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International Comparison of South African Private Hospitals Price Levels

Luca Lorenzoni, Tomas Roubal

JEL Classification: C43, D24, I13, M41

**DIRECTORATE FOR EMPLOYMENT, LABOUR AND SOCIAL AFFAIRS
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INTERNATIONAL COMPARISON OF SOUTH AFRICAN PRIVATE HOSPITALS PRICE LEVELS

Luca Lorenzoni (1), Tomas Roubal (2)

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Figures used in this paper are sourced from OECD Health Statistics 2015, unless otherwise specified. All figures reported for South Africa are from the private hospital sample described unless otherwise indicated.

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EXECUTIVE SUMMARY

1. The health system in South Africa is unique in many ways. South Africa spends 41.8% of total health expenditures on private voluntary health insurance – more than any OECD country – but only 17% of the population – mostly high income citizens - can afford to purchase private insurance. Given the magnitude of private health expenditures, the activities in the private health care market have an important impact on the functioning of the health care system as a whole. Medical schemes (private health insurance) in South Africa mainly finance care that is predominantly delivered by private providers (i.e., private hospitals, specialists, general practitioners, pharmacies). Therefore, these schemes primarily finance an alternative to seeking care in the public sector and offer services that duplicate those available in the public sector.

2. This study aims to conduct a comparison of price levels for private hospital services in South Africa with hospital services in the public and private sector in a selection of OECD countries. The methodology applied has been used and validated in OECD countries, in identifying a sample of services based on standardized definitions, and collecting information on the number of hospitalizations, average length of stay, price per case type, and its cost structure. Hospital data from 625,940 cases for 2011-12-13 were provided by several large medical schemes in South Africa. Comparator hospital data were collected from OECD countries for the same period as part of the OECD-Eurostat regular data collection on Purchasing Power Parities (PPPs).

3. Results from OECD countries indicate that a country's wealth as measured by per capita GDP correspond with higher price levels for hospitals. Given that South Africa has the lowest GDP per capita relative to OECD countries in this study, one would expect hospital price levels in South Africa to be significantly lower in comparison with OECD averages. However, South Africa is an exception to this trend. Despite having the lowest GDP per capita in the sample of countries, price levels for private hospital services are comparable to the average observed across OECD countries. Private hospital prices in South Africa are *on par* with prices in countries with much higher GDP levels - including the United Kingdom, Germany, and France.

4. Furthermore, general prices for goods and services in South Africa are half (53%) of that observed in OECD countries. Private hospital price levels are the least affordable in South Africa in comparison with OECD countries, as they have exceeded general price levels by an extent that is not observed in other countries for which data is available. In addition, for the selected hospital services, prices increased above the rate of inflation - on average by 6.5 percentage points per year between 2011 and 2013. The study finds that surgical services accounted for the majority of total claims in this sample (60%), and this share had increased over time from 54% in 2011. Payments to specialists appear to be driving this increase. Hospital costs, however, are the main component of both surgical and medical cases studied. In examining volume, we find that admissions are relatively high based on the available data but average length of stay was lower for all conditions studied compared to OECD averages.

5. In summary, private hospital prices are expensive relative to what could reasonably be predicted given the country's income and are likely to be expensive even for individuals with higher levels of income. However, the findings have implications far beyond the personal budgets of the fraction of the population that can afford them, as they set benchmarks for how much the public sector has to attract medical specialists to work in the public sector. This study suggests that policies to control price increases while ensuring accessibility and quality are needed. There is scope to improve the value provided to South Africans for their considerable spending on health care.

RESUME

6. Le système de santé sud-africain est unique à plusieurs égards. L'assurance maladie privée volontaire représente 41.8% des dépenses totales de santé sud-africaines - plus que tous les pays de l'OCDE - mais seul 17% de la population – surtout des citoyens à revenus élevés - peut souscrire à une assurance privée. Compte tenu de l'étendue des dépenses de santé privées, les activités du marché privé ont un impact important sur le fonctionnement du système de santé dans son ensemble. Les assurances maladie privées en Afrique du Sud financent principalement des soins fournis par des professionnels privés (hôpitaux privés, spécialistes, généralistes, pharmacies). Elles représentent par conséquent une alternative à la recherche de soins dans le secteur public et offrent les mêmes services que ce dernier.

7. Cette étude vise à comparer les niveaux de prix des services dans les hôpitaux privés sud-africains avec ceux des services hospitaliers privés et publics dans des pays de l'OCDE sélectionnés. La méthodologie utilisée, et validée dans les pays de l'OCDE, a identifié un échantillon de services basé sur des définitions standardisées et a rassemblé l'information sur le nombre d'hospitalisations, la durée moyenne de séjours, le prix pour les services hospitaliers, et la structure des coûts. Des données hospitalières de 625,940 cas pour 2011-12-13 ont été fournies par plusieurs programmes médicaux en Afrique du Sud. Des données hospitalières comparables ont ainsi été collectées dans les pays de l'OCDE pour la même période dans le cadre de la collecte régulière de données OCDE-Eurostat sur les Parités de Pouvoir d'Achat (PPAs).

8. Les résultats pour les pays de l'OCDE indiquent que la richesse d'un pays (mesurée par le PIB par habitant) est associée à des niveaux de prix plus élevés pour les hôpitaux. L'Afrique du Sud, qui affiche un faible PIB par habitant, est une exception à cette règle. Malgré un plus faible PIB par habitant, les niveaux de prix des services hospitaliers sont comparables aux moyennes observées dans les pays de l'OCDE. Les prix des hôpitaux privés en Afrique du Sud sont équivalents aux prix constatés dans les pays affichant un PIB beaucoup plus élevé – incluant la Grande Bretagne, l'Allemagne ou la France.

9. De plus, les prix des biens et services en Afrique du Sud sont moitié moins chers (53 %) que ceux observés dans les pays de l'OCDE. Les niveaux de prix dans les hôpitaux privés sont donc moins abordables en Afrique du Sud que dans les autres pays de l'OCDE. Ils ont en effet largement dépassé le niveau général des prix, alors que cette tendance n'est pas observée dans les autres pays pour lesquels les données sont disponibles. En outre, les prix des services hospitaliers ont augmenté plus vite que l'inflation - en moyenne de 6.5 points par an de 2011 à 2013. L'étude montre que les services chirurgicaux représentent la majorité des créances totales dans cet échantillon (60%), en augmentation depuis 2011 (54%). La rémunération des médecins spécialistes semble être la cause de cette augmentation. Cependant, les coûts hospitaliers sont la principale composante des cas médicaux et chirurgicaux étudiés. En examinant le volume d'activité, sur la base des données disponibles, l'étude montre que les admissions sont relativement plus élevées mais que la durée moyenne de séjour est inférieure pour toutes les maladies étudiées par rapport aux moyennes de l'OCDE.

10. En résumé, les prix des hôpitaux privés sont relativement élevés par rapport à ce que l'on pourrait envisager compte tenu du niveau de richesse du pays. Et il se peut qu'ils soient élevés même pour les individus ayant les plus hauts revenus. Mais les implications de ces résultats ne concernent pas seulement la fraction de la population qui peut se payer de tels services hospitaliers. Les hôpitaux privés établissent des normes autour de la rémunération des médecins spécialistes pour rendre le travail attrayant dans le secteur public. Cette étude montre qu'il est nécessaire de mettre en place des politiques visant à contrôler l'augmentation des prix tout en assurant l'accessibilité et la qualité des soins. Des progrès restent à faire pour améliorer les résultats obtenus étant donné les niveaux importants de dépenses de santé de la population sud-africaine.

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1. PURPOSE OF THE STUDY

11. The purpose of the study is to compare utilization of hospital services and hospital price levels in South Africa with OECD countries. The study first examines the correlations between a country's wealth and service prices, and compares price levels in South Africa with OECD countries. We then aim to evaluate the cost drivers of hospital prices, including admissions, length of stay, and the components of the cost. This study focuses on private hospitals and a forthcoming study will expand the analysis to public hospitals.

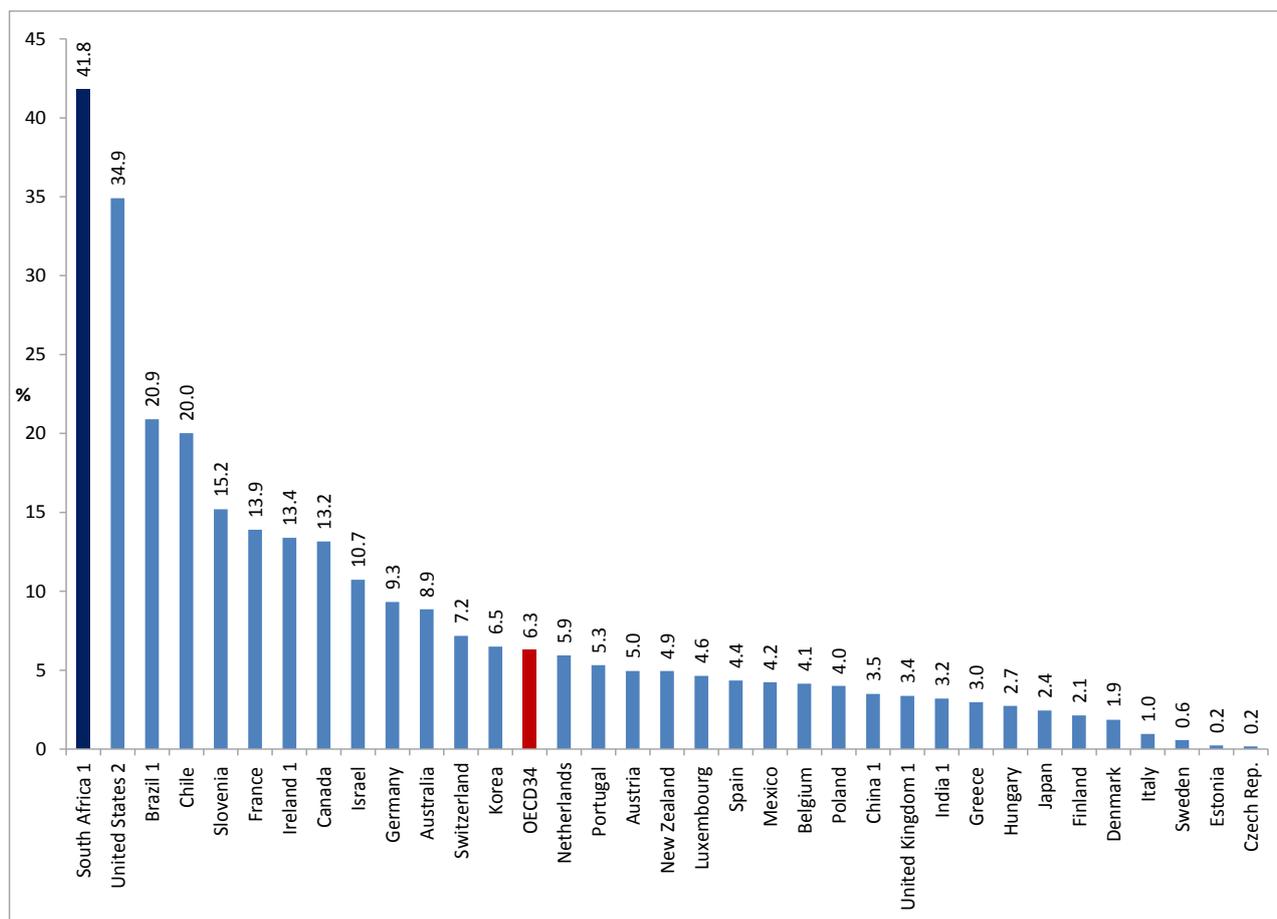
2. WHY SOUTH AFRICA IS UNIQUE

12. South Africa spends a higher share of its total health expenditure on private voluntary health insurance compared with any OECD country – including the United States (Figure 1). Total expenditures on health amounted to R311 billion in 2013¹. Private voluntary health insurance accounts for 41.8% of total health spending, which is more than 6 times the 2013 OECD average of 6.3%. Out of pocket payments are relatively low and account for an estimated 6.5% of total health spending in 2013, which represents around one-third of the 2013 OECD average². These payments are primarily spent within the private sector as co-payments or upfront payments made by individuals and households that access private health care. In the public sector, means testing is applied in public hospitals and can also result in some levels of co-payments but this is considered minimal.

¹ Data for 2013/2014, National Treasury, Provincial budgets and expenditure review: 2010/11 – 2016/17, page 53.

² While South Africa is unique in having a well-established private health insurance despite being a developing country, it is not unusual for developing countries to have a high share of health expenditure from private sources, mostly from households' out-of-pocket payments.

Figure 1. Private health insurance as a share of total current health expenditures (%), 2013



1. Data refer to total health expenditure (= current health expenditure plus capital formation).
2. Social security reported together with general government.

Source: OECD Health Statistics 2015.

13. Despite high levels of expenditure (41.8%), voluntary health insurance serves a smaller share of the population (17%) compared with OECD countries. Around 17% of the population were enrolled in 87 medical schemes registered in South Africa at the end of 2013³. There is no obligation for individuals to purchase health insurance in South Africa, although, in some cases, private employers require enrolment in health insurance. In addition, the Government provided tax credits of R15.9 billion in 2014 to members of medical schemes, which represents 12% of gross income from contributions⁴.

14. The South Africa constitution guarantees universal access to health services, which enables 83% of the population access public health services at no or little cost to patients. The South Africa constitutional obligation of universal access is primarily fulfilled through subsidizing the costs of care from

³ Twenty-four schemes – around one quarter of the total – were “open” at end-2013, representing 55% of revenues of all schemes. Council for Medical Schemes 2014.

⁴ National Treasury (2015) Budget Review 2015, Pretoria, p.134
<http://www.treasury.gov.za/documents/national%20budget/2015/review/FullReview.pdf>

public hospitals and primary care clinics, and emergency services. Nearly 60% of total health expenditures are channelled through the public health system and services.

15. South Africa's medical schemes offer duplicative and supplementary private health insurance on a voluntary basis, with open enrolment and community rating. Medical schemes in South Africa mainly finance an alternative to seeking care in the public sector, by reimbursing private hospitals and specialists, thus offering services that duplicate those available in the public sector⁵. They also offer supplementary benefits, including services not available in the public sector. In some OECD countries, private health insurance plays a similar role to that in South Africa. Australia, Finland, Ireland, Italy, New Zealand, Portugal, Spain and the United Kingdom provide access to public health care services for all, but offer individuals the choice of purchasing voluntary private health insurance that reimburses care in a private facility. The benefits enjoyed include upgraded hospital accommodation, choice of treating doctors, lower waiting times and perception of higher quality services. In OECD countries studied, private health insurance also extends supplementary services not provided by the public sector. Among this group of comparator countries, the proportion of the population covered by private health insurance in Australia, Ireland, New Zealand and Portugal is higher than South Africa, it is lower in Finland and Spain (Table 1).

16. OECD countries with high levels of private health insurance coverage are usually qualitatively different from South Africa as they focus principally on supplementary coverage. In France, the Netherlands, Switzerland, Israel, Belgium, Slovenia and Luxembourg, private insurers principally focus on covering the gap between public cover and/or providing access to enhanced services. Germany is more unusual in that it has public social insurance but some 11% of the population⁶ choose to opt-out of this and receive cover from a private health insurer. Similarly, the United States has a tradition of employer and self-financed health insurance that reimburses care for those that are not eligible for the two major public programmes (Medicare and Medicaid).

⁵ Kumar et al 2014. Pricing and competition in specialist medical services: overview for South Africa.

⁶ Only a share of the population has the possibility to do so. One of the criteria is the gross salary. In 2012, above a gross salary of 50,850 euros, people could choose between a state health insurance and a private health insurance.

Table 1. Population covered by Private Health Insurance in 2011 (or nearest year)

Country	Population covered by PHI, %	Types of private coverage
Australia	52.5	Supplementary, duplicate
Austria	34.2	Supplementary
Belgium	79.6	Complementary
Canada	68	Supplementary
Chile	17	Primary
Denmark	20.8	Complementary
Finland	14.2	Duplicate, complementary, supplementary*
France	96.1	Complementary
Germany	32	Primary, complementary
Greece	12	Duplicate
Iceland	0.2	Primary
Ireland	47.5	Duplicate
Israel	80	Supplementary
Korea	51.1	Complementary
Luxembourg	54	Complementary
Mexico	6.9	Primary
Netherlands	89	Supplementary
New Zealand	30.8	Complementary
Portugal	19.8	Duplicate
Slovenia	73	Complementary, supplementary, duplicate
Spain	13.4	Primary, Duplicate
Switzerland	29.5	Supplementary
Turkey	4.6	Primary
United States	60.6	Primary, complementary

*Latest information available in OECD, 2004

Source: Health at a glance, 2013 and OECD, 2004

17. Given the magnitude of private health expenditures, the activities in the private health care market have a significant spill-over impact on the functioning of public health care system. The high proportion of spending on private sector facilities and their major role in attracting doctors mean that prices set in the private sector set labour market benchmarks that doctors face in choosing between working in a public or private facility. This can have a considerable impact across the health care system as a whole. Private hospitals can spend heavily on their personnel and on facilities and technologies that make them attractive to medical specialists. Private hospitals account for 26% of the country's total hospital bed capacity but attract 55% of medical specialists⁷. The competition for human resources with the economically significant private health sector can lead to competition on wages with the public sector. In this way, benchmarks established in the private sector for doctors' remuneration could constrain the public sector's expansion efforts.

18. The private hospital sector in South Africa is highly concentrated in urban areas, with three hospital groups accounting for an estimated 70% of the market. Members of medical schemes are concentrated around economic hubs in Gauteng province (35% members), KwaZulu-Natal and Western Cape province (both around 15%). The concentration of private hospitals in urban areas with large markets implies difficulties in maintaining a regionally balanced distribution of medical professionals⁸.

19. Other OECD countries have measures to prescribe, cap or signal prices - often in a collective way - that South Africa lacks. In OECD countries with health insurance systems, the public sector tends to have

⁷ Health Systems Trust, 2010.

