Saudi Center for Organ Transplantation

SCOT

Annual Report for Organ Transplantation in Kingdom of Saudi Arabia

2019

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Statistical Summary

Deceased Organ Transplantation after Brain Death

Deceased Donation after Brain Death

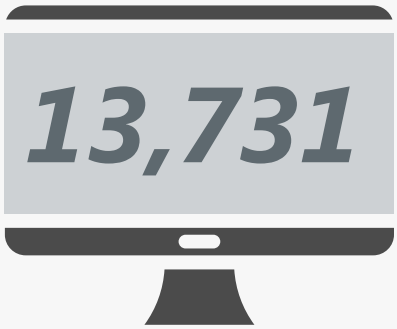
585 *Deceased Brain Death donors reported in 2019*

Possible Donors	Potential Donors	Eligible Donors	Consented Donors	Actual Donors	Utilized Donors
585	411	354	126	114	113

Over the years, number of actual and possible DBD donors remains further diverged. Overall utilization rate of the possible donors is approximately 13% in 2019.*

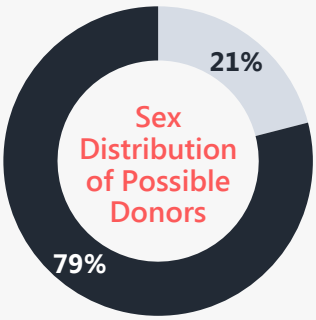
The highest number of possible DBD donors was obtained from Riyadh region with 235 possible, 184 potential, 165 eligible, 50 consents, 45 actual cases and 45 utilized donors.

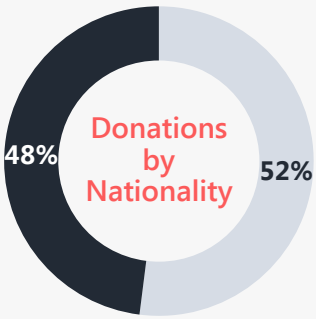
Total Number of Possible Donors Reported to SCOT between 1986-2019



Female
2,938

Male
10,793

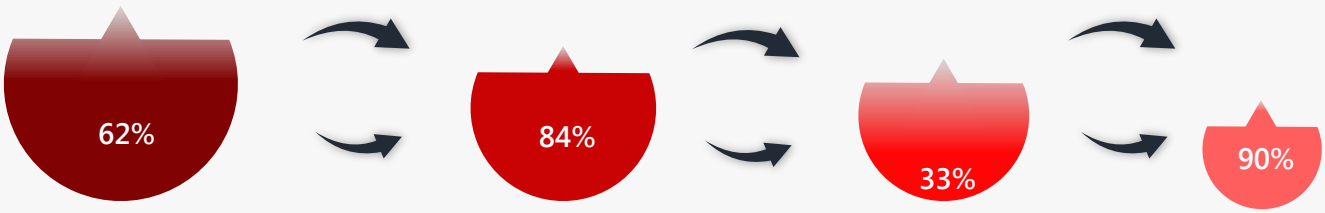




Saudi
7,192

Non-Saudi
6,539

Conversion Rate of Deceased Donation Critical Pathway



Undocumented	Not-Approached	Family Refusal	Not-Recovered
Documented	Approached	Consented	Recovered

*Utilization rate = Absolute Number of Possible DBD / Absolute Number of Utilized DBD.
Greater values indicate better utilization of donors

Statistical Summary

Hospital Contribution in Organ Donation Program

Hospital Contribution in Organ Donation Program

Utilization Rate* by Hospital Categories in KSA

Greater than 20 ICU Beds	**13%**	*Number of Possible DD reported 385*
10-20 ICU Beds	**17%**	*Number of Possible DD reported 113*
Less than 10 ICU Beds	**17%**	*Number of Possible DD reported 47*

Top 3 Hospital Contribution in Organ Donation Program

King Saud Medical City Riyadh

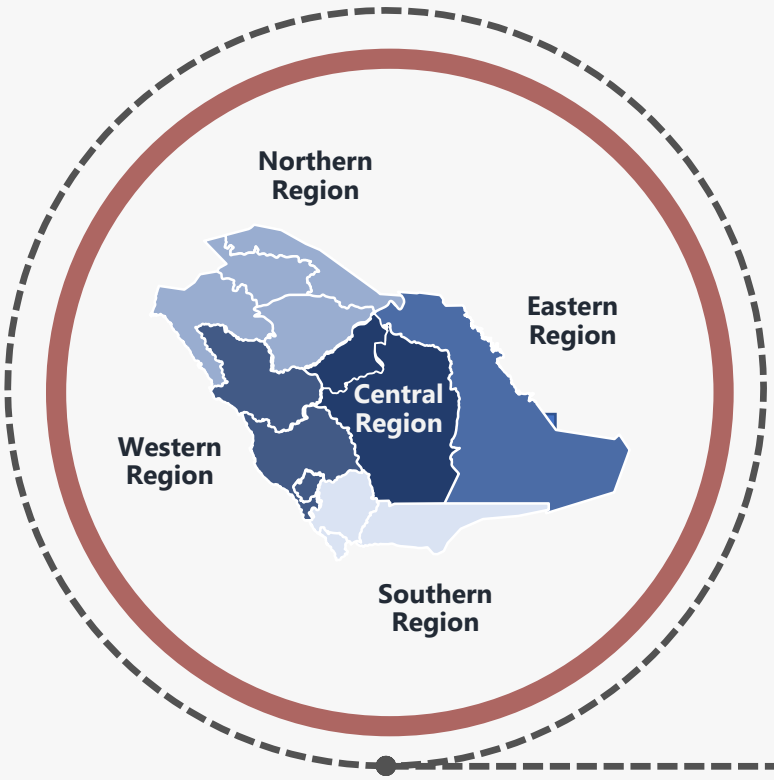
- 70 Possible
- 51 Eligible
- 12 Utilized

King Abdulaziz Medical City Riyadh

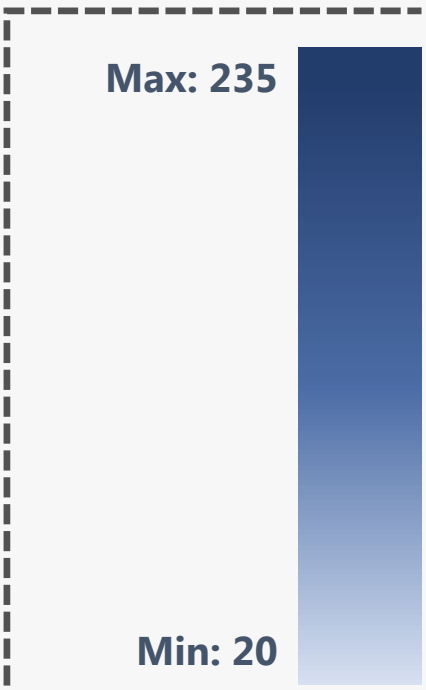
- 35 Possible
- 32 Eligible
- 7 Utilized

Dammam Medical Complex

- 24 Possible
- 15 Eligible
- 4 Utilized



Possible DBD Regional Distribution



*Utilization rate = Absolute Number of Possible DBD / Absolute Number of Utilized DBD.
Greater values indicate better utilization of donors

Statistical Summary

Liver and Kidney Transplantation

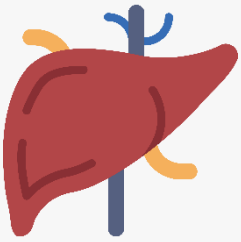
Liver and Kidney Transplantation

Total Number of Kidney Transplanted Inside the Kingdom of Saudi Arabia, 1979-2019

13,641

Total Number of Kidney Transplanted Inside the Kingdom of Saudi Arabia, 2019

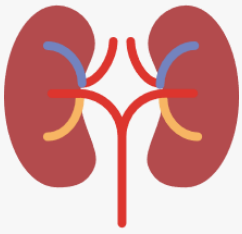
1,121



Total Number of Liver Transplantation by Activity Breakdown, 1979-2019

Number of Transplanted Livers from Deceased Donors	1,145
Number of Transplanted Livers from Living Related Donors	1,529
Number of Transplanted Livers from Living Unrelated Donors	148

Total Number of Kidney Transplantation by Activity Breakdown, 1979-2019



Number of Transplanted Livers from Deceased Donors	3,394
Number of Transplanted Livers from Living Related Donors	9,471
Number of Transplanted Livers from Living Unrelated Donors	776

Total Number of Livers Transplanted Inside the Kingdom of Saudi Arabia, 1979-2019

2,822

Total Number of Livers Transplanted Inside the Kingdom of Saudi Arabia, 2019

319

Statistical Summary

Heart, Lung and Pancreas Transplantation

Heart Transplantation

46 hearts were transplanted in 2019

Hearts transplanted from 1986-2019. **449**

King Faisal Specialist Hospital & Research Center (38) and Prince Sultan Cardiac Center (8) a totral of 46 deceased hearts transplants in Riyadh.

30 heart for valves were collected in 2019

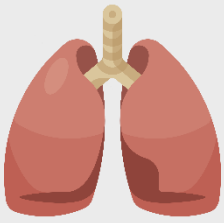
Total Heart for valves collected from 1993-2019. **707**

From 126 hearts from deceased donors 126 consented (100%). 76 hearts were recovered, 46 were transplanted and 30 were collected as HFV.

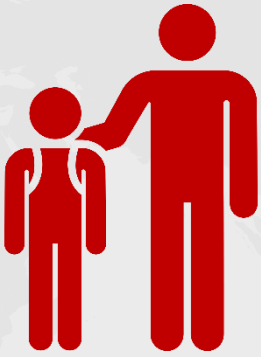
Lung Transplantation

70 lungs were transplanted in 2019

Total lungs transplanted from 1991-2019 **423**



From this 423 lung transplantations majority of them, 403 transplanted lungs was transplanted in KFSH, Riyadh and 16 in KFSH, Jeddah and 4 in KFH, Jeddah.

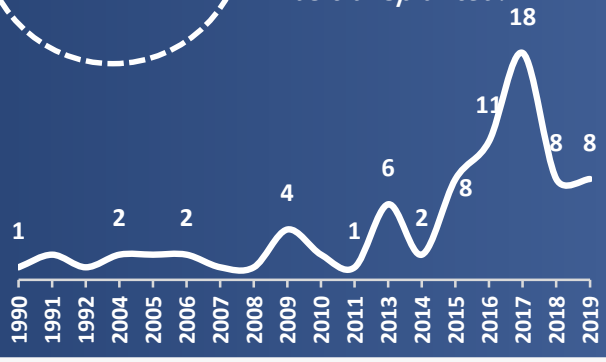


In 2019, 70 deceased lungs were transplanted to 38 recipients inside the kingdom and of which, 38 were transplanted to adult (100%)

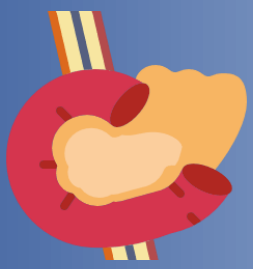
Pancreas Transplantation

80

Number of cumulative deceased pancreas transplantation from 1990-2019. In 2019, 8 pancreas was transplanted.



In 2019, 126 consented pancreas donors recovered, 96 were consented and offered in KSA, wherein, 8 pancreas were transplanted and 87 were non-recovered.



In 2019, 5 pancreas were transplanted by King Faisal Specialist Hospital and Research Center and 3 pancreases by King Fahad Specialist Hospital in Dammam.

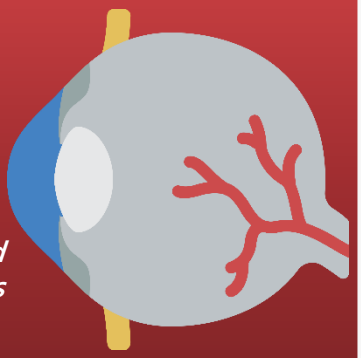
Statistical Summary

Corneal Recovery, Bone Banking and Intestinal Transplantation

Corneal Recovery

711

Number of cumulative corneal recovered locally in Saudi Arabia 1983-2019 Number of recovered corneas in 2019 was 9.



33,116

Number of cumulative corneal recovered abroad in 1983-2019. Number of corneas recovered from abroad in 2019 was 1,895.

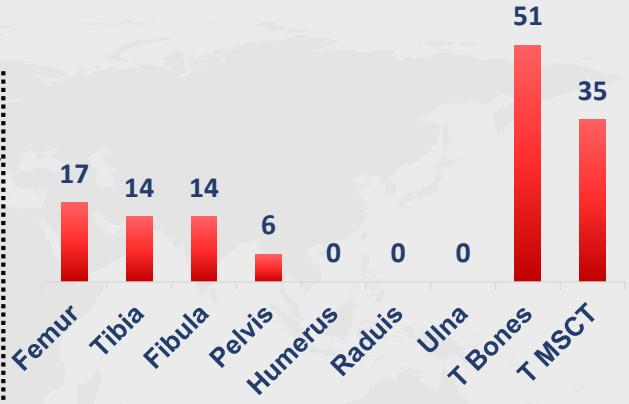
Bone Banking

522

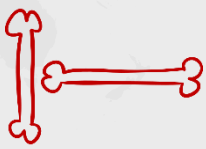
Number of cumulative recovered deceased bones from 2009-2019. Number of recovered bones 2019 was 51.

206

Number of cumulative recovered musculoskeletal connective tissue (MSKT) 2009-2019. Number of recovered MSKT in 2019 was 35.



Performance of deceased bone and MSCT recovery in currently active national bone bank in 2019

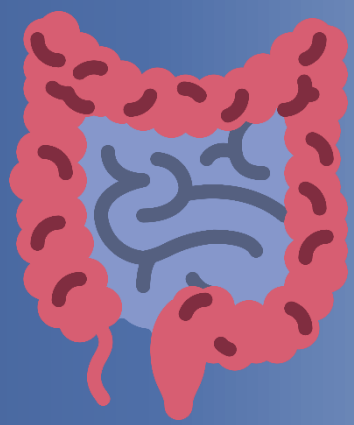


Intestinal Transplantation

7

Number of Small Bowel Transplantation 2016-2019 Types are multivesicular and isolated.

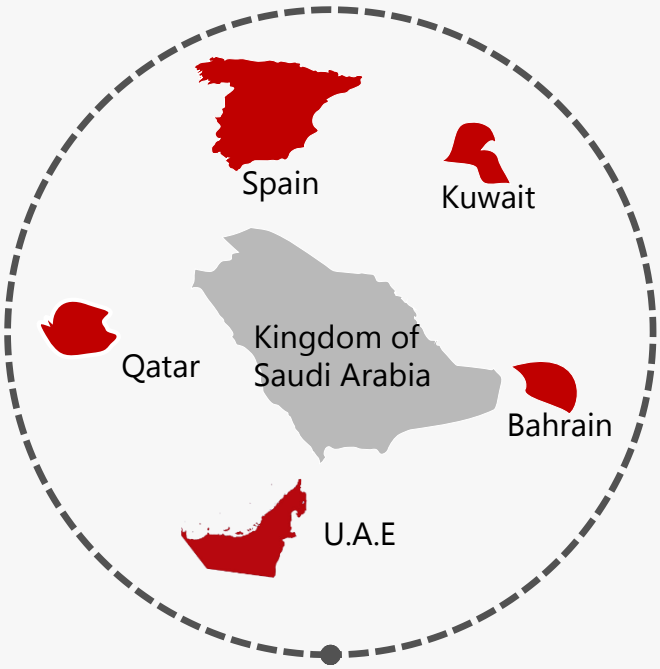
Intestinal or small bowel transplantation program initiated during the year 2016, first performed in King Faisal Specialist Hospital and Research Center (KFSH & RC) Riyadh.



Statistical Summary

Organ Sharing between KSA and GCC

Organ Sharing between KSA and GCC 1996-2019



Total Recovered
438

Total Transplanted
377

	Recovered	Transplanted		Recovered	Transplanted
Kidney	83	74	Lung	96	87
Liver	208	175	Pancreas	3	3
Heart	48	38	Tissues, Heart for Valves	73	

Comparison of Estimated Total Cost of Organs and Tissues Transplanted Inside and Outside the Kingdom 2019

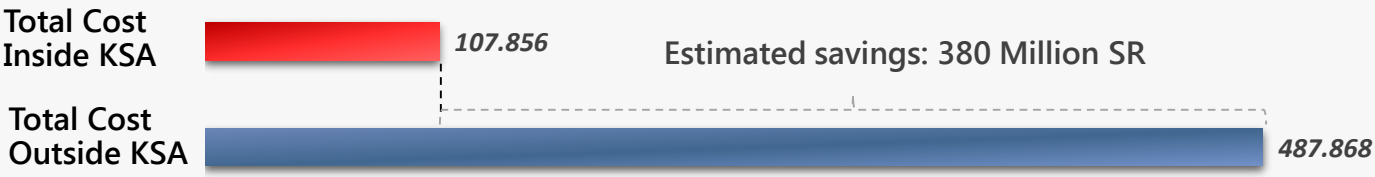
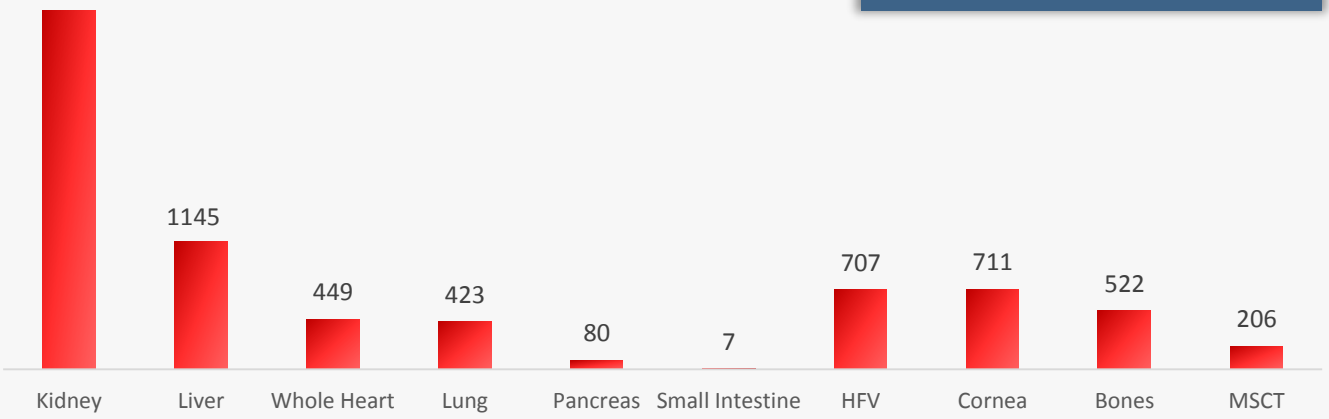


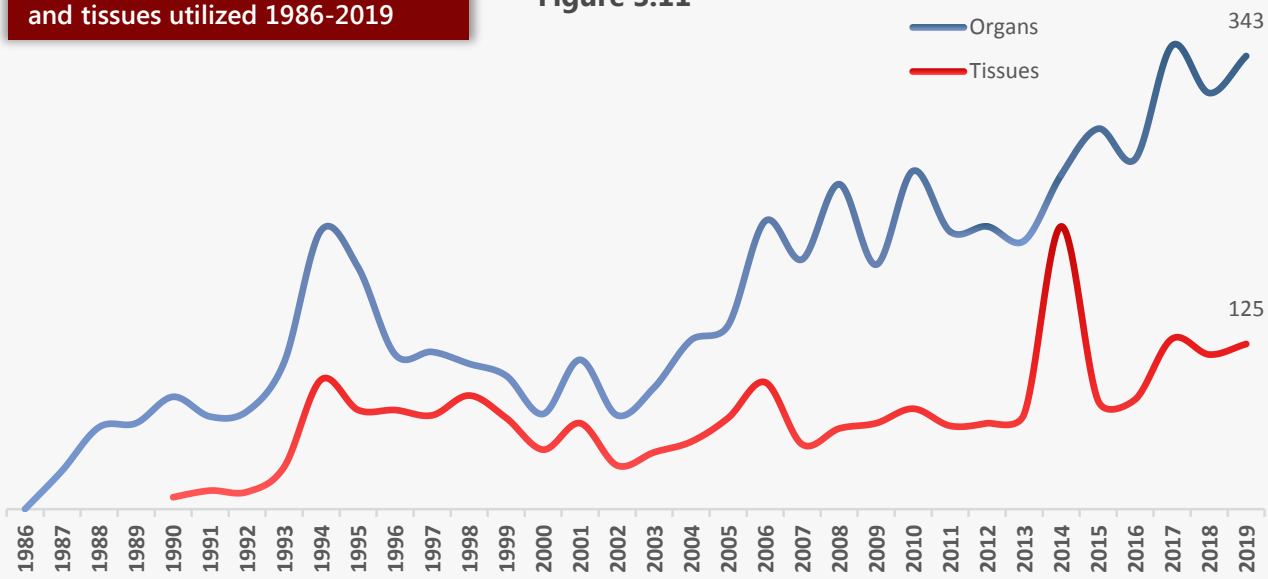
Figure 3.10

Total number of deceased organs and tissues utilized 1986-2019



Total number of deceased organs and tissues utilized 1986-2019

Figure 3.11

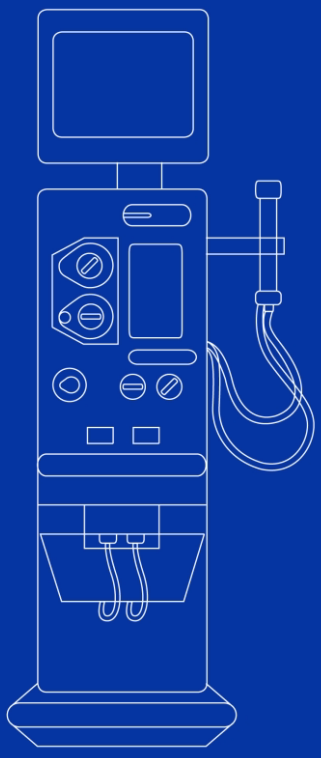


Total Organs (kidney, liver, heart, small bowel, pancreas, lung)	**5,498**
Total Tissues (corneas, heart for valves, bones, musculoskeletal tissues)	**2,146**

Statistical Summary

Hemodialysis

Hemodialysis



8,165

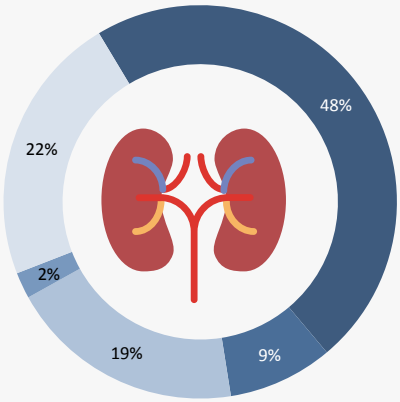
Total Number of HD Machines

19,522

Total Number of HD Patients 2019

278

Total Number of Hemodialysis Centers

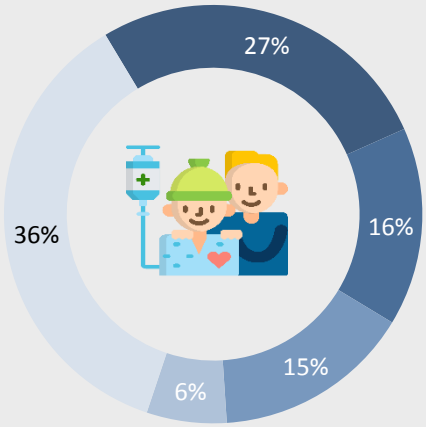


Hemodialysis Center and Affiliation 2019

- MOH **132 (48%)**
- Gov't Non-MOH **24 (9%)**
- King Abdullah Hemodialysis Projects **6 (2%)**
- Private & Charitable hospitals **54 (19%)**
- MOH Outsourcing Dialysis Program **62 (22%)**

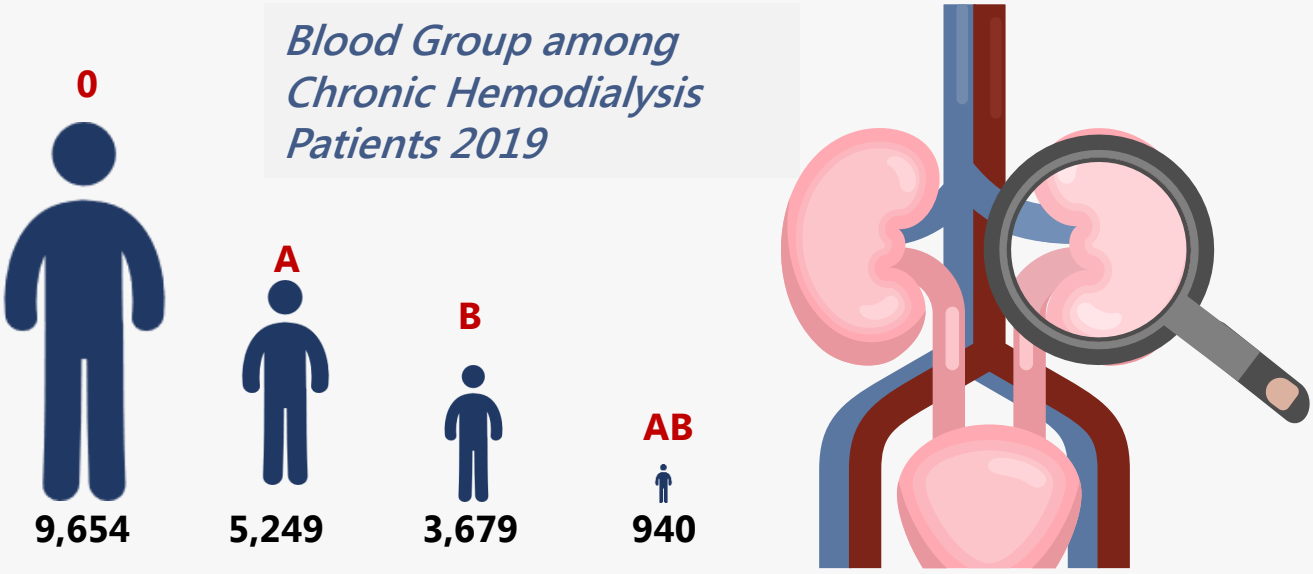
Distribution of Chronic Hemodialysis Patients by Dialysis Sector

- MOH **5,258 (27%)**
- Gov't Non-MOH **2,994 (16%)**
- Private & Charitable hospitals **2,987 (15%)**
- King Abdullah Hemodialysis Projects **1,207 (6%)**
- MOH Outsourcing Dialysis Program **7,076 (36%)**

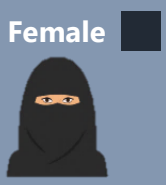


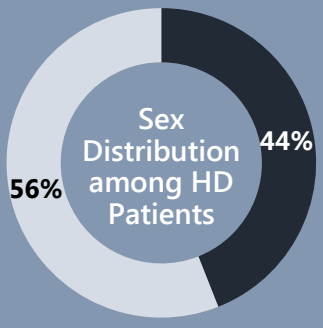
Hemodialysis Patients

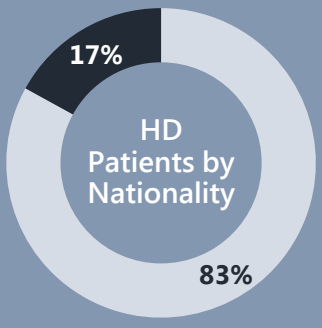
Blood Group among Chronic Hemodialysis Patients 2019



2019

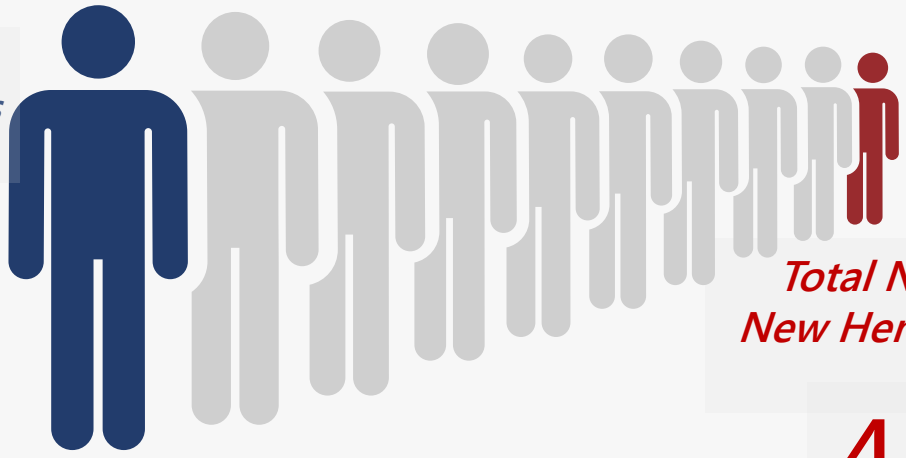






Total Number of Hemodialysis Patients

19,522



Total Number of New Hemodialysis Patients

4,146

Hemodialysis Centers & Patients in All Sectors 2019

Central Region

HD Centers 86

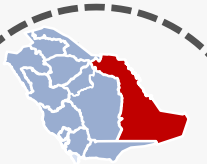
5946 Number of Patients	271 Number of Consultants & Specialists	2501 Number of Follow up Transplanted Patients
2460 Number of HD Machines	1672 Number of Nurses	1414 Number of New Patients

Western Region

HD Centers 74

6502 Number of Patients	253 Number of Consultants & Specialists	1000 Number of Follow up Transplanted Patients
2504 Number of HD Machines	1219 Number of Nurses	1396 Number of New Patients

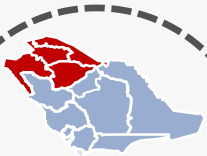
Eastern Region



HD Centers 38

2416 Number of Patients	130 Number of Consultants & Specialists	770 Number of Follow up Transplanted Patients
1030 Number of HD Machines	686 Number of Nurses	509 Number of New Patients

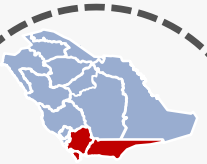
Northern Region



HD Centers 31

1675 Number of Patients	56 Number of Consultants & Specialists	465 Number of Follow up Transplanted Patients
846 Number of HD Machines	399 Number of Nurses	284 Number of New Patients

Southern Region



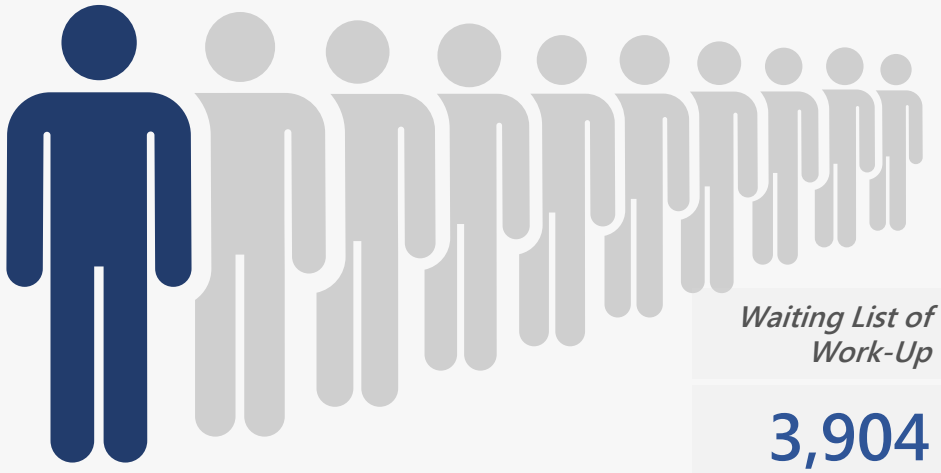
HD Centers 49

2983 Number of Patients	113 Number of Consultants & Specialists	2452 Number of Follow up Transplanted Patients
1325 Number of HD Machines	624 Number of Nurses	543 Number of New Patients

Hemodialysis in All Sectors by Regions 2019

Active List (Ready for Renal Transplantation)

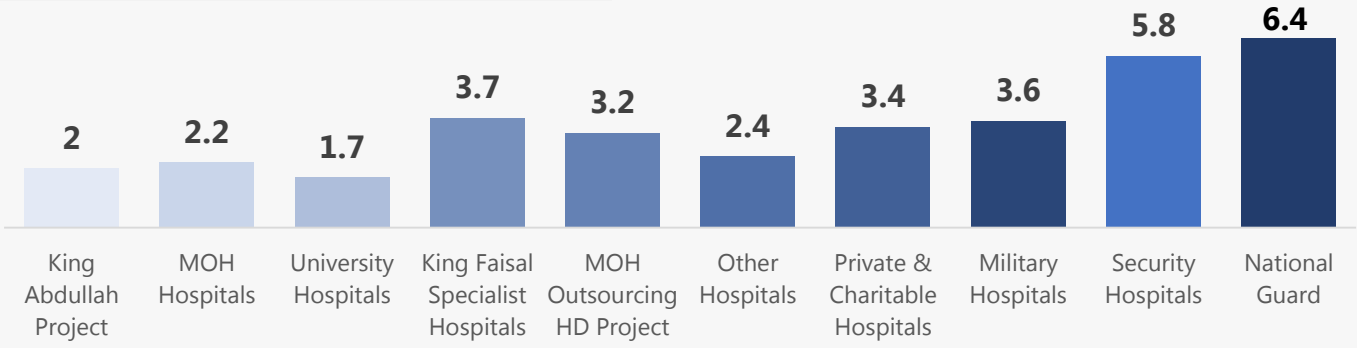
3,198



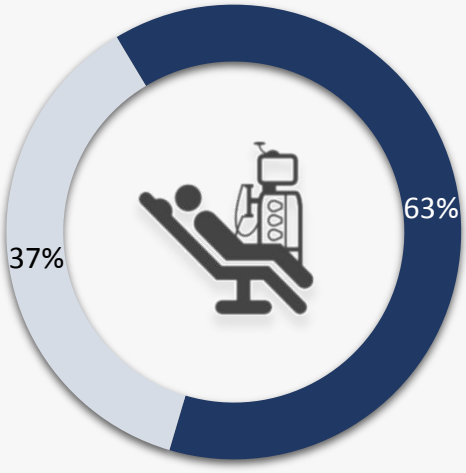
Waiting List of Work-Up

3,904

Number of HD Pts/Number of Dialysis Outlets

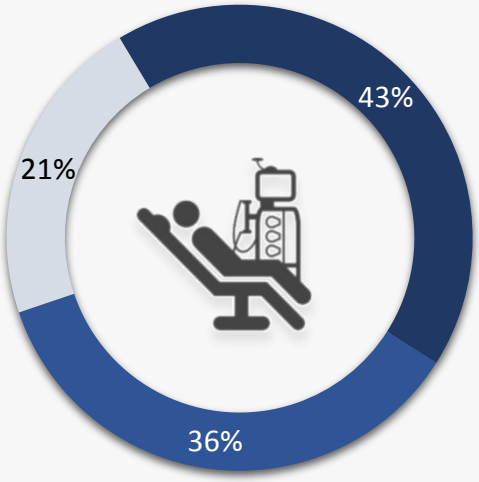


Number of HD pts. MOH vs. NON-MOH



MOH: 12334 NON-MOH: 7188

Number of HD pts. In MOH hospitals per sector



MOH: 5258 Diaverum: 4414 Davita: 2662

Statistical Summary

Peritoneal Dialysis

Peritoneal Dialysis

Total Number of Peritoneal Dialysis Patients, 2019

1,546

Total Number of New Peritoneal Dialysis Patients, 2019

594

2019

	Number of Hospitals	Number of Adult and Paediatric Patients	
		Adult	Paediatric
Central Region	16	538	113
Western Region	9	282	37
Eastern Region	6	300	27
Northern Region	3	117	7
Southern Region	2	96	29

Foreword and Highlights

Foreword

The annual report of the Saudi Center for Organ Transplantation (SCOT) is largely based on the data collected from 2019 since the commencement of organ donation and transplantation program in the Kingdom of Saudi Arabia. The data is composed of records from SCOT and follow-up reports from the transplant programs in the Kingdom. The medical department at SCOT collated the statistics, conducted the required analyses, created figures and tables, generated the content and designed the document. The data provided via tables and figure, and each chapter contain a brief introduction highlighting the salient aspects of the data in relevant sections.

