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Clinical Variation in Common Surgical Procedures in Australia: Implications for Health Expenditure

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Abstract: Introduction: Payments for surgical procedures through the Australian Medical Benefits Scheme (MBS) have a large effect on health budgets. We sought to evaluate the magnitude of surgical variation in five common surgical procedures: endometrial ablation; tonsillectomy in children; laparoscopic herniorraphy; cholecystectomy; and, knee arthroscopy. Methods: The MBS funds only a proportion of treatment costs affecting the potential affordability of surgery according to socio-economic factors. We hypothesised that lower rates of unemployment, higher average weekly earnings, a higher proportion of the population with private health insurance, and a higher percentage of the population in higher socio-economic brackets would be associated with a higher uptake of the procedures. Since surgery is more likely to be accessible in capital cities or larger regional centres, we also hypothesised that geographical isolation would be associated with lower access to surgical procedures. The relationship between surgical uptake and socio-economic factors was examined using linear regression and double bootstrap was used for statistical inference in an assumption-lean regression setting. Conclusion: We identified clinical variation in four of the five procedures studied. This variation was not associated with affordability or geographical access factors.

Keywords: Clinical Variation, Expenditure, Population, Budget, Regression

1. Introduction

Health expenditure in Australia has increased by almost 50% over the last 25 years, from 6.5% of gross domestic product (GDP) in 1989-90 to 9.7% of GDP in 2013-14: this reflects a change in spending from $50.3 billion to $154.6 billion in real terms [1]. The rate of growth in health spending exceeds both population growth and that of the broader economy, in real terms increasing from $2969 per person in 1989-90 to $6637 per person (123.5%) in 2013-14 [1]. Growth in health expenditure has also exceeded population ageing—with the ratio of total spending to the size of the population aged 65 and over increasing by 69%. These changes highlight that government spending on health is driven by other factors in addition to demographics. People of all ages are "seeing doctors more often, having more tests, treatments and operations, and taking more prescription drugs" [2].

In Australia, 68% of all health expenditure is funded by governments and over the last 25 years the overall ratio of government health expenditure to taxation revenue increased from 15.7% to 24.1%. [1] Increases in health spending in Australia mirror those of other similar countries, with the 9.7% of GDP spent on health in Australia in 2013–14 close to the Organisation for Economic Cooperation and Development (OECD) average of 9.2%. It is no surprise, then, that governments of many advanced economies are expressing concern about the fiscal sustainability of their health systems [3, 4]. Although increases in health expenditure are considered a 'superior good' in economic terms, and spending on superior goods tends to rise with income, a large gap has opened between the change in health expenditure and overall

economic growth [5].

The Australian MBS provides almost universal access to government subsidised health services, accounting for about one third of Commonwealth Government health spending and almost 5% of Australian Governments' total expenditure, over $20 billion in 2014-15 [6]. MBS spending increased by 2.3% per year over the past two decades, and at present 17% of spending through the MBS is for surgery and treatment. Surgery and surgical procedures have a large effect on health budgets as they are demand driven, making it difficult for governments to control expenditure [3]. For each MBS payment made for a surgical operation, there is usually an associated payment for an anaesthetist, and in many cases a payment to a surgical assistant as well. The majority of surgical procedures generate associated payments for pathology services and, through the Pharmaceutical Benefits Scheme (PBS), payments for medications such as antibiotics and analgesics. Surgery may also contribute to payments for treatment of operative complications. More broadly, when patients undergo surgical procedures, there is reduced productivity both for the patient and for carers. As well, surgical procedures commonly have associated costs to either public hospitals or private health insurers, for disposable items (such as harmonic scalpels) or implantables (such a hip replacement prostheses).

It is obvious that treating health problems that reduce individuals' productivity will be beneficial to the economy, and there is employment and economic activity associated with the health sector in general and surgery in particular. However, treatment that is potentially *unnecessary* may have an adverse effect on the economy and this effect has not been thoroughly investigated.

In Australia, government expenditure on health is affected by the volume of services provided and the price paid for those services through the MBS. To slow increases in expenditure, then, governments would need to control the volume of unnecessary health services: the difficulty, however, lies in determining which services and operations are *necessary* and which are *unnecessary*. In Australia, decision-making on what constitutes a necessary procedure or operation is usually left to health professionals [3]. Leaving such decisions to doctors might seem like the prudent thing to do, yet there is evidence that doctors themselves may face uncertainty in decision-making about surgery. Kennedy and colleagues, writing in the *Medical Journal of Australia*, argued that clinical practice may be idiosyncratic [7]. This situation is not unique to Australia and has been recognised across the developed world [8, 9].