⁸ On the contrary, public hospitals are well distributed between urban and rural areas.

some form of price setting for hospitals and specialist medical services, and this often provides benchmarks for the private sector (de Lagasnerie *et al.* 2015). Developing credible prices and large increases in public spending have been common to OECD countries that have used private sector facilities to expand access to hospitals in recent years. OECD countries that have established some form of price setting or guidance have done so to improve the transparency of how public funds are spent and provide norms against which private sector prices can be compared. South Africa lacks these price measures. This means that negotiations between a handful of medical schemes (or their administrators) and private hospitals determine how a large section of the country's funds for health are spent. In this way, the public policy implications of the interactions between private insurers and private providers in South Africa are of considerable importance, particularly when compared with OECD countries that often do not have such high levels of private market concentration.

3. METHODOLOGY: DEFINITIONS AND PROCESS

20. The study aims to conduct a cross-country price comparison, which requires standard units, definitions, and ways of measurement that can be applied uniformly across all countries. The general approach used was one applied and validated in all OECD countries. The process is as follows:

- Identifying a sample of services (called “case types”) produced by hospitals.
- Collecting information on the number of hospitalizations and average length of stay per case type and in total.
- Collecting information on the price per case type together with its cost structure.

21. The term “case type” refers to categories of hospital services that are similar from a clinical perspective and in term of their consumption of resources. The selected case types characterize a representative sample of hospital services for international comparisons. The general case type identification is tailored to the specific information system in each country to achieve comparability across case types. The term “price” relates to the amount paid to healthcare providers from risk pools, savings accounts and out-of-pocket rather than the amount claimed. Payments to all private provider types are included in the analysis. This includes but is not limited to hospitals, specialists, pathologists, radiologists and allied and auxiliary providers. For the purpose of this analysis, length of stay is calculated as the difference between the admission date and the discharge date. However, a same day admission has a length of stay of 1 day. This definition was applied consistently across countries in the study.

22. The items for which prices are collected and reported in the present study should be comparable and representative⁹. It is clear that such a list will not be exhaustive as it cannot cover all hospital activities. However, exhaustiveness is not necessarily required if the selected case types are considered representative for a broad set of activities. Only “typical” cases were included in the population in study. Typical cases are those cases that underwent a normal and expected course of treatment. Atypical and long stay cases were excluded in the calculations. Atypical cases are defined as cases for which the “standard”

⁹ Further information on the methodology can be found in the Eurostat-OECD Methodological Manual on Purchasing Power Parities, published in 2012.

profile of care is not followed because of death, sign-out, or transfer to other facilities, while long stay cases are cases with a number of days of stay higher than 1 ½ standard deviations from the scheme's case type-specific mean. Only hospitals with at least 30 typical cases eligible for inclusion in this study population were included.

23. Annex 2 contains the list of the 28 case types under study. The ICD-10 codes for diagnoses and Current Procedural Terminology (CPT) codes for procedures that identify the case type are provided. This Annex represents the tailored case type definitions, which have been developed in collaboration with South African experts from medical schemes and their administrators. Rules and criteria for inclusion/exclusion are reported too¹⁰. Cases with more than one surgical procedure reported were excluded¹¹.

24. Four case types with a significant number of cases seen in a day surgery/outpatient surgery setting were identified: arthroscopic excision of meniscus of knee; cataract surgery; ligation and stripping of varicose veins - lower limb; and tonsillectomy and/or adenoidectomy. Number of cases and prices were collected also for those products when delivered in a day surgery/outpatient surgery setting¹². The total number of cases types for which data are collected is 32 (28 inpatient + 4 day surgery/outpatient surgery).

25. A total of 625,940 cases, of which 561,959 (89.8%) inpatient, were selected as the population in this study. Table 2 shows the percentage of atypical and long stay cases excluded from the population in study by year.

Table 2. Share of total cases excluded from study because of atypical and long stay cases. South African sample, by year

	% of total cases	
	Atypical	Long stay
2011	2.1	5.3
2012	2.5	4.3
2013	2.9	4.1

¹⁰ The case type definitions do not take into account the “severity” of the hospitalization case as proxied through secondary diagnoses and/or age. The main reasons include the way severity is measured and coding practices among countries. This means that severity is not a selection criterion for the case types identified for this study and all the hospitalization cases that match the case type definitions should be included independently of their severity level.

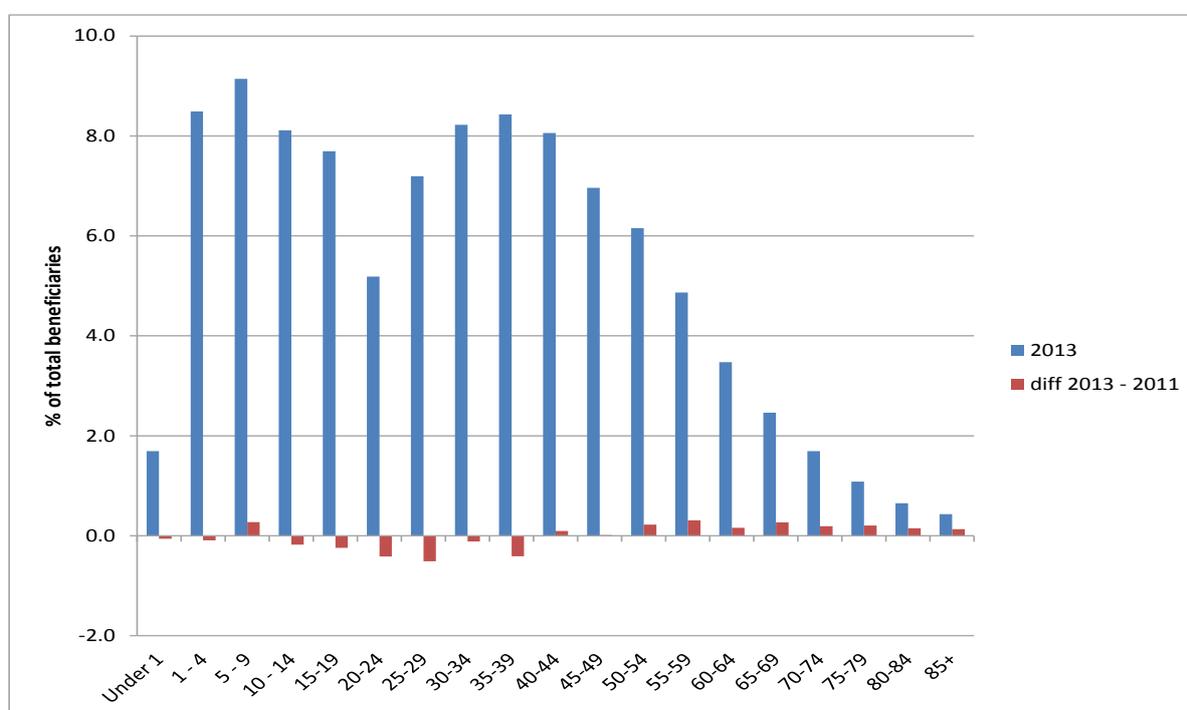
¹¹ This means that if for a case of hospitalization two different procedure codes that qualify for two different surgical case types are reported, then this case should be excluded; or if for a case of hospitalization one procedure code that qualifies for a case type and one additional operating room procedure code are reported, then this case should be excluded; or if during the same hospitalization bilateral hip (knee) replacement surgery replaces both hips (knees) at the same time, then this case should be excluded.

¹² It should be noted that the case type definitions are the same. Only the mode of production - inpatient versus day care/outpatient - varies.

4. DATA SOURCES

26. Hospital data were provided by several large medical schemes in South Africa for 2011-2013. These medical schemes enrolled 59.4 % of total beneficiaries in this sector at the end of 2013. Medical schemes provided the number of cases, the average length of stay and its coefficient of variation, the average price and its coefficient of variation by case type by year. Claims by groups of disciplines¹³ - a proxy of the cost structure - were also gathered by case type by year. It is notable that the membership of medical schemes increased by 5.9% per year – 6.2% for females and 5.5% for males - over this time period and thus changes in utilization should take into consideration this increase in membership. Furthermore, medical schemes reported an increase in the share of beneficiaries in older age categories if 2013 is compared to 2011 (Figure 2).

Figure 2. Distribution of beneficiaries by age band in 2013, and difference (in percentage points) between 2013 and 2011. South African sample



27. Hospital data were collected also from OECD countries for the same period as part of the OECD-Eurostat regular data collection on Purchasing Power Parities. Note that data from OECD countries include both public and private providers. The methodology used in other countries produces comparable case types and uses the same rules for calculating number of admissions, length of stay, exclusion criteria and price calculations. The OECD-Eurostat hospitals PPP survey collects data on the average quasi-prices¹⁴

¹³ Disciplines used for this study included “family practitioners and specialists”, “radiology”, “hospital”, “pathology” and “other”. Future work may carve out “pharmaceuticals” from the hospital component as pharmacy costs make up a significant part of hospital costs.

¹⁴ When goods or services are supplied by a non-market producer, measurement is based on costs per unit of case type or *quasi-prices*. They are those (unobserved) ‘prices’ that emulate a competitive situation where prices equal average costs per product. Unit costs can be treated *as if they were prices* (Diewert 2011 and 2012; Schreyer 2012). The term ‘quasi-prices’ is used in recognition that those values are frequently not observed in open and

for the selected case types. Quasi-prices are normally extracted from administrative databases maintained for the purposes of reimbursement and health financing. The quasi-price can be a negotiated price or an administered price; where the former refers to prices that have been established through negotiations between purchasers (third party payers) and providers of hospital services; and the latter reflect the average costs of the service provided. In either case, it is important that they cover the same types of costs across all participating countries reflecting the direct costs as well as the capital costs and overhead costs relating to the production of health services. The cost items included in the quasi-prices are listed in Annex 1.

28. Hospital utilisation rates in South Africa were compared against those reported in selected OECD countries for two case types, knee replacement and hysterectomy¹⁵ (OECD 2014). An age/sex standardised rate was calculated to eliminate the effect of differences in population age/sex structures. The standard population used for international comparisons is the 2010 OECD population which includes all 34 OECD countries. The age/sex standardised rate for each country is a weighted average of age and sex specific rates.

5. PURCHASING POWER PARITIES AND COMPARATIVE PRICE LEVELS

29. Purchasing Power Parities (PPPs) serve both as currency convertors and as spatial price deflators. They convert different currencies to a common currency and, in the process of conversion, equalise their purchasing power by eliminating the differences in price levels between countries. In their simplest form, PPPs are nothing more than price relatives that show the ratio of the prices in national currencies of the same good or service in different countries. PPPs indicate the composition of goods and services that contribute to a country's GDP.

30. In this study, PPPs were computed so as to be invariant to the choice of the base country. Calculation of PPPs uses the quasi-prices reported for each of the 32 hospital product types in each country. Hospital products are weighted in the calculation on the basis of the total cost for the case type (quasi-price times number of cases) expressed as the percentage of the total cost for all case types. For more details on the formulae used for the calculation and aggregation of PPPs, see Chapter 7 of the Methodological Manual on PPPs (European Union, OECD, 2012).

31. Comparative price levels reflect what people naturally do when comparing prices of a particular product across countries: they convert the price of a product in country A, expressed in country A currency into country B's currency by applying a market exchange rate. The resulting price (now expressed in units of country B's currency) is then compared with the actual price of the product in country B. If the converted price of country A's product exceeds the actual price of country B's product, country A would be seen as 'more expensive' than country B. Comparative price levels emulate this calculation by dividing PPPs (the ratio of the price observed in country A over the price observed in country B) by the market exchange rate between the two countries. If the resulting ratio exceeds unity, country A has a price level that is higher than the price level in country B. A different way of describing comparative price levels is that they indicate – for a given category or aggregate set of goods or services – the number of units of the common currency needed to buy the same volume of the category or aggregate.

competitive market transactions and are imputed to approximate what a market price might have been, if there were a market.

¹⁵ "Knee replacement" and "Hysterectomy" were the only hospital services included in the OECD study (2014) and for which a significant number of cases was reported in South Africa in 2011.

32. The average for the comparison group is calculated as the geometric mean of the comparative price levels across all countries included in the comparison group, and is then set equal to 100. Each country's comparative price level is then expressed in relation to the mean of 100. Results should be interpreted looking at the relative positions of countries rather than looking at absolute levels.

33. The first comparison group for benchmarking includes twenty OECD countries for which hospitals PPPs data were available in 2011-2013: Austria, Czech Republic, Estonia, Finland, France, Germany, Hungary, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland and United Kingdom. The average Gross Domestic Product per capita converted to a common currency (US dollars) and adjusted to take account of the different purchasing power of the national currencies at PPP is US\$ 41,224 in 2013 for the 20 OECD countries in this study. The corresponding figure for South Africa is US\$ 12,891.

34. The second comparison group for benchmarking includes a subset of seven countries selected from the first group on the basis of a Gross Domestic Product (GDP) per capita level closer of South Africa: Czech Republic, Estonia, Hungary, Poland, Portugal, Slovenia and Spain. The average GDP per capita converted to a common currency (US dollars) and adjusted to take account of the different purchasing power of the national currencies at PPP is US\$ 27,323 in 2013 for the seven countries.

35. PPPs are used to convert expenditures on aggregates (e.g. health) and GDP of different countries into real expenditures. The expenditures are real because in the process of being converted to a common currency, they are valued at a uniform price level and so reflect only differences in the volumes purchased in countries. PPPs and real expenditures provide the price and volume measures required for international comparisons. Note that in this study only price levels are compared. Price levels depend on exchange rates and maybe subject to large variations in line with exchange rates swings and should therefore be interpreted with caution.

36. Some authors (Insight, 2014) have suggested different benchmarks, such as the Gross National Income (GNI) for international comparisons of the private health sector in South Africa and that the comparisons should be the sub-population accessing private health services within South Africa. However, this study utilises existing validated methods for international comparisons, and national level GDP as per established methods. The principle is that prices of hospital services and affordability are relevant for the population as a whole rather a specific population subset that can already afford to use the services.

6. DESCRIPTION OF THE SOUTH AFRICAN SAMPLE

37. The total number of cases included in the analysis is 625,940, of which 561,959 (89.8%) inpatient cases (Table 3). This includes 195,776, 201,284, and 219,880 cases reported for 2011, 2012, and 2013, respectively. Pneumonia and caesarean section were the hospital services with the highest number of cases reported for each year in this study, accounting for 23.6% and 20.7% of the total number of cases in 2013. In addition, ligation and stripping of varicose veins as either surgical inpatient care and day surgery combined accounted for 10.7% of total cases, and tonsillectomy and/or adenoidectomy accounted for 8.5% of total cases. It is notable that 74-75% of total deliveries reported every year were caesarean section. The OECD average was estimated at 26% in 2011^{16 17}.

¹⁶ OECD Health at a Glance http://www.oecd-ilibrary.org/sites/health_glance-2011-en/04/09/index.html?itemId=/content/chapter/health_glance-2011-37-en

38. Between 2011 and 2013, the average annual rate of change¹⁸ in the number of cases across the 32 cases types was 6% (Table 3). This reflects in part the increase in membership among the schemes during the time period. However, the annual rates of change vary across the services. Percutaneous transluminal coronary angioplasty cases reported an annual increase of 161.8%, while the annual rate of increase for knee replacement was 24%. Similarly, other services that reported high annual rates of increase include discectomy (18.8%) and cholelithiasis (16.7%). All of the cases under study reported an increase in the annual rate of change between 2011 and 2013, with the single exception of ligation and stripping of varicose veins – lower limb as inpatient where the number of cases declined by 2.8%.

Table 3. Number of admissions and average annual rate of change by case type. South African sample, 2011-2013

	Case type	Year			Annual rate of change (%)
		2011	2012	2013	
Medical - Inpatient	M01 Acute Myocardial Infarction	1,381	1,475	1,668	9.9
	M02 Angina Pectoris	7,831	9,075	9,581	10.6
	M03 Cholelithiasis	532	654	725	16.7
	M04 Heart Failure	6,503	7,219	8,344	13.3
	M05 Malignant Neoplasm of Bronchus and Lung	677	776	837	11.2
	M06 Normal Deliveries	15,040	15,053	15,231	0.6
	M07 Pneumonia	49,025	49,676	51,783	2.8
Surgical - Inpatient	S01 Appendectomy	5,796	6,246	6,129	2.8
	S02 Caesarean section	41,865	45,798	45,571	4.3
	S03 Cholecystectomy	5,656	6,454	6,674	8.6
	S04 Colorectal resection	290	337	340	8.3
	S05 Coronary artery bypass graft	456	470	490	3.7
	S06 Discectomy	146	177	206	18.8
	S07 Endarterectomy	138	113	145	2.5
	S08 Hip replacement: total and partial	2,574	2,907	3,396	14.9
	S09 Hysterectomy: abdominal or vaginal	6,774	7,331	7,353	4.2
	S10 Knee replacement	2,898	3,610	4,455	24.0
	S11 Mastectomy	926	917	961	1.9
	S12 Open prostatectomy	284	262	307	4.0
	S13 Percutaneous transluminal coronary angioplasty	61	343	418	161.8
	S14 Peripheral vascular bypass	169	184	170	0.3
	S15 Repair of inguinal hernia	3,286	3,546	3,531	3.7
	S16 Thyroidectomy	995	1,121	1,241	11.7
	S17 Transurethral resection of prostate	852	835	875	1.3
	S18 Arthroscopic excision of meniscus of knee	860	781	1,002	7.9
	S19 Lens and cataract procedures	11,367	11,960	13,058	7.2
	S20 Litigation and stripping of varicose veins - lower limb	1,142	1,057	1,080	-2.8
	S21 Tonsillectomy and/or adenoidectomy	9,980	10,145	10,362	1.9
Day surgery / outpatient surgery	S18 Arthroscopic excision of meniscus of knee	177	170	204	7.4
	S19 Lens and cataract procedures	13,797	16,759	18,706	16.4
	S20 Litigation and stripping of varicose veins - lower limb	28	40	33	8.6
	S21 Tonsillectomy and/or adenoidectomy	4,270	4,793	5,004	8.3
	Total	195,776	210,284	219,880	6.0

39. To remove the effect of changes in membership over the period in study, admission rate by case type and their annual change are shown in Table 4. On average, for the conditions in study, admission rates are stable. However, we observe important changes in admission rates by case type which may be partly explained by changes in the demographic characteristics of beneficiaries over time (see Figure 2 above).

