Geographical maldistribution of surgical resources in South Africa: A review of the number of hospitals, hospital beds and surgical beds

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Background. The global burden of surgical disease has been studied to a limited extent. Despite the proven benefits of surgery, surgical services remain poorly resourced. Contributing to this global crisis is the critical lack of data regarding available resources.
Objective. To analyse the distribution of some resources necessary for the provision of surgical care. The distribution and number of surgical resources (number of surgical beds) relative to the general resources (number of hospitals and total number of beds) in South Africa were analysed.
Methods. All hospitals in the country, including those in the public and private sectors, were contacted, and the total number of hospitals, the level of care (district v. regional v. tertiary), the total number of hospital beds, and the number of surgical beds were determined. The data were analysed according to the provincial distribution and the public v. private sector distribution relative to the size of the population.
Results. A total of 544 hospitals were included in the study – 327 in the public sector and 217 in the private sector. The public sector hospitals included 257 district-, 49 regional- and 21 tertiary-level hospitals. Nationally, there were 1 hospital, 187 hospital beds and 42 surgical beds per 100 000 population. Gauteng Province (GP), the Eastern Cape, KwaZulu-Natal (KZN) and the Western Cape had the most hospitals and GP had the largest number of private hospitals. GP and KZN had the largest total number of beds (n=29 181 and n=22 889, respectively) and number of surgical beds (n=7 289 and n=4 651, respectively). GP had the largest number of private surgical beds (n=4 837). There was a marked variation in the number of hospitals, total number of beds, and number of surgical beds among provinces.
Conclusion. This study provided an estimation of the number of hospitals, total number of beds, and number of surgical beds, and showed a marked variation among provinces and between the public and private sectors.

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Although a significant proportion of the global burden of disease can be treated surgically, and surgical illnesses are associated with significant morbidity and mortality, surgery has to a large extent been neglected as a developmental initiative.[1-3] In many developing countries, numerous patients who require basic surgical treatment never reach a healthcare facility, and those who do, encounter inadequate surgical resources.[4]

The full extent of the global burden of surgical disease is to a large extent unknown. It has been estimated that >2 billion people worldwide do not have access to the most basic surgical care.[5] Clearly, the 'unmet surgical need' is enormous. The Lancet Commission on Global Surgery (LCGS) acknowledged that surgery should be included as a core component of any health system, and made recommendations to stakeholders with regard to funding, provision and governance of surgical care. The LCGS designed a template to be used by stakeholders when implementing a national surgical plan, and included recommendations on infrastructure (tracking the number and distribution of facilities), workforce (density and distribution of surgical, anaesthetic and obstetric specialists), service delivery (Bellwether procedures), financing and information management (robust information systems).[6]

A major contributing factor to the global crisis with regard to surgery is the lack of comprehensive data, with few studies investigating surgical infrastructure and resources. The problem is further compounded by the lack of clarity as to which metrics should be measured to assess surgical infrastructure and resources. Furthermore, many of the metrics currently available have limitations when used to assess surgical services. The development of a surgical plan requires an analysis of the existing surgical facilities. Therefore, the aim of the current study was to analyse the number of surgical beds in each province in South Africa (SA) relative to the overall number of health facilities, i.e. the number of hospitals and hospital beds.

Methods

Study design and data collection

This study was a descriptive analysis of the overall number of hospitals, hospital beds and surgical beds in SA. SA has a dual health service, i.e. a public health service funded by the state and a private health service for patients who have health insurance or are self funded. The latter is used by ~16% of the population. Public hospitals were categorised as district-, regional- and tertiary-level hospitals according to the National Department of Health (NDoH) criteria.[7] According to NDoH definitions, *district* hospitals are staffed by family physicians or medical officers, *regional* hospitals are staffed by general specialists, and *tertiary* hospitals are staffed by general specialists and/or sub-specialists. However, there is considerable overlap, e.g. a district-level hospital may have specialists on the staff and provide specialist level of care. Clinics and so-called specialised hospitals, such as psychiatric, tuberculosis and rehabilitation facilities, were excluded, based on the assumption that limited or no surgery occurred at these facilities. Private facilities that performed day theatre surgery were included.

A list of all hospitals in SA was obtained from the Provincial DoH and cross-referenced with electronic databases of hospitals in SA

(Medpages and hospital websites). These were cross-referenced with the NDoH hospital list from the office of the minister of health.