Because it can be difficult for doctors and surgeons to agree on the best treatment or operation for their patients, the uptake and use of procedures and operations tend to vary. This phenomenon is well-recognised and is termed 'clinical variation'. A practical definition of clinical variation used by Kennedy [7] in the *Medical Journal of Australia* is:

> "Patients with similar diagnoses, prognoses and demographic states receive different levels of care depending on when, where, and by whom they are treated, despite agreed and documented evidence of best practice."

The Australian Commission on Quality and Safety in Healthcare has developed and published an 'atlas of variation' in 2016, examining a number of key treatments and procedures in different areas of Australia [10]. Since surgery and surgical procedures exert an influence on health expenditure and productivity in general, identification of potentially unnecessary operations might have a beneficial economic effect.

2. Methods

We selected five commonly-performed surgical procedures: endometrial ablation; tonsillectomy in children and adults; laparoscopic herniorraphy in men; cholecystectomy; and, arthroscopic knee surgery. The justification and background to selection is presented in Box 1. Some of these procedures feature in the national reporting of hospital waiting lists [11].

Because of health funding through Medicare Australia ('Medicare'), all Australian citizens and permanent residents are eligible for a financial rebate for non-cosmetic surgical procedures. It is important to note that there is no difference in the eligibility of patients to receive funding from Medicare Australia between any states in Australia. To ascertain the number of procedures funded through Medicare we obtained data from the MBS statistical database for the calendar years 2011 to 2014 inclusive. These data were classified by age band and gender of the patient, and by the state of residence of the claimant. We excluded data from the Northern Territory and the Australian Capital Territory due to the very small numbers of procedures. The MBS item numbers selected for study are shown in Table 1. To provide a denominator for calculation of incidence rates we obtained the point estimates of the relevant population of each age group and gender in each state and territory from the Australian Bureau of Statistics (ABS) for each year of the study.

Table 1. *Procedures for study: MBS item numbers and abbreviated descriptions, with rebate payable from the MBS; volume (number) of procedures performed in 2014.*

MBS item number	Procedure description	Rebate	Volume
41789	Tonsillectomy (child under 15)	$221.80	20 367
35616	Endometrial ablation	$337.20	4479
30609	Laparoscopic herniorraphy (male)	$348.40	15277
30445	Laparoscopic cholecystectomy	$554.55	20 587
49557		$204.75	696
49558		$204.75	1023
49559		$306.55	139
49560	Arthroscopic knee procedures	$413.70	3360
49561		$505.50	43497
49562		$551.65	3812
49563		$597.55	1247

The MBS funds a proportion, but not necessarily all, of the cost of treatments so for many patients there will be out-of-pocket ('gap') costs for surgery. Gap costs will affect the affordability of surgery for patients, and patients' ability or willingness to pay is likely to vary according to socio-economic factors. We considered four proxy indicators for the economic ability to pay the gap costs for surgery: (1) state-level unemployment rate; (2) average weekly total earnings per person; (3) the proportion of the population with private health insurance; and, (4) the percentage of the population in the top 20% of Socio-Economic Indexes for Areas (SEIFA). SEIFA is a product developed by the ABS that ranks areas according to relative socioeconomic advantage and disadvantage. SEIFA ranks and summarises aspects of the socioeconomic conditions of people living in certain areas. The four indices used to create SEIFA are the indices of Relative Socioeconomic Disadvantage, Relative Socioeconomic Advantage and Disadvantage, Economic Resources and Education and Occupation. Details can be found at the ABS website (www.abs.gov.au/websitedbs/censushome.nsf/home/seifa).

Considering the impact on the gap cost affordability we hypothesised that lower rates of unemployment, higher average weekly earnings, a higher proportion of the population with private health insurance, and a higher percentage of the population in the top 20% SEIFA would be associated with a higher uptake of the procedures.

The other factor that could potentially influence uptake of surgical procedures is accessibility: surgery is likely to be more accessible in capital cities or larger regional centres where most major hospitals are located. We considered relative accessibility by using two factors: the percentage of the population residing outside of capital city and significant urban areas ('geographic isolation'), and averaged each state population density per square-kilometre. We hypothesised that a higher percentage of the population living outside of capital city and significant urban areas and a lower population density would translate into lower access to surgical procedures. The socio-economic data were calculated from the relevant ABS datasets: ABS 6202.0 - *Labour Force, Australia* [12]; ABS 6302.0 - *Average Weekly Earnings, Australia* [13]; ABS 3101.0 - *Australian Demographic Statistics* [14]; ABS 3218.0 - *Regional Population Growth* [15]; the Private Health Insurance Administration Council annual coverage report [16]; and, a customised dataset obtained from the ABS.