¹⁷ The WHO Statement on Caesarean Section Rates (2015) has noted that, as caesarean section rates increase above 10% and up to 30% no effect on mortality rates has been observed.

¹⁸ The rate was computed using a geometric growth formula.

Table 4. Admission rates (per 10,000 beneficiaries) and average annual rate of change by case type. South African sample, 2011-2013

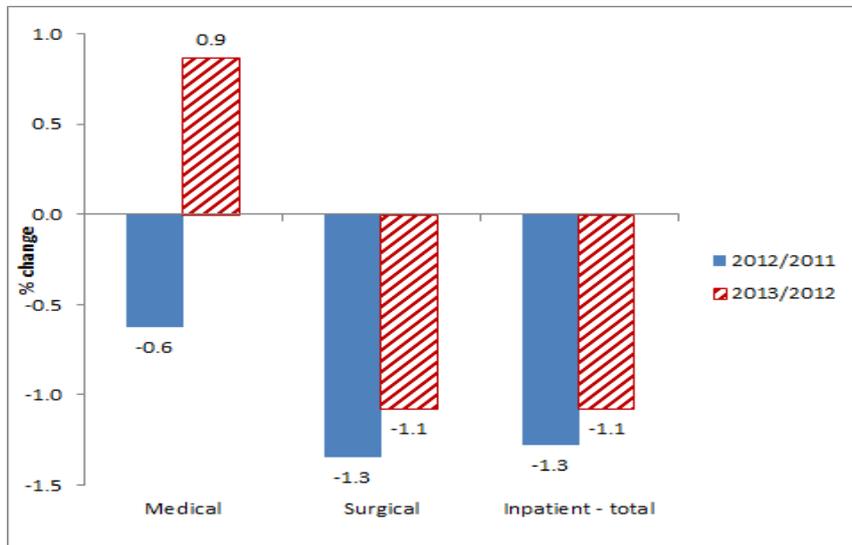
	Case type	Year			Annual rate of change (%)
		2011	2012	2013	
Medical - Inpatient	M01 Acute Myocardial Infarction	3.0	3.0	3.2	3.8
	M02 Angina Pectoris	16.8	18.3	18.4	4.5
	M03 Cholelithiasis	1.1	1.3	1.4	10.3
	M04 Heart Failure	14.0	14.5	16.0	7.0
	M05 Malignant Neoplasm of Bronchus and Lung	1.5	1.6	1.6	5.0
	M06 Normal Deliveries	32.3	30.3	29.2	-4.9
	M07 Pneumonia	105.4	100.1	99.4	-2.9
Surgical - Inpatient	S01 Appendectomy	12.5	12.6	11.8	-2.9
	S02 Caesarean section	90.0	92.3	87.4	-1.4
	S03 Cholecystectomy	12.2	13.0	12.8	2.6
	S04 Colorectal resection	0.6	0.7	0.7	2.3
	S05 Coronary artery bypass graft	1.0	0.9	0.9	-2.1
	S06 Discectomy	0.3	0.4	0.4	12.2
	S07 Endarterectomy	0.3	0.2	0.3	-3.2
	S08 Hip replacement: total and partial	5.5	5.9	6.5	8.5
	S09 Hysterectomy: abdominal or vaginal	14.6	14.8	14.1	-1.6
	S10 Knee replacement	6.2	7.3	8.5	17.1
	S11 Mastectomy	2.0	1.8	1.8	-3.8
	S12 Open prostatectomy	0.6	0.5	0.6	-1.8
	S13 Percutaneous transluminal coronary angioplasty	0.1	0.7	0.8	147.3
	S14 Peripheral vascular bypass	0.4	0.4	0.3	-5.2
	S15 Repair of inguinal hernia	7.1	7.1	6.8	-2.1
	S16 Thyroidectomy	2.1	2.3	2.4	5.5
	S17 Transurethral resection of prostate	1.8	1.7	1.7	-4.3
	S18 Arthroscopic excision of meniscus of knee	1.8	1.6	1.9	2.0
	S19 Lens and cataract procedures	24.4	24.1	25.1	1.3
	S20 Litigation and stripping of varicose veins - lower limb	2.5	2.1	2.1	-8.1
	S21 Tonsillectomy and/or adenoidectomy	21.5	20.4	19.9	-3.7
Day surgery / outpatient surgery	S18 Arthroscopic excision of meniscus of knee	0.4	0.3	0.4	1.4
	S19 Lens and cataract procedures	29.7	33.8	35.9	10.0
	S20 Litigation and stripping of varicose veins - lower limb	0.1	0.1	0.1	2.6
	S21 Tonsillectomy and/or adenoidectomy	9.2	9.7	9.6	2.3
Total		420.9	423.8	421.9	0.1

40. The average length of stay for the seven inpatient medical services under study was 3.9 days, and ranged from 4.7 days for malignant neoplasm to 2.3 days for normal deliveries in 2013 (Table 5). The annual rate of change between 2011 and 2013 ranges from -0.2% for pneumonia to 0.7% for cholelithiasis. Average length of stay for these cases underwent a slight decrease in 2012 and was followed by an increase of 1 percentage point in 2013 (Figure 3).

Table 5. Average length of stay and average annual rate of change by medical case type. South African sample, 2011-2013

Case type - Medical inpatient	Year			Annual rate of change (%)
	2011	2012	2013	
M01 Acute Myocardial Infarction	3.5	3.6	3.5	-0.1
M02 Angina Pectoris	2.7	2.6	2.7	0.4
M03 Cholelithiasis	2.8	2.8	2.9	1.1
M04 Heart Failure	5.0	5.0	5.0	-0.1
M05 Malignant Neoplasm of Bronchus and Lung	4.5	4.9	4.7	1.6
M06 Normal Deliveries	2.2	2.2	2.3	0.7
M07 Pneumonia	4.4	4.4	4.4	-0.2

Figure 3. Percentage change in average length of stay by type of hospital services. South African sample, 2011-2013



41. The average length of stay for the 21 typical inpatient services was 2.9 days, and ranged from 8.5 days for coronary artery bypass graft to 1.0 day for lens or cataract procedure (Table 6). Average length of stay has declined for many of these cases between 2011 and 2013. A one percentage point decrease in average length of stay (ALOS) for surgical cases was reported between 2011-2013 (Figure 3). The largest annual rates of decline in length of stay can be seen for thyroidectomy (11.3%), cholecystectomy (9.9%) and Ligation and stripping of varicose veins (8.7%).

Table 6. Average length of stay and average annual rate of change by inpatient surgical cases. South African sample, 2011-2013

Case type - Surgical inpatient	Year			Annual rate of change (%)
	2011	2012	2013	
S01 Appendectomy	3.3	2.9	2.8	-7.1
S02 Caesarean section	3.2	3.2	3.2	-0.2
S03 Cholecystectomy	3.7	3.2	3.0	-9.9
S04 Colorectal resection	8.0	8.0	7.5	-3.3
S05 Coronary artery bypass graft	9.0	9.0	8.5	-2.9
S06 Discectomy	4.2	4.0	3.6	-7.3
S07 Endarterectomy	5.4	4.8	4.7	-7.0
S08 Hip replacement: total and partial	7.1	6.9	6.6	-4.1
S09 Hysterectomy: abdominal or vaginal	3.3	3.3	3.4	0.2
S10 Knee replacement	6.1	6.0	5.8	-2.6
S11 Mastectomy	3.1	3.1	3.1	0.6
S12 Open prostatectomy	5.8	5.8	5.7	-1.1
S13 Percutaneous transluminal coronary angioplasty	2.7	2.7	2.5	-5.3
S14 Peripheral vascular bypass	6.2	6.0	6.0	-1.5
S15 Repair of inguinal hernia	1.6	1.4	1.4	-6.7
S16 Thyroidectomy	3.2	2.7	2.5	-11.3
S17 Transurethral resection of prostate	3.4	3.2	3.1	-4.7
S18 Arthroscopic excision of meniscus of knee	1.3	1.4	1.3	-1.2
S19 Lens and cataract procedures	1.0	1.0	1.0	0.2
S20 Ligation and stripping of varicose veins - lower limb	1.9	1.7	1.6	-8.7
S21 Tonsillectomy and/or adenoidectomy	1.2	1.2	1.2	-0.4

42. Prices per case are presented in Table 7. The cases with the highest prices in 2013 are surgical services, include coronary artery bypass graft (R 253,901), hip replacement (R120,758), knee replacement (R 114,043), peripheral vascular bypass (R 106,259) and colorectal resection (R103,542).

Table 7. Average price (in Rand) and average annual rate of change by case type. South African sample, 2011-2013

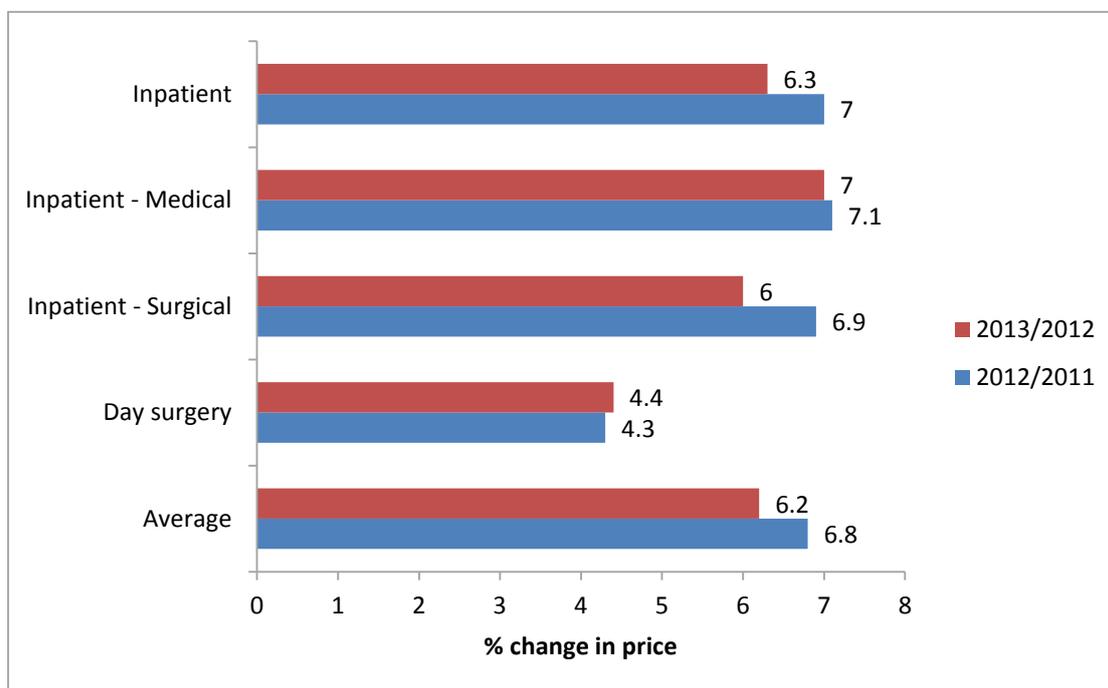
Case type	Year			Annual rate of change (%)
	2011	2012	2013	
M01 Acute Myocardial Infarction	56,726	59,038	64,308	6.5
M02 Angina Pectoris	25,729	27,562	29,445	7.0
M03 Cholelithiasis	11,954	13,788	14,639	10.7
M04 Heart Failure	25,325	27,168	28,959	6.9
M05 Malignant Neoplasm of Bronchus and Lung	24,147	25,651	26,412	4.6
M06 Normal Deliveries	16,251	17,056	17,954	5.1
M07 Pneumonia	17,002	18,359	19,731	7.7
S01 Appendectomy	23,448	25,725	27,836	9.0
S02 Caesarean section	27,802	29,915	31,912	7.1
S03 Cholecystectomy	34,390	36,753	39,071	6.6
S04 Colorectal resection	95,850	99,863	103,543	3.9
S05 Coronary artery bypass graft	220,344	237,497	253,901	7.3
S06 Discectomy	80,847	83,851	87,977	4.3
S07 Endarterectomy	69,901	73,993	82,917	8.9
S08 Hip replacement: total and partial	111,210	116,976	120,758	4.2
S09 Hysterectomy: abdominal or vaginal	29,108	31,616	34,432	8.8
S10 Knee replacement	105,536	110,801	114,044	4.0
S11 Mastectomy	31,427	33,944	37,437	9.1
S12 Open prostatectomy	68,556	73,683	76,645	5.7
S13 Percutaneous transluminal coronary angioplasty	88,827	93,466	101,689	7.0
S14 Peripheral vascular bypass	95,008	94,889	106,260	5.8
S15 Repair of inguinal hernia	20,428	21,704	23,857	8.1
S16 Thyroidectomy	29,204	31,907	34,623	8.9
S17 Transurethral resection of prostate	29,176	31,500	33,196	6.7
S18 Arthroscopic excision of meniscus of knee	21,002	22,974	24,748	8.6
S19 Lens and cataract procedures	19,367	20,464	21,633	5.7
S20 Litigation and stripping of varicose veins - lower limb	21,060	22,122	24,275	7.4
S21 Tonsillectomy and/or adenoidectomy	10,044	10,853	11,442	6.7
S18 Arthroscopic excision of meniscus of knee	17,279	18,152	19,497	6.2
S19 Lens and cataract procedures	18,520	19,299	20,115	4.2
S20 Litigation and stripping of varicose veins - lower limb	12,277	14,518	16,144	14.7
S21 Tonsillectomy and/or adenoidectomy	7,957	8,341	8,822	5.3

43. South Africa's private hospital prices increased¹⁹ by 6.8 percentage points from 2011 to 2012 and 6.2 percentage points from 2012 to 2013 (Figure 4), faster than inflation as measured by the Consumer Price Index²⁰ in the observed period. A higher increase was reported for inpatient medical services as compared to inpatient surgical services. The consumer price index year-on-year rate grew by 5.6% in 2012 and 5.7% in 2013. These figures take into consideration exchange rate fluctuations.

¹⁹ The rate was computed using a Paasche price index formula. The Paasche price index is used in price statistics for measuring the price development of the basket of goods and services that is consumed in the current period. The question it answers is how much a basket that consumers buy in the current period would have cost in the base period. So it is also defined as a fixed-weight, or fixed-basket, index, because it uses the basket of goods and services and their weights from the current period. It is therefore also known as a "current weighted index." (Eurostat statistics explained, http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Paasche_price_index).

²⁰ As indicated by the Council for Medical Schemes (2015), "Consumer Price Index is used as a proxy for affordability since most sectors within the economy experience CPI-linked salary increases".

Figure 4. Percentage increase in prices by type of service and mode of production. South African sample, 2011-12 and 2012-13



7. HOW DO PRIVATE HOSPITAL PRICES IN SOUTH AFRICA COMPARE TO OECD AVERAGE?

44. The results for economy-wide comparative price levels show that the South African price level is just over half of the OECD average in 2013, and 38% lower in 2011 and 2012²¹ (Table 8). In comparing prices, the benchmark used is 20 OECD countries for which data were available²². For these countries, the average Gross Domestic Product per capita is 41,078 US\$ in 2013. The corresponding figure for South Africa is 12,891 US\$²³ (bottom part of Table 8).

²¹ Comparative Price Levels for GDP are available at OECD.stat.

²² Austria, Czech Republic, Estonia, Finland, France, Germany, Hungary, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

²³ Converted to a common currency (US dollars) and adjusted to take account of the different purchasing power of the national currencies at PPP.

Table 8. South African private hospitals sample and GDP price levels relative to a subset of 20 OECD countries = 100, 2011-2013

<i>South African sample</i>	<i>Comparative price levels</i>		
	<i>2011</i>	<i>2012</i>	<i>2013</i>
Hospital - medical services	87	83	75
Hospital - surgical services	119	114	105
Hospital – total	108	103	94
<i>Gross Domestic Product</i>	<i>62</i>	<i>62</i>	<i>53</i>

	<i>GDP per capita (in US\$ PPPs)</i>		
OECD average (20 countries)	40,169	40,700	41,224
South Africa	12,144	12,555	12,891

45. Despite much lower GDP per capita and GDP comparative price levels, South African private hospital prices were comparable to OECD averages, and surgical services and were slightly higher than OECD averages. Total private hospital prices in South Africa were 94% of OECD average hospital prices; and surgical services were 105% of OECD average. Medical services were lower than OECD averages representing 75% of the mean (Table 8)²⁴. This finding is consistent over all three observed years, which supports the stability and significance of this result, as well as robustness of the methodology applied.

46. The second comparison group for benchmarking includes a subset of seven countries selected from the first group on the basis of a relatively lower GDP per capita²⁵. The average Gross Domestic Product per capita converted to a common currency (US dollars) and adjusted to take account of the different purchasing power of the national currencies at PPP is 27,323 US\$ in 2013 for the subset of seven OECD countries represented in Table 9. For the second benchmark of the subset of lower income OECD countries, the study found that South Africa's GDP comparative price level was 74% of the subset average in 2013. However, hospital prices were nearly double the subset average, and more than double for surgical services (Table 9).

²⁴ The average for the comparison group was calculated as the geometric mean of the comparative price levels across all countries included in the comparison group, and is then set equal to 100. Each country's comparative price level is then expressed in relation to the mean of 100. Results should be interpreted looking at the relative positions of countries rather than looking at absolute levels.

²⁵ Czech Republic, Estonia, Hungary, Poland, Portugal, Slovenia and Spain.