The Health Systems Trust provided estimates of the total number of hospitals and hospital beds for each province for comparison among the provinces. The public hospitals were grouped according to the nine provinces in SA and were subdivided into major district municipalities.

All hospitals were contacted telephonically and by email. Either the chief executive officer, superintendent or matron (in the case of district-level facility) in each hospital was contacted to obtain the relevant data. Data were collected from 1 October to 31 December 2014. Private hospital data were readily available from the Hospital Association of SA (HASA) and included extensive data on the number of hospitals, total number of hospital beds and type of beds. Private hospitals were contacted telephonically to verify these data.

Ethical approval

Permission to conduct this research was obtained from the provincial departments of health and from the individual hospitals. The research was approved by the Human Research and Ethics Committee, University of Cape Town (ref. no. HREC 515/2013, 515/2014, 515/2015) and the departmental Research Committee for the Department of Surgery, University of Cape Town.

South African background

Population estimates for 2014 were obtained from census data from Stats SA.[8] In 2014, SA had a population of 54 million.[9] The World Bank has designated SA as an upper-middle-income country, with a gross domestic product (GDP) of USD6 619 per capita. The total GDP for 2014 was USD350 billion, with an estimated growth rate of 1.5%.[9] SA has been divided into nine provinces: the Eastern Cape (EC), the Free State (FS), Gauteng Province (GP), KwaZulu-Natal (KZN), Limpopo Province (LP), Mpumalanga Province (MP), North West (NW), the Northern Cape (NC) and the Western Cape (WC). These have been subdivided into 52 district municipalities.[7]

Data analysis

The total number of hospitals and public and private hospitals in each province were documented. Similarly, the total number of hospital beds and surgical beds in the public and private sector in each province were documented. Using the population estimates for 2014, the number of hospitals and hospital/surgical beds per 100 000 population were calculated. Based on the estimation that 16% of the population have medical insurance and make use of the private sector,[10] the number of public hospitals and beds per 100 000 uninsured population and the number of private hospitals and beds per 100 000 insured population in each province were calculated.

Results

Total number of hospitals

A total of 544 hospitals were included in the study, of which 217 were private hospitals and 327 public hospitals. The provincial distribution of both private and public hospitals is shown in Fig. 1. The largest total number of hospitals was in GP (n=111) and the smallest in NC (n=21).

Public hospitals

Of the 327 public hospitals, 257 (79%) were district-level hospitals, 49 (15%) were regional-level hospitals and 21 (6%) were

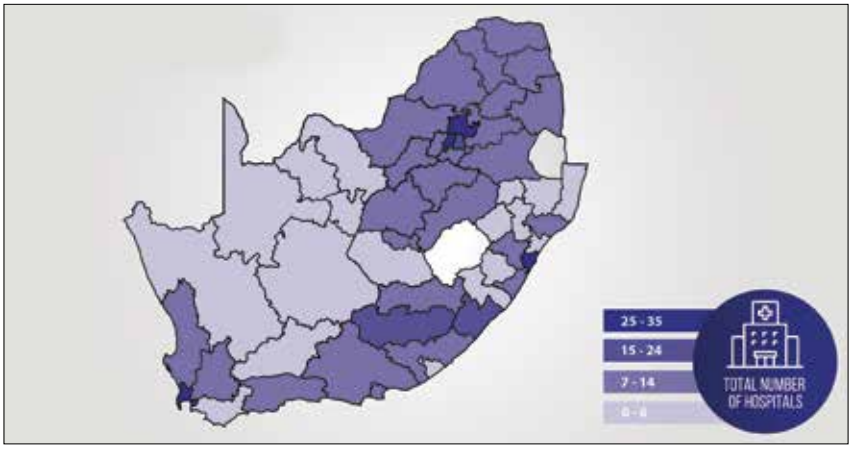

Fig. 1. Provincial distribution of total number of hospitals in South Africa according to district municipality.