Data were extracted to Excel™ spreadsheets and statistical analysis was performed in GenStat and R. The association of each of the socio-economic factors was examined separately using linear regression. Due to the challenging nature of the data with small size, no guarantee could be placed on the satisfactoriness of the linearity and homoscedasticity assumption of the linear regression, and in turn, the inference from the standard linear model theory was deemed invalid. Double bootstrap provided solution to the valid statistical inference for the best linear approximation of the association between the incidence rate of procedures and the socio-economic factors in an assumption-lean regression setting. R package '*perccal*' was used to produce the 95% calibrated double bootstrap confidence intervals [17, 18]. This study received prospective approval from the Australian National University Human Research Ethics Committee (protocol 2015/347).

Box 1 Characteristics of MBS procedures selected for study.

- Tonsillectomy in children under 15 years of age

This was the first example of clinical variation identified in the world literature [31]. Systematic review suggest that the procedure is of uncertain value for many children, with little or no data regarding long term value [32].

- Laparoscopic hernia repair in men

Hernias may be repaired either by an open incision, or using a minimal access (keyhole) laparoscopic approach. A systematic review concluded that there is uncertainty about the merits of each approach: "There is no apparent difference in recurrence between laparoscopic and open mesh methods of hernia repair. The data suggests less persisting pain and numbness following laparoscopic repair. Return to usual activities is faster. However, operation times are longer and there appears to be a higher risk of serious complication rate in respect of visceral (especially bladder) and vascular injuries."[33]

- Laparoscopic cholecystectomy

Gallstones are a common problem (affecting between 5% and 22% of adults), and removing the gallbladder is an established treatment. The minimal access (keyhole) approach has been widely adopted, however a small incision approach is considered equal regarding patient-relevant outcomes (mortality, complications, hospital stay, and convalescence). Operative time seems to be quicker and costs seem to be lower using the small-incision technique. Reviews of evidence have unable to find any arguments supporting the 'gold standard' status of laparoscopic cholecystectomy. [34]

- Endometrial ablation for heavy menstrual periods

Heavy menstrual bleeding (HMB) is a common health problem in women, associated with reduced quality of life and anaemia. The traditional treatment has been hysterectomy (removal of the uterus), but endometrial ablation offers an alternative to hysterectomy. Both procedures are effective, and satisfaction rates are high. The initial cost of endometrial ablation is significantly lower than that of hysterectomy. [35]

- Arthroscopic procedures for the knee

Knee pain is common, and arthroscopic (keyhole) operations on the knee have been identified as procedures of high clinical variation in Australia. Systematic review suggests that, "the small inconsequential benefit seen from interventions that include arthroscopy for the degenerative knee is limited in time and absent at one to two years after surgery. Knee arthroscopy is associated with harms. Taken together, these findings do not support the practice of arthroscopic surgery for middle aged or older patients with knee pain with or without signs of osteoarthritis."[36]

3. Results

The focus of this research was twofold: to discuss the historical trend of the five commonly-performed procedures in Australia across time; and, to examine association between state-level socio-economic affordability and accessibility and the incidence rates of these procedures. Figures 1-8 show the historic volumes of procedures per 1000 population from 2011 to 2014. In summary, while most of the procedures maintained a stable *per capita* rate over the span of the study period, there were marked variations between states and procedures. The majority of socio-economic factors were found not to associate with the incidence rates of the surgical procedures, however accessibility factors were significant for some procedures from the regression analysis (Table 2). In the following section, each procedure is discussed in detail separately.

Endometrial Ablation: NSW and Victoria had the lowest incidence rate per 1000 population for endometrial ablation for women (Figure 1). In 2011 South Australia had almost one and half times the incidence rate of NSW and Victoria, but the rate dropped in 2013. Western Australia experienced a surge in endometrial ablation procedures in 2013. Geographic accessibility was more relevant to the variations in endometrial ablation procedures as both population density and geographic isolation showed significant association with the procedure. Top 20% SEIFA showed a significantly negative effect, however it was heavily weighted by the low incidence rate of the procedure and the high percentage of top 20% SEIFA in NSW.

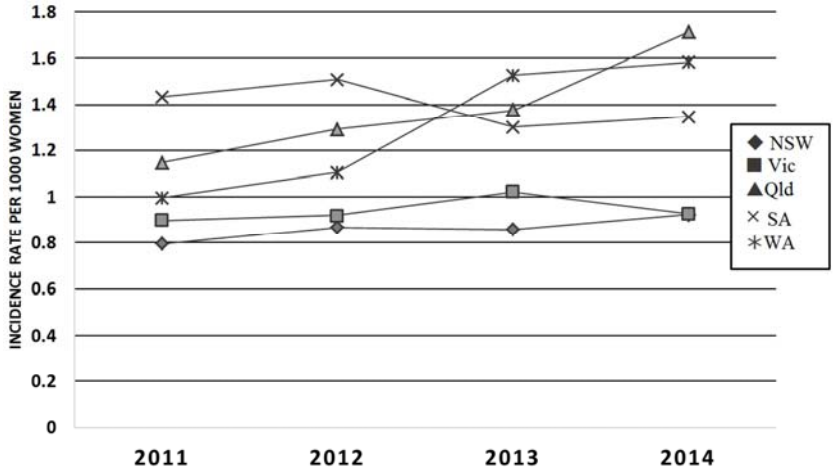

Figure 1. *Age-stratified incidence rate of endometrial ablation in women aged 35 to 54 years in Australia (procedures per 1000 women per year), 2011 to 2014 inclusive.*