Table 9. South African private hospitals sample and GDP price levels relative to a subset of 7 OECD countries = 100, 2011-2013

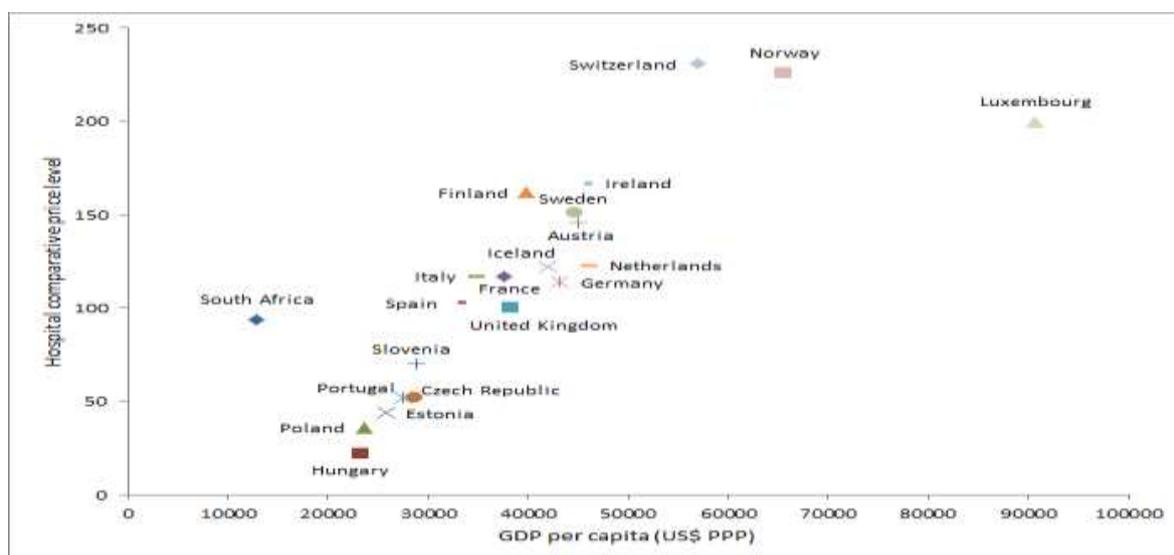
<i>South African sample</i>	<i>Comparative price levels</i>		
	<i>2011</i>	<i>2012</i>	<i>2013</i>
Hospital - medical services	174	168	161
Hospital - surgical services	207	201	211
Hospital – total	195	189	192
<i>Gross Domestic Product</i>	85	86	74

	<i>GDP per capita (in US\$ PPPs)</i>		
	<i>2011</i>	<i>2012</i>	<i>2013</i>
OECD average (subset of 7 lower income OECD countries)	26,404	26,702	27,323
South Africa	12,144	12,555	12,891

8. DO HOSPITAL SERVICE PRICES CORRELATE WITH A COUNTRY'S WEALTH?

47. Across OECD countries, higher GDP levels correlate with higher hospital price levels. Price levels tend to correlate with income levels: richer countries have generally higher price levels than poorer countries. This correlation is stronger for services (non-tradable) than for goods (tradable). Figure 5 displays the price levels for hospital services plotted against per capita GDP. There is indeed a strong correlation ($r = 0.817$) as higher levels of per capita GDP correspond to higher price levels for hospitals.

Figure 5 Hospital comparative price levels and GDP per capita. South African sample and OECD countries, 2013

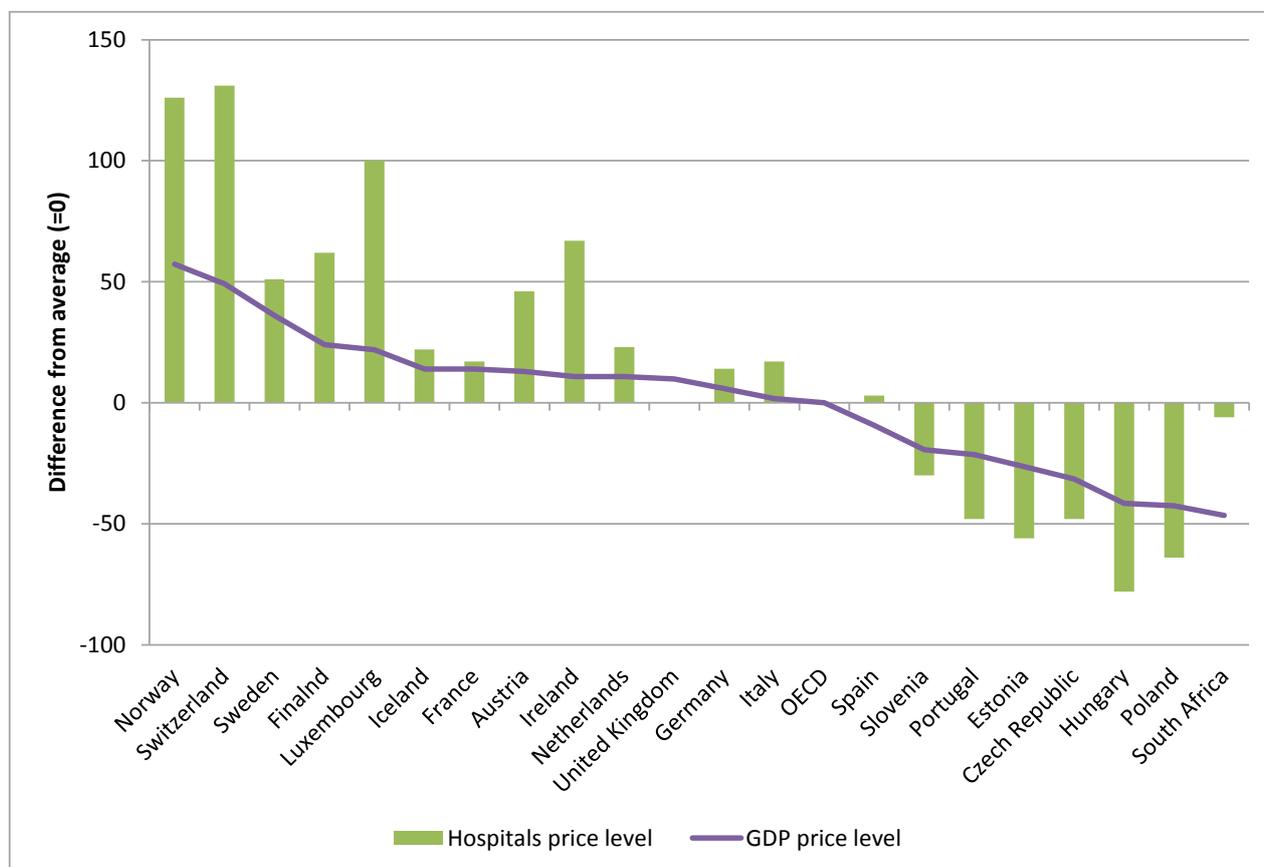


48. South Africa represents an outlier with the lowest GDP per capita and a price level for private hospitals comparable to the average observed across OECD countries²⁶. Private hospital prices in South Africa are *on par* with prices in countries with much higher GDP levels including the United Kingdom, Germany, and France.

49. If hospitals and GDP price levels are compared, broadly two clusters of countries might be identified: high income countries that show a hospital price level higher than the GDP price level; low income countries where the opposite is true. South Africa is the only lower income country that shows a comparative hospital price level substantially higher than the GDP price level (Figure 6).

²⁶ Of note that the income level of households with at least one member on a medical scheme could be higher than the overall average household income in South Africa as measured by the GDP per capita (Insight, 2014).

Figure 6. Hospital and GDP comparative price levels. South African sample and OECD countries (average=0) 2013



50. Hospital price levels in South Africa have exceeded general price levels to a greater extent compared to other countries in this study reporting similar levels of GDP per capita. This indicates that hospital services are less affordable compared with the other countries in this study (Annex 3).

9. COMPARISON BY CASE TYPES: PRIVATE HOSPITAL PRICES IN SOUTH AFRICA AND OECD AVERAGE

51. For inpatient medical cases in this study, the difference in prices between the South Africa sample and OECD averages ranged from 40.1% to -58.2% (Table 10). A subset of cases is substantially higher than OECD averages, acute myocardial infarction (40.4%), angina pectoris (23.2%), while prices for another subset are lower compared with OECD averages, including pneumonia (58.2% lower than OECD average), cholelithiasis (38.5%), heart failure (14.0%), and malignant neoplasms (8.8%). Prices for normal deliveries were comparable.

Table 10. Comparison of average price by medical case type. South African sample and OECD, 2013

Case	Euro		% difference
	South Africa	OECD	
Acute myocardial infarction	5016	2991	40.4
Angina pectoris	2297	1763	23.2
Normal delivery	1401	1375	1.8
Malignant neoplasm of bronchus and lung	2060	2242	-8.8
Heart failure	2259	2574	-14.0
Cholelithiasis	1142	1582	-38.5
Pneumonia	1539	2434	-58.2

52. For inpatient surgical cases in this study, the difference in prices between the South Africa sample and OECD averages ranged from 52.6% to -46.1% (Table 11). A subset of cases is substantially higher than OECD averages, discectomy (52.6%), coronary artery bypass graft (38%), coronary angioplasty (39.3%), angina pectoris (23.2%), hip replacement (32.9%), and knee replacement (31.0%) among others (Table 8). Prices for another subset are lower compared with OECD averages, including tonsillectomy (46.1%), appendectomy (40.1%), and mastectomy among others.

Table 11. Comparison of average price by inpatient surgical case type. South African sample and OECD, 2013

Case	Euro		% difference
	South Africa	OECD	
Discectomy	6863	3252	52.6
Percutaneous transluminal coronary angioplasty (PTCA)	7932	4813	39.3
Coronary artery bypass graft	19806	12278	38.0
Hip replacement: total and partial	9420	6322	32.9
Knee replacement	8896	6137	31.0
Arthroscopic excision of meniscus of knee	1930	1501	22.2
Endarterectomy: vessels of head and neck	6468	5263	18.6
Open prostatectomy	5979	4977	16.8
Colorectal resection	8077	6730	16.7
Cholecystectomy	3048	2544	16.5
Ligation and stripping of varicose veins - lower limb	1894	1592	15.9
Repair of inguinal hernia	1861	1744	6.3
Cataract surgery	1687	1592	5.7
Transurethral resection of prostate (TURP)	2590	2445	5.6
Peripheral vascular bypass	8289	8302	-0.2
Thyroidectomy	2701	2980	-10.3
Caesarean section	2489	2936	-18.0
Hysterectomy: abdominal and vaginal	2686	3255	-21.2
Mastectomy	2920	3580	-22.6
Appendectomy	2171	3041	-40.1
Tonsillectomy and/or adenoidectomy	893	1304	-46.1

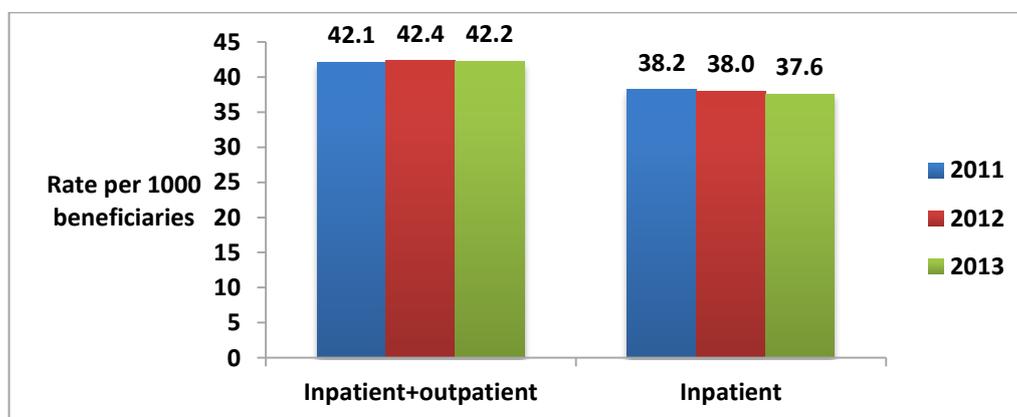
53. For outpatient surgical cases in this study, the difference in prices between the South Africa sample and OECD averages ranged from 39.6% to -28.7%. Cataract surgery was 39.6% higher than the OECD average, compared with tonsillectomy (28.7% lower) (Table 12). The price difference could be also driven by the difference in prices of pharmaceuticals and medical devices which were not analysed in this study.

Table 12. Comparison of average price by outpatient surgical case type. South African sample and OECD, 2013

Case	Euro		% difference
	South Africa	OECD	
Cataract surgery	1569	948	39.6
Arthroscopic excision of meniscus of knee	1521	1182	22.3
Ligation and stripping of varicose veins - lower limb	1259	1260	-0.1
Tonsillectomy and/or adenoidectomy	688	886	-28.7

10. WHAT ARE THE PRICE DRIVERS: IS VOLUME HIGH?

54. Hospital utilization rates for the inpatient services in this study slightly decreased from 2011-2013, to reach 37.6 per 1000 beneficiaries in 2013, while the rates for inpatient and outpatient services combined remained stable during the same period at around 42 per 1000 beneficiaries²⁷ (Figure 7). The largest increase in medical admissions was recorded in “cardiovascular” groups (Acute myocardial infarction, Angina pectoris, health failure), among the surgical admissions the number of admissions increased mainly for hip and knee replacement cases.

Figure 7. Hospital utilisation rates (per 1000 beneficiaries) by mode of production. South African sample, 2011-2013

55. In comparison with OECD countries, utilization rates for knee replacement and hysterectomy in the South African sample were higher than in many OECD countries reporting comparable rates (Figures 8 and 9). Data from OECD exist for only two cases (knee replacement and hysterectomy) where the admission rate would be comparable on age-adjusted terms²⁸. Based on the data available for selected countries, the rates of utilization for hysterectomy is more than double compared with the country reporting the lowest rates, and nearly three-fold for knee replacement, after adjusting for differences in the age structure of the population.

²⁷ The population in this study represents about 20% of the total discharges from private hospitals in South Africa. In OECD countries, on average, it represents 18.2% of total discharges (Koechlin et al. 2014, page 13).

²⁸ These two interventions have been selected from another OECD study - Medical Practice Variation that also collected admissions by age, gender across several OECD countries. <http://www.oecd.org/els/health-systems/medical-practice-variations.htm>.

Figure 8. Comparison of hospital utilisation rates (per 100,000 population) for hysterectomy. South African sample and selected OECD countries, 2011

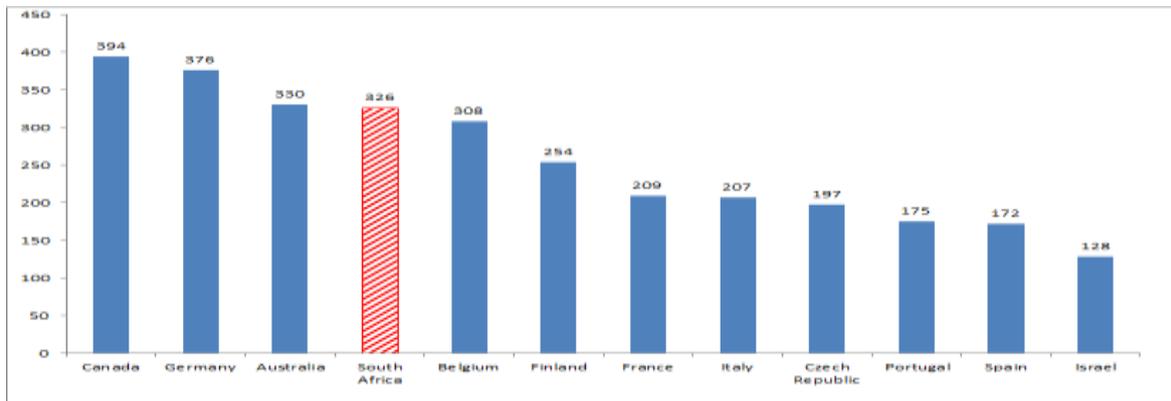
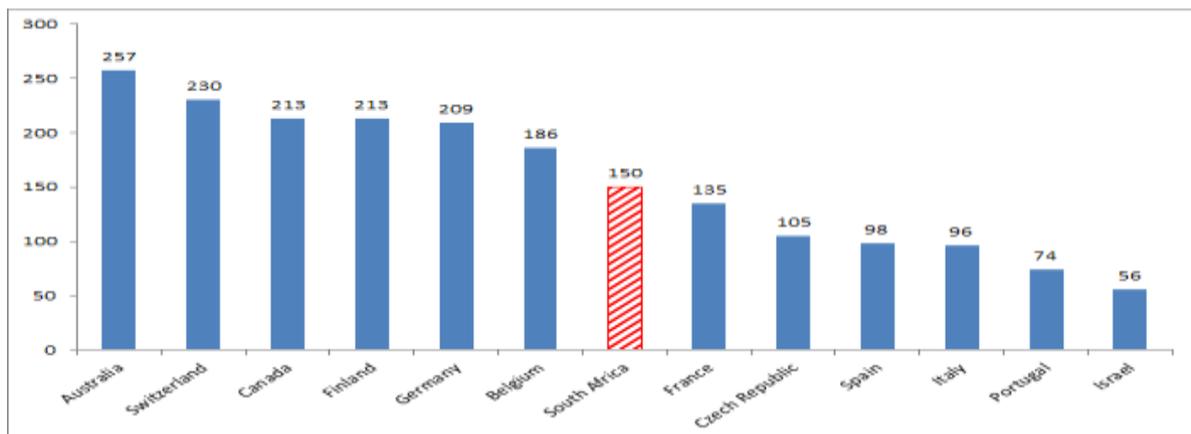
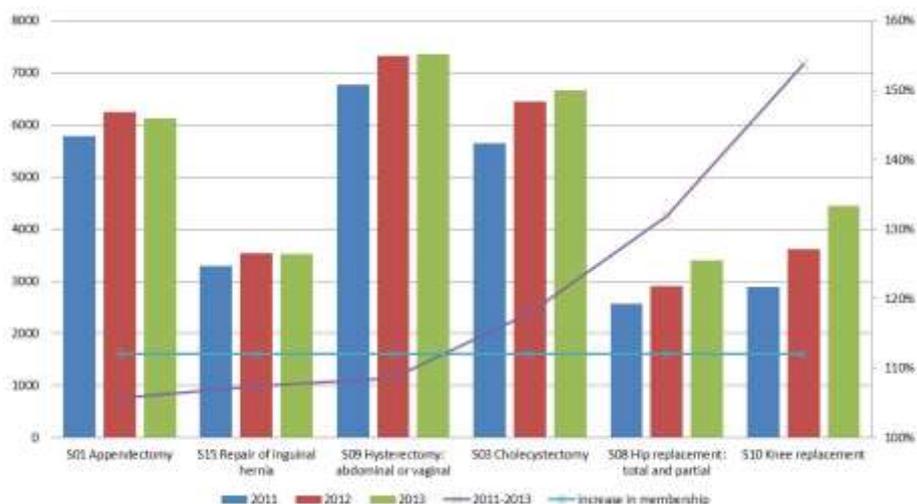


Figure 9. Comparison of hospital utilisation rates (per 100,000 population) for knee replacement. South African sample and selected OECD countries, 2011



56. Focusing on high volume surgical admissions, large increases were reported in knee and hip replacements, and cholecystectomy between 2011 and 2013. Between 2011 and 2013, large increases were reported in several high volume surgeries including knee and hip replacements, where rose by 53% and 31%, respectively (Figure 10). At the same time, the number of members in the medical schemes increased by only 12%; thus, the changes in membership do not fully explain the large and rapid increase in these high volume procedures.

