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For Better Health

Surgical Variance Report
Orthopaedic procedures

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Introduction to Surgical Variance Report

The Royal Australasian College of Surgeons' (RACS) vision is to champion surgical standards, professionalism and surgical education in Australia and New Zealand. It is committed to advocating for sustainable, safe, affordable and high quality healthcare that represents best practice.

Similarly, Medibank, Australia's leading private health insurer, is focussed on improving the health outcomes of patients, improving patient experiences, and improving efficiencies in the health system.

Currently, there is limited available information to surgeons on indicators such as the median length of patient stay, rates of readmission or admission to an intensive care unit (ICU), and prices charged for services, for different procedures within their speciality, and particularly in the private sector.

However, such information would enable surgeons to gain a better understanding of variations, and consider how their practice could be improved for the benefit of patients.

RACS and Medibank are pleased to publish this Surgical Variance Report, which analyses a number of clinical and other indicators for common procedures within orthopaedic surgery. This report has been prepared in consultation with the Clinical Variation Working Party, which includes Dr Lawrence Malisano (Orthopaedic Surgeon, QLD), Mr Simon Williams (Orthopaedic Surgeon, VIC) and Mr Richard Lander (Orthopaedic Surgeon, NZ).

This is the fifth in a series of reports, on common procedures within surgical specialities, including general surgery, urology, ear, nose and throat surgery, vascular surgery and orthopaedic surgery.

The data contained in these reports are based on analysis of de-identified Medibank claims data from 2014, which the College has analysed and interpreted. The reports deliberately pose questions that every clinician can reasonably ask about the possible reasons for the variations, and consider individual answers.

RACS and Medibank will continue to work together to identify opportunities to improve and enhance these reports so that they are as meaningful and useful as possible to surgeons, and we welcome everyone's feedback and comments.

The data contained in these reports do not define best practice, however it is hoped that by highlighting variation in practice, we will be able to improve clinical outcomes and patient care.



Professor David Watters OBE
Chair, Clinical Variation Working Party



Dr Linda Swan
Chief Medical Officer Medibank

Foreword

Data collected as part of a healthcare episode contains important insights about ways to improve care, achieve better outcomes and make care more efficient. However, there is a substantial challenge in bringing this information to light. The data is inherently complex and there is a shortage of individuals with the skills to extract intelligence from it.

The collaboration between the Royal Australasian College of Surgeons and Medibank combines the perspective of specialty experts with the skills of a data custodian. The value of this collaboration is well illustrated by the high quality information that has been derived. The dataset is large, comprising approximately 25% of the separations that occurred in private hospitals in 2014 for the procedures considered.

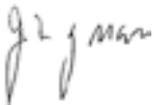
The prime purpose of the analysis is to explore variation in surgical practice and to raise questions that will allow clinicians and others to reflect on aspects of medical practice. It has been demonstrated many times that if information of this type is fed back to clinicians it often leads to greater uniformity of practice. Often the data comes as a revelation to those receiving it.

Studies of variation have become a very important part of healthcare analysis. It is frequently a sign of an evidence gap, but may also point to inefficiency or variation in outcomes. In many cases, it is the flag that initiates further more detailed analyses leading to changed practice.

Some aspects of the present report illustrate limitations typical of all large health datasets. For example, could reported variation infection rates have been influenced by variation in definitions and recording? Are readmission rates influenced by the distinction between planned and unplanned readmissions or whether the readmission was for a complication or an entirely different problem? Similarly, duration of admission is often dependent on comorbidities or social factors. So it is important that data like this is not used to reach simplistic conclusions, but should stimulate more detailed investigation.

Credible data is a powerful motivator of clinician behaviour. When convincing evidence is presented that outcomes could be better or safety improved, it is rarely ignored. One of the biggest problems at present is how little data of this type is routinely available.

For these reasons, this initiative is a welcome advance and a credit to both organisations involved in its production.



Prof. John McNeil, AM, MBBS, MSc, PhD, FRACP, FAFPHM

Professor and Head, Department of Epidemiology & Preventive Medicine, School of Public Health and Preventive Medicine, Faculty of Medicine, Nursing and Health Sciences, Monash University

Data used in this report

The data contained in this report is based on administrative claims data received by Medibank from private hospitals, for treatment of holders of Medibank-branded (but not ahm-branded) policies. The data relates to hospital separations with an admission date falling in 2014 (calendar year) and any follow-up hospital separations funded by Medibank within six months of discharge. The data comprises:

- Hospital claims data submitted to Medibank by private hospitals and used by Medibank to assess and pay benefits relating to hospital treatment on behalf of members. Hospital claims data includes details relating to the use of, amount charged and benefits paid for hospital accommodation, intensive care and prostheses provided in connection with treatment in hospital
- Hospital casemix protocol (HCP) data submitted to Medibank by private hospitals for each privately insured hospital separation, as required by legislation. HCP data includes details relating to diagnoses, interventions, demographics and financial data in connection with policy holders' treatment in hospital
- Medicare Benefit Schedule (MBS) claims data from medical practitioners, including diagnostic providers, submitted to Medibank by Medicare, medical practitioners or members, which is used by Medibank to assess and pay benefits for medical and diagnostic services provided to policy holders in relation to their hospital treatment. MBS claims data includes details relating to the use of MBS item numbers by medical practitioners as well as the amount charged, benefits paid and out of pocket costs incurred by policy holders for each MBS item claimed.

Data relating to individual surgeons and physicians have been identified using the Medicare provider number on the MBS claim, with activity aggregated and summarised across all practice locations relating to that provider number. A principal surgeon has been identified for each hospital separation based on the surgeon claiming the highest value MBS item schedule fee relating to a surgical procedure for that hospital separation.

The indicators included in this report for each procedure have been selected by RACS, having regard to the limitations of Medibank's datasets, and in consultation with the Clinical Variation Working Party, which comprises a panel of specialty experts (see page 26 for membership).

Surgeon-level analysis of the indicators included in this report has been limited to surgeons who performed at least five procedures. This has been done to ensure that each surgeon has a sufficient sample of separations to allow a value (e.g. an average, median or percentage) against an indicator to be reported. State and territory values have only been published where five or more specialists were included in the dataset, to protect the anonymity of surgeons in those areas. Medibank has not shared any information with RACS which would enable RACS to identify surgeons and only de-identified data is contained in this report.

Outliers at a separation-level and surgeon-level have been included in the analysis, although data points for some outlying surgeons are not shown in the figures.

No attempts have been made to risk adjust the data.

Disclaimer

The purpose of this report is to provide information to surgeons that highlights variation in surgical practice and encourages surgeons to reflect on their own practice and potential causes of the variation, with a view to supporting the continuous improvement of clinical outcomes and patient care.

It is important to recognise that:

- while Medibank has taken reasonable steps to ensure the accuracy and validity of the data, the report relies on the accuracy of information prepared and provided by hospitals, medical practitioners and policy holders;
- the data used for the purposes of this report relates to a specific time period (being calendar year 2014 and part of calendar year 2015);
- no adjustment has been made to the data based on casemix, patient risk or any other factor that may be taken into account when considering the data and any variation;
- the report identifies specialists by MBS provider stems, which in some limited cases may result in one individual being identified more than once;
- the report is not intended to, and is not a basis for, an assessment of relative or actual performance of specialists;
- the report does not contain any qualitative commentary or analysis; and
- the report may not reflect results of the wider private hospital sector or the health industry as a whole.

Indicators measured in this report

A selection of the indicators described below have been analysed for each of the procedures included in this report.

Indicator	Explanation
Median age of patients	The median age of a surgeon's patients at the time of discharge.
Median length of stay (nights)	The median number of nights that a surgeon's patients stayed in hospital.
Percentage of patients that stayed in hospital overnight	Separations where the patient stayed in hospital overnight, expressed as a percentage of a surgeon's total separations for that procedure.
Percentage of separations where the patient was transferred to ICU	Separations where patients were transferred to an intensive care unit (ICU), expressed as a percentage of a surgeon's total separations for that procedure.
Rate of Hospital Acquired Complications per 1,000 separations	Separations where a Hospital Acquired Complication was identified, expressed as a rate per 1000 separations of a surgeon's total separations for that procedure. Hospital Acquired Complications are Medibank's subset of 82 International Classification of Diseases (ICD) codes drawn from the Australian Commission of Safety and Quality in Healthcare's high priority complications dataset (see Table 27). They are selected on the basis that they occur frequently in private hospitals (relative to other complications) and are likely to result in increased costs.
Percentage of patients transferred to inpatient rehabilitation	Separations where patients were transferred to inpatient rehabilitation within one day of discharge from the acute separation, expressed as a percentage of a surgeon's total separations for that procedure.
Percentage of patients readmitted within 30 days	Separations where patients were readmitted to the same or a different hospital within 30 days of discharge from the original separation, expressed as a percentage of a surgeon's total separations for that procedure. Readmissions for all-causes except for readmissions for rehabilitation, psychiatric treatment, dialysis and chemotherapy, were included. Separations involving a patient 80 years or older were excluded from this analysis.
Percentage of patients re-operated on within six months	Separations where patients were re-operated on for the same procedure (meaning any one of the MBS codes included in the analysis for that procedure) within 6 months of discharge from the original separation, expressed as a percentage of a surgeon's total separations for that procedure.
Average number of MBS items billed	The total number of MBS items billed by a surgeon, expressed as an average number of MBS items billed per separation for a surgeon.
Average prostheses cost	The total of all charges relating to prostheses items (including consumables) for a hospital separation, expressed as an average prostheses cost per separation for a surgeon.
Average separation cost	The total of all charges relating to the hospital separation, expressed as an average cost per separation for a surgeon. Includes all charges raised by the hospital, medical practitioners, diagnostic providers and for prostheses items.
Average surgeon out of pocket charge	The patient out of pocket charge from the principal surgeon. Expressed as an average out of pocket charge per separation for a surgeon.
Average out of pocket charge for other medical services	The patient out of pocket charge for all other medical services (including charges from the anaesthetist, assistant surgeon and for diagnostics). Expressed as an average out of pocket charge for other medical services per separation, for a surgeon.

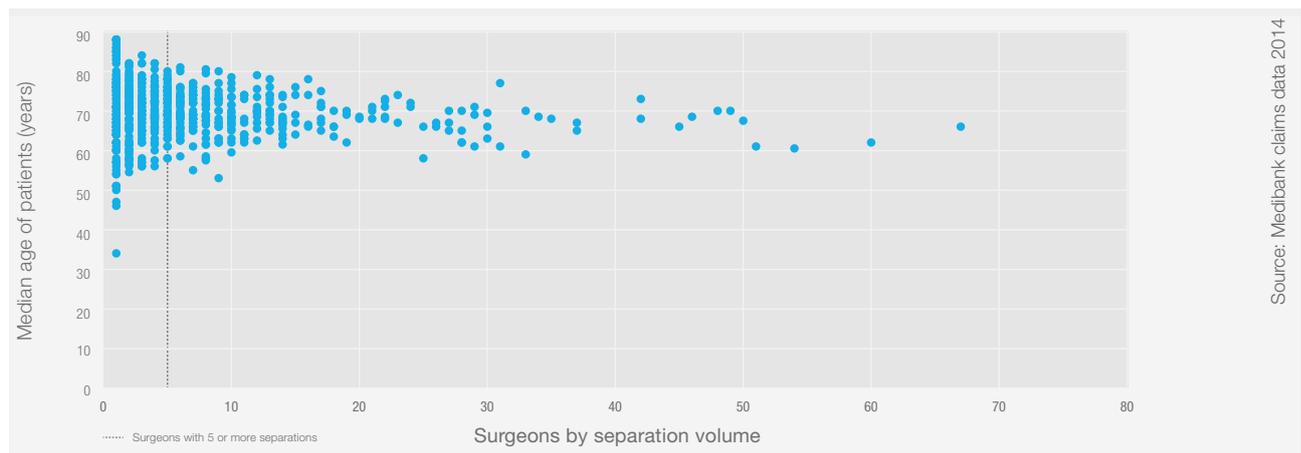
Hip replacement procedures

In 2014 Medibank funded 4,423 operations in private hospitals where a hip replacement was recorded as the principal procedure (highest value MBS fee from the medical claim) for the hospital admission. This analysis is limited to those 4,423 procedures. 561 surgeons (identified through the stem of their Medicare provider number) billed Medibank for those procedures. 299 (53%) of these surgeons billed Medibank for five or more hip replacement procedures during 2014. Surgeon-level analysis of the indicators considered for this procedure has been limited to those surgeons with five or more patient separations, so that each surgeon has a sufficient sample of separations from which a value (e.g. an average, median or percentage) for an indicator can be reported.