Tonsillectomy in Children: The incidence rate of tonsillectomy procedures remained stable within states for both boys and girls over the study period, with the lowest incidence rate in Victoria and the highest rate in Western Australia, which also showed a slight increase in over the study period (Figures 2 and 3). The directional association between socio-economic factors were consistent for both genders. Total earnings was positively associated with the uptake of the tonsillectomy procedures for boys. Population density had a negative association with the tonsillectomy incidence rates for both girls and boys.

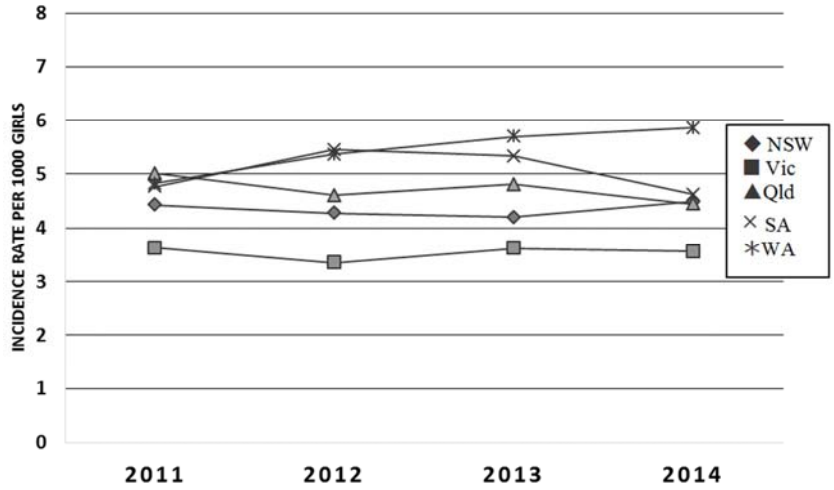

Figure 2. *Age-stratified incidence rate of tonsillectomy in girls aged one to 14 years in Australia (procedures per 1000 girls per year), 2011 to 2014 inclusive.*

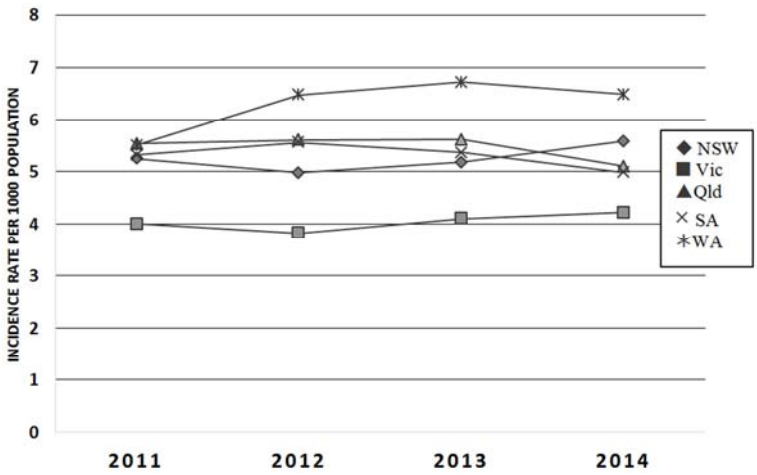

Figure 3. *Incidence rate of tonsillectomy in boys aged one to 14 years in Australia (procedures per 1000 boys per year), 2011 to 14 inclusive.*

Laparoscopic Hernia Repair: Despite the overall state variation, the *per capita* rates of laparoscopic hernia repair in men remained consistent within states across the study period with a slight decrease in South Australia (Figure 4). The incidence rate of laparoscopic hernia repair procedures in men aged 35 to 64 years showed no association with any socio-economic affordability or accessibility.

