



## DAY CLINICS AND HOSPITALS — A COST COMPARISON

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**Objective.** To determine the types of surgical procedures currently undertaken in day clinics and to compare the number of procedures, the average in-facility cost, and the pre- and post-discharge costs for each procedure or group of procedures.

**Design.** A retrospective descriptive study of medical aid claims data.

**Setting.** Department of Family Medicine, University of the Witwatersrand, Johannesburg.

**Subject.** Three private sector medical aid schemes with in excess of 170 000 principal members (380 000 lives).

**Outcome measures.** For each surgical procedure the following were compared: (i) the total number of procedures done; (ii) the average total in-facility cost; and (iii) the cost of professional fees and medicines for 7 days before admission, during admission, and for 14 days after discharge.

**Results.** During 1997, 89 216 patients underwent surgery. Day clinics and hospitals accounted for 5 490 and 83 726 admissions respectively. Fifty-one different types of procedures were identified that met the inclusion criteria.

On average the in-facility costs for 45 (88%) of the 51 compared procedures were lower in day clinics compared with hospitals. Average costs can be as much as 90% lower in day clinics. Some procedures, particularly certain dental operations, cost more in day clinics. The professional fees of attending doctors and the cost of medicines are generally higher when the procedure is undertaken in a hospital.

**Conclusion.** In South Africa, as is the case in the USA, day clinics have the potential to reduce the cost of surgical procedures.

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Many South African medical aid funders, both in the public and private sector, are grappling with the problem of rocketing health care costs. Day clinic and hospital costs comprise a large proportion of this expenditure. In 1997 three privately run

medical aids spent 26% (R397 million) of their total income on day clinic and hospital admissions (Managed Healthcare Systems — unpublished data).

### COST OF SURGICAL PROCEDURES

In the USA, day clinics (ambulatory surgical centres (ASCs)) have successfully reduced the cost of a variety of surgical procedures, including those previously only undertaken in hospitals. As a result, there has been a rapid growth in the number of ASCs, making them the preferred 'in-facility' (day clinic/hospital) provider.<sup>1</sup> In the USA the ASCs reduce costs mainly by shortening the length of in-facility stay.<sup>2,4</sup> Advances in medical technology, particularly endoscopic surgery and anaesthetics, have made this possible.<sup>5</sup>

Non-facility costs, i.e. professional fees and medicine (PF&M) provided before, during and after admission can substantially add to the cost of a procedure. PF&M costs should form part of net cost saving calculations. Re-admission usually does not occur, but if it does, these costs should also be included in savings calculation.

### QUALITY OF CARE

The quality of health care the patient receives is at least as important as cost-saving considerations when deciding on the type of in-facility to use, i.e. ASC or hospital. Measuring quality can be difficult. Ways to measure the quality of ASCs and hospitals, as well as doctors, include facility accreditation, physician profiling and patient outcome analysis.

#### Facility accreditation

Medicare, in the USA, insists that the federal government inspects and passes all in-facility institutions for safety before reimbursement will be considered.<sup>5</sup> Most institutions also voluntarily subscribe to additional accreditation by the Accreditation Association for Ambulatory Health Care.<sup>5</sup> The position in South Africa is similar. ASCs and hospitals in South Africa have to be government licensed, and at the time of the study, approved by the Representative Association of Medical Aid Schemes (RAMS) (now Board of Health Funders).

#### Physician profiling

Increasingly, physician profiling, including economic credentialling, benchmarking and best practice analysis, has been used to 'measure' physician quality in accredited facilities.<sup>6,7</sup>

#### Patient outcome analysis

The outcome of surgery may be difficult to measure in patients.<sup>8</sup> The results often depend on the patient's personal frame of reference and are often too subjective for accurate assessment.

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### Using costs as a measure of outcome

The simplest objective, albeit inadequate, measure of outcome is the total costs incurred by the funder for a particular procedure/s. Cost measures identify:

1. Either over- or under-servicing.
2. The surgeon's, both generalist and specialist, experience and personal preferences with regard to the: (i) length of the operation, viz. theatre time; (ii) medicines prescribed; (iii) consumables used; (iv) length of patients' in-facility stay and level of care, e.g. intensive care, high care or the ward; and (v) number and type of clinical and special investigation referrals.
3. Pre-existing clinical problems in patients undergoing surgery that require ongoing care.
4. The demands and expectations of the patient.

