

SCIENTIFIC REPORTS AND GUIDELINES

South African Renal Registry Annual Report 2020

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ABSTRACT

The ninth annual report of the South African Renal Registry summarises the December 2020 data on kidney replacement therapy (KRT) for patients with kidney failure in South Africa. The numbers of patients reported here are substantially lower than those recorded in the previous report. This is likely the result of several factors, including larger numbers of deaths from COVID-19 and other causes, delayed initiation of KRT due to the pandemic, and challenges with data submission to the registry during a period when personnel were overwhelmed with clinical responsibilities related to the pandemic.

In December 2020, the number of patients who were being treated with chronic dialysis or transplantation stood at 8 734, a prevalence of 146 per million population (pmp). The prevalence of South Africans accessing treatment in the private healthcare sector was 729 pmp, whereas it was 44 pmp in the chronically under-resourced public sector, well below the rate reported for 1994.

Keywords: renal registry; South Africa; haemodialysis; peritoneal dialysis; transplantation; COVID-19.

INTRODUCTION

The South African Renal Registry (SARR) collects, analyses and publishes information on the treatment of patients with kidney failure in South Africa on behalf of the South African Nephrology Society. This is the ninth consecutive annual report published by the SARR, which summarises the data on record for December 2020 on kidney replacement therapy (KRT) for patients with kidney failure in South Africa.

The COVID-19 pandemic resulted in many deaths of our patients on KRT. Studies from South Africa [1] and elsewhere [2] reported mortality rates from COVID-19 approximating 20% in patients on maintenance dialysis, and exceeding 20% in kidney transplant recipients. Transplantation programmes were suspended because of concerns regarding the consequences of SARS-CoV-2 infection in immunocompromised patients, and the management of potential deceased donors was stopped so that emergency departments and intensive care units could prioritise patients with COVID-19 [3]. In the public healthcare sector, where opening new slots for dialysis is largely dependent on an active transplant programme, this led to a further decrease in the access to KRT for patients with kidney failure.

The pandemic also presented major obstacles to the usual operations of the registry. Data capturers had difficulty accessing treatment centres during the lockdown periods, the staff at these facilities were overwhelmed with the challenges of managing cases of COVID-19 and many contracted the disease themselves.

METHODS

Registry platform

Our current platform was developed using the Webdev programming environment (www.windev.com) and resides on a secure, dedicated, Windows 10 server at a South African internet hosting company. It runs Windows Internet Information Services (IIS) and uses the client/server version of HFSQL (formerly Hyperfile SQL) as its relational database management system. Data capturers interface with the central database via user-friendly web pages from any device with internet access. The platform uses end-to-end encryption and full backups are made daily.

The quality of our data has improved considerably since we began cross-checking the identity numbers of our

patients with the Department of Home Affairs database of births and deaths, which is accessible via the South African Medical Research Council. This has allowed us to analyse and report on patient survival [4] and, more recently, on the survival of elderly patients starting KRT [5].

Over the past few years, the technology platform of the SARR has been expanded to serve as the backbone of the African Renal Registry. Botswana, Burundi, Ghana, Kenya, Nigeria and Zambia have joined the African Renal Registry and have commenced data collection with the aid of our platform [6].

Definitions

Kidney failure and start date of KRT. Kidney failure refers to advanced, irreversible kidney disease which requires the initiation of KRT. The start date is the date of first haemodialysis (HD), the date of the first peritoneal dialysis (PD) flushes or exchanges, or the date of pre-emptive transplantation (where there is no prior dialysis). For patients who are initially thought to have acute kidney injury (AKI) and are dialysed but who do not recover function and then continue KRT, the start date is the date of the first dialysis, even though the diagnosis at that time was AKI and not kidney failure.

Initial KRT modality. This is the intended first modality and should normally be the modality being used on day 91 of KRT. This means that someone who presents late and who is started on urgent HD but is soon established on PD, will have PD recorded as the initial modality.

Changes in the responsible treating unit. This refers to a change in the dialysis unit, PD follow-up unit/clinic or transplant follow-up unit/centre/practice. A transfer entry in the registry is required to record this. This is not done for short-term transfers when the intention is that the patient will return to the “home” unit, for example, for holiday dialysis, temporary transfer to a unit with isolation facilities, etc.

Primary kidney disease. Responsible nephrologists/physicians should assist their data-capturers to ensure that this critical information is accurate. We are using the diagnostic codes of the ERA registry [7]. If there is uncertainty about the diagnosis, as is often the case with patients who present late, then it should be recorded as “**chronic kidney disease (CKD) – aetiology uncertain/unknown**”. In patients who present with kidney failure, small kidneys and hypertension, there should not be an automatic default to labelling such patients as having “chronic glomerulonephritis” or “hypertensive kidney disease”.

Chronic hypertensive nephropathy or malignant hypertensive nephropathy. This should be selected as the primary kidney disease only if there is no reason to suspect that the hypertension is secondary to pre-existing renal disease. We suggest that the following criteria be met: hypertension known to precede kidney dysfunction, left ventricular hypertrophy, proteinuria <2 g/day and no evidence of other kidney diseases [8,9].

Lost to follow-up. The SARR assumes that a functioning transplant is maintained unless there is evidence of a “transplant failure” or death. A dialysis modality is assumed to continue for one year from the date of the last registry entry or laboratory result, in the absence of evidence of death; thereafter, the patient is considered lost to follow-up. Patients are also considered lost to follow-up one year after a “transplant failure” entry if no further entries are recorded.

Recovered kidney function. Patients who have been initiated on chronic HD/PD and who no longer require dialysis are removed from the registry. The period of dialysis-free recovery must persist for at least 90 days; if the period of recovery is less than 90 days and dialysis is restarted, there should be no END entry and dialysis is considered to have been continuous. If the period of recovery exceeds 90 days and the patient restarts KRT, a new entry is recorded for the patient.

Ethical approval

The SARR operates as a longitudinal study with ethical approval from the Health Research Ethics Committee of Stellenbosch University (reference no. NI 1/01/028). This is renewed annually upon submission of a progress report. A waiver of individual informed consent has been granted, and the approval includes countrywide data collection on adults and children, in the public and private sectors, and the tapping of various data sources to improve the accuracy and completeness of data. These include records available through doctors' practices, dialysis and transplant centres, provider companies and medical aid funds. Ethical approval has also been granted for the use of the expanded SARR platform for the African Renal Registry.