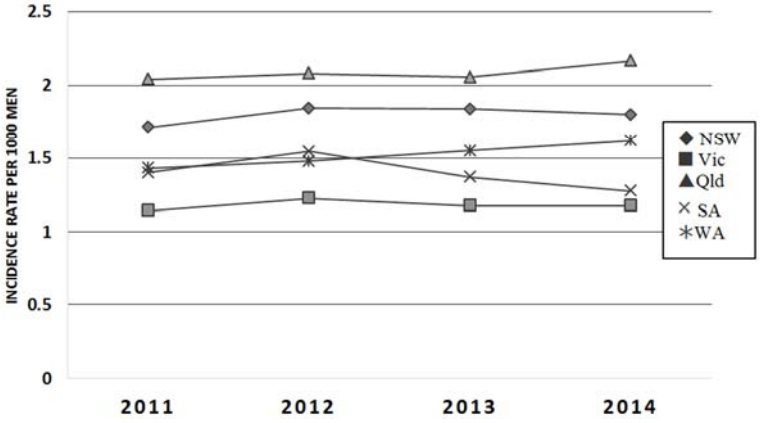

Figure 4. *Age-stratified incidence rate of laparoscopic hernia repair in men aged 35 to 64 years in Australia (procedures per 1000 men per year), 2011 to 2014 inclusive.*

Laparoscopic Cholecystectomy in Adults: Laparoscopic cholecystectomy in adults showed unique features comparing to other commonly-performed procedures (Figures 5 and 6). The key differences were the negligible variation between states and gender variation with higher rate of procedures in women. There was no particular trend for this procedure with a slight hint of an increased rate for both genders in Western Australia. Neither the socio-economic affordability nor the accessibility factors were relevant to laparoscopic cholecystectomy procedures.

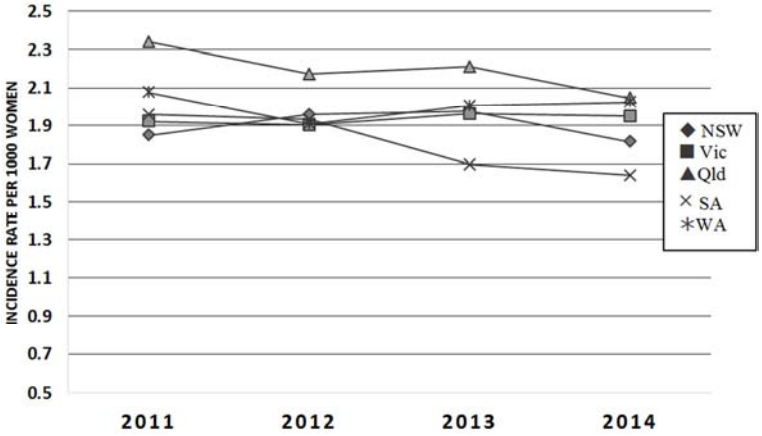

Figure 5. *Incidence rate of laparoscopic cholecystectomy in women aged 35 to 64 years in Australia (procedures per 1000 women per year), 2011 to 2014 inclusive.*

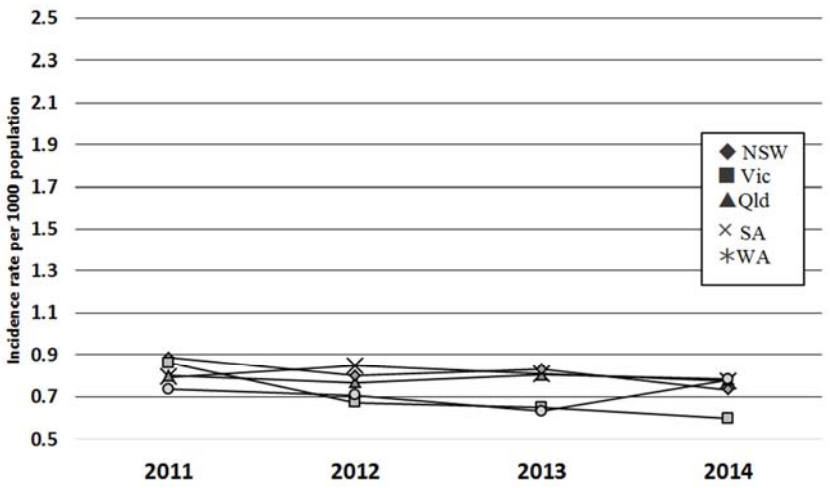

Figure 6. *Incidence rate of laparoscopic cholecystectomy in men aged 35 to 64 years in Australia (procedures per 1000 population per year), 2011 to 14 inclusive.*

Knee Arthroscopic Surgical Procedures: An increase for knee arthroscopic procedures in men was observed in 2012 in all states, yet the *per capita* rate remained stable for women (Figures 7 and 8). South Australia had significant higher incidence rates for knee arthroscopic procedures in both men and women, while other states showed similar *per capita* volume. Top 20% SEIFA showed a significant association with the incidence rate for both genders. Private health insurance was negatively associated with the *per capita* rate in males due to the influence from the high incidence rate and the low private health insurance rate in South Australia. Geographic isolation is another factor which was significant for both genders.