These factors must be taken into account when cost is used to measure quality.

### Using re-admission as an indicator of quality care

Although re-admission must be considered it seldom seems to occur. Re-admission has been used as an indicator of inadequate ASC quality where same-day discharge was associated with a greater risk of postoperative morbidity. In the USA, ASCs report few complications from surgery.<sup>10</sup> In one study<sup>11</sup> of 106 patients admitted to an ASC for cholecystectomy, only one patient had to be re-admitted to hospital for postoperative ileus and pain control. Re-admission did not occur in our study. Generally, re-admissions seem an insensitive indicator of the quality of care.

### CALCULATING COST SAVINGS

Cost-saving comparisons between ASCs and hospitals in South Africa have, to date, been difficult to perform. The input data have been notoriously inadequate. Ideally, accurate diagnostic, procedural, demographic and epidemiological data are necessary to make meaningful comparisons. In South Africa data come from a number of sources and in order to do multivariate analyses, systems are required to integrate these data before any analysis can be undertaken. As in-facility costs become increasingly less affordable, there is an urgent need to use the available data in order to have some indication of whether ASCs can provide savings for in-facility care. This study used the Managed Healthcare Systems-Pronet (MHS-Pronet) clinical audit system to integrate and compare claims data from a variety of providers including, but not exclusively, the in-facility, the surgeon, radiologists, pathologists and pharmacies.

### OBJECTIVES

The objectives of the study were to compare ASCs with hospitals for: (i) the number and type of surgical procedures

undertaken; (ii) the average cost of similar procedures; and (iii) the average cost of professional fees and medicines.

### DEFINITIONS

PF&M includes the cost of clinical and non-clinical consultant's fees incurred by the patient 7 days before admission, during admission and for 14 days after discharge from the in-facility. PF&M also includes the cost of all medicine obtained by the patient before admission or after discharge for the same time period.

In-facility refers to either a day clinic (ambulatory surgical centre) or hospital.

The provider may include any one or more of the following: (i) clinicians; (ii) non-clinical specialists, e.g. radiologist/pathologist; and (iii) paramedical staff, e.g. physiotherapist and occupational therapists, etc.

### METHOD

#### Study design, population and procedure

A retrospective descriptive design was used to analyse three medical aid schemes' claims data.

The combined principal membership of these three medical aids was greater than 170 000 members or 380 000 lives.

Magnetic tapes with the complete 1997 claims history data from each of the medical aids were retrospectively analysed with the help of the MHS-Pronet medical audit system during the latter part of 1998. This allowed sufficient time to include all the claims for the period. The MHS-Pronet medical audit system is an IBM AS400-based computer system. It was specially developed by MHS in South Africa to integrate claims data and to do multivariate clinical and cost analyses. At the time of the study the system was not programmed to calculate variances.

Claims for patients undergoing surgical procedure/s were submitted by: (i) the in-facility; (ii) health care professionals providing the service; and (iii) pharmacies providing medicines.

The medical aids provided magnetic tapes with a complete record of members and dependants' 1997 medical claims history.

Using the surgeons' account, the surgical procedure or combination of surgical procedures done were grouped according to RAMS tariff code numbers. This identified both the surgical discipline and the surgical procedure performed. The surgeons' accounts were matched with the hospital accounts. The complete clinical claims history of each patient included in the study was also analysed for 7 days before admission, during admission and for 14 days after discharge. These data were used to calculate the professional fees and the pre- and post-discharge medicine costs.



### Statistical methods

At the time of the study the Pronet system was not programmed to calculate variances and therefore non-parametric statistical methods were used instead of the preferred standard methods that depend on variances. In order to have at least 90% precision in the arithmetical mean cost of procedures done, comparisons were only made between procedures that had at least 10 admissions to day clinics. The average costs of procedures that met the inclusion criteria were compared by means of the binomial test.<sup>12</sup>

The binomial test entailed a comparison between the total number of cases where the equivalent procedure was less expensive in a day clinic and the total number of cases where the converse was true. The total number of similar procedures done in either an ASC or a hospital was counted. The average cost by procedure for all the procedures done in either the ASC or hospital was calculated. The difference between these average in-facility costs was calculated and recorded. In addition, for each procedure PF&M cost for all claims submitted 7 days before admission, during admission and for 14 days after discharge were calculated and compared.

### Theoretical expectation (null hypothesis)

The null hypothesis was that the difference between the mean costs for a similar procedure or group of procedures in an ASC or hospital is zero.

