

Segmenting and projecting public hospital patient activity and assisting the annual purchasing budget cycle - a novel approach

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Background

- ❑ *Broad challenge of projecting patient hospital activity & *Projecting health care budgets – a layer cake of assumptions! Includes:
 - Coding, Counting, National definitions vs Local interpretations.
 - How did we move forward in Tas?
- ❑ Historically budgets set on last year activity in DHHS Tas
 - Latest 12 month segment
 - Block funded
 - No prediction of next years activity
 - No assessment of last year activity in terms of variation in demand
 - Simple known last + or - known changes and policy inputs with CPI increase (rudimentary and basic)
- ❑ Would a more robust statistical approach help??? Which model is best???
How??

Background

- ❑ As a potential way forward? Over past 10 years DHHS has run a demand projections dataset (Hardes & Associates) and analyses – included:
 - age sex, resident LGH Provider, cohorts and projections up to 25 years in future
 - able to provide utilisation rates by LGA
 - 5 year increments up to 25 years forward
 - used for RHH redevelopment project and forward planning with limited success
 - potentially broad planning ability but mainly used as a basic hypothesis building tool in “What if” scenarios.
- ❑ Preliminary demand projection tool had limited usefulness
 - Not linked to any budget processes
 - Not linked to any costed information
 - Not reflected/linked to NWAU or other current Casemix cost output measures
 - In danger of being discontinued due to cost and lack of use
- ❑ So a new way forward?

A novel method

- ❑ Amalgamate the demand projection process with cost data and local budget processes
 - Link to a standard episode cost
 - Most recent reliable episode level cost data 15/16 fin year
 - Link to NWAU
 - Most recent national price weights 15/16 fin year
 - Able to link and view also at gross funding level (GWAU)
 - Requirement to alter the timeframe of projection years
 - Move from 5 yearly projections only to higher res annual projections for initial 5 years projections (then revert to 5 yearly projections)

Method: A novel method?

- ❑ Improve classification resolution of patient output types to include policy relevant classes stratified by:
 - Emergency Department, Short Stay
 - (aka Observation Medicine Units / other AMUs combined) – NHCDC/METeOR
 - Highly Specialised (Complex) Surgery
 - – NHS/Author Derived
 - Elective Surgery – METeOR
 - Multimorbidity – Author derived with broad clinician input (next)
 - Hospital Acquired Conditions – IHPA
 - Same/Multiday Admission – METeOR
- ❑ Can be further filtered by:
 - place of residence (SA2_3), Age (5 grps), DRG, SRG, ESRG, Hospital/Facility location (Pub or Private)

Method:

Refinements to basic process

- ❑ The objective was to achieve a number of refinements to demand projection process
- ❑ Conduct an estimate of activity year by year over the first five years to align with budget cycles
- ❑ Include cost and funding \$
- ❑ Linkages to Statement of Purchasing Intent items (SOPI)
 - E.g. High burden of disease cases and Highly specialised surgery
 - For this round defined by Service Related Group

Different rates of increase (Public)

| Fin Year | 2010_11 | 2011_12 | 2012_13 | 2013_14 | 2014_15 | 2015_16 | AAGR Incr. % |
|--|---------|---------|---------|---------|---------|---------|-----------------|
| ED_SSU | 3,405 | 4,136 | 7,685 | 12,647 | 15,044 | 15,410 | 38.65% |
| Elect Surg | 16,393 | 15,672 | 15,397 | 15,191 | 15,449 | 18,711 | 3.06% |
| Multi-Morb | 29,968 | 32,154 | 35,599 | 36,293 | 36,961 | 38,278 | 5.07% |
| HAC | 2,312 | 2,442 | 2,934 | 3,486 | 3,219 | 3,311 | 7.96% |
| Complex Surg | 2,464 | 2,374 | 2,488 | 2,460 | 2,715 | 2,722 | 2.13% |
| Same-Day | 67,654 | 70,805 | 80,010 | 82,271 | 85,683 | 86,276 | 5.06% |
| Multi-Day | 56,568 | 55,052 | 56,587 | 61,030 | 63,460 | 67,155 | 3.55% |
| All Unique Recorded Attendances | 124,222 | 125,857 | 136,597 | 143,301 | 149,143 | 153,431 | 4.34% |