RESULTS

South Africa in 2020

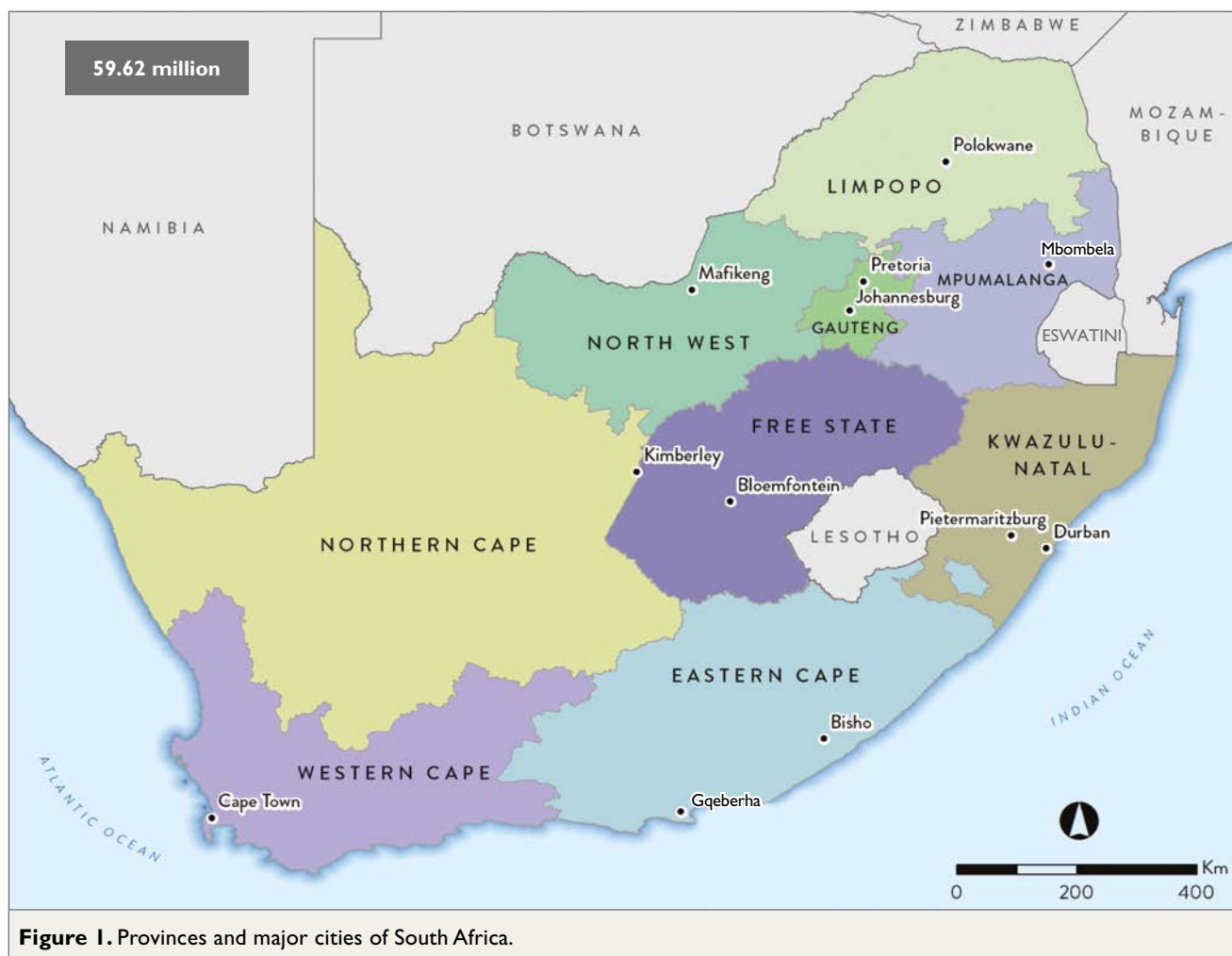
Figure 1 illustrates the provinces and major cities of South Africa. According to the Statistics South Africa (Stats SA) mid-year estimates for 2020 [10], the population of South Africa had increased to 59.62 million people. There was a slight female predominance (51.1%) and Black/African citizens constituted 80.8% of the population (Table 1). About 28.6% of the population was younger than 15 years of age and approximately 9.1% was 60 years or older. The province of Gauteng was home to 26.0% of the population, followed by KwaZulu-Natal with 19.3% (Table 2). Within South Africa, migration has a major impact on the age structure and distribution of provincial populations. For the period 2016–2021, Gauteng and the Western Cape experienced the largest net inflows of migrants, estimated at 980 398 and 290 555, respectively [10].

South Africa is classified as an upper-middle-income country by the World Bank, with a gross national income per capita for 2020 by the Atlas method (current US\$) of \$6 010 and by the purchasing power parity (PPP) method (current international US\$) of \$13 140 [11]. Most of the

population (85.1%) rely on the public healthcare sector for services, with only a small proportion (14.9%) having medical insurance and accessing private sector health care [12].

Life expectancy at birth for 2020 was estimated at 62.5 years for males and 68.5 years for females. The infant mortality rate was estimated at 23.6 per 1 000 live births.

The overall HIV prevalence was 13.0%, and 18.7% for adults aged 15–49 [10].



Population group	Million	%
Black	48.15	80.8
Coloured (mixed ancestry)	5.25	8.8
White	4.68	7.8
Indian/Asian	1.54	2.6
Total	59.62	100

Province	Million	%
Eastern Cape (EC)	6.73	11.3
Free State (FS)	2.93	4.9
Gauteng (GT)	15.49	26.0
KwaZulu-Natal (KZN)	11.53	19.3
Limpopo (LP)	5.85	9.8
Mpumalanga (MP)	4.68	7.8
North West (NW)	4.11	6.9
Northern Cape (NC)	1.29	2.2
Western Cape (WC)	7.01	11.8
Total	59.62	100

Treatment centres for dialysis and transplantation

The number of centres contributing data was 296; of these, 262 (88.5%) are privately owned (Table 3 and Appendix 1). Several provinces have increased access for their public sector patients by utilising spare capacity at private haemodialysis centres on a fee-per-treatment basis. There

are also a few privately run centres on the premises of government hospitals which serve public sector patients.