Figure 10. Number of admissions and rate of increase by high-volume surgical case type, and changes in medical scheme membership. South African sample, 2011-2013



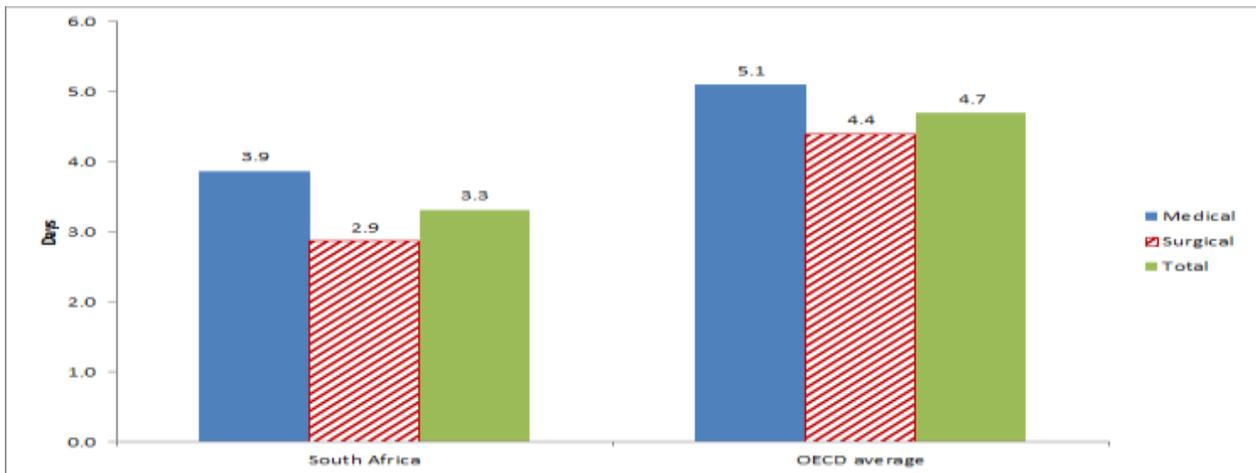
57. These data point to relatively high admission rates for some services in the study sample that are increasing over time and cannot be fully explained by changes in medical scheme membership. Between 2011 and 2013, pneumonia and deliveries admissions are unchanged, other medical cases increased by 25%, surgical inpatient cases increased by 16%, hip and knee replacements admissions rose by 31% and 53%. At the same time, the number of members in the medical schemes increased by 12%. Other studies have reported similar findings, suggesting that the private sector offers weaker controls on admissions and easier access to hospital services leading to relatively high rates of admissions in the private sector²⁹.

11. WHAT ARE THE PRICE DRIVERS: IS THE AVERAGE LENGTH OF STAY HIGH?

58. The average length of stay (ALOS) reported in the South African sample is among the shortest in comparison to OECD countries for all of the case types observed in the study. The average length of stay for medical services in this study was 3.9 days, in comparison to 5.1 days in OECD countries, a difference of more than one day. For surgical services, this study reported 2.9 days average length of stay compared with 4.4 days in OECD countries, amounting to a difference of 1.5 days (Figure 11). While this may reflect to some extent patient severity, it is remarkable that this trend is across all conditions studied, including deliveries and routine procedures.

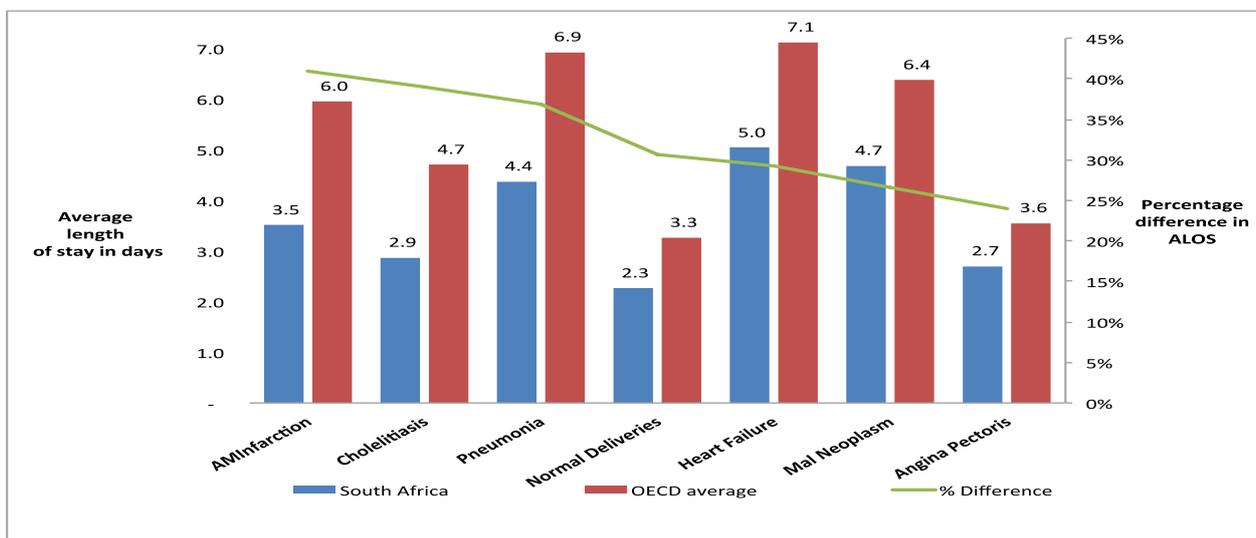
²⁹ Childs B, 2014. International Benchmarking of hospital utilization, Insight actuaries and consultants, Cape Town.

Figure 11. Comparison of average length of stay by type of hospital services. South African sample and OECD, 2013



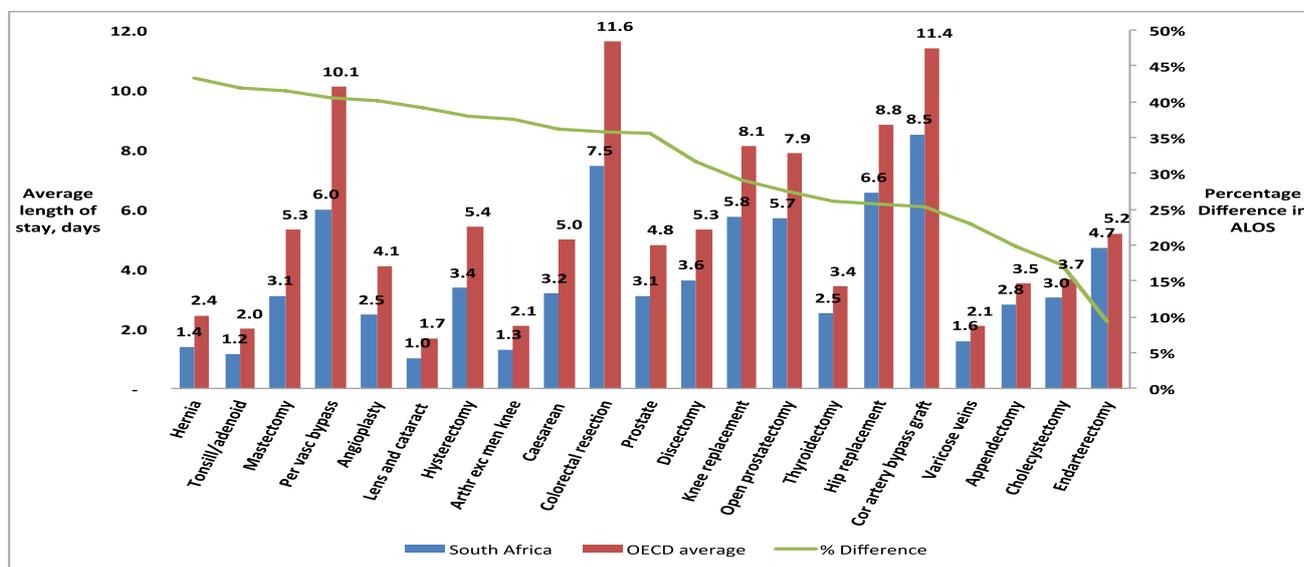
59. For each of the seven medical services studied, the average length of stay (ALOS) was much lower in comparison with OECD countries on average (Figure 12). The largest difference was 41% for acute myocardial infarction, where ALOS was 3.5 days in this sample compared with 5.1 day in OECD countries on average. Similarly, the study found differences in ALOS for pneumonia that were 37% lower than OECD averages, normal deliveries (31% lower), heart failure (29% lower), malignant neoplasm (27% lower), and angina pectoris (24% lower).

Figure 12. Comparison of average length of stay and percentage difference by medical case type. South African sample and OECD, 2013



60. For each of the surgical services studied, the average length of stay (ALOS) was much lower in comparison with OECD countries on average (Figure 13). The largest difference was 43% for repair of inguinal hernia, where ALOS was 1.4 days in this sample compared with 2.4 day in OECD countries on average. Similarly, the study found differences in ALOS of 40% or higher for tonsillectomy and/or adenoidectomy, mastectomy, peripheral vascular bypass, and percutaneous transluminal coronary angioplasty. For two cases (colorectal resection and peripheral vascular bypass) the difference in ALOS was more than 4 days lower for the sample in comparison with OECD average.

Figure 13. Comparison of average length of stay and percentage difference by surgical case type. South African sample and OECD, 2013



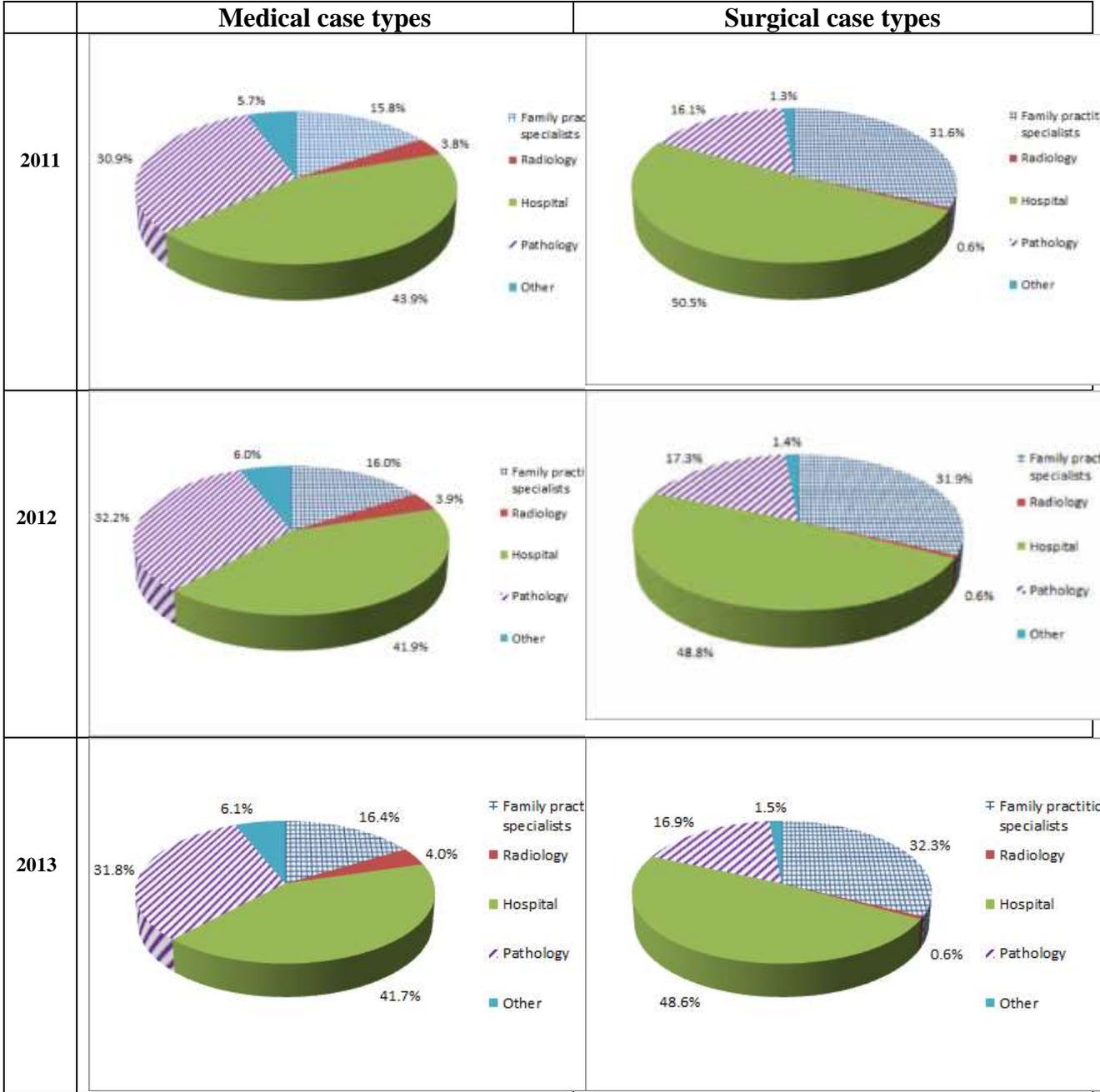
61. Using the average length of stay and the price per case, we estimate prices per day. The price per day was higher in all but two of the South African cases studied. And for seven cases, the price per day for the South African cases was double the OECD average: discectomy, acute myocardial infarction, coronary angioplasty, coronary artery bypass graph, excision of the knee, knee replacement and hip replacement.

12. WHICH COMPONENTS ACCOUNT FOR THE LARGEST SHARE OF THE PRICE?

62. “Hospital” and “specialists”³⁰ accounted for the largest share of claims, more than 81.6%, 80.7%, and 80.9% of the claims in 2011, 2012, and 2013, respectively. For surgical cases, the other major component was “pathology,” accounting for 16 to 17% of the total claim. For the medical cases studied, “hospital” and “specialists” accounted for some 59.7%, 57.9%, and 58.1% of the total claim. For medical cases, “pathology” accounted for a much higher share, amounting to 30.9%, 32.2%, and 31.8% in 2011, 2012, and 2013 (Figure 14).

³⁰ Specialists refer to GPs and specialists together in this study.

Figure 14. Percentage share of claims by discipline. Medical and surgical case types. South African sample, 2011-12-13



63. Examining the six specific medical cases, variations can be seen in the share of claims devoted to each component. For all of the medical cases, hospitals are the major cost component accounting for 40-52% of the total claim in 2013 (Figure 15). Pathology was the second most important component of the claim, comprising 21-35% of total, followed by family practitioners and specialists accounting for 13-19% of the total. However, the hospital share of claims has decreased over a relatively short time between 2011 and 2013, with an increasing share of the total claims for family practitioners/specialists and pathology (Figure 16).

Figure 15. Percentage share of claims by discipline. Medical case types, South African sample, 2013

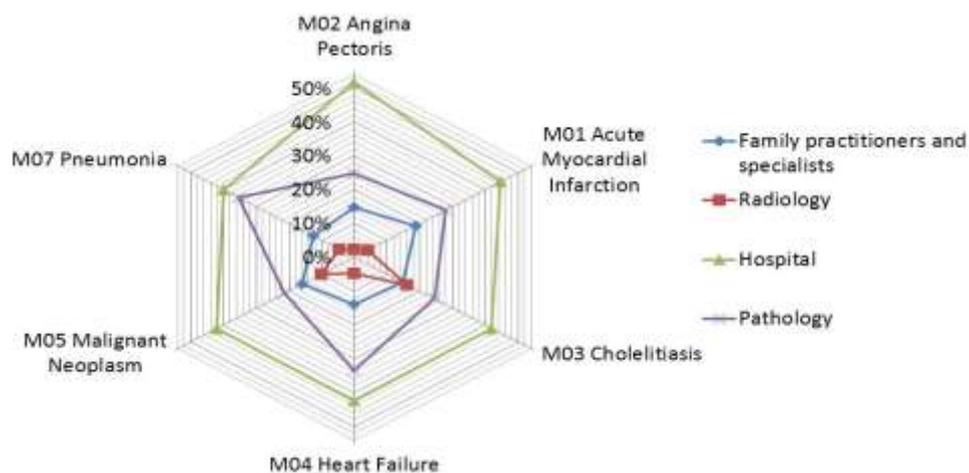
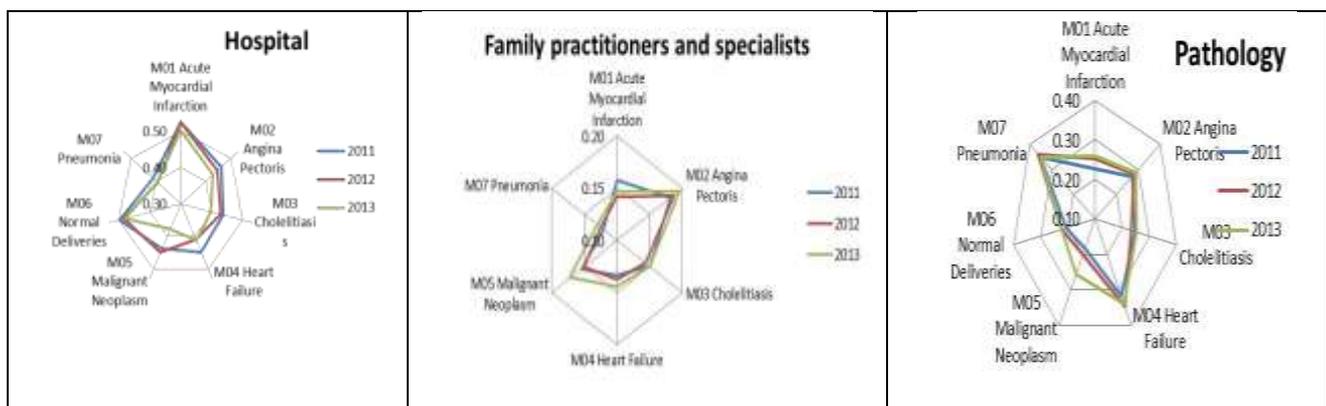


Figure 16. Change in the percentage share of claims by medical case type. Hospitals, family practitioners and specialists, and pathology, South African sample, 2011-2013



64. For 14 of the surgical cases, hospitals are also the major cost component accounting for 49-61% of the total claim in 2013 (Figure 17). In these 14 cases, family practitioners and specialists were the second most important component of the claim, comprising 20-37% of the total. In the remaining six surgical cases, pathology amounted to 19-32% of the claim and was a higher share than specialists and family practitioners (15-28%) (Figure 18). Similar to the medical cases, the hospital share of claims has decreased over a relatively short time between 2011 and 2013, with an increasing share of the total claims for family practitioners/specialists and pathology.

