, orthopaedics, GIT endoscopy, psychiatry, plastic and reconstructive surgery and gynaecology services, all of which are projected to account for more than 2,000 same separations each by 2021-22.

Demand for inpatient services at Calvary private hospital

The Aurora report indicates that Calvary private accounted for 28.5% of same day separations and 24.8% of overnight separations of total ACT resident private hospital service demand. During 2004-05, 79.4% of Calvary private hospital demand for overnight bed days was accounted for by ACT residents, the remainder from supra-territory residents. Taking these data into consideration, Aurora suggest that projected inpatient facility requirements for Calvary private will increase 62.2% from 86.7 beds in 2004-05 to 140.8 beds in 2021-22.

2.2 Review of modelling parameters and methods

Projected public and private hospital service provision by CH was modelled in the Aurora report based on the Hardes data set, provided by ACT Health. Projections to 2021-22 were calculated in this data set using the ACTAIM V1.2 status quo model (SQM), which takes a base year at 2007-08.

2.2.1 Public services projected activity

ACT Health Hardest data set model assumptions

- Calvary public hospital supply projections are considered for all residents, including those in the ACT, as well as inflows from other states.
- Occupancy rates for bed equivalent data are assumed in the SQM to be 75% for paediatric and neonates and 85% for adults on average.

These are standard assumptions and the same demographic data as those used by the ACT Government.

Inpatient bed requirements

In the Aurora report, data from the SQM 2021-22 public inpatient service projections for CH were used directly to inform bed requirements. These data included separations for day only and overnight (2007-08 to 2021-22), which were extrapolated from (and stratified against) facility requirements for provision of these services.

Tables 13 to 16 in the report present the data related to projected separations by discipline, and corresponding bed facility requirements, stratified by day only and overnight separations. The facility requirements scale up with projected inpatient demand at CH, and are in line with projected population growth trajectories.

ICU facility requirements for CH were calculated by Aurora based on population projections to 2019, which suggest a 23% increase in CH's primary population catchment (Belconnen, North Canberra and Gungahlin; 163,350 to 203,300), and factor an additional 28% to account for broader catchment applicable to CH. This 28% addition reflects input from surrounding districts and of interstate residents, and is based on broader public hospital servicing capacity at CH. Aurora apply these values linearly to existing facility numbers in the derivation of projected ICU bed facility requirements for 2019, through 2021-22.

These techniques are best practice: (1) estimate base level services utilisation based on historical trends, segregating day-only and overnight, (2) extrapolate per capita rates to future demographic data, (3) make adjustments for any impacts on services delivery or other factors over the period, and (4) convert services to beds using standard benchmarks from existing broader-based hospital utilisation rates. Perhaps the only refinement would be to stratify projections by age group and gender, but the impact of this is likely to be relatively minor. The 28% ICU catchment mark-up appears empirically based.

Demand for ED, procedural and ambulatory care services

The Aurora report takes the base year 2009-10 of 45,228 ED presentations, and extrapolates demand using population growth projections from the Australian Bureau of Statistics (ABS)⁶, to estimate a compound annual growth rate of 0.5, 1.2% or 1.9%. When

⁶ ABS Population Projections Australia 2006 to 2101.

applied over 12 years to 2021, respective total growth in ED presentations at CH are 6%, 15%, and 25%.

The modelling is standard:

$$\text{ED presentations (2021-22)} = \text{principal} * (1 + \text{rate})^{\text{years}} = 45,228 * (1 + r)^{12}$$

As indicated, these rates provide a window of between 48,018 and 56,689 ED presentations at CH by 2021-22, i.e. 37 to 44 ED treatment spaces, but 50 was modelled.

50 ED spaces corresponds to a maximum of 65,000 ED presentations using the Victorian conversion rate, which accommodates population growth-based assessments, with 15%-35% additional allowance for population ageing.

Operating theatre spaces are projected to increase from 3.8 theatres in 2007-08 to 6.8 by 2021-22.

Theatre requirements are estimated using established Victorian benchmarks for theatre throughput –1,300 overnight surgery services annually per theatre (25/week) and 1,900 day surgery services annually per theatre (36.5/week).

Outpatient services were averaged by discipline for the most recent three years (2007-08 to 2009-10), and assessed at a 3% compound annual interest rate.

The 3% rate provides coherence across state estimates. The use of high sensitivity analysis (5%) provides for potential increase in ambulatory care services. Additionally, the Aurora report takes a three year average base, thus accounting for stochastic year-on-year variation.

Demand for specific services

Chemotherapy requirements were calculated based on population projections published by ACT Government (CMD, 2009a), and taking cancer incidence rates by age group⁷. Specific numbers of chairs were based on NSW Health guidelines⁸, with rates projected an additional two years from 2019 through 2021, making for a robust and clear assessment of chemotherapy requirements. Relevant regional cancer incidence rates were also adopted in the report.

In regard of provision of radiation oncology services, Aurora make the case that future ACT and NSW demand for related treatment options will prefer a north side Canberra treatment centre. Drawing on an inquiry into radiotherapy facility development across rural Australia⁹, Aurora suggest that development of a single machine unit linear accelerator at

⁷ ACT Cancer Registry: Cancer Incidence and mortality by age, sex and site ACT 2002 - 06

⁸ NSW Health: Service Planning Guidelines for Intravenous Chemotherapy Services

⁹ [www.health.gov.au/internet/main/publishing.nsf/Content/31A45FEDBAC4A639CA256F180048D34F/\\$File/summaryroi.pdf](http://www.health.gov.au/internet/main/publishing.nsf/Content/31A45FEDBAC4A639CA256F180048D34F/$File/summaryroi.pdf)

Calvary hospital will be inadequate, recommending instead provision for two linear accelerators. The radiation oncology report itself prevaricates between the most appropriate locations for development of such facilities. However, it acknowledges that outer urban / fringe rural placement of such capital will facilitate for better rural and remote population access to treatment options. The four existing linear accelerators at TCH may meet ACT and regional demand for some time, although no studies have modelled ACT demand for these services. The Aurora report proposes dual linear accelerator provision at CH, which would help facilitate service and treatment provision to north Canberra, and inter-jurisdictional residents.

Overall – the estimates for cancer services are generous – Aurora may slightly overestimate needs, but this has only a relatively tiny impact on costs.

Renal dialysis chair requirements were developed based on assumptions of:

- 2008 as the base year, with 232 patients;
- growth for renal dialysis at 5% from NSW Health modelling;¹⁰
- three weekly treatments per patient;
- a NSW Health benchmark of 50% of renal dialysis treatments to be facility based;
- treatment to facility requirement extrapolations based on a Victorian benchmark of 593 separations per chair per annum;
- proportion of chairs required at CH assumed to be linearly proportionate with projected increase in Calvary primary catchment population; 48.6% in 2007 to 52.1% in 2019; and
- extrapolation of chair requirements made to 2021 based on an additive growth rate, fitting the projected 2007 to 2019 growth.

An integrative modelling approach is taken by Aurora for renal dialysis requirements, taking on both NSW and Victorian benchmarks, modelling contingently in line with projected north Canberra population growth, and clearly identifying empirically based assumptions.

Overall, Aurora has conducted its modelling in a clear manner, with a consistent discussion and presentation of methodology e.g. in relation to sources for empirically based benchmarks. Base year data were derived in the most appropriate manner for each calculation, with interstate comparisons and Government modelling projections guiding compound growth rates used and projections to 2021-22, and with specific definition of the primary catchment for Calvary public hospital. Some sensitivity analysis was undertaken.

2.2.2 Private services projected activity

LCMHC operates a number of private hospitals and community facilities, including Calvary private hospital with an 82 bed capacity collocated with CH, and Calvary John James

¹⁰ NSW Health: Service Planning Series, NSW Renal Dialysis Service Plan to 2011: Jan 2007

hospital with 155 beds, which is located in south Canberra. An additional private hospital, The National Capital Private hospital, has an 82 bed capacity, and is collocated with TCH.

ACT Health HarDES data set model assumptions

- The HarDES data set assumes public sector separations to represent ACT resident demand met by ACT public hospitals and interstate public hospitals
- The HarDES data set assumes private sector separations to represent ACT resident demand met by ACT private hospitals and interstate private hospitals

The Aurora report mentions that private facility requirements described in the facility options were derived through discussion with CH executive staff and the following factors.

- Separations and bed days presented in the HarDES data set represent ACT resident demand for all private hospitals, including ACT and interstate.
- The proportion of ACT resident demand was calculated for Calvary private by major bed category for 2004-05.
- The proportion of ACT residents contributing to total activity between Calvary private and Calvary John James was calculated for 2005-06.
- The projected activity for Calvary private was calculated assuming retention of its proportion of market share and the proportion of ACT residents compared to the total activity for Calvary private and Calvary John James.

The report indicates that based on these data, Calvary private accounted for 28.5% of same day separations and 24.8% of overnight separations of total ACT resident private demand. Additionally, the report indicates that ACT residents accounted for 79.4% of overnight bed days at Calvary private for 2004-05, and that this percentage was applied to projected ACT resident demand for private hospitals. Although there are number of shortcomings for the private hospital modelling, consultation with Aurora¹¹ on the following matters provided some insights as to why:

- The latest HarDES data set included 2007-08 as a base year, although 2004-05 base year data were employed in modelling projected private services. Aurora advised that the 2007-08 base year HarDES data were not available at the time of reporting.
- The Aurora report mentions Calvary private and Calvary John James in its activity assessment, but fails to mention the impact of National Capital Private on calculations (presumably because they are not privy to any strategic planning or other data from that private hospital). Presumably 2005-06 activity is utilised as that was when the last comparison was done. Aurora advised that limited access to private hospital service data were available for modelling.
- A static 2004-05 indication of ACT resident demand, exclusive of interstate demand, is presented, and used as the basis for projections. Presumably, Calvary primary catchment population percentages are employed to project facility requirements, yet their impact and treatment is not disclosed. Again, this may be due to commercial sensitivity, and the fact that the private sector analysis is not central to the ACT Government options.

¹¹ Pers. comm.. Liz Partridge, Health Architect Aurora Projects Pty Ltd, 6 April 2011.

Generally, the private demand modelling presented in the Aurora is less well specified than the public hospital modelling, presumably since it is peripheral to the main modelling, commercially sensitive, and is hampered by data availability and accessibility constraints.