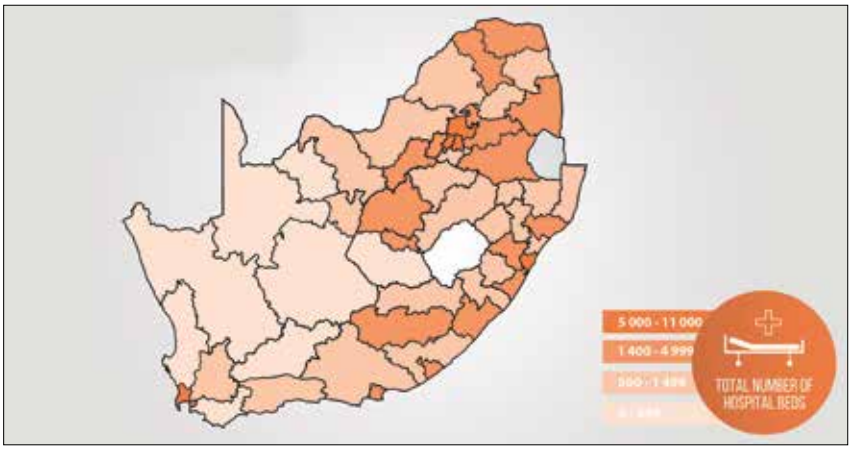

Fig. 2. Provincial distribution of total number of hospital beds in South Africa according to district municipality.

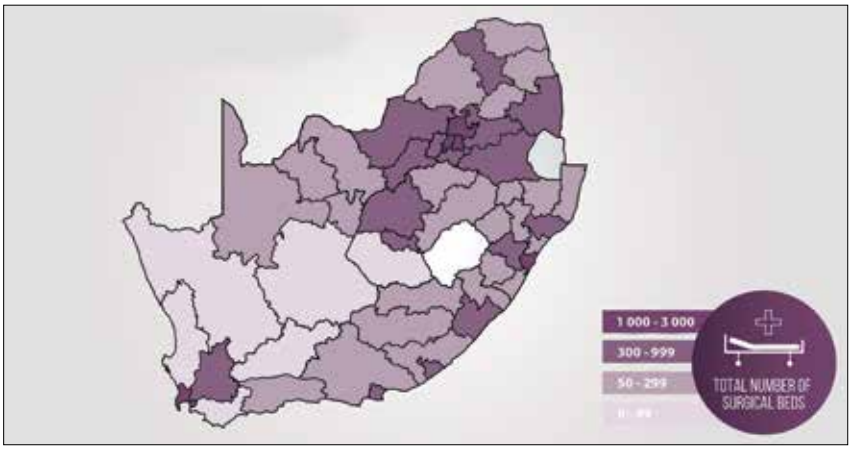

Fig. 3. Provincial distribution of total number of surgical beds in South Africa according to district municipality.

tertiary-level hospitals. The majority of public hospitals were in EC (*n*=75), although most of these were district-level hospitals. These were followed by KZN (*n*=54), WC (*n*=40), LP (*n*=37) and FS (*n*=30). The fewest public hospitals were in NW (*n*=20) and NC (*n*=17). There were no tertiary-level hospitals in NC and NW, with only 1 in FS. KZN (*n*=14) and GP (*n*=11) had the largest number of regional hospitals (Table 1).

Private hospitals

The largest number of private hospitals were located in GP (*n*=85), followed by WC (*n*=34) and KZN (*n*=31) (Table 1).

Hospitals per 100 000 population

Hospitals per 100 000 population were calculated for the total number of hospitals, although accessibility to private hospitals is limited to ~16% of the population as part of the current health scheme in SA (Table 1).[10]

The largest total number of hospitals per population were in NC (1.79/100 000), FS (1.65/100 000) and EC (1.31/100 000). These provinces were regarded as being less well resourced. A comparison of public hospitals per 100 000 uninsured population (84% of SA) and private hospitals per 100 000 insured population (16% of SA) is shown in Table 2.

These results provide a more meaningful perspective. There were more private hospitals per insured population compared with public hospitals per uninsured population in all the provinces. The difference was greatest in FS and GP, and smallest in EC, LP and MP. GP had the fewest public hospitals per uninsured population (0.27/100 000), which fell far below the national average of 0.71/100 000.

Total number of hospital beds

There were an estimated 102 229 hospital beds in SA. The provincial distribution of total hospital beds is shown in Fig. 2. The provincial distribution of the number of hospital beds according to hospital type is shown in Table 3.