Table 1: MBS codes included in this analysis

Procedure	MBS Codes	Volume of separations	Percentage of separations	Definition
Hip replacement procedures	49318	3620	82%	Hip, total replacement arthroplasty of, including minor bone grafting (Anaes.) (Assist.)
	49321	803	18%	Hip, total replacement arthroplasty of, including major bone grafting, including obtaining of graft (Anaes.) (Assist.)

Figure 1: Median age of patients



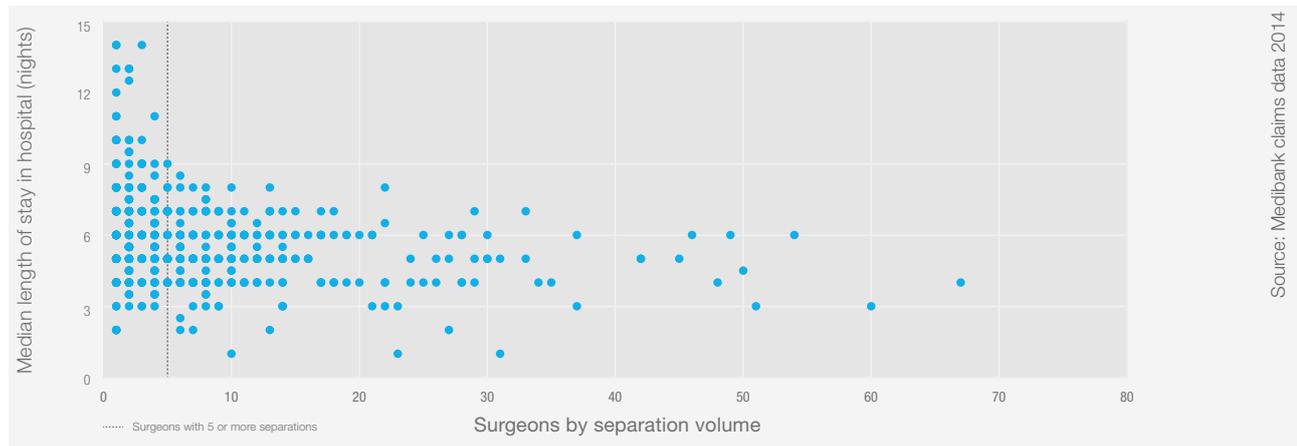
Across all separations the median patient age was 69 years.

For the 299 surgeons who performed at least five procedures:

- The median patient age of a surgeon ranged between 53 years and 81 years.

Is this variation in age clinically expected?

Figure 2: Median length of stay in hospital (nights)



Source: Medibank claims data 2014

For the 299 surgeons who performed at least five procedures:

- The median number of nights that a surgeon’s patients stayed in hospital ranged between 1 night and 9 nights with a median of 5 nights.

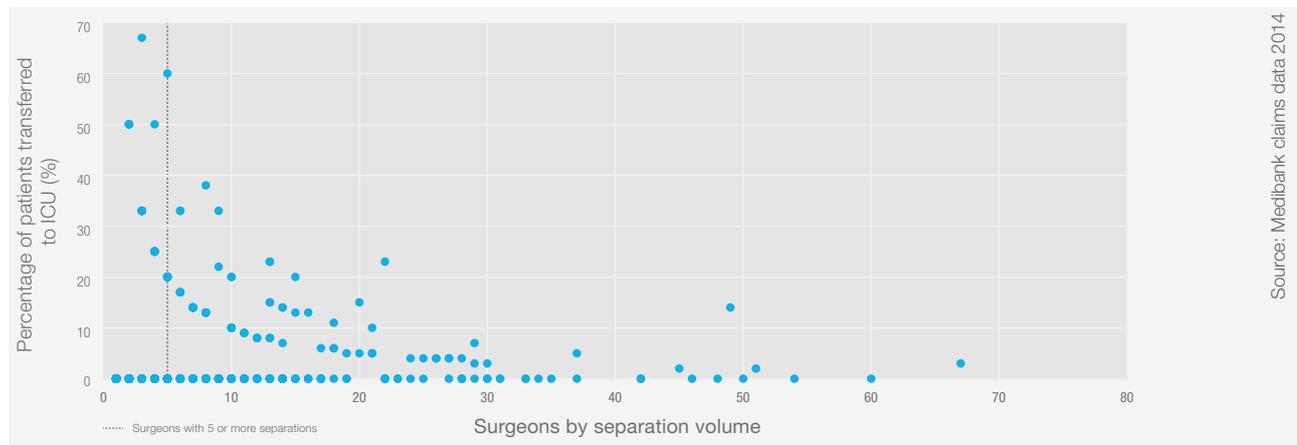
Table 2: Median patient length of stay (nights) by state/territory

	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Length of stay	5.00	5.00	NA*	5.00	6.00	4.00	6.00	5.00

*State/territory values not shown where dataset contains less than five surgeons to protect anonymity

***What would you consider the most effective length of stay for this procedure?
Does the availability of inpatient rehabilitation affect the length of stay?***

Figure 3: Percentage of patients transferred to ICU



Source: Medibank claims data 2014

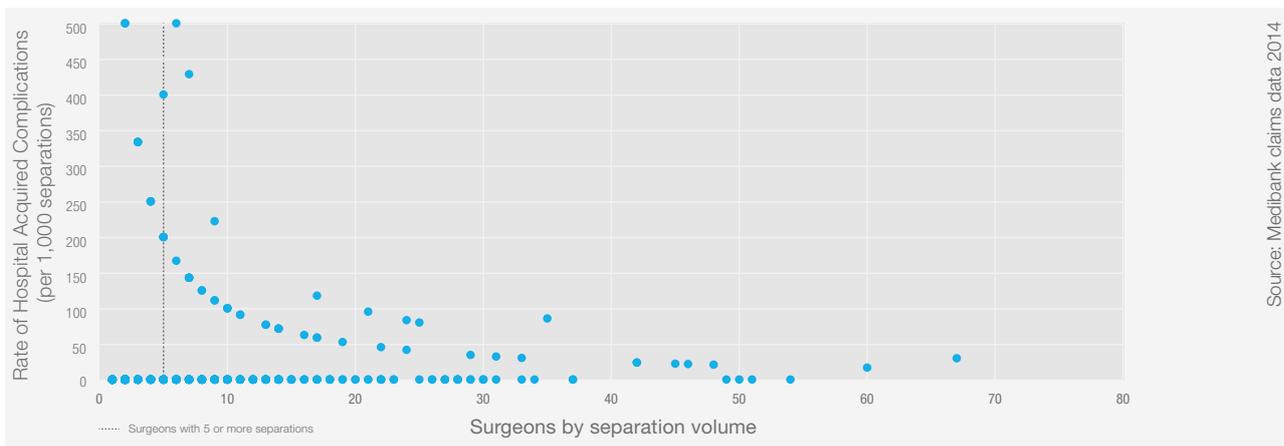
Across the total sample of 4,423 hospital separations, patients were transferred to an intensive care unit (ICU) during 154 hospital separations (3%). Administrative claims data does not indicate whether the transfers were planned or unplanned.

For the 299 surgeons who performed at least five procedures:

- 84 (28%) surgeons had one or more patient separations during which patients were transferred to ICU
- The percentage of a surgeon’s patients that were transferred to ICU ranged between 0% and 60% with a median of 0%.

Given that ICU transfers could indicate a difficult post-operative recovery, what would be the expected transfer rate?

Figure 4: Rate of Hospital Acquired Complications (per 1,000 separations)



Hospital Acquired Complications are a Medibank subset of 82 International Classification of Diseases (ICD) codes drawn from the Australian Commission of Safety and Quality in Health Care’s list of high priority complications (see Table 3).

The rate of Hospital Acquired Complications was 16 per 1,000 hospital separations.

For the 299 surgeons who performed at least five procedures:

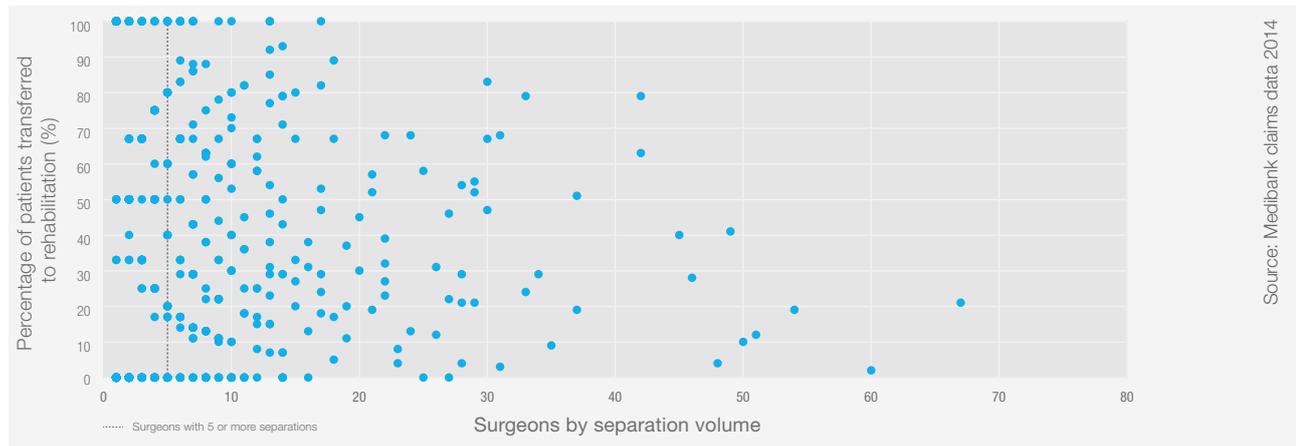
- 48 (16%) surgeons had one or more patient separations during which a Hospital Acquired Complication was identified
- The rate of Hospital Acquired Complications for a surgeon ranged between 0 per 1,000 separations to 500 per 1,000 separations with a median of 0 per 1,000 separations.

Table 3: Hospital Acquired Complications identified during the hospital separation

Complication description	Number recorded
Haemorrhage and haematoma complicating a procedure, not elsewhere classified	47
Sepsis following a procedure	2
Infection and inflammatory reaction due to other cardiac and vascular devices, implants and grafts	2
Infection and inflammatory reaction due to prosthetic device, implant and graft in urinary system	1
Infection and inflammatory reaction due to internal joint prosthesis	4
Wound infection following a procedure	8
Vascular complications following infusion, transfusion and therapeutic injection	1
Accidental puncture and laceration during a procedure, not elsewhere classified	4
Disruption of operation wound, not elsewhere classified	4
Pulmonary embolism without mention of acute cor pulmonale	1
Total	74

What complications have you had for this procedure?

Figure 5: Percentage of patients transferred to rehabilitation



Source: Medibank claims data 2014

Across the total sample of 4,423 hospital separations, patients were transferred to inpatient rehabilitation following 1,623 hospital separations (37%).

For the 299 surgeons who performed at least five procedures:

- 51 (17%) had no patients referred to inpatient rehabilitation
- 229 (77%) surgeons had one or more patients referred to inpatient rehabilitation
- 19 (6%) had all of their patients referred to inpatient rehabilitation
- The percentage of a surgeon's patients that were transferred to rehabilitation ranged between 0% and 100% with a median of 29%.