2.2.3 Capital costing

Final cost estimates for the redevelopment of the Calvary Bruce Campus are presented in the Aurora report. Specific capital cost estimates for the five project options indicated in Figure 2.1 are demonstrated in Figure 2.3.

Figure 2.3: Capital costing for CH facility redevelopment, options 1a-e (\$, excluding GST)

| Option | Capital Cost Estimate (excl escalation) ¹ | area | cost/m2 | Capital Cost Estimate (excl Carpark) ¹ | area | cost/m2 | Capital Cost Estimate (incl escalation) ¹ | No. beds ² | AVG Cost per bed | AVG Cost per bed (excl Carpark) |
|--|---|--------|----------|--|--------|----------|--|-----------------------|---------------------|---------------------------------------|
| 1a - Public Acute Services - Calvary Projection - 169 bed increase | \$ 216,979,121 | 64,414 | \$ 3,369 | \$ 174,649,288 | 34,714 | \$ 5,031 | \$ 243,016,615 | 169 | \$ 1,437,968 | \$ 1,157,439 |
| 1b - Public Acute Services - ACT Health Projections - 272 bed increase | \$ 288,491,846 | 83,227 | \$ 3,466 | \$ 234,348,141 | 45,238 | \$ 5,180 | \$ 323,110,867 | 272 | \$ 1,187,908 | \$ 964,963 |
| 1c - Public Acute & Sub-acute Services - Calvary Projections 200 bed increase | \$ 229,295,556 | 66,241 | \$ 3,462 | \$ 186,965,723 | 36,541 | \$ 5,117 | \$ 256,811,022 | 200 | \$ 1,284,055 | \$ 1,047,008 |
| 1d - Public Acute & Sub-acute Services - ACT Health Projections 400 bed increase | \$ 361,955,453 | 99,605 | \$ 3,634 | \$ 299,666,463 | 55,901 | \$ 5,361 | \$ 405,390,108 | 400 | \$ 1,013,475 | \$ 839,066 |
| 1e - Private Services Component - Calvary Projections | \$ 65,405,877 | 12,417 | \$ 5,268 | \$ 65,405,877 | 12,417 | \$ 5,268 | \$ 73,254,582 | 70 | \$ 1,046,494 | \$ 1,046,422 |

Source: Aurora, 2011.

The capital costing for the four Calvary public hospital options (1a-1d) plus the Calvary private hospital option (1e) is modelled based on a straight line build in each case. These options have embedded within them escalation for the duration of the build of each project. Additionally, option 1d, which addresses a build of 400 additional beds, has a sub option projecting a 10 year 'staged development', which adds \$26 million to that cost (pers comm., Walter Kmet from CH, email, 28 March 2011, 09:15).

The capital costing process was contracted out to AltusPageKirkland, in consideration of cost variations including role delineation, building type, works type, procurement method and ACT regional market price. Hospital capital costing and planning follows typical Victorian planning processes¹² across functional, area and cost benchmarks required for capital.

Deloitte Access Economics reviewed the input data provided by AltusPageKirkland. The main inputs were: (1) square metreage and (2) benchmark rates per square metre for new build, high level refurbishment and low level refurbishment.

New build rates varied from \$3,400/m² (ambulatory care) to \$4,200/m² (for acute mental health). High level refurbishment costs ranged from \$2,600/m² (to relocate engineering services) to \$5,500/m² for the magnetic resonance imaging (MRI) building and \$4,282 for expanded ICU. Low level refurbishment costs ranged from \$630/m² (to convert an area for circulation) to \$1,600/m² (for conversion of the Xavier building to offices) and \$1,800/m² for medical/surgical centre upgrades.

Rates per square metre did not vary between options for the same type of rebuild e.g. the new build carpark was \$1,000/m² regardless of size or placement. However, decanting and relocation, infrastructure, external works, demolition, fees, contingencies, furniture and fittings naturally varied depending on the specifics of the option, and were individually itemised with rationale.

Deloitte Access Economics assessed the AltusPageKirkland costings as reliable given that: (1) the company is an experienced, multi-disciplined property specialist, operating across 11 countries globally;¹³ (2) the modelling was well set out with parameter estimates based on 30 years experience in cost management and quantity surveying, an intimate knowledge of local conditions, and empirical data covering the service spectrum of feasibility analysis, capital planning and life cycle costing; (3) the square metreage was based on real design constructs; and (4) all the cost parameters are intended to be used for potential real world application where there would be substantial risk to the proponent in any mis-estimation.

2.2.4 Population and primary catchment modelling

The ACT is approximately 2,400km², and bounded by New South Wales. The seven districts of Canberra include Belconnen, Gungahlin, North Canberra, South Canberra, Tuggeranong,

¹² <http://www.capital.dhs.vic.gov.au/capdev/ProjectProposals/Benchmarking/HospitalCapitalProcess/>

¹³ <http://www.pagekirkland.com/home.asp>

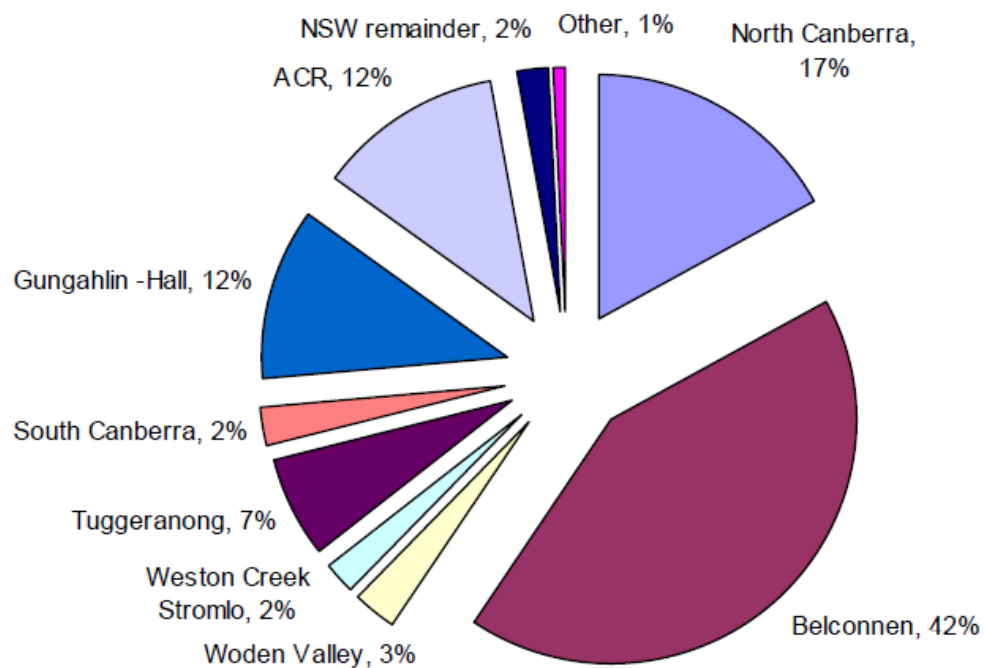
Weston and Woden. A planned upcoming district, Molonglo Valley lies 2/3 into the north side of Canberra, and is forecast to grow to 60,000 to 70,000 people¹⁴.

Assumptions to definition of Calvary primary catchment population

The Aurora report identifies Belconnen, North Canberra and Gungahlin as the three population districts relevant to service provision by CH. Together, these districts are used to describe the primary catchment population for CH in the report. The upcoming development district – Molonglo Valley – was not incorporated into this primary catchment area as redevelopment data are not available currently.

A section on catchment analysis in the Aurora report describes separation activity for CH based on 2005-06 data, identifying the CH's main geographic service areas, the results of which are presented in Figure 2.4. The primary regions serviced by CH are identified as Belconnen, North Canberra and Gungahlin, as well as the Australian capital region.

Figure 2.4: Calvary public hospital service provision by geographical district, 2005-06



Source: Aurora, 2011.

Modelling parameters

As of 2007, the Calvary primary catchment accounted for 48.6% of the total ACT population. The ACT Government has projected population in the Calvary primary catchment to increase from 165,250 (2007) to 203,350 by 2019, representing 52.1% of total ACT population (CMD, 2009a). These projections are independent of Molonglo Valley development, and reflect a projected population increase of 38,100, or 23.1%. As such, this population growth trajectory is greater than growth for the remainder of the ACT.

¹⁴ <http://form.molonglovalley.com.au/wp-content/uploads/2010/04/FAQs-Molonglo-Valley-11-June-2010.pdf>

Based on CMD population projection data to 2021 (CMD, 2009b), Aurora has taken the projected population for all ACT (398,500), and factored in the projected north side Canberra population growth of 53% of this total (ACT Health, 2011). Together, these data mark a projected population of 211,205 for the Calvary primary catchment by 2021.

Population ageing will also be a factor for public hospital service provision by CH through 2021, as the proportion of the population aged 45 and over is expected to increase substantially during this period (Figure 2.5).

Figure 2.5: Projected primary catchment population by age (2007 and 2019)

| Age (years) | 2007 | 2019 | # Change | % Change |
|--------------|---------------|---------------|--------------|-------------|
| 0-14 | 30000 | 37550 | 7550 | 25.2 |
| 15-44 | 84050 | 93300 | 9250 | 11 |
| 45-69 | 41200 | 54050 | 12850 | 31.2 |
| 70-84 | 8450 | 15300 | 6850 | 81.1 |
| 85+ | 1550 | 3150 | 1600 | 103.2 |
| Total | 165250 | 203350 | 38100 | 23.1 |

Source: Aurora, 2011; CMD, 2009a.

The Aurora report has successfully identified key geographical districts of Canberra relevant to service provision by CH, currently and in the future, using well defined definitions for what is regarded as north Canberra (by ACT Health). By not incorporating proportions of other districts into the Calvary primary catchment population, Aurora may have understated the primary catchment population. However: (1) it appears the ACT Government analysis also excludes the Molonglo region, due to lack of data; (2) development of Molonglo would affect the out years more than the initial years so, with discounting, the affect may be relatively small; (3) the estimates are not generally based on the primary catchment but on the same Hardees data and bed numbers as those that the ACT Government uses for the ACT Government options.