Overview and Highlights

The report includes chapters on Deceased Donors after Brain Death and Organ Donation that underline the current activities of deceased organ donation program. In addition, the hospitals' contributions to organ donation program with regional breakdown is included. The organ transplantation activities constitute of kidney, liver, heart, pancreas, lung, corneal transplantations as well as bone donations. Each section of organ transplantation activities contains data on deceased and living transplantation in currently active transplant centers and chapters on haemodialysis and peritoneal dialysis of which data was collected from all dialysis centers in the Kingdom.

Sperate indices of tables and figures presented in report are included for easy access for our data and glossary of abbreviation.

The data of this annual report will also be available on our website: www.scot.gov.sa

Deceased Donation after Brain Death in the Kingdom of Saudi Arabia

The Chapter of Deceased Donation After and Brain Death, will

- Introduce to you the SCOT's approach to deceased organ donation and the tools we used to build up the data in this annual report (e.g. The Critical Pathways of Deceased Organ Donation.
- Show the deceased donation conversion process in every steps.
- Show the deceased donor's characteristics and their demographics.
- Display the hospital activities including the GCC decease donor sharing activities and their individual contribution to deceased donation process.
- Provide the data organs of deceased organs shared via deceased organ sharing from other GCC countries.

In 2019, The Critical pathways of deceased organ donation conversion rate consist of 585 possible deceased donor, 411 potential, 354 eligible, 126 consented donors for organ donation, 114 actual donors and 113 utilized deceased donors.

Donor demographics and characteristics were recorded highlighting important data including the age, sex, and causes of death.

The success from organ recovery to transplantation involves the logistics and transportation utilized in majority of the actual DBD donor these includes the use of MEDEVAC and Ambulance services.

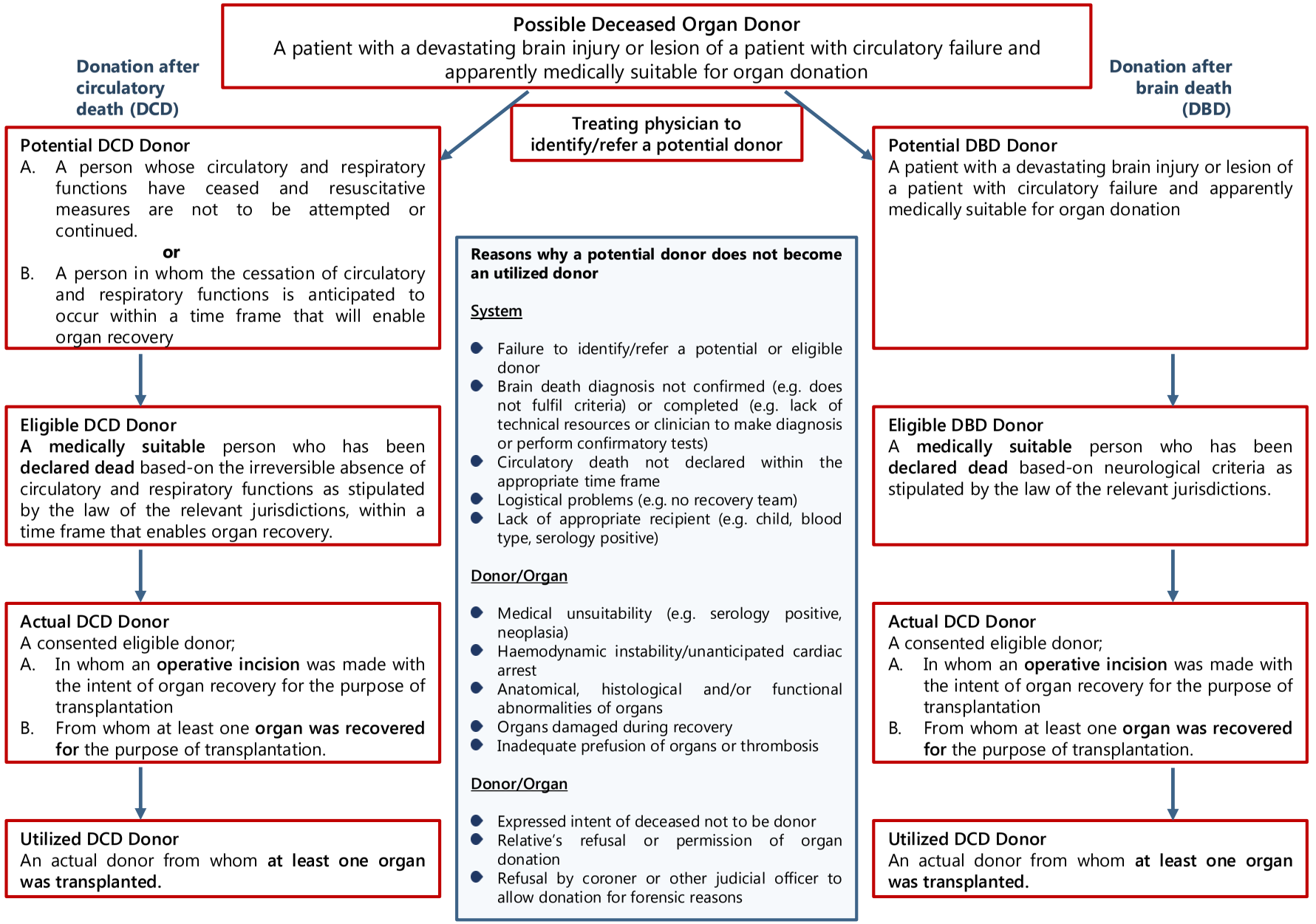
Lastly, the national program on deceased organ donation will not materialized without the hospital participation and their important contribution from reporting the possible donor, documentation of brain death to breaking the bad news to the family. Highlighted on this report were the hospitals individual contribution and the top performing hospitals activity from reporting to donor utilization.

- The Kingdom of Saudi Arabia has an active deceased donation and transplantation program under the supervision of the Saudi Center for Organ Transplantation (SCOT).
- Clear policies have been laid down to facilitate diagnosis of Death by Brain Function Criteria and the management of potential deceased donors.
- Religious scholars approved the concept of Death by Brain Function Criteria and Organ Donation.

Deceased Donation after Brain Death in the Kingdom of Saudi Arabia

Critical Pathways for Organ Donation

Figure 1.1.1 Critical pathways of deceased organ donation



*The "dead donor rule" must be respected That is, patients may only become donors after death, and the recovery of organs must not cause a donor's death

Deceased Donation after Brain Death in the Kingdom of Saudi Arabia

1.1 Possible DBD Donors

Annual Trend of Possible DBD Donors

Figure 1.1.2

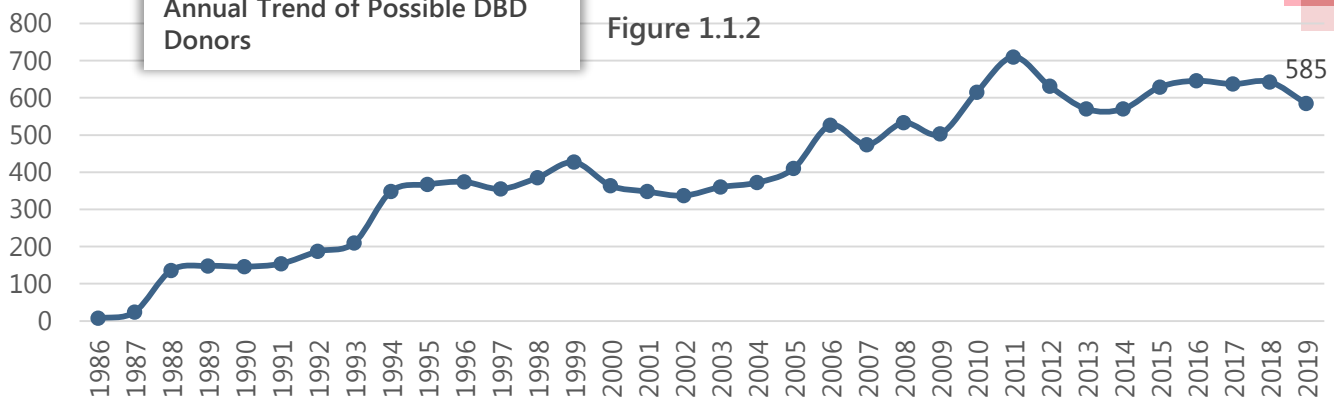


Figure 1.1.3 Critical Pathway of Deceased Organ Donation in 2019

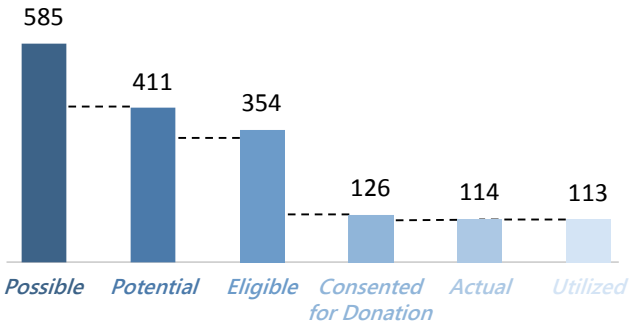
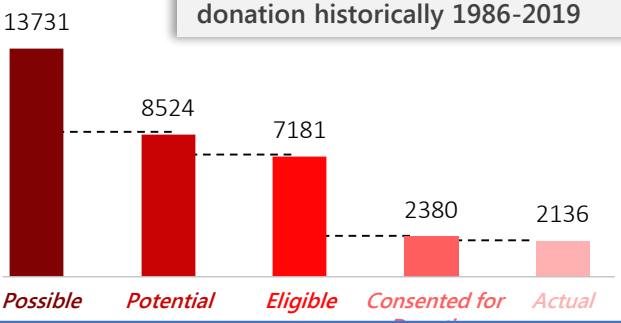


Figure 1.1.4 Critical pathway of deceased organ donation historically 1986-2019



In 2019, the Critical Pathways of Deceased Organ Donation recorded 585 possible DBD donors, 411 potential, 354 eligible, 126 consents, 114 actual and 113 Utilized donors (see figure 1.3). Since 1986, the deceased donors recorded were 13,731 possible, 8,524 potential, 7,181 eligible, 2,380 consents and 2,136 actual donors (see figure 1.4).

Annual trend of possible DBD recorded the highest possible DBD donors was in 2011 with 710 donors. (See figure 1.2).

In 2019, the highest number of DBD donors recorded were from Riyadh region with 217 possible, 169 potential, 151 eligible, 45 consents, 42 actual and 42 utilized donors recognizing its highest performance region wise (see table 1.1.1).

Region	Possible	Potential	Eligible	Consented	Actual	Utilized
Riyadh	217	169	151	45	42	42
Eastern	117	101	88	31	26	26
Western	113	61	41	5	5	5
Northern	50	18	15	2	2	2
Southern	30	7	5	0	0	0
Qassim	18	15	14	5	3	3
Outside KSA	40	40	40	38	36	35
Total	585	411	354	126	114	113

Table 1.1.1: Critical pathway of deceased organ donation, region wise in 2019

Figure 1.1.5 Age Distribution of Possible DBD Donors in 2019

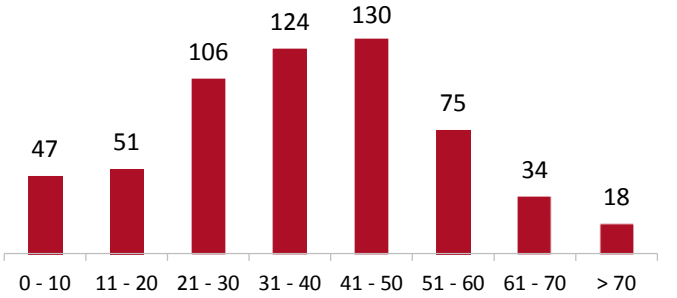
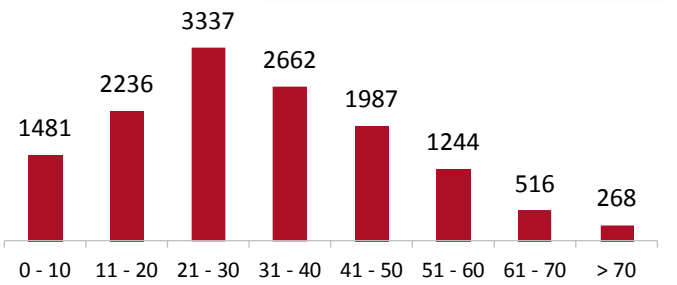


Figure 1.1.6 Age Distribution of Possible DBD Donors, 1986-2019

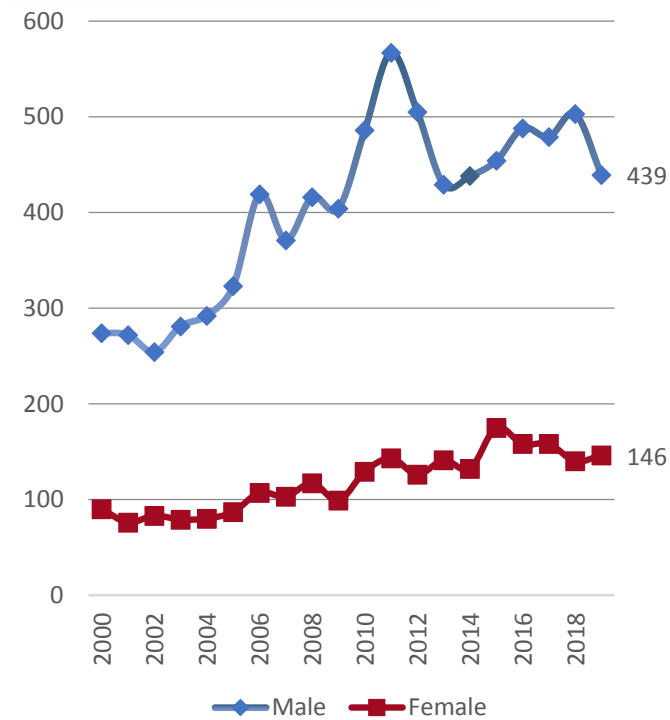


In 2019, analysis of the age distribution of the possible DBD donors shows that the majority of the DBD donors were in the age group between 21-50 yrs. composing 62% of the cases, with the highest number in age group between 41-50 yrs., having 22% of the possible DBD donors (see figure 1.1.5). Cumulatively, since 1986, the majority of possible DBD donors were mainly from age group between 21-40 years composing 44% of the cases (see figure 1.1.6).

Gender analysis during the year among BD donors have shown that 75% of DBD donors were male and the remaining 25% were females having a gender ratio of 3:1. Since 1986, the males represent 79% of the possible DBD donors and females represent 21% with a male to female ratio of 4:1 (see figures 1.1.7 & 1.1.8).

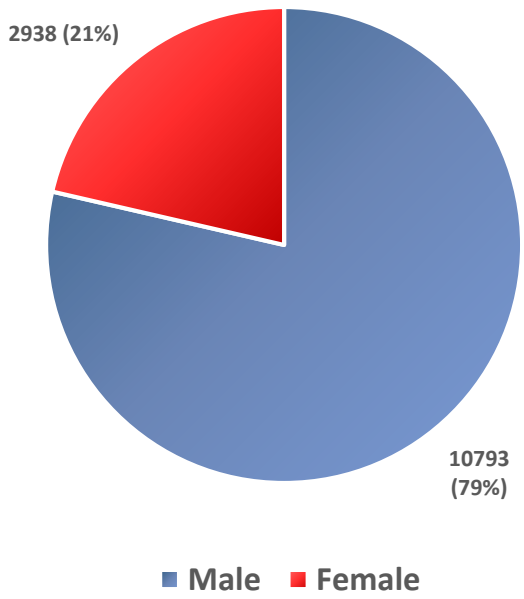
Gender Distribution in Possible DBD Donors, 2000-2019

Figure 1.1.7



Gender Distribution in Possible DBD Donors, 2000-2019

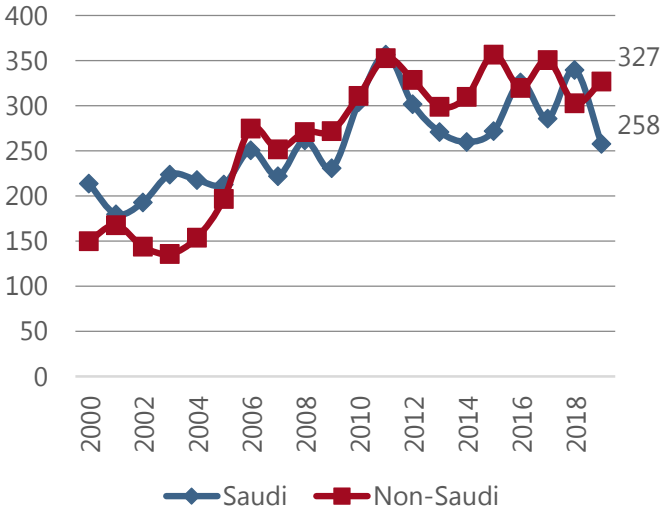
Figure 1.1.8



In 2019 Nationality distribution among possible DBD donors have shown that Saudi Nationals comprises 286 (44%) of the total DBD donors while the other 327 (56%) were non-Saudis. Since 1986, Saudi's comprises 53% of the possible DBD donors and non-Saudis with 47% of the total DBD donors (see figures 1.1.9 and 1.1.10).

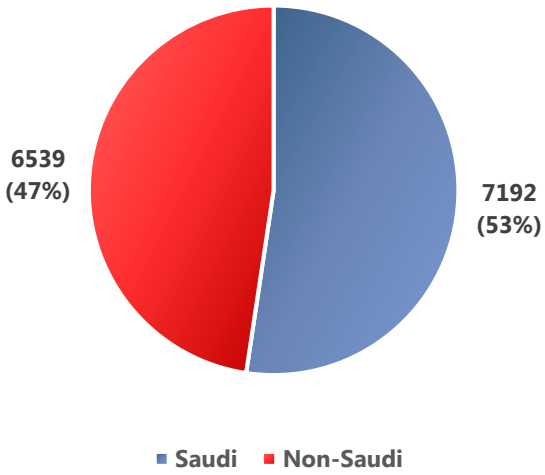
Nationality Distribution in Possible DBD Donors, 2000-2019

Figure 1.1.9



Nationality Distribution in Possible DBD Donors, 2000-2019

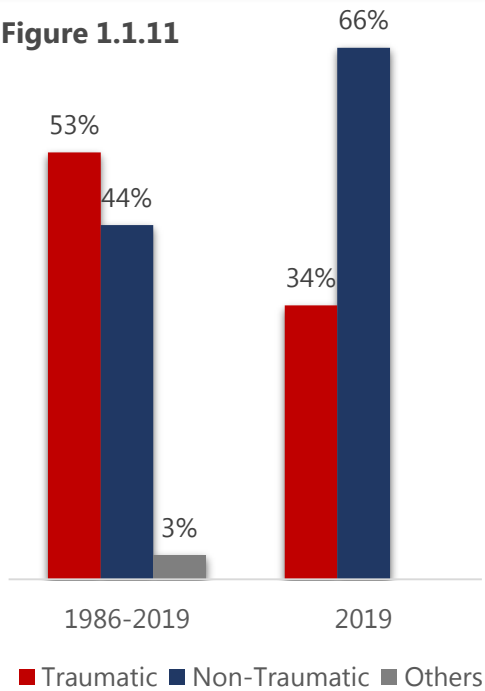
Figure 1.1.10



Analysis of the causes of death among possible DBD donors in 2019 shows that traumatic cause of death were (34%) and death from non-traumatic causes were (66%). Majority of the traumatic causes were due to Motor Vehicle Accident (MVA) 82% while non-traumatic causes were mainly due to Cerebrovascular Accident (CVA) 67% (See table 1.1.2).

Historical Comparison of Cause of Death among Possible DBD Donors

Figure 1.1.11



Cause of Death	Number	
	1986-2019	2019
Traumatic	**7,282**	**199**
• MVA	5,941	154
• FFH	825	27
• DHT	375	8
• Gunshot	139	10
• Electric Shock	2	-
Non-Traumatic	**6,043**	**386**
• CVA	4,053	264
• Anoxia	1,490	115
• CNS Tumor	500	7
Others	**406**	**0**
Total	**13,731**	**585**

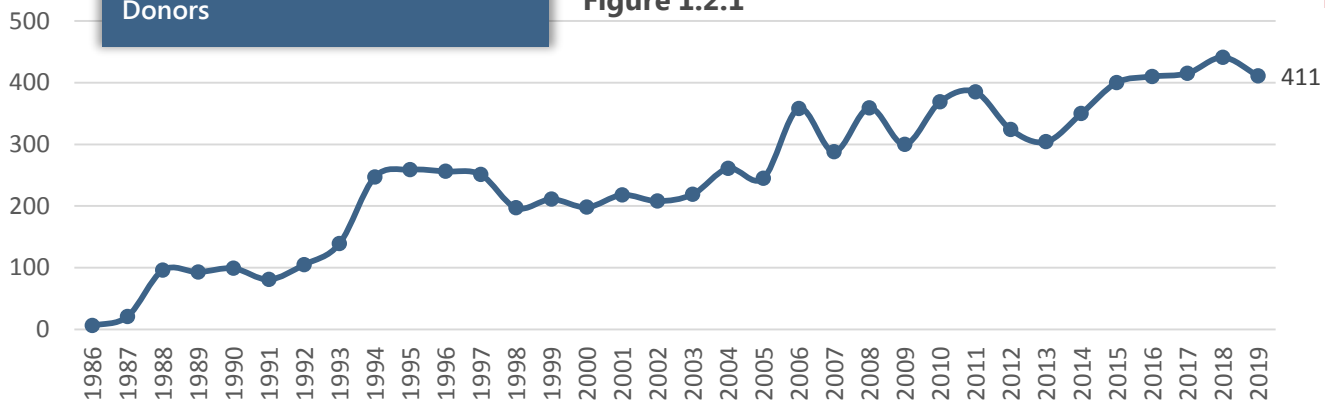
Table 1.1.2: Cause of death among possible DBD donors in 1986-2019 and 2019

Deceased Donation after Brain Death in the Kingdom of Saudi Arabia

1.2 Potential DBD Donors

Annual Trend of Potential DBD Donors

Figure 1.2.1



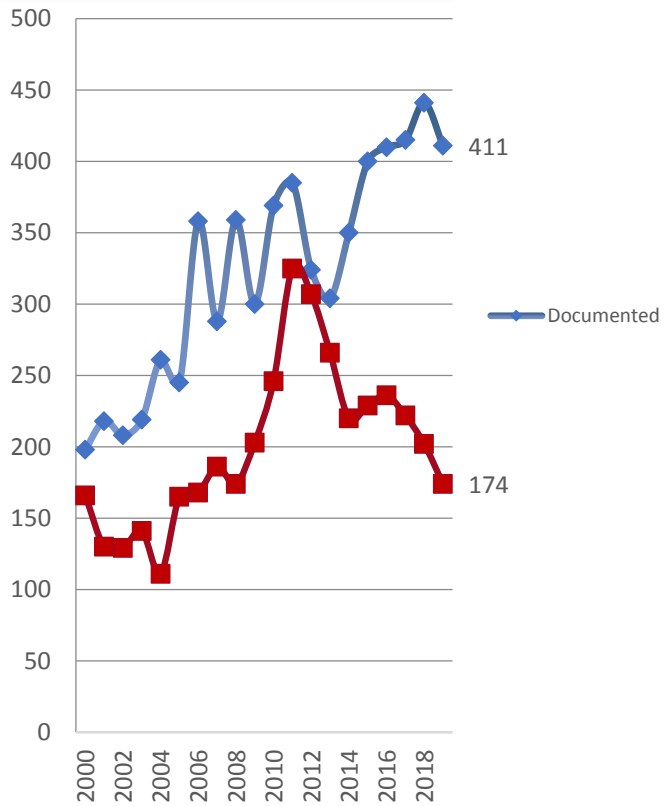
1.2 Potential DBD Donors

In 2019, there were 411 potential DBD donors and the annual trend of potential DBD donors since 1986 has shown a total of 8,524 potential DBD donors reported to SCOT. (See figure 1.2.1).

The 411 potential DBD donors were fully documented based on the Saudi National Protocol for Diagnosis of Death by Brain Function Criteria and had shown an improvement over the past 4 years in comparison to Not documented cases which shows a decreasing pattern from 2012(see figure 1.2.2 & 1.2.3 cumulative).