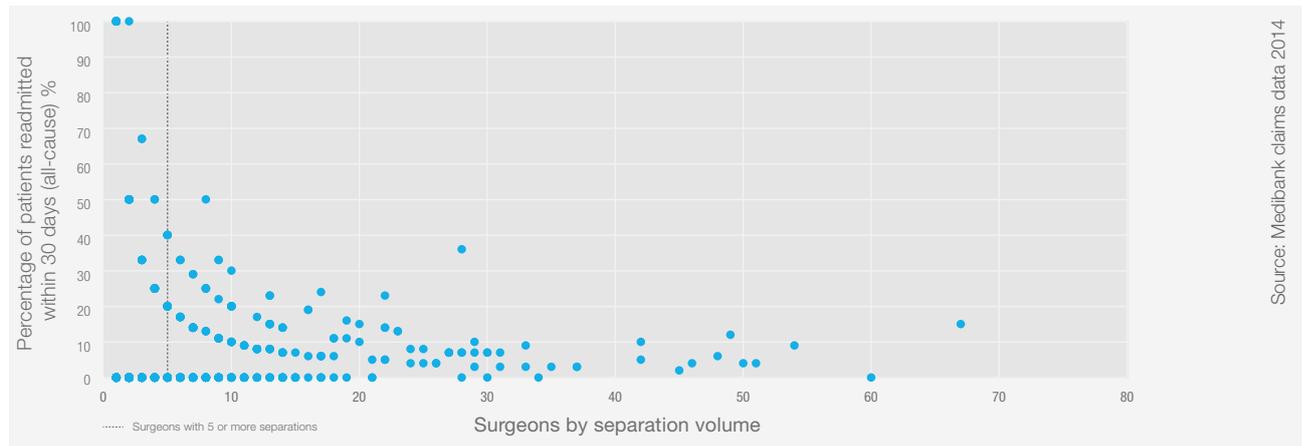
Table 4: Percentage of patients transferred to rehabilitation by state/territory

Category	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Transfer rate	35%	53%	NA*	27%	34%	4%	47%	14%

*State/territory values not shown where dataset contains less than five surgeons to protect anonymity

***What would be the expected transfer rate to rehabilitation?
Which factors contribute to the use of inpatient rehabilitation?***

Figure 6: Percentage of patients readmitted within 30 days



In 258 (7%) of the hospital separations patients were readmitted (for all causes*) to a hospital within 30 days. Administrative claims data does not indicate whether the readmissions were planned or unplanned. The median age of patients readmitted was 70 years, compared with a median age of 67 years for those patients not readmitted. For the 258 readmissions:

- 199 readmissions were to a private hospital (the same one or a different hospital). In 38 of these separations at least one Hospital Acquired Complication was identified (see Table 5 below)
- 59 readmissions were to a public hospital (where the patient was treated as a private patient).

For the 299 surgeons who performed at least five procedures, the percentage of a surgeon’s patients readmitted within 30 days ranged between 0% and 50% with a median of 0%.

Readmissions to public hospitals, where patients were treated as public patients, are not captured in these datasets.

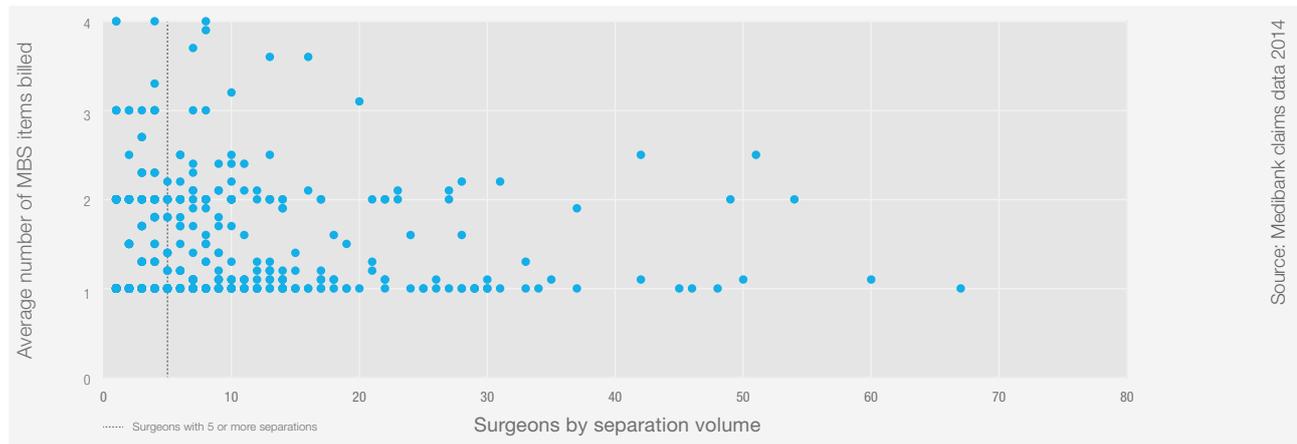
* Readmissions for rehabilitation, psychiatric treatment, dialysis and chemotherapy were excluded where identified. Separations involving a patient 80 years or older were also excluded.

Table 5: Hospital Acquired Complications identified on readmission

Category	Falls	Infection	Surgical complication	Total
Number recorded	1	27	14	42

What are the reasons for readmission for this procedure, and what is the expected rate?

Figure 7: Average number of MBS items billed



Source: Medibank claims data 2014

The average number of MBS items billed by the surgeon (the principal surgeon only) was 1.4 per hospital separation.

Of the 299 surgeons who performed five or more procedures, the average number of MBS items billed by a surgeon ranged between 1.0 and 4.0 with a median of 1.1.

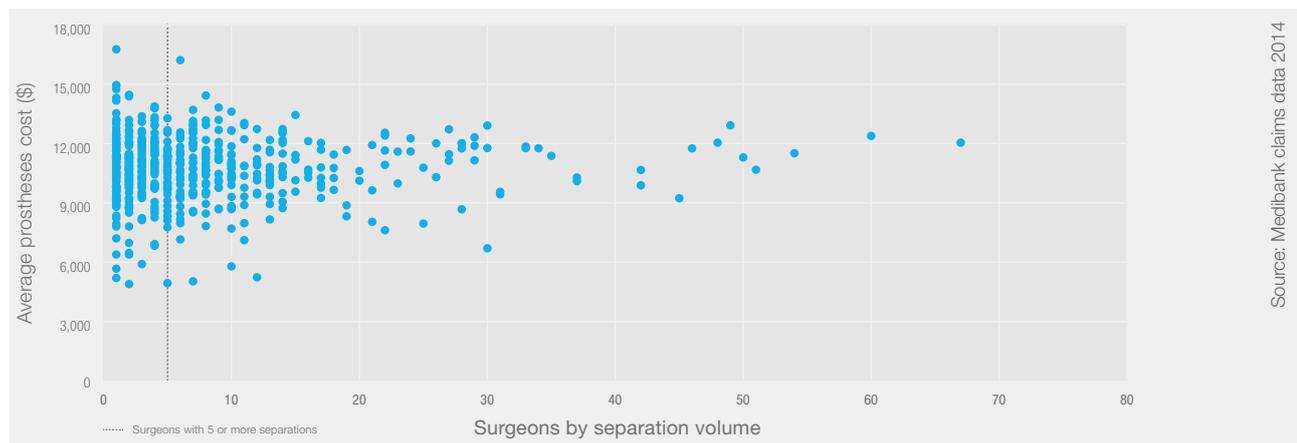
The top five MBS items billed by the surgeon for separations where MBS item number 49318 was the principal procedure (3,620 separations) are shown in the table below.

Table 6: Top five MBS items billed by the surgeon (principal procedure MBS # 49318)

MBS item number	Description	Total frequency	Frequency per separation
49318	Hip, total replacement arthroplasty of, including minor bone grafting (Anaes.) (Assist.)	3,734	1.03
00105	Professional attendance by a specialist in the practice of his or her specialty	1,081	0.30
00104	Specialist, referred consultation – surgery or hospital	151	0.04
18222	Infusion of a therapeutic substance to maintain regional anaesthesia or analgesia	27	0.01
47930	Plate, rod or nail and associated wires, pins or screws, 1 or more of	25	0.01

What are the reasons for the wide variation in the number of MBS items billed?

Figure 8: Average prostheses cost



Source: Medibank claims data 2014

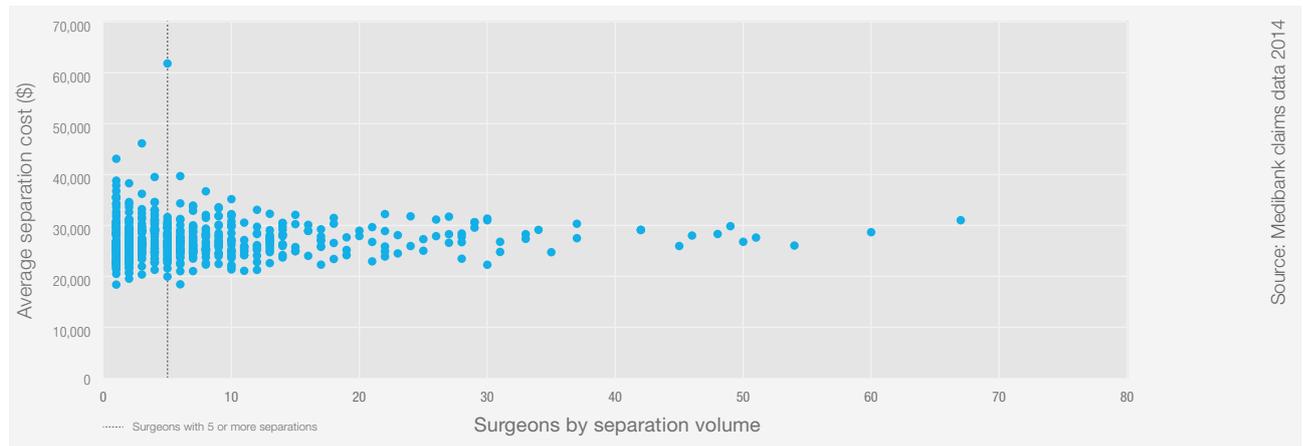
The average cost of prostheses items was \$10,766 per hospital separation.

For the 299 surgeons who performed at least five procedures, the average cost of prostheses used by a surgeon ranged between \$4,908 and \$16,178 with a median of \$10,727.

Are you aware of the associated costs for prostheses items used for this procedure?

What are the reasons for the variation in costs between surgeons?

Figure 9: Average separation cost



Source: Medibank claims data 2014

The separation cost includes the total charges for the hospital separation, including payments made by Medibank, Medicare and the patient. Costs include hospital, prostheses, medical practitioners and diagnostic services. The average total cost per hospital separation was \$27,310.

For the 299 surgeons who performed at least five procedures, the average separation cost of a surgeon ranged between \$18,309 and \$61,699 with a median of \$26,661.

Table 7: Average separation cost by state/territory

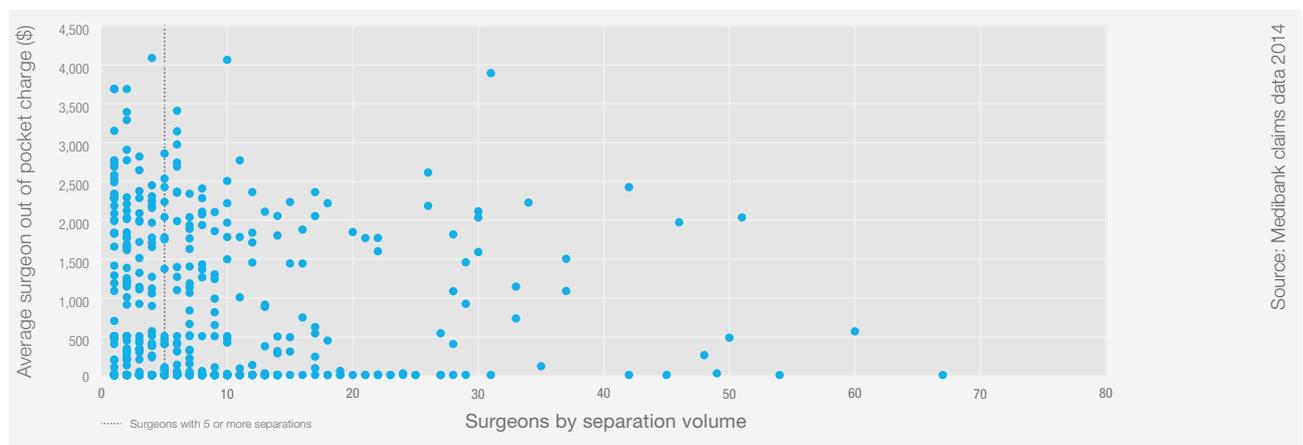
	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Average separation cost	\$28,202	\$27,743	NA*	\$26,306	\$24,716	\$27,916	\$28,408	\$26,389

*State/territory values not shown where dataset contains less than five surgeons to protect anonymity

Are you aware of the associated costs for this procedure such as pathology, diagnostic imaging, surgical assistants, anaesthetists, hospital bed fees?