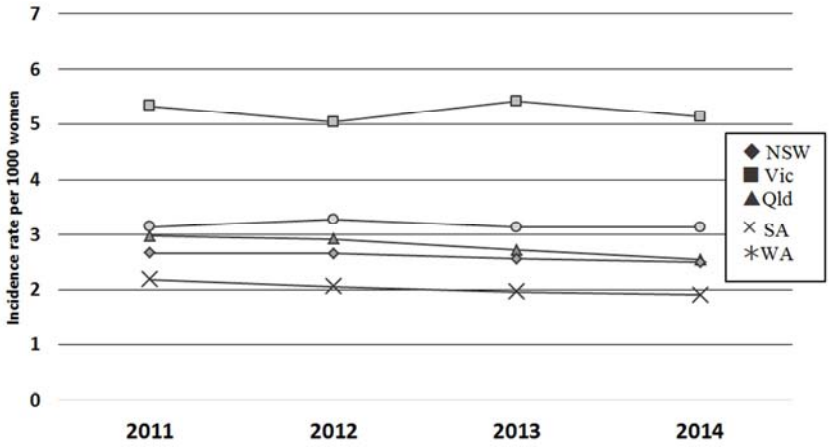

Figure 7. *Age-stratified incidence rate of arthroscopic surgical procedures on the knee in women aged 25 to 64 years in Australia (procedures per 1000 women per year), 2011 to 2014 inclusive.*

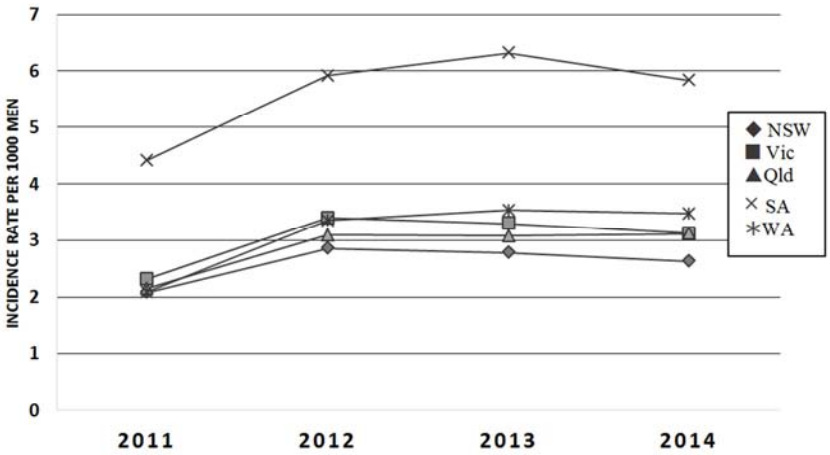

Figure 8. *Age-stratified incidence rate of arthroscopic surgical procedures on the knee in men aged 25 to 64 years in Australia (procedures per 1000 men per year), 2011 to 2014 inclusive.*

4. Discussion

This study has demonstrated apparent clinical variation in four of the five high-volume surgical procedures selected for study over the four-year study period 2011 to 2014 inclusive, and this variation was not associated with factors related to affordability or geographical access. The 11 MBS item numbers selected for the study represent less than 0.2% of the approximately 6000 item numbers in the MBS, and if similar variation is present across all item numbers then this would represent a large amount of health expenditure.

Clinical variation is becoming a well-recognised phenomenon and avoiding surgery that might not benefit patients makes both clinical and economic sense. Surgical procedures represent 17% of all expenditure within the MBS and the rebate paid to the surgeon is only a proportion of all costs associated with surgery. Of course, variation in the use of surgical procedures does not in itself mean procedures are unnecessary, but identification of higher-variation procedures may allow selection of operations for more detailed analysis. According to Hollingsworth and colleagues [19]:

> "The large and persistent variation brought to light by the publication of documents such as The *NHS Atlas of Variation in Healthcare* and international equivalents suggests that some variation reflects more than simple differences in population health need. It is possible that high variation in practice may help policy-makers identify existing health care where [health technology reassessment] is needed and partial disinvestment might be appropriate."

Where procedures are found to have lower levels of variance it is possible that development of clinical guidance might assist in decision-making and appropriate use [19]. Procedures of very high clinic variation could potentially offer little clinical value, prompting review for disinvestment. It is important also to recognise the effect of patient demand for surgery, and that the development of high-quality patient information can assist doctors in dealing with requests from patients for potentially low-value procedures.

