



# SOUTH AFRICAN RENAL REGISTRY Annual Report 2019

MR Davids, T Jardine, N Marais, S Sebastian, T Davids, JC Jacobs

## SCIENTIFIC REPORTS AND GUIDELINES

# South African Renal Registry Annual Report 2019

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### ABSTRACT

The eighth annual report of the South African Renal Registry summarises the 2019 data on kidney replacement therapy (KRT) for patients with kidney failure in South Africa. This round of data collection has been adversely affected by the COVID-19 pandemic, which has impacted on the completeness of the data.

In December 2019, the number of patients who were being treated with chronic dialysis or transplantation stood at 9 937, a prevalence of 169 per million population (pmp). The prevalence in South Africans accessing the private healthcare sector was 788 pmp, whereas it was 57 pmp in the chronically under-resourced public sector, still 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 eighth consecutive annual report published by the SARR, which summarises the data on record for December 2019 on kidney replacement therapy (KRT) for patients with kidney failure in South Africa.

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

## METHODS

### Registry platform

Since the inception of the SARR, our technology platform has undergone several major iterations, all aimed at making data entry simpler and faster. Our current platform was developed using the Webdev programming

environment ([www.windev.com](http://www.windev.com)) and resides on a secure, dedicated, Windows 10 server at a reputable 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 that has 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 the survival of our patients for the first time [1].

Over the past few years, the technology platform of the SARR has been expanded to serve as the basis for the African Renal Registry. Botswana, Burundi, Ghana, Kenya, Nigeria, Uganda and Zambia have formally joined the African Renal Registry and most have started data collection with the aid of our platform [2,3].

## 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-EDTA [4] and have mapped all previous entries to these codes. If there is uncertainty about the diagnosis, as is often the case with patients who present late, then it should be indicated 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 kidney 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 [5,6].

**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.** These are patients who have been initiated on chronic HD/PD and who no longer require dialysis. 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 (even within the same year), there should be an END entry for the initial period of KRT and then a new entry recorded for the patient when he/she starts the second period of KRT; that is, there will be two registry entries for the same patient.

## Ethical approval

The SARR operates as a longitudinal study with ethical approval from the Health Research Ethics Committee of Stellenbosch University (reference no. N11/01/028). 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 2019

Figure 1 illustrates the provinces and major cities of South Africa. According to the Statistics South Africa (Stats SA) mid-year estimates for 2019 [7], the population of South Africa had increased to 58.78 million people. There was a slight female predominance (51.2%) and Black/African citizens constituted 80.7% of the population (Table 1). About 28.8% of the population was younger than 15 years of age and approximately 9.0% was 60 years or older. The province of Gauteng was home to 25.8% of the population, followed by KwaZulu-Natal with 19.2% (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 inflows of migrants, estimated at 1 643 590 and 493 621, respectively [7].

South Africa is classified as an upper-middle-income country by the World Bank, with a gross national income

per capita for 2019 by the Atlas method (current US\$) of \$6 040 and by the purchasing power parity (PPP) method (current international US\$) of \$12 640 [8]. Most of the population (84.9%) rely on the public healthcare sector for services, with only a small proportion (15.1%) having medical insurance and accessing private sector health care [9].

Life expectancy at birth for 2019 was estimated at 61.5 years for males and 67.7 years for females. The infant mortality rate was estimated at 22.1 per 1 000 live births. The overall HIV prevalence was 13.5%, and 19.1% for adults aged 15–49 [7].



**Figure 1.** Provinces and major cities of South Africa.

<b>Table 1.</b> Population data by ethnic group.		
Population group	Million	%
Black	47.44	80.7
Coloured (mixed ancestry)	5.18	8.8
White	4.65	7.9
Indian/Asian	1.50	2.6
<b>Total</b>	<b>58.78</b>	<b>100</b>

<b>Table 2.</b> Population data by province.		
Province	Million	%
Eastern Cape (EC)	6.71	11.4
Free State (FS)	2.89	4.9
Gauteng (GT)	15.18	25.8
KwaZulu-Natal (KZN)	11.29	19.2
Limpopo (LP)	5.98	10.2
Mpumalanga (MP)	4.59	7.8
North West (NW)	4.03	6.9
Northern Cape (NC)	1.26	2.2
Western Cape (WC)	6.84	11.6
<b>Total</b>	<b>58.78</b>	<b>100</b>

## Treatment centres for dialysis and transplantation

The number of centres contributing data was 291; of these, 257 (88.3%) 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.