What are the reasons for variation in separation costs?

Figure 10: Average surgeon out of pocket charge



Source: Medibank claims data 2014

Patients were charged an out of pocket fee by the principal surgeon in 39% of separations and the average out of pocket charged was \$1,778.

For the 299 surgeons who performed at least five procedures, 142 (47%) did not charge any of their patients an out of pocket for the hospital admission. The average out of pocket charged by these surgeons ranged from \$0 (no out of pocket charged) to \$4,057 with a median of \$15.

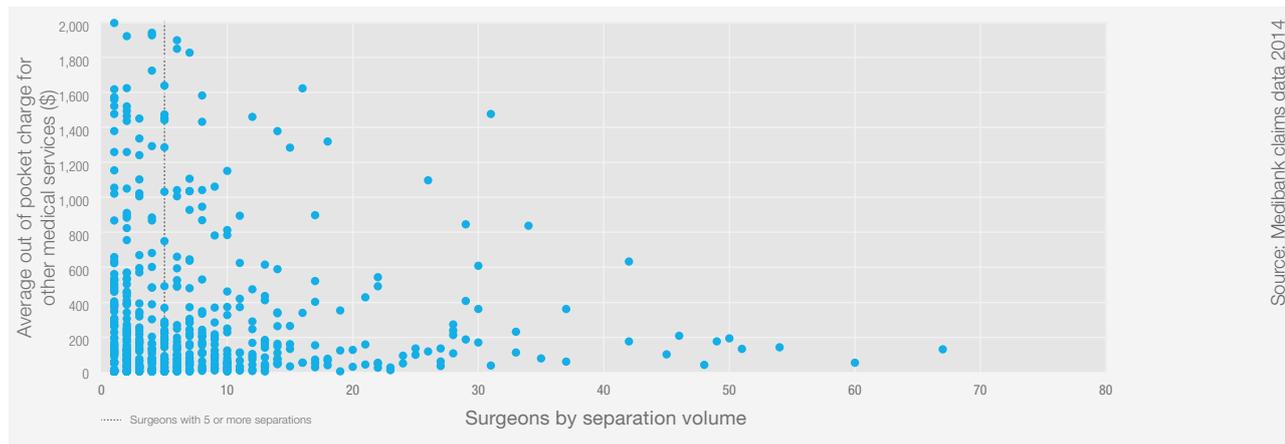
Table 8: Surgeon out of pocket charges by state/territory

	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
% of separations with OOP	82%	57%	NA*	46%	2%	55%	30%	27%
Average OOP	\$2,471	\$2,382	NA*	\$1,717	\$498	\$535	\$1,741	\$709

*State/territory values not shown where dataset contains less than five surgeons to protect anonymity

Why is there such variation in the average out of pocket charge?

Figure 11: Average out of pocket charge for other medical services



Source: Medibank claims data 2014

Patients were charged an out of pocket fee for other medical services (including charges raised by the anaesthetist, assistant surgeon and for diagnostics) in 80% of the hospital separations and the average out of pocket charge was \$342.

For the 299 surgeons who performed at least five procedures, the average out of pocket charges received by their patients for other medical services ranged between \$0 and \$1,895 with a median of \$123.

Table 9: Out of pocket charges for other medical services by state/territory

	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
% of separations with OOP	97%	92%	NA*	90%	78%	50%	70%	80%
Average OOP	\$1,223	\$631	NA*	\$323	\$141	\$82	\$201	\$166

*State/territory values not shown where dataset contains less than five surgeons to protect anonymity

Why is there such variation in the average out of pocket charge?

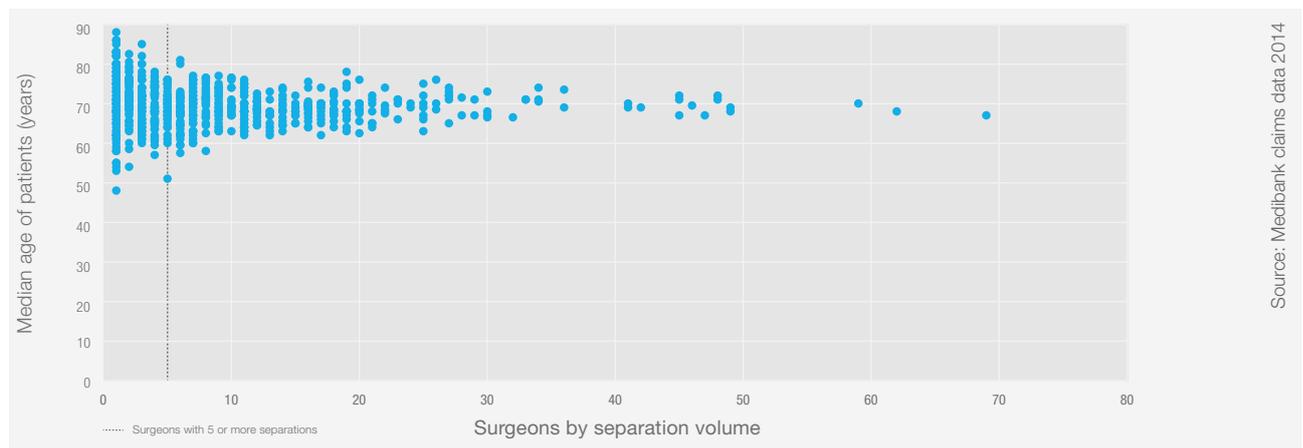
Knee replacement procedures

In 2014 Medibank funded 6,102 operations in private hospitals where a knee replacement was recorded as the principal procedure (highest value MBS fee from the medical claim) for the hospital admission. The analysis is limited to those 6,102 procedures. 632 surgeons (identified through the stem of their Medicare provider number) billed Medibank for those procedures. 394 (62%) of these surgeons billed Medibank for five or more procedures in 2014. Surgeon-level analysis of the indicators considered for this procedure has been limited to those surgeons with five or more patient separations, so that each surgeon has a sufficient sample of separations from which a value (e.g. an average, median or percentage) for an indicator can be reported.

Table 10: MBS codes included in this analysis

Procedure	MBS Codes	Volume of separations	Percentage of separations	Definition
Knee	49518	5,547	91%	Knee, total replacement arthroplasty of
	49521	555	9%	Knee, total replacement arthroplasty of, requiring major bone grafting to femur or tibia, including obtaining of graft

Figure 12: Median age of patients



Source: Medibank claims data 2014

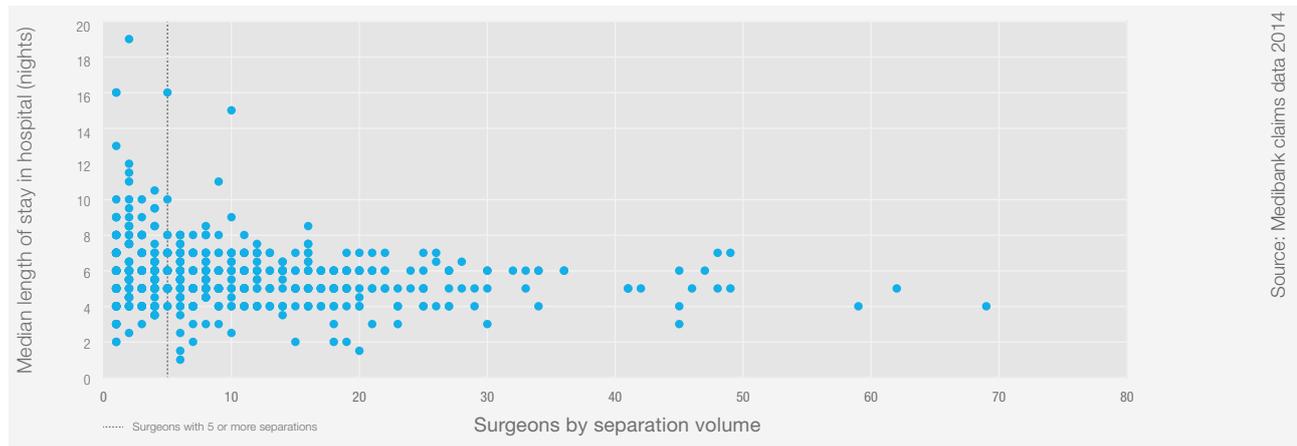
Across all separations the median patient age was 69 years.

For the 394 surgeons who performed at least five procedures:

- The median patient age of a surgeon ranged between 51 years and 81 years.

Is this variation in age clinically expected?

Figure 13: Median length of stay in hospital (nights)



Source: Medibank claims data 2014

For the 394 surgeons who performed at least five procedures:

- The median number of nights that a surgeon’s patients stayed in hospital ranged between 1 night and 16 nights with a median of 5 nights.

Table 11: Median length of stay (nights) by state/territory

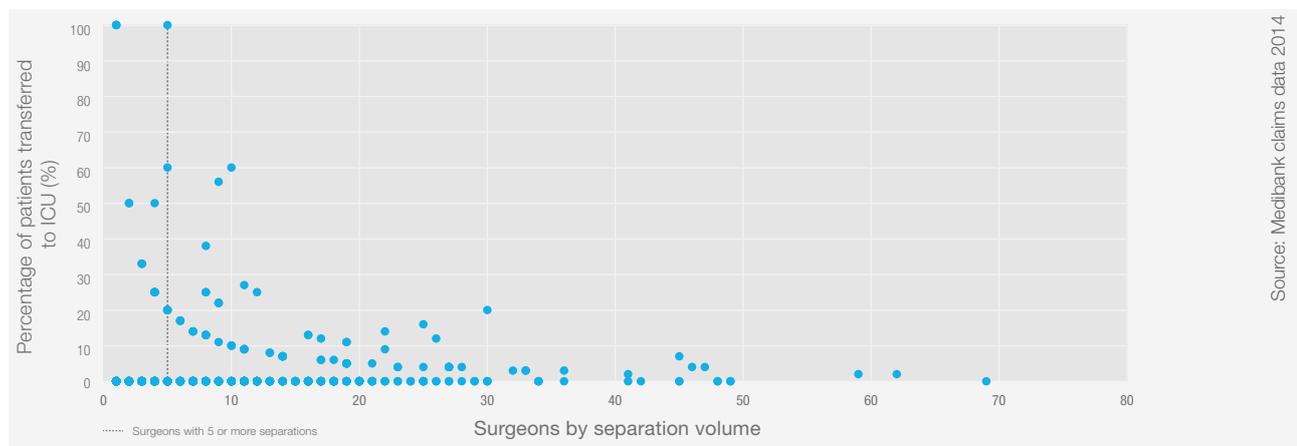
	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Length of stay	5.00	6.00	NA*	5.00	5.00	6.00	6.00	5.00

*State/territory values not shown where dataset contains less than five surgeons to protect anonymity

What would you consider the most effective length of stay for this procedure?

Does the availability of inpatient rehabilitation affect the length of stay?