2.3 Conclusions regarding the Aurora modelling

The Aurora report has provided a clear service plan and benchmarking analysis, with detailed presentation of services growth assumptions and replicable estimation of bed numbers by type. The report has identified the relevant catchment, and uses the same demographic data as that of the ACT Government. The outsourced AltusPageKirkland capital costing data are presented in detail and are highly credible. Where appropriate, sensitivity analysis was provided. Costed options show that an additional 200 beds (169 acute and 31 sub-acute) could be provided at CH for \$257 million and 400 beds for \$405 million (342 acute and 58 sub-acute).

3 Current ACT Government options modelling

3.1 Summary of the modelling and findings

The ACT Government modelling is premised on a significant increase in demand for health services over the next 15 years, with public hospital admissions projected to increase by 77% and overnight admission by 49% by 2022 (ACT Health, 2011). The major driver for this increase is changing population demographics. A significant increase in population ageing is projected, particularly of those aged 85 or older (projected to increase 509% to 2056), with the median ACT population age increasing from 33.7 years to 39.6 years over 2009 to 2056 (CMD, 2011). Moreover, the proportion of those living on the north side of Canberra is projected to increase to 53%, from the current even split, by the end of the decade (ACT Health, 2011). The Chief Minister's Department (CMD, 2011) has projected ACT population to increase 14% by 2020 and 50.5% to 557,443 by 2056 (Table 3.1).

Table 3.1: Projections of ACT population, by sex, 2009-2056

| Year | Male | Female | Total | % change on previous period |
|-----------------------|----------------|----------------|----------------|-----------------------------|
| ACT Government | | | | |
| 2009 | 174,999 | 177,190 | 352,189 | |
| 2010 | 178,055 | 179,903 | 357,958 | 1.64 |
| 2020 | 205,739 | 203,950 | 409,689 | 14.45 |
| 2030 | 229,410 | 223,933 | 453,343 | 10.66 |
| 2040 | 250,220 | 240,559 | 490,779 | 8.26 |
| 2050 | 270,678 | 256,028 | 526,706 | 7.32 |
| 2056 | 282,583 | 265,057 | 547,640 | 3.97 |
| ABS Series B | | | | |
| 2009 | 165,693 | 169,769 | 335,462 | |
| 2010 | 166,972 | 171,146 | 338,118 | 0.79 |
| 2020 | 178,564 | 183,767 | 362,331 | 7.16 |
| 2030 | 187,872 | 193,969 | 381,841 | 5.38 |
| 2040 | 193,802 | 200,275 | 394,077 | 3.20 |
| 2050 | 197,564 | 203,493 | 401,057 | 1.77 |

Source: CMD, 2011 for ACT Government. ABS data from <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3222.02004%20to%202101?OpenDocument>

The ACT Government CMD demographic projections are considerably higher than the ABS Series B (mid-case) demographic projections, with nearly 50,000 extra people by 2020 – 12.4% higher than the ABS with over double the growth projected (14.5% compared to 7.2% over the coming decade).

It should be noted that currently 23% of the patients in the ACT hospital system come from outside the ACT as TCH is the primary regional hospital (ACT Health, 2011:4). However, the estimates in Table 3.1 above are for the ACT only, with loadings applied later.

The ACT Government believes that these demand pressures and capacity constraints combined with an ageing health infrastructure require a strategic options analysis to be undertaken (ACT Treasury, 2011). The aim is to provide high quality public health services in a comprehensive, safe, effective and efficient way (Gallagher, 2011:2).

Four options were put forward by the Minister for Health in August 2010 and submissions sought before November 26, 2010 (LASC ACT, 2010a). Following this, in February 2011 five options were made available for a six week consultation period until 14 April 2011 relating to a broader review of the health care system in the ACT. The rough mix is 350 acute and 50 sub acute beds unless otherwise specified which is 'broadly' in line with ACT Health Planning (ACT Treasury, 2011).¹⁵

The five options are presented in Table 3.2, and described as:

- A Equal TCH and CH expansion [two hospital model]
- B Solo TCH expansion [one hospital model]
- C TCH expansion and construct a Northern Hospital [three hospital duplication model]
- D Construct acute Northern Hospital - fully networked and specialised hospital system [three hospital role delineated model]
- E Construct sub-acute Northern Hospital - fully networked and specialised hospital system [three hospital role delineated model]

Table 3.2: ACT Government public hospital service options, 2011

| Option / Criteria | Comment | TCH expansion | CH expansion | New hospital expansion |
|-------------------|--------------------------------------|---------------|-------------------------------|------------------------|
| A | Two hospital model | 200 | 200 | N/A |
| B | One hospital model | 400 | N/A | N/A |
| C | Three hospital duplication model | 200 | N/A | 200 |
| D | Three hospital role delineated model | N/A | Change to sub-acute and rehab | 400 |
| E | Three hospital role delineated model | N/A | 200 | 200 |

Source: ACT Treasury, 2011

The ACT Government's outlined benefit of each option is depicted in Table 3.3.

¹⁵ In some cases it is difficult to reconcile the estimates. See footnote 1.

Table 3.3: Options analysis 2011, rating* by criteria

| Option / Criteria | Patient Centred | Intra-disciplinary | ACT resident accessible | Safety, quality | Efficiency, cost | Total Option Value of 25* (20)^: |
|-------------------|-----------------|--------------------|-------------------------|-----------------|------------------|----------------------------------|
| A | 2 | 4 | 3 | 3 | 3 | 15 (10) |
| B | 2 | 3 | 2 | 2 | 2 | 11 (6) |
| C | 3 | 2 | 4 | 4 | 4 | 17 (12) |
| D | 4 | 5 | 5 | 5 | 5 | 24 (19) |
| E | 4 | 5 | 5 | 5 | 3 | 22 (17) |

Source: ACT Treasury, 2011 * Rating: 0 (extremely bad) – 5 (excellent); min:max=0:25. ^With a base 1 (adequate) – 4 (excellent), min:max=5:20. # Cost estimates provided by Rider Levitt Bucknall.

The cost of each option is provided in Table 3.4.

Table 3.4: Cost overview

| Option | Cost of construction (\$) | Cost per bed (\$) |
|--------|---------------------------|-------------------|
| A | 788,460,000 | 1,971,150 |
| B | 832,840,000 | 2,082,100 |
| C | 730,810,000 | 1,827,025 |
| D | 687,650,000 | 1,719,125 |
| E | 792,320,000 | 1,980,800 |

Source: ACT Treasury, 2011.

The recurrent cost of each option is shown in Table 3.4.

Table 3.5: Recurrent cost by option, relative to base case (\$ million):

| Cost Type | Option A | Option B | Option C | Option D | Option E |
|-------------------------------------|-------------|-------------|---------------|---------------|-------------|
| Depreciation | Base | 0.59 | (0.77) | (1.34) | 0.05 |
| Financing costs | Base | 2.56 | (3.33) | (5.82) | 0.22 |
| Maintenance | Base | 0.89 | (1.15) | (2.02) | 0.08 |
| Building operating costs | Base | 0.07 | 0.31 | (0.06) | 0.52 |
| Total annual cost / (saving) | Base | 4.11 | (4.94) | (9.24) | 0.87 |

Source: ACT Dept of Treasury Feb 2011.

Notes: Depreciation over 75 years; Financing costs based on Commonwealth 10 year bond rate of 5.77%; Maintenance costs at 2% of construction cost after warranty period; Building operation costs at \$135m² annually.

ACT Health (2011:8) noted, as did Ms Gallagher (Gallagher, 2011:8), that there is a further option of placing all 400 beds on the Calvary site, but believed the site is not big enough to support such a project without significant rebuilding of the hospital and that rebuilding of the hospital at the same time as The Canberra Hospital (TCH) would diminish hospital services too significantly to allow a reconstruction until TCH was finished.

ACT Health acknowledged that detailed modelling of beds does not have 400 as the final requirement for 2022 as that will be adjusted based on demographic, technological and treatment changes (ACT Health, 2011: 8) and this total for the Canberra region has not been released. ACT Health does believe that there will be a present need for 272 additional acute beds in northern Canberra (Calvary catchment area) and 76 additional sub acute beds in all of Canberra by 2022 (ACT Health, 2011: 5). ACT Health, however, through the Capital Asset Development Plan does anticipate a 50% increase in 2022 on 2006-07 levels in overnight admissions (ACT Treasury, 2011:3).

3.2 Review of the modelling parameters and methods

ACT Treasury has not delivered any information in relation to its costing, stating that cabinet confidentiality prevents public disclosure of the assumptions and methods underlying the figures presented for public consideration. Deloitte Access Economics offered to sign a confidentiality agreement to independently review the costing but this offer was not accepted. As such, appropriate scrutiny of the estimates is not possible.

In the absence of Government disclosure of assumptions and methods, our review will be limited to what has been released into the public domain, acknowledging that the costing is described as ‘a strategic high level cost’ and after an option is chosen, then this would ‘go to a more detailed costing analysis’ (LASC ACT, 2011b:129). The implication is unclear. What confidence could be placed in strategic analysis based on methods that will have to be redone? How can an option be selected if there is no confidence in the accuracy of the costing? While the options may not be based on cost alone, cost is a highly relevant consideration.

3.2.1 Estimates of required bed numbers

The demographic estimates underlying the calculations are based on 400 beds. 400 beds were described in consultation with Treasury as a ‘strategic goal’ rather than an ‘operational goal,’ which should be correct within a range of 40-50 beds and that, regardless, the ACT will need 400 beds some time in the future.¹⁶ The danger of undertaking strategic analysis as an absolute guide and relying on presumptive costs is that it ignores the staging, spatial analysis, and capacity utilisation issues which would typically be included in appropriate analysis for a capital infrastructure investment of this scale and health importance.

Deloitte Access Economics modelled the required needs for the ACT using historical separation rates and bed days combined with a demographic model based on ABS Series B (mid-case) population projections, to estimate bed requirements from bed days. This modelling shows a 36% increase in requirements of beds from 2006-07 to 2021-22 as opposed to the 50% increase by ACT Health (ACT Treasury, 2011:3).¹⁷ While the Deloitte Access Economics’ data includes only the ACT demographic data and not the whole catchment area, it is unlikely that rural NSW population would be growing faster than the

¹⁶ Meeting with Khalid Ahmed, ACT Treasury, 16 March 2011.

¹⁷ Gallagher (2011: 10) states 40% but provides no basis for her figure.