**Table 3.** Number of treatment centres by province and sector.

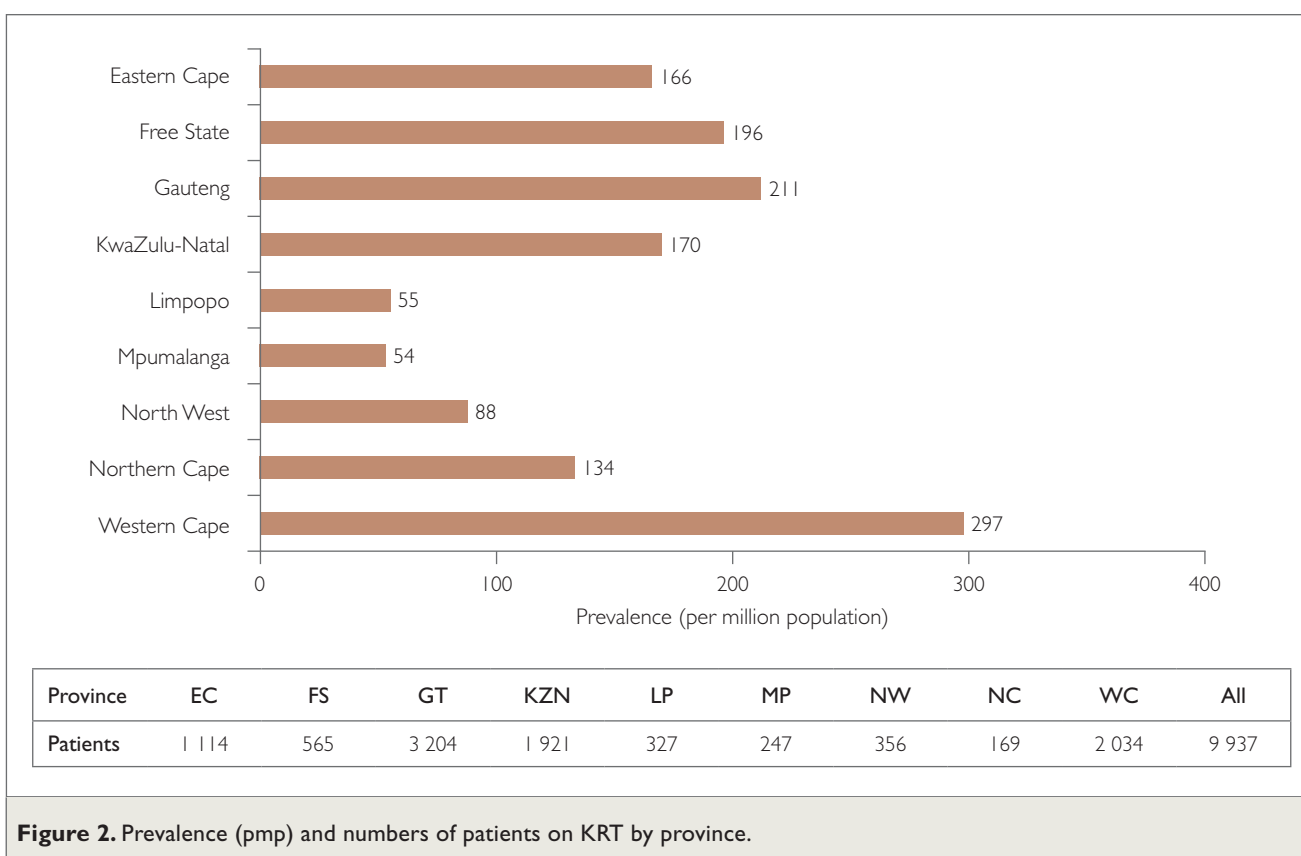
Sector	EC	FS	GT	KZN	LP	MP	NW	NC	WC	All
Public	4	7	7	6	1*	0	3	1	5	34
Private	22	14	78	63	14	15	12	5	34	257
<b>Total</b>	<b>26</b>	<b>21</b>	<b>85</b>	<b>69</b>	<b>15</b>	<b>15</b>	<b>15</b>	<b>6</b>	<b>39</b>	<b>291</b>

\*This centre is a public-private initiative on the premises of Polokwane Provincial Hospital.