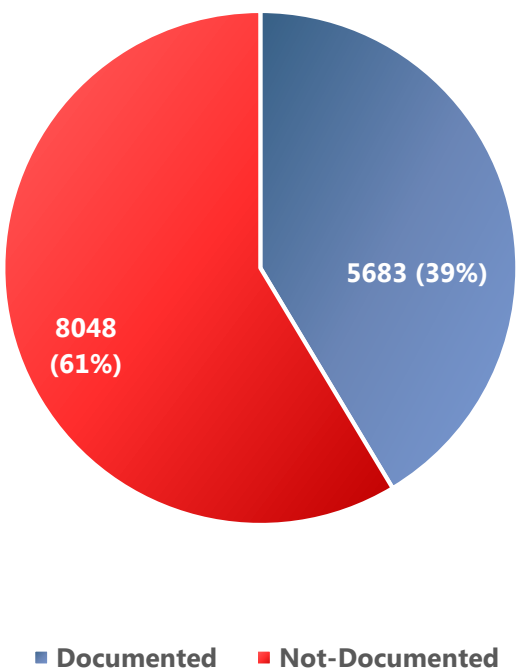
Documented and Undocumented Possible DBD Donors

Figure 1.2.2



Documented and Undocumented Possible DBD Donors (1986-2019)

Figure 1.2.3

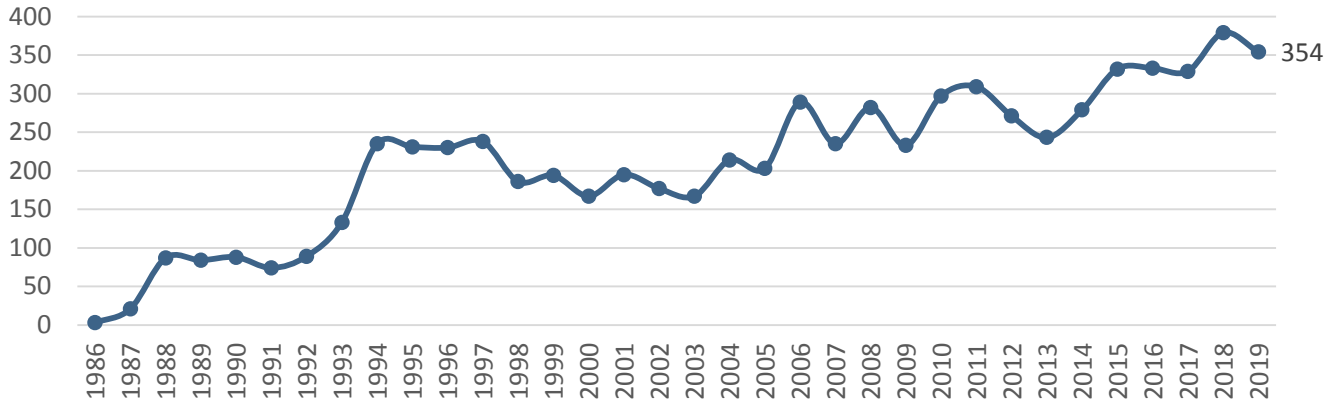


Deceased Donation after Brain Death in the Kingdom of Saudi Arabia

1.3 Eligible to Consented DBD Donors

Annual Trend of Approached Eligible DBD Donors

Figure 1.3.1

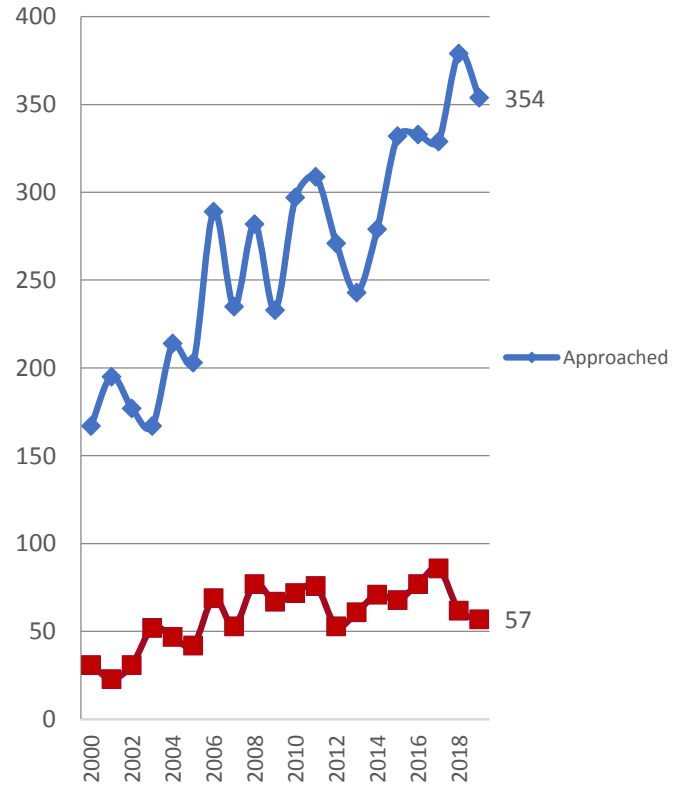


1.3 Eligible DBD Donors

In 2019, there were 354 eligible DBD donors wherein the donors next of kin was approached for organ donation and since 1986, a total of 7,181 eligible DBD donor's kin were approached by SCOT (see figure 1.3.1). Approached and not approached families of DBD donors for organ donation were also documented yearly and cumulatively from 1986. In addition, the number of eligible donors or family approached for organ donation has slightly improved yielding 84% of the donor's conversion from potential to eligible donors. (See figure 1.3.2 & 1.3.3).

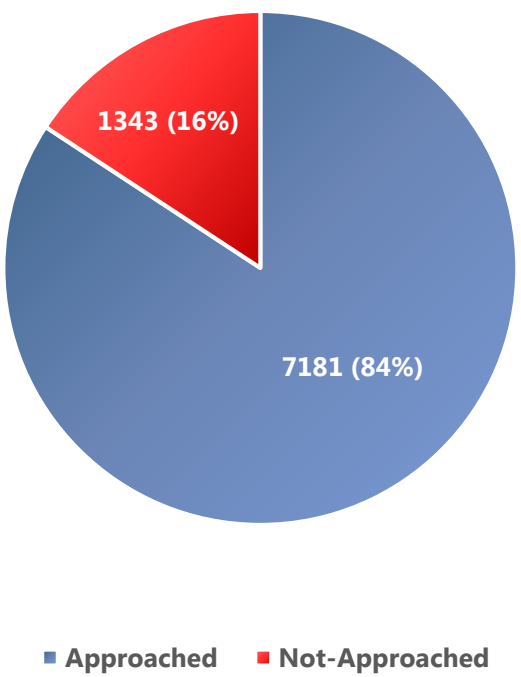
Approached and Not-Approached Eligible DBD Donors

Figure 1.3.2



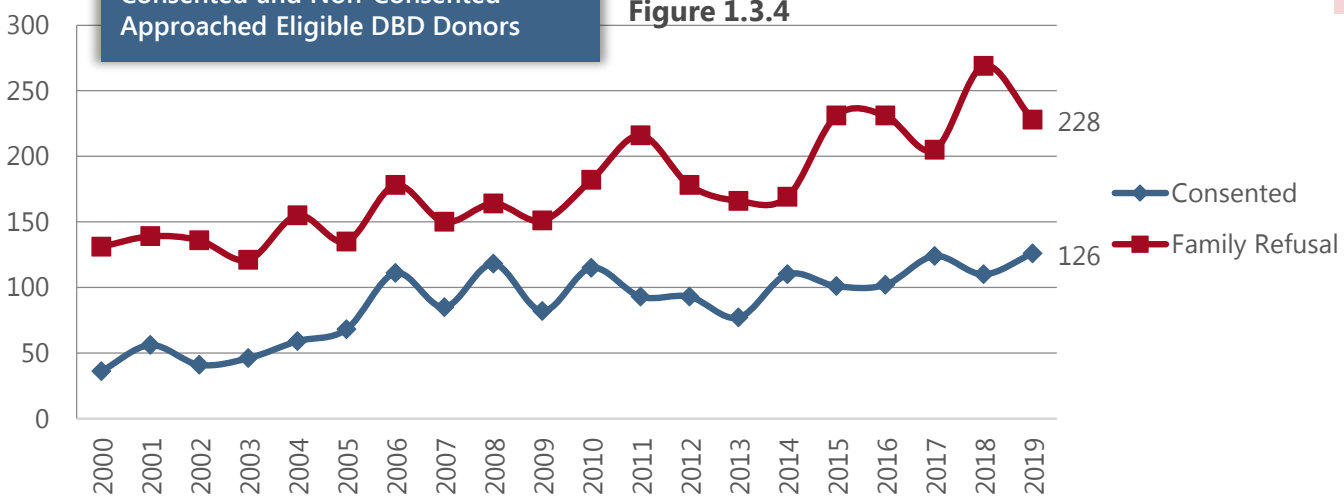
Approached and Not-Approached Eligible DBD Donors (1986-2019)

Figure 1.3.3



Consented and Non-Consented Approached Eligible DBD Donors

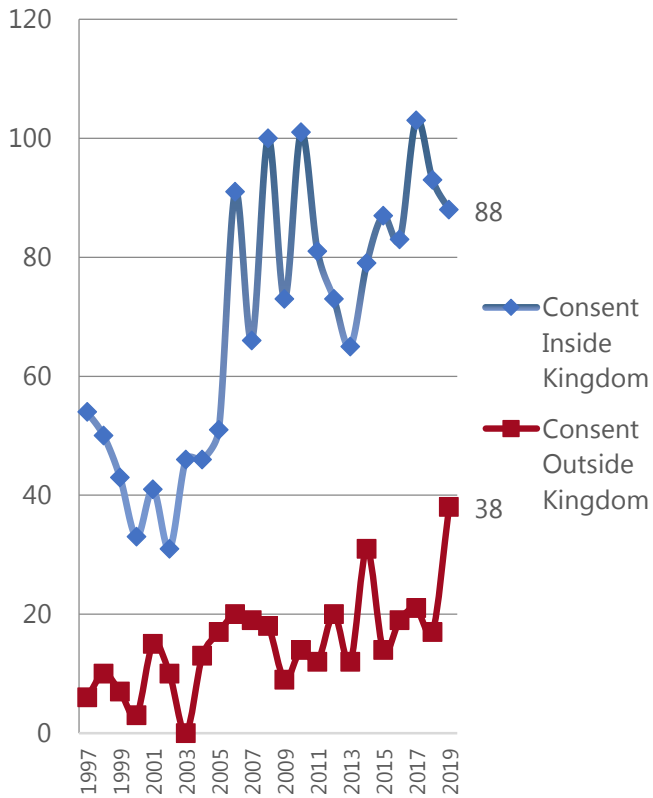
Figure 1.3.4



In 2019, there were a total of 126 (36%) consented cases for organ and tissue donation of the 354 approached eligible DBD donors the highest recorded consent DBD donors over the last 20 years. (see figure 1.3.5 & 1.3.6 cumulatively). The trend of consented eligible DBD donors including the consents from outside the Kingdom of Saudi Arabia in 1997-2019 is shown in (figure 1.3.4).

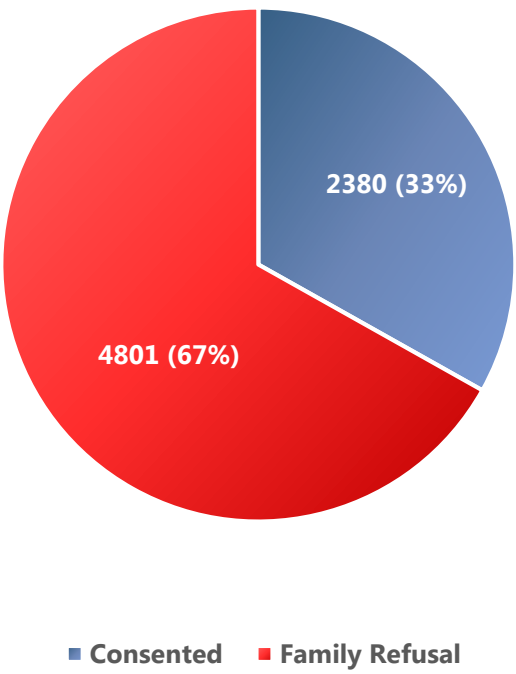
Annual Trend of Consented Eligible DBD Donors

Figure 1.3.5



Consented and Non-Consented Approached Eligible DBD Donors (1986-2019)

Figure 1.3.6

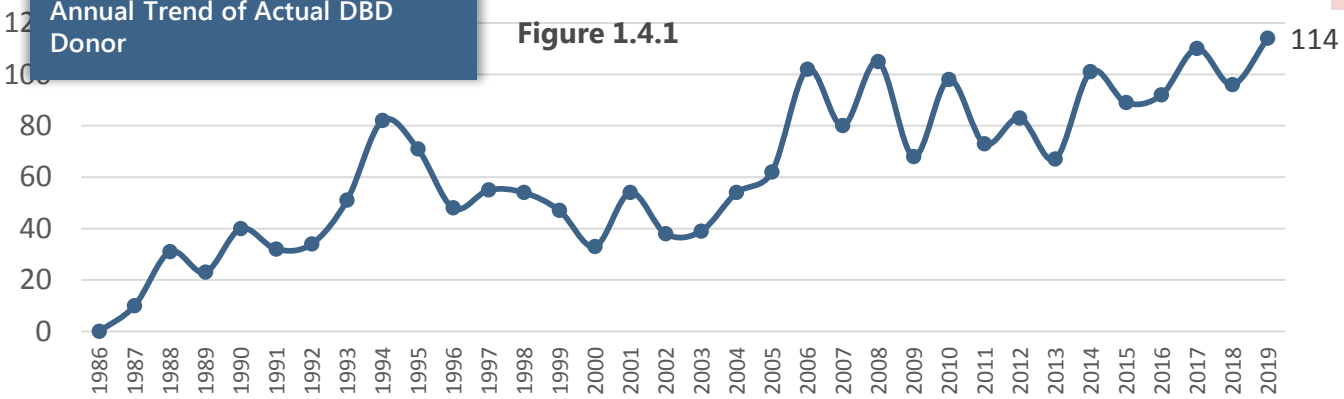


Deceased Donation after Brain Death in the Kingdom of Saudi Arabia

1.4 Actual DBD Donors

Annual Trend of Actual DBD Donor

Figure 1.4.1

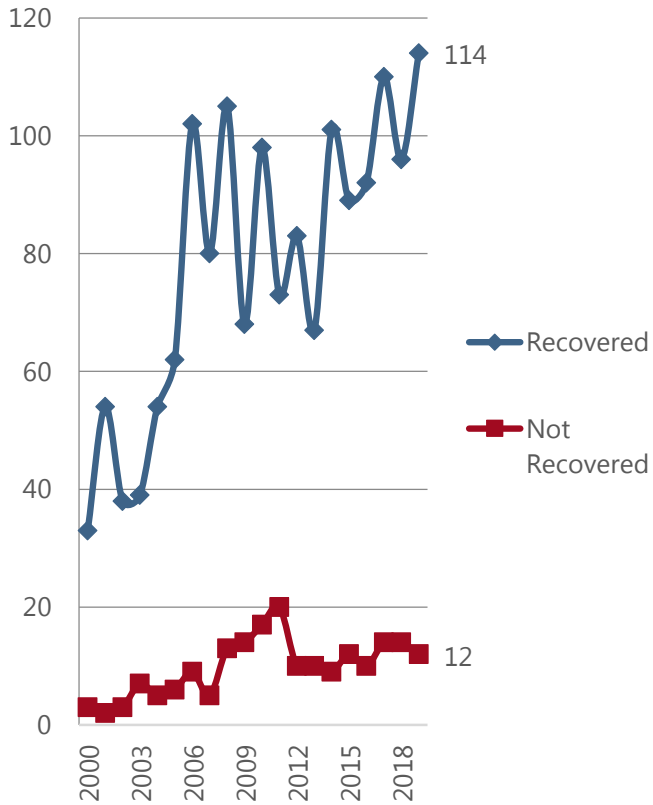


1.4 Actual DBD Donors

In 2019, 126 deceased eligible donors were consented for organ donation wherein, 114 (90%) were converted to actual DBD donors and 12 non-recovered donors (figure 1.4.2). Since 1986, a total of 2,136 consented eligible DBD donors were recovered and 244 donors were non-recovered (figure 1.4.3). The annual trend of actual DBD donors is shown in (figure 1.4.1).

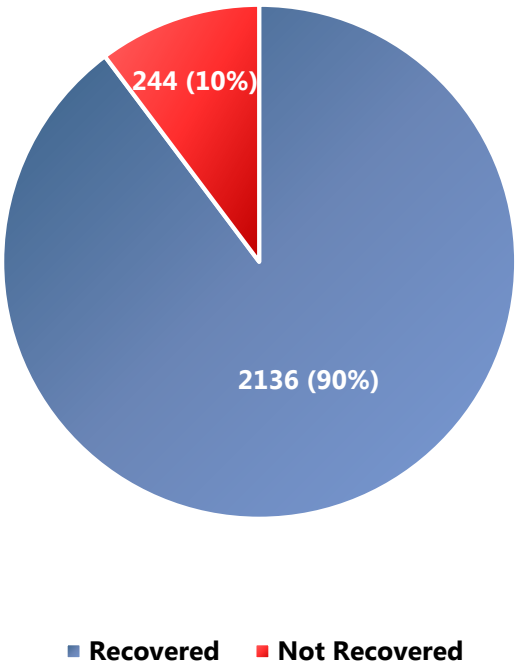
Recovered and Non-Recovered Consented Eligible DBD Donor

Figure 1.4.2



Recovered and Non-Recovered Consented Eligible DBD Donor (1986-2019)

Figure 1.4.3



Deceased Donation after Brain Death in the Kingdom of Saudi Arabia

1.5 Utilized DBD Donors

1.5 Utilized DBD Donor

From the 114 actual DBD donors; 113 donors were utilized; wherein, 78 donors where utilized from inside the KSA including 35 deceased were donors from shared GCC countries. Actual Non-utilized donors is 1 from GCC (Kuwait) (Details of the not utilized actual DBD donors are listed in table 1.5.1). There was an increased in utilized deceased cases compared to last year.(see figure 1.5.1).

Reasons	Number	%
Intraoperative		
Male/45 yrs. Old/CVA; Hepatitis C positive; Fibrotic liver	1	100

Table 1.5.1: Reasons for not utilized actual DBD Donors 2019

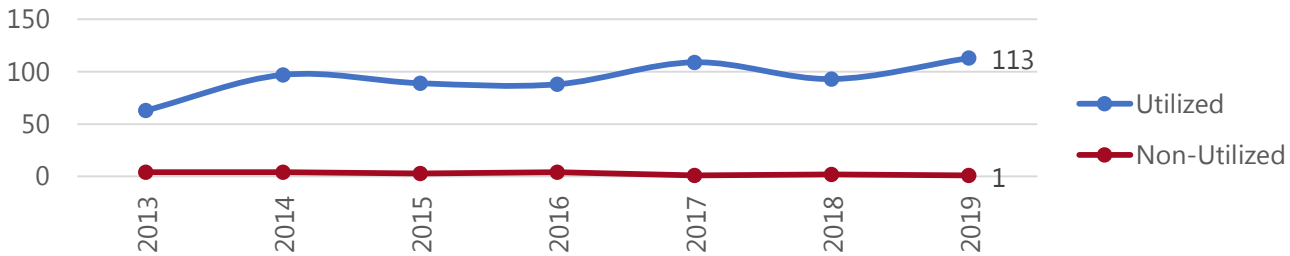


Figure 1.5.1 Utilized and Non-Utilized DBD Donors 2013-2019

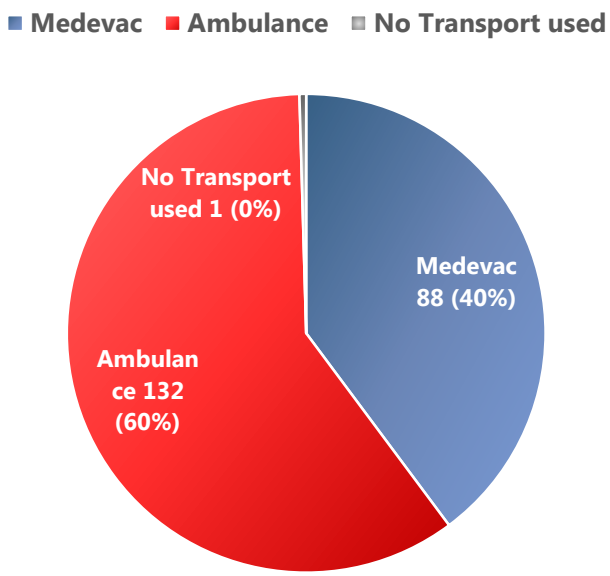
Utilized and Non-Utilized Actual DBD Donors 2019

In 2019, utilized organ donors were as follows : Kidney 72, liver in 74, heart 46, pancreas 8, lungs 37 and small bowel 1 donor.

1.5.1 Logistics

Transportation and logistics plays an important role in the success of organ donation program. Ambulances and Medevacs were used to transport personnel and organs in and out of the Kingdom. In 2019, 88 medevac flights were made in 61 consented cases. 132 ambulances in 106 cases and 1 case, the donor was in transplant center. (see figure 1.5.2 for transportation used during organ recovery).

Figure 1.5.2: Logistics used in actual deceased donors in 2019



1.6 Key Performance Indicators

The ministry of Health (MOH) is keen on the quality of health service provided and started an initiative to measure the key performance indicator (KPI) among health practices in the Kingdom. SCOT managed to include the deceased organ donation process into this initiative and had a list of quality criteria and KPI which will allow identifying rooms for improvement to maximize the deceased organ donation process overall.

The quality indicators are the following :

1. Identification and Reporting of Possible Deceased Donors

- Donor Medical Coordinator should notify all comatose patients with devastating brain injury on mechanical ventilation admitted to ICU apparently suitable for organ donation to Saudi Center for organ transplantation (SCOT)

- **Key Performance Indicator (KPI):** Number of comatose patients with devastating brain injury on mechanical ventilation admitted to ICU who are referred to SCOT **/** Number of comatose patients with devastating brain injury on mechanical ventilation admitted to ICU should be at least **75%**

- Donor Medical Coordinator should refer to the Directory of regulation of organ transplantation in kingdom of Saudi Arabia on the referral criteria and clinical triggers.

2. Death Declaration by neurological Criteria:

1.1. Number of Death Declaration by neurological Criteria:

- Donor Medical Coordinator should follow Death declaration by neurological criteria according to Saudi national protocol for referred possible donors to SCOT

- **Key Performance Indicator (KPI)**: Number of patients declared dead by neurological criteria according to Saudi national protocol/Number of patients referred as possible donors to SCOT should be at least **75**%.

- Donor Medical Coordinator should refer to Directory of regulation of organ transplantation in kingdom of Saudi Arabia on the Saudi national protocol for death declaration by neurological criteria.

1.2. Time of Death Declaration by neurological Criteria

- **Key Performance Indicator (KPI)**: Patients referred as possible donors to SCOT should be declared dead by neurological criteria according to Saudi national protocol within **24** hours from time of referral.

1.3 Post Death Declaration (Breaking bad news)

- **Key Performance Indicator (KPI)**: Families of patients declared dead by neurological criteria according to Saudi national protocol should be informed about death of their relatives within **12** hours from time of death declaration.

3. Management and maintenance of Deceased Organ donor

3.1 Management Protocol

- **Key Performance Indicator (KPI): All** Hospitals should **apply** the Saudi national protocol for management and maintenance of deceased organ donor to all Patients referred as possible donors to SCOT during the whole hospital / ICU stay

3.2 Unexpected Cardiac Arrest

- **Key Performance Indicator (KPI)**: Number of Patients referred as possible donors to SCOT who suffered unanticipated cardiac arrest / Number of Patients referred, as possible donors to SCOT during the whole hospital/ ICU stay should be maximum **5**% if applicable.

- Unanticipated cardiac arrest is cardiac arrest that occurs from the moment at which brain death is suspected or afterwards and that is not attributable to multi-organ failure / sepsis.

4. Family Approach

- Donor Administrative Coordinator should interview Families of patients declared dead by neurological criteria according to Saudi national protocol

- **Key Performance Indicator (KPI)** : Number of patients' families declared dead by neurological criteria according to Saudi national protocol who were interviewed by DAC for organ donation within **12** hours from breaking bad news **/** Number of patients declared dead by neurological criteria according to Saudi national protocol should be at least **90** %

- Donor Administrative Coordinator should refer to Directory of regulation of organ transplantation in kingdom of Saudi Arabia on family approach for organ donation.

5. Consent

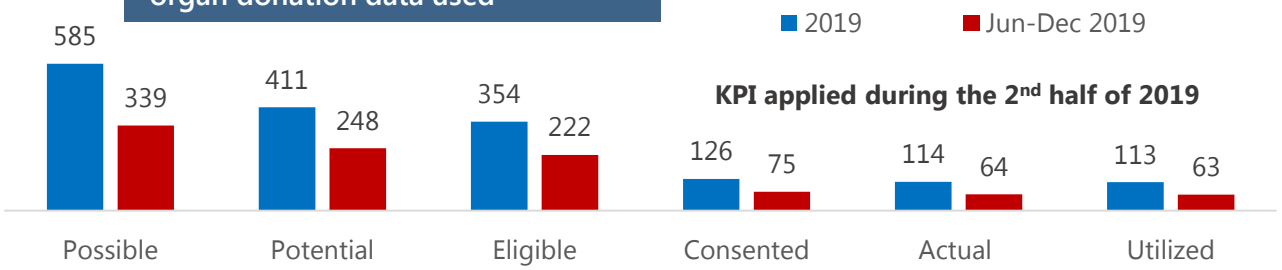
- Donor Administrative Coordinator should follow the process of obtaining written consent from next of kin.

- **Key Performance Indicator (KPI):** Number of no opposition / Number of families interviewed should be at least **50** %.

- Donor Administrative Coordinator should refer to Directory of regulation of organ transplantation in kingdom of Saudi Arabia on getting consent for organ donation.

KPI on critical pathways of deceased organ donation data used

Figure 1.6.1

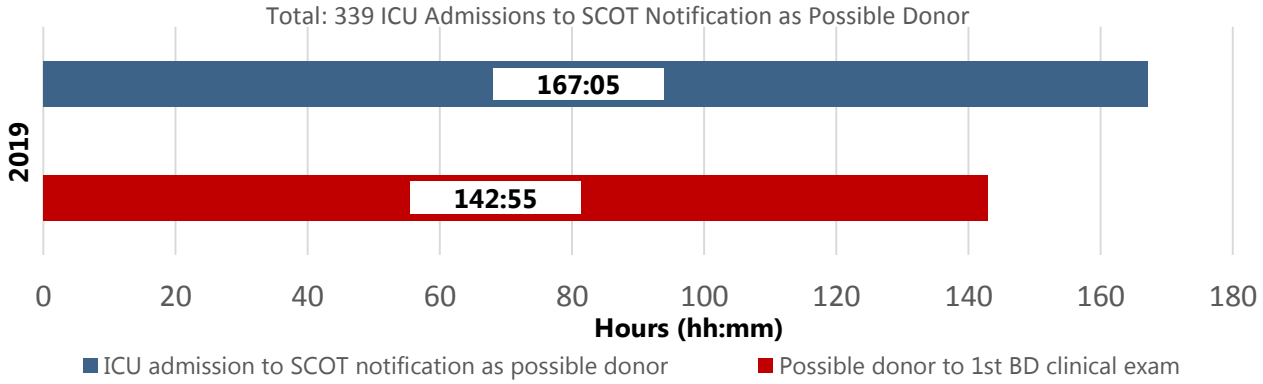


Period	Possible	Potential	Eligible	Consented	Actual	Utilized
2019	585	70.3%	86.1%	35.6%	90.5%	99.1%
Jun-Dec 2019	339	72.9%	89.9%	33.8%	80.3%	98.4%
KPI Parameters	Comatose patients with devastating brain injury admitted to the ICU: 75%	75%	90%	50%	%90	%90

From ICU admission to SCOT notification as a possible donor had an average time of 167:05 hrs. and possible donor to 1st BD clinical exam took an average of 142:55 hrs. (please see figure 1.6.2). Regional distribution of possible deceased donors were mostly from Central region (39.29%) and followed by Eastern region (36.01%), please see figure 1.6.3).

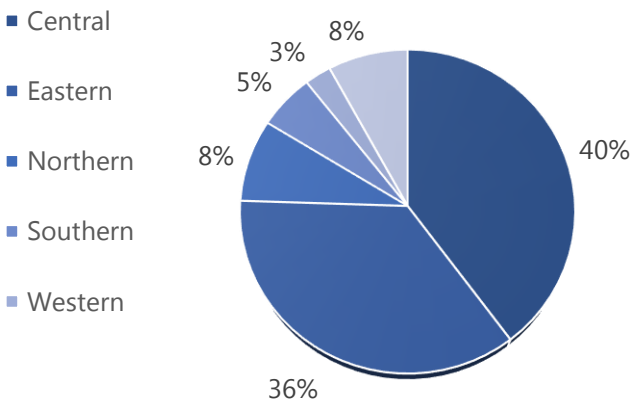
ICU Admission to 1st BD Clinical Exam

Figure 1.6.2



Regional Distribution of Possible Deceased Donors on KPI Study

Figure 1.6.3



Regional Distribution of Possible Deceased Donors on KPI Study

Table 1.6.1

Region	N	%
Central	135	39.29
Eastern	121	36.01
Northern	28	8.33
Southern	19	5.65
Western	9	2.68
Outside Kingdom	27	8.04
Total	339	100.00

Table 1.6.2: Performance Parameters used for the KPI application

N		Performance Parameter	KPI
1		Percentage of Possible Donor from all comatose patients with devastating brain injury on mechanical ventilation admitted to ICU	≥ 75%
2	Death Declaration by neurological Criteria		
		Possible donor to 1st brain death (BD) clinical exam	within 6 to 12 hours
	2.1	1st BD clinical exam to BD declaration	≤ 24 hours
	2.2	Percentage of Donors declared dead by neurological criteria /Number of possible donors	≥ 75%
	2.3	BD Declaration to breaking of bad news to family	≤ 12 hours
3	Management and maintenance of Deceased Organ donor		
		Management Protocol	Not Applicable
		Percentage of unexpected cardiac arrest before BD declaration from possible donors	maximum 5% if applicable
4	Family Approach		
	4.1	Breaking bad news to family approach for organ donation	≤ 12 hours
	4.2	Percentage of families approached for organ donation from declared BD	≥ 90%
5	Consent		
		Percentage of consent for organ donation from families approached	≥ 50%
6			
		6.1 Time from Consent for organ donation to organ recovery	≤ 24 hours
		6.2 Percentage of Utilized Organ from Recovered Organs	≥ 90%

Among the documented and approached cases for organ donation, 75 (33.8%) donors were consented and 134 (60.4%) donors, the family refused organ donation. Consented cases were from 45 donors hospitals (32 inside KSA and 13 from GCC countries) and family refusal cases were from 53 donor hospitals (52 inside KSA and 1 case from GCC country).

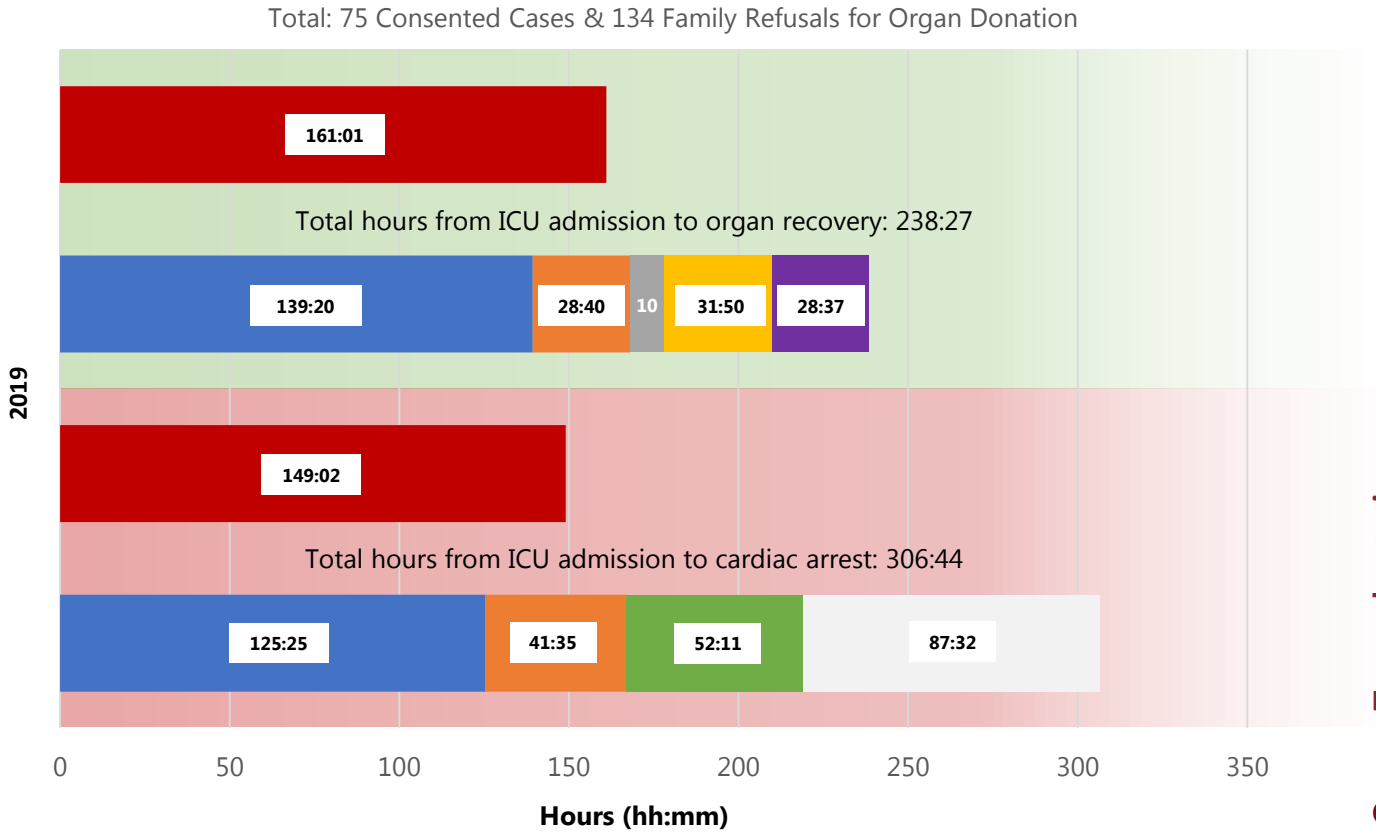
Among the consented donors, the average timings among the parameters are as follows: time from possible donor to 1st BD clinical exam was 139:20 hours, then to BD declaration at 28:40 hours. After BD declaration, the breaking of bad news was done for the family in 10 hours and then followed by the signing of consented for organ donation by the family which took 31:50 hours. Finally, organ recovery procedure was performed and had an average of 28:37 hours from the time the consent was given. Overall for consented donors, it took a total of 238:27 hours from the initiation of deceased organ donation process (ICU admission to organ recovery), see figure 1.6.4.