Addition of Cost information (Public)

- ❑ To incorporate the impact of volume changes on budget, the
 - 2015-16 Actual episode cost attached to each public hospital episode in the Hardes source table (Standard cost)
 - 2016 NWAU (IHPA national price) and GWAU (unadjusted NWAU) was also attached to each episode. (Standard price)
 - Difference between the two values used as proxy for own source revenue targets
- ❑ Emergency department cost and NWAU is also linked to the Actual Admitted episode
 - Also able to be reported separately.
- ❑ These data are applied externally via an Access database Allowing a standard cost and funding price to be set and projected for budget purposes

Projected Cost Increases

| Fin Year (pt total per year) | Actual 2015_16 | 2016_17 | 2017_18 | 2018_19 | 2019_20 | 2020_21 | AAGR Incr. % |
|------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|--------------|
| ED_SSU | \$ 37,320,337 | \$ 38,903,631 | \$ 40,486,925 | \$ 42,070,219 | \$ 43,653,512 | \$ 45,236,806 | 3.92% |
| Elect_Surg | \$ 134,982,989 | \$ 139,240,342 | \$ 143,497,695 | \$ 147,755,048 | \$ 152,012,401 | \$ 156,269,754 | 2.97% |
| Multi-Morb | \$ 162,980,508 | \$ 170,276,839 | \$ 177,573,170 | \$ 184,869,501 | \$ 192,165,833 | \$ 199,462,164 | 4.12% |
| HAC | \$ 126,291,976 | \$ 131,272,285 | \$ 136,252,593 | \$ 141,232,902 | \$ 146,213,210 | \$ 151,193,518 | 3.67% |
| Complex Surg | \$ 71,119,081 | \$ 73,565,541 | \$ 76,012,001 | \$ 78,458,460 | \$ 80,904,920 | \$ 83,351,379 | 3.23% |
| Remaining Same-Day | \$ 45,066,662 | \$ 46,728,176 | \$ 48,389,690 | \$ 50,051,204 | \$ 51,712,719 | \$ 53,374,233 | 3.44% |
| Remaining Multi-Day | \$ 262,187,532 | \$ 268,621,456 | \$ 275,055,379 | \$ 281,489,303 | \$ 287,923,226 | \$ 294,357,150 | 2.34% |
| All Recorded Episodes | \$ 662,492,072 | \$ 685,845,874 | \$ 709,199,676 | \$ 732,553,477 | \$ 755,907,279 | \$ 779,261,081 | 3.30% |

Cost vs Funding by Segments

| | Cost | Fund | Difference |
|------------------|----------------|----------------|-------------------|
| Complex Surgery | \$ 56,791,187 | \$ 55,617,359 | \$ (1,173,827) |
| Multimorbid | \$ 83,222,766 | \$ 80,839,870 | \$ (2,382,897) |
| Complex + Mmorb | \$ 14,065,884 | \$ 13,601,522 | \$ (464,362) |
| ED_SSU combined | \$ 38,162,775 | \$ 51,459,782 | \$ 13,297,007 |
| Overnight others | \$ 278,820,489 | \$ 284,769,566 | \$ 5,949,077 |
| SD Others | \$ 73,655,895 | \$ 62,597,706 | \$ (11,058,189) |
| total_IP | \$ 544,718,997 | \$ 548,885,806 | \$ 4,166,809 |