## Prevalence and incidence of renal replacement therapy

The total number of patients on KRT on 31 December 2019 was 9 937. This is a prevalence of 169 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 pmp was the Western Cape, followed by Gauteng and the Free State (Figure 2).

There were 889 patients who started KRT in 2019, an incidence of 15 pmp. Most of these patients (71%) received KRT in private centres.



The number of patients treated in the public sector remained low, with a prevalence of 57 pmp (Table 4). In the private sector, the prevalence for 2019 was 787 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 [7] and the Council for Medical Schemes Annual Report [9]. Medical aid beneficiaries who were unclassified with respect to province were allocated to provinces in proportion to the numbers of beneficiaries in each province.

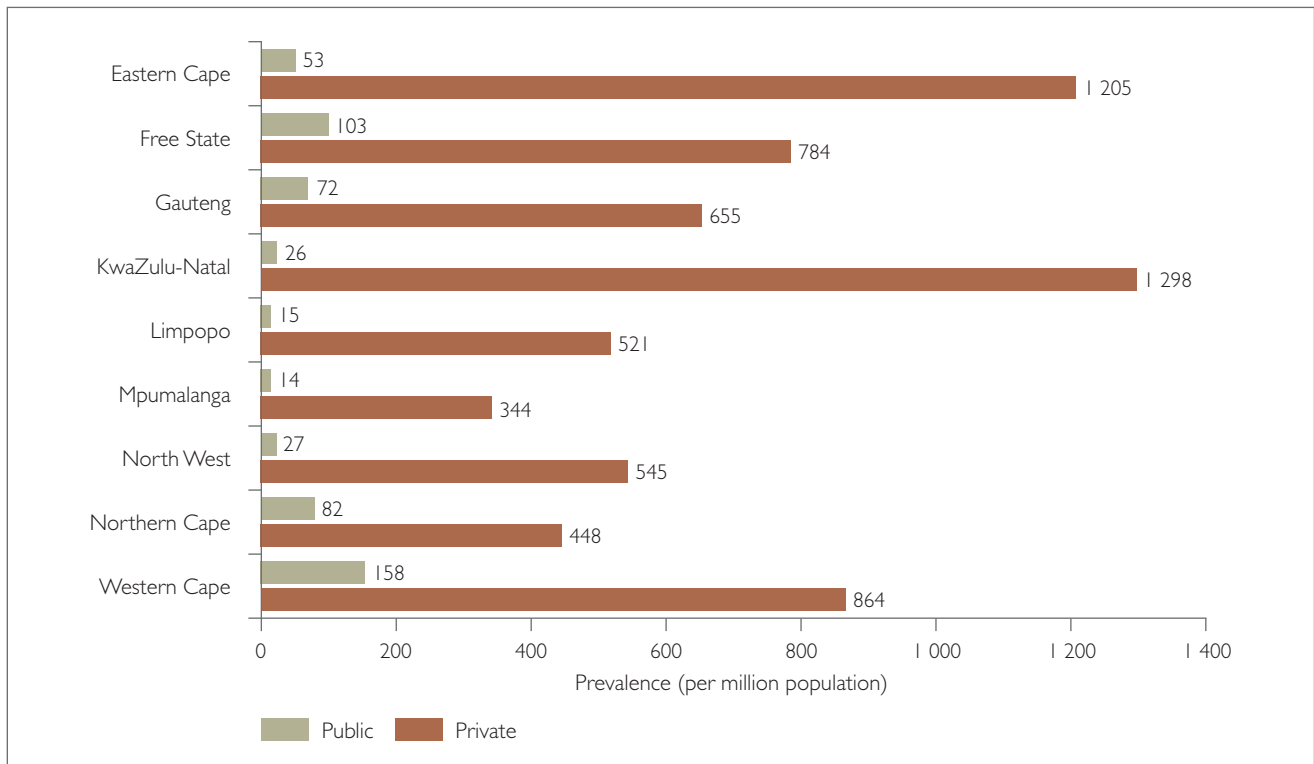
**Table 4. KRT prevalence (pmp) by healthcare sector.**