Sector	EC	FS	GT	KZN	LP	MP	NW	NC	WC	All
Public	4	7	7	6	1	0	3	1	5	34
Private	23	14	79	62	15	15	13	5	36	262
Total	27	21	86	68	16	15	16	6	41	296

Prevalence and incidence of renal replacement therapy

The total number of patients on KRT on 31 December 2020 was 8 734. This is a prevalence of 146 per million population (pmp). The province with the highest patient numbers remained Gauteng, followed by the Western Cape and KwaZulu-Natal, whereas the province with the highest prevalence was the Western Cape, followed by the Free State and Gauteng (Figure 2).

There were 672 patients who started KRT in 2020, an incidence of 11.3 pmp. Most of these patients (73.8%) were treated in private centres.

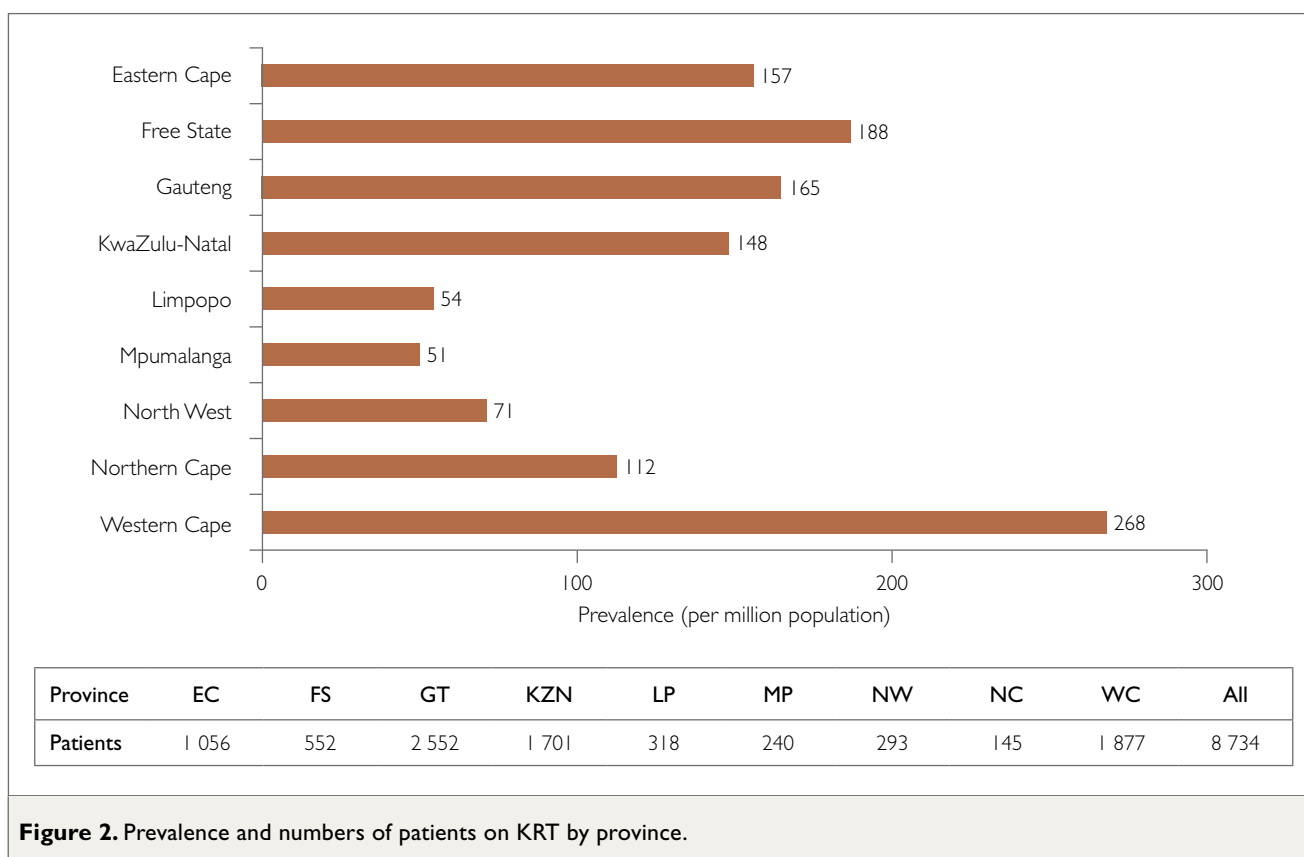


Figure 2. Prevalence and numbers of patients on KRT by province.



The number of patients treated in the public sector declined, with a prevalence of 44 pmp (Table 4). In the private sector, the prevalence was 729 pmp. The numbers of patients and prevalences by province and healthcare sector are shown in Table 5 and Figure 3. Denominators for prevalence calculations are based on the Stats SA mid-term estimates [10] and the Council for Medical Schemes Annual Report [12]. Medical aid beneficiaries who were unclassified with respect to province were allocated to provinces in proportion to the numbers of beneficiaries in each province.