The alternative hypothesis was that the difference between the mean costs for a similar procedure or group of procedures in an ASC or hospital is not zero.

The proportion of procedures in which the clinic costs were less than hospital costs was compared to a half (or 0.5) on the assumption that if there was no difference the number of procedures for which the clinic was cheaper would follow a binomial distribution with parameters  $N = 51$  (number of procedures) and  $\pi = 0.5$ .

### LIMITATIONS

Average costs by procedure for ASCs were compared with average costs from hospitals. A particular ASC or hospital may have been consistently more or less expensive for a particular procedure or group of procedures.

Patients' total costs to medical aid were only monitored for 7 days before ASC or hospital admission and for 14 days post discharge. In the unlikely event that a patient required post-discharge medical care as a result of the surgery for more than 14 days, then the additional costs would have been ignored. In view of the type of surgical procedures being compared, this was highly unlikely.

Not considered were:

1. Patients' age, physical fitness, present medication, previous medical and surgical history or clinical risk. These

factors could influence the surgeon's decision to admit to either an ASC or hospital. However, we did not have any evidence to suggest that those admitted to ASCs were healthier.

2. Because of the smaller number of patients admitted to ASCs, the average day clinic costs are more variable.

3. Surgeons' qualifications, skill and experience.

4. The accuracy of the accounts and procedural codes submitted by surgeons, ASCs, hospitals or other providers of health care.

## RESULTS AND DISCUSSION

### Number of admissions

A total of 89 216 patients were admitted to an in-facility during 1997 — 5 490 to ASCs and 83 726 to hospitals. Although 408 different combinations of surgical procedures were claimed for, only 51 met the inclusion criteria.

### Types of procedures and extent of cost savings in ASCs

The surgical disciplines that had admitted patients to ASCs included dentistry, general surgery, gynaecology, ophthalmology, orthopaedics, otorhinolaryngology and urology. The range of surgical procedures admitted by some of the disciplines, when compared with those done in ASCs in Europe and the USA, was limited. Many more different types of general surgical procedures are undertaken in ASCs overseas, including appendectomies, cholecystectomies, inguinal hernia and thyroid operations.<sup>11,13-22</sup>

In Tables I - VIII, the 'Procedure done' column summarises the RAMS tariff code/s claimed for by the surgeons who operated on the patients. Different types of procedures may be done at the same time. This column shows the various combinations of procedures claimed for by the surgeons that met the inclusion criteria.

Taking into account both in-facility and PF&M costs, 45 types of procedures (88%) were less expensive in an ASC compared with a hospital. The binomial test with  $N = 51$ ,  $x = 45$ ,  $\pi = 0.5$  and  $\alpha = 0.05$  yielded a  $P$ -value of less than 0.01. Hence the null hypothesis was rejected in favour of the alternative hypothesis.

Tables I - VII are surgical discipline-specific. The first two columns, for hospitals and ASCs, show the number of procedures done together with their average in-facility and PF&M costs. The last two columns show the recorded average cost saving by in-facility and PF&M.

The in-facility cost savings varied from 1% in certain dental procedures to 90% in 'Gastroscopy and oesophagoscopy with minor procedures'. On average, it was one-third (33%) less expensive to perform tonsillectomy and myringotomy together with the insertion of ventilation tubes in an ASC. A similar study in the USA reported a 46% ASC saving.<sup>5</sup>



**Table I. Dental procedure costs in day clinics compared with hospitals**

Procedure done	Hospital			ASC/day clinic			In-facility average cost		Average PF&M cost	
	Number done	Average cost	Average PF&M cost	Number done	Average cost	Average PF&M cost	Saving (R)	Saving (%)	Saving (R)	Saving (%)
Diverse dental anaesthetics, impacted or unerupted teeth	133	1 850.94	1 313.01	80	1 517.41	1 214.37	333.53	18	98.64	8
Diverse dental anaesthetics, treatment of sepsis	26	1 890.82	1 367.79	16	1 580.51	1 102.81	310.31	16	264.98	19
Impacted or unerupted teeth	1 907	1 844.03	1 313.66	774	1 744.43	1 205.51	99.60	5	108.15	8
Impacted or unerupted teeth plus treatment of sepsis	33	2 613.77	1 898.78	11	1 730.27	1 645.04	883.50	34	253.74	13
Periodontal surgical procedures	105	3 304.80	3 660.10	59	2 651.08	2 098.33	653.72	20	1 561.77	43
Removal of roots plus surgical removal of teeth	29	2 298.62	1 945.43	20	2 268.79	1 656.16	29.83	1	289.27	15
Treatment of dental sepsis	219	1 811.18	1 273.87	49	1 656.77	1 261.32	154.41	9	12.55	1