	Public	Private
Population in millions	49.79	8.99*
Patients on treatment	2 860	7 077
Treatment rate (pmp)	57	787

\*Council for Medical Schemes Annual Report 2019/20

**Table 5. Numbers of patients by sector and province.**

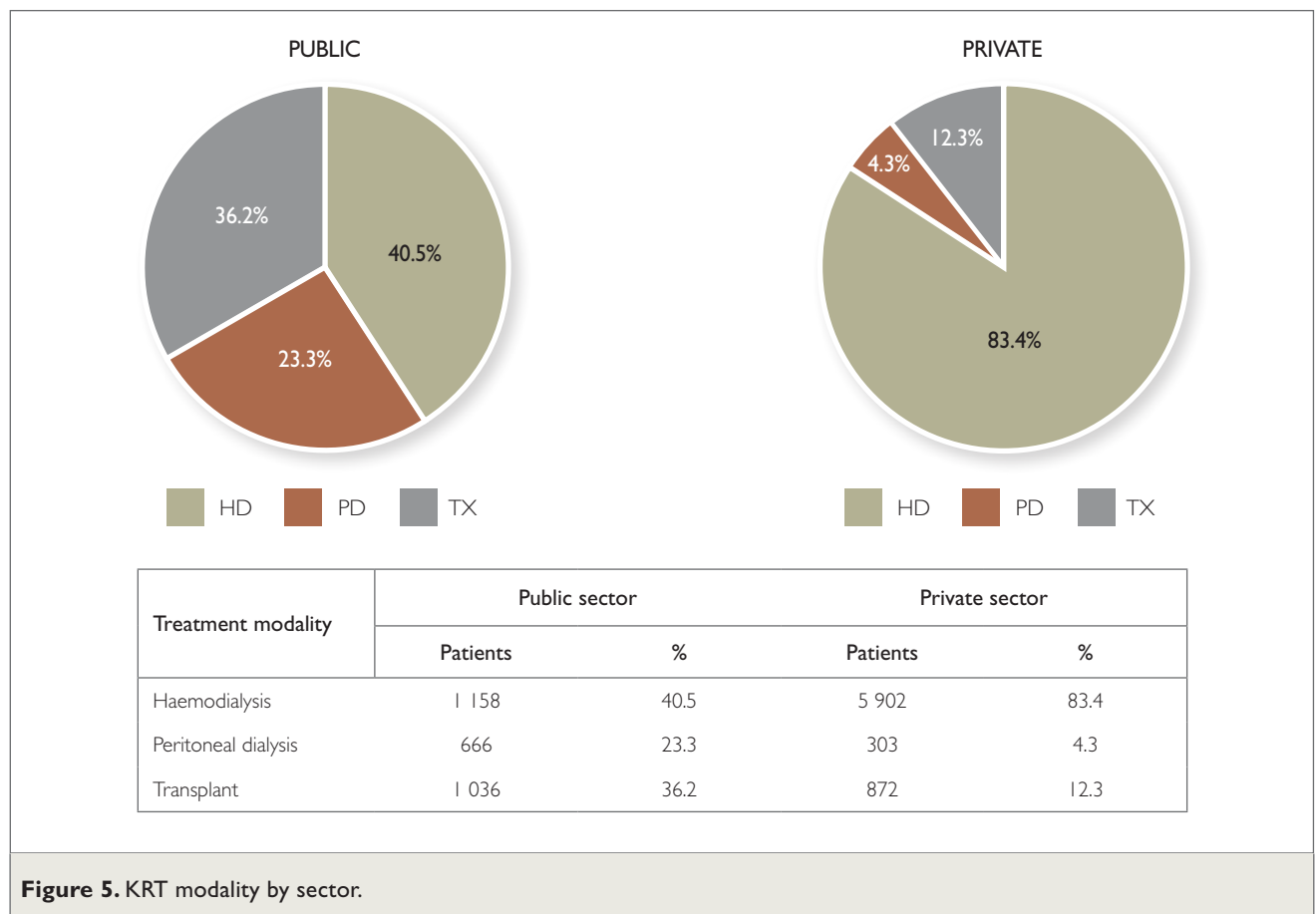
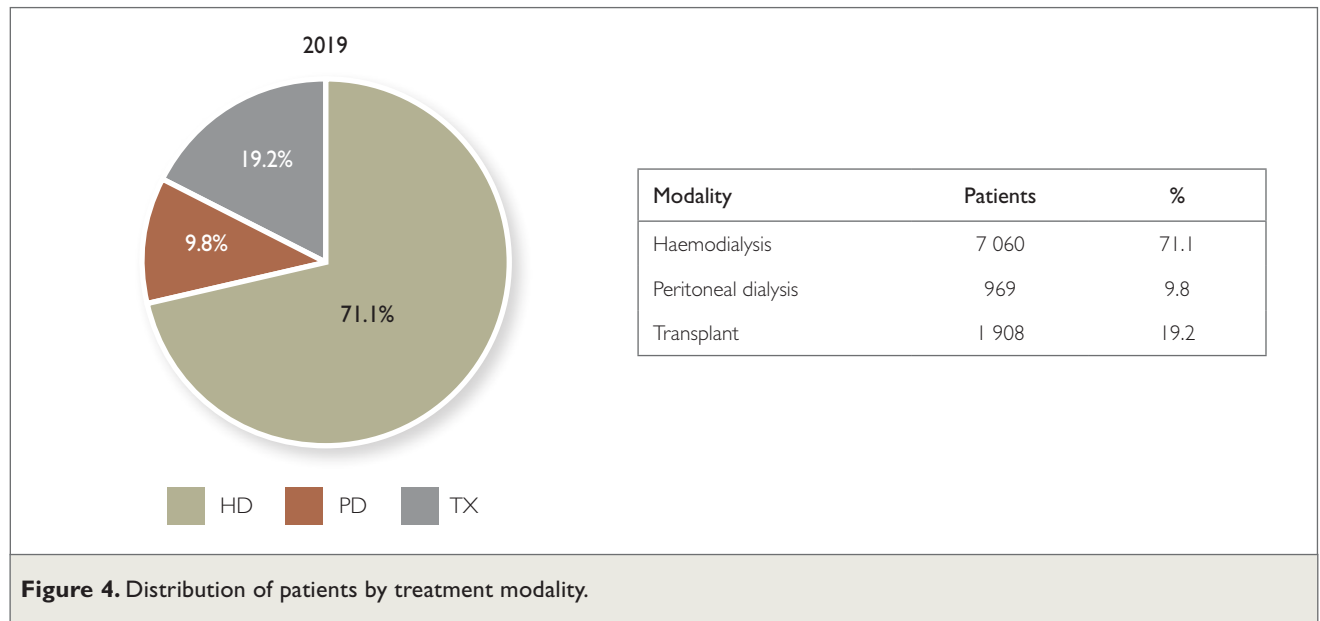
Sector	EC	FS	GT	KZN	LP	MP	NW	NC	WC	All
Public	319	256	826	264	85	56	94	89	871	2 860
Private	795	309	2 378	1 657	242	191	262	80	1 163	7 077
<b>Total</b>	<b>1 114</b>	<b>565</b>	<b>3 204</b>	<b>1 921</b>	<b>327</b>	<b>247</b>	<b>356</b>	<b>169</b>	<b>2 034</b>	<b>9 937</b>