Table 2. *Regression estimation and 95% calibrated double bootstrap confidence intervals of the effect of socio-economic affordability and accessibility factors on a given surgical procedure.*

Endometrial ablation in women aged 35 to 54 years			
	estimate	s.e.	95% CI
Total earnings	0.0003	0.0007	(-0.0017, 0.0016)
Unemployment rates	-0.036	0.11	(-0.226, 0.381)
Private health insurance	-0.0072	0.014	(-0.081, 0.025)
Top 20% SEIFA	-0.0638	0.0201	(-0.010, -0.037)*
Population density	-0.0188	0.0055	(-0.073, -0.0098)*
Geographical isolation	0.0579	0.0156	(0.035, 0.083)*
Tonsillectomy in girls aged 1 to 14 years			
	estimate	s.e.	95% CI
Total earnings	0.0038	0.0016	(-0.001, 0.007)
Unemployment rates	-0.51	0.263	(-0.941, 0.496)
Private health insurance	0.0435	0.0361	(-0.076, 0.146)
Top 20% SEIFA	-0.0942	0.0758	(-1.081, 0.019)
Population density	-0.0669	0.0095	(-0.128, -0.052)*
Geographical isolation	0.115	0.0495	(-0.013, 0.188)
Tonsillectomy in boys aged 1 to 14 years			
	estimate	s.e.	95% CI
Total earnings	0.0055	0.0015	(0.002, 0.008)*
Unemployment rates	-0.776	0.255	(-1.184, 0.127)
Private health insurance	0.0833	0.0358	(-0.104, 0.164)
Top 20% SEIFA	-0.0501	0.0905	(-0.878, 0.052)
Population density	-0.0713	0.0116	(-0.088, -0.055)*
Geographical isolation	0.0945	0.0589	(-0.057, 0.209)
Laparoscopic hernia repair in man aged 35 to 64 years			
	estimate	s.e.	95% CI
Total earnings	0.0004	0.0009	(-0.001, 0.002)
Unemployment rates	0.003	0.135	(-0.247, 0.305)
Private health insurance	0.0037	0.0174	(-0.021, 0.059)
Top 20% SEIFA	0.0495	0.0331	(0.020, 0.437)*
Population density	-0.0186	0.0077	(-0.031, 0.048)
Geographical isolation	0.0537	0.0227	(-0.015, 0.100)

*indicates the significance at 95% confidence level

Table 2. *Continued*

Laparoscopic cholecystectomy in women aged 35 to 64 years			
	estimate	s.e.	95% CI
Total earnings	0.0004	0.0004	(-0.0001, 0.0009)
Unemployment rates	-0.029	0.0626	(-0.198, 0.100)
Private health insurance	0.0072	0.0079	(-0.027, 0.028)
Top 20% SEIFA	-0.0042	0.0176	(-0.047, 0.278)
Population density	-0.0026	0.0042	(-0.009, 0.005)
Geographical isolation	0.0097	0.0121	(-0.023, 0.036)
Laparoscopic cholecystectomy in men aged 35 to 64 years			
	estimate	s.e.	95% CI
Total earnings	-0.0001	0.0002	(-0.0006, 0.0004)
Unemployment rates	0.0171	0.0287	(-0.071, 0.085)
Private health insurance	0.0001	0.0038	(-0.012, 0.018)
Top 20% SEIFA	0.0122	0.0072	(-0.007, 0.118)
Population density	0.0024	0.0018	(-0.001, 0.006)
Geographical isolation	-0.0038	0.0056	(-0.016, 0.005)
Arthroscopic surgical procedures on the knee in women aged 25 to 64 years			
	estimate	s.e.	95% CI
Total earnings	-0.0034	0.0029	(-0.013, 0.002)
Unemployment rates	0.378	0.454	(-0.489, 1.938)
Private health insurance	-0.113	0.0522	(-0.375, 0.063)
Top 20% SEIFA	-0.2859	0.0969	(-1.260, -0.120)*
Population density	-0.0429	0.0291	(-0.194, -0.005)*
Geographical isolation	0.1746	0.0794	(0.021, 0.382)*
Arthroscopic surgical procedures on the knee in men aged 25 to 64 years			
	estimate	s.e.	95% CI
Total earnings	-0.0048	0.0028	(-0.019, 0.001)
Unemployment rates	0.584	0.447	(-0.317, 2.099)
Private health insurance	-0.1397	0.0489	(-0.463, -0.001)*
Top 20% SEIFA	-0.224	0.113	(-1.681, -0.054)*
Population density	-0.0394	0.03	(-0.165, 0.001)
Geographical isolation	0.1828	0.0799	(0.034, 0.438)*

* indicates the significance at 95% confidence level

Disinvestment in very high variation procedures has the potential not only to reduce unnecessary risk to patients but

also to ease pressure on health expenditure. The way new medical treatments and operations become part of accepted medical practice is well understood, yet very little is known about how operations fall out of favour and are discontinued [19]. In a review of 400 studies on the topic, Greenhalgh and colleagues [20] were able to identify only a single paper that dealt with discontinuance and disinvestment in medical procedures. Disinvestment in health care has been defined as the process of partially or completely 'withdrawing health resources from any existing health care practices, procedures, technologies or pharmaceuticals that are deemed to deliver little or no health gain for their cost [21]. As with other economic phenomena, there is likely path dependency or lock-in. It is rare for disinvestment in operations to occur suddenly – in general, the process occurs gradually. However, disinvestment is important as it allows health policy-makers an opportunity to redistribute resources in other areas where it might be possible to achieve greater improvements in health care [19].