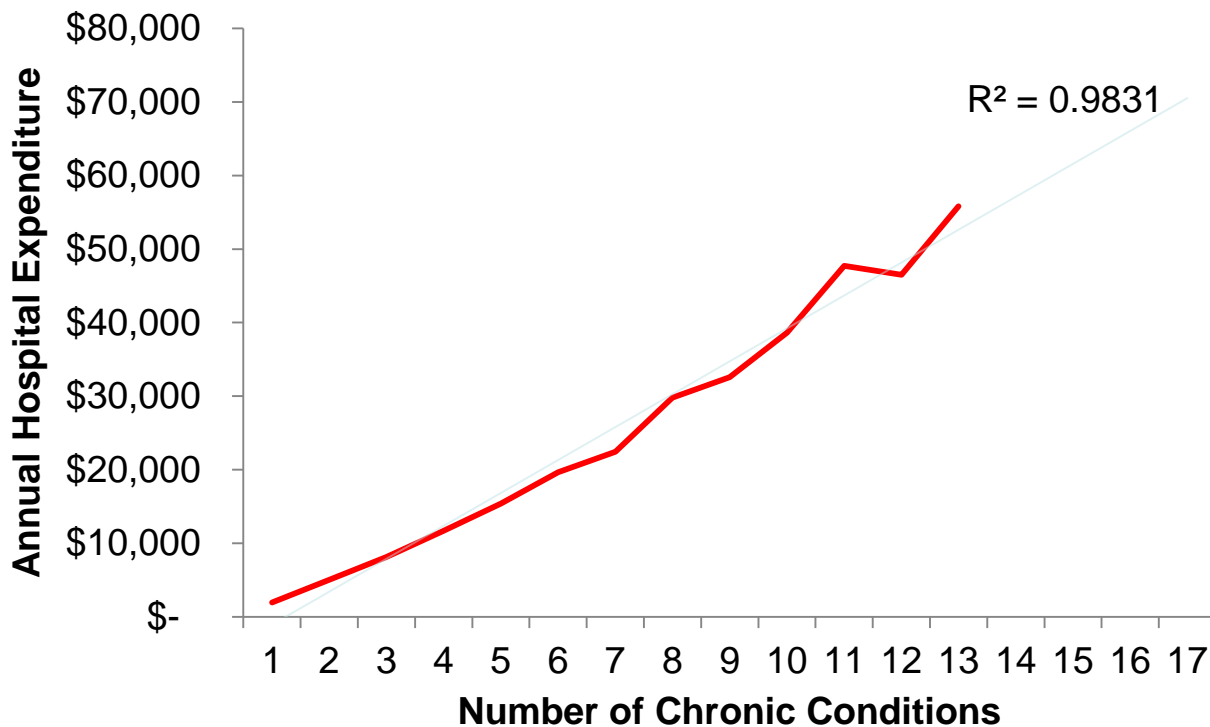
Multimorbid Patients

- ❑ Patients with 6+ chronic conditions
 - Highly conservative definition
 - Also examined a continuum
- ❑ Have more episodes in a year per person
- ❑ Longer episode length for each
- ❑ Are relatively underfunded by NWAU/GWAU models
- ❑ Volume is relatively stable
- ❑ Multimorbid activity volume is likely inevitable up to medium term
- ❑ Should be a target of health improvement
- ❑ Has high risk of HAC

The Impact of Chronic Conditions

| | 6+ chronic conditions | <6 chronic conditions |
|----------------------|------------------------------|---------------------------------|
| Persons | 3,904 | 50,608 |
| Episodes | 18,096 | 93,603 |
| Epi days | 61,100 | 238,512 |
| Average LOS | 3.4 | 2.5 |
| Epis /person | 4.6 | 1.8 |
| Days /person | 15.7 | 4.7 |
| HAC / Episode | 5.0% | 2.6% |
| HAC / Person | 23.2% | 4.8% |