Figure 17. Percentage share of claims by discipline. Surgical case types with the highest share of hospitals and family practitioners and specialists claims. South African sample, 2013

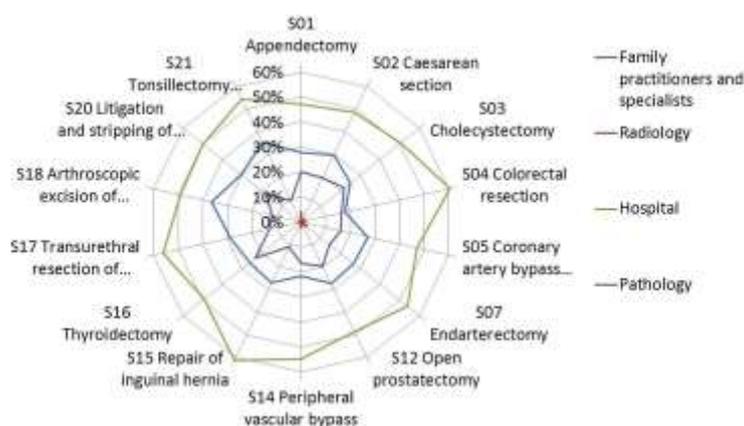
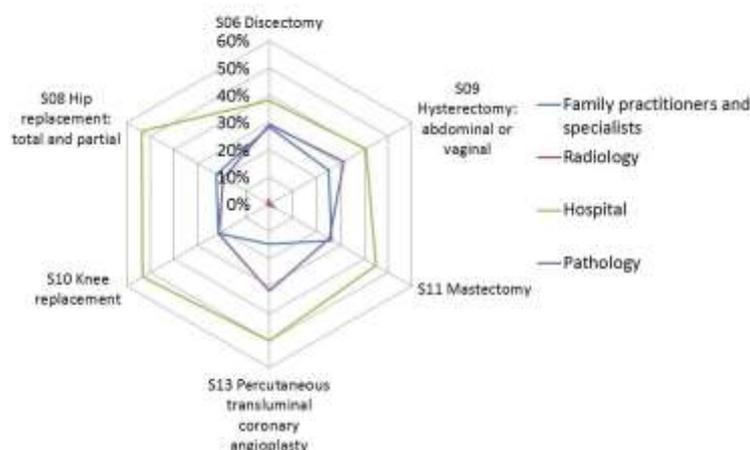


Figure 18. Percentage share of claims by discipline. Surgical case types with the highest share of hospitals and pathology claims. South African sample, 2013



13. DISCUSSION

65. The purpose of this study is to compare private hospital prices in South Africa with OECD countries. The study uses data from 625,940 cases among beneficiaries of a medical scheme in South Africa between 2011 and 2013, and the majority (89.8%) are inpatient cases in private hospitals. These data are standardized to enable comparison with utilization and price data from OECD countries. A future study will expand on this work to include public sector hospital prices and utilization.

66. The study uses data from a sample of private health care providers in South Africa to compare with public and private hospitals in OECD countries. The public sector in OECD countries with health insurance systems tends to have some form of price setting for specialist medical services, and this often provides benchmarks for the private sector. This mechanism has been used as a means to use private sector facilities to expand access to hospitals. Thus, given the structure of the private sector, the extent of contracting with public and private service providers, and the price setting mechanisms commonly used by governments, we would anticipate that prices in OECD countries with health insurance systems would be similar regardless of public or private hospital ownership (de Lagasnerie *et al.* 2015).

67. The study showed that wealthier countries (as measured by the higher levels of per capita GDP) correspond with higher price levels for hospitals. However, South Africa is an exception to this trend. South Africa has the lowest GDP per capita in the sample of countries used for this comparison; however, price levels for private hospitals are comparable to the average observed across OECD countries. Comparative price levels for the South African private sector are as high as the price levels in hospitals in OECD countries with considerably higher incomes. For the 20 OECD countries in this study, the average Gross Domestic Product per capita is US\$ 41,224 in 2013. The corresponding figure for South Africa is US\$ 12,891. Private hospital prices in South Africa, however, are on par with prices in countries with much higher GDP levels including the UK, Germany, and France. While hospitals prices are comparable, the economy-wide price level – that is the prices for goods and services - in South Africa is half that observed in OECD countries in 2013. This implies the private hospital services are expensive relative to countries at similar levels of income and likely to be expensive even for individuals with higher levels of income.

68. Private hospital price levels have exceeded general price levels by an extent that is not observed in other countries for which data is available. We observed that South Africa has the largest difference between hospital price levels and general price levels across countries in our study with similar GDP per capita, which indicates that hospital services are less affordable compared to other countries in this study. We identified several case types where utilization is rising rapidly combined with high per day prices.

69. Moreover, prices have been increasing above the rate of inflation. The prices for the selected hospital services increased by 6.8 percentage points (7 for inpatient services) from 2011 to 2012 and 6.2 percentage points (6.3 for inpatient services) from 2012 to 2013, faster than inflation in the observed period (5.6-5.7%). The decrease observed in the hospital comparative price level over time is mainly due to fluctuations in exchange rates in the period in study. Further analysis of hospital cost is required to fully understand the underlying drivers of such price increases.

70. Relatively high admissions rates were observed based on available data. The study finds relatively high admission rates for some services, including increases in most of the medical cases, and in particular high volume surgical inpatient cases, such as hip and knee replacements. These rates cannot be fully explained by changes in medical scheme membership. This finding is consistent with how medical

schemes are managed, including no waiting lists for patients and no controls on admissions by specialists³¹. Supplier-induced demand may be a factor that explains these high-volume surgical procedures as well as other procedures, i.e., caesarean sections, which account for 75% of total deliveries in this sample for the private hospital sector.

71. Striking findings were also noted in lower average lengths of stay across nearly all conditions observed in South African private hospitals in comparison with OECD averages. For two cases (colorectal resection and peripheral vascular bypass) the difference in ALOS was more than 4 days for the sample in comparison with OECD averages. Possible explanations include admission of less complex cases and higher efficiency in treating cases. It is most likely, however, this finding is the result of cost control measures implemented by medical schemes and specifically, the use of pre-authorisation with benchmark length of stay indicators to admit patient in South African private hospitals. Notably, the impact of lower average length of stay on quality of care and health outcomes was also not observed and should be investigated in the future. Taking into consideration the low average lengths of stay, the price per day for all but two cases treated in private hospitals in the South African sample is much higher than OECD averages for the management of the same cases.

72. Surgical services accounted for 60% of total claims in 2013, which was an increase from 54% in 2011. Generally, the price level for surgical services is much higher than the price level for medical services in South Africa. In addition, inpatient surgical prices increased by 6.9 percentage points from 2011 to 2012 and 6 percentage points from 2012 to 2013. The main cost contributor to this increase is the payment to specialists, which increased at a higher rate compared to other observed cost components. Prices for specific surgical cases were substantially higher than OECD averages, suggesting the importance of specialists and surgical services in driving prices. The impact of the pharmaceuticals prices will be analysed in future studies.

73. The utilization levels and prices in the private health care sector have important effects on the health care system as a whole. Given the relative magnitude of expenditures that flow through the private sector, market interactions between medical schemes and private health care providers spill over onto the rest of the health system. Negotiations between medical schemes (or their administrators) and private hospitals determine how a large section of the country's funds for health are spent. Prices established for services in essence set norms with which the public sector must contend in seeking to retain specialists. Other OECD countries have measures to control prices that South Africa lacks³². This study suggests that efforts to control prices while ensuring accessibility and quality are needed, which could help individual South Africans and the country at large get more from their considerable spending on health care.

³¹ Childs, 2014. International Benchmarking of hospital utilization, Insight actuaries and consultants, Cape Town.

³² Hospital prices may be adjusted to reflect changes in costs over time due to – for example – inflation and productivity improvements (as in England). Hospital prices may be also tapered if activity exceeds a given threshold (as in Germany).

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ANNEX 1 - COST ITEMS COVERED BY QUASI-PRICES

Overhead costs	Medical infrastructure	Laundry
		Sterilization
		Patient transport within the hospital
		Food service to patient
		Other (includes patient transport outside the hospital, staff transport, transportation of samples/blood)
	Non-medical infrastructure	Administrative staff
		Cleaning
		Security
		Gardening
		Desk officers
		Telephone
		Printing and stationery
		Rent
		Taxes
		Energy
		Water
		Waste disposal
		IT/IS services
		Building maintenance
		Equipment maintenance
Capital costs		Consumption of fixed capital
Direct costs	Compensation of employees	Medical staff
		Nursing staff
		Technical staff
		Administrative staff
	Goods and services	Medical and surgical equipment
		Laboratory equipment
		Disposable (including medical and surgical supplies)
		Drugs
		Medical gases
		Dressing
		Prosthesis

Capital costs: research and development is not included in the quasi prices reported

Medical and surgical equipment, laboratory equipment: include small tools - that is tools that may be used separately or continuously in production over many years but may nevertheless be small, inexpensive and used to perform relatively simple operations

ANNEX 2 - CASE TYPES DEFINITIONS*S01 Appendectomy (surgical)*

The following CPT procedure codes are used to identify S01 admissions. One of the below codes must be listed as the primary procedure. The secondary procedure string must either be blank or one of the codes listed below.

Procedure code	Description
44950	Appendectomy;
44955	Appendectomy; when done for indicated purpose at time of other major procedure (not as separate procedure) (List separately in addition to code for primary procedure)
44960	Appendectomy; for ruptured appendix with abscess or generalised peritonitis
44970	Laparoscopy; surgical; appendectomy

Admissions must have a primary diagnosis such that the first three characters are K35, K36, K37 or K38 (diseases of appendix).

S02 Caesarean Section (surgical)

The following CPT procedure codes are used to identify S02 admissions. One of the below codes must be listed as the primary procedure. The secondary procedure string must either be blank or one of the codes listed below.

Procedure code	Description
59510	Routine obstetric care including ante-partum care; Caesarean delivery; and postpartum care
59514	Caesarean delivery only;
59515	Caesarean delivery only; including postpartum care
59618	Routine obstetric care including ante-partum care; Caesarean delivery; and postpartum care; following attempted vaginal delivery after previous Caesarean delivery
59620	Caesarean delivery only; following attempted vaginal delivery after previous Caesarean delivery;
59622	Caesarean delivery only; following attempted vaginal delivery after previous Caesarean delivery; including postpartum care

S03 Cholecystectomy (surgical)

The following CPT procedure codes are used to identify S03 admissions. One of the below codes must be listed as the primary procedure. The secondary procedure string must either be blank or one of the codes listed below.

Procedure code	Description
47562	Laparoscopy, surgical; cholecystectomy
47563	Laparoscopy; surgical; cholecystectomy with cholangiography
47564	Laparoscopy; surgical; cholecystectomy with exploration of common duct
47600	Cholecystectomy;
47605	Cholecystectomy; with cholangiography
47610	Cholecystectomy with exploration of common duct;
47612	Cholecystectomy with exploration of common duct; with choledochoenterostomy
47620	Cholecystectomy with exploration of common duct; with transduodenal sphincterotomy or sphincteroplasty; with or without cholangiography

Admissions must have a primary diagnosis such that the first three characters are K80 (cholelithiasis) , K81 (cholecystitis) or K82 (other diseases of gallbladder).

S04 Colorectal Resection (surgical)

The following CPT procedure codes are used to identify S04 admissions. One of the below codes must be listed as the primary procedure. The secondary procedure string must either be blank or one of the codes listed below.

Procedure code	Description
44140	Colectomy; partial; with anastomosis
44141	Colectomy; partial; with skin level cecostomy or colostomy
44143	Colectomy; partial; with end colostomy and closure of distal segment (Hartmann type procedure)
44144	Colectomy; partial; with resection; with colostomy or ileostomy and creation of mucofistula
44145	Colectomy; partial; with coloproctostomy (low pelvic anastomosis)
44146	Colectomy; partial; with coloproctostomy (low pelvic anastomosis); with colostomy
44147	Colectomy; partial; abdominal and transanal approach
44150	Colectomy; total; abdominal; without proctectomy; with ileostomy or ileoproctostomy
44151	Colectomy; total; abdominal; without proctectomy; with continent ileostomy
44155	Colectomy; total; abdominal; with proctectomy; with ileostomy
44156	Colectomy; total; abdominal; with proctectomy; with continent ileostomy
44157	Colectomy; total; abdominal; with proctectomy; with ileoanal anastomosis; includes loop ileostomy and rectal mucosectomy; when performed
44158	Colectomy; total; abdominal; with proctectomy; with ileoanal anastomosis; creation of ileal reservoir (S or J); includes loop ileostomy and rectal mucosectomy; when performed
44160	Colectomy; partial; with removal of terminal ileum with ileocolostomy
44204	Laparoscopy; surgical; colectomy; partial; with anastomosis
44205	Laparoscopy; surgical; colectomy; partial; with removal of terminal ileum with ileocolostomy
44206	Laparoscopy; surgical; colectomy; partial; with end colostomy and closure of distal segment (Hartmann type procedure)
44207	Laparoscopy; surgical; colectomy; partial; with anastomosis; with coloproctostomy (low pelvic anastomosis)
44208	Laparoscopy; surgical; colectomy; partial; with anastomosis; with coloproctostomy (low pelvic anastomosis) with colostomy
44210	Laparoscopy; surgical; colectomy; total; abdominal; without proctectomy; with ileostomy or ileoproctostomy
44211	Laparoscopy; surgical; colectomy; total; abdominal; with proctectomy; with ileoanal anastomosis; creation of ileal reservoir (S or J); with loop ileostomy; includes rectal mucosectomy; when performed
44212	Laparoscopy; surgical; colectomy; total; abdominal; with proctectomy; with ileostomy
44213	Laparoscopy; surgical; mobilisation (take-down) of splenic flexure performed in conjunction with partial colectomy (List separately in addition to primary procedure)
44626	Closure of enterostomy, large or small intestine; with resection and colorectal anastomosis (e.g., closure of Hartmann type procedure)

Admissions must have a primary diagnosis such that the first three characters are C18 (malignant neoplasm of colon), C19 (malignant neoplasm of rectosigmoid junction) or C20 (malignant neoplasm of rectum).

S05 Coronary Artery Bypass Graft (surgical)

The following CPT procedure codes are used to identify S05 admissions. One of the below codes must be listed as the primary procedure. The secondary procedure string must either be blank or one of the codes listed below.

Procedure code	Description
33510	Coronary artery bypass; vein only; single coronary venous graft
33511	Coronary artery bypass; vein only; two coronary venous grafts
33512	Coronary artery bypass; vein only; three coronary venous grafts
33513	Coronary artery bypass; vein only; four coronary venous grafts
33514	Coronary artery bypass; vein only; five coronary venous grafts
33516	Coronary artery bypass; vein only; six or more coronary venous grafts
33517	Coronary artery bypass; using venous graft(s) and arterial graft(s); single vein graft (List separately in addition to code for primary procedure)
33518	Coronary artery bypass; using venous graft(s) and arterial graft(s); two venous grafts (List separately in addition to code for primary procedure)
33519	Coronary artery bypass; using venous graft(s) and arterial graft(s); three venous grafts (List separately in addition to code for primary procedure)
33521	Coronary artery bypass; using venous graft(s) and arterial graft(s); four venous grafts (List separately in addition to code for primary procedure)
33522	Coronary artery bypass; using venous graft(s) and arterial graft(s); five venous grafts (List separately in addition to code for primary procedure)
33523	Coronary artery bypass; using venous graft(s) and arterial graft(s); six or more venous grafts (List separately in addition to code for primary procedure)
33530	Re-operation; coronary artery bypass procedure or valve procedure; more than one month after original operation (List separately in addition to code for primary procedure)
33533	Coronary artery bypass; using arterial graft(s); single arterial graft
33534	Coronary artery bypass; using arterial graft(s); two coronary arterial grafts
33535	Coronary artery bypass; using arterial graft(s); three coronary arterial grafts
33536	Coronary artery bypass; using arterial graft(s); four or more coronary arterial grafts

S06 Discectomy (surgical)

The following CPT procedure codes are used to identify S06 admissions. One of the below codes must be listed as the primary procedure. The secondary procedure string must either be blank or one of the codes listed below.