GP had the largest overall number with 29 181 beds, comprising almost equal numbers of public and private beds. The large number of public hospital beds was as a result of the 4 tertiary-level and 11 regional-level hospitals. These hospitals typically have more beds as per their definition. The smallest total number of hospital beds were in NC (*n*=2 015) and NW (*n*=4 877). These provinces had no central hospitals and very few private beds. The fewest private beds were in LP (*n*=576) and NC (*n*=361).

Number of hospital beds per 100 000 population

The largest total number of beds per 100 000 population were in GP (*n*=225.95), followed by FS (*n*=216.80) and KZN (*n*=214.03).

Table 1. Provincial distribution of total number of hospitals per 100 000 population, 2014

Province	Population, *n*	Hospitals, *n*	Private hospitals, *n*	Public hospitals, *n*	Total hospitals/100 000, *n*
EC	6 786 900	89	14	75	1.31
FS	2 786 800	46	16	30	1.65
GP	12 914 800	111	85	26	0.86
KZN	10 694 400	85	31	54	0.79
LP	5 630 500	45	7	37	0.80
MP	4 999 300	40	12	28	0.80
NC	1 166 700	21	4	17	1.79
NW	3 676 300	34	14	20	0.92
WC	6 116 300	74	34	40	1.21
SA	54 772 000	544	217	327	1.00

EC = Eastern Cape; FS = Free State; GP = Gauteng Province; KZN = KwaZulu-Natal; LP = Limpopo Province; MP = Mpumalanga Province; NC = Northern Cape; NW = North West; WC = Western Cape; SA = South Africa.

Table 2. Comparison of public and private hospitals per 100 000 population, 2014

Province	Medical aid coverage, %[11]	Public hospitals, *n*	Public hospitals per 100 000 uninsured population, *n*	Private hospitals, *n*	Private hospitals per 100 000 insured population, *n*
EC	11.4	75	1.24	14	1.88
FS	18.0	30	1.31	16	3.19
GP	26.6	26	0.27	85	2.47
KZN	12.5	54	0.58	31	2.32
LP	8.7	37	0.71	7	1.43
MP	13.3	28	0.64	12	1.80
NC	15.4	17	1.71	4	2.29
NW	13.7	20	0.63	14	2.78
WC	25.5	40	0.87	34	2.16
SA	16.0	327	0.71	217	2.48

EC = Eastern Cape; FS = Free State; GP = Gauteng Province; KZN = KwaZulu-Natal; LP = Limpopo Province; MP = Mpumalanga Province; NC = Northern Cape; NW = North West; WC = Western Cape; SA = South Africa.

Table 3. Provincial distribution of hospital beds according to hospital type, *n*

	Hospital				
Province	District, *n*	Regional, *n*	Central, *n*	Private, *n*	Total, *n*
EC	6 252	555	4 026	1 684	12 517
FS	1 568	1 606	543	2 325	6 042
GP	2 722	6 412	5 721	14 326	29 181
KZN	8 399	8 329	1 359	4 802	22 889
LP	4 431	1 579	1 231	576	7 817
MP	3 227	915	650	1 382	6 174
NC	960	694	0	361	2 015
NW	1 396	2 016	0	1 465	4 877
WC	2 659	1 172	2 495	4 391	10 717
SA	31 614	23 278	16 025	31 312	102 229

EC = Eastern Cape; FS = Free State; GP = Gauteng Province; KZN = KwaZulu-Natal; LP = Limpopo Province; MP = Mpumalanga Province; NC = Northern Cape; NW = North West; WC = Western Cape; SA = South Africa.

Table 4. Comparison of public hospital beds per uninsured population, private hospital beds per insured population and total hospital beds per total population, 2014

Province	Public hospital beds, *n*	Public hospital beds per 100 000 uninsured population, *n*	Private hospital beds, *n*	Private hospital beds per 100 000 insured population, *n*	Total beds, *n*	Total beds per 100 000 population, *n*
EC	10 833	179.34	1 684	217.65	12 517	184.43
FS	3 717	162.66	2 325	463.49	6 042	216.80
GP	14 855	155.44	14 326	417.02	29 181	225.95
KZN	18 087	192.19	4 802	359.21	22 889	214.03
LP	7 241	139.79	576	117.59	7 817	138.83
MP	4 792	110.18	1 382	207.85	6 174	123.50
NC	1 654	166.79	361	200.92	2 015	172.71
NW	3 412	106.68	1 465	290.87	4 877	132.66
WC	6 326	138.67	4 391	281.54	10 717	175.22
SA	70 917	154.14	31 312	357.30	102 229	186.64

EC = Eastern Cape; FS = Free State; GP = Gauteng Province; KZN = KwaZulu-Natal; LP = Limpopo Province; MP = Mpumalanga Province; NC = Northern Cape; NW = North West; WC = Western Cape; SA = South Africa.