The more Chronic conditions a person has the more they cost in a year



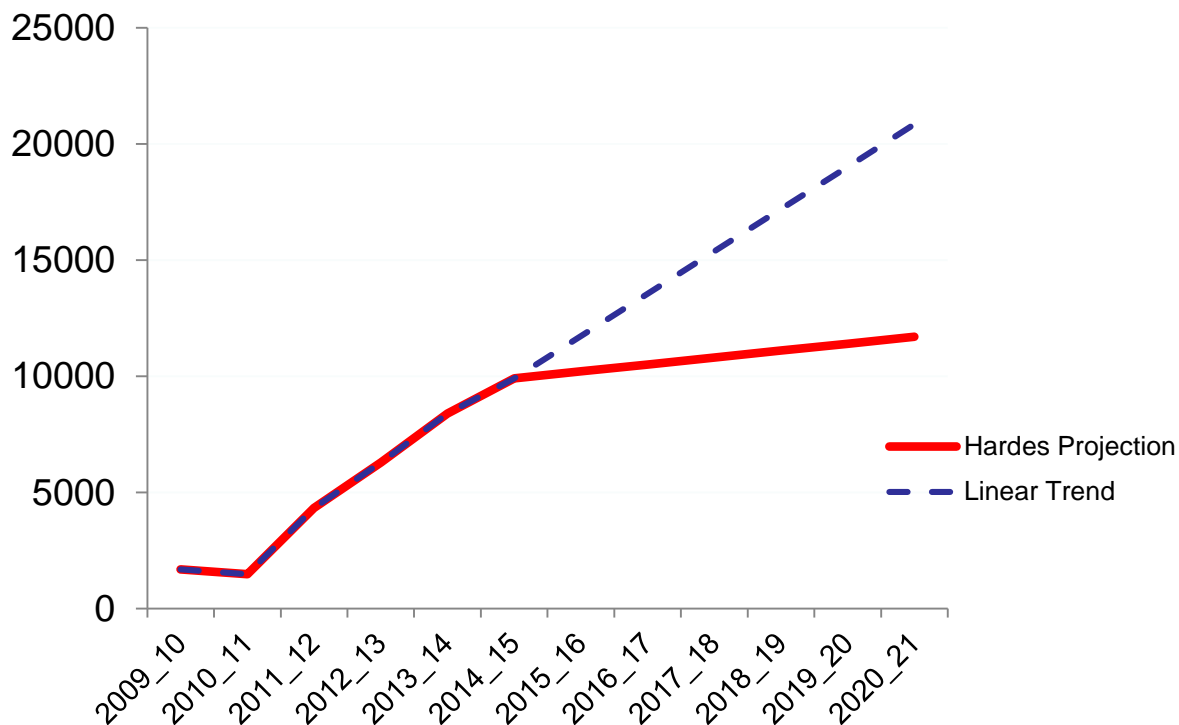
Data: Tas 2014-15 Cost data

Emergency dept. Short Stay Episodes

- ❑ Increasing rapidly – but now plateaued off
- ❑ ? increase due to change in choice to admit in some cases – e.g. stable chest pain patients awaiting clearing troponin result
 - Boundary between ED and Episode seems to be a bit variable – identified as a risk earlier in the NHRA process
- ❑ However in some ways a better care mode
- ❑ 2 funding parts – ED and Episode
- ❑ The part ED is often underfunded
- ❑ Episode part is overfunded
- ❑ Overall overfunded – therefore some incentive
- ❑ Another incentive to admit as IP – if the ED admitted does not have a companion episode, then episode goes to Error URG