A study of managers in the British National Health Service (NHS), undertaken in the mid-1990s, reported that among the barriers to uptake of economic evaluation of operations and treatments included a mistrust in the validity of economic evaluations [22]. A decade later, a similar review found little had changed: Eddama and colleagues concluded that there were numerous obstacles to disinvestment – political, cultural, and methodological – and that the lack of cost-effectiveness evaluations of established and new operations made it very difficult to inform decision-making [23]. Their review also reported that political objectives, such as targeting hospital waiting lists as occurs in Australia, commonly had the unintended adverse consequence of diverting attention from disinvestment activities. In Australia, public hospital waiting lists are close to a political obsession with annual reports provided by the Australian Institute of Health and Welfare [11], and associated commentaries such as the *Hospital Report Card* published by the Australian Medical Association [24].

Five key challenges to health care disinvestment have been identified [25]:

a) A lack of resources that can support disinvestment policy mechanisms.

b) A lack of methods allowing identification and prioritisation of operations with uncertain cost-effectiveness.

c) Resistance to changes in established medical practices, including political, clinical, and social barriers.

d) A paucity of information about the effectiveness and cost-effectiveness of many existing operations and treatments.

e) Poor funding of research into disinvestment mechanisms.

Hollingworth and colleagues [19] also commented that exclusion of surgeons from the decision-making process tended to threaten the sense of collaboration, and with collaboration difficulties came the potential for 'turbulence in implementing disinvestment decisions.' When they interviewed health service managers in the United Kingdom they found that:

> "A theme that recurred throughout…[was] the frequently expressed concern of public and media outcry… Cutting back in healthcare is undeniably an unpalatable subject… [and] perceived barriers to disinvestment were all based on the contentious issue of reducing or removing health care."

They concluded that:

> "Disinvestment… is fraught with difficulties, owing to a lack of tools and capacity to engage in the complex decision-making process. Implementation of disinvestment decisions would benefit from greater inclusion of provider groups. This will require promotion of a shared dialogue, and greater transparency in the process of identifying and negotiating opportunities for disinvestment."

A particular problem for dealing with healthcare costs through disinvestment has been "fairness and transparency in identifying and prioritising suboptimal health care practices for consideration" [26]. While disinvestment in procedures with little clinical value for patients is a difficult process, developing and disseminating clinical practice guidelines (CPGs) that assist surgeons in the selection of the correct operation, if required at all, for the patient is likely to be more acceptable. CPGs are statements developed to assist practitioner and patient decisions about the appropriateness of health care in specific clinical circumstances. CPGs are intended to improve healthcare quality not only at an individual patient level, but by influencing the policies that promote efficient allocation of resources [27]. However there are also challenges in popularizing CPGs among clinicians. Farquhar and colleagues [28] undertook a comprehensive review of doctors' views of CPGs, and found that:

> "It is widely perceived that CPGs are not popular with clinicians. CPGs have been variously described as anti-intellectual, standardising practice around the average, prevention discretion in individual cases, cost-cutting, limiting innovation and clinical freedom and encouraging litigation."

In their review, Farquhar and colleagues [28] reported that nearly half of all respondents considered that CPGs increased the chances of litigation or disciplinary action, and the reported concerns on questioning the motivation of the CPGS of being "reducing healthcare costs". However, to date there is actually little published evidence that introduction of CPGs actually reduces costs despite their intuitive potential [29, 30].

5. Conclusions

The MBS contains approximately 6000 items, when pharmaceuticals are excluded, yet it has been estimated that as few as 3% of all of these have been formally assessed against contemporary evidence [6]. At present a review of the MBS is underway and although there may be some changes made to the schedule, the review is not resourced to evaluate the evidence of costs and benefits for every procedure. However, these considerations are important not only in Australia but internationally. Health expenditure comprises a significant portion of all governments' budgets

in Australia and is expected to be the main source of budgetary pressure over the next 50 years. For this reason, "limited resources mean that nations cannot escape having to make difficult health care choices. Identifying and reducing the use of low-value care is becoming a priority for an increasing number of jurisdictions."[26]

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