**Table II. General surgical procedure costs in day clinics compared with hospitals**

Procedure done	Hospital			ASC/day clinic			In-facility average cost		Average PF&M cost	
	Number done	Average cost	Average PF&M cost	Number done	Average cost	Average PF&M cost	Saving (R)	Saving (%)	Saving (R)	Saving (%)
Breasts: biopsy or excision of cyst or benign tumour	369	1 744.12	1 025.93	26	1 308.74	716.99	435.38	25	308.94	30
Colonoscopy	666	1 452.60	1 294.69	59	787.04	985.52	665.56	46	309.17	24
Colonoscopy gastroscopy	421	2 194.33	2 167.11	40	1 002.22	1 303.89	1 192.11	54	863.22	40
Extensive resection for malignant soft-tissue tumour	293	2 052.46	1 227.44	18	921.42	797.56	1 131.04	55	429.88	35
Excision of large benign tumour	225	1 748.86	997.94	20	1 081.33	753.77	667.53	38	244.17	24
Gastroscopy	2 030	2 007.99	1 532.15	195	635.78	976.32	1 372.21	68	555.83	36
Gastroscopy oesophagoscopy with minor procedures	35	4 992.02	2 960.73	19	508.04	1 410.23	4 483.98	90	1 550.50	52
Major debridement of wound sloughectomy or secondary suture	190	4 186.35	1 326.67	10	1 514.14	853.65	2 672.21	64	473.02	36
Radical excision of nailbed	160	1 410.11	711.94	30	999.30	637.96	410.81	29	73.98	10
Skin: removal of benign skin lesion under general anaesthesia	238	1 435.36	757.05	80	982.76	721.57	452.60	32	35.48	5
Tumour/cyst removal	19	1 791.66	1 796.69	11	1 704.03	1 739.71	87.63	5	56.98	3

Performance of certain procedures (five types of dental and one gynaecological procedure) was more expensive in an ASC (Table VIII). The average increase in in-facility cost varied between 3% and 41%. The removal of impacted roots or unerupted teeth was the most expensive procedure.

### Sources of cost saving

Thirty-seven procedures showed a cost saving of between 13% and 90% in ASCs.

The in-facility costs are usually charged at the RAMS recommended tariff of fees. ASCs are compensated at a lower rate for theatre time, ward stay and use of equipment. Except for dentistry and urology, ASC theatre fees were always lower than those of hospitals (Table IX). One possible explanation for

this finding is that certain additional work may have been undertaken while the patient was under anaesthesia in an ASC incurring additional theatre fees, while not being claimed by the surgeon.

### Medicines

The cost of medicines in the theatre, in the ward and to take out (TTO) showed much variability. It ranged from always more expensive for TTO in ophthalmology to always less expensive in otorhinolaryngology.

Dispensary drugs, except for dentistry, were always less expensive when the patient was operated on in an ASC. Dispensary drugs do not form part of ward stock and need to be specially ordered for the patient.



**Table III. Gynaecology procedure costs in day clinics compared with hospitals**

Procedure done	Hospital			ASC/day clinic			In-facility average cost		Average PF&M cost	
	Number done	Average cost	Average PF&M cost	Number done	Average cost	Average PF&M cost	Saving (R)	Saving (%)	Saving (R)	Saving (%)
Cryo- or electro-cauterisation										
D&C	59	1 091.29	765.93	11	793.07	947.49	298.22	27	-181.56	-24
D&C	499	1 137.89	844.40	68	813.60	703.78	324.29	28	140.62	17
D&C plus laparoscopic sterilisation and minor procedures	406	2 298.22	1 224.82	46	2 072.28	1 215.91	225.94	10	8.91	1
D&C plus laparoscopy	154	2 023.75	1 108.87	24	1 437.94	1 032.71	585.81	29	76.16	7
Evacuation of uterus	712	1 429.60	1 082.45	46	1 071.36	897.47	358.24	25	184.98	17
Hysteroscopy	238	1 403.14	987.14	12	1 472.83	792.33	-69.69	-5	194.81	20
Laser or harmonic scalpel treatment of the cervix	59	1 484.36	764.55	26	1 184.31	942.49	300.05	20	-177.94	-23
Laparoscopic sterilisation and minor procedures	986	2 474.22	1 325.83	32	2 145.10	912.13	329.12	13	413.70	31
Laparoscopy	364	2 485.91	1 201.54	20	1 615.30	834.07	870.61	35	367.47	31

D&C = dilatation and curettage.