Figure 14: Percentage of patients transferred to ICU



Source: Medibank claims data 2014

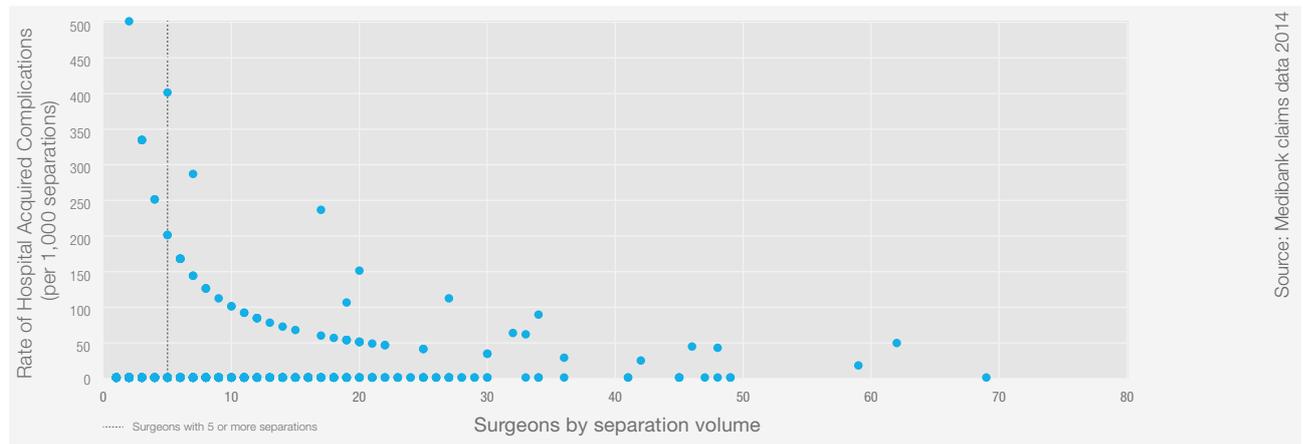
Across the total sample of 6,102 hospital separations, patients were transferred to an intensive care unit (ICU) during 145 hospital separations (2%). Administrative claims data does not indicate whether the transfers were planned or unplanned.

For the 394 surgeons who performed at least five procedures:

- 81 (21%) surgeons had one or more patient separations during which patients were transferred to ICU
- The percentage of a surgeon’s patients that were transferred to ICU ranged between 0% and 100% with a median of 0%.

Given that ICU transfers could indicate a difficult post-operative recovery, what would be the expected transfer rate?

Figure 15: Rate of Hospital Acquired Complications (per 1,000 separations)



Hospital Acquired Complications are a Medibank subset of 82 International Classification of Diseases (ICD) codes drawn from the Australian Commission of Safety and Quality in Health Care’s list of high priority complications (see Table 12).

The rate of Hospital Acquired Complications was 14 per 1,000 hospital separations.

For the 394 surgeons who performed at least five procedures:

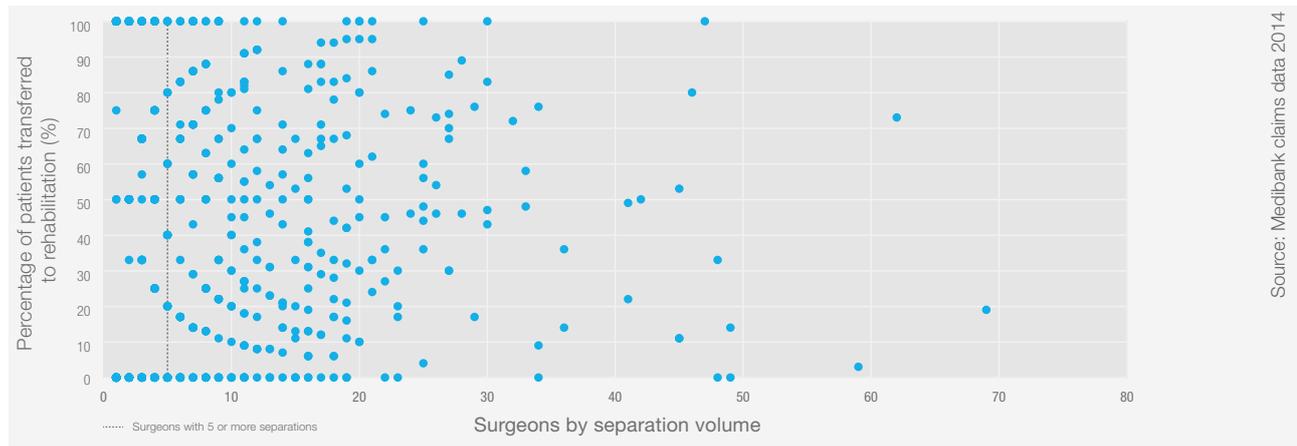
- 58 (15%) surgeons had one or more patient separations during which a Hospital Acquired Complication was identified
- The rate of Hospital Acquired Complications for a surgeon ranged between 0 per 1,000 separations to 400 per 1,000 separations with a median of 0 per 1,000 separations.

Table 12: Hospital Acquired Complications identified during the hospital separation

Complication description	Number recorded
Haemorrhage and haematoma complicating a procedure, not elsewhere classified	49
Vascular complications following infusion, transfusion and therapeutic injection	1
Accidental puncture and laceration during a procedure, not elsewhere classified	2
Disruption of operation wound, not elsewhere classified	19
Foreign body accidentally left in body cavity or operation wound following a procedure	1
Fracture of lateral malleolus	1
Sepsis following a procedure	1
Infection and inflammatory reaction due to other cardiac and vascular devices, implants and grafts	4
Infection and inflammatory reaction due to prosthetic device, implant and graft in urinary system	1
Infection and inflammatory reaction due to internal joint prosthesis	1
Infection and inflammatory reaction due to other internal prosthetic devices, implants and grafts	3
Wound infection following a procedure	10
Total	93

What complications have you had for this procedure?

Figure 16: Percentage of patients transferred to rehabilitation



Across the total sample of 6,102 hospital separations, patients were transferred to rehabilitation during 2,602 hospital separations (43%). Administrative claims data does not indicate whether the transfers were planned or unplanned.

For the 394 surgeons who performed at least five procedures:

- 73 (18%) had none of their patients transferred to inpatient rehabilitation
- 291 (74%) had one or more of their patients transferred to inpatient rehabilitation
- 30 (8%) surgeons had all of their patients transferred to inpatient rehabilitation
- The percentage of a surgeon's patients that were transferred to rehabilitation ranged between 0% and 100% with a median of 40%.

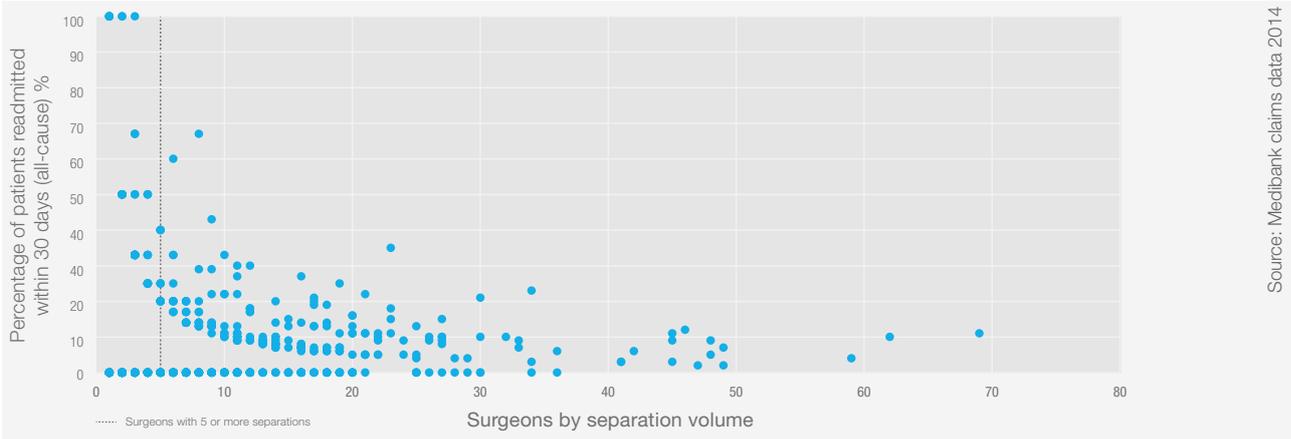
Table 13: Percentage of patients transferred to inpatient rehabilitation by state/territory

	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Transfer rate	35%	64%	NA*	28%	33%	14%	58%	19%

*State/territory values not shown where dataset contains less than five surgeons to protect anonymity

What would be the expected transfer rate to rehabilitation?

Figure 17: Percentage of patients readmitted within 30 days



Source: Medibank claims data 2014

In 395 (7%) of the hospital separations patients were readmitted (for all causes*) to a hospital within 30 days. Administrative claims data does not indicate whether the readmissions were planned or unplanned. The median age of patients readmitted was 69 years, compared with a median age of 68 years for those patients not readmitted. For the 395 readmissions:

- 277 readmissions were to a private hospital (the same one or a different hospital). In 61 of these separations a Hospital Acquired Complication was identified (see Table 14)
- 118 readmissions were to a public hospital (where the patient was treated as a private patient).

For the 394 surgeons who performed at least five procedures, the percentage of a surgeon’s patients readmitted within 30 days ranged between 0% and 67% with a median of 4%.

Readmissions to public hospitals, where patients were treated as public patients, are not captured in these datasets.

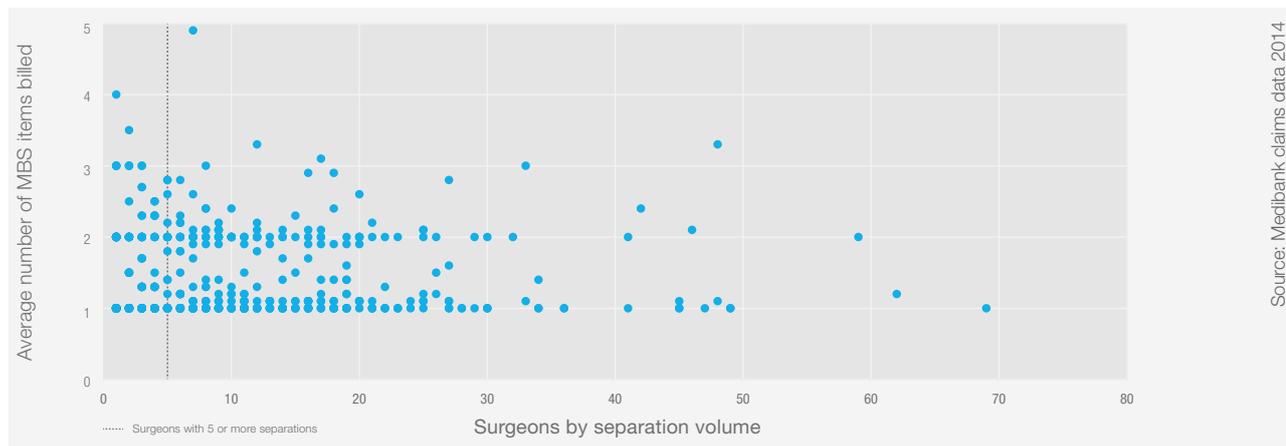
* Readmissions for rehabilitation, psychiatric treatment, dialysis and chemotherapy were excluded where identified. Separations involving a patient 80 years or older were also excluded.

Table 14: Hospital Acquired Complications on readmission

Category	Pressure injury	Infection	Surgical complication	Total
Number recorded	2	45	19	66

What are the reasons for readmission for this procedure, and what is the expected rate?

Figure 18: Average number of MBS items billed



Source: Medibank claims data 2014

The average number of MBS items billed by the surgeon (the principal surgeon only) was 1.4 per hospital separation.

Of the 394 surgeons who performed five or more procedures, the average number of MBS items billed by a surgeon ranged between 1.0 and 4.9 with a median of 1.1.