On the other hand, there were 134 donors where the family refused for organ donation. The time from possible to 1st BD clinical exam had an average of 125:25 hours and then after that, the donor was declared BD after 41:35 hours. After BD declaration, the families were approached for organ donation and refused; it took an average of 52:11 hours to get the families' answer. From this step, the donor is then placed under minimum maintenance until cardiac arrest; averagely, the deceased donor takes 87:32 hours of total stay and then cardiac arrest occurs. The total time from ICU admission to cardiac arrest among refusal cases was at 306:44 hours, see figure 1.6.4.

Regional distribution of documented donors were mainly from central region at 45% then followed by eastern region with 36% of the cases. also, the consented donors were mainly from central and eastern region having 34% and 27% respectively.; please see figure 1.6.5 and 1.6.6).

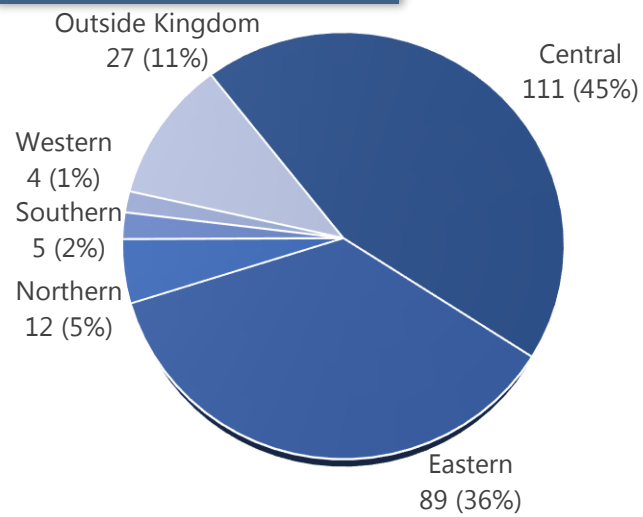
Documented and Approached Donors for Organ Donation

Figure 1.6.4



Documented Cases Regional Distribution

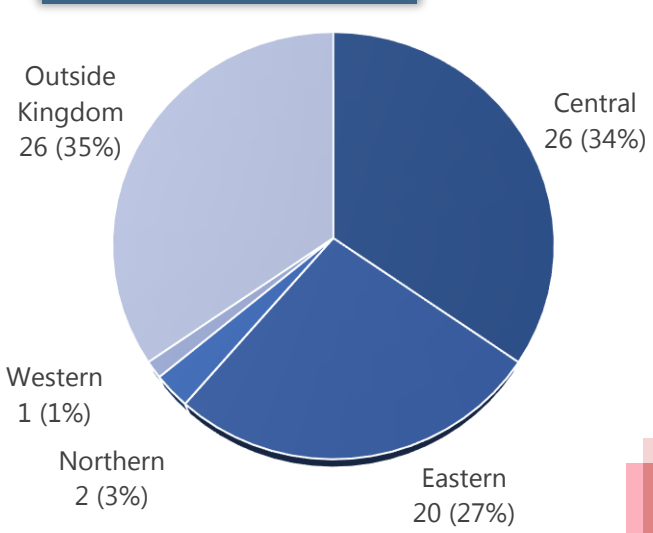
Figure 1.6.5



Total: 248 cases

Consented Cases Regional Distribution

Figure 1.6.6

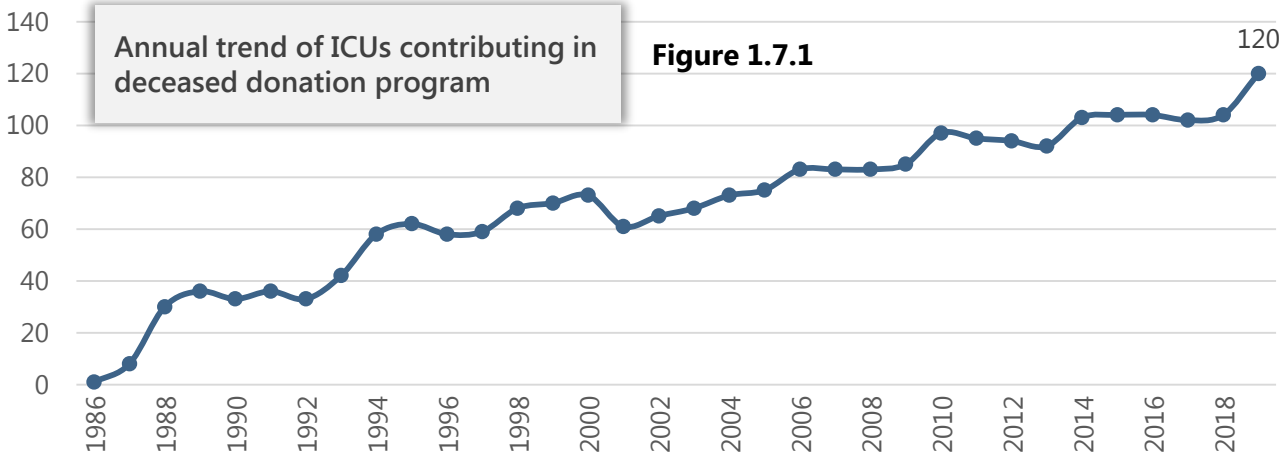


Total: 75 cases

Hospital Contribution in Organ Donation Program

Annual trend of ICUs contributing in deceased donation program

Figure 1.7.1



In 2019, 120 ICU's reported possible DBD donors to Saudi Center for Organ Transplantation (SCOT). Over the years, there was an increase in the number of ICUs contributing to this program.

These ICU's were divided into three categories; large (>20 ICU beds), medium (10-20 ICU beds) or small (<10 ICU beds). The top 3 hospital with the outmost consented cases are mentioned below with their corresponding ICU beds.

Total Number of DBD Donor for All Type Hospitals

Table 1.7.1

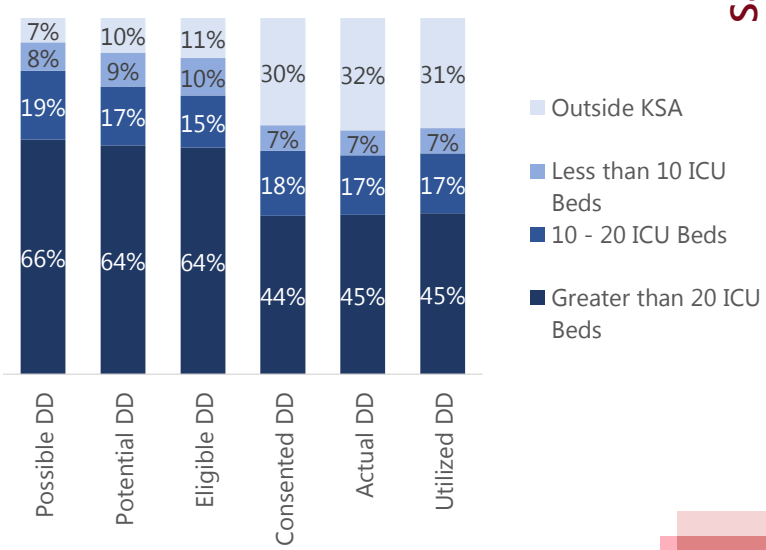
Hospital Category	Possible	Potential	Eligible	Consented	Actual	Utilized
Greater than 20 ICU Beds	385	264	225	56	51	51
10 - 20 ICU Beds	113	68	52	23	19	19
Less than 10 ICU Beds	47	39	37	9	8	8
Outside KSA	40	40	40	38	36	35
TOTAL	**585**	**411**	**354**	**126**	**114**	**113**

Hospitals with >20 (53 beds) reported 385 cases (66% of the total), of which 264 (64%) were fully documented, 56 (44%) were consented for donation.

In this group, The King Saud Medical Complex, which have been a consistent top contributing hospital in deceased organ donation had contributed 70 possible donors, documented 56 (potential), consented 12 and out of which 12 were utilized. This was followed by King Abdulaziz Medical City National Guard Riyadh with 35 possible, 32 potential, 7 consents and 7 utilized. Dammam Medical Complex with 24 possible, 18 potential 5 consents and 4 utilized donors.

Deceased Organ Donation by Hospital ICU Capacity

Figure 1.7.2



In 2019, from this category of hospital ICU's having more than 20 beds capacity contributed 385 possible donors, documented (potential) 264 donors and utilized 51 organ donors. The top 5 reporting hospitals were the King Saud Medical City Riyadh with 70 possible donors, documented (potential) 56 donors and utilized 12 organ donors, followed by King Abdulaziz Medical City National Guard Riyadh with 35, 32 and 7; Dammam Medical Complex 24, 18 and 4; Al Noor Hospital Makkah 23, 11 but had no consented donors, King Fahad University Hospital Al Khobar 17, 17 and 4. King Fahad Hospital Jeddah had reported possible 17 donors, 9 potentials and utilized 2. It is worth mentioning that Sanad Hospital in Riyadh had 7 possible donors, 7 potential and utilized 4 donors making it one the hospitals with most numbers of utilized donors in this category.

Table 1.7.2 Hospitals with ICU's Having More than 20 Beds

No.	HOSPITAL NAME	POSSIBLE	POTENTIAL	ELIGIBLE	CONSENTED	ACTUAL	UTILIZED
1	KING SAUD MEDICAL CITY RIYADH	70	56	51	12	12	12
2	KING ABDULAZIZ MEDICAL CITY NATIONAL GUARD RIYADH	35	32	30	7	7	7
3	DAMMAM MEDICAL COMPLEX	24	18	15	5	4	4
4	AL NOOR SPECIALIST HOSPITAL MAKKAH	23	11	5	0	0	0
5	KING FAHAD UNIVERSITY HOSPITAL AL KHOBAR	17	17	15	5	4	4
6	KING FAHAD HOSPITAL JEDDAH	17	9	4	2	2	2
7	PRINCE MOHAMMED BIN ABDULAZIZ HOSPITAL RIYADH	15	11	11	3	2	2
8	KING KHALID HOSPITAL HAIL	13	5	5	0	0	0
9	KING SALMAN HOSPITAL RIYADH	12	6	6	3	2	2
10	IMAM ABDULRAHMAN AL FAISAL HOSPITAL RIYADH	10	6	5	1	1	1
11	KING ABDULLAH HOSPITAL BISHA	10	4	3	0	0	0
12	KING ABDULAZIZ HOSPITAL JEDDAH	10	3	3	0	0	0
13	KING KHALID HOSPITAL TABUK	9	7	6	1	1	1
14	PRINCE SULTAN MILITARY MEDICAL CITY	8	3	3	1	1	1
15	SANAD HOSPITAL RIYADH	7	7	7	5	4	4
16	KING FAISAL HOSPITAL MAKKAH	6	5	2	0	0	0
17	KING FAHAD MEDICAL CITY RIYADH	6	6	6	0	0	0
18	KING FAHAD MILITARY MEDICAL COMPLEX DHAHRAN	6	5	4	1	1	1
19	KING FAHAD ARMED FORCES HOSPITAL JEDDAH	6	5	4	0	0	0
20	RIYADH CARE HOSPITAL	4	2	2	1	1	1
21	KING ABDULAZIZ MEDICAL CITY JEDDAH	4	3	3	0	0	0
22	AL RASS GENERAL HOSPITAL	4	3	3	1	1	1
23	KING ABDULAZIZ SPECIALIST HOSPITAL AL JOUF	4	1	1	0	0	0
24	KING FAISAL SPECIALIST HOSPITAL RESEARCH CENTER RIYADH	4	3	2	1	1	1
25	AL HADA MILITRY HOSPITAL TAIF	3	2	1	0	0	0
26	KING KHALID GENERAL HOSPITAL HAFAR AL BATIN	3	3	1	0	0	0
27	OHUD GENERAL HOSPITAL MADINA	3	1	1	0	0	0

Table 1.7.2 Hospitals with ICU's Having More than 20 Beds (Continuation)

No.	HOSPITAL NAME	POSSIBLE	POTENTIAL	ELIGIBLE	CONSENTED	ACTUAL	UTILIZED
28	SECURITY FORCES HOSPITAL RIYADH	3	3	1	0	0	0
29	MATERNITY AND CHILDREN HOSPITAL JEDDAH	3	2	1	0	0	0
30	KING FAHD SPECIALIST HOSPITAL DAMMAM	3	3	3	0	0	0
31	AL QURRAYAT GENERAL HOSPITAL	3	0	0	0	0	0
32	KING FAISAL HOSPITAL TAIF	3	1	1	0	0	0
33	KING ABDULAZIZ UNIVERSITY HOSPITAL JEDDAH	3	2	2	1	1	1
34	DR. SULAIMAN AL HABIB HOSPITAL AL RAYAN	3	1	1	1	1	1
35	ASSIR CENTRAL HOSPITAL	3	0	0	0	0	0
36	DR. SULAIMAN AL HABIB HOSPITAL QASSIM	2	2	2	0	0	0
37	AL YAMAMAH HOSPITAL RIYADH	2	2	2	1	1	1
38	KING ABDULAZIZ SPECIALIST HOSPITAL TAIF	2	0	0	0	0	0
39	AR'AR CENTRAL HOSPITAL	2	1	1	1	1	1
40	DR. SULAIMAN AL HABIB HOSPITAL TAKAZUSSI	2	2	2	1	1	1
41	KING ABDULAZIZ MEDICAL CITY NATIONAL GUARD JEDDAH	2	1	1	0	0	0
42	KING FAISAL SPECIALIST HOSPITAL RESEARCH CENTER JEDDAH	2	1	1	0	0	0
43	KING FAHAD HOSPITAL AL BAHA	2	0	0	0	0	0
44	KING ABDULLAH MEDICAL CITY MAKKAH	2	2	2	0	0	0
45	CARE NATIONAL HOSPITAL	2	2	2	1	1	1
46	AL HAMADI HOSPITAL AL NUZHA	1	1	1	1	1	1
47	IMMAM ABDULRAHMAN BIN FAISAL HOSPITAL DAMMAM	1	1	1	0	0	0
48	MATERNITY AND CHILDREN HOSPITAL MADINA	1	0	0	0	0	0
49	MATERNITY AND CHILDREN HOSPITAL MAKKAH	1	0	0	0	0	0
50	KING KHALID UNIVERSITY HOSPITAL RIYADH	1	1	1	0	0	0
51	QURRAYAT GENERAL HOSPITAL	1	1	1	0	0	0
52	KING SALMAN MILITARY HOSPITAL TABUK	1	0	0	0	0	0
53	AL HAMADI HOSPITAL OLAYA	1	1	0	0	0	0
	TOTAL	**385**	**264**	**225**	**56**	**51**	**51**

In 2019, from of mid-sized hospital ICU's having more than 10-20 beds capacity contributed 118 possible donors, documented (potential) 68 donors and utilized 19 organ donors. , the top 5 reporting hospitals were the King Fahad Hospital Hofuf 13 possible donors, documented (potential) 10 donors and utilized 5 organ donors, followed by Prince Meteb Bin Abdulaziz Hospital Al Jouf with 12, 2, but had no consented donors; Buraida Central Hospital with 10, 8 and 2; Saudi German Hospital Riyadh 8, 8, and 2; King Abdullah Medical Complex Jeddah 8,6 and 1. It is worth mentioning that Al Mana General Hospital Dammam had 5, 5, and 2 utilized donors and Al Mana General Hospital Al Ahsa had converted their 2 possible donors to utilized donors making these 2 hospitals with most number of utilized donors in these category.

Table 1.7.3 Hospitals with ICU's Having 10 to 20 Beds

No.	HOSPITAL NAME	POSSIBLE	POTENTIAL	ELIGIBLE	CONSENTED	ACTUAL	UTILIZED
1	KING FAHAD HOSPITAL HOFUF	13	10	8	5	5	5
2	PRINCE METEB BIN ABDULAZIZ HOSPITAL AL JOUF	12	2	1	0	0	0
3	BURAIDA CENTRAL HOSPITAL	10	8	7	4	2	2
4	SAUDI GERMAN HOSPITAL RIYADH	8	8	5	2	2	2
5	KING ABDULLAH MEDICAL COMPLEX JEDDAH	8	6	6	1	1	1
6	KING KHALID GENERAL HOSPITAL NAJRAN	7	1	0	0	0	0
7	AL MANA GENERAL HOSPITAL DAMMAM	5	5	5	2	2	2
8	AL EIMAN HOSPITAL RIYADH	5	2	0	0	0	0
9	KING ABDULAZIZ HOSPITAL MAKKAH	5	3	3	0	0	0
10	EAST JEDDAH HOSPITAL	4	2	0	0	0	0
11	KING FAHAD HOSPITAL TABUK	4	1	0	0	0	0
12	ABHA PRIVATE HOSPITAL	3	0	0	0	0	0
13	HAFAR AL BATIN CENTRAL HOSPITAL	3	2	1	0	0	0
14	AL MANA GENERAL HOSPITAL AL KHOBAR	3	3	3	2	0	0
15	OBEID SPECIALIZED HOSPITAL AL AHSA	2	2	2	1	1	1
16	BUGSHAN HOSPITAL JEDDAH	2	0	0	0	0	0
17	KING KHALID HOSPITAL AL KHARJ	2	2	2	1	1	1
18	AL THAGER HOSPITAL JEDDAH	2	1	0	0	0	0
19	AL MANA GENERAL HOSPITAL AL AHSA	2	2	2	2	2	2
20	SPECIALIZED MEDICAL CENTER RIYADH	2	2	1	0	0	0
21	OBEID SPECIALIZED HOSPITAL RIYADH	1	0	0	0	0	0

Table 1.7.3 Hospitals with ICU's Having 10 to 20 Beds (Continuation)

No.	HOSPITAL NAME	POSSIBLE	POTENTIAL	ELIGIBLE	CONSENTED	ACTUAL	UTILIZED
22	PRINCE MISHARI BIN SAUD HOSPITAL IN BELJARAISY	1	0	0	0	0	0
23	AL ZAHRA GENERAL HOSPITAL QATEEF	1	1	1	1	1	1
24	MATERNITY AND CHILDREN HOSPITAL AL AHSA	1	1	1	0	0	0
25	PRINCE SAUD BIN JALAWI HOSPITAL HOFUF	1	1	1	0	0	0
26	DR. SULAIMAN AL HABIB HOSPITAL SWAIDI	1	0	0	0	0	0
27	DR. SULAIMAN AL HABIB HOSPITAL OLAYA	1	1	1	1	1	1
28	ARMED FORCES HOSPITAL SOUTHERN REGION KHAMIS MUSHAYAT	1	0	0	0	0	0
29	KING KHALID HOSPITAL MAJMAAH	1	0	0	0	0	0
30	ROYAL COMMISSION YANBU MEDICAL CENTER	1	1	1	1	1	1
31	SECURITY FORCES HOSPITAL DAMMAM	1	1	1	0	0	0
	TOTAL	**113**	**68**	**52**	**23**	**19**	**19**

In 2019, small hospital ICU's having less than 10 ICU beds capacity contributed 47 possible donors, documented (potential) 39 donors and utilized 8 organ donors. , the top 5 reporting hospitals were Al Hamadi Hospital Al Suweidi with 6 possible donors, documented (potential) 6 donors and utilized 1 organ donors, followed Al Mowasat Hospital Dammam 6, 5 and 0, Qateef Central Hospital 5, 1 and 1, King Abduziz Hospital National Guard Al Hassa 4, 4, 0 and King Khalid Hospital Hafar Al Batin with 3, 3 and 1.

Table 1.7.4 Hospitals with ICU's Having Less than 10 Beds

No.	HOSPITAL NAME	POSSIBLE	POTENTIAL	ELIGIBLE	CONSENTED	ACTUAL	UTILIZED
1	AL HAMADI HOSPITAL SWAIDI	6	6	6	1	1	1
2	AL MOWASAT HOSPITAL DAMMAM	6	5	4	0	0	0
3	QATEEF CENTRAL HOSPITAL	5	3	3	1	1	1
4	KING ABDULAZIZ HOSPITAL NATIONAL GUARD AL HASSA	4	4	3	0	0	0
5	ROYAL COMMISSION HOSPITAL JUBAIL	3	3	3	0	0	0
6	KING KHALID HOSPITAL HAFAR AL BATIN	3	3	3	2	1	1
7	AL AHSA HOSPITAL	2	2	2	0	0	0
8	KINGDOM HOSPITAL RIYADH	2	1	1	1	1	1
9	JUBAIL GENERAL HOSPITAL	2	1	1	1	1	1
10	JOHN HOPKIN'S ARAMCO HOSPITAL	2	2	2	1	1	1
11	SHAROURAH GENERAL HOSPITAL	1	0	0	0	0	0
12	TADAWI GENERAL HOSPITAL DAMMAM	1	1	1	0	0	0
13	AL MANA GENERAL HOSPITAL JUBAIL	1	1	1	0	0	0
14	MOHAYEL GENERAL HOSPITAL ASSIR	1	1	1	0	0	0
15	JEDDAH CLINIC HOSPITAL	1	0	0	0	0	0
16	MATERNITY AND CHILDREN HOSPITAL DAMMAM	1	0	0	0	0	0
17	AL AZHAR HOSPITAL	1	1	1	0	0	0
18	AL NARIYA GENERAL HOSPITAL	1	1	1	1	1	1
19	FARSAN GENERAL HOSPITAL	1	1	1	0	0	0
20	ASSALAMA HOSPITAL AL KHOBAR	1	1	1	1	1	1
21	DALLAH HOSPITAL RIYADH	1	1	1	0	0	0
22	HAYAT NATIONAL HOSPITAL QASSIM	1	1	1	0	0	0
	TOTAL	**47**	**39**	**37**	**9**	**8**	**8**

Hospitals with ICU's Organ Sharing from GCC Countries

Deceased organ sharing is well established within the GCC countries and this year it had contributed 40 possible donors, documented (potential) 40 donors and utilized 35 organ donors. Most the deceased donors shared to KSA were from Kuwait with 27 possible donors, 27 potential and 35 utilized, followed by United Arab Emirates with 10, 10 and 10 and Bahrain with 3, 3 and 0 utilized donors.

Table 1.7.5 Hospitals outside the Kingdom of Saudi Arabia

No.	HOSPITAL NAME	POSSIBLE	POTENTIAL	ELIGIBLE	CONSENTED	ACTUAL	UTILIZED
1	FARWANIYA HOSPITAL KUWAIT	11	11	11	10	10	10
2	AL ADAN HOSPITAL KUWAIT	8	8	8	8	8	7
3	MUBARAK AL KABEER HOSPITAL KUWAIT	5	5	5	5	5	5
4	SALMANIYA MEDICAL COMPLEX BAHRAIN	3	3	3	2	0	0
5	FUJAIRAH HOSPITAL	2	2	2	2	2	2
6	AL MAFRAQ HOSPITAL ABUDHABI	2	2	2	2	2	2
7	CLEVELAND CLINIC ABU DHABI	2	2	2	2	2	2
8	DR. SULAIMAN AL HABIB HOSPITAL UAE	1	1	1	1	1	1
9	SHEIKH KHALIFA MEDICAL CITY ABUDHABI	1	1	1	1	1	1
10	AMIRI HOSPITAL KUWAIT	1	1	1	1	1	1
11	RAHBAH HOSPITAL UAE	1	1	1	1	1	1
12	MADINAT ZAYED HOSPITAL UAE	1	1	1	1	1	1
13	BIN SINA HOSPITAL KUWAIT	1	1	1	1	1	1
14	SABHA HOSPITAL KUWAIT	1	1	1	1	1	1
	TOTAL	**40**	**40**	**40**	**38**	**36**	**35**

18 Total Utilized donor from Kuwait of which 13 cases were utilized by KSA

Distribution of consents by region shows that 50 (40%) consents were obtained from the Central region (from 11 MOH hospitals, 5 from Govt. Non-MOH hospitals and 18 from private hospitals). The Eastern region came next with 31 consents which constitutes (14 from MOH hospitals, 6 from Govt.-Non-MOH and 9 from Private). The Western region follows with 5 consents (2 MOH hospitals, and 2 Govt.-Non-MOH). Northern region had 2 consents both from MOH hospitals. It is also worth noting that hospitals from GCC countries had contributed 36 consents giving a total 126 consents this year. (see table 1.7.6).

Table 1.7.6 Distribution of possible, consented and actual deceased donors according to region 2019

Region	No. of Hospitals	Possible DD	Consent for Organ Donation	Actual DD
Central (Riyadh, Kharj and Qassim)	34	235	50	45
Western (Jeddah, Makkah, Madinah & Taif)	24	113	5	5
Eastern (Dammam, Hofuf, Al Khobar, Dhahran, Khafji, Qateef, Jubail & Hafar Al Baten)	29	117	31	26
Northern (Tabuk, Al Jouf, Hail and Northern Borders)	9	50	2	2
Southern (Assir, Al Baha, Gizan & Najran)	10	30	0	0
Outside KSA (Kuwait, Qatar, UAE, & Bahrain)	14	40	38	36
Total	**120**	**585**	**126**	**114**

A total number of 120 hospitals had reported 585 possible deceased donors (DD) this year of 2019 wherein, 126 consents were obtained for organ donation & 114 donors were converted to actual deceased organ donors.

Figure 1.7.3 Deceased Organ Donation Activity by Region in KSA

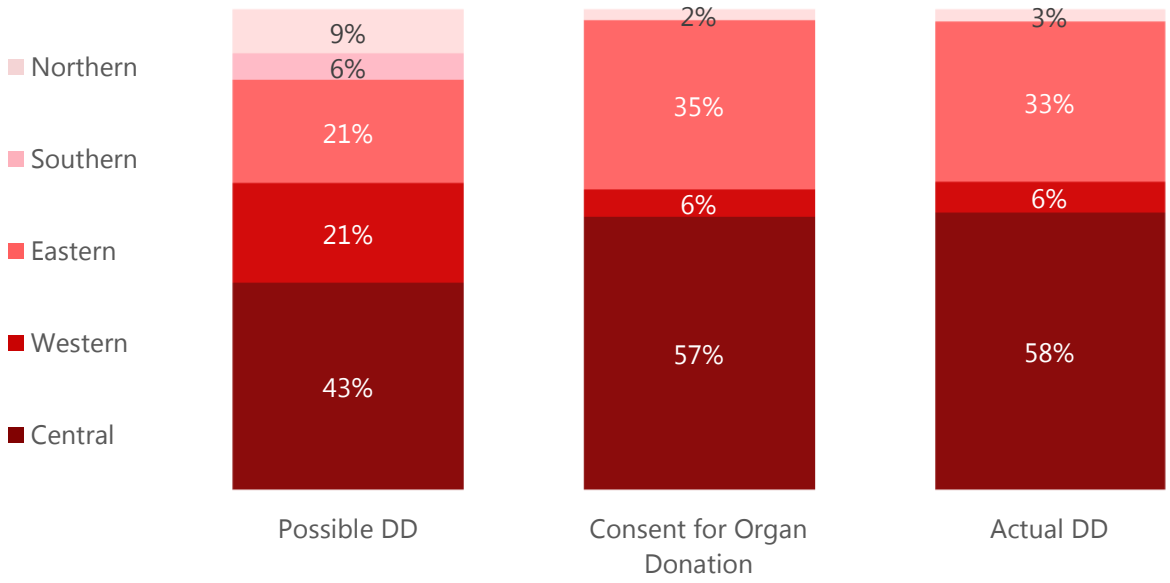


Table 1.7.7 Deceased Organ Donation Activity by Sector in KSA

Region	Number of hospitals	Possible DD	Consent for Organ Donation	Actual DD
Ministry of Health	55	359	47	41
Government Non-MOH	20	107	18	17
Private sectors	31	79	23	20
GCC country	14	40	38	36
Total	**120**	**585**	**126**	**114**

Organ Transplantation in the Kingdom of Saudi Arabia

2.1 Kidney Transplantation

In the year 2019, 1,121 kidneys was transplanted inside the kingdom of Saudi Arabia with 981 kidneys transplanted from living and 140 were transplanted from deceased donors. (Details of the living and deceased kidney transplantation are shown in Table 2.1.1)

It is worth mentioning that a total of 13,641 kidneys were transplanted inside the kingdom from 1979-2019; of these transplantation activities, 9,471 (69%) were from living related, 3,394 (25%) were from deceased donors and 776 (6%) from living unrelated kidney donor. Illustration of the cumulative living and deceased kidney transplantation is shown in figure 2.1.1.