ACT urban centre. Note that the 36% increase is based on 7.2% overall population growth but with strong growth for the 75+ population (over 50%, albeit from a low base).

There is no sensitivity analysis presented in the ACT Government bed number projections, which was undertaken by experienced project management company, Thinc. No site visit to CH was conducted by Thinc in order to model the options as they include Calvary, in contrast to the detailed level of services analysis undertaken by Aurora. The exercise appears to have been conducted more as an indicative early spatial analysis rather than a tool for definitive planning. Moreover, Thinc appears to have distanced itself from the ACT Government papers subsequent to their release.

ACT Government estimates of bed numbers are not replicable and are substantially higher than Deloitte Access Economics estimates based on ABS rather than CMD demographic projections. The analysis underlying the bed projections appears to lack the rigour that would normally be associated with projections released into the public domain for general consideration, and on which a Government decides an option affecting long term capital investment decisions and health outcomes affecting a generation of residents.

3.2.2 Completeness and symmetry of options considered

The option of 400 beds on the Calvary campus is excluded in the Government paper, although Calvary could indeed fit the beds on the current campus (Aurora, 2011). Treasury conceded that, given that Option B was included (400 new beds all in TCH), the similar Option with 400 new beds in Calvary should have been included in the strategic analysis.¹⁸

The reasons put forward for probable exclusion of the standalone options at both TCH and Calvary for 'serious consideration' was not due to cost, as confirmed by Ms Gallagher in her Ministerial Statement, but due to not being able to have both sites as construction zones and the delay to rebuilding Calvary would therefore be too long a timeframe for new beds (Gallagher, 2011). This decision and view, however, was formed without consultation with the hospital's management. In contrast, LCMHC believes it is able to continue to provide the required services while upgrading (Aurora, 2011). The LCMHC belief is not unprecedented, as Ipswich Public Hospital and Calvary Mater Newcastle were able to successfully increase patients treated while managing its construction program (Queensland Health, 2011; New South Wales Health 2007a, 2007b).

The options analysis is missing the option of 400 new beds in CH.

3.2.3 Incorporation of timing and phasing in the cost projections

All options have a five to eight year construction time and the costing has been undertaken over a ten year period. Considering current ACT Health projections (ACT Health, 2011) it was felt that a strategic decision needs to be made before the ACT Budget.¹⁹ While funding commitments already made will be honoured, future refurbishments will still be required

¹⁸ Meeting with Khalid Ahmed, ACT Treasury, 16 March 2011.

¹⁹ Meeting with Khalid Ahmed, ACT Treasury, 16 March 2011.

whatever strategic option is chosen, requiring continued development of Calvary and the Canberra Hospital, yet those costs have not been incorporated into the current options analysis. This could mean a duplication of capital construction and respective costs e.g. with option D, Calvary would be expanded to meet acute demand for the upcoming 5-8 year construction period for the new hospital which would then be altered afterwards to switch to sub-acute demand. This involves a ten year 'sunk cost' (2011-12) of \$94 million for continued support of hospital services at CH for the immediate future. These included among other costs (LASC ACT, 2011a:12):

- \$32 million for a 900 space multistorey car park;
- \$5.5 million for refurbishment of the ED;
- \$22 million for an ambulatory care centre;
- \$3 million for a diagnostic cardiology clinic;
- \$2 million for the MRI Service;
- \$11 million for an ophthalmology centre; and
- \$1.05 million to upgrade medical imaging equipment.

Further, there was a new ICU at a cost of \$13.5 million recently constructed (LASC ACT, 2011a: 60). If these upgrades are abandoned, with a change to CH into a sub-acute facility the write-off should be factored into the strategic analysis of costs.

From discussions with ACT Health and ACT Treasury the costing of the options are not done on a net present value basis. This could create larger differences in the variations of cost between the options as the differences in the phasing of construction costs could be markedly different.

Failure to consider phasing issues, lack of net present value analysis, and exclusion of write-offs for sunk and transition costs present serious concerns regarding the reliability of the cost estimates.

3.2.4 Quality of data and methods used for the costing

There is a lack of applicable data in which to review the options and their benefits. Currently it is not clear how changing models of care, demographic and non-demographic trends have been accounted for in the modelling. It appears that a basis of ~8.5% growth per annum has been used for costing, but the exact details are not revealed except for a rough estimate given by ACT Treasury (LASC ACT, 2011b:139).

“So there is a cost component and, typically, it is run at about four per cent—in excess of four per cent—per annum. The population has grown, and, all else being equal, if you assume the same utilisation rate from the demographic factors, they will add another 1½ per cent. Then there is a non-demographic utilisation factor, which is due to ageing and things like technology. Typically, another 2½ to three per cent is added there... Combined, they add up to something like around eight to 8½ per cent.”

This should be compared with the detailed service-line based Aurora costing.

ACT Treasury confirmed²⁰ that no detailed analysis for costing the options related to Calvary was undertaken by ACT Treasury or ACT Health – rather, the analysis was based on costs from the Canberra Hospital expansion. There is no evidence to suggest that the expansion of CH could be compared to that of TCH (where substantial escalations occurred). Rather this would appear to bias the options away from CH solutions.

There is no evidence presented for why rebuilding at CH is costed considerably higher than the same activities conducted by ACT Health (2011:13) when (1) there has been no actual research done onsite at Calvary relating to what and how a rebuild would occur there, and (2) given that rebuilding is usually considered cheaper (Victorian Government, 2011) in the Victorian model that ACT Health based the costing on (LASCACT, 2011b:124).

Discussion with Treasury indicated that whilst a large number of assumptions were taken, they were taken in regards to all options and so the effect on the options analysis would be equal. However, it is unclear why this would be the case, since different parameters or assumptions could well affect some options very differently from others. ACT Treasury confirmed²¹ that current building plans, staffing, scheduling and cost of land have not been accounted for in any of the options, and these would vary for each scenario.

- For example, in the ACT Government analysis the cost of converting Calvary into a sub-acute facility does not take into account the cost or feasibility of converting specialist rooms (i.e. operating theatres) into sub-acute spaces.
- The cost of land has not been included for a new NH (ACT Treasury, 2011:12), which could vary costs significantly between the NH and other options. (Typically at least the opportunity cost of land in alternative use is included in such infrastructure development costing analysis e.g. for airports.)
- Legal considerations could also impact on cost. If an option chosen negates what LCMHC believes is the current contract between ACT Health and LCMHC in the provision of an acute hospital service on the Calvary site (i.e. option D) LCMHC could legally challenge such a provision. This is likely to add a significant change to the cost of those options.

Moreover, while definitions have been given for what constitutes acute and sub-acute care there has been no indication of how these estimates were made (considering changing models of care and possible data limitations). The differences between acute and sub-acute costs per bed do not seem to be taken into account nor does the differences related to the actual spatial configurations required in the pre-existing infrastructure.

Deloitte Access Economics spoke with Rider Levett Bucknall (RLB)²² who conducted the costing analysis, who confirmed that the capital costing was undertaken for indicative purposes, and that the margin of error on the cost estimates could range from 50% to 200%.

However, there is only a 4.6% difference between the first four options. Considering the low accuracy of the cost estimates, any variation of the order of the options is possible.

²⁰ Meeting with Khalid Ahmed, ACT Treasury, 16 March 2011.

²¹ Ibid.

²² Pers. comm., Brad Marino, 7 April 2011.

Moreover, the costing estimates provided are point estimates only. As with the demographic analysis, no sensitivity analysis has been undertaken in relation to the costing to mitigate the uncertainty of risk. Sensitivity analysis and cost ranges are standard tools typically used when Governments make long term infrastructure investment decisions.

There are numerous fatal flaws in data and methods that preclude any reliance on the costing analysis. According to RLB (the capital cost modellers) any of the estimates could be up to half or double the numbers presented in the ACT Government papers (summarised in Table 3.4 and Table 3.5). With such margins of error, any option could be best or least socially preferred and no confidence or decision should take into consideration the numbers presented in the papers.

3.2.5 Cost comparisons: brownfield or greenfield?

ACT Treasury in discussions on March 16th expressed little confidence in the precision of the estimates and in the 16th March Standing Committee reported that detailed costing would only be done when a choice was made (LASC ACT, 2011b). Given that the previous section concluded that the costing undertaken by the ACT Government has little relevance to the actual costs, what cost principles could be considered in 'strategic analysis'?

The basis of the costing by ACT Treasury is the Victorian model (LASC ACT, 2011b:124). The Victorian Government (2011) states the redevelopment costs of an existing hospital will typically cost 30-90% of an equivalent new hospital and only in exceptional circumstances is it likely to be cheaper to build from new. However, the ACT Government, while purportedly using this model, concludes that the cheapest model is building a new hospital. Deloitte Access Economics undertook a review of recent and current brownfield and greenfield hospital developments where data were readily available, as a reality check.

The reality check revealed that the greenfield hospital developments were on average 73% more expensive in terms of cost per bed than the brownfield hospital developments.

New builds (greenfield)

- Royal Children’s Hospital, Melbourne \$2.8 million²³
- Princess Margaret Hospital, Perth \$4.3 million²⁴
- Midland Health Campus, Perth \$1.2 million²⁵
- Gold Coast University Hospital \$2.35 million²⁶
- Bendigo Hospital \$1.3 million²⁷

Average cost **\$2.39 million**

Median cost **\$2.35 million**

Rebuilds (brownfield)

- Queen Elizabeth Hospital, Adelaide \$0.64 million²⁸
- Lyell McEwin Hospital, Adelaide \$1.7 million²⁹
- Northern Hospital, Melbourne \$1.8 million³⁰

Average cost **\$1.38 million**

Median cost **\$1.70 million**

3.2.6 Considerations other than cost

Both Ms Gallagher and Mr Ahmed stated the primary consideration is not cost but, rather, about ‘providing a system that is going to work for the city for the next 40 years’ (Ms Gallagher, LASC ACT, 2011b:127) with the most significant benefits being the ‘efficiency of care and quality of service’ (Mr Ahmed, LASC ACT, 2011b:130). It is important, however, to understand the cost effectiveness of the investments and this requires robust analysis. Further if efficiency of care and quality of service are the key drivers to the consideration of

²³ Standing Committee on Health, Community and Social Services 2011, *Calvary Public Hospital Options*, <http://www.parliament.act.gov.au/downloads/reports/7th%20HCSS%2005%20Calvary%20Public%20Hospital.pdf> accessed 1 April 2011.