**Figure 3. KRT prevalence (pmp) by province and sector.**

### Treatment modality and KRT vintage

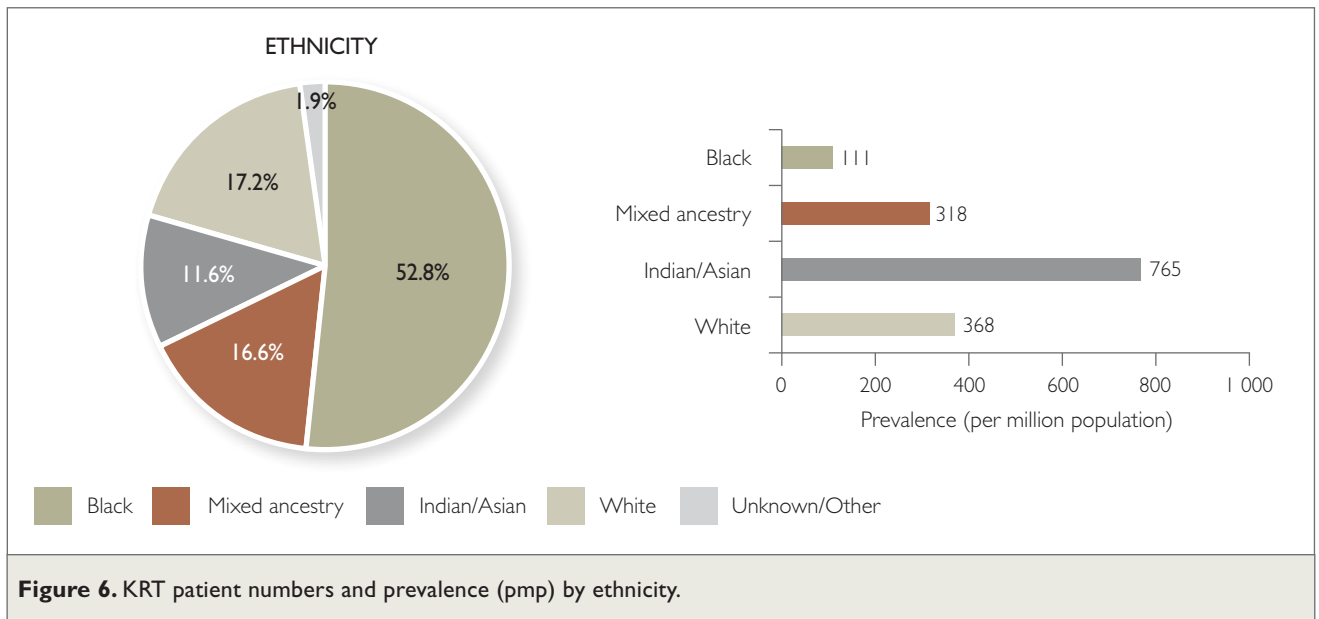
Of the patients on KRT in December 2019, 19.2% had a functioning kidney transplant. Of the patients on dialysis, 87.9% were on haemodialysis and 12.1% were on peritoneal dialysis. Most of the transplant and peritoneal dialysis patients were in the public sector; the private sector had much lower proportions of patients on these KRT modalities (Figures 4 and 5).

Overall, the median KRT vintage was 5.4 years [inter-quartile range (IQR) 2.8–9.0 years]. The median vintage was 4.7 years (IQR 2.5–7.8 years) for haemodialysis patients, 4.0 years (IQR 1.8–7.5 years) for peritoneal dialysis patients and 9.5 years (IQR 6.5–13.8 years) for transplant patients.



### Demographic and clinical data

The median age of the patients on KRT was 53.1 years (IQR 42.4–62.6 years) and 60.0% 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 (45.0 versus 56.3 years). Just more than half of the patients were Black. However, the prevalence was still lowest in Blacks (111 pmp) and highest in Indians/Asians (765 pmp) (Figure 6).



**Figure 6.** KRT patient numbers and prevalence (pmp) by ethnicity.

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

**Table 6.** Most commonly reported causes of kidney failure.

	% of total
Hypertensive kidney disease	36.0
Cause unknown	31.7
Diabetic nephropathy	14.4
Glomerular disease	10.2
Cystic kidney disease	3.0
Obstruction and reflux	1.8

Of the 9 206 patients with data on diabetes status, 39.2% had diabetes, with a much higher percentage in the private than in the public sector (47.8% versus 18.6%). The seropositive rate for hepatitis B virus was 2.3% (197 of 8 635 patients), for hepatitis C virus 0.7% (52 of 7 897 patients) and for HIV 11.5% (940 of 8 185 patients).