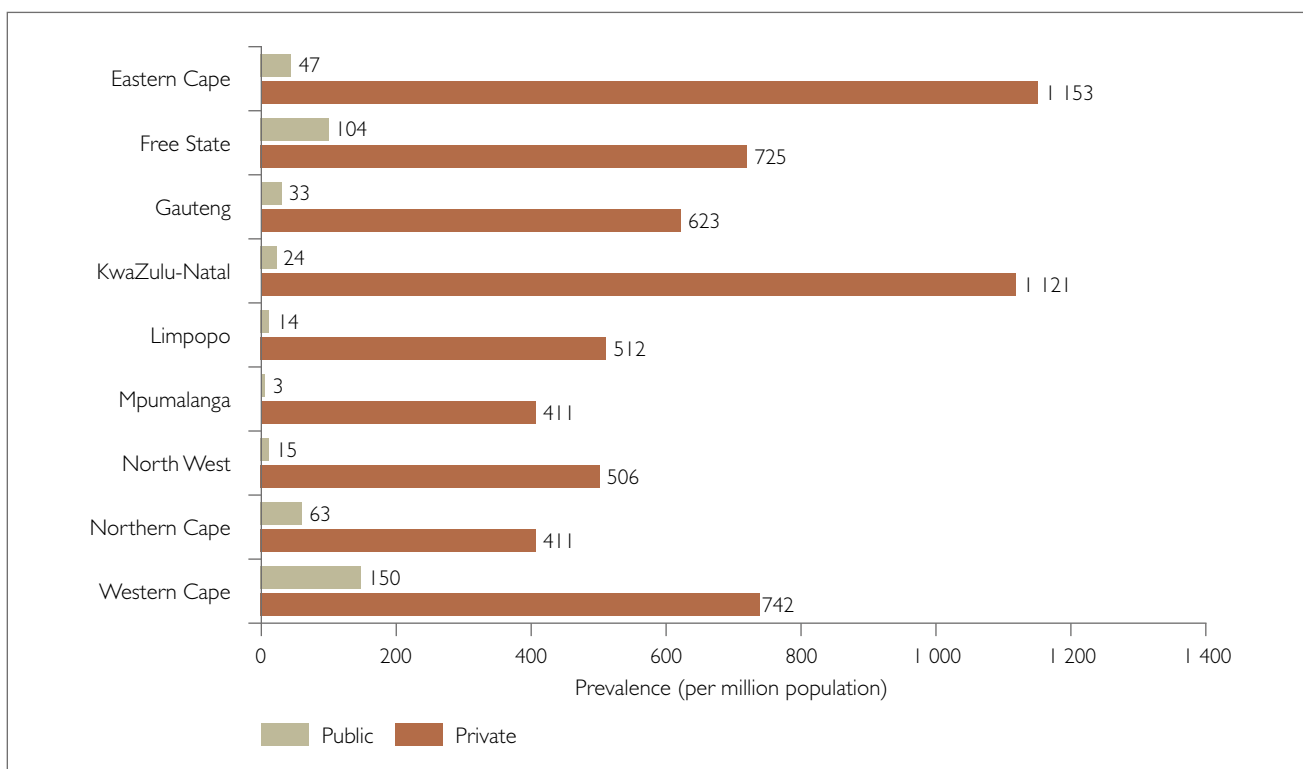
Table 4. KRT prevalence by healthcare sector.

	Public	Private
Population in millions	50.72	8.90*
Patients on treatment	2 248	6 486
Treatment rate (pmp)	44	729

*Council for Medical Schemes Annual Report 2020/21

Table 5. Numbers of patients by sector and province.

Sector	EC	FS	GT	KZN	LP	MP	NW	NC	WC	All
Public	286	263	399	247	75	12	53	70	843	2 248
Private	770	289	2 153	1 454	243	228	240	75	1 034	6 486
Total	1 056	552	2 552	1 701	318	240	293	145	1 877	8 734

**Figure 3. Prevalence of KRT by province and sector.**

Treatment modality and KRT vintage

Of the patients on KRT in December 2020, 20.7% had a functioning kidney transplant. Of the patients on dialysis, 88.5% were on haemodialysis and 11.5% were on peritoneal dialysis. Most of the transplant and peritoneal dialysis patients were in the public sector; the private sector had much lower proportions of patients on these KRT modalities (Figures 4 and 5).

Overall, the median KRT vintage was 5.8 years [interquartile range (IQR) 3.2–9.3 years]. The median vintage was 5.1 years (IQR 2.8–8.0 years) for patients on haemodialysis, 3.6 years (IQR 1.5–6.1 years) for patients on peritoneal dialysis and 10.4 years (IQR 7.3–14.6 years) for transplant recipients.

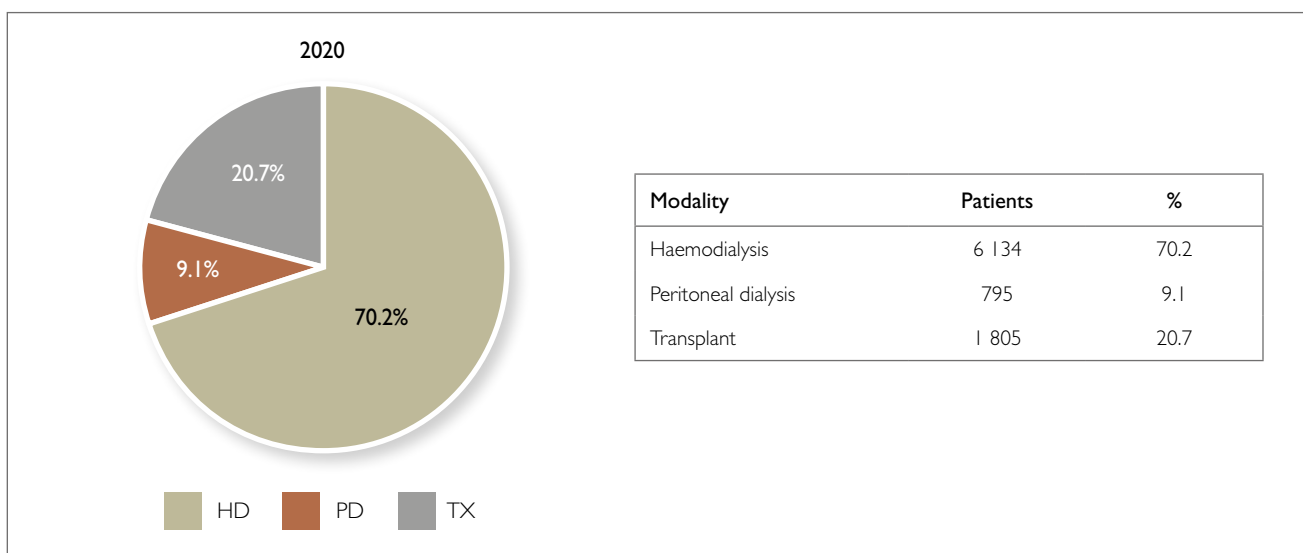


Figure 4. Distribution of patients by treatment modality.