²⁴ Ibid.

²⁵ Ibid.

²⁶ Queensland Government 2010, *Projects: Gold Coast University Hospital – project overview*, <http://www.dip.qld.gov.au/projects/health-and-social/gold-coast-university-hospital-3.html>, accessed 11 April 2011.

²⁷ Bendigo Health 2011, *The New Bendigo Hospital*, <http://www.newbendigohospital.org.au/> accessed 1 April, 2011

²⁸ South Australian Health 2010, *Learn more about the Queen Elizabeth Hospital*, <http://www.sahealth.sa.gov.au/wps/wcm/connect/public+content/sa+health+internet/health+services/hospitals+and+health+services/metropolitan/the+queen+elizabeth+hospital/learn+more>, accessed 3 April 2011.

²⁹ South Australian Liberal Party 2009, *Building the new Royal Adelaide Hospital*, <http://www.davidridgway.com.au/pdf/vision2010/November09newRAH.pdf>, accessed 1 April 2011.

³⁰ Northern Health 2011, *Hospital Expansion*, <http://www.nh.org.au/hospital-expansion/w1/i1001356.com> accessed 1 April 2011.

these options, it is important that these considerations are openly and explicitly explained for proper evaluation. It is important that in all of this analysis that a quantifiable rather than subjective approach is adopted.

The future of Calvary Private Hospital must also be considered. If the sub-acute facility was concentrated on the current Calvary premises with no provision of public acute services, Calvary Private Hospital may not be deemed worthwhile to continue by the LCMHC. This is a decision only LCMHC can make, but if it was taken there would be a decrease in hospital services on the north side of Canberra which would put further strain on public hospital services (LASC ACT, 2011a). This factor, however, does not seem to form part of consideration of what is going to work for the city for the next 40 years.

The methodology behind how each 'tick' was ascribed in this part of the analysis is obscure. The paper simply states (ACT Treasury, 2011:11):

*"The options **are given** a number of ticks or crosses to reflect how well they meet the stated objectives"*

It is not stated 'by whom' the options are given their ticks or crosses (presumably by ACT Health and/or Treasury?), nor is it clear how the expert advice 'sought' by KPMG, Ernst and Young and Dr Lesley Russell from Macroeconomics³¹ was applied by whomever allocated the ratings and converted them to scores. There is no evidence for the claims made in support of the tick/cross allocation, and all are highly arguable. For example: A new NH would deliver patient centred care very well, but in an expanded hospital, patient centred care would only be 'adequate'. (ACT Treasury, 2011:13).

In the literature, patient centred care is typically a product of many factors, but new vs. expanded hospital facilities was not a factor revealed in our brief literature search. Rather, patient centred models of care include a number of basic principles related to attitudes and culture of the organisation and its staff; systems supporting patient care that provide quality services and information; shared responsibilities; promotion of independence, and so on (Kendall and Lissauer, 2003). Facilities are only relevant in terms of the patient's *immediate* environment – comfort, cleanliness, light – all modifiable through reburbsishing but, indeed, mainly through operational means.

Based on the growing body of research into the nature of individual patient's interactions with health practitioners, there is a growing body of evidence about what makes care "patient-centred", both in health and social care. Consistently, the following characteristics have been identified in the research (Williams & Calnam 1991, Walker et al. 1998, Henwood 2001, Kendall 2001):

- *The nature of the relationship between patients and practitioners (based on trust and respect)*
- *The speed of care (access, timeliness, appropriateness)*
- *The quality of the facilities (comfort, cleanliness, light)*

³¹ We note with some humour that words for the Health Economics capability section on the Macroeconomics website are a direct copy and paste from those on the former Access Economics website (drafted by the author of this report), there are no health economics reports actually completed or uploaded to the site, and Dr Russell appears to be the only health economics person on the 'team'. <http://www.macroeconomics.com.au/node/6/16> This casts some doubt on the degree of 'expertise' involved.

- *The adoption of a patient-centred approach in interactions (working to the patient's agenda, active listening, providing patients with high quality, relevant information).³²*

On the 'intra-disciplinary and collaborative' score, 3 hospitals are ranked as worse than 2, so Option C is ranked lowest. However, Option D and E are also 3-hospital models, yet they are not similarly ranked lower, since there are still 2 acute hospitals in each case. However, they are ranked higher than an expanded 2-hospital model on the grounds that both would continue to provide a mix of emergency and elective services, and at least one would maintain a mix of acute and sub-acute services. Neither assertion need be the case. Both situations could also be the case with Options D and E, unless those options removed ED facilities from northern Canberra or sub-acute services from one side of Canberra. Neither of those options would appear sensible. Much longer ambulance commutes would put lives at risk with only one ED; and chronic, elderly patients travelling across town for sub-acute services also appears sub-optimal. The rationale seems based on one article (arguably with its findings applied out of context) which makes no sense when applied to the actual spatially dispersed care setting of the ACT environment.

For the 'accessibility' criterion, Option D and E are again ranked as most preferred on the basis that they provide a more equitable distribution of beds between north and south sides. The missing option of 400 beds at CH would also provide this. The basis for the costing of alleged travel time savings/costs are a mystery. Option B is claimed to result in net costs, but has the same sign as Options C and E. Only Government net benefits are considered, whereas appropriate decision analysis should be based on social net benefits.

ACT Treasury (2011:15) claim that safety and quality are related to new construction. As with patient-centred care, this is not borne out by evidence. Drivers of adverse events in Australia have no correlation with a hospital's age but rather reflect the management and care reasons itemised below, with the percentage of adverse events attributed to each (Wilson et al, 1999):

- Complication of or failure in the technical performance of an indicated procedure or operation (34.6%);
- Failure to synthesise, decide and/or act on available information (15.8%);
- Failure to request or arrange investigation, procedure or consultation (11.8%);
- Misapplication of or failure to apply a rule or use of a bad or inadequate rule (8.8%);
- Violation of a protocol or rule (4.8%);
- Acting on insufficient information (1.8%);
- Slips and lapses, errors due to absentmindedness in activities in which the operator is skilled (1.6%);
- Failure to continue established management (1.5%);
- Lack of knowledge (1.1%);
- Electively practising outside area of expertise (1.0%);
- Questionable practice ethics (0.5%); and
- Other/unable to code (5.9%).

³² SA Health, no date:3.

Points were then allocated based on counting the total ticks (no crosses emerged). There is no explanation given for this 'weighting' system, nor rationale for why each tick across criteria and within criteria was given equal weight.

One way to test the system used to assess the non-cost criteria would be for a group of hospital practitioners unaware of the ACT Government conclusions and independent of the analysis to rank the options, using the same criteria, and review whether similar outcomes emerged.

The non-cost analysis is described as 'quantitative and qualitative' (ACT Treasury, 2001:13) but it appears neither. Rather, it is simplistic, subjective conjecture – lacking in evidence and open to substantial bias. If outcomes other than cost such as efficacy and safety are important, and they are, then cost effectiveness analysis is the appropriate analytical tool – routinely employed across the health sector.

3.3 Conclusions regarding the current Government modelling

For such an important capital investment and health issue, the ACT Government options analysis, costings and qualitative considerations should be redone by a skilled and independent body, with all data and methods open to the public for consideration.

4 Previous ACT Government analysis

This chapter compares and contrasts the Aurora report with the Government's previous paper, which concluded in 2010 that continued operation of CH was the best option, rather than construction of a new hospital. The change of direction in 2011 leads into a discussion of spatial catchment considerations, economies of scale, and other 'big picture' factors such as best practice in funder-provider models of health care, consumer-directed health care and clinical/clinician considerations.

4.1 Summary of the previous ACT Government modelling and findings

Through a series of contractual negotiations with the ACT Government and dating back to 1971 (ACT Government, 2009; LASC ACT, 2011b), six different standing agreements describe the public service provision offered by LCMHC (LASC ACT, 2011b). The array of arrangements between the ACT Government and LCMHC has been described as "complex and not well understood" (AGO, 2008).

Ongoing challenges have presented in regards to the transfer of assets for a 'one management model' (LASC ACT, 2011b), and the development of infrastructure at CH. In short, the ACT Government began negotiating the transfer of ownership of CH with the LCMHC in August 2008. An information paper justifying the transfer of ownership, governance and control of CH to the ACT Government was released in 2009. A key motivator for single management expressed by the ACT Government (2009) was the view that CH represents the greatest privately controlled provision of public hospital services in Australia³³ and, rather, the Government should control public hospitals.

In-principle agreement was reached in October 2009 for the ACT Government to purchase and operate CH.

This agreement also included the transfer of Clare Holland House (CHH) to LCMHC. However, significant concern was raised by community members unhappy with the proposal.

In August 2010, the Minister for Health disclosed four options concerning the provision of public hospital services by LCMHC (ACT Government, 2010a):

- Option 1: Proceed with the standing service agreements between ACT Government and LCMHC;

³³ Since 30% of public hospital services in the ACT are provided by CH. However, in absolute terms there are a number of other larger Australian public hospital service providers e.g. the Mater public adult, mothers and children's hospitals in Brisbane.

- Option 2: Develop an activity funding agreement (AFA) for public hospital services between LCMHC and the ACT Government. The agreement would replace all existing agreements and would comprise:
 - a 15 year term, with re-negotiation for renewal occurring at least two years prior to cessation of the AFA;
 - an annual service annexure to disclose agreed service level targets, caps, and total funding;
 - conditions for LCMHC to oversee maintenance, repair and development of public hospital assets, and for the ACT Government to provide LCMHC funding to this end (land required for any new infrastructure would be sub-leased to the ACT Government by LCMHC. The sub-lease would be for 30 years, at the end of which the buildings would belong to LCMHC for a “peppercorn” amount. LCMHC would not pay for the lease while the new infrastructure was being used for the provision of public hospital services); and an independent resolution process.
- Option 3: LCMHC and the ACT Government would develop a new private hospital in a North Canberra greenfields location. The existing Calvary private hospital would be used for provision of public hospital services; and
- Option 4: Proceed with the standing service agreements between ACT Government and LCMHC, with the ACT Government to consider a new hospital in a North Canberra greenfields location. A possible development plan in this scenario may include:
 - Continued operation of TCH
 - Operation of CH in a sub- / non-acute capacity
 - A new public hospital in North Canberra

Generally, the proposals disclosed by the Minister for Health were relatively light on detail. In summary, Option 1 proposed no change, Option 2 specifically recommended changes to service agreements between LCMHC and the ACT Government, Option 3 proposed the construction of a new north Canberra private hospital through an LCMHC and ACT Government collaboration, and Option 4 suggested no change to the service agreement but proposed the independent development of new hospital by the ACT Government in north Canberra, possibly as a public good, also implying a restructure of public service hospital provision at CH (Table 4.1).