### DISCUSSION

The number of patients on KRT in South Africa stood at 9 937 in December 2019, a prevalence of 169 pmp. Most of the patients were being treated with haemodialysis in the private healthcare sector. The treatment rates in the public sector remained extremely low and the number of new patients starting treatment in 2019 was also very low. The Western Cape had the highest public sector treatment rates by a large margin.

The data presented in this report must be interpreted with due consideration of the challenges presented by the COVID-19 pandemic. Routine data submission to the Registry has been adversely affected and this has led to many missing year-end entries and more patients being classified as “lost to follow-up”. Some of these patients are likely still to be receiving KRT. In addition, it is likely that some new patients who started KRT have 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 success of our 2019 data collection. 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
- Baxter Healthcare
- 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, Davids T, Jacobs JC. South African Renal Registry Annual Report 2019. *African Journal of Nephrology*. 2021; 24(1):95-106.

## Conflict of interest

None to declare.

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**APPENDIX I: PARTICIPATING TREATMENT CENTRES**

<b>EASTERN CAPE</b>		
<b>Public</b>	<b>Private</b>	<b>Private</b>
Dora Nginza Hospital	B. Braun Avitum Lusikisiki	NRC East London HD
Frere Hospital	B. Braun Avitum Matatiele	NRC East London PD
Livingstone Hospital	B. Braun Avitum Mt Frere	NRC King Williamstown
Nelson Mandela Academic Hospital	B. Braun Avitum Mthatha	NRC Kwadwesi
	Jeffreys Bay Kidney and Dialysis Centre (FMC)	NRC Mdantsane
	Life East London Private Hospital	NRC Mthatha
	Life Mercantile Hospital	NRC Port Elizabeth HD
	NRC Alice	NRC Port Elizabeth PD
	NRC Butterworth	NRC Queenstown
	NRC Alice	NRC Uitenhage
	NRC Butterworth	Port Elizabeth Kidney and Dialysis Centre (FMC)
<b>FREE STATE</b>		
<b>Public</b>	<b>Private</b>	<b>Private</b>
Boitumelo Regional Hospital (Kroonstad)	B. Braun Avitum Bethlehem (Hoogland)	NRC Bloemfontein PD
Bongani Regional Hospital (Welkom)	B. Braun Avitum Bloemfontein	NRC Kroonstad
Dihlabeng Regional Hospital (Bethlehem)	B. Braun Avitum Harrismith	NRC Pelsonomi
Mofumahadi Manapo Mopeli Hospital (Qua Qua)	B. Braun Avitum Welkom	Pelsonomi Regional Hospital
Pelsonomi Regional Hospital	Bloemfontein Kidney and Dialysis Centre (FMC)	Sasolburg Kidney and Dialysis Centre (FMC)
Universitas Academic Hospital	Bophelong Busamed Harrismith Hospital	Talitha Koum Dialysis
	Life Rosepark Hospital	Universitas Private Hospital
	NRC Bloemfontein HD	
<b>GAUTENG</b>		
<b>Public</b>	<b>Private</b>	<b>Private</b>
Charlotte Maxeke Johannesburg Academic Hospital	Arcadia Kidney and Dialysis Centre (FMC)	Life Fourways Hospital
Chris Hani Baragwanath Hospital	Atteridgeville Kidney and Dialysis Centre (FMC)	Life Groenkloof Hospital
Dr George Mukhari Hospital	B. Braun Avitum Emfuleni (Vanderbijlpark)	Life Robinson Private Hospital
Helen Joseph Hospital	B. Braun Avitum Pretoria (Kloof)	Life Springs Parkland Hospital
Leratong Hospital	B. Braun Avitum Pretoria (Urology Hospital)	Life The Glynnwood Hospital
Sebokeng Hospital	B. Braun Avitum Sandton	Life Wilgeheuwel Hospital
Steve Biko Academic Hospital	B. Braun Avitum Vereeniging	LRC Lenasia
	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)	Morula Kidney and Dialysis Centre (FMC)
	Izinso Dialysis Busamed	Naledi Kidney and Dialysis Centre (FMC)
	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