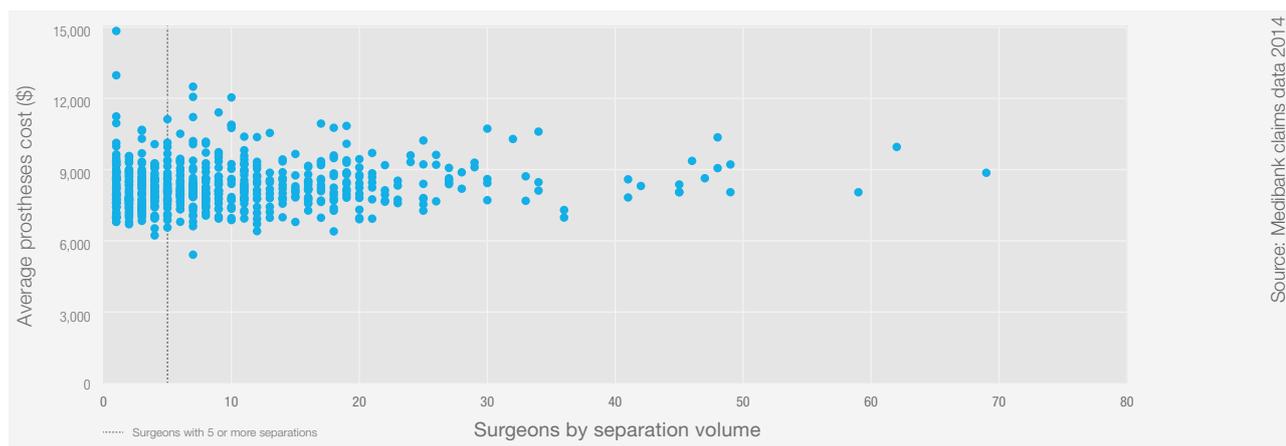
The top five MBS items billed by the surgeon for separations where the principal MBS item number was 49518 (5,547 separations) are shown in the table below.

Table 15: Top five MBS items billed by the surgeon (principal procedure MBS # 49518)

MBS item number	Description	Total frequency	Frequency per separation
49518	Knee, total replacement arthroplasty of (Anaes.) (Assist.)	5,620	1.01
00105	Professional attendance by a specialist in the practice of his or her specialty where the patient is	1,473	0.27
49509	Knee, total synovectomy or arthrodesis with synovectomy if performed (Anaes.) (Assist.)	185	0.03
48400	Phalanx, metatarsal, accessory bone or sesamoid bone, osteotomy or osteectomy of, excluding services	47	0.01
18222	Infusion of a therapeutic substance to maintain regional anaesthesia or analgesia, subsequent inject	27	0.00

What are the reasons for the wide variation in the number of MBS items billed?

Figure 19: Average prostheses cost



Source: Medibank claims data 2014

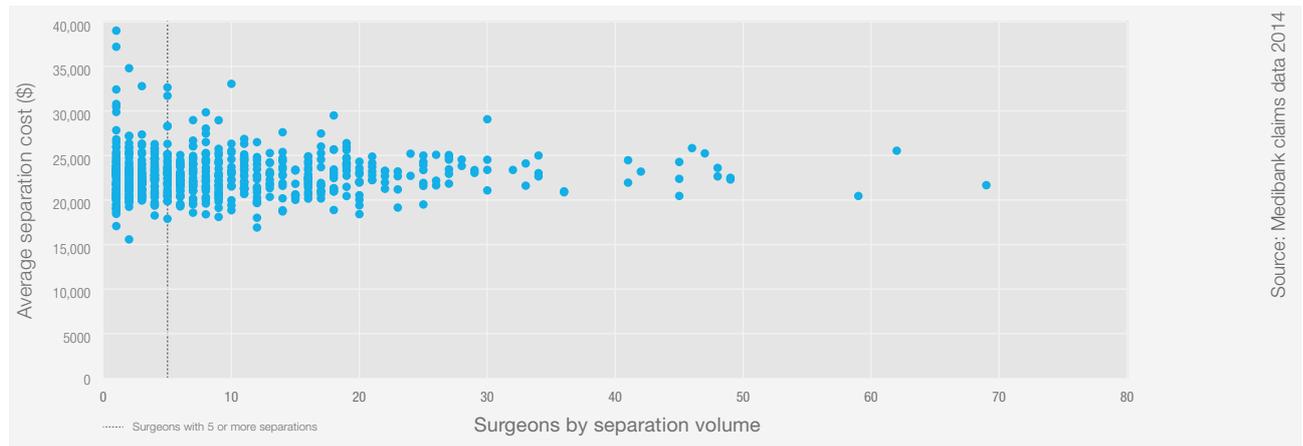
The average cost of prostheses items was \$8,398 per hospital separation.

For the 394 surgeons who performed at least five procedures, the average cost of prostheses used by a surgeon ranged between \$5,388 and \$12,464 with a median of \$8,193.

Are you aware of the associated costs for prostheses items used for this procedure?

What are the reasons for the variation in costs between surgeons?

Figure 20: Average separation cost



Source: Medibank claims data 2014

The separation cost includes the total charges for the hospital separation, including payments made by Medibank, Medicare and the patient. Costs include hospital, prostheses, medical practitioners and diagnostic services. The average total cost per hospital separation was \$22,769.

For the 394 surgeons who performed at least five procedures, the average separation cost of a surgeon ranged between \$16,838 and \$32,976 with a median of \$22,620.

Table 16: Average separation cost by state/territory

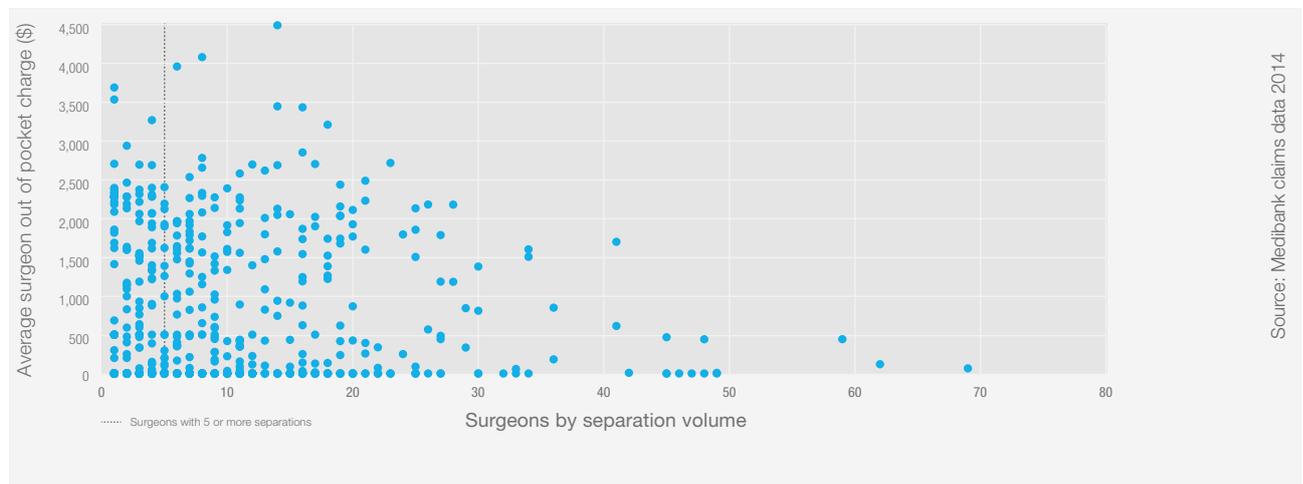
	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Average separation cost	\$23,868	\$23,268	NA*	\$22,214	\$20,511	\$21,664	\$23,552	\$22,844

*State/territory values not shown where dataset contains less than five surgeons to protect anonymity

Are you aware of the associated costs for this procedure such as pathology, diagnostic imaging, surgical assistants, anaesthetists, hospital bed fees?

What are the reasons for variation in separation costs?

Figure 21: Average surgeon out of pocket charge



Source: Medibank claims data 2014

Patients were charged an out of pocket fee by the principal surgeon in 37% of separations and the average out of pocket charged was \$1,738.

For the 394 surgeons who performed at least five procedures, 174 (44%) did not charge any of their patients an out of pocket for the hospital admission. The average out of pocket charged by these surgeons ranged from \$0 (no out of pocket charged) to \$4,484 with a median of \$132.

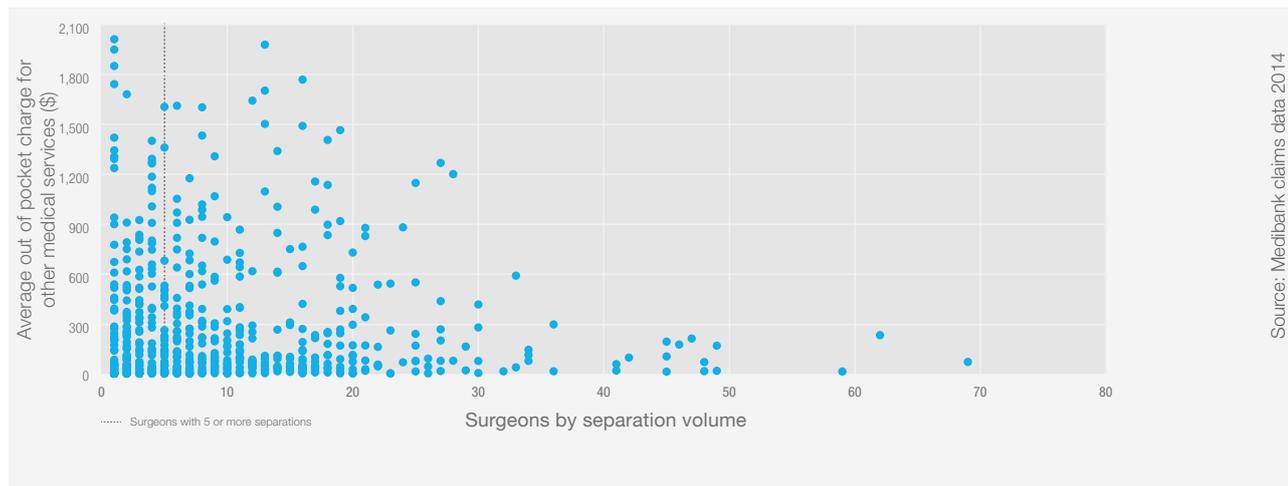
Table 17: Surgeon out of pocket charges by state/territory

	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
% of separations with OOP	77%	56%	NA*	44%	0.5%	31%	23%	33%
Average OOP	\$2,484	\$2,221	NA*	\$1,641	\$1,415	\$640	\$1,584	\$794

*State/territory values not shown where dataset contains less than five surgeons to protect anonymity

Why is there such variation in the average out of pocket charge?

Figure 22: Average out of pocket charge for other medical services



Source: Medibank claims data 2014

Patients were charged an out of pocket fee for other medical services (including charges raised by the anaesthetist, assistant surgeon and for diagnostics) in 80% of the hospital separations and the average out of pocket charge was \$325.

For the 394 surgeons who performed at least five procedures, the average out of pocket charges received by their patients for other medical services ranged between \$0 and \$1,975 with a median of \$104.

Table 18: Out of pocket charges for other medical services by state/territory

	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
% of separations with OOP	97%	89%	NA*	86%	79%	87%	66%	75%
Average OOP	\$1,090	\$560	NA*	\$315	\$120	\$39	\$188	\$159

*State/territory values not shown where dataset contains less than five surgeons to protect anonymity

Why is there such variation in the average out of pocket charge?