Table 4.1: Summary of 4 options for public hospital service provision by LCMHC, Aug 2010

| Option | Change to LCMHC – ACT Govt. Service Agreements | New hospital infrastructure | Other arrangements |
|--------|--|---|---|
| 1 | No change | No change | |
| 2 | New agreement to replace old | No change | |
| 3 | Not disclosed | New north Canberra private hospital (LCMHC / ACT Govt. Collaboration) | Calvary private hospital to provide public services |

| | | | |
|---|------------------|------------------|---|
| 4 | No change | No change | ACT Govt. to consider a new north Canberra public hospital A networked system, involving restructure at CH |
|---|------------------|------------------|---|

Based on the four options proposed, the standing committee on health, community and social services (LASC ACT) summarised two choices for the ACT Government (LASC ACT, 2011b):

- a. proceed with a major upgrade of CPH [sic] and continue to work with LCMHC under a revised agreement (the form of which is yet to be determined); or*
- b. build a new hospital, restructure CPH [sic] and continue to work with LCMHC in a reduced capacity.*

LASC ACT further notes that two of the four proposed options would entail CH operating to provide acute public hospital service, in an expanded capacity. Then, as now, such service provisions would entail development and negotiation of new agreements between LCMHC and the ACT Government (LASC ACT, 2011b).

LCMHC responded to these options in its 2010 submission, suggesting:

- Option 1: Calvary would welcome a new activity-based funding framework to underpin Calvary's future public health service delivery;
- Option 2: Calvary has proposed a mutually agreeable network agreement, in place of existing agreements;
- Option 3: Expanded not-for-profit private health services on the Bruce campus would be welcome by Calvary, easing the burden on existing public services; and
- Option 3: A third hospital is not required in the ACT, with increased investment in Calvary likely to prove an efficient outcome.

Following the four-option inquiry and consultation process, the ACT Government (2010b) rejected the option for a new hospital on systemic and cost grounds, and concluded that it would continue to operate Calvary public hospital in accordance with the current agreements.

4.2 Review of the methods

ACT Government (2009) concluded that the ACT Government should purchase CH, assuming ownership, governance and control. The proposal also concluded that a new private hospital run by LMCHC should be constructed on the site, replacing the existing Calvary Private Hospital. This proposal was supported with the following arguments:

- The current model does not encourage efficient and effective networking of public hospital and health services.

- Dual governance of the ACT's two public hospitals is inefficient and it complicates the planning and delivery of services.
- The co-management and collocation of the public and private arms of Calvary create issues with cross-charging for resources, resulting in misallocation of costs between the public and private hospitals.
- The current contractual arrangements mean that any investment in infrastructure at CH would result in a transfer of assets from the ACT Government to LCMHC, preventing the Government from investing as it deems necessary.
- An increase in both public and private hospital investment (as proposed) will provide more and better choices for consumers, take pressure off the public system and attract a broad range of high-quality health professionals.

The first argument draws on the principles of comparative advantage and gains from trade, arguing that a networked model of public health provision allows each individual health facility to specialise in a service (or group of services). By working together, it follows, the network can provide a broader and better range of health services to the community. The Government argues that this is only possible if governance of all public services is clear and manageable which, it is argued, the current arrangement is not.

The report concludes that the purchase of CH by the ACT Government is the best option, with the other alternatives being for the ACT Government to maintain the current funding arrangements with LMCHC, or for the ACT Government to build an entirely new and separate hospital. However, the methods used to analyse these alternatives are not clearly defined in the report. The report simply notes that financial assessment of the three options over a 20 year timeframe arrives at this conclusion, with the 'buy' option yielding a positive change in net assets from the base case that is larger than that of the 'build' option. As outlined above, developments concerning the accounting and legal circumstances of the agreement between the ACT Government and LMCHC led to the conception of a further four options in 2010.

Detail on methodology used by the government to arrive at these options is limited. Recent communication with ACT Treasury³⁴ indicated that the Government would not release any further information in relation to Government modelling of these options, due to confidentiality.

Mr Ahmed justified the different conclusions in 2009, 2010 and 2011 by suggesting that the analyses asked different questions, and hence arrived at different answers.³⁵ The policy context itself, however, should surely be addressing the single and ongoing question regarding how best to provide the capital facilities for ongoing high quality and affordable health care in the ACT to meet its population needs. It is thus unclear how the answer to this question has changed so substantially in recent years.

³⁴ Pers comm., 10:43pm, 4 April 2011.

³⁵ Meeting with Khalid Ahmed, ACT Treasury, 16 March 2011.

In general, there has been a lack of public transparency in relation to the ACT Government making its methods of assessment of hospital options clear and available for public analysis and informed comment. This has substantially limited the ability of the broader Canberra community to independently assess options in ‘consultation’ processes. As with the ill-fated ACT power station proposal, lack of transparency regarding touted benefits, gross failings in analytical rigour, and inadequacy in consultation processes is not a recipe for consistent, sound policy formulation or for economically and socially desirable outcomes.

4.3 Broader issues for hospital planning

4.3.1 Spatial catchment and stakeholder views on a ‘third hospital’

In October 2009, ACT Health questioned whether Canberra’s population could viably sustain three hospitals (ACT Government, 2009). This opinion is in line with the four options proposed by the Minister, which focuses predominantly on developing closer ties between the ACT Government and LCMHC, and which only tentatively addresses the option of building a third north side Canberra hospital, concluding against that option.

From a clinical perspective, the Australian Medical Association (AMA) ACT has indicated that development of a third hospital in Canberra would generate unnecessary duplication of infrastructure and administrative services (AMA ACT, 2010). Moreover, the AMA believes that inefficiencies would be created through the dilution of case loads of speciality units across three hospitals, impairing inherent integrative networked gains that result from threshold speciality service provision.

The ACT Council of Social Services (ACTCOSS, 2010) noted that equity of access needs to be considered in the development of future hospital facilities. Dissemination of services across three campuses, as proposed in Option 4 of the Minister’s August 2010 package, neglects to consider the logistical impact of a third Canberra hospital.

A number of consumers believe that future health planning for Canberra should be designed around the appropriate geographical grouping and distribution of services, and a third hospital site would fragment the delivery of hospital services in the ACT (SCG, 2010). The existing “two pillar” spatial model, with CH in a central north Canberra location, and TCH in south Canberra, is regarded by both clinicians and patients as the most appropriate foundation for future ACT health planning (AMA ACT, 2010; SCG, 2010).

Calvary has argued that the existing two hospital framework in the ACT provides for a range of public hospital services through THC and CH. CHC (2010) argues that role delineation between these public hospitals is clearly defined and supports the current model where TCH acts as the regional referral centre and provider of level 5/6 services, while CH caters to level 3/4 and some 4/5 level services in specific areas, such as ICU, as illustrated in Figure 4.1. Our expert view is that, as presented, the existing role delineation between TCH and CH appears rational and in line with practice elsewhere.

Figure 4.1: Role delineation for services provided by ACT public hospitals, 2010

| Service | Calvary Hospital | TCH 2010 | Service | Calvary Hospital | TCH 2010 | Service | Calvary Hospital | TCH 2010 |
|----------------------------------|------------------|----------|---|------------------|----------|---|------------------|----------|
| Clinical Support Services | | | Core Services - Medical | | | Integrated Community and Hospital Services | | |
| Pathology | 4 | 6 | Respiratory Medicine | 4 | 6 | Adolescent Health | 2 | 4 |
| Pharmacy | 5 6 | 6 | Rheumatology | 4/5 | 5 | Adult Mental Health | 4 5 | 6 |
| Diagnostic Imaging | 4 5 | 6 | Core Services - Surgical | | | Child & Adolescent Mental Health | 1 | 4 |
| Nuclear Medicine | 3 | 5 | General Surgery | 5 | 5 | Child Protection Services | 1 | 3 |
| Anaesthetics | 5 | 6 | Burns | 2 | 3 | Drug & Alcohol Services | 1 | 5 |
| Intensive Care | 5 | 6 | Cardiothoracic Surgery | 0 | 5 | Geriatrics | 5 | 6 |
| Coronary Care | 4 | 6 | Day Surgery | 5 | 6 | Health Promotion | 3 | 3 |
| Operating Suites | 6 | 6 | Ear, Nose, Throat | 4 | 5 | Palliative Care | 6 | 5 |
| Core Services - Medical | | | Gynaecology | 5 | 6 | Rehabilitation | 5 | 6 |
| Emergency Medicine | 5 | 6 | Neurosurgery | 4 | 6 | Sexual Assault Services | 1 | 4 |
| General Medicine | 4/5 | 6 | Ophthalmology | 3 5 | 5 | Aboriginal Health | 0 | |
| Cardiology | 4/5 | 5 | Orthopaedics | 4 5 | 6 | | | |
| Dermatology | 5 | 5 | Plastic Surgery | 3 | 5 | Community Services | | |
| Endocrinology | 4 5 | 6 | Urology | 5 | 6 | Community Health - General | 1 | |
| Gastroenterology | 4/5 | 6 | Vascular Surgery | 4 | 6 | Community Nursing | 1 | |
| Haematology - Clinical | 4 | 6 | | | | Genetics | 1 | 4 |
| HIV/AIDS | 0 | 6 | Maternal and Child Health Services | | | Dental Health | 1 | |
| Immunology | 4 | 5 | Maternity | 5 | 6 | Multicultural Health | 0 | |
| Infectious Diseases | 3 | 6 | Neonatal | 4 | 6 | Sexual Health Services | 0 | 5 |
| Neurology | 4 5 | 6 | Paediatric Medicine | 1 | 4 | Women's Health | 0 | |
| Oncology - Medical | 4/5 | 5 | Paediatric Surgery | 1 | 4 | | | |
| Oncology - Radiation | 0 | 5 | Family & Child Health | 0 | 3 | | | |
| Renal | 3 | 6 | | | | | | |

Source: Calvary health and THINC, 2010, data special request. Proportional ranking by level of service provision.