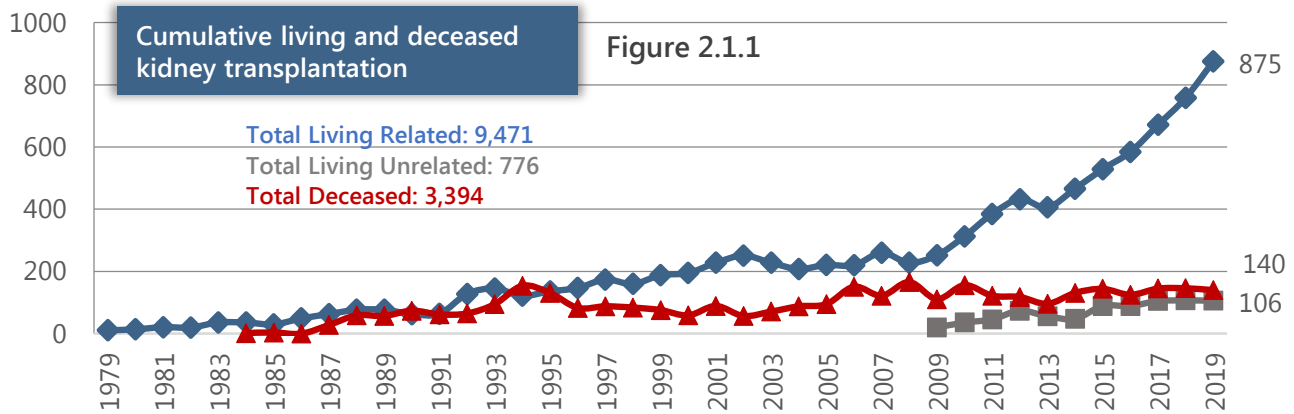
Table 2.1.1: Living and deceased kidney transplantation

N	Transplant Center	Living		Deceased	Total
		Related	Unrelated		
1	KFSH Riyadh	199	7	34	240
2	KFSH Jeddah	201	15	10	226
3	KFSH Dammam	146	14	44	204
4	PSMMC Riyadh	83	29	27	139
5	KAMC Riyadh	67	26	24	117
6	AFHSR Khamis Mushayt	49	9	0	58
7	AHMH Taif	47	1	0	48
8	KSMH Tabuk	16	3	1	20
9	KFAFH Jeddah	12	0	0	12
10	KFH Madinah	10	0	0	10
11	KFH Jeddah	1	0	0	1
12	KAMC Makkah	21	2	NA	23
13	KAMC Jeddah	7	0	NA	7
14	DSFH Jeddah	15	0	NA	15
15	DSHH Swaidi Riyadh	0	0	NA	0
16	SGH Jeddah	1	0	NA	1
17	National Hospital Riyadh	0	0	NA	0
	Total	**875**	**106**	**140**	**1,121**

Transplant centers performing living and deceased kidney transplantation in 2019

Cumulative living and deceased kidney transplantation

Figure 2.1.1

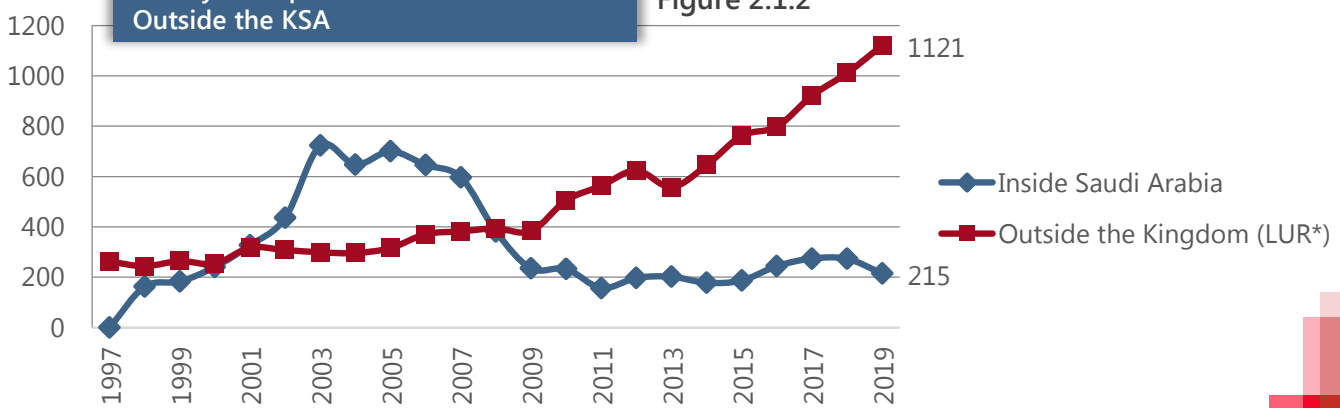


Details of living and deceased kidney transplantation in the Kingdom of Saudi Arabia during 1979-2019

Total number of kidneys transplantation(1979-2019)	**13,641**

Kidney Transplantation Inside and Outside the KSA

Figure 2.1.2



*LUR: Living Un-Related Kidney Transplant

2.1.1 Deceased Kidney Donation

126 deceased donors were consented for the purpose of organ donation and (100%) were consented for kidney donation . Of the consented kidney donors 88 donors were from KSA and 38 were from other GCC countries. A Total of 91 donors were consented for KSA including 3 donors offered from GCC countries. Utilized kidney donors of KSA were 72, non-recovered kidney donors were 14, and discarded kidney donors were 5. From 38 deceased kidney donors from GCC countries, 3 deceased kidney donors were offered to KSA, 1 donor was utilized and 2 donors non-recovered. (See details of utilized kidney donor characteristics inside the kingdom are listed in table 2.1.1.2 and the details of the deceased kidney donation are listed in tables 2.1.1.1 & figure 2.1.1.1 cumulative).

Table 2.1.1.1: Deceased kidney donation 2019

Kidneys from deceased donors	N	%
Transplanted in KSA	140	55.5%
Not recovered kidneys	28	11%
Discarded kidneys	14	5.5%
Kidneys for GCC*	70	28%
Total	252	100%

*Kidneys for GCC- other donor organs (e.g. liver, heart, lungs) were offered or shared to KSA except the kidneys.

Figure 2.1.1.1: Recovered Deceased Kidneys 1986-2019

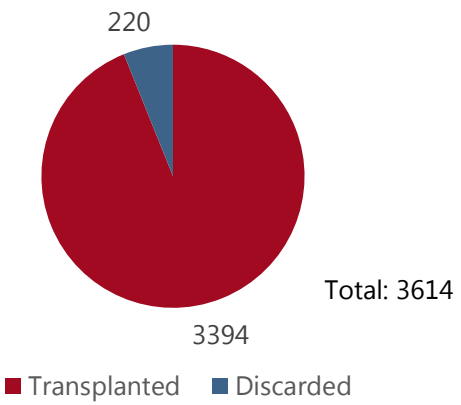


Table 2.1.1.2: Deceased kidney donor characteristics

Characteristics of utilized deceased kidney donors in KSA

Characteristic	N	%
Age		
0-10	**5**	7%
11-20	**1**	1%
21-30	**13**	18%
31-40	**20**	28%
41-50	**22**	31%
51-60	**9**	12%
61-70	**2**	3%
Blood Group		
A	**20**	28%
B	**16**	22%
AB	**7**	10%
O	**29**	40%
Gender		
Male	**63**	88%
Female	**9**	12%
Donor Type		
SCD	**59**	82%
ECD	**13**	18%
Cause of Death		
Anoxia	**13**	18%
CVA	**28**	39%
Head trauma	**31**	43%
CNS tumor	**0**	0
Cirumstance of Death		
MVA	**21**	29%
Non-MVA	**51**	71%

2.1.1.1 Kidney Donor Risk Index (KDRI)

KDRI for utilized kidney from deceased donors were ranging from 0.31 to 1.73 with mean KDRI 1.03; of which 35 (49%) of the cases has the KDRI <1, 31 (43%) are between 1-1.5 and 6 (8%) had KDRI of 1.5 above.

2.1.2 Deceased Kidney Transplantation

252 deceased kidneys were consented for the purpose of transplantation of the total consented kidneys, 176 kidneys were from KSA and 76 kidneys were from GCC countries. 140 kidneys were transplanted with 2 kidneys transplanted from UAE. 28 kidneys were non-recovered including 4 offered kidneys from Kuwait and 14 kidneys were discarded. Transplantation was performed by 9 out of the 11 currently active deceased kidney transplant centers all over the Kingdom. (See table 2.1.2.1). Illustration of the cumulative deceased kidney transplantation is shown in figure 2.1.2.1.

Table 2.1.2.1: Deceased kidney transplantation 2019

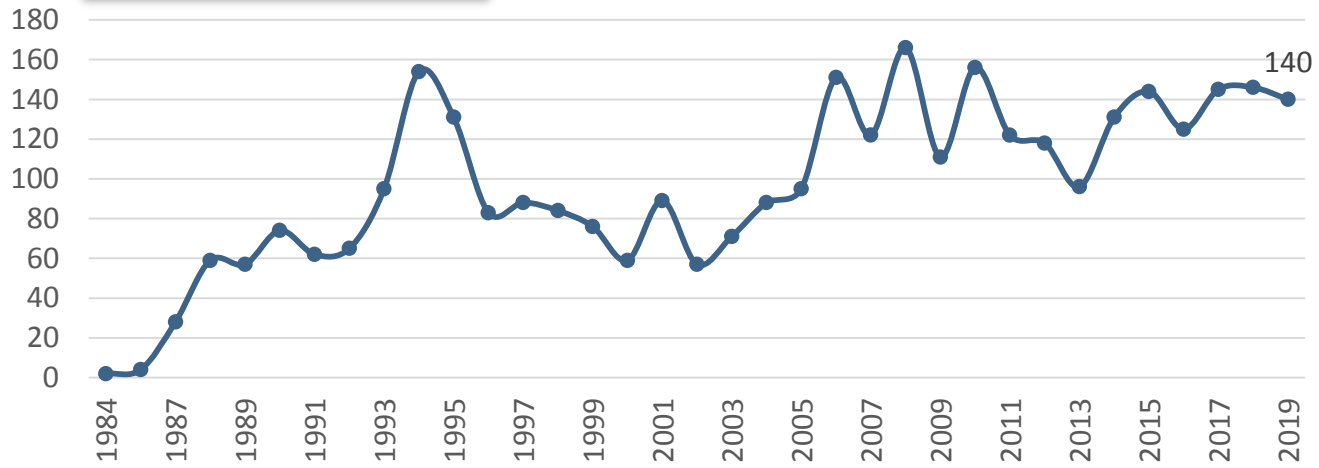
Transplant Center	Transplanted
King Faisal Specialist Hospital & Research Center-Riyadh	34*
Prince Sultan Military Medical City-Riyadh	27
King Fahd Specialist Hospital-Dammam	44*
King Faisal Specialist Hospital & Research Center-Jeddah	10
King Abdulaziz Medical City & National Guard Hospital-Riyadh	24*
Al Hada Military Hospital-Taif	0
King Fahd Armed Forces Hospital-Jeddah	0
King Salman Military Hospital-Tabuk	1
King Faisal Military Hospital-Khamis Mushayt	0
Total	**140**

Performance of deceased kidney transplantation in currently active national kidney transplant centers in 2019

***3 kidneys transplanted as en-bloc to 3 recipients**

Cumulative deceased kidney transplantation

Figure 2.1.2.1



Total deceased kidney transplantation **3,394**

2.1.2.1 Non-recovered deceased kidneys

252 deceased kidneys were consented for kidney donation; out of which, 28 kidneys were not recovered (See table 2.1.2.2 for non-recovered kidneys inside the kingdom). The major causes of non-recovered kidneys are shown in Figure 2.1.2.2.

Table 2.1.2.2: Reasons of non-recovered deceased kidneys in 2019

Reasons of Non-Recovery	N	%
Sudden cardiac arrest	**6**	22
Diseased Kidneys	**6**	22
• ESRD	*4*	
• CKD DM	*2*	
Infection	**4**	14
• Tuberculosis	*2*	
• Sepsis	*2*	
Technical	**6**	21
• Undiagnosed meningo-encephalitis	*2*	
• No Clear History of malignancy	*4*	
No available suitable recipient	**4**	14
• No HCV+ recipients	*4*	
Determined unsuitable kidney donor	**2**	7
• Prolonged CPR multiple HD	*2*	
Total	**28**	**100%**

2.1.2.2 Discarded deceased kidneys

252 deceased kidneys were consented for kidney donation; of which 14 (6%) kidneys were discarded in the Kingdom (see table 2.1.2.4 discarded kidneys inside Kingdom). Causes of discarded deceased kidneys from 1986-2019 are listed in table 2.1.2.3.

Table 2.1.2.3: Causes of discarded deceased kidneys

Cause	N	%
Congenital & vascular anomalies	38	17%
CKD	25	11%
Traumatic renal injury	26	12%
Necrosis	20	9%
Malignancy & neoplastic kidney	20	9%
No available suitable recipient	14	7%
Fibrosis/sclerosis	12	6%
Technical	9	4%
Vascular thrombosis	9	4%
TB	7	3%
Glomerulosclerosis	9	4%
Sepsis	6	3%
Poor Perfusion	13	6%
Sent abroad	3	1%
Multiple renal stones	2	1%
Multiple kidney cyst	2	1%
Pyelonephritis	3	1%
Black discoloration	1	0.5%
Short ureter	1	0.5%
Total	220	100%

Discarded kidneys among actual deceased donors during 1986-2019

2.1.2.3 Cold ischemia time (CIT)

The CIT for locally transplanted deceased kidneys were ranging from 1 hour to 30 hrs. 1 min., with a mean CIT of 9 hrs. and 7 minutes. Wherein, 103 (75%) of the deceased kidneys were transplanted with, CIT of < 12 hrs., 32, (23%) were transplanted with CIT ranging from ≥12-24 hrs., and 2 (2%) were with the CIT of >24-30 hrs.

Figure 2.1.2.2: Major Causes of non-recovered deceased kidneys 2019

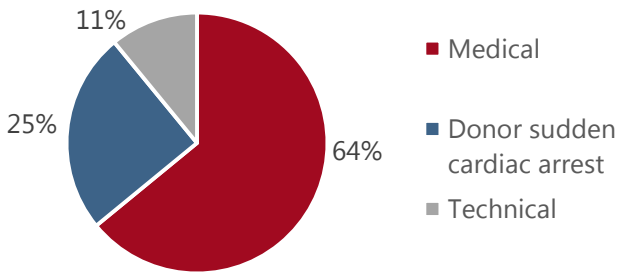


Table 2.1.2.4: Reasons of discarded deceased kidneys

Reason of Discard	N	%
Poor kidney perfusion (Lifeport, back table)	4	29%
Glumerulosclerosis	2	15%
Multiple abscess and lesion on biopsy	2	14%
Multiple kidney cyst	2	14%
Renal mass suspected malignancy	2	14%
Short ureter	1	7%
Transected renal artery	1	7%
Total	14	100%

2.1.2.4 Adult and pediatric deceased kidney transplantation

140 deceased kidneys were transplanted to 137 recipients via 3 enbloc transplantation inside the kingdom, with 115 (84%) kidneys transplanted to adults and 22 (16%) kidneys were transplanted to pediatric recipient (see table 2.1.2.5).

Table 2.1.2.5: Adult and pediatric deceased kidney transplantation

Transplant Center	Adult	Pediatric	Total
King Faisal Specialist Hospital & Research Center-Riyadh	23	10*	33*
Prince Sultan Military Medical City-Riyadh	22	5	27
King Fahd Specialist Hospital-Dammam	38*	5	43*
King Abdul-Aziz Medical City & National Guard-Riyadh	22*	1	23*
King Faisal Specialist Hospital & Research Center-Jeddah	9	1	10
King Salman Military Hospital-Tabuk	1	0	1
King Fahd Armed Forces Hospital-Jeddah	0	0	0
Al Hada Military Hospital-Taif	0	0	0
King Faisal Military Hospital-Khamis Mushayt	0	0	0
King Fahad Hospital-Madinah	0	0	0
King Fahd Hospital-Jeddah	0	0	0
Total	115	22	137*

***140 kidney were transplanted to 137 recipients with 6 kidneys transplanted via enbloc.**

2.1.2.5 SCD & ECD kidney transplantation

140 deceased kidneys were transplanted to 137 recipients (3 enbloc transplantation) with 116 (83%) kidneys were transplanted from standard criteria donors (SCD) and the remaining 24 (17%) kidneys transplanted from expanded criteria donors (ECD). The criteria for ECD kidneys transplanted are listed in table 2.1.2.6.

Table 2.1.2.6: Transplanted deceased ECD kidneys in 2019

Characteristics	Utilized Kidneys
Age ≥ 60 years	4
Age 50-59 years and having 2 of the following:	14
• CVA	
• Hypertension	
• SCr. ≥ 133 µmol/L (1.5 mg/dl)	
CVA, Hypertension and SCr. result doubled during admission and before retrieval	6*
TOTAL	24

***2 kidneys transplanted as enbloc**

2.1.2.6 Deceased donor–recipient matching

Matching sex was done in 58% of cases and matching blood group for kidney transplantation between deceased donors and recipients were done in 82% of the cases. Age distribution between deceased kidney donor and recipient is shown in table 2.1.2.7.

Table 2.1.2.7: Age distribution between deceased kidney donor and recipients 2019

Donor Age (yrs.)	Recipient Age (yrs.)						Recipient/ Kidneys
	<5	5-15	16-29	30-50	51-65	>65	
<5	0	1	1	0	0	0	2/4*
5-15	0	2	3	0	1	0	6/6
16-29	0	5	12	5	2	0	24/24
30-50	0	15	17	31	19	3	85/86*
51-65	0	0	1	4	12	3	20/20
>65	0	0	0	0	0	0	0/0
Total	**0**	**23**	**34**	**40**	**34**	**6**	**137/140**

2.1.3 Living Kidney Transplantation

A total of 981 living kidney transplants had been performed; with 875 (89%) kidney transplantation from living related donors and 106 (11%) kidney transplantation from living unrelated donor. The total living kidney transplantation this year was performed in 16 currently active kidney transplant centers (see table 2.1.3.1).

Table 2.1.3.1: Living kidney transplantation 2019

Transplant Center	Living		T
	Related	Unrelated	
King Faisal Specialist Hospital, Jeddah	201	15	216
King Faisal Specialist Hospital, Riyadh	199	7	206
King Fahad Specialist Hospital Dammam	146	14	160
Prince Sultan Military Medical City, Riyadh	83	29	112
King Abdulaziz National Guard, Riyadh	67	26	93
King Fahad Military Hospital, Khamis Mushayt	49	9	58
Al Hada Armed Forces Hospital, Taif	47	1	48
King Abdullah Medical City, Makkah	21	2	23
King Salman Military Hospital, Tabuk	16	3	19
Dr. Suleiman Al Fakeeh, Jeddah	15	0	15
King Fahad Armed Forces Hospital Jeddah	12	0	12
King Fahad Hospital, Madinah	10	0	10
King Abdulaziz National Guard, Jeddah	7	0	7
King Fahad Hospital, Jeddah	1	0	1
Saudi German Hospital, Jeddah	1	0	1
National Hospital, Riyadh	0	0	0
Dr. Suleiman Al Habib Suwedi Riyadh	0	0	0
Total	**875**	**106**	**981**

Performance of living kidney transplantation in currently active national kidney transplant centers in 2019

2.1.4 Kidney donation and transplantation Outcome 2019

A total of 1121 kidneys from living and deceased were transplanted this year, an 11% increase from last year's 1,011. The top performing kidney transplant centers were KFSH Riyadh: 240 kidneys (206 Living and 34 deceased kidneys) and KFSH Jeddah: 226 kidneys (216 Living and 10 deceased kidneys)

2.1.4.1 Living kidney transplantation

981 kidney transplants were performed from living donation, highest recorded living transplant done since 2010.

Figure 2.1.4.1.1: Living Related and Unrelated Kidney Transplantation 2019

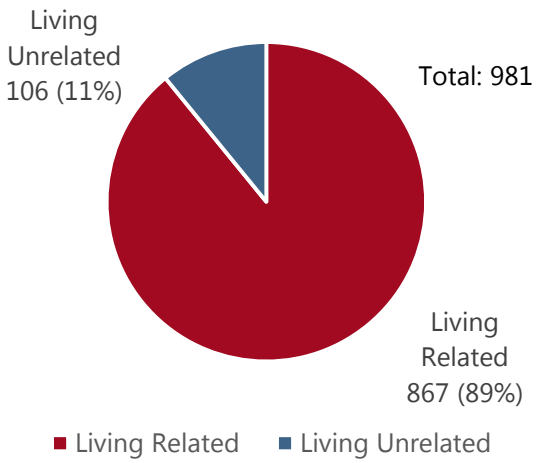
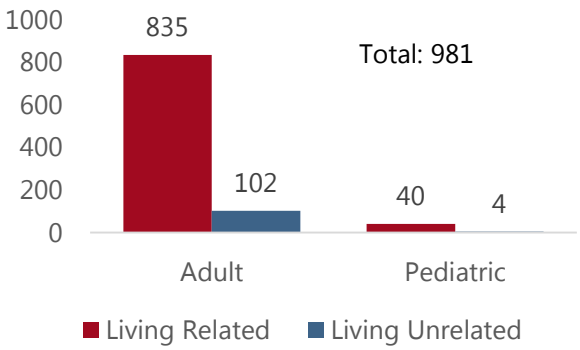


Figure 2.1.4.1.2: Adult and Pediatric Living Kidney Transplantation 2019



There were a total of 6 graft loss and 2 mortalities among living related kidney transplantation and none among living unrelated kidney transplants.

Paired kidney exchange (PKE) were performed in 62 kidney transplants and as well as 165 laparoscopic kidney transplantation. The following shows laparoscopic kidney transplantation per center

Table: 2.1.4.1.1: Laparoscopic kidney transplantation by transplant center 2019

Transplant Center	Laparoscopic Transplantation	Total Kidney Transplantation
PSMMC Riyadh	112	112
AFHSR Khamis Mushayt	47	58
AHAFH Taif	6	48
Total	165	218

The total graft loss rate among living kidney transplantation is 6/981 (0.61%) and mortality rate at 2/981 (0.2%). The mean serum creatine was 93.54 µmol at discharged post-transplant.

2.1.4.1.1 Living Kidney Transplantation demographics

Age distribution among living kidney transplant recipients were majorly belonging from age groups between 15 to 64 years which consists of 88.5% of the total population (please see figure 2.1.4.1.1). In addition, donor and recipient sex distribution consisted of 62% male and 38% female donors and recipients (see figure 2.1.4.1.2 & 2.1.4.1.3). Donor blood group as well consist majorly from O (60%), A (26%), B (12%) and AB (2%) and recipient wise consisted of O (51%), A (30%), B (15%) and AB (4%), kindly see figure 2.1.4.1.4. & 2.1.4.1.5

Figure 2.1.4.1.1: Age distribution among living kidney transplant recipients 2019

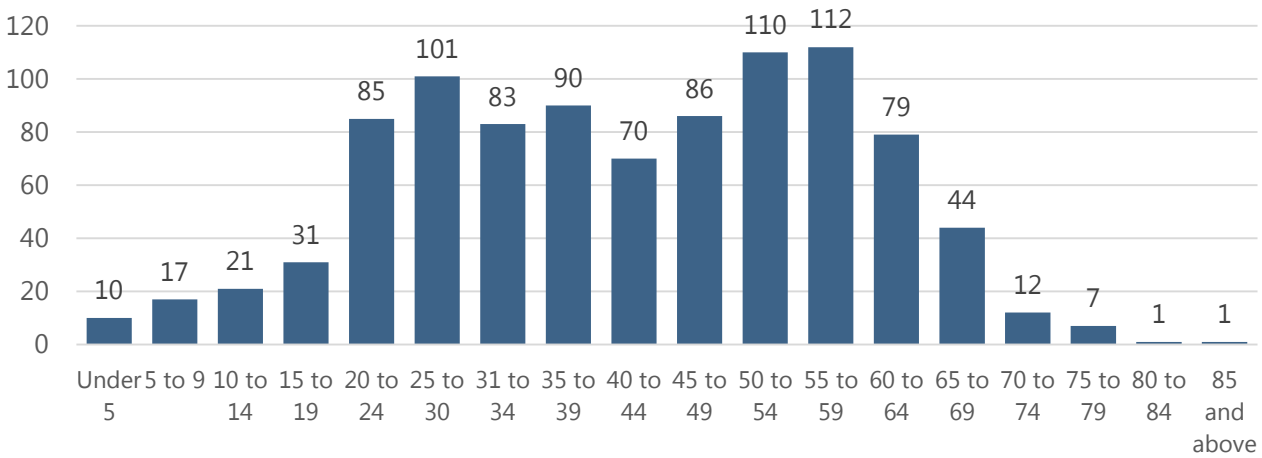


Figure 2.1.4.1.2: Living kidney donor sex distribution

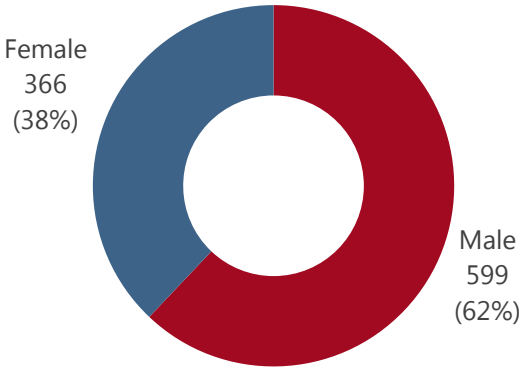


Figure 2.1.4.1.3: Living kidney recipient sex distribution

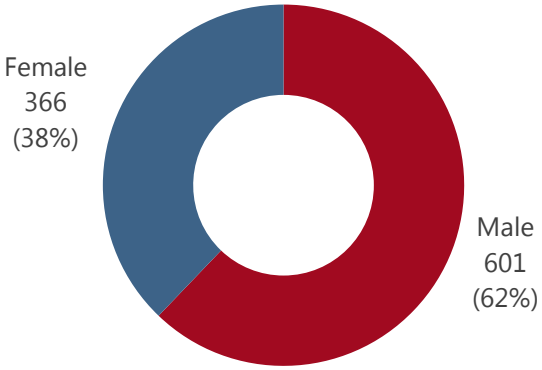


Figure 2.1.4.1.4: Living kidney donor blood group

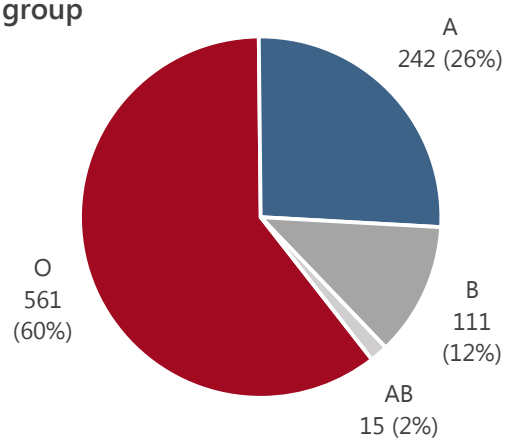
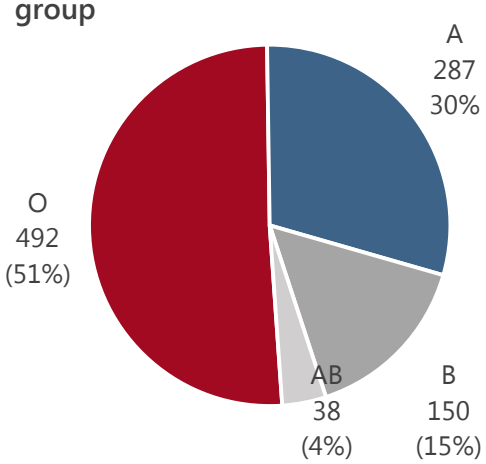


Figure 2.1.4.1.5: Living kidney recipient blood group



Donor-recipient blood group matching also shows that identical blood group were performed in 78% of transplant operations, 16% on compatible blood group and 6% in incompatible blood group donor and recipients (please see figure 2.1.4.1.6, 2.1.4.1.7 & 2.1.4.1.8). And lastly, the relationship of donors towards their recipients shows that majority were from between siblings with 34%, children 18.5%, parents 14%, 2nd degree relatives at 8%, spouse at 4% and a grandparent at 0.1%; unrelated kidney transplantation were performed in 20.5%. Please see table x.

Figure 2.1.4.1.6: Identical donor-recipient blood group

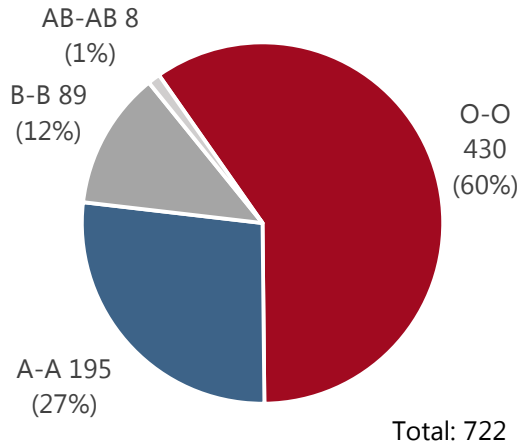


Figure 2.1.4.1.7: Compatible donor-recipient blood group

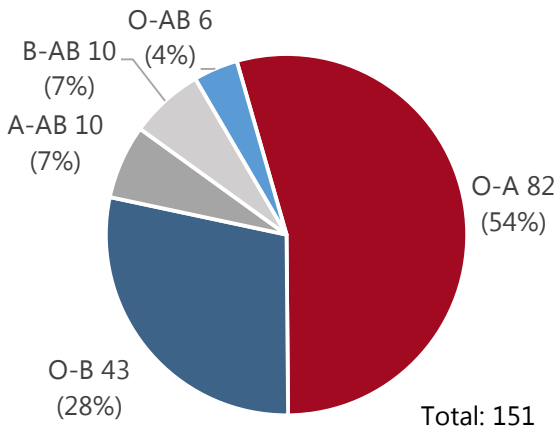


Figure 2.1.4.1.8: Incompatible donor-recipient blood group

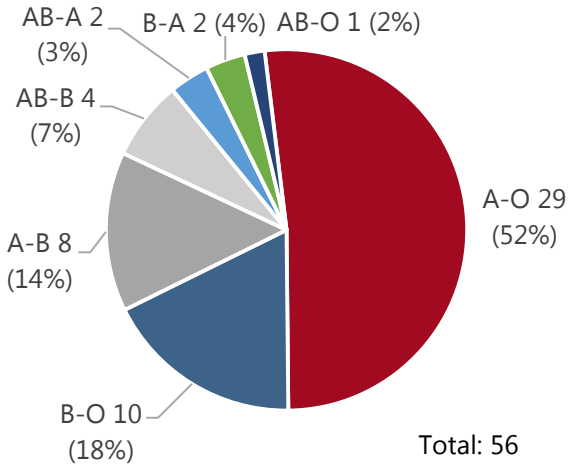


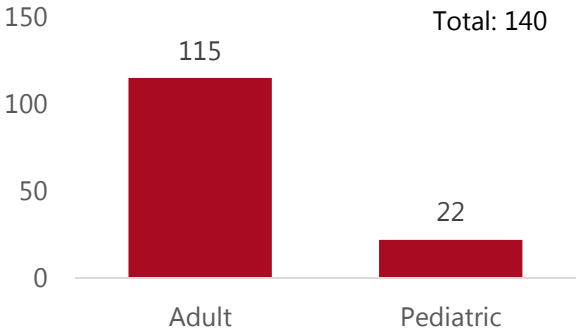
Table 2.1.4.1.8: Relationship of donor with recipient among living kidney transplantation 2019

Relationship	Number	%
Siblings	329	34.3
Children	177	18.5
Parents	136	14.2
2nd Degree Relatives	79	8.2
Spouse	40	4.2
Grandparents	1	0.1
Unrelated	196	20.5
Total	958	100.0

2.4.1.2 Deceased kidney transplantation

140 kidneys were recovered and transplanted to 137 recipients including the 3 en-bloc kidney transplants performed.

Figure 2.1.4.2.1: Adult and Pediatric Deceased Kidney Transplantation 2019



The total graft loss among deceased kidneys transplanted were 3/137 (1.5%) and having a mortality rate of 2/137 (1.5%). The mean serum creatine was 117 µmol at discharged post-transplant.

Organ Transplantation in the Kingdom of Saudi Arabia

2.2 Liver Transplantation

In the year 2019, 319 livers has been transplanted inside the kingdom of Saudi Arabia; with 241 livers transplanted from living and 78 transplanted from deceased donors including 4 split liver transplantation. Details of the living and deceased liver transplantation 2019 are shown in table 3.2.8). It is worth mentioning that a total of 2,822 livers were transplanted inside the kingdom from 1990 to 2019; of these transplant activities, 1,145 (41%) were transplanted from deceased donors, 1,529 (54%) were from living related donors and 148(5%) were from living unrelated donors. Illustration of cumulative living and deceased liver transplantation is shown in (figure 2.2.1).

2.2.1 Deceased Liver Donation

126 deceased donors were consented for the purpose of organ donation of which, (100%) were consented for liver donation. Of the consented liver donors 88 donors were from KSA and 38 were from GCC countries. Total consented liver donors for KSA were 113 including 23 donors from GCC countries. Utilized livers donors of KSA were 74 including 12 from GCC, Non-recovered donors were 27, 7 from GCC and discarded livers were 12, 4 from GCC. The details of utilized liver donor characteristics are listed in table 2.2.1.1. Details of the cumulative deceased liver donation are listed in table 2.2.1.2.