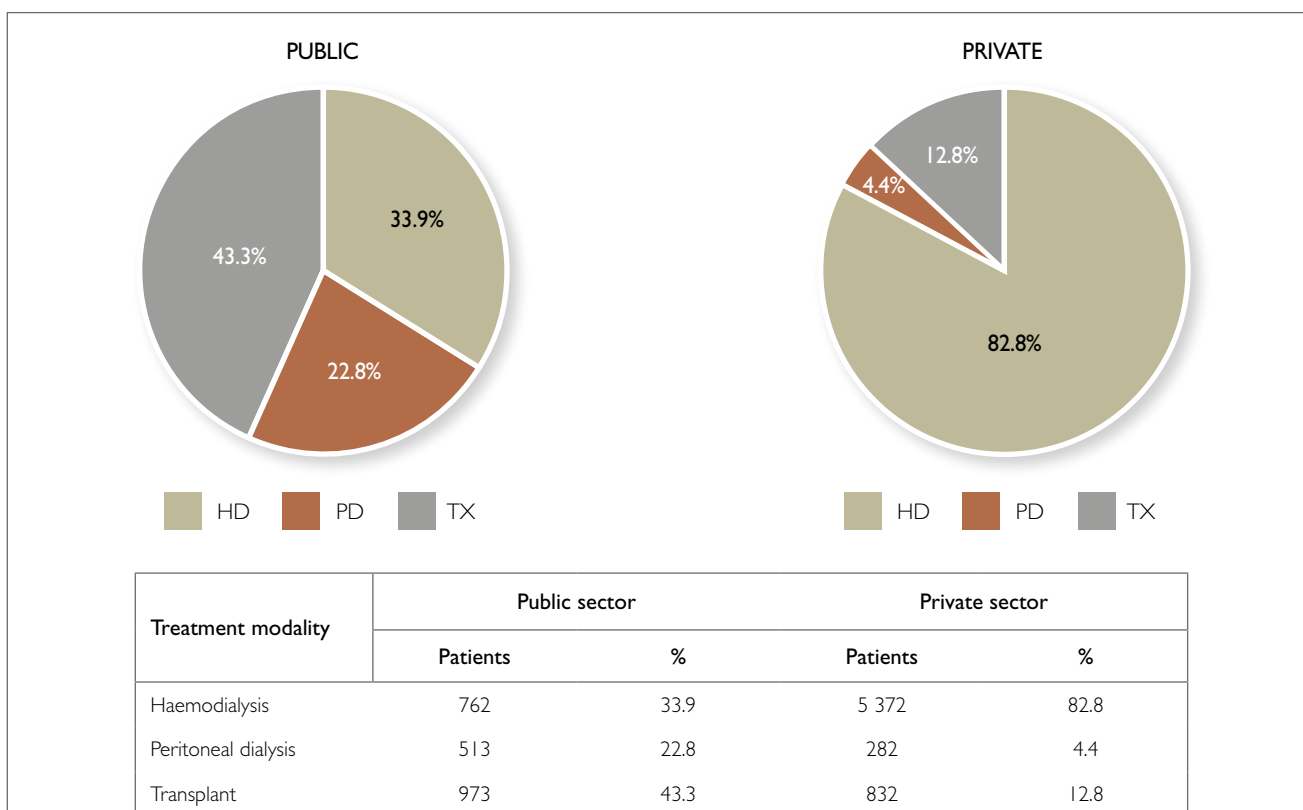
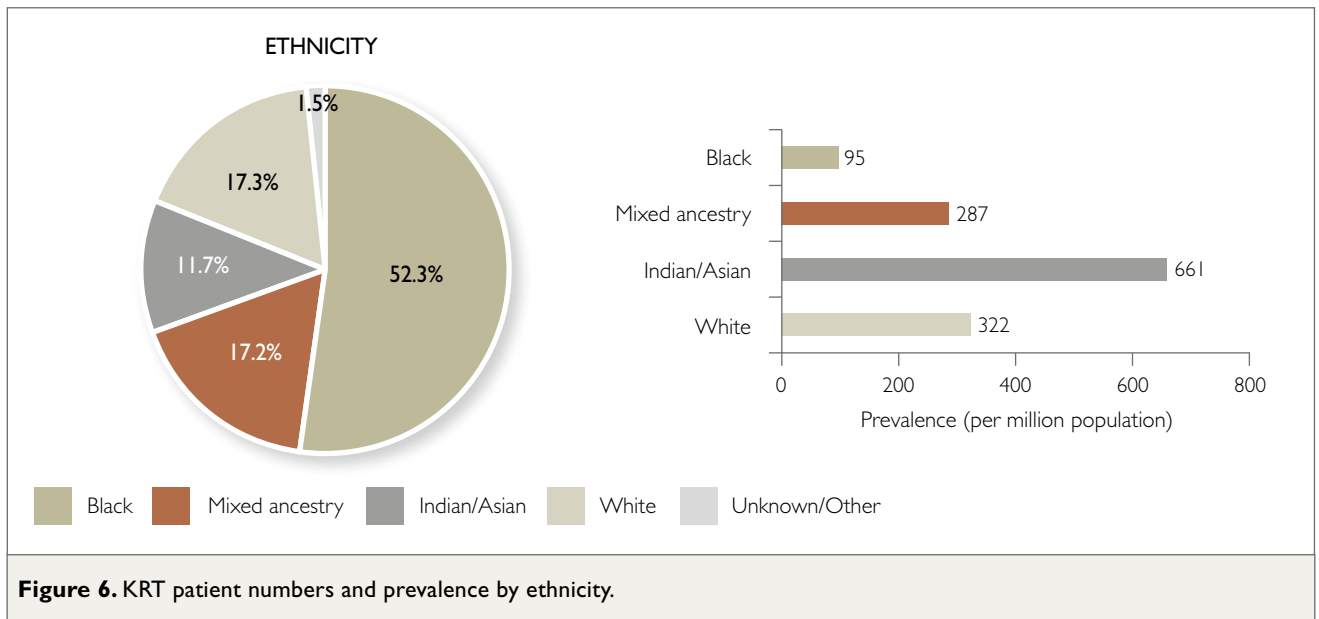


Figure 5. KRT modality by sector.

Demographic and clinical data

The median age of the patients on KRT was 53.0 years (IQR 42.4–62.5 years) and 59.8% were male. Because of the rationing and selection criteria applied in public sector hospitals, patients treated there were much younger than those treated in the private sector (44.3 versus 56.0 years). Just more than half of the patients were Black. However, the prevalence was still lowest in Blacks (95 pmp) and highest in Indians/Asians (661 pmp) (Figure 6).



The most common primary kidney disease was hypertensive kidney disease, followed by CKD/kidney failure of unknown cause and diabetic nephropathy (Table 6).

	% of total
Hypertensive kidney disease	36.6
Cause unknown	30.4
Diabetic nephropathy	14.3
Glomerular disease	11.0
Cystic kidney disease	3.3
Obstruction and reflux	1.7

Of the patients with data on diabetes status (8 042 patients), 38.0% had diabetes, with a much higher percentage in the private than in the public sector (45.5% versus 16.6%). The seropositive rate for hepatitis B virus was 2.3% (173 of 7 629 patients), for hepatitis C virus 0.5% (32 of 7 059 patients) and for HIV 12.1% (881 of 7 309 patients).