**Table IV. Ophthalmology procedure costs in day clinics compared with hospitals**

Procedure done	Hospital			ASC/day clinic			In-facility average cost		Average PF&M cost	
	Number done	Average cost	Average PF&M cost	Number done	Average cost	Average PF&M cost	Saving (R)	Saving (%)	Saving (R)	Saving (%)
Cataract removal	1 447	2 775.26	3 521.52	60	2 793.74	3 075.23	-18.48	-1	446.29	13
Pterygium conjunctival cyst	68	1 428.10	743.20	15	1 102.87	671.20	325.23	23	72.00	10

**Table V. Orthopaedic procedure costs in day clinics compared with hospitals**

Procedure done	Hospital			ASC/day clinic			In-facility average cost		Average PF&M cost	
	Number done	Average cost	Average PF&M cost	Number done	Average cost	Average PF&M cost	Saving (R)	Saving (%)	Saving (R)	Saving (%)
Arthroplasty debridement large joints, arthroscopy (excluding aftercare)	298	3 201.11	1 893.45	10	2 007.98	1 708.28	1 193.13	37	185.17	10
Bursae and ganglia excision	212	1 766.87	823.50	16	1 397.17	641.20	369.70	21	182.30	22

### Professional fees

An additional finding was that on average professional fees are lower when the procedure is undertaken in an ASC.

The PF&M in each table records, for each of the procedures, the total costs of the surgeon as well as any referrals and medicine/s prescribed or dispensed 7 days before admission and for 14 days after discharge. Referrals include physiotherapy and occupational therapy.

Hospital stay for more than 1 day, because the patient is

'readily available', has the potential to increase the number of referrals, and hence the overall cost of the procedure. Surgeons need to be aware of the cost implications of 'standing orders' applied to every patient.

Except in those cases where there is a need to make use of special equipment during in-facility stay, for example cryo- or electro-cauterisation during dilatation and curettage (Table III) or diathermy to nose or pharynx (Table VI), the PF&M costs are almost always less when the procedure is undertaken in an ASC.



Table VI. Otorhinolaryngology procedure costs in day clinics compared with hospitals

Procedure done	Hospital			ASC/day clinic			In-facility average cost		Average PF&M cost	
	Number done	Average cost	Average PF&M cost	Number done	Average cost	Average PF&M cost	Saving (R)	Saving (%)	Saving (R)	Saving (%)
Diathermy to nose or pharynx plus dissection of tonsils and adenoidectomy	46	1 670.59	659.67	13	1 058.84	971.16	611.75	37	-311.49	-47
Dissection of tonsils and adenoidectomy	1 554	1 664.21	748.03	158	1 189.24	671.51	474.97	29	76.52	10
Dissection of tonsils and adenoidectomy plus instrumental examination of the nasopharynx	84	1 669.29	752.04	26	1 048.82	935.82	620.47	37	-183.78	-24
Dissection of tonsils and adenoidectomy plus proof puncture uni- or bilateral	94	1 736.15	736.99	10	1 177.27	899.23	558.88	32	-162.24	-22
Instrumental examination of the nasopharynx plus myringotomy with insertion of ventilation tube	32	1 168.53	775.90	11	973.80	879.65	194.73	17	-103.75	-13
Myringotomy with insertion of ventilation tube — unilateral	89	1 145.04	908.05	18	599.87	829.63	545.17	48	78.42	9
Myringotomy with insertion of ventilation tube — bilateral	1 070	1 214.12	851.77	101	838.87	675.49	375.25	31	176.28	21
Myringotomy	60	941.17	2 474.32	13	639.42	689.49	301.75	32	1 784.83	72