4.3.2 Economies of scale, efficiency and capacity

Economies of scale result from the operation of large scale services. LCMHC provides nation-wide acute and sub-acute hospital care services and in scale is nearly five times the size of ACT Health's acute services provision (CHC, 2010).

One indicator of efficiency arising from the know-how derived from national scaled practices is in the management of waiting lists. The recent ACT Auditor-General's Office report (AGO, 2011) has indicated that in relation to elective surgery waiting lists, ACT compares unfavourably to other jurisdictions (AGO, 2011).³⁶ As quoted in the report, for 2008-09 the median wait in the ACT was 75 days (34 days nationally), 66% of total ACT admissions were seen within the recommended time (86% nationally), and more than 10% of ACT public patients waited more a year for admissions (3% nationally) (AGO, 2011). Notably, across three consecutive years ending 30 June 2010, TCH accounted for between 74-80% of patients on a category 1 clinical urgency³⁷ waiting list while CH was found to demonstrate greater flexibility in management of its waiting lists (AGO, 2011). On this metric, CH performs well, continuing to increase elective surgery throughput including by taking on patients from TCH waiting lists.

Calvary has committed to increasing elective surgery throughput by 25% in 2010-11, and we are on target to deliver this. This has included 387 elective surgery procedures on patients transferred from the Canberra Hospital elective surgery program.

CH's commitment to efficiency is further evidenced in the activity based funding model that CH proposed to the ACT Government (2010a; LASCACT, 2011a). This model is supported by visiting medical officers, with VMOA recommending that funding of CH on an activity based casemix basis similar to that in Victoria would be a desirable arrangement between the ACT Government and CH going forward³⁸).

In the public submission process, various stakeholders are raising concerns with the costing of health care provided under the proposed options and the effectiveness and efficiency of role delineation between acute and sub acute facilities at separate hospital campuses for both the provider of care and for the patient. This concern is held by various doctors and the Australian Medical Association (AMA ACT) in its submissions to the Inquiry of Calvary Public Hospital Options. The concern was reiterated during a meeting of forty doctors with the ACT Health Minister on 21 February 2011 at Calvary between them and the (ABC News, 2011).

³⁶ The report also concluded that, while ACT Health had a sound framework of guidelines and funding had significantly increased, implementation and monitoring were not well managed - 97% of reclassified patients from category 1 were done so with no documented clinical reason) and patient outcomes had not improved (AGO, 2011: 5-6).

³⁷ Category 1 clinical urgency is defined as an "admission within 30 days desirable for a condition that has the potential to deteriorate quickly to the point that it may become an emergency", <http://www.dhs.vic.gov.au/ahs/archive/esis2/a1.htm>, accessed 6 April 2011.

³⁸ Pers comm., Peter Hughes of 3 April 2011.

4.4 Conclusions

Of the many options floated in recent years, there is relatively scant support for a ‘third hospital’ option, with rejection historically not just from the ACT Government, but also from numerous stakeholders – including the clinicians represented by the AMA ACT and VMOA, consumer and patient groups, and ACTCOSS. The third hospital model has been criticised by stakeholders on the basis of unnecessary duplication, inefficiency through dilution of specialist caseloads, logistical impacts from dissemination of services, and fragmentation of service delivery. In contrast, role delineation is well-defined in the current two-hospital model with TCH acting as the regional referral centre and provider of level 5/6 services, while CH caters to level 3/4 and some 4/5 level services in specific areas, such as ICU. As a national acute care provider nearly five times the size of ACT Health, LCMHC also enjoys economies of scales and can pass on the efficiencies from its broader experience. Evidence of this is provided in CH taking on patients from TCH’s elective surgery waiting lists.

5 Conclusions for use of public funds

There is a significant focus on efficiency of care and quality of service in the current options papers (ACT Health, 2011 and ACT Treasury, 2011) and of the respective benefits of role delineation for the hospital system (Dwyer, 2008) through the options papers and the tick based system. It would be erroneous to conclude from that reference, however, that the most effective and efficient hospital system is where multiple small role-delineated hospitals are created. Dwyer suggests role delineation of the hospital system when there are multiple hospitals having a duplication of services where it is not needed (such as having three general acute hospitals in the ACT).

Research evidence, however, goes further than just role delineation. The most comprehensive and recent research for efficiency in the Australian hospital system was undertaken by the Productivity Commission in its Multivariate Analysis of both the public and private hospitals – and supplement (PC, 2010).

5.1 Productivity Commission findings

In its 2010 review, the PC establishes best practice methods to measure quality and effectiveness among hospitals, and then applies these hospitals to Australian public and private hospitals.

Neither efficiency nor quality were well-defined using objectively replicable methods in the ACT Government papers, although the PC's outcomes-focused metrics were available.³⁹

- The PC measured quality using risk adjusted hospital standardised mortality ratios (HSMR), 'as it represents the basic tenet of a hospital – to heal the sick and provide for their safety' (PC, 2010, p. xix). The Commission used HSMRs as a reliable means of comparing hospital performance.
- The PC noted that efficiency can be defined by output, input or cost efficiency:
 - Input – 'how well a hospital economises on resources to produce a given output level (PC, 2010, p. 77) that is, the hospital is run more efficiently.
 - Output – 'how well a hospital maximises output from its given resources' (PC, 2010, p. 77) that is, patient outcomes are delivered more efficiently.
 - Cost – 'the extent with which a hospital can reduce its costs and still produce the same level of output' (PC, 2010, p.12).

The Productivity Commission found that public contract hospitals like CH (i.e. that are public hospitals run by a non government entities) in comparison to Government-administered public hospitals had no statistical difference in the quality of care (PC, 2010, Table 2, p. xxxii). However, the PC found that **public contract hospitals in comparison to**

³⁹ It should be noted that the efficiency in the ACT Treasury report (ACT Treasury, 2011:12) was based on comparison of (invalidly-derived) construction cost estimates, although in health economics, efficiency is generally measured by incremental cost for a given health gain.

Government-administered public hospitals had higher output and input efficiency, giving a significantly better average efficiency overall (PC, 2010, p. 94).⁴⁰

The PC also found that, in terms of both quality and efficiency, larger hospitals were more effective than smaller hospitals at delivering outcomes for patients and the provider. CH's current separations numbers place it in the 'large' category, which implies comparable cost efficiency to Government-administered public hospitals. The results of the report are found in Appendix A.

There are few reports with a similar scope to the PC for the Australian hospital system, as few have been undertaken and overseas studies have different methodologies and systems that do not permit sound comparison. Chua et al (2008) compared the size of hospitals in Victoria and similarly found larger hospitals provide higher quality of care. Forbes et al (2010) continued the original methodology of the PC and found that larger hospitals had higher quality of care than smaller hospitals, and that the quality of care is similar among public and private hospitals.

Specialisation of hospital services in relation to efficiency scores was tested by the PC, to determine whether smaller hospitals (in comparison with each other) were more efficient when they specialised in the provision of services, based on the five most frequent services by major diagnostics. **There was no consistent finding to support a trend between specialisation of hospitals and efficiency** (PC, 2010: 99).

The conclusions of the PC based on diverse data are different from the conclusions drawn in the ACT Government papers. The PC findings suggest that having public contracted hospitals provides a comparable quality of care at a greater level of efficiency, and having larger hospitals (like CH) increases these advantages, rather than breaking up the hospital into multiple smaller hospitals.

The omission of the 400-extra-bed CH option from ACT Government analysis becomes particularly pertinent given this PC context. At a strategic level, when considering the efficiency of care and quality of service using comprehensive analysis, the option relating to major expansion of CH would be likely to score well on a PC scorecard.

5.2 Comparison of ACT hospitals and options

Lack of access to data prevented us reproducing the PC methods in respect of a head-to-head quality and efficiency comparison of TCH and CH. The ACT Government would have access to such data, however, and could provide this in the context of public consideration of future hospital options for the ACT.

A direct comparison would need to control for differences. For example, TCH is a teaching hospital and is likely to have higher overheads related to this function (reducing efficiency). As the regional hospital, it is likely to experience a higher acuity casemix, as well as patient mix and risk levels that could lead to higher mortality rates decreasing quality perceptions without standardisation. The HSMR, however, takes account of such casemix

⁴⁰ The PC explained what it considered a surprising corollary result that Government administered public hospitals were more cost efficient as resulting from data limitations in that area (PC, 2010, pp. 163-164).

considerations. On the other hand, TCH is nearly three times the size of CH and this scale could lead to higher efficiency compared to CH. Without data, a prognosis is purely speculative.

Although we lack access to granular data, it is possible to use aggregate data to make comparisons, while less precise. In the ACT from 2005-06 to 2008-09 there were 318,899 separations (AIHW, 2010) and 3,225 beds (ACT, 2010c). This equates to roughly 98 separations per bed. A very large hospital is considered to have over 20,001 casemix-adjusted separations per annum and large hospitals have between 10,001 and 20,000 (PC, 2010, p. 30). So, 200+ beds equates to being a large hospital (19,600+ separations). The ACT Government options were then weighted using the values of table 5.4 of the PC (2010:96-97). Option F was created in these tables to show the concept of quality and efficiency if an option was included for 400 beds placed at CH.

Table 5.1: Efficiency of options by mean

| Options | Weighted output efficiency | Weighted Input efficiency | Weighted average efficiency |
|---|----------------------------|---------------------------|-----------------------------|
| A – 50% Very Large Public, 50% Very Large Public Contracted | 91.05 | 92.35 | 91.7 |
| B – 100% Very Large Public | 91.4 | 90.1 | 90.7 |
| C – 50 % Very Large Public , 50% Large Public | 90.75 | 89.85 | 90.3 |
| D – 100% Very Large Public | 91.4 | 90.1 | 90.7 |
| E – 50% Large Public, 50% Very Large Public Contracted | 90.4 | 92.1 | 91.3 |
| F – 100% Very Large Public Contracted | 90.7 | 94.6 | 92.7 |

Table 5.2: Efficiency of options by median

| Options | Weighted Output Efficiency | Weighted Input Efficiency | Weighted Average Efficiency |
|---|----------------------------|---------------------------|-----------------------------|
| A – 50% Very Large Public, 50% Very Large Public Contracted | 91.65 | 93.2 | 92.35 |
| B – 100% Very Large Public | 92 | 91.3 | 91.4 |
| C – 50 % Very Large Public , 50% Large Public | 91.75 | 91.25 | 91.45 |
| D – 100% Very Large Public | 92 | 91.3 | 91.4 |
| E – 50% Large Public, 50% Very Large Public Contracted | 91.4 | 93.15 | 92.4 |
| F – 100% Very Large Public Contracted | 91.3 | 95.1 | 93.3 |

These scores suggest locating 400 beds at CH would create the best efficiency outcomes for the health services in the ACT. Option F would have 2% greater mean and median efficiency than Option D, the highest ranked in the tick based system in the options papers. Option E and A would also be considered more efficient than option D using the PC data.