DISCUSSION

The number of patients on KRT in South Africa stood at 8 734 in December 2020, a prevalence of 146 pmp. These numbers are substantially lower than those reported for December 2019, when the total number of patients treated was 9 937 and the prevalence 169 pmp [13]. We speculate that this is the result of several factors, including larger numbers of deaths (from COVID-19 and other causes), delayed initiation of KRT due to the pandemic, and challenges with data submission to the registry during a period when personnel were overwhelmed with clinical responsibilities related to the pandemic.

The data presented in this report must therefore be interpreted with caution. The many missing year-end entries led to more patients being classified as “lost to follow-up”. Some of these patients may still be alive and receiving KRT. In addition, it is likely that some new patients who had started KRT had not yet been entered into the registry. The impact of these factors is a lower reported prevalence.

Acknowledgements

The SARR is an initiative of the South African Nephrology Society (<http://www.sa-renalsociety.org/>) and is chaired by Razeen Davids and Julian Jacobs. The SARR has been incorporated as a non-profit company (company registration no. 2018/401217/08, NPO no. 212-901) with Razeen Davids, Julian Jacobs and Sajith Sebastian as directors. The founding document is available from the South African Nephrology Society.

We thank the doctors, nurses, technologists, support staff and management of participating treatment centres for contributing to the 2020 data collection in very trying circumstances. These centres are listed in Appendix I. We also thank the sponsors listed below, especially the National Department of Health, for their financial and logistical support:

- Adcock Ingram Critical Care
- Amgen
- Astellas Pharma
- National Department of Health
- National Kidney Foundation of South Africa
- Roche Products
- Stellenbosch University.

Supplementary materials

The figures in this report are available as PowerPoint slides via the supplementary materials on the *African Journal of Nephrology* website.

Usage of this report

Extracts from this report, and figures from the accompanying PowerPoint slides, may be freely used and reproduced without requesting permission provided the source is acknowledged. Suggested citation: Davids MR, Jardine T, Marais N, Sebastian S, Jacobs JC. South African Renal Registry Annual Report 2020. *African Journal of Nephrology*. 2022; 25(1):155-166.

Conflict of interest

None to declare.

REFERENCES

1. Boule A, Davies MA, Hussey H, Ismail M, Morden E, Vundle Z, et al. Risk factors for COVID-19 death in a population cohort study from the Western Cape Province, South Africa. *Clin Infect Dis*. 2021; 73(7): e2005-2015.
2. Mahalingasivam V, Su G, Iwagami M, Davids MR, Wetmore JB, Nitsch D. COVID-19 and kidney disease: insights from epidemiology to inform clinical practice. *Nat Rev Nephrol*. 2022; 18(8):485-498.
3. Chothia MY, Barday Z, Nel J, Davids MR. Impact of COVID-19 on access to chronic kidney replacement therapy in the public sector of Western Cape Province, South Africa. *S Afr Med J*. 2021; 111(11):1030.
4. Jardine T, Wong E, Steenkamp R, Caskey FJ, Davids MR. Survival of South African patients on renal replacement therapy. *Clin Kidney J*. 2020; 13:782-790.
5. Thapa S, Jardine T, Davids T, Caskey FJ, Davids MR. Incidence and one-year survival of elderly South Africans starting kidney replacement therapy. *Kidney Int Rep*. 2022. DOI: 10.1016/j.ekir.2022.05.030.
6. Davids MR, Eastwood JB, Selwood NH, Arogundade FA, Ashuntantang G, Benghanem Gharbi M, et al. A renal registry for Africa: first steps. *Clin Kidney J*. 2016; 9:162-167.
7. Venkat-Raman G, Tomson CR, Gao Y, Cornet R, Stengel B, Gronhagen-Riska C, et al. New primary renal diagnosis codes for the ERA-EDTA. *Nephrol Dial Transplant*. 2012; 27:4414-4419.
8. Perneger TV, Whelton PK, Klag MJ, Rossiter KA. Diagnosis of hypertensive end-stage renal disease: effect of patient's race. *Am J Epidemiol*. 1995; 141:10-15.
9. Schlessinger SD, Tankersley MR, Curtis JJ. Clinical documentation of end-stage renal disease due to hypertension. *Am J Kidney Dis*. 1994; 23:655-660.
10. Mid-year population estimates, 2020. Pretoria: Statistics South Africa (2020). <http://www.statssa.gov.za/publications/P0302/P03022020.pdf>. Accessed 12 July 2022.
11. The World Bank: South Africa. The World Bank. <https://data.worldbank.org/indicator/NY.GNP.PCAP.CD?locations=ZA>. Accessed 12 July 2022.
12. Council for Medical Schemes Annual Report 2020/21. Pretoria, South Africa: Council for Medical Schemes (2021). <https://www.medicalschemes.co.za/cms-annual-report-2020-21/>. Accessed 12 July 2022.
13. Davids MR, Jardine T, Marais N, Sebastian S, Davids T, Jacobs JC. South African Renal Registry Annual Report 2019. *Afr J Nephrol*. 2021; 24:95-106.