Table 2.2.1.1. Deceased liver donor characteristics

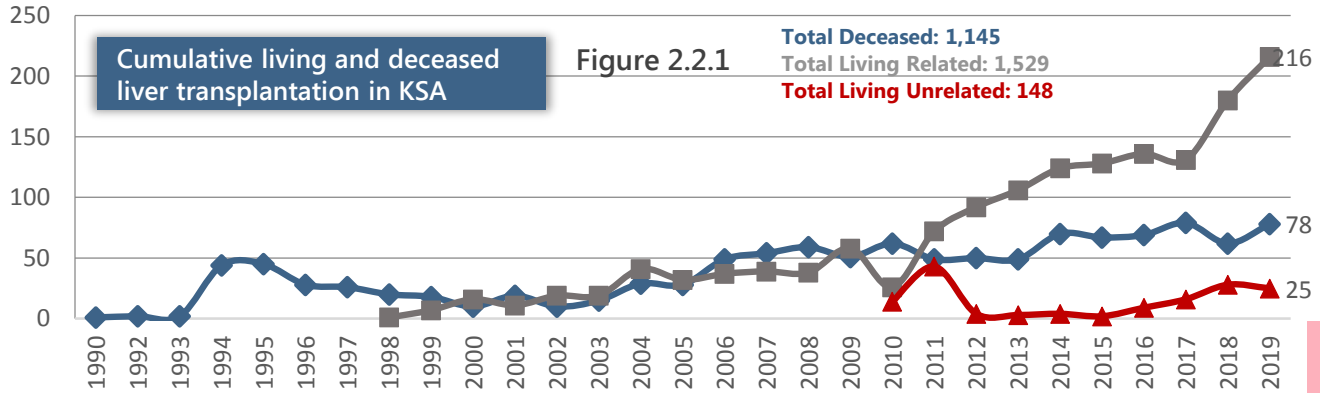
Characteristic	N	%
Age		
0-10	**4**	6%
11-20	**1**	1%
21-30	**9**	12%
31-40	**21**	28%
41-50	**28**	38%
51-60	**10**	14%
61-70	**1**	1%
Blood Group		
A	**20**	27%
B	**17**	23%
AB	**4**	5%
O	**33**	45%
Gender		
Male	**66**	89%
Female	**8**	11%
Cause of Death		
Anoxia	**12**	16%
CVA	**32**	43%
Head trauma	**30**	41%
CNS tumor	**0**	0
Others	**0**	0
Cirumstance of Death		
MVA	**19**	26%
Non-MVA	**55**	74%

Characteristics of utilized deceased liver donors in 2019

Table 2.2.1.2 Deceased liver donation 2019

Livers from deceased donors	N	%
Transplanted in KSA	**78***	**59%**
Not recovered kidneys	**27**	**21%**
Discarded kidneys	**12**	**10%**
Transplanted by other transplant centers in GCC countries	**13**	**10%**
Total	**126**	**100%**

Including 4 Split liver Transplantation



Total living and deceased liver transplantation 1990-2019 **2,822**

2.2.2 Deceased Liver Transplantation 2019

126 deceased livers were consented for transplantation; a total of 113 livers donors were consented for KSA. 88 from KSA and 23 were offered from GCC countries. 74 including 12 livers from GCC countries were transplanted to 78 recipients with 4 split liver transplantation. The deceased liver transplantations this year were performed in 4 currently active liver transplant centers in the kingdom (see table 2.2.2.2).

It is worth mentioning that out of the 74 utilized deceased livers, 4 livers was transplanted as split to 8 recipients by King Faisal Specialist Hospital & Research Center-Riyadh (3) and King Fahad Specialist Hospital Dammam (1).

2.2.2.1 Non-recovered deceased livers

126 deceased livers were consented for transplantation; a total of 113 livers donors were consented for KSA. 88 from KSA and 23 from GCC countries. 27 were non-recovered including 7 donors from GCC, (see table 2.2.2.4). The major causes of non-recovered deceased livers are mainly due to determined unsuitable liver donor, donor sudden Cardiac arrest and Infection. Major causes of non-recovered deceased livers in 2019 are listed in Figure 2.2.2.1. Illustration of the cumulative major cause non-recovered deceased liver transplantation from 1994 is shown in Figure 2.2.2.2.

2.1.2.2 Discarded deceased livers

126 deceased livers were consented for transplantation; a total of 113 livers were offered to KSA, of which 12 livers were discarded including 4 livers from GCC countries. (see table 2.2.2.1). Causes of discarded deceased livers from 1994-2019 are listed in (table 2.2.2.7).

Table 2.2.2.1: Reasons of discarded deceased livers

Reason of Discard	N	%
Macro/Microstasis, Steatosis (fatty Changes)	3	25%
Fibrosis	2	17%
Artery blockage and vessel Injury	2	17%
Cholestasis and ductopenia	2	17%
Unresolved arterial anatomy and poor perfusion	1	8%
Recipient died during transplantation	1	8%
Necrosis	1	8%
Total	12	100%

Discarded livers among actual deceased liver donors in 2019

Table 2.2.2.2: Deceased liver transplantation

Hospital Name	Deceased Utilized Donors
King Fahad Specialist Hospital Dammam	29*
King Faisal Specialist Hospital, Riyadh	26*
King Abdulaziz National Guard, Riyadh	20
Prince Sultan Military Medical City, Riyadh	3

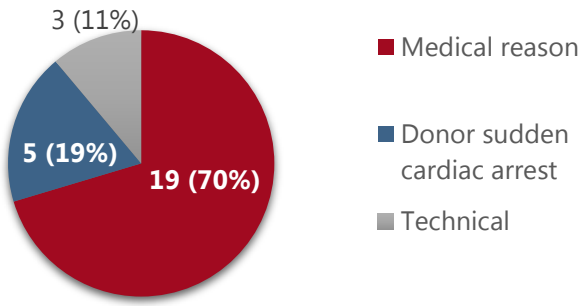
Performance of deceased liver transplantation in currently active national liver transplant centers in 2019
*4 Livers was transplanted via split liver transplantation by KFSH Riyadh (3) and KFSH Dammam (1).

Table 2.2.2.4. Reasons of non-recovered deceased livers

Reasons of Non-Recovery		N	%
Determined unsuitable liver donor		**8**	**30%**
·High liver enzymes	4		
·Persistent hypernatremia	2		
·Young age; Small size	1		
·Old age; Hbcore +ve	1		
Donor sudden cardiac arrest		**5**	**19%**
Macroscopic & Microscopic findings		**4**	**15%**
·Fatty/Steatosis	2		
·Cirrhosis/Fibrosis	1		
·Necrotic lacerated Liver	1		
Technical		**4**	**15%**
·Undiagnosed Meningo encephalitis	1		
·History of breast CA; no clear histopath	1		
·Police case	1		
·Unclear diagnosis; suspicious malignancy	1		
Infection		**3**	**11%**
·HCV +ve	1		
·Fungimia	1		
·Tuberculosis	1		
Hemodynamic instability		**2**	**7%**
No Available Suitable Liver Recipient		**1**	**4%**
·No Hbcore +ve recipient	1		
Total		**27**	**100%**

Reasons of non-recovery of livers among eligible donors consented for liver donation in 2019

Figure 2.2.2.1: Major causes of non-recovered deceased livers



2.2.2.3 Adult and pediatric deceased liver transplantation

A total of 78 (including 4 split liver transplants) deceased livers were transplanted inside the Kingdom with 73 (94%) livers transplanted to adult and 5 (6%) livers transplanted to pediatric recipients (see table 2.2.2.4).

Table 2.2.2.4: Adult and pediatric deceased liver transplantation

Liver Transplant Center	Adult	Pediatric	Total
King Fahd Specialist Hospital-Dammam	28	1	29
King Faisal Specialist Hospital & Research Center-Riyadh	22	4	26
King Abdul-Aziz Medical City and National Guard-Riyadh	20	0	20
Prince Sultan Military Medical City	3	0	3
Total	73	5	78*

Pediatric and adult deceased liver transplanted in currently active national liver transplant centers in 2019
*3 Livers Transplanted as split

2.2.2.4 Deceased donor-recipient matching

Matching sex was done in 47 (64%) of the cases and matching blood group for liver transplantation between deceased donors and recipients was done in 72 (97%) of the cases. Age distribution between deceased kidney donor and recipient is shown in table 2.2.2.5.

Table 2.2.2.5: Age distribution between deceased liver donor and recipients; *performed as split liver transplantation

Donor Age (yrs.)	Recipient Age (yrs.)						Recipient/ Kidneys
	<5	5-15	16-29	30-50	51-65	>65	
<5	1	0	0	0	0	0	1
5-15	1	1	1	1	0	0	4
16-29	0	1	0	4	3	2	10
30-50	1	0	5	18	24	4	52
51-65	0	0	0	3	6	2	11
>65	0	0	0	0	0	0	0
Total	**3**	**2**	**6**	**26**	**33**	**8**	**78**

2.2.2.5 Cold ischemia time (CIT)

The Cold Ischemic time of recovered livers from 74 donors and transplanted to 78 recipients (4 split livers) ranges from 00 hour 43 minutes to 11 hours 32 minutes. With a mean CIT of 6 hours. Breakdown of CIT of liver transplantation are as follows: <6 hours: 39 recipients (50%), ≥6 – 8 hours: 18 recipients (23%), and ≥8 - 12 hours: 21 recipients (27%).

2.2.3 Living Liver Transplantation

A total of 241 living liver transplants were performed this year; of which, 215 (89%) livers were transplanted from living related donors and 26 (11%) from living unrelated liver donors. The total living liver transplantations this year were performed in 6 currently active national liver transplant centers (see table 2.2.3.1).

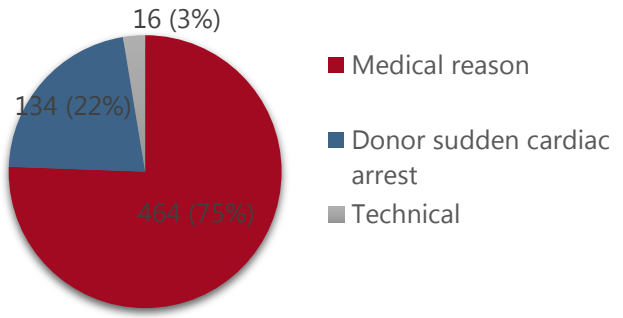
Table 2.2.3.1: Living liver transplantation

Transplant Center	Living Related	Living Unrelated	Total
King Faisal Specialist Hospital, Riyadh	136	24	160
Prince Sultan Military Medical City, Riyadh	26	1	27
King Abdulaziz National Guard, Riyadh	27	0	27
King Fahad Specialist Hospital Dammam	23	1	24
Saudi German Hospital, Jeddah	3	0	3
National Hospital, Riyadh	0	0	0
Total	**215**	**26**	**241**

Table 2.2.2.6: Major causes of non-recovered deceased livers 2019

Not recovered deceased livers	N	%
Medical reason	19	70%
Donor sudden cardiac arrest	5	19%
Technical	3	11%
Total	**27**	**100%**

Figure 2.2.2.2 Major causes of non-recovered deceased livers 1994-2019



Major causes of non-recovered deceased livers among eligible donors consented for liver donation

Table 2.2.2.7:. Causes of discarded deceased livers 1994-2019

Major Causes	N	%
Macro/Microstasis, Steatosis (fatty Changes)	130	50%
Granulomatous Changes/Fibrosis/Atherosclerosis	51	20%
Ischemia/Long CIT	23	9%
Sepsis	12	5%
Neoplastic	9	4%
Infectious Disease (TB, Bilharziasis, Others)	6	2%
Hepatitis (B,C) Changes	6	2%
Cardiac Arrest (Donor/Recipient)	5	2%
Traumatic Liver Injury	7	3%
Cholestasis and ductopenia	3	1%
Congenital/Vascular Abnormalities	3	1%
Necrosis	2	1%
Poor liver perfusion	1	0%
Total	**258**	**100%**

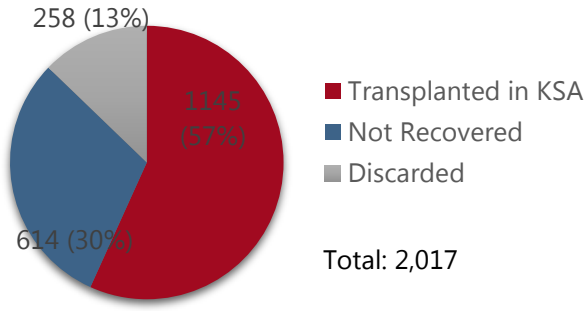
Discarded livers among actual deceased donors consented for liver donation 1994-2019

Table 2.2.3.2: Living and deceased liver transplantation

Transplant Center	Living		Deceased	T
	Related	Unrelated		
King Faisal Specialist Hospital, Riyadh	136	24	26	186
Prince Sultan Military Medical City, Riyadh	26	1	3	30
King Abdulaziz National Guard, Riyadh	27	0	20	47
King Fahad Specialist Hospital Dammam	23	1	29	53
Saudi German Hospital, Jeddah	3	0	NA	3
National Hospital, Riyadh	0	0	NA	0
Total	215	26	78	319

Transplant centers performing living and deceased liver transplantation in 2019

Table 2.2.2.8: Livers from deceased donors 1994-2019



2.2.4 Liver donation and transplantation Summary 2019

A total of 319 liver from living and deceased were transplanted this year, an 18% increase from last year's 270. Top performing liver transplant centers: KFSH Riyadh: 186 livers (160 Living and 26 deceased livers) and KFSH Dammam: 53 kidneys (24 Living and 29 deceased kidneys)

2.2.4.1 Living liver transplantation

241 liver transplants were performed from living donation, the highest recorded living transplant done the start of the program. Among the living liver donor transplants 215 (89%) were from living related (LR) and 26 (11%) were from living unrelated donors (LUR).

Adult and pediatric liver transplants were as follows: there were 162 adults & 53 pediatric liver transplants performed for living related donors and 12 adults & 14 pediatric liver transplants performed for living unrelated donors (figure 2.2.4.2).

A total of 18 (7.5%) recipients had primary non-functioning graft and 17 (7%) mortalities among living liver transplantation

Figure 2.2.4.1: Living Related and Unrelated Liver Transplantation 2019

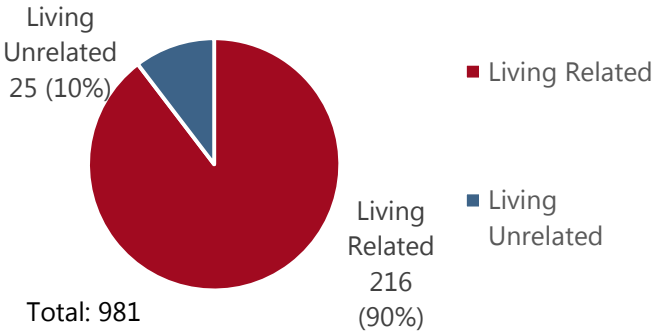
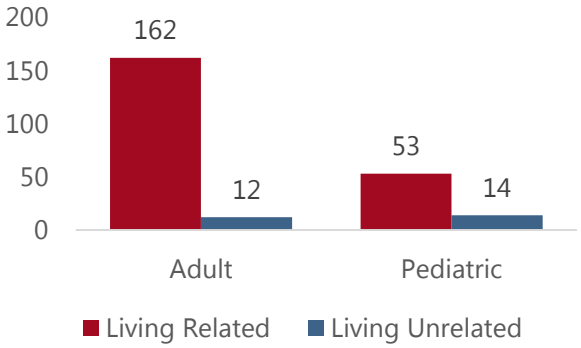


Figure 2.2.4.2: Adult and Pediatric Living Liver Transplantation 2019

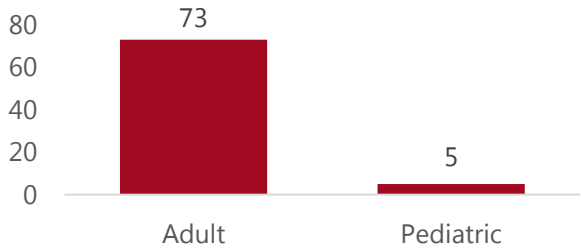


2.2.4.2 Deceased kidney transplantation

74 livers were recovered and transplanted to 78 recipients 4 were split liver transplants). Of these recipients, there were 73 adult and 5 pediatric recipients (≤14 years) figure 2.2.4.3.

A total of 8 (10%) recipients had primary non-functioning graft and 6 (8%) mortalities among deceased liver transplantation.

2.2.4.3Adult and Pediatric Deceased Kidney Transplantation 2019



Organ Transplantation in the Kingdom of Saudi Arabia

2.3 Heart Transplantation

In the year 2019, 46 whole hearts was transplanted, and 30 hearts were recovered as source of valves inside the kingdom of Saudi Arabia. It is worth mentioning that a total of 449 hearts had been transplanted from 1986-2019 in addition, 707 hearts were recovered as sources of valves since 1993. Illustration of the cumulative deceased heart transplantation and recovered hearts as source of valves in Saudi Arabia is shown in figure 2.3.1.

2.3.1 Deceased Heart Donation 2019

126 deceased donors were consented for the purpose of organ donation with (100%) donors consented for heart donation (see table 2.3.1.3); of the, consented heart donors, 88 were from KSA and 38 were from other GCC countries. Total transplanted whole hearts by the KSA were 46 including 9 shared heart from GCC countries. 30 hearts were recovered as source for valves including 10 from GCC and 44 hearts were non-recovered including 13 hearts offered from GCC. The characteristics of the transplanted utilized deceased heart donor by the KSA are listed in table 2.3.1.1. Illustration of the cumulative deceased heart donation from 1986 is shown in table 2.3.1.2.

Table 2.3.1.1: Deceased heart donor characteristics

Characteristic	N	%
Age		
0-10	3	7%
11-20	1	2%
21-30	8	17%
31-40	17	37%
41-50	14	30%
51-60	3	7%
Blood Group		
A	21	28%
B	19	25%
AB	6	8%
O	29	39%
Gender		
Male	61	81%
Female	14	19%
Cause of Death		
Anoxia	8	17%
Cerebrovascular/Stroke	11	24%
Head trauma	27	59%
CNS Tumor	0	0
Cirumstance of Death		
MVA	17	37%
Non-MVA	29	63%

Characteristics of utilized deceased heart donors in 2019

Table 2.3.1.2: Deceased heart donation 1986-2019

Hearts from deceased donors	N	%
Consented	1,932	89%
• Recovered as source of valves	707	
• Not recovered	776	
• transplanted	449	
• Discarded	0	
Not consented	233	11%
Total	**2,165**	**100%**

Table 2.3.1.3: Deceased heart donation 2019

Hearts from deceased donors	N	%
Consented	126	100%
• Not recovered	44	
• Transplanted whole heart	46	
• Recovered as source of valves	30	
• Heart for GCC*	6	
Total	**126**	**100 %**

*Heart for GCC- other donor organs (e.g. liver, lungs) were offered or shared to KSA except the heart.

2.3.2 Deceased Heart Transplantation

126 deceased hearts were consented for the purpose of heart transplantation; wherein, 120 hearts were consented for KSA including 32 hearts from GCC countries; of which, 46 hearts were transplanted, 30 were recovered as source of valves and 44 (35%) were non-recovered. (See table 2.3.2.2) For transplanted hearts (See table 2.3.2.1) Heart as source for valves.

Table 2.3.2.1: Heart for valve recovery and utilization

	Aortic valve	Pulmonary valve
Total Collected	30	30
Used	7	18
To be used	8	7
Discarded	15	5

Recovered heart as source of valves from eligible deceased hearts in 2019

Table 2.3.2.2: Deceased hearts transplantation 2019

Transplant Center	Transplanted Deceased Hearts
King Faisal Specialist Hospital & Research Center-Riyadh	38
Prince Sultan Cardiac Center-Riyadh	8
Total	46

Performance of deceased heart transplantation in currently active national heart transplant centers in 2019

2.3.2.1 Non-recovered deceased hearts

126 deceased hearts were consented for heart donation; out of which 44 (35%) were not recovered (see table 2.3.2.3). The major causes of non-recovered deceased hearts are mainly due to determined unsuitable heart donor, poor heart function and no available suitable recipients.

Table 2.3.2.3: Reasons of non-recovered deceased hearts

Reasons of Non-Recovery	N	%
Determined Unsuitable Heart Donor	**12**	27%
·Diseased Heart	*7*	
·Old Age; comorbidities	*5*	
Poor Heart Function	**11**	25%
·Low Ejection Fraction	*7*	
· Abnormal Echo Result	*3*	
· Poor Cardiac Cath result	*1*	
No Available Suitable Recipient	**7**	16%
·No ABO compatible recipient	*4*	
·Donor-recipient sizemismatch	*2*	
·Donor-recipient cross-match positive	*1*	
Donor Sudden Cardiac Arrest	**5**	12%
Infection	**5**	11%
·HCV +ve	*2*	
·Sepsis	*1*	
·Pericardial effusion; pus	*1*	
·Tuberculosis	*1*	
Technical	**4**	9%
·Undiagnosed Meningo encephalitis	*1*	
·History of breast CA; no clear histopath	*1*	
·Police case	*1*	
·Unclear diagnosis; suspicious malignancy	*1*	
Total	**44**	**100%**

Reasons of non-recovered deceased hearts among eligible donors consented for heart donation in 2019

2.3.2.2 Cold ischemia time (CIT)

CIT for the 46 deceased hearts transplanted was ranging from 1 hr. 32 minutes to 6 hrs. 00 minutes with a mean CIT of 3 hrs. 24 minutes. Of these 30 hearts were transplanted with CIT of ≤4 hours, 15 with CIT ≤5 hours, and 1 with CIT of >5 hours.

2.3.2.3 Adult and pediatric heart transplantation

46 hearts were transplanted inside the kingdom with 33 (72%) hearts utilized for adult recipients and 13 (28%) hearts for pediatric recipients (2.3.2.4).

Table 2.3.2.4 Adult and pediatric deceased heart transplantation

Liver Transplant Center	Adult	Pediatric	Total
King Faisal Specialist Hospital & Research Center Riyadh	26	12	38
Prince Sultan Military Medical City Riyadh	7	1	8
Total	**33**	**13**	**46**

Adult and pediatric deceased heart transplantation in currently active national heart transplant centers in 2019

2.3.2.4 Deceased donor-recipient matching

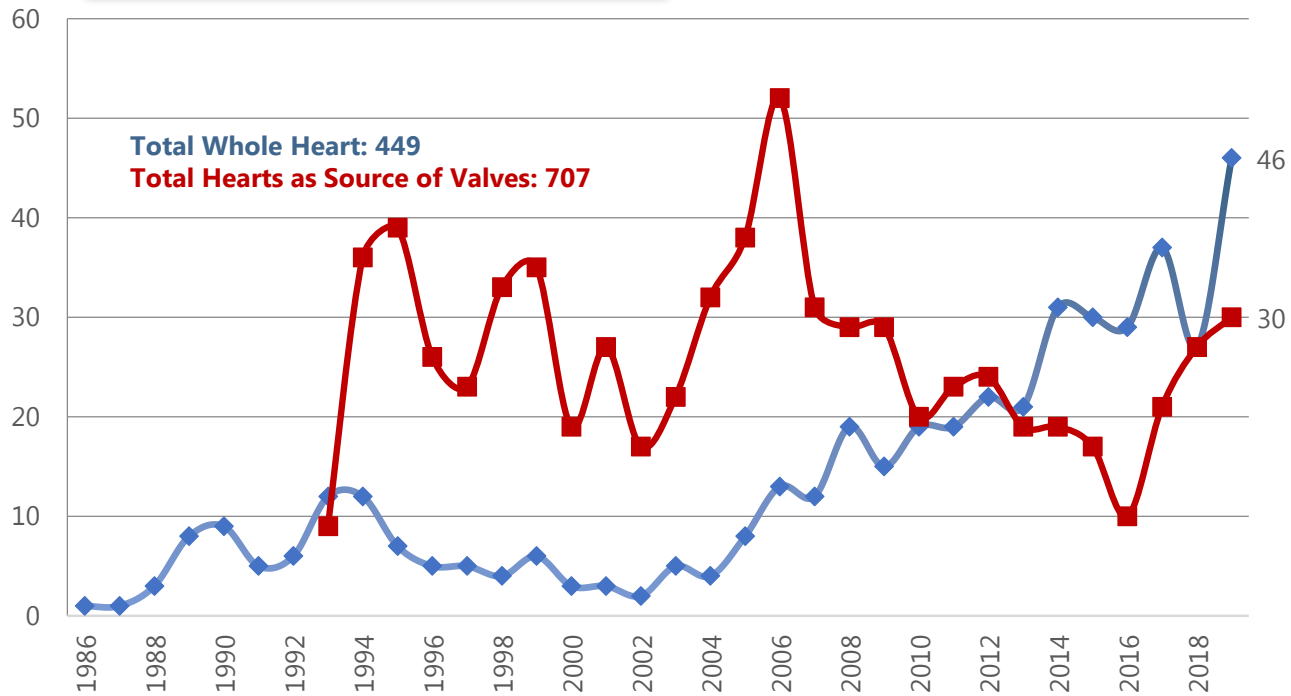
Matching sex was done in 32 (70%) of the cases and matching blood group for heart transplantation between deceased donors and recipients was done in 39 (85%) of the cases. Age distribution between deceased heart donors and recipients are shown in table 2.3.2.5.

Table 2.3.2.5: Age distribution between deceased heart donor and recipients 2019

Donor Age (yrs.)	Recipient Age (yrs.)						Total
	<5	5-15	16-29	30-50	51-65	>65	
<5	2	0	0	0	0	0	2
5-15	0	1	0	0	0	0	1
16-29	0	1	2	4	0	0	7
30-50	0	11	4	10	8	0	33
51-65	0	0	1	1	1	0	3
Total	**2**	**13**	**7**	**15**	**9**	**0**	**46**

Cumulative deceased heart transplantation and recovered hearts as source of valves in Saudi Arabia 1986-2019

Figure 3.3.1



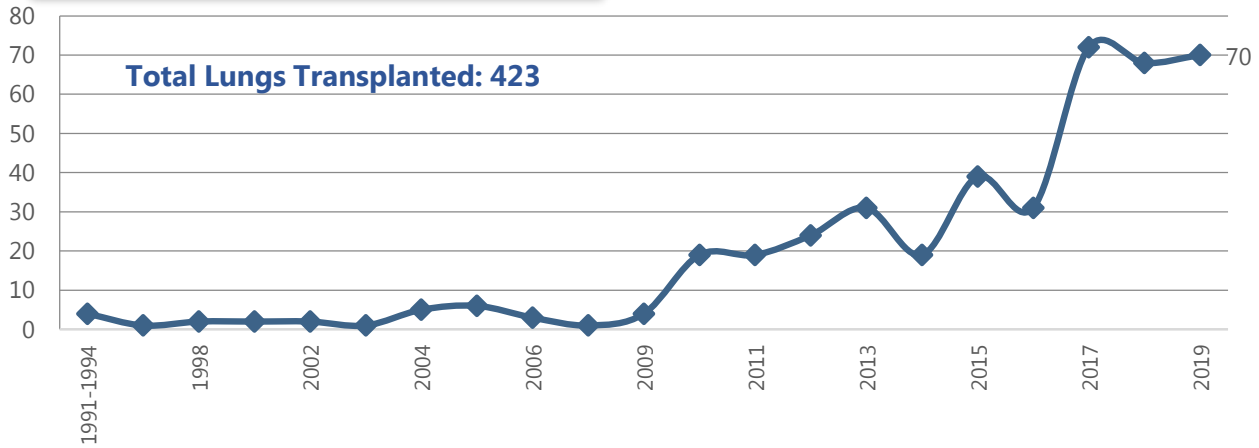
Organ Transplantation in the Kingdom of Saudi Arabia

2.4 Lung Transplantation

In the year 2019, 70 lungs was transplanted from deceased donation inside the Kingdom of Saudi Arabia. It is worth mentioning that a total of 423 lungs have been transplanted from 1991-2019. Illustration of the cumulative deceased lung transplantation is shown in figure 2.4.1

Cumulative deceased lung transplantation 1991-2019

Figure 2.4.1



2.4.1 Deceased Lung Donation 2019

126 deceased donors were consented for deceased organ donation and (100%) were consented for lung donation. Of the consented donors 88 donors were from KSA and 38 were from other GCC countries. of which, 122 cases were consented for KSA; 88 from and KSA and 34 donors were offered from GCC countries. Utilized lung donors were 37 including 11 donors from GCC. Non-recovered lung donors were 82 including 23 donors from GCC and discarded lung donors were 3 (see figure 2.4.1.1). The details of the utilized lung donor characteristics are listed in table 2.4.1.1

Figure 2.4.1.1 Lungs from deceased donation 2019

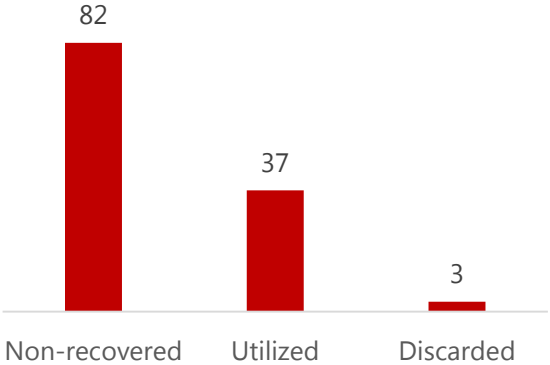


Table 2.4.1.1 Deceased Lung Donor Characteristics

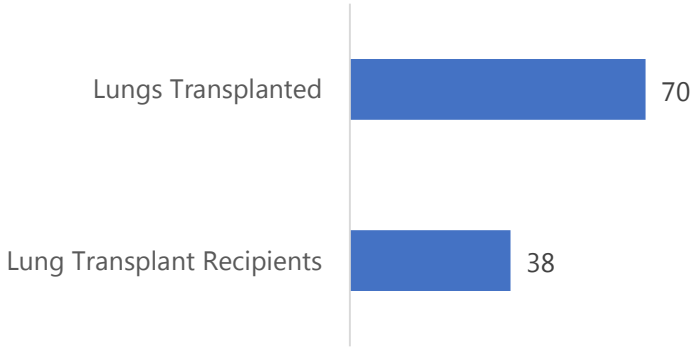
Characteristic	N	%
Age		
11-20	**1**	3%
21-30	**9**	24%
31-40	**11**	30%
41-50	**11**	30%
51-60	**5**	13%
Blood Group		
A	**11**	30%
B	**7**	19%
AB	**2**	5%
O	**17**	46%
Gender		
Male	**32**	86%
Female	**5**	14%
Cause of Death		
Anoxia	**5**	13%
Cerebrovascular/Stroke	**14**	38%
Head trauma	**18**	49%
CNS Tumor	**0**	0%
Other	**0**	0%
Circumstance of Death		
MVA	**14**	38%
Non-MVA	**23**	62%

Characteristics utilized deceased lung donors 2019

2.4.2 Deceased Lung Transplantation

252 deceased lungs were consented for the purpose of transplantation; there were a total of 80 lungs recovered; of which 70 (88%) lungs were transplanted; wherein, 64 lungs were transplanted as double lungs to 32 recipients and 6 single lung transplanted to 6 recipients. The deceased lung transplantations this year was performed by King Faisal Specialist Hospital & Research Center, Riyadh the currently active lung transplant center in the Kingdom (see Figure 2.4.2.1).