An analysis of quality among the options is not possible with appreciable accuracy. The PC findings had such large standard deviations (Table 4.3 in the appendix) that it was inconclusive without more data.

Given the indications on efficiency, however, the risk is that the current Government Options analysis may prefer the removal of a hospital with greater efficiency and the replication of a hospital with lower efficiency.

5.3 Conclusions

When considering the use of public funds, the PC's approach – derived from its major national review of the efficiency of public and private hospitals – is considered superior to the ACT Government's tick-box approach. Applying the PC approach in the ACT suggests that the 'missing' option of locating up to 400 extra beds in CH would rank highest of the (then) six options in terms of efficiency, by 2% over Option D (and with Options E and A also performing better than Option D). This is in line with the Aurora calculations, which suggest that up to 400 extra beds at CH would be cheaper per bed than any of the ACT Government options – at around \$1.01 million per bed compared to \$1.72 million for the proposed Option D (*without land*).

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Appendix A: PC data

Table 4 Summary of estimated technical efficiency scores, by ownership and hospital size, 2003-04 to 2006-07^a

| | Very large | Large | Medium | Small | Very small | All sizes |
|---------------------------|------------|----------|----------|-------------------|------------|-------------------|
| | Per cent | Per cent | Per cent | Per cent | Per cent | Per cent |
| <i>Output-oriented</i> | | | | | | |
| Public hospitals | 91.4 | 90.1 | 89.5 | 89.7 | 87.5 | 89.1 |
| Private hospitals | 92.5 | 93.0 | 91.8 | 94.2 | 89.9 | 92.6 ^b |
| For-profit hospitals | 95.7 | 94.2 | 94.8 | 94.9 | 94.2 | 94.8 ^c |
| Not-for-profit hospitals | 87.8 | 88.1 | 77.9 | 88.0 ^g | | 85.6 |
| Public contract hospitals | 90.7 | 93.1 | np | np | np | 92.4 ^d |
| All hospital types | 91.6 | 91.4 | 90.5 | 90.8 | 87.6 | 90.0 |
| <i>Input-oriented</i> | | | | | | |
| Public hospitals | 90.1 | 89.6 | 88.5 | 88.5 | 89.0 | 89.1 |
| Private hospitals | 92.4 | 90.2 | 90.6 | 92.8 | 92.9 | 91.4 ^e |
| For-profit hospitals | 93.1 | 90.7 | 91.2 | 92.9 | 92.5 | 91.8 ^f |
| Not-for-profit hospitals | 91.2 | 88.2 | 87.9 | 92.7 ^g | | 90.2 |
| Public contract hospitals | 94.6 | 93.3 | np | np | np | 93.6 ^d |
| All hospital types | 90.8 | 90.3 | 89.5 | 89.6 | 89.1 | 89.8 |

^a Very large hospitals have 20 001 or more casemix-adjusted separations per year, Large hospitals have between 10 001 and 20 000, Medium hospitals have between 5001 and 10 000, Small hospitals have between 2001 and 5000, and Very Small hospitals have up to 2000 separations per year. ^b Statistically significantly different from public hospitals, "all sizes". ^c Statistically significantly different from public hospitals and from not-for-profit hospitals, "all sizes". ^d Statistically significantly different from other public and private hospitals, "all sizes". ^e Not statistically significantly different from public hospitals, "all sizes". ^f Not statistically significantly different from not-for-profit hospitals, "all sizes". ^g Results combined for small and very small hospitals because of ABS confidentiality concerns. np Not published due to ABS confidentiality concerns.

PC, 2010, Table 4:p 30.

Table 5.3 Technical efficiency scores by hospital ownership

| | Public | Private | | | Public contract | All hospitals |
|-----------------------------|--------|----------------|------------|------|-----------------|---------------|
| | | Not-for-profit | For-profit | All | | |
| Output-oriented | | | | | | |
| Mean | 89.1 | 85.6 | 94.8 | 92.6 | 92.4 | 90.0 |
| Median | 90.6 | 90.1 | 95.4 | 94.8 | 93.0 | 91.8 |
| 5 th percentile | 75.6 | 62.0 | 89.9 | 82.9 | 85.5 | 76.6 |
| 95 th percentile | 97.0 | 96.8 | 97.7 | 97.6 | 97.2 | 97.2 |
| Input-oriented | | | | | | |
| Mean | 89.1 | 90.2 | 91.8 | 91.4 | 93.6 | 89.8 |
| Median | 90.8 | 91.8 | 93.1 | 92.6 | 94.0 | 91.4 |
| 5 th percentile | 76.3 | 78.6 | 83.8 | 83.2 | 90.4 | 77.4 |
| 95 th percentile | 96.6 | 96.3 | 96.8 | 96.7 | 96.0 | 96.6 |
| Averaged | | | | | | |
| Mean | 89.1 | 87.9 | 93.3 | 92.0 | 93.0 | 89.9 |
| Median | 90.4 | 90.5 | 93.9 | 93.7 | 93.3 | 91.2 |
| 5 th percentile | 77.7 | 77.6 | 88.2 | 84.2 | 89.4 | 78.6 |
| 95 th percentile | 96.2 | 96.1 | 96.9 | 96.7 | 96.4 | 96.4 |
| No. observations | 1354 | 94 | 295 | 389 | 63 | 1806 |

Source: Productivity Commission calculations based on unpublished ABS and AIHW data.

PC 2010 Table 5.3 p.93.

Table 5.4 (continued)

| | <i>Public</i> | <i>Private</i> | | | <i>Public contract</i> | <i>All hospitals</i> |
|-----------------------------|---------------|-----------------------|-------------------|------------|------------------------|----------------------|
| | | <i>Not-for-profit</i> | <i>For-profit</i> | <i>All</i> | | |
| Large | | | | | | |
| Output-oriented | | | | | | |
| Mean | 90.1 | 88.1 | 94.2 | 93.0 | 93.1 | 91.4 |
| Median | 91.5 | 87.9 | 94.5 | 94.4 | 94.1 | 93.0 |
| 5 th percentile | 77.7 | 75.3 | 89.4 | 83.2 | 88.3 | 80.4 |
| 95 th percentile | 96.7 | 98.2 | 97.5 | 97.5 | 98.0 | 97.3 |
| Input-oriented | | | | | | |
| Mean | 89.6 | 88.2 | 90.7 | 90.2 | 93.3 | 90.3 |
| Median | 91.2 | 89.5 | 92.2 | 91.5 | 93.2 | 91.9 |
| 5 th percentile | 77.6 | 77.2 | 83.0 | 80.1 | 90.4 | 78.7 |
| 95 th percentile | 95.7 | 95.7 | 96.6 | 96.3 | 96.5 | 96.1 |
| Averaged | | | | | | |
| Mean | 89.8 | 88.2 | 92.5 | 91.6 | 93.2 | 90.8 |
| Median | 91.5 | 88.1 | 93.7 | 92.5 | 93.2 | 92.2 |
| 5 th percentile | 78.5 | 77.6 | 87.6 | 84.2 | 90.0 | 81.2 |
| 95 th percentile | 95.9 | 96.9 | 96.1 | 96.1 | 96.7 | 96.1 |
| No. observations | 155 | 17 | 68 | 85 | 39 | 279 |

Continued next page

Table 5.4 (continued)

| | <i>Public</i> | <i>Private</i> | | | <i>Public contract</i> | <i>All hospitals</i> |
|-----------------------------|---------------|-----------------------|-------------------|------------|------------------------|----------------------|
| | | <i>Not-for-profit</i> | <i>For-profit</i> | <i>All</i> | | |
| Very large | | | | | | |
| Output-oriented | | | | | | |
| Mean | 91.4 | 87.8 | 95.7 | 92.5 | 90.7 | 91.6 |
| Median | 92.0 | 88.3 | 96.2 | 94.9 | 91.3 | 92.6 |
| 5 th percentile | 84.1 | 76.7 | 92.4 | 78.6 | 84.6 | 83.1 |
| 95 th percentile | 96.7 | 96.2 | 97.8 | 97.7 | 95.4 | 97.0 |
| Input-oriented | | | | | | |
| Mean | 90.1 | 91.2 | 93.1 | 92.4 | 94.6 | 90.8 |
| Median | 91.3 | 91.6 | 94.2 | 93.6 | 95.1 | 92.0 |
| 5 th percentile | 79.7 | 83.8 | 83.8 | 83.8 | 88.5 | 80.6 |
| 95 th percentile | 96.5 | 96.4 | 97.2 | 96.8 | 97.3 | 96.5 |
| Averaged | | | | | | |
| Mean | 90.7 | 89.5 | 94.4 | 92.4 | 92.7 | 91.2 |
| Median | 91.4 | 90.6 | 94.8 | 93.9 | 93.3 | 91.9 |
| 5 th percentile | 83.3 | 80.6 | 88.2 | 83.8 | 87.5 | 83.7 |
| 95 th percentile | 96.2 | 94.8 | 97.2 | 96.9 | 96.1 | 96.3 |
| No. observations | 252 | 35 | 52 | 87 | 17 | 356 |

^a The small and very small size categories are aggregated for not-for-profit private hospitals due to ABS confidentiality restrictions. Therefore, the same aggregated figures are tabulated for these two categories.
 np Not available for publication due to ABS confidentiality restrictions.

Source: Productivity Commission calculations based on unpublished ABS and AIHW data.

PC 2010 Table 5.4 pp. 97-98.

Limitation of our work

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