Projections of Activity increase

Short Stay unit Admitted Episodes



ED and Short Stay components Cost vs Funding

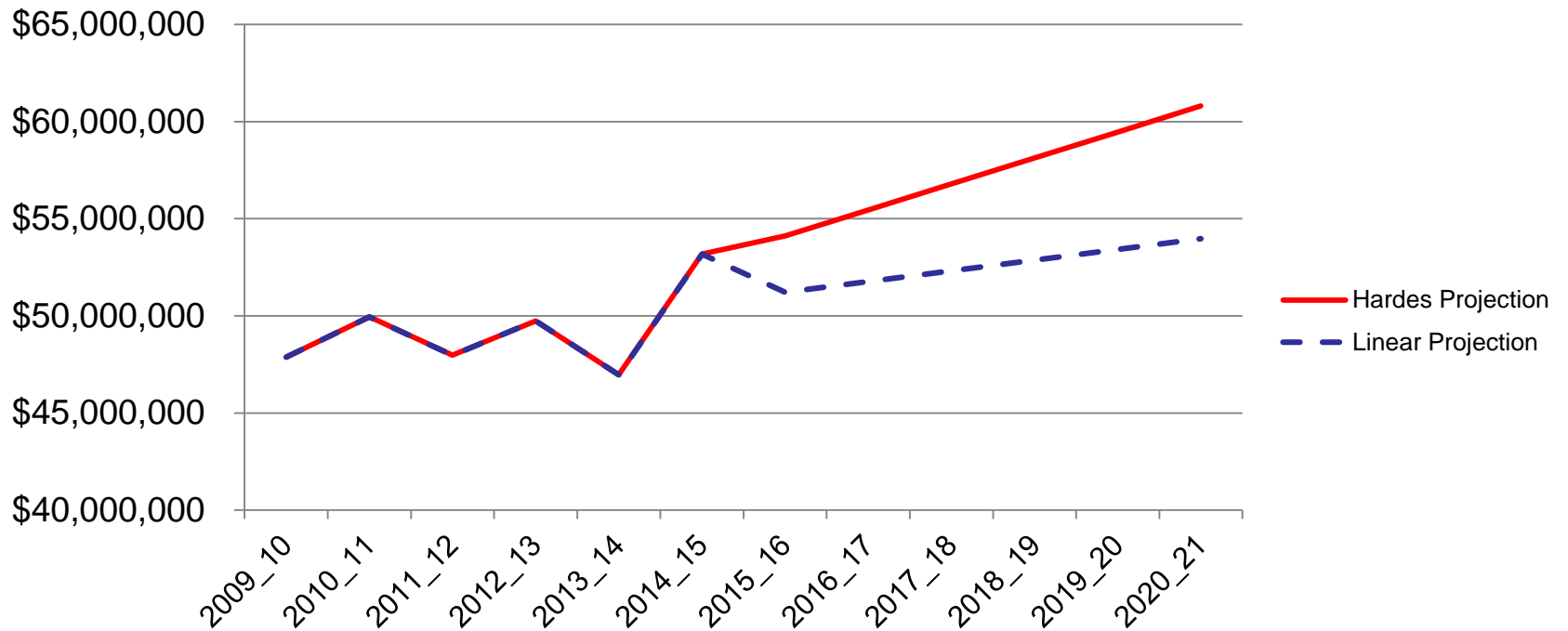
| ED and Short Stay Unit 2015-16 | Cost | Funding GWAU |
|-----------------------------------|---------------|---------------|
| ED part | \$ 13,215,946 | \$ 10,808,161 |
| Episode part | \$ 35,998,623 | \$ 48,412,019 |
| Combined | \$ 49,214,569 | \$ 59,220,180 |

Complex Surgery

- ❑ List of 740 ICD procedures based on highly specialised surgery
 - E.g. Cardiac Surgery, Spinal Surgery, Neurosurgery, Upper GI surgery, Complex Orthopedics, Bariatric surgery
 - These are often “Tertiary” activity
- ❑ Requires specialised centres and support structures
 - Service capability framework
- ❑ Access across the entire system is important
 - Examination of service provision indicates that this has been achieved
- ❑ Volume is relatively stable
- ❑ Slightly underfunded in National Efficient Price Models (NWAU/GWAU)
- ❑ Very Substantial risk of Hospital Acquired Conditions