Table 5. Provincial distribution of surgical beds according to hospital type, *n*

	Hospital				
Province	District, *n*	Regional, *n*	Central, *n*	Private, *n*	Total, *n*
EC	793	152	945	663	2 553
FS	559	336	60	764	1 383
GP	428	1 176	848	4 837	7 289
KZN	1 670	1 522	354	1 459	4 651
LP	715	235	130	197	1 277
MP	605	132	107	406	1 250
NC	146	146	0	126	418
NW	220	407	0	576	1 203
WC	455	210	509	1 560	2 734
SA	5 591	4 316	2 953	10 578	22 758

EC = Eastern Cape; FS = Free State; GP = Gauteng Province; KZN = KwaZulu-Natal; LP = Limpopo Province; MP = Mpumalanga Province; NC = Northern Cape; NW = North West; WC = Western Cape; SA = South Africa.

Table 6. Surgical beds per 100 000 population according to sector and province, *n*

Province	Public hospital surgical beds, *n*	Public hospital surgical beds per 100 000 uninsured population, *n*	Private hospital surgical beds, *n*	Private hospital surgical beds per 100 000 insured population, *n*	Total surgical beds, *n*	Total surgical beds per 100 000 population, *n*
EC	1 890	31.29	663	85.69	2 553	37.62
FS	619	27.09	764	152.31	1 383	49.62
GP	2 452	25.31	4 837	140.80	7 289	56.44
KZN	3 192	34.31	1 449	108.39	4 641	43.40
LP	1 080	20.85	197	40.22	1 277	22.68
MP	844	19.41	406	67.12	1 250	25.00
NC	292	29.10	126	70.13	418	35.83
NW	627	19.83	576	114.36	1 203	32.72
WC	1 174	25.39	1 560	100.02	2 734	44.70
SA	12 170	26.45	10 578	120.70	22 758	41.55

EC = Eastern Cape; FS = Free State; GP = Gauteng Province; KZN = KwaZulu-Natal; LP = Limpopo Province; MP = Mpumalanga Province; NC = Northern Cape; NW = North West; WC = Western Cape; SA = South Africa.

The fewest beds per 100 000 population were in MP (*n*=123.50) and LP (*n*=138.83) (Table 4). There were far more private hospital beds per insured population (*n*=357.30) than public hospital beds per uninsured population (*n*=154.14). The largest number of private beds per insured 100 000 population were in FS (*n*=463.29), followed by GP (*n*=417.02) and KZN (*n*=359.21). The largest number of public sector beds available to uninsured patients per 100 000 population were in KZN (*n*=192.19), EC (*n*=179.34), NC (*n*=166.79) and FS (*n*=162.66). These provinces comprise predominantly rural areas.

Number of surgical beds

In SA, 22 758 beds were assigned as general surgical beds. Over half (53%) of these were located in the public sector.

Both private and public surgical beds were concentrated in GP, WC and KZN. The largest number of private surgical beds were in GP, whereas the largest number of public surgical beds were in KZN (Fig. 3, Table 5).

The district-level hospitals had an average of 131 beds and 20 surgical beds compared with regional-level hospitals, which had an average of 471 beds and 86 surgical beds. Tertiary-level hospitals had an average of 762 beds and 144 surgical beds. Private hospitals had an average of 144 beds and 48 surgical beds.

In the public sector, surgical beds comprised 17.2% of total hospital beds, ranging between 14.9% (LP) and 26.7% (WC). In the private sector, surgical beds comprised 33.8% of the total beds, with a range of 29.3% (MP) - 39.4% (EC). Overall in SA, surgical beds comprised 22.3% of total hospital beds.

Number of surgical beds per population

There were 41.55 surgical beds per 100 000 population, ranging from 22.68 (LP) to 56.44 (GP) (Table 6).