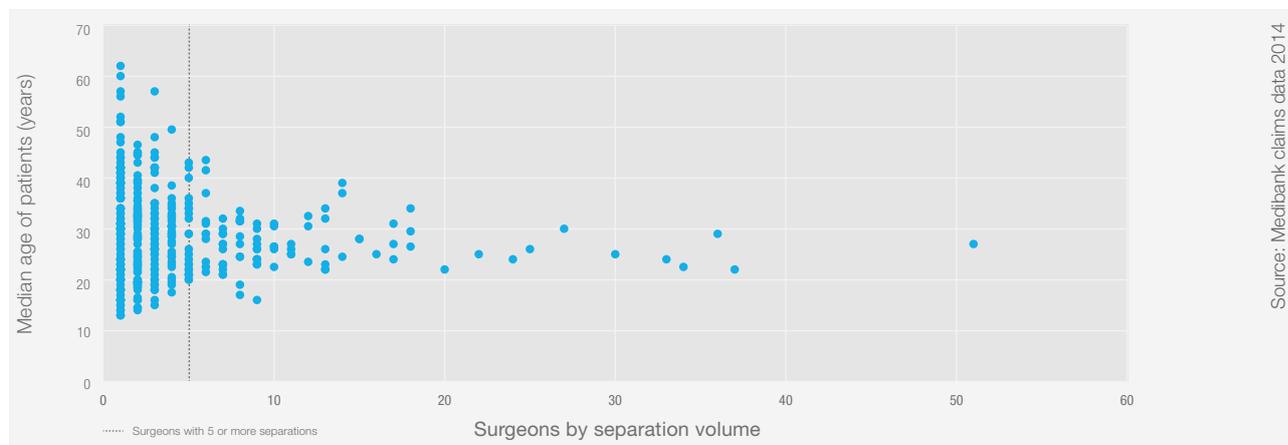
Knee ACL repair procedures

In 2014 Medibank funded 1,779 operations in private hospitals where an ACL repair was recorded as the principal procedure (highest value MBS fee from the medical claim) for the hospital admission. The analysis is limited to those 1,779 procedures. 394 surgeons (identified through the stem of their Medicare provider number) billed Medibank for those procedures. 112 (28%) of these surgeons billed Medibank for five or more procedures. Surgeon-level analysis of the indicators considered for this procedure has been limited to those surgeons with five or more patient separations, so that each surgeon has a sufficient sample of separations from which a value (e.g. an average, median or percentage) for an indicator can be reported.

Table 19: MBS codes included in this analysis

Procedure	MBS Codes	Volumes of separations	Percentage of separations	Definition
Knee ACL repair procedures	49539	222	12%	Knee, reconstructive surgery of cruciate ligament or ligaments (open or arthroscopic, or both), including notchplasty when performed and surgery to other internal derangements, not being a service to which another item in this Group applies or a service associated with any other arthroscopic procedure of the knee
	49542	1557	88%	Knee, reconstructive surgery to cruciate ligament or ligaments (open or arthroscopic, or both), including notchplasty, meniscus repair, extracapsular procedure and debridement when performed, not being a service associated with any other arthroscopic procedure of the knee

Figure 23: Median age of patients



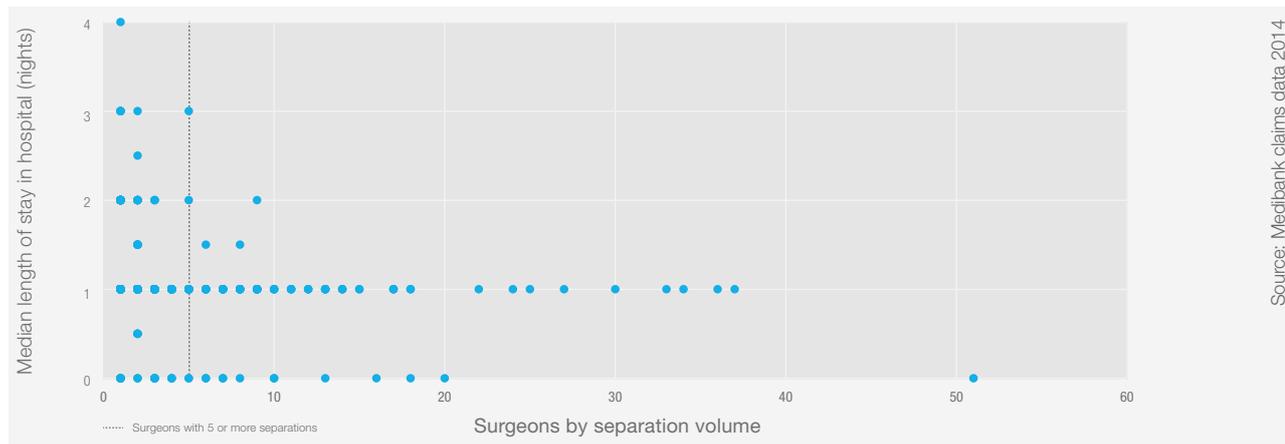
Source: Medibank claims data 2014

Across all separations the median patient age was 27 years.
 For the 112 surgeons who performed at least five procedures:

- The median patient age of a surgeon ranged between 16 years and 44 years.

Is this variation in age clinically expected?

Figure 24: Median length of stay in hospital (nights)



Source: Medibank claims data 2014

For the 112 surgeons who performed at least five procedures:

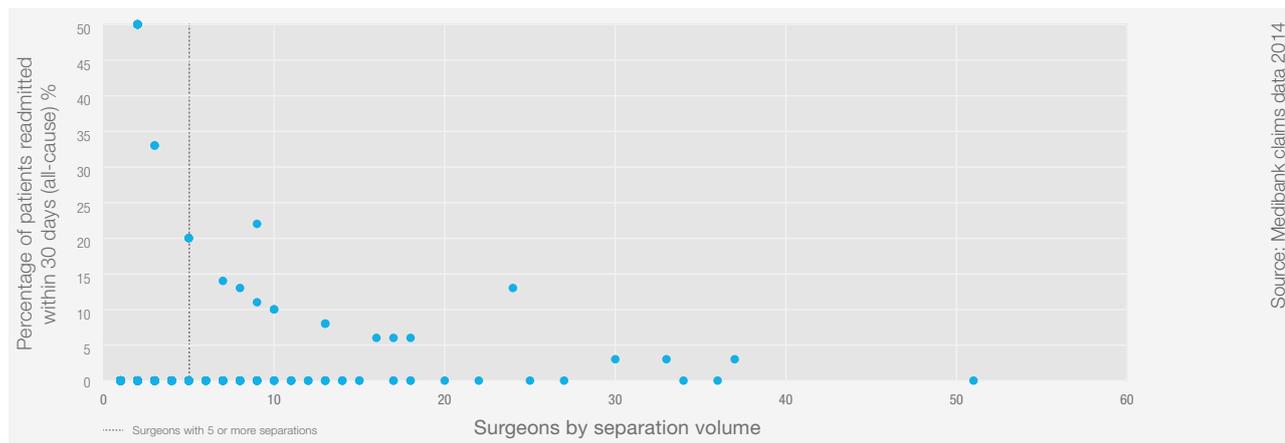
- The median number of nights that a surgeon’s patients stayed in hospital ranged between 0 nights and 3 nights with a median of 1 night.

Table 20: Median length of stay (nights) by state/territory

	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Length of stay	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

What would you consider the most effective length of stay for this procedure?

Figure 25: Percentage of patients readmitted within 30 days



Source: Medibank claims data 2014

In 36 (2%) of the hospital separations patients were readmitted (for all causes*) to a hospital within 30 days. Administrative claims data does not indicate whether the readmissions were planned or unplanned. The median age of patients readmitted was 25 years, compared with a median age of 27 years for those patients not readmitted. For the 36 readmissions:

- 28 readmissions were to a private hospital (the same one or a different hospital). In 8 of these separations at least one Hospital Acquired Complication was identified (see Table 21)
- 8 readmissions were to a public hospital (where the patient was treated as a private patient).

For the 112 surgeons who performed at least five procedures, the percentage of a surgeon’s patients readmitted within 30 days ranged between 0% and 22% with a median of 0%.

Readmissions to public hospitals, where patients were treated as public patients, are not captured in these datasets.

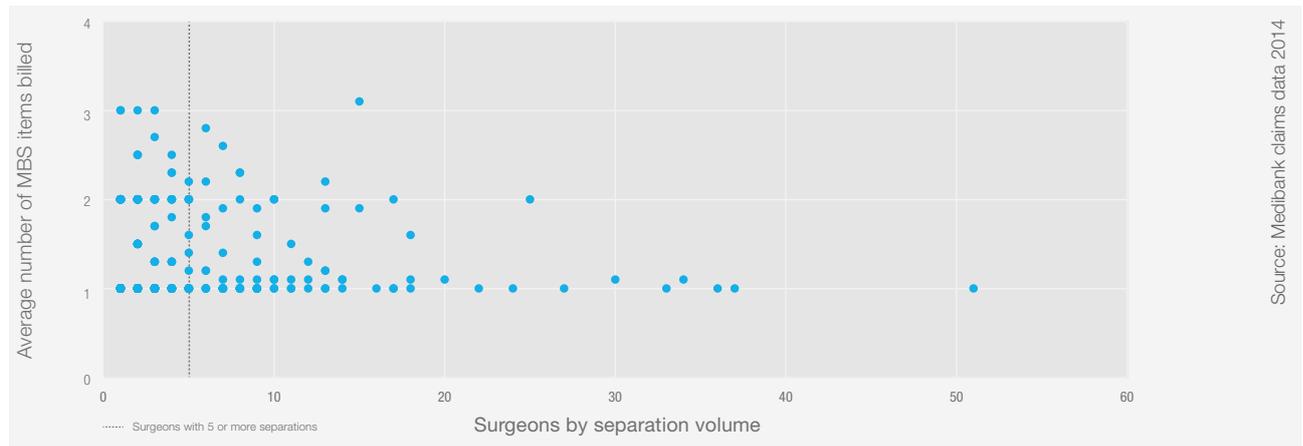
* Readmissions for rehabilitation, psychiatric treatment, dialysis and chemotherapy were excluded where identified. Separations involving a patient 80 years or older were also excluded.

Table 21: Hospital Acquired Complications identified on readmission

Category	Infection	Surgical complication	Total
Number recorded	6	3	9

What are the reasons for readmission for this procedure, and what is the expected rate?

Figure 26: Average number of MBS items billed



Source: Medibank claims data 2014

The average number of MBS items billed by the surgeon (the principal surgeon only) was 1.3 per hospital separation.

Of the 112 surgeons who performed five or more procedures, the average number of MBS items billed by a surgeon ranged between 1.0 and 3.1 with a median of 1.0.

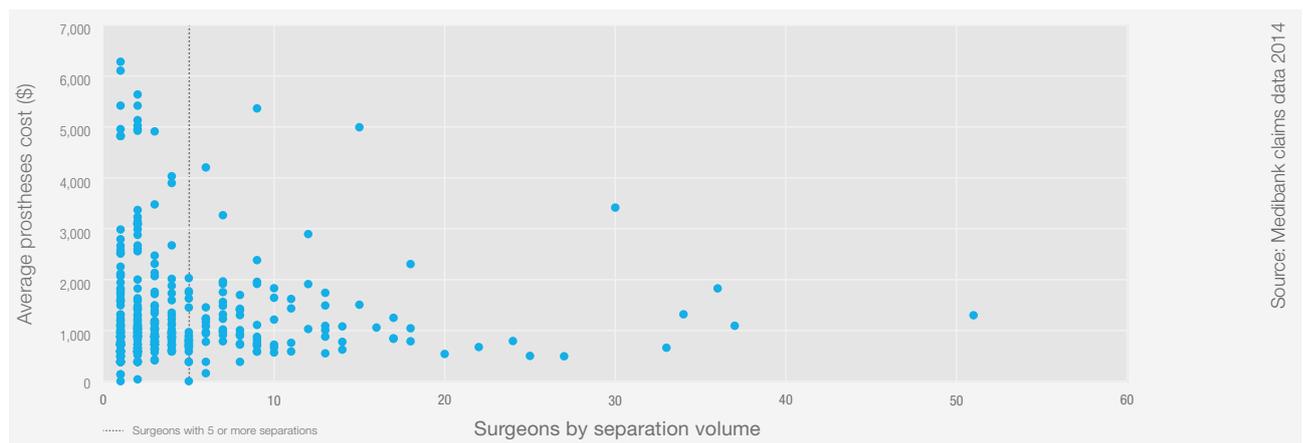
The top five MBS items billed by the surgeon for separations where MBS item number 49542 was the principal procedure (1,557 separations) are shown in the table below.