APPENDIX I: PARTICIPATING TREATMENT CENTRES

EASTERN CAPE		
Public	Private	Private
Dora Nginza Hospital	B. Braun Avitum Lusikisiki	NRC East London PD
Frere Hospital	B. Braun Avitum Matatiele	NRC King Williamstown
Livingstone Hospital	B. Braun Avitum Mt Frere	NRC Kwadwesi
Nelson Mandela Academic Hospital	B. Braun Avitum Mthatha	NRC Mdantsane
	Jeffreys Bay Kidney and Dialysis Centre (FMC)	NRC Mthatha
	Life East London Private Hospital	NRC Port Elizabeth HD
	Life Mercantile Hospital	NRC Port Elizabeth PD
	Living Waters Dialysis Alival North	NRC Queenstown
	Makhanda Kidney Care	NRC Uitenhage
	NRC Alice	Port Elizabeth Kidney and Dialysis Centre (FMC)
	NRC Butterworth	Uitenhage Renal Care Centre
	NRC East London HD	
FREE STATE		
Public	Private	Private
Boitumelo Regional Hospital (Kroonstad)	B. Braun Avitum Bethlehem (Hoogland)	NRC Bloemfontein HD
Bongani Regional Hospital (Welkom)	B. Braun Avitum Bloemfontein	NRC Bloemfontein PD
Dihlabeng Regional Hospital (Bethlehem)	B. Braun Avitum Harrismith	NRC Kroonstad
Mofumahadi Manapo Mopeli Hospital (Qua Qua)	B. Braun Avitum Welkom	NRC Pelonomi
Pelononi Regional Hospital	Bloemfontein Kidney and Dialysis Centre (FMC)	Pelononi Regional Hospital
Universitas Academic Hospital	Bophelong Busamed Harrismith Hospital	Sasolburg Kidney and Dialysis Centre (FMC)
Universitas Private Hospital	Life Rosepark Hospital	Talitha Koum Dialysis
GAUTENG		
Public	Private	Private
Charlotte Maxeke Johannesburg Academic Hospital	Arcadia Kidney and Dialysis Centre (FMC)	Life Groenkloof Hospital
Chris Hani Baragwanath Hospital	Atteridgeville Kidney and Dialysis Centre (FMC)	Life Robinson Private Hospital
Dr George Mukhari Hospital	B. Braun Avitum Emfuleni (Vanderbijlpark)	Life Springs Parkland Hospital
Helen Joseph Hospital	B. Braun Avitum Pretoria (Kloof)	Life The Glynnwood Hospital
Leratong Hospital	B. Braun Avitum Sandton	Life Wilgeheuwel Hospital
Sebokeng Hospital	B. Braun Avitum Vereeniging	LRC Lenasia
Steve Biko Academic Hospital	Botshilu Kidney and Dialysis Centre (FMC)	Mabika Renal Solutions
	Carletonville Kidney and Dialysis Centre (FMC)	Midstream Kidney and Dialysis Centre (FMC)
	Edison Hammanskraal Centre	Morningside Children's Kidney Treatment Centre
	Edison Mamelodi Centre	Morningside Kidney and Dialysis Centre (FMC)
	Groenkloof Kidney and Dialysis Centre (FMC)	Naledi Kidney and Dialysis Centre (FMC)
	Izinso Dialysis Busamed	Nephromed Kidney Centre Kwa-Thema
	Izinso Dialysis Centre Eersterust	Netcare Transplant Centre Garden City Hospital
	Izinso Dialysis Garankuwa	Netcare Transplant Centre Jakaranda Hospital
	Izinso Dialysis Glen Austin	Netcare Transplant Centre Milpark Hospital
	Izinso Dialysis Soshanguve (Pretoria)	NRC Akasia
	Izinso Dialysis Soweto	NRC Alberton
	Kempton Kidney and Dialysis Centre (FMC)	NRC Arcadia
	Lenasia Kidney and Dialysis Centre (FMC)	NRC Johannesburg PD
	Lesedi Kidney and Dialysis Centre (FMC)	NRC Krugersdorp
	Life Bedford Gardens Hospital	NRC Linksfield
	Life Brenthurst Hospital	NRC Lyttleton
	Life Fourways Hospital	NRC Mayfair

Abbreviations: BRC, Busamed Renal Care; FMC, Fresenius Medical Care; LRC, Lenmed Renal Centre; MRC, Melomed Renal Care; NRC, National Renal Care; RCH, Renal Care Holdings.

APPENDIX I: PARTICIPATING TREATMENT CENTRES continued

GAUTENG cont.		
Public	Private	Private
	NRC Modderfontein	RCH Randfontein
	NRC Montana	RCH Zamokuhle (Thembisa)
	NRC Mulbarton	Renalworx Dialysis Centre Pretoria West
	NRC Olivedale	Renalworx Dialysis Centre Wilgers
	NRC Parktown West	Sunshine Dialysis Unit
	NRC Pretoria East	Tshepo-Themba Kidney and Dialysis Centre (FMC)
	NRC Pretoria PD	Tshwane Kidney and Dialysis Centre (FMC)
	NRC Rynfield	Vaal Kidney and Dialysis Centre (FMC)
	NRC Sedibeng	Von Wielligh Kidney and Dialysis Centre (FMC)
	NRC Sunninghill	Vosloorus Kidney and Dialysis Centre (Clinix)
	NRC Sunward Park	Waverley Kidney and Dialysis Centre (FMC)
	NRC Waterfall	Westrand Dialysis Randfontein
	Pretoria Kidney and Dialysis Centre (FMC)	Westrand Dialysis Westonaria
	Q Kidney Care	Westrand Kidney and Dialysis Centre (FMC)
	Ramdial Renal Services	Wits Donald Gordon Kidney and Dialysis Centre (FMC)
	Randfontein Kidney and Dialysis Centre (FMC)	Wits Donald Gordon Medical Centre Transplant Division
	Randfontein Private Hospital Dialysis Unit	
KWAZULU-NATAL		
Public	Private	Private
Addington Hospital	AlphaMed Dialysis	Merediac Durban
Greys Hospital	B. Braun Avitum Dundee	Midlands Dialysis and Kidney Centre
Inkosi Albert Luthuli Hospital	B. Braun Avitum Durdoc	Mount Edgecombe Dialysis Care Group
King Edward VIII Hospital	B. Braun Avitum Ethekwini	Mount Edgecombe Kidney and Dialysis Centre (FMC)
Ngwelezana Hospital	B. Braun Avitum Ixopo	Netcare Transplant Centre St Augustine's Hospital
St Aidan's Hospital	B. Braun Avitum Newcastle	Newcastle Kidney and Dialysis Centre (FMC)
	B. Braun Avitum Pietermaritzburg	NRC Athlone
	B. Braun Avitum Scottburgh	NRC Ballito
	B. Braun Avitum Vryheid	NRC Berea
	BRC Gateway	NRC Chatsworth
	BRC Hillcrest	NRC Durban PD
	Chatsworth Kidney and Dialysis Centre (FMC)	NRC Margate
	Coastal Nephrology Centre Nongoma	NRC Pietermaritzburg CBD
	Coastal Nephrology Centre Ulundi	NRC Pietermaritzburg PD
	Dr Parag and Raghbir Kidney Care Centre	NRC Pinetown
	Durban Kidney and Dialysis Centre (FMC)	NRC Richards Bay
	Ekuphileni Renal Centre Mtubatuba	NRC Umhlanga
	Empangeni Kidney and Dialysis Centre (FMC)	Pinetown Kidney and Dialysis Centre (FMC)
	Ethekwini Kidney and Dialysis Centre (FMC)	RCH Ladysmith
	Hibiscus Kidney and Dialysis Centre (FMC)	RCH Shifa
	Kokstad Kidney and Dialysis Centre (FMC)	Renal Care Team Durdoc
	Kwazulu Dialysis Shifa Private Hospital	Renal Care Team Kwamashu
	Kwazulu Dialysis Umlazi Megacity Renal Unit	Renal Care Team Ladysmith
	KZN Nephrology and Dialysis Clinic	Renal Care Team Pinetown
	Life Chatsmed Hospital	Richards Bay Kidney and Dialysis Centre (FMC)
	Life Empangeni Hospital	Stanger Kidney and Dialysis Centre (FMC)
	Life Entabeni Hospital	Ultra Kidney Care City Hospital
	Life Hilton Hospital	Umhlanga Kidney and Dialysis Centre (FMC)
	Life Mount Edgecombe Hospital	Verulam Dialysis Centre
	Life Westville Hospital	Victoria Kidney and Dialysis Centre (FMC)
	Mabika Renal Solutions	Vryheid Kidney and Dialysis Centre (FMC)