There was a striking difference between the number of surgical beds available to the public (*n*=26.45) compared with the number available to private patients (*n*=120.70). The fewest public beds per uninsured population were located in the less well-resourced provinces (MP, *n*=19.41; NW, *n*=19.83; and LP, *n*=20.85); however, these were not far behind the so-called well-resourced provinces (GP, *n*=25.31; and WC, *n*= 25.39). Surprisingly, EC, which comprises largely rural districts, had the second highest number of surgical beds available to uninsured patients (*n*=31.29) after KZN (*n*=34.31). The largest number of private surgical beds available to patients with health insurance were in FS (*n*=152.31), GP (*n*=140.80) and NW (*n*=114.36), whereas the fewest were in LP (*n*=40.22) and MP (*n*=67.12).

Discussion

Surgically treatable diseases comprise >30% of the burden of disease globally.[6] However, many people do not have access to adequate surgical care. Only 3.5% of the 243 million surgical procedures each year are performed in lower- and middle-income countries.[6] The current research provided an assessment of surgical beds as a metric of surgical services, even though this does have limitations.

Overview of national results in South Africa

Our study included 544 hospitals in SA. There were 257 district-level hospitals, 49 regional-level hospitals and 21 tertiary-level hospitals. The district-level hospitals had an average of 131 beds and 20 surgical beds. The regional-level hospitals had an average of 471 beds and 86 surgical beds. The tertiary-level hospitals had an average of 762 beds and 144 surgical beds. EC, surprisingly, had the largest number of public hospitals, whereas the largest total number of hospitals per population were in NC, followed by FS and EC – despite these provinces being perceived as less well resourced.

The number of public hospitals per uninsured population for the country were 0.71. GP fell far below this average with 0.27/100 000. However, GP had the third highest number of private hospitals per insured population (*n*=2.47), behind NW (*n*=2.78) and FS (*n*=3.19). This was not surprising, as GP was by far the 'wealthiest' in terms of GDP, which was valued at ZAR811 billion (USD112 billion).[9] When public and private facilities were combined (*n*=0.86), GP still fell below the national average of 1.00 hospital per 100 000 population.

Hospital beds as resource indicators

The largest proportion of the 102 229 hospital beds were located in GP (28%), KZN (22%), EC (12%) and WC (10%). GP, WC and KZN comprise large metropolitan areas, whereas EC is largely rural.

GP had the largest overall number of beds (*n*=29 181), comprising almost equal numbers of public and private beds. The reason for the large number of public hospital beds was the four tertiary-level and 11 regional-level hospitals in the province. Hospital beds per 100 000 were greatest in the metropolitan areas, with the largest total number of beds per population in GP (*n*=225.95), followed by FS (*n*=216.80) and KZN (*n*=214.03). Despite WC having large metropolitan areas, it had fewer hospital beds per population (*n*=175.22) than EC (*n*=184.43). When private hospital beds per population were compared with public hospital beds, a far greater maldistribution was found. Unexpectedly, the largest number of public hospital beds available to uninsured patients were in the less well-resourced provinces in SA.

Surgical beds

When the number of surgical beds were compared across different levels of care, district-level hospitals reported a range of surgical beds from as few as 146 in NC to as many as 1 670 in KZN. In all provinces, district-level surgical beds were more numerous than regional-level surgical beds; yet, most district-level facilities refer their surgical cases to regional facilities for treatment. In particular, KZN district-level hospitals were found to be performing very few surgical procedures, except caesarean sections.[12] With far more surgical beds available at district-level facilities and the knowledge that surgery at this level is more cost-effective,[13] there needs to be a greater emphasis on performing surgery at district level. This would involve ensuring that operating theatres were 'functional' and that well-qualified surgical, anaesthetic and nursing staff were available to perform the procedures. Tertiary-level surgical beds were most numerous in EC (*n*=945), followed by GP (*n*=848) and WC (*n*=509).

Total number of hospital and surgical beds in the private sector

Private hospitals had an average of 144 beds and 48 surgical beds. Netcare, Life, Mediclinic and independent groups were the largest private hospital groups. There were 31 312 private hospital beds in SA. The largest proportion of these were in GP (*n*=14 326), KZN (*n*=4 802) and WC (*n*=4 391).