Table VII. Urology procedure costs in day clinics compared with hospitals

Procedure done	Hospital			ASC/day clinic			In-facility average cost		Average PF&M cost	
	Number done	Average cost	Average PF&M cost	Number done	Average cost	Average PF&M cost	Saving (R)	Saving (%)	Saving (R)	Saving (%)
Circumcision	548	1 449.78	629.22	37	1 197.73	557.11	252.05	7	72.11	11
Cystoscopy and minor procedures	773	2 352.69	1 558.36	21	1 014.71	1 027.59	1 337.98	57	530.77	34
Cystoscopy and minor procedures plus internal urethrotomy	173	2 134.95	1 571.69	11	983.23	761.12	1 151.72	54	810.57	52
Cystoscopy: hospital equipment	389	1 710.62	1 201.28	11	1 011.12	657.91	699.50	41	543.37	45
Cystoscopy: hospital equipment plus internal urethrotomy	64	1 998.29	1 213.60	21	916.71	906.51	1 081.58	54	307.09	25
Vasectomy unilateral and bilateral	324	1 333.53	703.47	44	1 221.23	561.45	112.30	8	142.02	20

In 40 of the 51 procedures the PF&M costs were between 1% and 72% lower in ASCs. The least savings occurred with 'Laparoscopic sterilisation and minor procedures', while the greatest savings occurred with 'Myringotomy'.

#### Procedures with no cost savings

Table VIII lists the procedures that were more expensive to perform in ASCs.

#### CONCLUSION

Strong evidence exists that on average and for most procedures

currently undertaken in either an ASC or hospital, ASCs are less expensive than hospitals for both in-facility and PF&M costs.

#### Quality of care

Although the quality of care was not specifically measured, there is no reason to suspect that there was any difference between outcomes in patients operated on in ASCs compared with hospitals. We could not find any evidence to suggest that patients discharged from ASCs required any more post-discharge care or had to be re-admitted more often for complications, than those discharged from hospitals.



Table VIII. Procedures that are more expensive to do in day clinics compared with hospitals

Procedure done	Hospital			ASC/day clinic			In-facility average cost		Average PF&M cost	
	Number done	Average cost	Average PF&M cost	Number done	Average cost	Average PF&M cost	Saving (R)	Saving (%)	Saving (R)	Saving (%)
<b>Dentistry</b>										
Impacted or unerupted teeth, removal of roots	50	2 054.86	1 528.21	37	2 159.22	1 481.05	-104.36	-5	47.16	3
Impacted or unerupted teeth, removal of roots plus surgical removal of teeth	14	1 931.14	1 573.04	10	2 727.25	1 818.94	-796.11	-41	-245.90	-16
Impacted or unerupted teeth plus surgical removal of teeth	119	1 959.45	1 356.13	93	2 124.94	1 428.16	-165.49	-8	-72.03	-5
Removal of roots	176	1 752.09	1 336.04	82	1 796.36	1 334.52	-44.27	-3	1.52	0
Surgical removal of teeth	173	1 883.57	1 180.88	128	1 856.99	1 213.20	26.58	1	-32.32	-3
<b>Gynaecology</b>										
Hysteroscopy, laparoscopic sterilisation and minor procedures	95	2 891.59	1 329.11	20	3 034.41	1 377.35	-142.82	-5	-48.24	-4

Table IX. Percentage of cases where the average cost per patient for each cost category was lower in ASCs compared with hospitals

	Theatre fee (%)	Theatre drugs (%)	Ward drugs (%)	TTO drugs (%)	Dispensary drugs (%)
Table I: Dental procedures	57	29	29	86	86
Table II: General surgical procedures	100	45	73	82	100
Table III: Gynaecology procedures	100	25	50	75	100
Table IV: Ophthalmology procedures	100	50	50	0	100
Table V: Orthopaedic procedures	100	0	100	50	100
Table VI: Otorhinolaryngology procedures	100	25	50	100	100
Table VII: Urology procedures	83	33	87	50	100

## In-facility costs

Although the reduced tariff of fees for ASCs contributed to the cost savings, this alone could not explain the difference in in-facility costs. Other factors that may have contributed are preferential bulk-buying discounts, limited range of available pharmaceuticals and consumables, and the reduced opportunity for in-facility referrals.

## PF&M costs

Surgeons can significantly influence the cost of procedures not only by their choice of in-facility, but also by: (i) the number and type of referrals they make; (ii) the medicines and consumables they use; and (iii) the length of their patients' stay in theatre, intensive care, high care and the ward.

This study shows that there is the potential to reduce costs of surgical procedures normally undertaken in hospitals. It also highlights the need to investigate in more detail the reasons for the differences in the average in-facility and PF&M costs.

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