Abbreviations: BRC, Busamed Renal Care; FMC, Fresenius Medical Care; LRC, Lenmed Renal Centre; MRC, Melomed Renal Care; NRC, National Renal Care; RCH, Renal Care Holdings.

APPENDIX I: PARTICIPATING TREATMENT CENTRES continued

LIMPOPO		
Public	Private	Private
Pietersberg Hospital	B. Braun Avitum Louis Trichardt B. Braun Avitum Mokopane B. Braun Avitum Polokwane B. Braun Avitum Tzaneen Chantel van Rooyen Bela-Bela Edison Giyani Centre Edison Thohoyandou Centre Life Carstenhof Hospital	Medline Dialysis Centre Musina Nephromed Kidney Centre Elim Hospital NRC Polokwane NRC Thabazimbi NRC Venda Phalaborwa Kidney and Dialysis Centre (FMC) Thohoyandou Kidney and Dialysis Centre (FMC)
MPUMALANGA		
Public	Private	Private
	B. Braun Avitum Ermelo B. Braun Avitum Nelspruit B. Braun Avitum Trichardt B. Braun Avitum Witbank Emalaheni Kidney and Dialysis Centre (FMC) Hazyview Dialysis Centre Highveld Nephrology Centre Bethal Highveld Nephrology Centre Emalaheni	Life Midmed Hospital Middelburg Kidney and Dialysis Centre (FMC) NRC Nelspruit Supreme Dialysis Barberton Supreme Dialysis Malelane Supreme Dialysis Standerton White River Dialysis
NORTH WEST		
Public	Private	Private
Job Shimankana Tabane Hospital Klerksdorp Hospital Mafikeng Provincial Hospital	B. Braun Avitum Vryburg Brits Kidney and Dialysis Centre (FMC) Izinso Dialysis Mafikeng Living Waters Dialysis Klerksdorp Mafikeng Kidney and Dialysis Centre (FMC) North West Dialysis Klerksdorp North West Dialysis Lichtenburg	North West Dialysis Viljoenskroon NRC Rustenberg NRC Lonmin Potchefstroom Kidney and Dialysis Centre (FMC) Rustenburg Kidney and Dialysis Centre (FMC) Zeerust Renal Unit
NORTHERN CAPE		
Public	Private	Private
Kimberley State Hospital	B. Braun Avitum Kimberley B. Braun Avitum Upington Kimberley Kidney and Dialysis Centre (FMC)	North West Dialysis Hartswater RCH Kimberley
WESTERN CAPE		
Public	Private	Private
George Hospital Groote Schuur Hospital Red Cross War Memorial Children's Hospital Tygerberg Hospital Worcester Hospital	Athlone Kidney and Dialysis Centre (FMC) B. Braun Avitum Cape Gate B. Braun Avitum Mossel Bay B. Braun Avitum Oudtshoorn B. Braun Avitum Worcester Cape Town Kidney and Dialysis Centre (FMC) George Kidney and Dialysis Centre (FMC) Hermanus Kidney and Dialysis Centre (FMC) Khayelitsha Kidney and Dialysis Centre (FMC) Life Vincent Pallotti Hospital Life Vincent Pallotti Hospital Paediatrics MRC Gatesville MRC Gatesville PD MRC Mitchells Plain MRC Tokai	Netcare Transplant Centre Christiaan Barnard Memorial Hospital NRC Blaauwberg NRC Cape Town CBD NRC Cape Town PD NRC Eersteriver NRC George NRC Goodwood NRC Kuilsriver NRC Paarl NRC Plumstead NRC Vredenburg Paardevele Kidney and Dialysis Centre (FMC) Panorama Kidney and Dialysis Centre (FMC) Rondebosch Dialysis Centre

Abbreviations: BRC, Busamed Renal Care; FMC, Fresenius Medical Care; LRC, Lenmed Renal Centre; MRC, Melomed Renal Care; NRC, National Renal Care; RCH, Renal Care Holdings.

APPENDIX I: PARTICIPATING TREATMENT CENTRES continued

WESTERN CAPE cont.		
Public	Private	Private
	Stellenbosch Kidney and Dialysis Centre (FMC)	V & A Waterfront Kidney and Dialysis Centre (FMC)
	Stilbaai Kidney and Dialysis Centre (FMC)	Winelands Kidney and Dialysis Centre (FMC)
	UCT Kidney and Dialysis Centre (FMC)	Worcester Kidney and Dialysis Centre (FMC)
	UCT Private Academic Hospital	

APPENDIX I: PARTICIPATING TRANSPLANT CENTRES

FREE STATE	
Public	Private
	Universitas Private Hospital
GAUTENG	
Public	Private
Charlotte Maxeke Johannesburg Academic Hospital	Netcare Garden City Hospital
Steve Biko Academic Hospital	Netcare Jakaranda Hospital
	Netcare Milpark Hospital
	Wits Donald Gordon Medical Centre
KWAZULU-NATAL	
Public	Private
Inkosi Albert Luthuli Hospital	Life Entabeni Hospital
	Netcare St Augustine's Hospital
WESTERN CAPE	
Public	Private
Groote Schuur Hospital	Netcare Christiaan Barnard Memorial Hospital
Red Cross War Memorial Children's Hospital	UCT Private Academic Hospital
Tygerberg Hospital	