Procedure code	Description
63075	Discectomy; anterior; with decompression of spinal cord and/or nerve root(s); including osteophytectomy; cervical; single interspace
63076	Discectomy; anterior; with decompression of spinal cord and/or nerve root(s); including osteophytectomy; cervical; each additional interspace (List separately in addition to code for primary procedure)
63077	Discectomy; anterior; with decompression of spinal cord and/or nerve root(s); including osteophytectomy; thoracic; single interspace
63078	Discectomy; anterior; with decompression of spinal cord and/or nerve root(s); including osteophytectomy; thoracic; each additional interspace (List separately in addition to code for primary procedure)

Admissions with the following additional codes are also included given that discectomy procedures are often performed in conjunction with one of the procedures listed below

Procedure code	Description
20930	Allograft for spine surgery only; morselised (List separately in addition to code for primary procedure)
20931	Allograft for spine surgery only; structural (List separately in addition to code for primary procedure)
20936	Autograft for spine surgery only (includes harvesting the graft); local (e.g.; ribs; spinous process; or laminar fragment(s) obtained from same incision (List separately in addition to code for primary procedure)
20937	Autograft for spine surgery only (includes harvesting the graft); morselised (through separate skin or fascial incision) (List separately in addition to code for primary procedure)
20938	Autograft for spine surgery only (includes harvesting the graft); structural; bicortical or tricortical (through separate skin or fascial incision) (List separately in addition to code for primary procedure)
22551	Arthrodesis, anterior interbody, including disc space preparation, discectomy, osteophytectomy and decompression of spinal cord and/or nerve roots; cervical below C2
22552	Arthrodesis, anterior interbody, including disc space preparation, discectomy, osteophytectomy and decompression of spinal cord and/or nerve roots; cervical below C2, each additional interspace (List

Procedure code	Description
	separately in addition to code for separate procedure)
22840	Posterior non-segmental instrumentation (e.g., Harrington rod technique), pedicle fixation across one interspace, atlantoaxial transarticular screw fixation, sublaminar wiring at C1, facet screw fixation) (List separately in addition to code for primary procedure)
22841	Internal spinal fixation by wiring of spinous processes (List separately in addition to code for primary procedure)
22842	Posterior segmental instrumentation (e.g., pedicle fixation, dual rods with multiple hooks and sublaminar wires); 3 to 6 vertebral segments (List separately in addition to code for primary procedure)
22843	Posterior segmental instrumentation (e.g., pedicle fixation, dual rods with multiple hooks and sublaminar wires); 7 to 12 vertebral segments (List separately in addition to code for primary procedure)
22844	Posterior segmental instrumentation (e.g., pedicle fixation, dual rods with multiple hooks and sublaminar wires); 13 or more vertebral segments (List separately in addition to code for primary procedure)
22845	Anterior instrumentation; 2 to 3 vertebral segments (List separately in addition to code for primary procedure)
22846	Anterior instrumentation; 4 to 7 vertebral segments (List separately in addition to code for primary procedure)
22847	Anterior instrumentation; 8 or more vertebral segments (List separately in addition to code for primary procedure)
22851	Application of intervertebral biomechanical device(s) (e.g., synthetic cage(s), threaded bone dowel(s), methylmethacrylate) to vertebral defect or interspace (List separately in addition to code for primary procedure)

S07 Endarterectomy (surgical)

The following CPT procedure codes are used to identify S07 admissions. One of the below codes must be listed as the primary procedure. The secondary procedure string must either be blank or one of the codes listed below.

Procedure code	Description
35301	Thromboendarterectomy; including patch graft; if performed; carotid; vertebral; subclavian; by neck incision

35302	Thromboendarterectomy; including patch graft; if performed; superficial femoral artery
35303	Thromboendarterectomy; including patch graft; if performed; popliteal artery
35304	Thromboendarterectomy; including patch graft; if performed; tibioperoneal trunk artery
35305	Thromboendarterectomy; including patch graft; if performed; tibial or peroneal artery; initial vessel
35306	Thromboendarterectomy; including patch graft; if performed; each additional tibial or peroneal artery (List separately in addition to code for primary procedure)
35311	Thromboendarterectomy; including patch graft; if performed; subclavian; innominate; by thoracic incision
35321	Thromboendarterectomy; including patch graft; if performed; axillary-brachial
35331	Thromboendarterectomy; including patch graft; if performed; abdominal aorta
35341	Thromboendarterectomy; including patch graft; if performed; mesenteric; celiac; or renal
35351	Thromboendarterectomy; including patch graft; if performed; iliac
35355	Thromboendarterectomy; including patch graft; if performed; iliofemoral
35361	Thromboendarterectomy; including patch graft; if performed; combined aortoiliac
35363	Thromboendarterectomy; including patch graft; if performed; combined aortoiliofemoral
35371	Thromboendarterectomy; including patch graft; if performed; common femoral
35372	Thromboendarterectomy; including patch graft; if performed; deep (profunda) femoral
35390	Re-operation, carotid, thromboendarterectomy, more than one month after original operation (List separately in addition to code for primary procedure)

S08 Hip Replacement (surgical)

The following CPT procedure codes are used to identify S08 admissions. One of the below codes must be listed as the primary procedure. The secondary procedure string must either be blank or one of the codes listed below.

Procedure code	Description
27125	Hemiarthroplasty, hip, partial (e.g., femoral stem prosthesis, bipolar arthroplasty)
27130	Arthroplasty; acetabular and proximal femoral prosthetic replacement (total hip arthroplasty); with or without autograft or allograft

27132	Revision of total hip arthroplasty; both components; with or without autograft or allograft
27134	Revision of total hip arthroplasty; both components; with or without autograft or allograft
27137	Revision of total hip arthroplasty; acetabular component only; with or without autograft or allograft
27138	Revision of total hip arthroplasty; femoral component only; with or without allograft

S09 Hysterectomy (surgical)

The following CPT procedure codes are used to identify S09 admissions. One of the below codes must be listed as the primary procedure. The secondary procedure string must either be blank or one of the codes listed below.

Procedure code	Description
51925	Closure of vesico-uterine fistula; with hysterectomy
58150	Total abdominal hysterectomy (corpus and cervix); with or without removal of tube(s); with or without removal of ovary(s);
58152	Total abdominal hysterectomy (corpus and cervix); with or without removal of tube(s); with or without removal of ovary(s); with colpo-urethrocytopexy (e.g.; Marshall-Marchetti-Krantz; Burch)
58180	Supracervical abdominal hysterectomy (subtotal hysterectomy); with or without removal of tube(s); with or without removal of ovary(s)
58200	Total abdominal hysterectomy; including partial vaginectomy; with para-aortic and pelvic lymph node sampling; with or without removal of tube(s); with or without removal of ovary(s)
58210	Radical abdominal hysterectomy; with bilateral total pelvic lymphadenectomy and para-aortic lymph node sampling (biopsy); with or without removal of tube(s); with or without removal of ovary(s)
58240	Pelvic exenteration for gynecologic malignancy, with total abdominal hysterectomy or cervicectomy, with or without removal of tube(s), with or without removal of ovary(s), with removal of bladder and ureteral transplantations, and/or abdominoperineal resection of rectum and colon and colostomy, or any combination thereof
58260	Vaginal hysterectomy; for uterus 250 g or less;
58262	Vaginal hysterectomy; for uterus 250 g or less; with removal of tube(s); and/or ovary(s)
58263	Vaginal hysterectomy; for uterus 250 g or less; with removal of tube(s); and/or ovary(s); with repair of enterocele
58267	Vaginal hysterectomy; for uterus 250 g or less; with colpo-urethrocytopexy (Marshall-Marchetti-Krantz type; Pereyra type) with or without endoscopic control

Procedure code	Description
58270	Vaginal hysterectomy; for uterus 250 g or less; with repair of enterocele
58275	Vaginal hysterectomy; with total or partial vaginectomy;
58280	Vaginal hysterectomy; with total or partial vaginectomy; with repair of enterocele
58285	Vaginal hysterectomy, radical (Schauta type operation)
58290	Vaginal hysterectomy; for uterus greater than 250 g;
58291	Vaginal hysterectomy; for uterus greater than 250 g; with removal of tube(s) and/or ovary(s)
58292	Vaginal hysterectomy; for uterus greater than 250 g; with removal of tube(s) and/or ovary(s); with repair of enterocele
58293	Vaginal hysterectomy; for uterus greater than 250 g; with colpo-urethrocytopexy (Marshall-Marchetti-Krantz type; Pereyra type) with or without endoscopic control
58294	Vaginal hysterectomy; for uterus greater than 250 g; with repair of enterocele
58541	Laparoscopy; surgical; supracervical hysterectomy; for uterus 250 g or less;
58542	Laparoscopy; surgical; supracervical hysterectomy; for uterus 250 g or less; with removal of tube(s) and/or ovary(s)
58543	Laparoscopy; surgical; supracervical hysterectomy; for uterus greater than 250 g;
58544	Laparoscopy; surgical; supracervical hysterectomy; for uterus greater than 250 g; with removal of tube(s) and/or ovary(s)
58548	Laparoscopy, surgical, with radical hysterectomy, with bilateral total pelvic lymphadenectomy and para-aortic lymph node sampling (biopsy), with removal of tube(s) and ovary(s), if performed
58550	Laparoscopy; surgical; with vaginal hysterectomy; for uterus 250 g or less;
58552	Laparoscopy; surgical; with vaginal hysterectomy; for uterus 250 g or less; with removal of tube(s) and/or ovary(s)
58553	Laparoscopy; surgical; with vaginal hysterectomy; for uterus greater than 250 g;
58554	Laparoscopy; surgical; with vaginal hysterectomy; for uterus greater than 250 g; with removal of tube(s) and/or ovary(s)
58570	Laparoscopy; surgical; with total hysterectomy; for uterus 250 g or less;
58571	Laparoscopy; surgical; with total hysterectomy; for uterus 250 g or less; with removal of tube(s)

Procedure code	Description
	and/or ovary(s)
58572	Laparoscopy; surgical; with total hysterectomy; for uterus greater than 250 g;
58573	Laparoscopy; surgical; with total hysterectomy; for uterus greater than 250 g; with removal of tube(s) and/or ovary(s)
58951	Resection (initial) of ovarian, tubal or primary peritoneal malignancy with bilateral salpingo-oophorectomy and omentectomy; with total abdominal hysterectomy, pelvic and limited para-aortic lymphadenectomy
58953	Bilateral salpingo-oophorectomy with omentectomy, total abdominal hysterectomy and radical dissection for debulking;
58954	Bilateral salpingo-oophorectomy with omentectomy, total abdominal hysterectomy and radical dissection for debulking; with pelvic lymphadenectomy and limited para-aortic lymphadenectomy
58956	Bilateral salpingo-oophorectomy with total omentectomy, total abdominal hysterectomy for malignancy
59135	Surgical treatment of ectopic pregnancy; interstitial, uterine pregnancy requiring total hysterectomy
59525	Sub-total or total hysterectomy after Caesarean delivery (List separately in addition to code for primary procedure)

S10 Knee Replacement (surgical)

The following CPT procedure codes are used to identify S10 admissions. One of the below codes must be listed as the primary procedure. The secondary procedure string must either be blank or one of the codes listed below.

Procedure code	Description
27440	Arthroplasty, knee, tibial plateau;
27441	Arthroplasty, knee, tibial plateau; with debridement and partial synovectomy
27442	Arthroplasty, femoral condyles or tibial plateau(s), knee;
27443	Arthroplasty, femoral condyles or tibial plateau(s), knee; with debridement and partial synovectomy
27445	Arthroplasty, knee, hinge prosthesis (eg. Walldius type)
27446	Arthroplasty, knee, condyle and plateau; medial OR lateral compartment
27447	Arthroplasty, knee, condyle and plateau; medial AND lateral compartments with or without patella resurfacing (total knee arthroplasty)
27486	Revision of total knee arthroplasty, with or without allograft; one component
27487	Revision of total knee arthroplasty, with or without allograft; femoral and entire tibial component

S11 Mastectomy (surgical)

The following CPT procedure codes are used to identify S11 admissions. One of the below codes must be listed as the primary procedure. The secondary procedure string must either be blank or one of the codes listed below.

Procedure code	Description
19300	Mastectomy for gynecomastia
19301	Mastectomy; partial (e.g.; lumpectomy; tylectomy; quadrantectomy; segmentectomy);
19302	Mastectomy; partial (e.g.; lumpectomy; tylectomy; quadrantectomy; segmentectomy); with axillary lymphadenectomy
19303	Mastectomy; simple; complete
19304	Mastectomy; subcutaneous
19305	Mastectomy; radical; including pectoral muscles; axillary lymph nodes

19306	Mastectomy; radical; including pectoral muscles; axillary and internal mammary lymph nodes (Urban type operation)
19307	Mastectomy; modified radical; including axillary lymph nodes; with or without pectoralis minor muscle; but excluding pectoralis major muscle

S12 Open Prostatectomy (surgical)

The following CPT procedure codes are used to identify S12 admissions. One of the below codes must be listed as the primary procedure. The secondary procedure string must either be blank or one of the codes listed below.

Procedure code	Description
55801	Prostatectomy; perineal; sub-total (including control of post-operative bleeding; vasectomy; meatotomy; urethral calibration and/or dilation; and internal urethrotomy)
55810	Prostatectomy; perineal radical;
55812	Prostatectomy; perineal radical; with lymph node biopsy(s) (limited pelvic lymphadenectomy)
55815	Prostatectomy; perineal radical; with bilateral pelvic lymphadenectomy; including external iliac; hypogastric and obturator nodes
55821	Prostatectomy (including control of post-operative bleeding; vasectomy; meatotomy; urethral calibration and/or dilation; and internal urethrotomy); suprapubic; subtotal; 1 or 2 stages
55831	Prostatectomy (including control of post-operative bleeding; vasectomy; meatotomy; urethral calibration and/or dilation; and internal urethrotomy); retropubic; subtotal
55840	Prostatectomy; retropubic radical; with or without nerve sparing;
55842	Prostatectomy; retropubic radical; with or without nerve sparing; with lymph node biopsy(s) (limited pelvic lymphadenectomy)
55845	Prostatectomy; retropubic radical; with or without nerve sparing; with bilateral pelvic lymphadenectomy; including external iliac; hypogastric and obturator nodes

S13 Percutaneous Transluminal Coronary Angioplasty (surgical)

The following CPT procedure codes are used to identify S13 admissions. One of the below codes must be listed as the primary procedure. The secondary procedure string must either be blank or one of the codes listed below.

Procedure code	Description
92980	Transcatheter placement of an intra-coronary stent(s); percutaneous; with or without other therapeutic intervention; any method; single vessel
92981	Transcatheter placement of an intra-coronary stent(s); percutaneous; with or without other therapeutic intervention; any method; each additional vessel (List separately in addition to code for primary procedure)
92982	Percutaneous transluminal coronary balloon angioplasty; single vessel
92984	Percutaneous transluminal coronary balloon angioplasty; each additional vessel (List separately in addition to code for primary procedure)
92995	Percutaneous transluminal coronary atherectomy; by mechanical or other method; with or without balloon angioplasty; single vessel
92996	Percutaneous transluminal coronary atherectomy; by mechanical or other method; with or without balloon angioplasty; each additional vessel (List separately in addition to code for primary procedure)

S14 Peripheral Vascular Bypass (surgical)

The following CPT procedure codes are used to identify S14 admissions. One of the below codes must be listed as the primary procedure. The secondary procedure string must either be blank or one of the codes listed below.

Procedure code	Description
35501	Bypass graft; with vein; common carotid-ipsilateral internal carotid
35506	Bypass graft; with vein; carotid-subclavian or subclavian-carotid
35508	Bypass graft; with vein; carotid-vertebral
35509	Bypass graft; with vein; carotid-contralateral carotid
35510	Bypass graft; with vein; carotid-brachial
35511	Bypass graft; with vein; subclavian-subclavian

Procedure code	Description
35512	Bypass graft; with vein; subclavian-brachial
35515	Bypass graft; with vein; subclavian-vertebral
35516	Bypass graft; with vein; subclavian-axillary
35518	Bypass graft; with vein; axillary-axillary
35521	Bypass graft; with vein; axillary-femoral
35522	Bypass graft; with vein; axillary-brachial
35523	Bypass graft; with vein; brachial-ulnar or -radial
35525	Bypass graft; with vein; brachial-brachial
35526	Bypass graft; with vein; aortosubclavian or carotid
35531	Bypass graft; with vein; aortoceliac or aortomesenteric
35533	Bypass graft; with vein; axillary-femoral-femoral
35535	Bypass graft; with vein; hepatorenal
35536	Bypass graft; with vein; splenorenal
35537	Bypass graft; with vein; aortoiliac
35538	Bypass graft; with vein; aortobi-iliac
35539	Bypass graft; with vein; aortofemoral
35540	Bypass graft; with vein; aortobifemoral
35548	Bypass graft; with vein; aortoiliofemoral; unilateral
35549	Bypass graft; with vein; aortoiliofemoral; bilateral
35551	Bypass graft; with vein; aortofemoral-popliteal
35556	Bypass graft; with vein; femoral-popliteal
35558	Bypass graft; with vein; femoral-femoral
35560	Bypass graft; with vein; aortorenal
35563	Bypass graft; with vein; ilioiliac

Procedure code	Description
35565	Bypass graft; with vein; iliofemoral
35566	Bypass graft; with vein; femoral-anterior tibial; posterior tibial; peroneal artery or other distal vessels
35570	Bypass graft; with vein; tibial-tibial; peroneal-tibial; or tibial/peroneal trunk-tibial
35571	Bypass graft; with vein; popliteal-tibial; -peroneal artery or other distal vessels
35601	Bypass graft; with other than vein; common carotid-ipsilateral internal carotid
35606	Bypass graft; with other than vein; carotid-subclavian
35612	Bypass graft; with other than vein; subclavian-subclavian
35616	Bypass graft; with other than vein; subclavian-axillary
35621	Bypass graft; with other than vein; axillary-femoral
35623	Bypass graft, with other than vein; axillary-popliteal or -tibial
35626	Bypass graft; with other than vein; aortosubclavian or carotid
35631	Bypass graft; with other than vein; aortoceliac; aortomesenteric; aortorenal
35632	Bypass graft; with other than vein; ilio-celiac
35633	Bypass graft; with other than vein; ilio-mesenteric
35634	Bypass graft; with other than vein; iliorenal
35636	Bypass graft; with other than vein; splenorenal (splenic to renal arterial anastomosis)
35637	Bypass graft; with other than vein; aortoiliac
35638	Bypass graft; with other than vein; aortobi-iliac
35642	Bypass graft; with other than vein; carotid-vertebral
35645	Bypass graft; with other than vein; subclavian-vertebral
35646	Bypass graft; with other than vein; aortobifemoral
35647	Bypass graft; with other than vein; aortofemoral
35650	Bypass graft; with other than vein; axillary-axillary
35651	Bypass graft; with other than vein; aortofemoral-popliteal

Procedure code	Description
35654	Bypass graft; with other than vein; axillary-femoral-femoral
35656	Bypass graft; with other than vein; femoral-popliteal
35661	Bypass graft; with other than vein; femoral-femoral
35663	Bypass graft; with other than vein; ilioiliac
35665	Bypass graft; with other than vein; iliofemoral
35666	Bypass graft; with other than vein; femoral-anterior tibial; posterior tibial; or peroneal artery
35671	Bypass graft; with other than vein; popliteal-tibial or -peroneal artery

S15 Inguinal Hernia Repair (surgical)

The following CPT procedure codes are used to identify S15 admissions. One of the below codes must be listed as the primary procedure. The secondary procedure string must either be blank or one of the codes listed below. Only admissions with a primary diagnosis, where the first 3 characters are K40 (inguinal hernia) are included.