Figure 2.4.2.1 Deceased Lung Transplantation

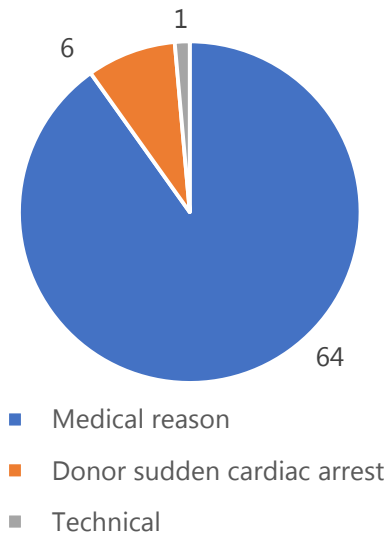


Performance of deceased lung transplantation in currently active national lung transplant center in the year 2019

2.4.2.1 Non-recovered deceased lungs

252 deceased lungs were consented for lung transplantation; out of which 164 lungs (65%) were non-recovered (see table 2.4.2.1.1). The major causes of non-recovered deceased lungs is shown in figure 2.4.2.1.1)

Table 2.4.2.1.1 Major causes of non-recovered lungs



The reasons of non-recovery of lungs among eligible donors consented for lung donation 2019

Table 2.4.2.1.1 Reasons of non-recovered deceased lungs

Reasons of Non-Recovery	N	%
Infection	**26**	32%
·Purulent Secretions	*12*	
·Pneumonia	*8*	
·HCV +ve	*2*	
·Bacterimia and ARDS	*1*	
·Colistin resistant; MDRO	*1*	
·Respiratory culture positive	*1*	
·Tuberculosis	*1*	
Diseased Lungs	**23**	28%
·Abnormal Chest X-ray	*12*	
·Lung consolidation	*3*	
·Pulmonary Congestion; edema	*2*	
·Atelectasis	*2*	
·Airway injury; smoke inhalation	*1*	
·Aspiration	*1*	
·Emphysema	*1*	
·Pulmonary Embolism	*1*	
Poor lung function	**10**	12%
·Poor oxygenentaion; Challenge test, ABG	*9*	
·Marginal lung donor	*1*	
No available suitable lung recipient	**7**	9%
·No ABO compatible recipient	*3*	
·Donor-recipient size mismatch	*2*	
·Cross-match positive	*2*	
Technical	**7**	9%
·Undiagnosed Meningo encephalitis	*1*	
·Recipient not fit for surgery on coagulation medication	*1*	
·Recipient's family disgree for transplant	*1*	
·ecipient measurement	*1*	
· Police case	*1*	
· History of breast CA; no clear histopath	*1*	
·Recipient outside Riyadh	*1*	
Donor sudden cardiac arrest	**4**	**5%**
Hemodynamic Instability	**3**	**3%**
Determined unsuitable lung donor	**1**	**1%**
·Old age with infection	*1*	
Traumatic Lung Injury	**1**	**1%**
·Lung contusion; LLL collapsed	*1*	
Total	**82**	**100%**

Reasons of non-recovered of lungs among eligible donors consented for lung donation in 2019

2.4.2.2 Discarded Lungs

252 deceased lungs were consented for lung donation; out of which, 10 (4%) were discarded (see table 2.4.2.2.1)

Table 2.4.2.2.1 Reasons of discarded deceased lungs

Reason of discard	N
Congested lungs in (Ex Vivo)	2
Emphysematous lungs	2
Bilateral lobe edema	2
Single lung transplant	4
Total	10

Discarded lungs among actual deceased lung donors in 2019

2.4.2.3 Adult and pediatric lung transplantation

70 deceased lungs were transplanted to 38 adult recipients inside the kingdom. (see table 2.4.2.3.1).

Table 2.4.2.3.1 Adult and Pediatric Lung Transplantation

Reasons of Non-Recovery Diseased Lungs	Adult		Pediatric	
	Single	Double	Single	Double
King Faisal Specialist Hospital & Research Center-Riyadh	6	32	0	0

Adult and pediatric deceased lung transplanted in currently active national lung transplant center in 2019

2.4.2.4 Cold ischemia time (CIT)

CIT for the 70 deceased transplanted lungs was ranging from 2 hours and 30 minutes to 10 hours and 1 minute with mean CIT of 5 hours and 19 minutes. Of which, 54 (77%) lungs were transplanted with CIT of ≤ 6 hours and 16 (23%) were transplanted with CIT of > 6 hours.

2.4.2.5 Deceased donor-recipient matching

Matching sex was done in 23 (61%) of the cases and matching blood group for lung transplantation between deceased donors and recipients was done in 38 (100%) of the cases. Age distribution between deceased lung donors and recipients are shown in table 2.4.2.5.1.

Table 2.4.2.5.1.: Age distribution between deceased lung donor and recipients 2019

Donor Age (yrs.)	Recipient Age (yrs.)						Total
	<5	5-15	16-29	30-50	51-65	>65	
<5	0	0	0	0	0	0	0
5-15	0	0	0	0	0	0	0
16-29	0	0	0	6	3	0	9
30-50	0	0	3	10	7	4	24
51-65	0	0	1	1	3	0	5
>65	0	0	0	0	0	0	0
Total	0	0	4	17	13	4	38

Adult and pediatric deceased lung transplanted in currently active national lung transplant center in 2019

Table 2.4.2.1 Deceased lung Transplantation Activity 1991-2019

Center	Period	Single Lung	Double Lung*	Total Lungs	Recipient
KFH-Jeddah	1991-1994	4	0	4	4
KFSH-Jeddah	2001-2010	8	8	16	12
KFSH-Riyadh	1996-2019	31	373	403	217
Total	**1991-2019**	**43**	**380**	**423**	**233**

*double lung transplant operation is counted as 2 lungs per transplant

Organ Transplantation in the Kingdom of Saudi Arabia

2.5 Pancreas Transplantation

In the year 2019, 8 pancreases was transplanted inside the kingdom of Saudi Arabia with a total of 80 pancreases transplantation done from 1990-2019. It is worth mentioning that the first pancreas transplantation in the Kingdom was performed in 1990 then followed by kidney-pancreas transplantation in 1991. Another combined operation was also done in 1992 at Al Shati Hospital in collaboration with King Abdul-Aziz Hospital-Jeddah. Illustration of the cumulative deceased pancreas transplantation is shown in figure 2.5.1.

Cumulative Deceased Pancreas Transplantation Figure 2.5.1

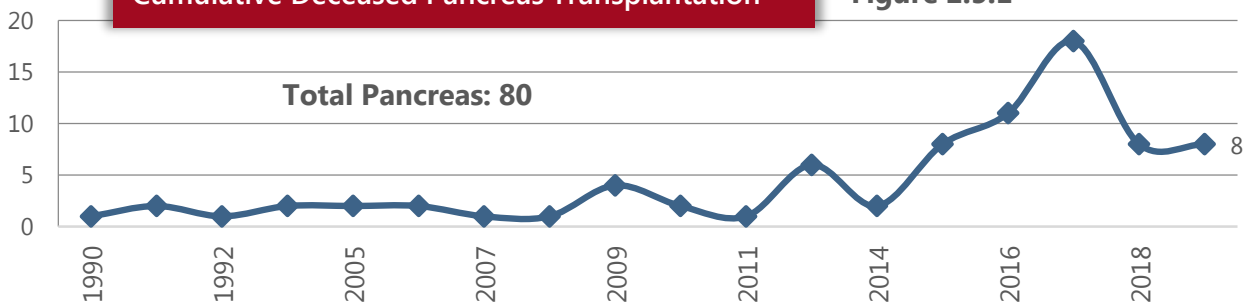
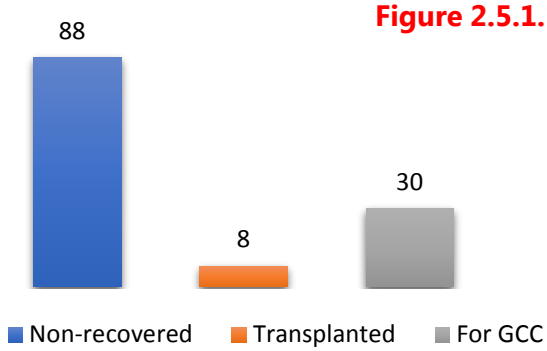


Table 2.5.1.1 Deceased pancreas donor characteristics

Characteristic	N	%
Age		
1-10	1	12%
11-20	0	0%
21-30	4	50%
31-40	3	38%
41-50	0	0%
51-60	0	0%
Blood Group		
A	1	12.5%
B	1	12.5%
AB	1	12.5%
O	5	62.5%
Sex		
Male	6	75%
Female	2	25%
Cause of Death		
Anoxia	2	25%
Cerebrovascular/Stoke	2	25%
Head Trauma	4	50%
CNS Tumor	0	0%
Others	0	0%
Circumstance of Death		
MVA	3	37%
Non-MVA	5	63%

Pancreas from Deceased Donors inside the Kingdom 2019

Figure 2.5.1.1



*Pancreas for GCC- other donor organs (e.g. liver, heart, lungs) were offered or shared to KSA except the Pancreas.

2.5.1 Deceased Pancreas Donation 2019

126 deceased donors were consented for deceased organ donation and (100%) were consented for pancreas donation; (see figure 2.5.1.1); Of the consented donors, 88 donors were from KSA and 38 were from other GCC countries. 96 pancreas donors were consented for KSA; 88 donors from KSA and 8 from GCC countries of these donors, 8 pancreases were utilized, 88 pancreas were not recovered. (See table 2.5.1.1 for Characteristics of utilized pancreas donor characteristics).

2.5.2 Deceased Pancreas Transplantation 2019

8 pancreases were transplanted inside the Kingdom of which were transplanted as Simultaneous Kidney-Pancreas (7) (SKP) Transplantation and Pancreas transplant alone (1). Pancreas Transplantation was performed by 2 currently active transplant centers. (See table 2.5.2.1).

Hospital Name	PTA	SKP
King Faisal Specialist Hospital & Research Center-Riyadh	0	5
King Fahad Specialist Hospital Dammam	1	2
Total	1	7

Table 2.5.2.1: Deceased pancreas transplantation 2019

2.5.2.3 Non-recovered Deceased Pancreas

A total of 88 pancreas donors were not recovered and of which, 80 were from inside the KSA and 8 from GCC countries. The major causes of non-recovered deceased pancreas are shown in table 2.5.2.3.1

Reasons of Non-Recovery	N	%
Determined unsuitable pancreas donor	**39**	44%
High Pancreatic Enzyme	10	
DM, HTN, DM with HTN	9	
Old Age	6	
Long stay in ICU	6	
Multiple Cardiac Arrest	6	
Young age	1	
Marginal donor	1	
No available suitable recipient	**30**	34%
No ABO compatible recipient	12	
No available PTA recipient	15	
Positive cross-match	2	
Donor recipient size mismatched	1	
Macroscopic Findings	**9**	10%
Fatty pancreas	2	
Edematous pancreas	5	
Nodular pancreas	1	
Not Transplantable	1	
Donor sudden cardiac arrest	**4**	5%
Technical Reasons	**3**	4%
Undiagnosed meningo encephalitis	1	
Recipient refused to come	1	
History of breast CA; no clear histopath	1	
Hemodynamic instability	**2**	2%
Infection	**1**	1%
Tuberculosis	1	
Total	**88**	**100%**

Table 2.5.2.3.1: Reasons for non-recovered deceased pancreas

Table 2.5.2.3.2: Major causes of non-recovered deceased pancreas 2019

Not recovered	N	%
Medical reason	82	93%
Donor sudden cardiac arrest	3	3.5%
Technical	3	3.5%
Total	88	100%

The reasons of non-recovery of pancreas among eligible donors consented for pancreas donation in 2019

2.5.2.2 Adult and Pediatric Pancreas Transplantation

Age distribution between decease pancreas donor and recipient is shown in table 2.5.2.2.1

N	Hospital Name	Adult	Pediatric
1	King Faisal Specialist Hospital & Research Center-Riyadh	5	0
2	King Fahad Specialist Hospital Dammam	2	1
	Total	7	1

Table II.5.7: adult and paediatric deceased pancreas transplantation
Adults and paediatric pancreas transplantation in currently active pancreas transplant center in 2019

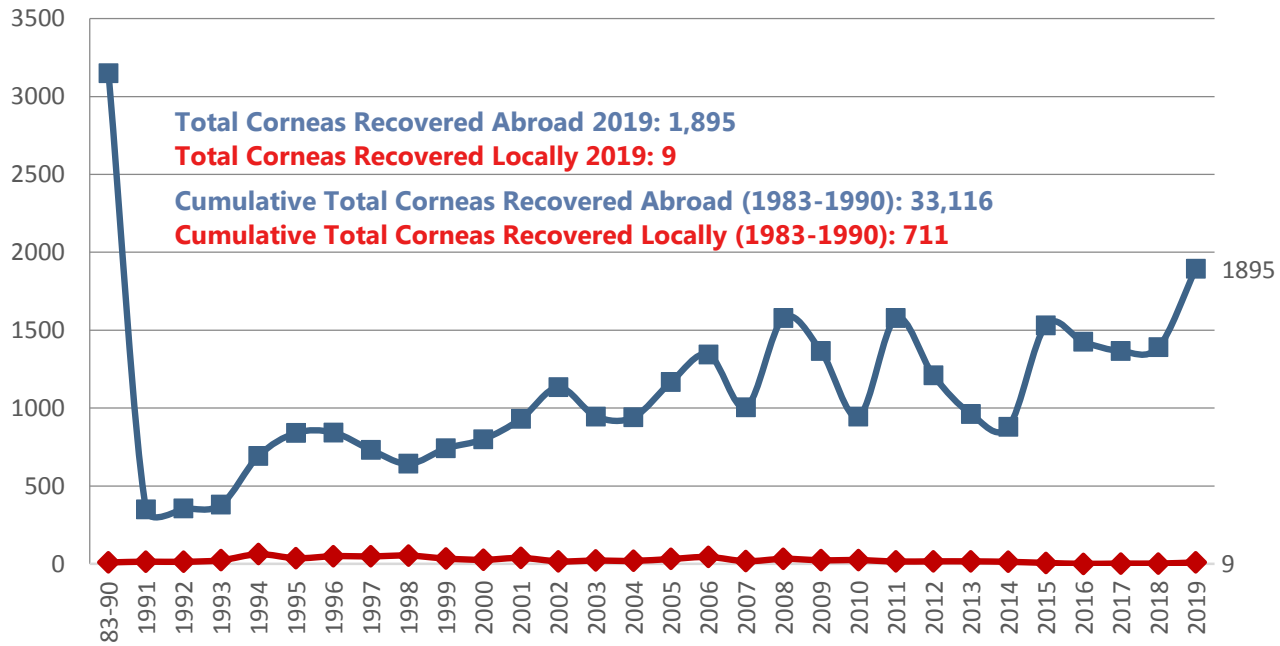
Organ Transplantation in the Kingdom of Saudi Arabia

2.6.1 Corneal Recovery &
2.6.2 Bone Banking

Corneal tissue donation and transplantation program was established in the kingdom in the year 1983. Corneal recovery were usually done along with multi-organ retrieval procedure from actual DBD donors. In the year 2019, nine (9) corneas were locally recovered from deceased organ donors a total of 711 corneas from deceased donors inside the kingdom from 1983-2019. Illustration of cumulative corneal recovery is shown in figure 2.6.1.1

Corneas used in the Kingdom were mostly procured abroad mostly from the USA. It is worth that there are 14 corneal transplant centers. A total of 1,895 corneas were imported by these centers with the King Khalid Eye Specialist Hospitals having 78% of these corneas which was transplanted and distributed for transplant to other centers.

Figure 2.6.1.1 **Corneal Recovery in KSA**



Details of the deceased corneal recovery in the Kingdom of Saudi Arabia 1983-2019

2.6.1 Deceased corneal donation 2019

126 deceased donors were consented for the purpose of organ donation; of these donors, 22 (17%) were consented for corneal donation (21 donors were from inside the Kingdom and 1 donor were from other GCC countries); 9 corneas was recovered from 5 deceased corneal donors, all donors were from KSA. Corneal recovery was performed by by King Khalid Eye Specialist Hospital. (see table 3.6.3 Reasons for Non-recovered deceased corneas in KSA.

Non-Recovered Deceased Corneas

22 deceased corneal donors (N=44 corneas) were consented for corneal donation, of which, only 9 corneas were recovered from 5 corneal donors and the remaining 17 deceased donors the corneas were not recovered (see table for reason of non-recovered corneas 2.6.1.1).

Table 2.6.1.1 Reasons for non-recovered deceased corneas

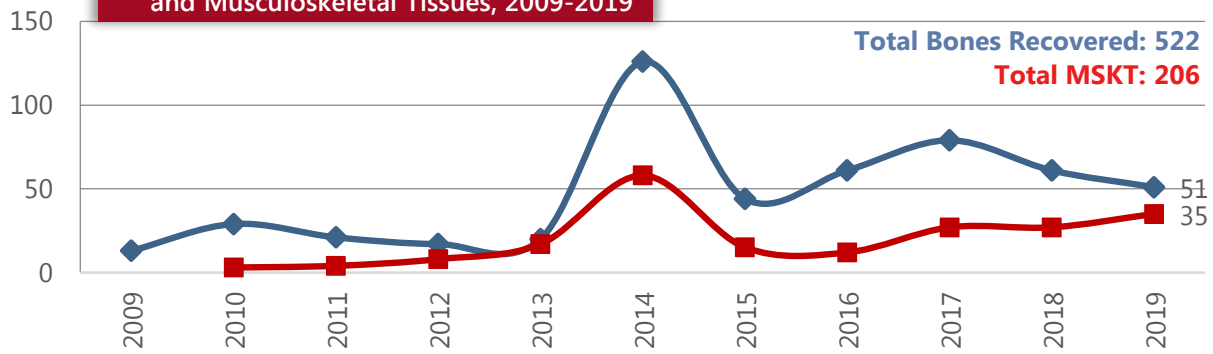
Reasons of Non-Recovery		N=cornea	%
Technical		**22**	63%
Excess Corneas	4		
Lack of available blood for investigation	4		
Undiagnosed meningoencephalitis	2		
Lack of manpower	2		
No corneal solution	2		
No ophthalmologist	2		
No order from supervisor	2		
Equipment problem	2		
Outside Riyadh	2		
Infection		**10**	29%
Positive cultures	8		
MRSA positive	2		
Donor Unstable		**2**	6%
Damage Cornea		**1**	2%
Total		**35**	**100%**

Reasons of non-recovered deceased corneas in KSA among eligible donors consented for corneal in 2019.

Bone donation program from deceased donors was started in the Kingdom by King Faisal Specialist Hospital & Research Center in 2009. In the year 2019, 51 bones and 35 musculoskeletal tissues were recovered inside the Kingdom of Saudi Arabia. It is worth mentioning that 522 bones and 206 musculoskeletal connective tissues (MSKT) were recovered for the purpose of bone allograft. Illustration of the cumulative recovered deceased bones and musculoskeletal tissues is shown in figure 2.6.2.1.

Cumulative Recovered Deceased Bones and Musculoskeletal Tissues, 2009-2019

Figure 2.6.2.1



2.6.2.1 Deceased Bone Donation 2019

126 deceased donors were consented for organ donation; of which 12 (10%) were consented for bone and MSKT. Wherein, 10 (83%) donors were recovered and the remaining 2 (17%) were not recovered. The details of the recovered deceased bone and MSCT donors characteristics are listed in table 2.6.2.1.1 and details of collected bones and MSKT in fig. 2.6.2.1.1.

Characteristic	N	%
Age		
10-20	0	0%
21-30	2	20%
31-40	1	10%
41-50	6	60%
51-60	1	10%
Blood Group		
A	3	30%
B	3	30%
AB	1	10%
O	3	30%
Gender		
Male	10	100%
Female	0	0%
Cause of Death		
Anoxia	2	20%
Cerebrovascular/Stroke	5	50%
Head trauma	3	30%
CNS Tumor	0	0%
Others	0	0%
Circumstance of Death		
MVA	3	30%
Non-MVA	7	70%

Table 2.6.2.1.1 Characteristics of Deceased Bone & MSKT donors

2.6.2.2 Non-recovered bones

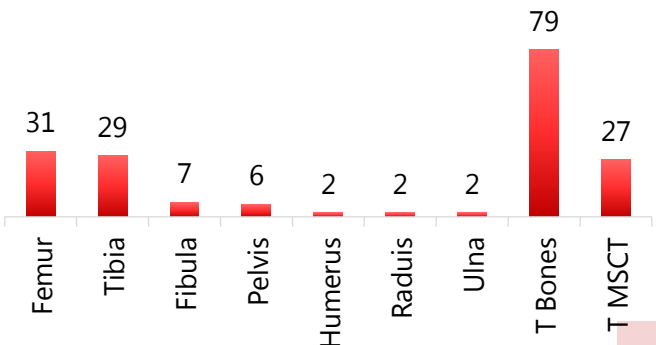
12 deceased donors were consented for bone donation and of which, 2 (17%) were not recovered see (see table 2.6.2.1.2).

Reasons of Non-Recovery	N	%
Technical Reasons:	2	100%
Donor Sudden Cardiac Arrest (No Blood sample available)	1	
High risk donor, due to infection and suspicion of malignancy	1	
Total	2	100%

Table 2.6.2.1.1 Reasons of non-recovered bones

Performance of deceased bone and MSKT recovery in currently active national bone bank in 2019

Figure 2.6.2.1.1



Organ Transplantation in the Kingdom of Saudi Arabia

2.7 Intestinal Transplantation

Intestinal or small bowel transplantation program from deceased organ donors was initiated in the Kingdom during the year 2016 and it was first performed at King Faisal Specialist Hospital and Research Center (KFSH & RC) Riyadh. The first small bowel was utilized as a multi-visceral organ transplant (transplanted along with liver and pancreas) and to date, a total of 2 intestinal transplantation was performed in the Kingdom.

It is worth mentioning that the first donor for small bowel donation in the Kingdom was from Prince Mohammed Bin Abdulaziz Hospital Riyadh. On February 7, 2016, a multivesicular transplantation was performed by KFSH & RC including the small bowel, liver and pancreas.

The first request for deceased intestinal transplantation was made by KFSH & RC, Riyadh in 2016.

The indications for isolated intestinal transplantation small bowel donation from KFSH & RC, Riyadh includes the following:

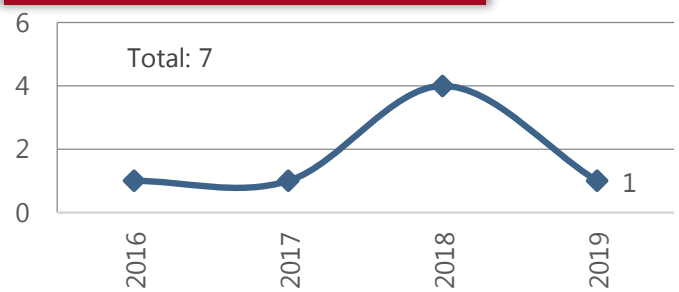
- Irreversible intestinal failure
- Total Parenteral Nutrition (TPN) or intravenous fluid dependency
- Necrotizing enterocolitis
- Congenital short bowel syndrome
- No or reversible TPN-induced liver disease (no bridging fibrosis or cirrhosis in histology)

Table 2.7.1 Types of Small Bowel Transplantation 2016-2019

Year	Type of Transplant	Organ Combination
2016	Multivisceral	Pancreas, Liver, Intestine
2017	Isolated	Small Bowel Only
2018	Isolated	Small Bowel Only
2019	Isolated	Small Bowel Only

Cumulative deceased small bowel transplantation 2016-2019

Figure 2.7.1



Patients on life-long TPN with evidence of severe complications:

- Liver dysfunction
- Repeated infections (>2 times per year requiring hospitalization or one single mycotic sepsis)
- Difficult venous access for TPN or fluids (2 or more central veins thrombosed)

Frequent dehydrations episodes (2 or more hospital admissions annually) And, indications for multivesicular transplantation are as follows:

- Same details as above and
- Any form of bridging liver fibrosis/cirrhosis (porto-portal, porto-central or centro-central) or
- Anatomical or technical reason

Organ Transplantation in the Kingdom of Saudi Arabia

2.8 Organ Sharing between Kingdom of Saudi Arabia and GCC Countries 2019

In 2019, there were a total of 38 donors consented for deceased organ donation in GCC countries reported to SCOT and of which, 46 organs were utilized inside the Kingdom including 2 kidneys, 14 livers, 9 whole hearts, and 21 lungs in addition to 10 hearts for Valves (HFV); details of the organs shared between KSA and GCC countries. Over the years, there is a continuous successful cooperation in the organ sharing program between the GCC countries and a total of 377 organs were utilized in KSA in addition to 73 HFV were shared from Kuwait, Qatar, Bahrain, U.A.E. and Spain since 1996.

Table 2.8.1

Recovery and transplantation activities from organ sharing program between the Kingdom and other countries 1996-2019

Year	Recovered/Transplanted Organs*										Total		Tissues
	Kidney		Liver		Heart		Lung		Pancreas				HFV****
	Rec.	Tx.	Rec.	Tx.	Rec.	Tx.	Rec.	Tx.	Rec.	Tx.	Rec.	Tx.	Rec.
1996-2000	6	6	19	14	4	4	2	2			31	26	11
2001	13	12	3	3							16	15	1
2002	2	2	2	2							4	4	2
2004	6	6	6	5	1	1					13	12	4
2005	7	7	13	10	1	1	4	2			25	20	12
2006	6	3	12	8							18	11	7
2007	2	2	14	13	1	1					17	16	2
2008	6	5	12	11							18	16	
2009	2	2	5	5							7	7	1
2010	2	2	11	10							13	12	
2011	4	3	5	3	1	1					10	7	
2012	6	3	13	10			10	10			29	23	7
2013	2	2	5	6	2	2	4	4	1	1	14	15	
2014	8	8	21	20	5	5	4	4			38	37	7
2015	0	0	13	12	3	3	8	6			24	21	3
2016	2	2	13	10	3	3	12	12			30	27	1
2017	2	2	17	14	3	3	20	16	2	2	44	37	2
2018	5	5	5	5	4	4	10	10			24	24	3
2019	2	2	19	14	19	9	22	21			62	46	10
Total	**83**	**74**	**208**	**175**	**48**	**38**	**96**	**87**	**3**	**3**	**438**	**377**	**73**

*Kuwait, Qatar, Bahrain and Spain; **Rec.: Recovered Organs; ***Tx.: Transplanted Organs, ****HFV: Heart for Valves

Table 2.8.2

Transplant activities from organ sharing program between the kingdom and other countries 1996-2019

Year	Country	Transplanted Organs					Total Organs	Tissues
		Kidney	Liver	Heart	Lung	Pancreas		HFV
1996-2002	Kuwait	3	19	4	2		28	14
2000-2001	Spain	17					17	
2004-2009	Kuwait	10	39	2	2		82	18
	Qatar	15	12	1				8
	Bahrain		1					
2010	Kuwait		5				12	
	Qatar	2	4					
	Bahrain		1					
2011	Kuwait	1	2	1			7	
	Qatar	2	1					
2012	Kuwait	1	9		10		23	7
	Qatar	2	1					
2013	Kuwait	2	6	1	2	1	15	
	Qatar			1	2			
2014	Kuwait	1	16	5	4		37	4
	Qatar	4	1					
	Bahrain	3	3					3
2015	Kuwait		10	2	6		21	2
	Bahrain		2	1				1
2016	Qatar	2					27	
	Kuwait		10	3	12			1
2017	Kuwait	2	13	3	12	1	31	1
	U.A.E.		1		4	1	6	1
2018	Kuwait	3	5	3	8		24	3
	UAE	2		1	2			
2019	Kuwait		11	8	17		36	10
	UAE	2	3	1	4		10	
Total		**74**	**175**	**38**	**87**	**3**	**377**	**73**

Cost of organ and tissue utilized inside and outside the Kingdom in 2019 (Million SR)

Figure 2.1

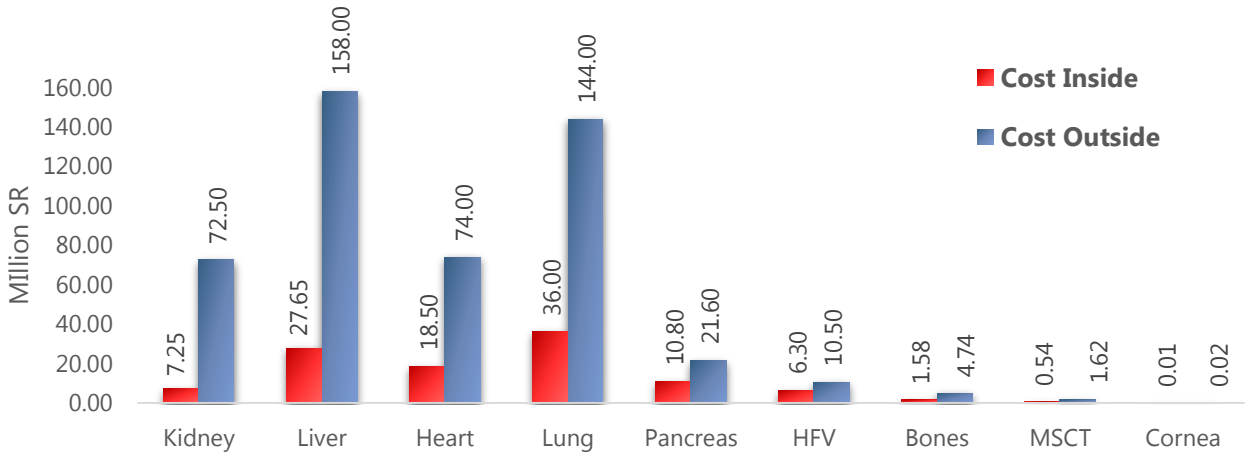
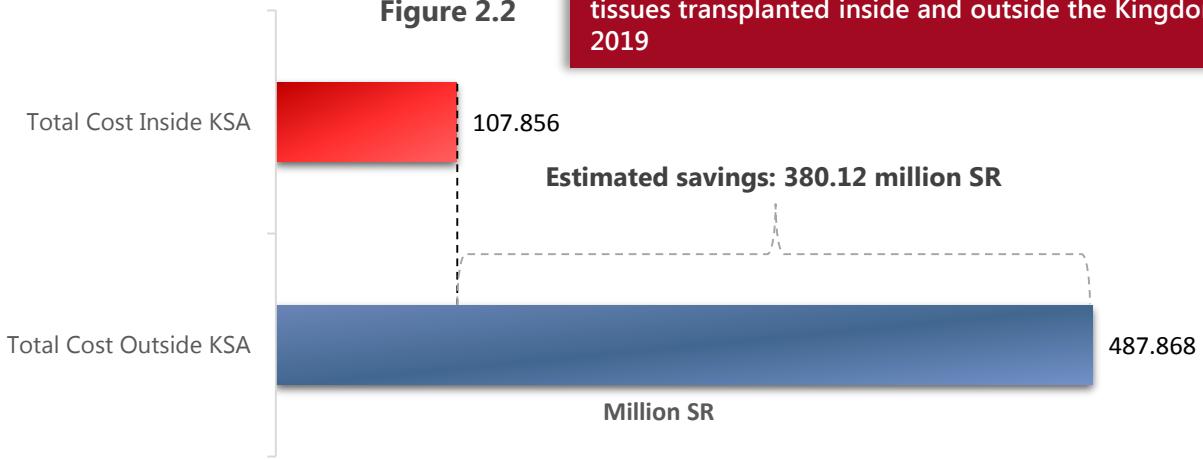


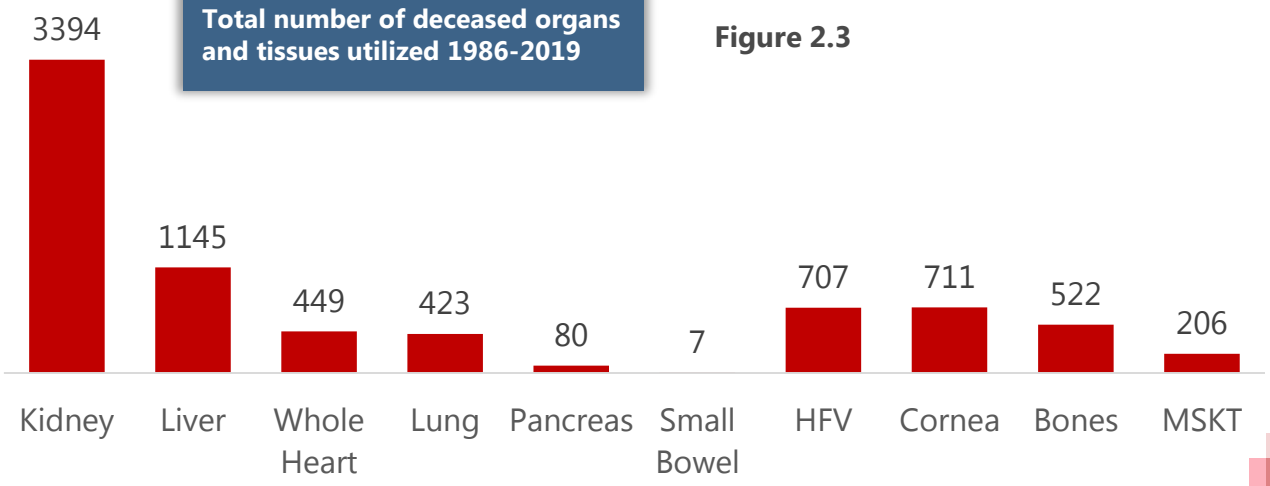
Figure 2.2

Comparison of estimated total cost of organs and tissues transplanted inside and outside the Kingdom in 2019



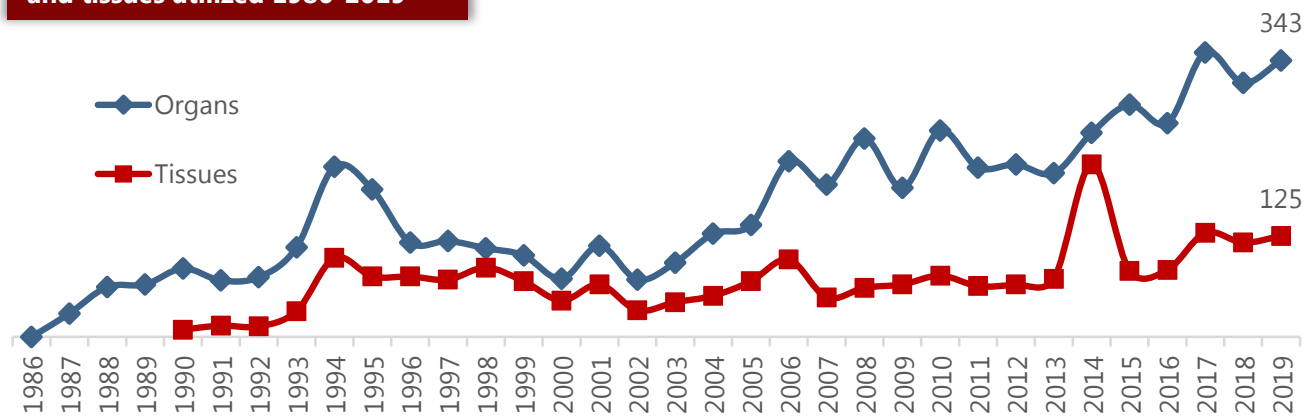
Total number of deceased organs and tissues utilized 1986-2019

Figure 2.3



Total number of deceased organs and tissues utilized 1986-2019

Figure 2.4



Total Organs (kidney, liver, heart, lungs, pancreas, small bowel)	**5,498**
Total Tissues (corneas, heart for valves, bones, musculoskeletal tissues)	**2,146**

The cost of transplantation for different organs (kidney, liver heart, etc.) and the amount of savings when comparing inside and outside the Kingdom in organ transplantation. (see fig. 2.2)

Dialysis in the Kingdom of Saudi Arabia

The Chapter of Dialysis (HD and PD) in the Kingdom of Saudi Arabia, will

- *Provide the list of all dialysis centers in the kingdom highlighting the manpower, number of patients and patient's characteristics.*
- *Provide an overview of the different of sectors providing dialysis treatments*
- *Highlights the causes of renal failure, their prevalence and incidence rate*
- *Provide a scientific prediction on average annual increased of patients on hemodialysis*

In 2019, a total of 21,068 patients were on renal replacement therapy (HD and PD) with 19,522 patients on hemodialysis and 1,546 on peritoneal dialysis treatment a prevalence rate of 631 pmp. New patients were 4,740 with an incidence rate of 142 pmp.