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 Mayfair	Randfontein Private Hospital Dialysis Unit
	NRC Montana	RCH Randfontein
	NRC Mulbarton	RCH Zamokuhle (Thembisa)
	NRC Olivedale	Renalworx Dialysis Centre Pretoria West
	NRC Parktown West	Renalworx Dialysis Centre Wilgers
	NRC Pretoria East	Sunshine Dialysis Unit
	NRC Pretoria PD	Tshepo-Themba Kidney and Dialysis Centre (FMC)
	NRC Rynfield	Tshwane Kidney and Dialysis Centre (FMC)
	NRC Sedibeng	Vaal 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)
	Ramdiel Renal Services	Wits Donald Gordon Kidney and Dialysis Centre (FMC)
	Randfontein Kidney and Dialysis Centre (FMC)	Wits Donald Gordon Medical Centre Transplant Division
KWAZULU-NATAL		
Public	Private	Private
Addington Hospital	AlphaMed Dialysis	Life Entabeni Hospital
Greys Hospital	B. Braun Avitum Dundee	Life Hilton Hospital
Inkosi Albert Luthuli Hospital	B. Braun Avitum Durdoc	Life Mount Edgecombe Hospital
King Edward VIII Hospital	B. Braun Avitum Ethekwini	Life Westville Hospital
Ngwelezana Hospital	B. Braun Avitum Harding	Midlands Dialysis and Kidney Centre
St Aidan's Hospital	B. Braun Avitum Ixopo	Mount Edgecombe Dialysis Care Group
	B. Braun Avitum Newcastle	Mount Edgecombe Kidney and Dialysis Centre (FMC)
	B. Braun Avitum Pietermaritzburg	Netcare Transplant Centre St Augustine's Hospital
	B. Braun Avitum Scottburgh	Newcastle Kidney and Dialysis Centre (FMC)
	B. Braun Avitum Vryheid	NRC Athlone
	BRC Gateway	NRC Ballito
	BRC Hillcrest	NRC Berea
	Chatsworth Kidney and Dialysis Centre (FMC)	NRC Chatsworth
	Coastal Nephrology Centre Nongoma	NRC Durban PD
	Coastal Nephrology Centre Ulundi	NRC Margate
	Dr Parag and Raghbir Kidney Care Centre	NRC Pietermaritzburg CBD
	Durban Kidney and Dialysis Centre (FMC)	NRC Pietermaritzburg PD
	Ekuphileni Renal Centre Mtubatuba	NRC Pinetown
	Empangeni Kidney and Dialysis Centre (FMC)	NRC Richards Bay
	Entabeni Kidney and Dialysis Centre (FMC)	NRC Umhlanga
	Ethekwini Kidney and Dialysis Centre (FMC)	Pinetown Kidney and Dialysis Centre (FMC)
	Hibiscus Kidney and Dialysis Centre (FMC)	Port Shepstone Kidney and Dialysis Centre (FMC)
	Kokstad Kidney and Dialysis Centre (FMC)	RCH Ladysmith
	Kwazulu Dialysis Shifa Private Hospital	RCH Shifa
	Kwazulu Dialysis Umlazi Megacity Renal Unit	Renal Care Team Durdoc
	KZN Nephrology and Dialysis Clinic	Renal Care Team Kwamashu
	Life Chatsmed Hospital	Renal Care Team Ladysmith
	Life Empangeni Hospital	Renal Care Team Pinetown
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**

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

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
	NRC Eersteriver	Panorama Kidney and Dialysis Centre (FMC)
	NRC George	Rondebosch Dialysis Centre
	NRC Goodwood	Stellenbosch Kidney and Dialysis Centre (FMC)
	NRC Kuilsriver	UCT Kidney and Dialysis Centre (FMC)
	NRC Paarl	UCT Private Academic Hospital
	NRC Plumstead	Winelands Kidney and Dialysis Centre (FMC)
	NRC Vredenburg	Worcester Kidney and Dialysis Centre (FMC)
	Paardevelei Kidney and Dialysis Centre (FMC)	

**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	