Procedure code	Description
49491	Repair; initial inguinal hernia; preterm infant (younger than 37 weeks gestation at birth); performed from birth up to 50 weeks postconception age; with or without hydrocelectomy; reducible
49492	Repair; initial inguinal hernia; preterm infant (younger than 37 weeks gestation at birth); performed from birth up to 50 weeks postconception age; with or without hydrocelectomy; incarcerated or strangulated
49495	Repair; initial inguinal hernia; full term infant younger than age 6 months; or preterm infant older than 50 weeks postconception age and younger than age 6 months at the time of surgery; with or without hydrocelectomy; reducible
49496	Repair; initial inguinal hernia; full term infant younger than age 6 months; or preterm infant older than 50 weeks postconception age and younger than age 6 months at the time of surgery; with or without hydrocelectomy; incarcerated or strangulated
49500	Repair initial inguinal hernia; age 6 months to younger than 5 years; reducible
49501	Repair initial inguinal hernia; age 6 months to younger than 5 years; with or without hydrocelectomy; incarcerated or strangulated
49505	Repair initial inguinal hernia; age 5 years or older; reducible

Procedure code	Description
49507	Repair initial inguinal hernia; age 5 years or older; incarcerated or strangulated
49520	Repair recurrent inguinal hernia; any age; reducible
49521	Repair recurrent inguinal hernia; any age; incarcerated or strangulated
49525	Repair inguinal hernia; sliding; any age
49650	Laparoscopy; surgical; repair initial inguinal hernia
49651	Laparoscopy; surgical; repair recurrent inguinal hernia
49654	Laparoscopy; surgical; repair; incisional hernia (includes mesh insertion; when performed); reducible
49655	Laparoscopy; surgical; repair; incisional hernia (includes mesh insertion; when performed); incarcerated or strangulated
49656	Laparoscopy; surgical; repair; recurrent incisional hernia (includes mesh insertion; when performed); reducible
49657	Laparoscopy; surgical; repair; recurrent incisional hernia (includes mesh insertion; when performed); incarcerated or strangulated

S16 Thyroidectomy (surgical)

The following CPT procedure codes are used to identify S16 admissions. One of the below codes must be listed as the primary procedure. The secondary procedure string must either be blank or one of the codes listed below.

Procedure code	Description
60210	Partial thyroid lobectomy, unilateral; with or without isthmusectomy
60212	Partial thyroid lobectomy, unilateral; with contralateral subtotal lobectomy, including isthmusectomy
60220	Total thyroid lobectomy, unilateral; with or without isthmusectomy
60225	Total thyroid lobectomy, unilateral; with contralateral subtotal lobectomy, including isthmusectomy
60240	Thyroidectomy; total or complete
60252	Thyroidectomy; total or subtotal for malignancy; with limited neck dissection
60254	Thyroidectomy; total or subtotal for malignancy; with radical neck dissection

60260	Thyroidectomy; removal of all remaining thyroid tissue following previous removal of a portion of thyroid
60270	Thyroidectomy; including substernal thyroid; sternal split or transthoracic approach
60271	Thyroidectomy; including substernal thyroid; cervical approach

S17 Transurethral Resection of Prostate (surgical)

The following CPT procedure codes are used to identify S17 admissions. One of the below codes must be listed as the primary procedure. The secondary procedure string must either be blank or one of the codes listed below.

Procedure code	Description
52601	Transurethral electrosurgical resection of prostate; including control of post-operative bleeding; complete (vasectomy; meatotomy; cystourethroscopy; urethral calibration and/or dilation; and internal urethrotomy are included)
52630	Transurethral resection; residual or regrowth of obstructive prostate tissue including control of post-operative bleeding; complete (vasectomy; meatotomy; cystourethroscopy; urethral calibration and/or dilation; and internal urethrotomy are included)

S18 Arthroscopic Excision of Meniscus of Knee (surgical)

The following CPT procedure codes are used to identify S18 admissions. One of the below codes must be listed as the primary procedure. The secondary procedure string must either be blank or one of the codes listed below.

Procedure code	Description
29880	Arthroscopy; knee; surgical; with meniscectomy (medial AND lateral; including any meniscal shaving)
29881	Arthroscopy; knee; surgical; with meniscectomy (medial OR lateral; including any meniscal shaving)

S19 Lens and Cataract Procedures (surgical)

The following CPT procedure codes are used to identify S20 admissions. One of the below codes must be listed as the primary procedure. The secondary procedure string must either be blank or one of the codes listed below.

Procedure code	Description
65235	Removal of foreign body; intraocular; from anterior chamber of eye or lens
66820	Discission of secondary membranous cataract (opacified posterior lens capsule and/or anterior hyaloid); stab incision technique (Ziegler or Wheeler knife)
66821	Discission of secondary membranous cataract (opacified posterior lens capsule and/or anterior hyaloid); laser surgery (e.g.; YAG laser) (1 or more stages)
66825	Repositioning of intraocular lens prosthesis; requiring an incision (separate procedure)
66830	Removal of secondary membranous cataract (opacified posterior lens capsule and/or anterior hyaloid) with corneo-scleral section; with or without iridectomy (iridocapsulotomy; iridocapsulectomy)
66840	Removal of lens material; aspiration technique; 1 or more stages
66850	Removal of lens material; phacofragmentation technique (mechanical or ultrasonic) (e.g.; phacoemulsification); with aspiration
66852	Removal of lens material; pars plana approach; with or without vitrectomy
66920	Removal of lens material; intracapsular
66930	Removal of lens material; intracapsular; for dislocated lens
66940	Removal of lens material; extracapsular (other than 66840; 66850; 66852)
66982	Extracapsular cataract removal with insertion of intraocular lens prosthesis (one stage procedure); manual or mechanical technique (e.g.; irrigation and aspiration or phacoemulsification); complex; requiring devices or techniques not generally used in rou
66983	Intracapsular cataract extraction with insertion of intraocular lens prosthesis (1 stage procedure)
66984	Extracapsular cataract removal with insertion of intraocular lens prosthesis (1 stage procedure); manual or mechanical technique (e.g.; irrigation and aspiration or phacoemulsification)
66985	Insertion of intraocular lens prosthesis (secondary implant); not associated with concurrent cataract removal
66986	Exchange of intraocular lens

S20 Ligation and Stripping of Varicose Veins (surgical)

The following CPT procedure codes are used to identify S20 admissions. One of the below codes must be listed as the primary procedure. The secondary procedure string must either be blank or one of the codes listed below.

Procedure code	Description
37650	Ligation of femoral vein
37660	Ligation of common iliac vein
37700	Ligation and division of long saphenous vein at saphenofemoral junction; or distal interruptions
37718	Ligation; division; and stripping; short saphenous vein
37722	Ligation; division; and stripping; long (greater) saphenous veins from saphenofemoral junction to knee or below
37735	Ligation and division and complete stripping of long or short saphenous veins with radical excision of ulcer and skin graft and/or interruption of communicating veins of lower leg; with excision of deep fascia
37760	Ligation of perforator veins; subfascial; radical (Linton type); with or without skin graft; open
37761	Ligation of perforator vein(s), subfascial, open, including ultrasound guidance, when performed, 1 leg
37765	Stab phlebectomy of varicose veins; one extremity; 10-20 stab incisions
37766	Stab phlebectomy of varicose veins; one extremity; more than 20 incisions
37780	Ligation and division of short saphenous vein at saphenopopliteal junction (separate procedure)
37785	Ligation; division; and/or excision of varicose vein cluster(s); one leg

S21 Tonsillectomy and/or adenoidectomy (surgical)

The following CPT procedure codes are used to identify S21 admissions. One of the below codes must be listed as the primary procedure. The secondary procedure string must either be blank or one of the codes listed below.

Procedure code	Description
42820	Tonsillectomy and adenoidectomy; younger than age 12
42821	Tonsillectomy and adenoidectomy; age 12 or over

42825	Tonsillectomy; primary or secondary; younger than age 12
42826	Tonsillectomy; primary or secondary; age 12 or over
42830	Adenoidectomy; primary; younger than age 12
42831	Adenoidectomy; primary; age 12 or over
42835	Adenoidectomy; secondary; younger than age 12
42836	Adenoidectomy; secondary; age 12 or over

M03 Cholelithiasis (medical, no procedures)

M03 admissions are identified on the basis of primary diagnosis codes– the primary diagnosis must precisely match one of the diagnoses on the list below.

Diagnosis code	Description
K80.0	Calculus of gallbladder with acute cholecystitis
K80.1	Calculus of gallbladder with other cholecystitis
K80.2	Calculus of gallbladder without cholecystitis
K80.3	Calculus of bile duct with cholangitis
K80.4	Calculus of bile duct with cholecystitis
K80.5	Calculus of bile duct without cholangitis or cholecystitis
K80.8	Other cholelithiasis

Admissions with procedures (or where any amount is billed by the hospital for theatre time) are excluded.

M04 Heart Failure (medical, no procedures)

M04 admissions are identified on the basis of primary diagnosis codes– the primary diagnosis must precisely match one of the diagnoses on the list below.

Diagnosis code	Description
I50.0	Congestive heart failure
I50.1	Left ventricular failure
I50.9	Heart failure, unspecified

Admissions with procedures (or where any amount is billed by the hospital for theatre time) are excluded. Admissions with a primary diagnosis of I11.0 or I09.9 are excluded.

M05 Malignant Neoplasm (medical, no procedures)

M05 admissions are identified on the basis of primary diagnosis codes– the primary diagnosis must precisely match one of the diagnoses on the list below.

Diagnosis code	Description
C34.0	Malignant neoplasm of bronchus and lung - Main bronchus
C34.1	Malignant neoplasm of bronchus and lung - Upper lobe, bronchus or lung

C34.2	Malignant neoplasm of bronchus and lung - Middle lobe, bronchus or lung
C34.3	Malignant neoplasm of bronchus and lung - Lower lobe, bronchus or lung
C34.8	Malignant neoplasm of bronchus and lung - Overlapping lesion of bronchus and lung
C34.9	Malignant neoplasm of bronchus and lung, unspecified

Admissions with procedures (or where any amount is billed by the hospital for theatre time) are excluded. Admissions with a primary diagnosis of D02.2 are excluded.

M07 Pneumonia (medical, no procedures)

M05 admissions are identified on the basis of primary diagnosis codes– the primary diagnosis must precisely match one of the diagnoses on the list below.

Diagnosis code	Description
J12.0	Adenoviral pneumonia
J12.1	Respiratory syncytial virus pneumonia
J12.2	Para influenza virus pneumonia
J12.3	Human metapneumovirus pneumonia
J12.8	Other viral pneumonia
J12.9	Viral pneumonia, unspecified
J13	Pneumonia due to Streptococcus pneumoniae
J14	Pneumonia due to Haemophilus influenza
J15.0	Pneumonia due to Klebsiella pneumoniae
J15.1	Pneumonia due to Pseudomonas
J15.2	Pneumonia due to staphylococcus
J15.3	Pneumonia due to streptococcus, group B
J15.4	Pneumonia due to other streptococci
J15.5	Pneumonia due to Escherichia coli
J15.6	Pneumonia due to other aerobic Gram-negative bacteria
J15.7	Pneumonia due to Mycoplasma pneumoniae
J15.8	Other bacterial pneumonia
J15.9	Bacterial pneumonia, unspecified
J16.0	Chlamydial pneumonia
J16.8	Pneumonia due to other specified infectious organisms
J18.0	Bronchopneumonia, unspecified
J18.1	Lobar pneumonia, unspecified
J18.2	Hypostatic pneumonia, unspecified
J18.8	Other pneumonia, organism unspecified
J18.9	Pneumonia, unspecified

Admissions with procedures (or where any amount is billed by the hospital for theatre time) are excluded. Admissions with a secondary diagnosis such that the first three characters of the diagnosis are I00 or J17 are excluded.

M01 Acute Myocardial Infarction (medical, with procedures)

M01 admissions are identified on the basis of primary diagnosis codes – the primary diagnosis must precisely match one of the diagnoses on the list below.

Diagnosis code	Description
I21.0	Acute transmural myocardial infarction of anterior wall
I21.1	Acute transmural myocardial infarction of inferior wall
I21.2	Acute transmural myocardial infarction of other sites
I21.3	Acute transmural myocardial infarction of unspecified site
I21.4	Acute subendocardial myocardial infarction
I21.9	Acute myocardial infarction, unspecified
I22.0	Subsequent myocardial infarction of anterior wall
I22.1	Subsequent myocardial infarction of inferior wall
I21.8	Subsequent myocardial infarction of other sites
I21.9	Subsequent myocardial infarction of unspecified site

Admissions already categorised in either S05 or S13 are excluded. Admissions with invasive treatments should be removed by inspection.

M02 Angina Pectoris (medical, with procedures)

M01 admissions are identified on the basis of primary diagnosis codes– the primary diagnosis must precisely match one of the diagnoses on the list below.

Diagnosis code	Description
I20.0	Unstable angina
I20.1	Angina pectoris with documented spasm
I20.8	Other forms of angina pectoris
I20.9	Angina pectoris, unspecified

Admissions already categorised in either S05 or S13 are excluded. Admissions with invasive treatments should be removed by inspection.

M06 Normal delivery (medical, with procedures)

M06 admissions are identified on the basis of primary diagnosis codes– the primary diagnosis must precisely match one of the diagnoses on the list below.

Diagnosis code	Description
O80.0	Spontaneous vertex delivery
O80.1	Spontaneous breech delivery
O80.8	Other single spontaneous delivery
O80.9	Single spontaneous delivery, unspecified

Only the following procedure codes are permitted:

Procedure code	Description
59400	Routine obstetric care including ante-partum care; vaginal delivery (with or without episiotomy; and/or forceps) and postpartum care
59409	Vaginal delivery only (with or without episiotomy and/or forceps);

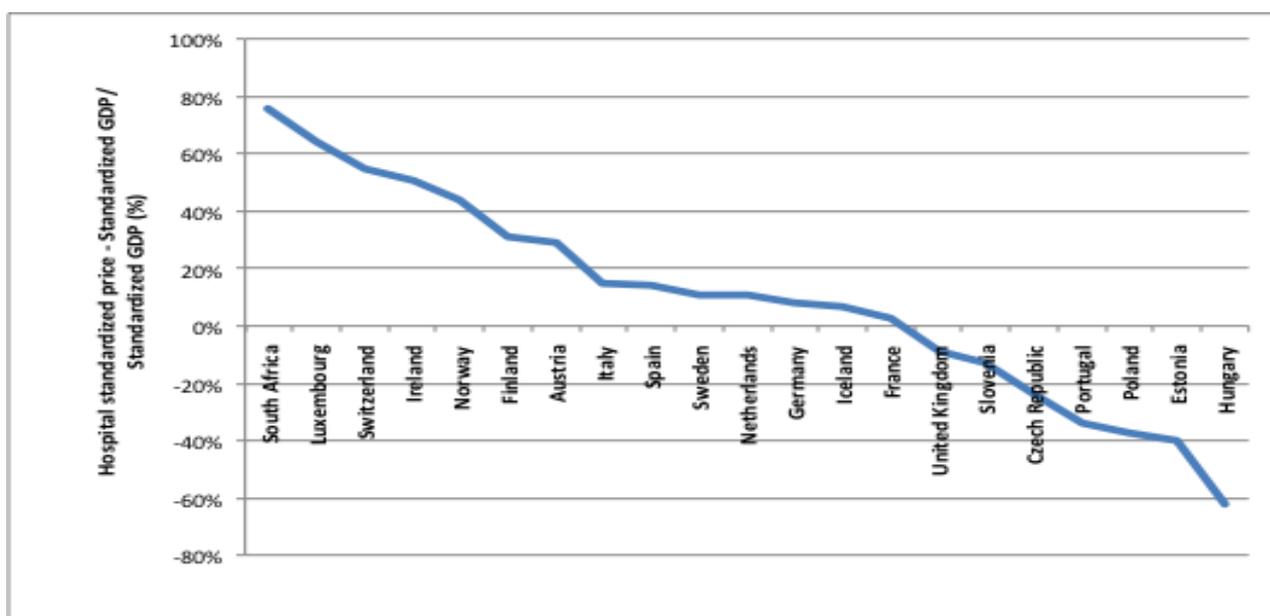
59410	Vaginal delivery only (with or without episiotomy and/or forceps); including postpartum care
59610	Routine obstetric care including ante-partum care; vaginal delivery (with or without episiotomy; and/or forceps) and postpartum care; after previous Caesarean delivery
59612	Vaginal delivery only; after previous Caesarean delivery (with or without episiotomy and/or forceps);
59614	Vaginal delivery only; after previous Caesarean delivery (with or without episiotomy and/or forceps); including postpartum care

ANNEX 3 – A RANKING OF COUNTRIES BASED ON A COMPARISON OF HOSPITALS AND GDP PRICE LEVELS

One of the approaches to measure affordability uses the ratio of expenditures on a good relative to the total available resources (e.g. measured by household income or economic product, GDP). The price of a commodity is deemed unaffordable when it exceeds a certain proportion of a household's or economy's resources³³.

In this study, we looked at affordability from a price level perspective by comparing hospitals and GDP price levels across countries. To do so, we ranked countries by rescaling the hospital price level³⁴, and by taking the difference between the hospital price level and the GDP price level for each country expressed as a ratio of the GDP price level. This measure should not be interpreted quantitatively as its main purpose is to rank countries. As illustrated in the figure below, the largest difference between hospital price levels and economy-wide price levels is for South Africa.

Figure 19. Ranking of countries based on hospitals and GDP comparative price levels, 2013



³³ Niëns LM, Van de Poel E, Cameron A, Ewen M, Laing R and Brouwer WBF, Practical measurement of affordability: an application to medicines, Bulletin of the World Health Organization 2012; 90:219-227.

³⁴ The average price level for hospitals is assumed to be 5% higher than the average price level for GDP on the basis of average price levels for health and GDP observed across OECD countries (source: OECD.stat).

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