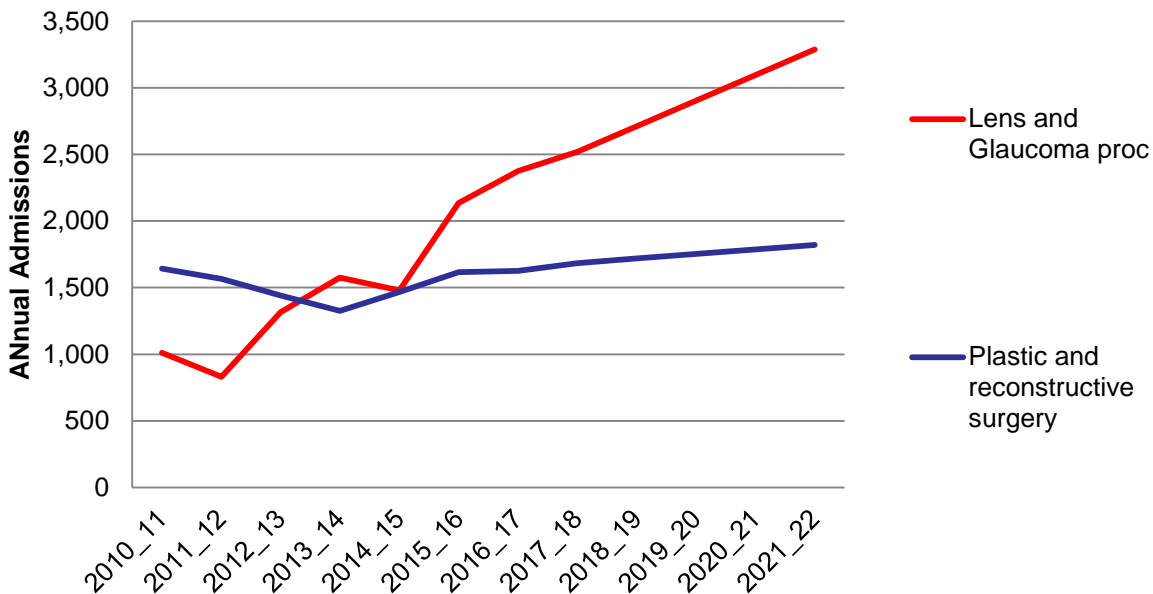
Complex Surgery

Projected expenditure - Complex Surgery



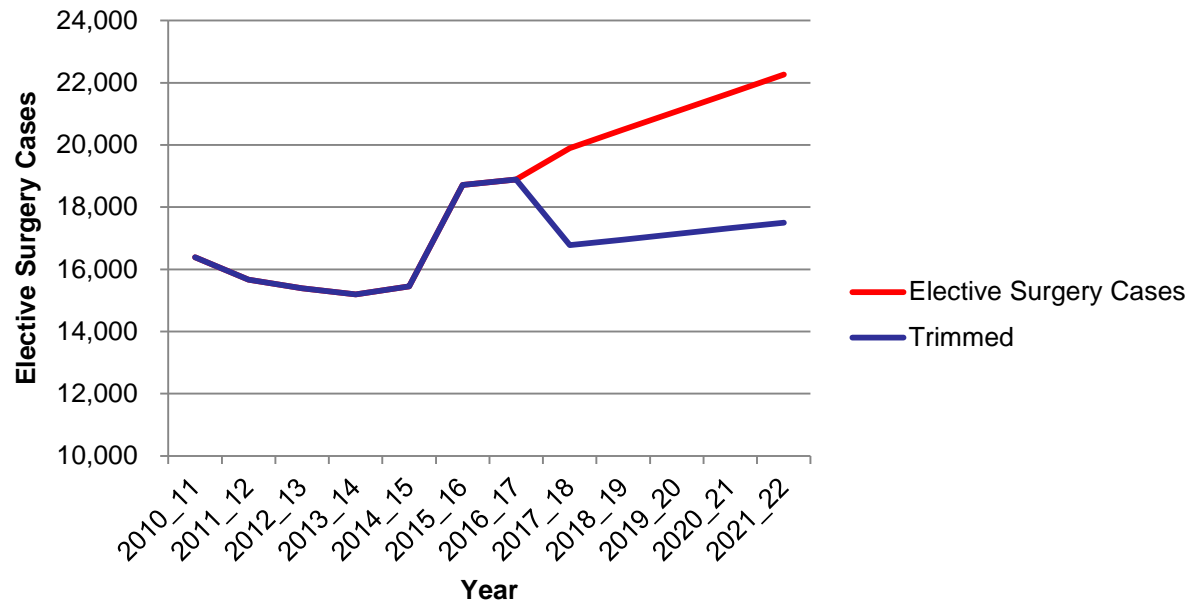
Elective Surgery: different rates of increase by surgery type

Annual Increase Variation



Elective Surgery overall

Adjusting Elective Surgery Projections



So how did we go?

❑ Initial version 2017-18 Budget

- Based on 2015 cost year data
- Projected activity and cost from 2016 on
- 2016 actual vs projected examined
 - Projection shown to be reliable

❑ Budget approved and implemented

- Currently initial development for 2018-19 Budget
- Based on 2016 Actual cost data
- Projections from 2017 on

Questions?