Table 22: Top five MBS items billed by the surgeon (principal procedure MBS #49542)

MBS item number	Description	Total frequency	Frequency per separation
49542	Knee, reconstructive surgery of cruciate ligament or ligaments (open or arthroscopic, or both)	1,574	1.01
00105	Professional attendance by a specialist in the practice of his or her specialty where the patient is	281	0.18
47966	Tendon or ligament transfer, as an independent procedure (Anaes.) (Assist.)	37	0.02
48206	Tibia, bone graft to (Anaes.) (Assist.)	34	0.02
48209	Tibia, bone graft to, with internal fixation (Anaes.) (Assist.)	16	0.01

What are the reasons for the wide variation in the number of MBS items billed?

Figure 27: Average prostheses cost



Source: Medibank claims data 2014

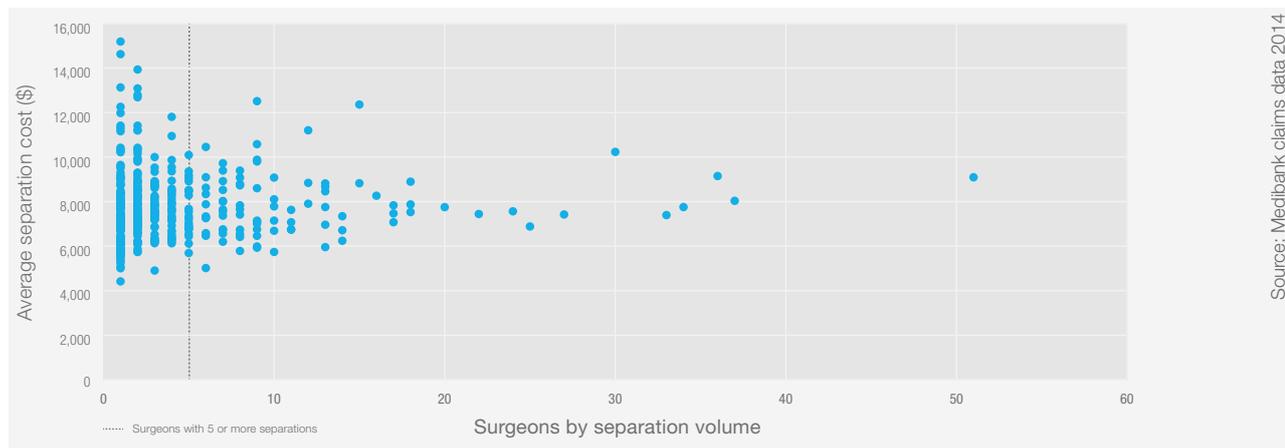
The average cost of prostheses items was \$1,276 per hospital separation.

For the 112 surgeons who performed at least five procedures, the average cost of prostheses used by a surgeon ranged between \$0 and \$5,360 with a median of \$979.

Are you aware of the associated costs for prostheses items used for this procedure?

What are the reasons for the variation in costs between surgeons?

Figure 28: Average separation cost



Source: Medibank claims data 2014

The separation cost includes the total charges for the hospital separation, including payments made by Medibank, Medicare and the patient. Costs include hospital, prostheses, medical practitioners and diagnostic services. The average total cost per hospital separation was \$7,907.

For the 112 surgeons who performed at least five procedures, the average separation cost of a surgeon ranged between \$5,005 and \$12,501 with a median of \$7,585.

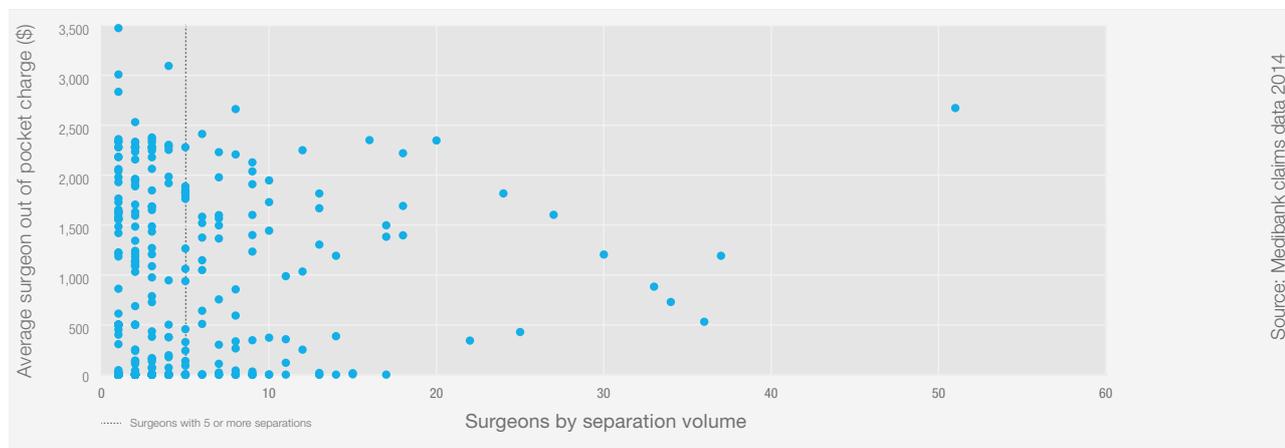
Table 23: Average separation cost by state/territory

	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Average separation cost	\$8,606	\$8,375	\$6,908	\$7,992	\$6,983	\$6,784	\$7,785	\$7,787

Are you aware of the associated costs for this procedure such as pathology, diagnostic imaging, surgical assistants, anaesthetists, hospital bed fees?

What are the reasons for variation in separation costs?

Figure 29: Average surgeon out of pocket charge



Source: Medibank claims data 2014

Patients were charged an out of pocket fee by the principal surgeon in 56% of separations and the average out of pocket charged was \$1,583.

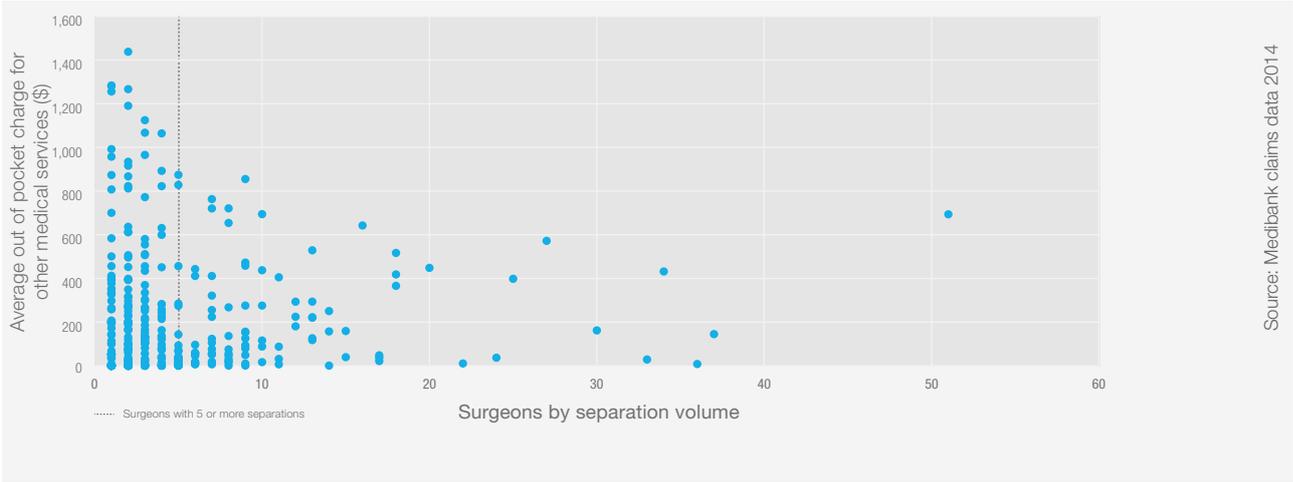
For the 112 surgeons who performed at least five procedures, 26 (23%) did not charge any of their patients an out of pocket for the hospital admission. The average out of pocket charged by these surgeons ranged from \$0 (no out of pocket charged) to \$2,670 with a median of \$683.

Table 24: Surgeon out of pocket charges by state/territory

	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
% of separations with OOP	95%	76%	50%	68%	4%	39%	42%	48%
Average OOP	\$2,088	\$2,033	\$1,894	\$1,424	\$229	\$320	\$1,639	\$835

Why is there such variation in the average out of pocket charge?

Figure 30: Average out of pocket charge for other medical services



Patients were charged an out of pocket fee for other medical services (including charges raised by the anaesthetist, assistant surgeon and for diagnostics) in 59% of the hospital separations and the average out of pocket charge was \$379.

For the 112 surgeons who performed at least five procedures, the average out of pocket charges received by their patients for other medical services ranged between \$0 and \$873 with a median of \$94.

Table 25: Out of pocket charges for other medical services by state/territory

	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
% of separations with OOP	88%	73%	60%	63%	54%	42%	52%	40%
Average OOP	\$795	\$563	\$381	\$414	\$197	\$159	\$187	\$172

Why is there such variation in the average out of pocket charge?

Clinical variation working party membership

Prof David Watters
(General Surgeon, VIC), Chair

A/Prof Andrew Brooks
(Urologist, NSW)

Mr Graeme Campbell
(General Surgeon, VIC)

Dr Cathy Ferguson
(Otolaryngologist Head and Neck Surgeon, NZ)

Prof David Fletcher
(General Surgeon, WA)

Prof Mark Frydenberg
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Prof Michael Grigg
(Vascular Surgeon, VIC)

Mr Richard Lander
(Orthopaedic Surgeon, NZ)

Dr Lawrence Malisano
(Orthopaedic Surgeon, QLD)

Prof Julian Smith
(Cardiothoracic Surgeon, VIC)

Mr Phil Truskett
(General Surgeon, NSW)

Mr Neil Vallance
(Otolaryngologist Head and Neck Surgeon, VIC)

Mr Simon Williams
(Orthopaedic Surgeon, VIC)

Definitions

Table 26: Definitions

Term	Definition
ACT	Australian Capital Territory
HCP	Hospital Casemix Protocol. HCP data includes details of diagnoses, interventions, demographics and financial data relating to members' treatment in hospital
Hospital Acquired Complication	Medibank's subset of 82 ICD10 codes drawn from the Australian Commission of Safety and Quality in Healthcare's high priority complications dataset (see Table 27).
ICD	International Classification of Diseases. The ICD is the standard diagnostic tool for epidemiology, health management and clinical purposes.
ICU	Intensive Care Unit
MBS	Medicare Benefit Schedule
Median	The middle number in a given sequence of numbers
NSW	New South Wales
NT	Northern Territory
NZ	New Zealand
QLD	Queensland
SA	South Australia
Operation	Surgery performed on a patient that may involve one or more surgical procedures
Out of pocket charge	The amount payable by the patient to a medical provider (including medical practitioners and diagnostics providers) for services performed during the hospital separation
Principal surgeon/specialist	The surgeon/specialist who billed the MBS item with the highest fee in a separation
Primary procedure	The procedure performed on the patient with the highest value MBS fee
RACS	Royal Australasian College of Surgeons
Separation	The episode of admitted patient care
VIC	Victoria
WA	Western Australia

Table 27: Categories of hospital acquired complications

Category	Sub-Category
Pressure Injury	NA (only includes type 3 and 4 pressure ulcers)
Falls	Cranial Injury Femoral Fracture Other Fracture
Healthcare Associated Infection	Urinary Tract Infection Surgical Site Infection Blood Stream Infection Prostheses Site Infection
Surgical Complication	Post-operative Haemorrhage And Haematoma Other surgical complications including, thrombophlebitis, transfusion reaction, accidental puncture and laceration, wound disruption
Venous Thromboembolism	Pulmonary Embolism Venous Thrombosis