Private beds comprised 31% of total hospital beds in SA, which was a substantial increase from the 21% reported in 2006.[10] Forty-six percent of private beds were located in the most populous province, i.e. GP. There were 10 578 general surgical beds in the private sector. The largest number of private surgical beds were in GP (*n*=4 837), WC (*n*=1 560) and KZN (*n*=1 449). GP had three times as many surgical beds than other metropoles, such as WC and KZN. With its significant contribution to the national GDP, this was not surprising. MP had the fewest private surgical beds as a proportion of total number of beds (29.3%), and EC and NW had the largest proportion, with 39.3% each. In SA, private hospitals allocate approximately one-third of total hospital beds to surgical patients, whereas public hospitals allocate 15 - 26% of their beds to general surgery.

Rural provinces, such as EC, have a significant migration of patients towards the urban provinces (such as WC) in search of better healthcare, despite having a larger number of hospitals. This suggests that the number of resources may not reflect acceptable levels of care and provinces with fewer hospitals may have higher patient volumes. Despite the perception that WC and GP were 'wealthy' and had greater resources, they were often accessed by inhabitants of neighbouring provinces, thereby placing strain on the health systems. By implication, simply looking at the number of hospitals and beds does not translate into adequate healthcare or surgical provision, as bed utilisation rates are highest in these provinces. WC experienced a bed utilisation rate of 88.7, which is far higher than the national average of 68.3 and that of EC, which has a bed utilisation rate of 59.5 (the lowest on the country).[11] Furthermore, WC reported an average length of hospital stay of 3.7 days, whereas EC reported an average of 5.7 days.[11] This could be as a result of greater patient volumes in WC, which may result in mandatory higher patient turnover because of 'bed pressure'. Assessing readmission rates to hospital could provide an indication as to whether this higher turnover rate results in poorer outcomes and increased expenditure.

Tracking the migration patterns of patients may provide insight into their help-seeking behaviour. Migration is an important demographic process that shapes the distribution of the provincial population.[8] From 2011 to 2016, it was estimated that ~241 758 people migrated from EC; LP was estimated to experience an outflow of ~303 101 migrants. During the same period, GP and WC were estimated to experience an inflow of ~1 106 375 and 344 830 migrants, respectively. MP and NW also received a positive net migration, whereas EC, FS and LP experienced the largest outflow.[8] Understanding the ebb and flow of patients migrating between provinces in search of healthcare is critical and demonstrates that using infrastructure metrics, such as the number of hospitals and beds, is limited in the information provided to policymakers about resource availability.

There is unfortunately no uniform reporting of hospital beds, as countries use different definitions for the number of hospital beds. Nonetheless, since the 1990s, there has been a worldwide decrease in the number of beds.[14] SA has 186 hospital beds per 100 000 population, whereas according to the World Bank, Australia has the highest number, with 382 beds per 100 000 population. The UK (294/100 000) and USA (299/100 000) have 60% more hospital beds per population than SA. Brazil is an upper-middle-income country, with ~230 hospital beds per 100 000.[14] Kenya and Zambia are classified as low- and middle-income countries and have 140 and 190 hospital beds per 100 000, respectively.[14] Uganda, Tanzania and Mozambique have the fewest beds per population, indicating limited resources that coincide with being low-income countries. Surgical beds are currently not used as a measure of surgical resources and no global data exist as a comparative for SA's 41.55 surgical beds per 100 000. This could be as a result of surgical bed numbers being poor indicators of surgical capacity.

Study limitations

The measurement of the total number of beds had its shortcomings, as not all hospitals were included in the study. Specialised hospitals were excluded, as they did not perform general surgical procedures. District-level hospitals were non-uniform in the manner in which they allocated and reported surgical beds. The use of metrics for describing hospital beds as an indicator of provision of surgical care is flawed. Perhaps bed utilisation rates would provide more robust data. The proportion of patients with health insurance and access to the private sector may not represent the true number of patients who access private care. There are a number of uninsured patients who can afford out-of-pocket payments, which predisposes them to catastrophically high health expenditure. Similarly, patients with insurance may choose to access public sector hospitals.

Conclusion

Diseases that require surgery are an important and growing public health priority. Strengthening surgical systems will allow countries to tackle and reduce the surgical burden of disease, which may improve health outcomes globally. Our research provides part of an overview of the surgical infrastructure in SA and highlights some limitations of using these metrics to evaluate surgical capacity.

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