Provides each dialysis units data with comprehensive details such as number of staff and patients. It also includes the patient's demographic and characteristics such as age, sex, Nationality, blood group and vascular access.

Provides an overview of different dialysis sectors and each affiliation. Graphs and tables were made available that highlights important data such patients' characteristics, causes of renal disease and its prevalence rate, serology status (HCV, HBsAg and HIV).

Provides the centers overall structures with the total number of machines and outlets were highlighted per dialysis sectors and region wise. Treatment modalities were also recorded as well as the patients treated with erythropoietin.

Shows an important data of the overall renal replacement therapy in the kingdom, which includes, the HD, PD and numbers of patient who had renal transplant.

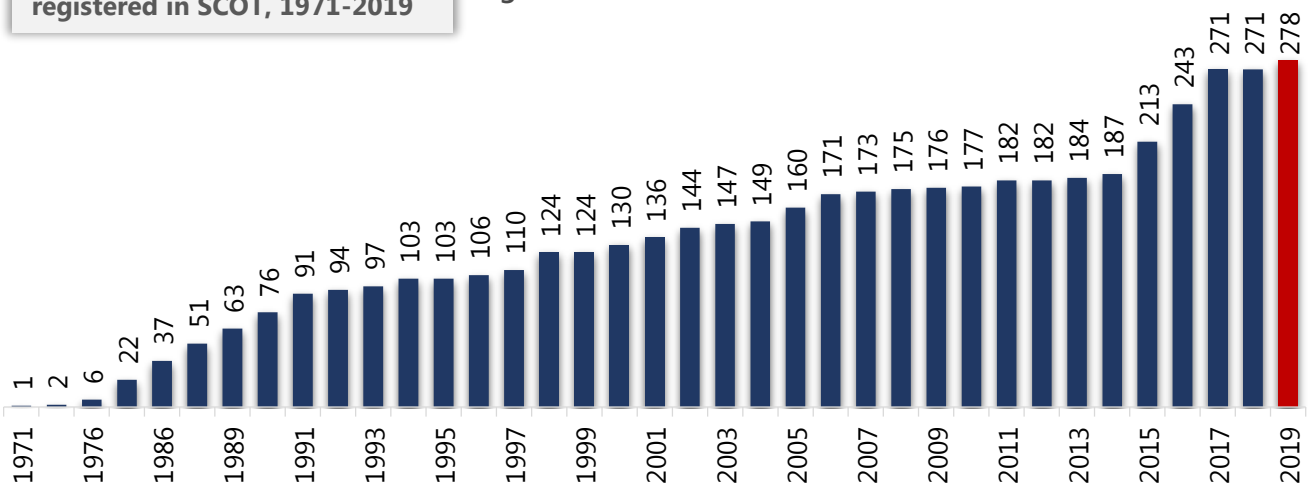
3.1 Hemodialysis in the Kingdom of Saudi Arabia

Hemodialysis Centers in Saudi Arabia

In 2019 there were a total of 278 dialysis centers registered in the Saudi Center for Organ Transplantation (SCOT). A total of 4,146 new patients were recorded a 16% decline from last year. The average net annual increase of patients on hemodialysis is 6%.

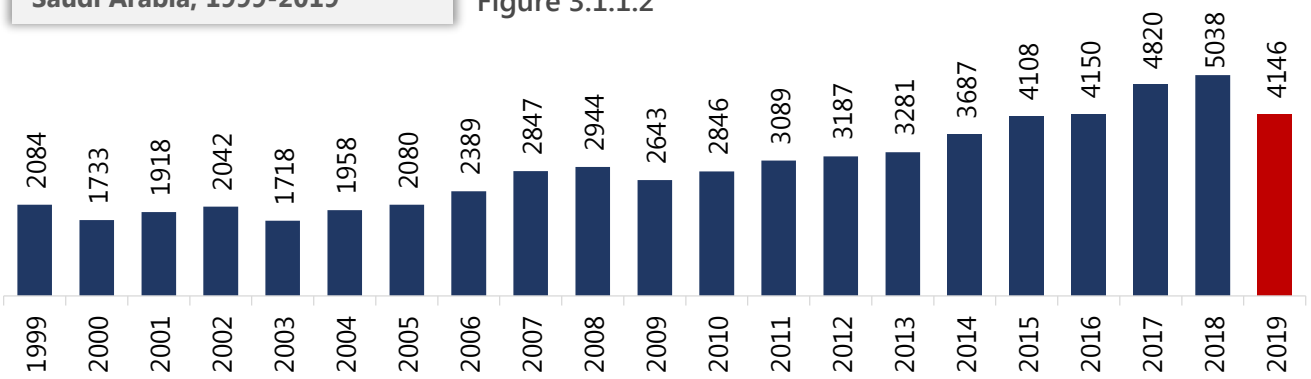
Number of Dialysis Centers registered in SCOT, 1971-2019

Figure 3.1.1.1



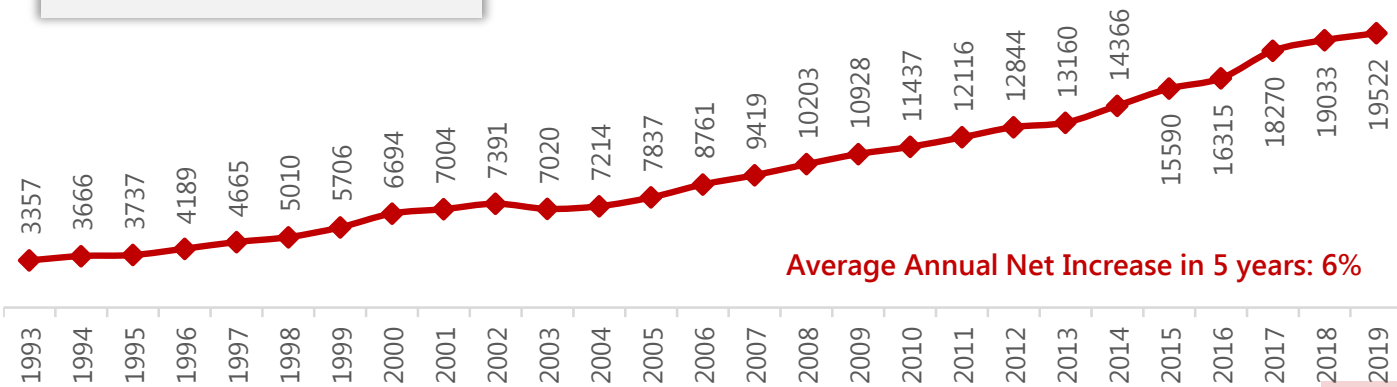
New Hemodialysis Patients in Saudi Arabia, 1999-2019

Figure 3.1.1.2



Dialysis Population Net Annual Increase, 1993-2019

Figure 3.1.1.3



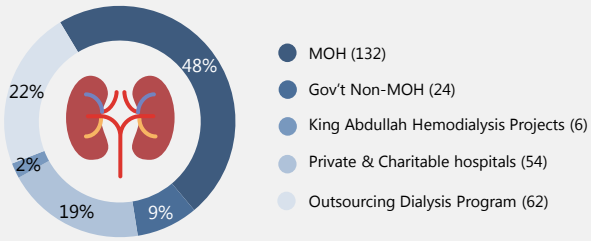
Hemodialysis in the Kingdom of Saudi Arabia

3.1.2 - Hemodialysis Patients and Staffing

MOH, MOH outsourcing hemodialysis Centers, Gov't-Non MOH, King Abdullah Projects and Private

In 2019, total of 278 dialysis centers were recorded and the number of their affiliated dialysis centers were categorized into five 5 sectors. MOH with 132 dialysis centers; MOH outsourcing centers, Diaverum 39 and Davita 23; Gov't Non-MOH 24, Private & Private Charitable centers 54; and King Abdullah Hemodialysis Projects 6 hemodialysis Centers see figure 3.1.2.1.

Figure 3.1.2.1 Hemodialysis Center and Affiliation 2019

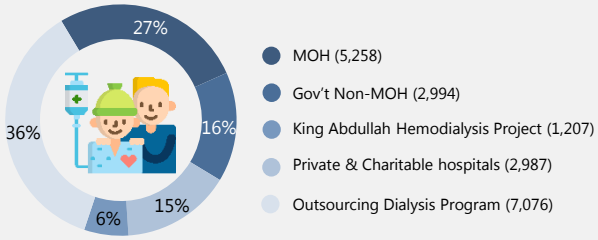


Total Centers: 278

Hemodialysis Patients (Number of Patients, Blood group, Age, Sex and Nationality)

A total of 19,522 permanent chronic hemodialysis patients were recorded in the Kingdom of which 4,146 are new chronic cases. These patients are dialyzing in 5 hemodialysis sectors in the Kingdom (See 3.1.2.2 for patients' distribution by each sector.).

Figure 3.1.2.2 Distribution of Chronic Homedialysis Patients by Dialysis Sector

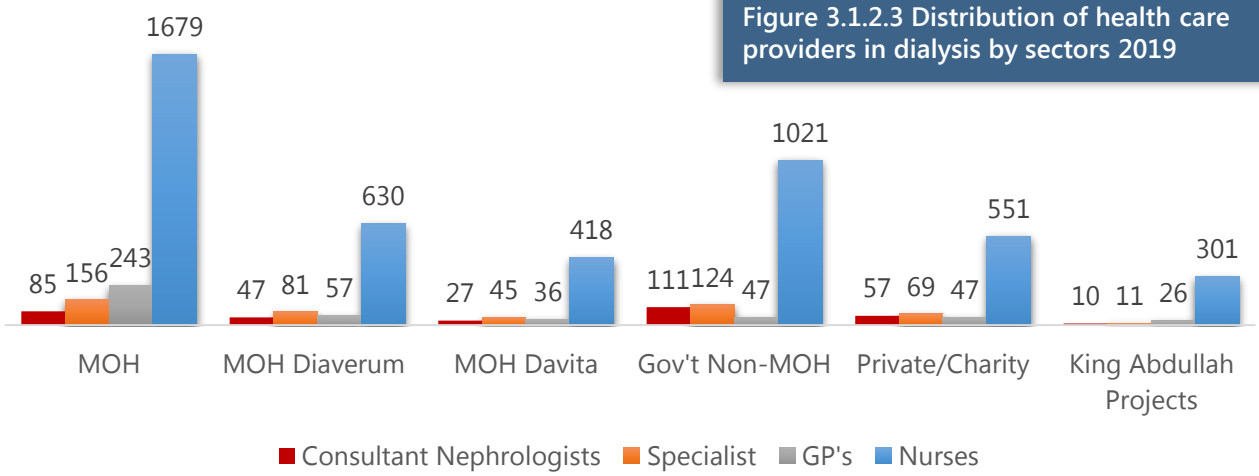


Total Patients: 19,522

Dialysis Health Care Providers (Consultant Nephrologist, Specialist, GP's and Nurses)

A total of 5,879 health care providers in the hemodialysis centers are in the Kingdom and were composed primarily of consultant nephrologists, specialist, general practitioners and nurses. Manpower were distributed in 5 sectors of hemodialysis centers all throughout the Kingdom. See figure 3.1.2.3 for the distribution of health care providers in dialysis sectors.

Figure 3.1.2.3 Distribution of health care providers in dialysis by sectors 2019



A total of 19,522 patients were on hemodialysis, age group among hemodialysis patients have shown that the majority of dialysis patients were in the group of 26 to 65 years old, composing of (67%) of the total HD population. See figure 3.1.2.4 for age group distribution and figure 3.1.2.5 for age trend.

Blood group among hemodialysis patients were recorded and have shown that majority of patients were in the blood group O (49%), followed by A with (27%), B with (19%) and AB (5%) with the least number of patients. See figure 3.1.2.6 for trend of blood groups among hemodialysis patients.

Figure 3.1.2.4 Age group distribution among hemodialysis patients 2019

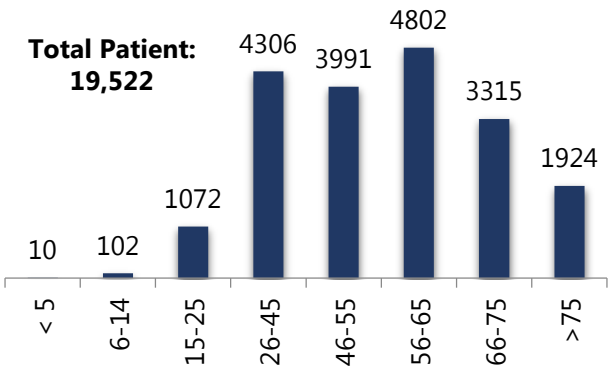
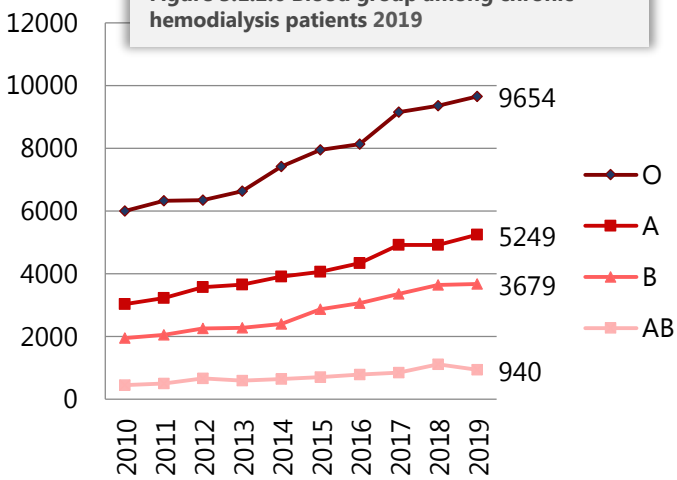


Figure 3.1.2.6 Blood group among chronic hemodialysis patients 2019



Sex distribution among hemodialysis patients have shown that (56%) of dialysis patients were male and (44%) were female. The same percentage of sex distribution was noted from the previous years. See figure 4.4.5 for sex distribution among HD patients.

Nationalities among hemodialysis patients are between Saudis and non-Saudis wherein, Saudi patients composed the (83%) of total hemodialysis patients in the Kingdom and the remaining (17%) were composed of Non-Saudi patients which had increased by 1% from the previous year (see fig. 3.1.2.7 Nationalities of Patient on HD).

Figure 3.1.2.5 Sex distribution among hemodialysis patients

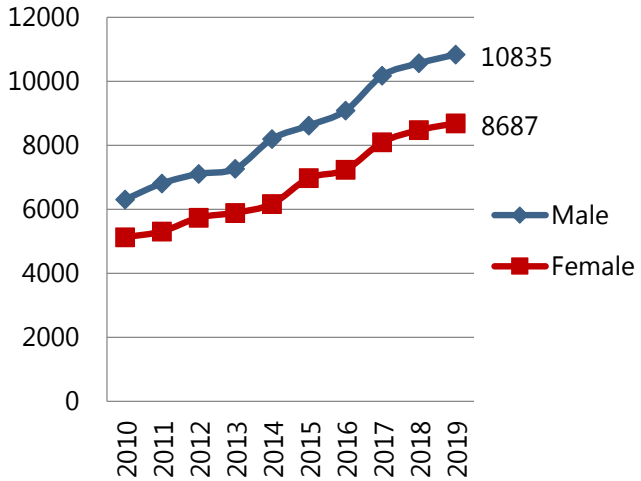
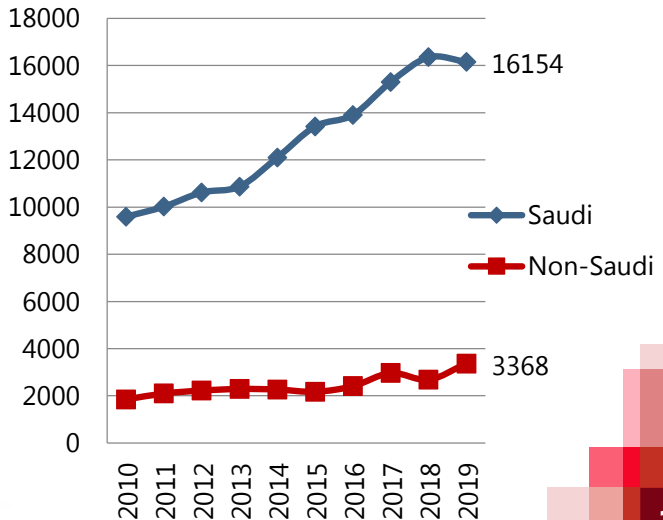


Figure 3.1.2.7 Nationalities of Patients on HD



Hemodialysis in the Kingdom of Saudi Arabia

3.1.3 - Causes of Renal Disease and Active Serology

Causes of Renal Disease and Active Serology status (Causes of Renal Failure, Prevalence Rate of DM and HTN, Patient Serology and HCV PCR screening)

The causes of renal failure among hemodialysis patients were determined based on the cumulative data gathered from all the hemodialysis centers in the kingdom, the 2 main causes of end-stage renal disease among HD patients were diabetic nephropathy and the hypertensive nephropathy (See table 3.1.3.1 for Causes of renal Failure among HD patients and figure 3.1.3.3 for trends of major causes of renal failure).

Table 3.1.3.1 Causes of Renal Failure among HD patients

Cause of Renal Failure	N	%
Diabetic Nephropathy	8420	43%
Hypertensive Nephropathy	6679	34%
Unknown Etiology	1715	9%
Glumerulonephritis	724	4%
Others	502	3%
Obstructive Uropathy	406	2%
Congenital Malformation	380	2%
Heredofamilial Disease	378	2%
Vasculitis	199	1%
Pregnancy Related	119	1%
Total	**19522**	**100%**

Figure 3.1.3.3 Trends of Major Causes of Renal Failure

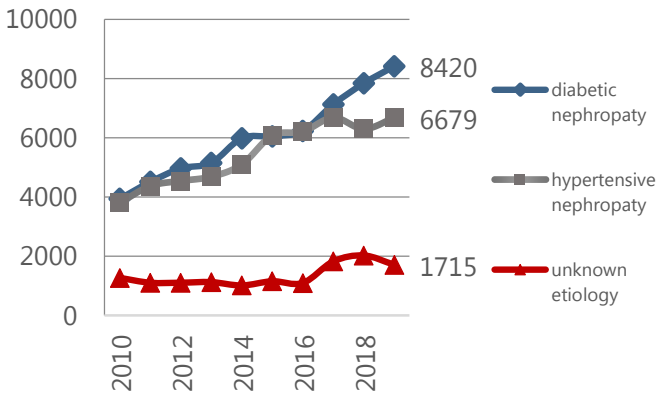
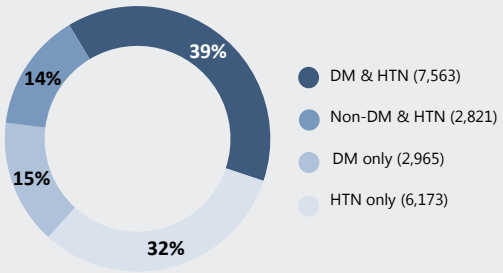
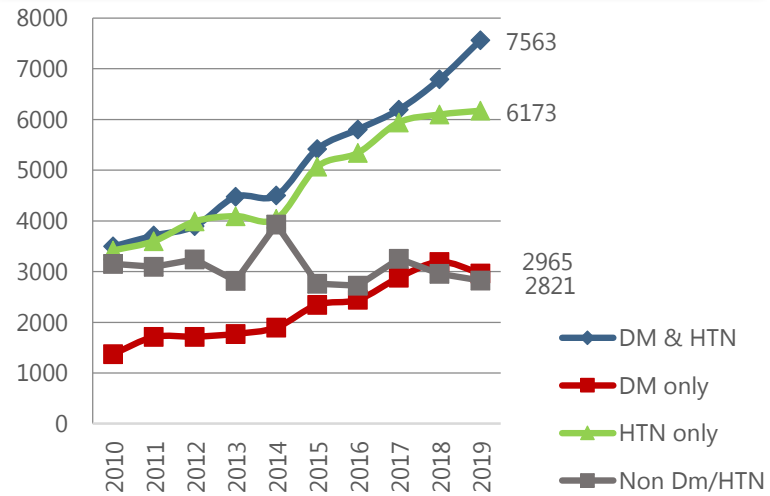


Figure 3.1.3.1 Prevalence of DM, HTN and Both DM and HTN



Total Patients: 19,522

Figure 3.1.3.2 Trend of Prevalence of DM, HTN and Both DM and HTN



The prevalence rate of Diabetes Mellitus (DM), Hypertension (HTN) and combined DM and HTN on patients have shown that the highest rate were those with combined DM and HTN with 39%; followed by HTN only patients at 32% and DM only at 15%. The prevalence trend on each category had shown an increasing trend in patients with combined DM and HTN, followed by HTN only patients which had slightly increased this year. On the contrary patients with DM only, had decreased this year compared to lasts year's record. See figure 3.1.3.2 for the trend of prevalence among HD patients with DM, HTN and both DM and HTN

Causes of Renal Disease and Active Serology status (Causes of Renal Failure, Prevalence Rate of DM and HTN, Patient Serology and HCV PCR screening)

Serology were annually monitored especially the HCV, HBsAg and HIV cases among the HD patients. The trend of each positive serology results have shown that patients who were HCV+ve has been in continuous decline over the last 4 years with 8% infection rate this year. HBsAg+ve patients has slight increase from last year's number but maintain a 3% infection rate and patient's with HIV have also decreased this year. See figure 3.1.3.4 for trend of serology positive patient, figure 3.1.3.6 for HCV+ve antibody patients, figure 3.1.3.5 for HCV+ve patients region wise and figure 3.1.3.7 HBsAg+ve antibody patients.

Figure 3.1.3.4 Trend of Serology Positive patients 2019

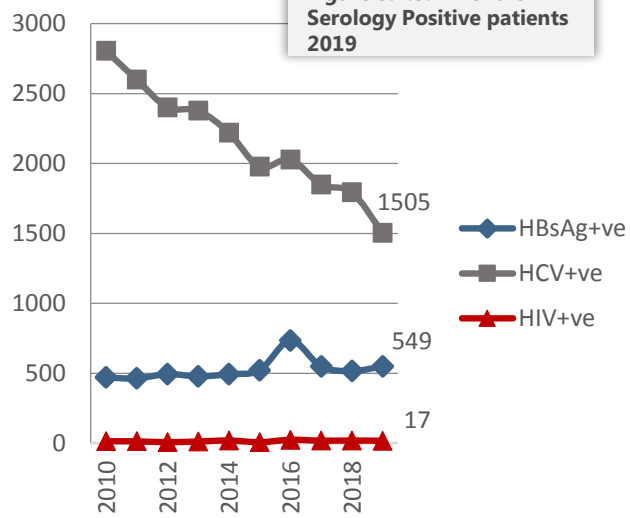


Figure 3.1.3.6 HBsAg+ve antibody patients 2019

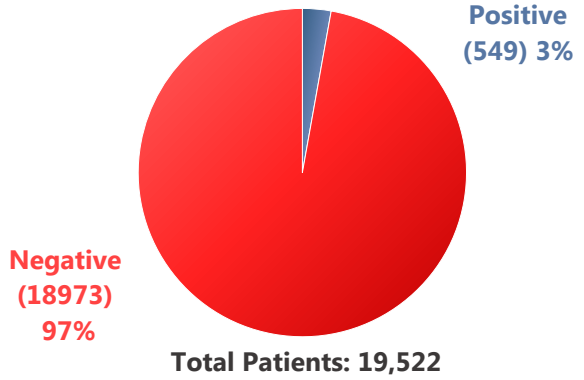
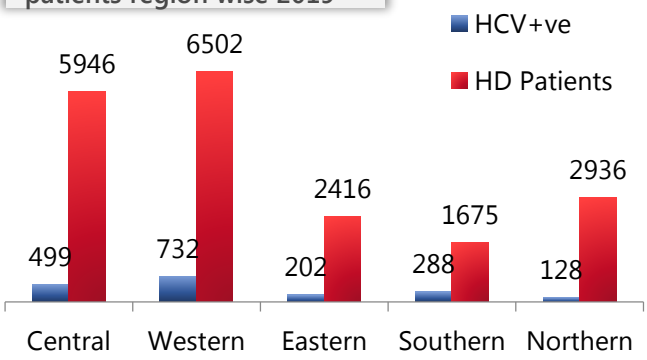
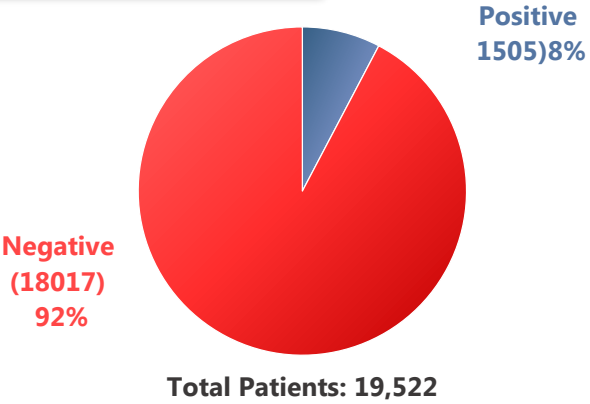


Figure 3.1.3.5 HCV+ve patients region wise 2019



Regions	HC+ve	HD Patients
Central	499	5195
Western	732	6290
Eastern	202	2558
Southern	288	2847
Northern	128	1380

Figure 3.1.3.7 HCV+ve antibody patients 2019



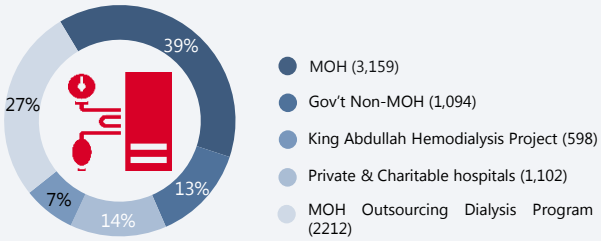
Polymerase Chain Reaction (PCR) of HCV positive patients were carried out by some dialysis centers. From which 260 (17%) of the 1,505 HCV+ patients were found to be HCV PCR positive.

Hemodialysis in the Kingdom of Saudi Arabia

3.1.4 - Machines, outlets and patient's quality care

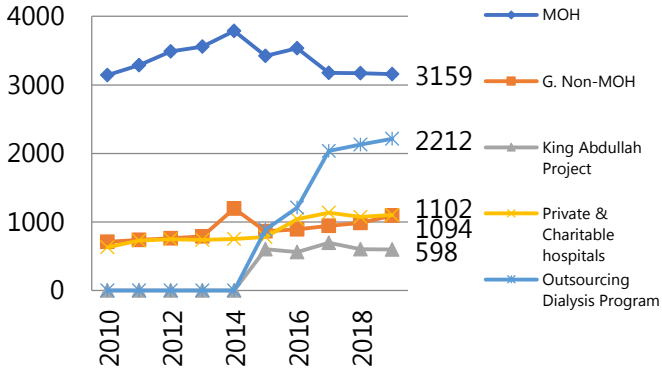
Hemodialysis machines being utilized in the Kingdom are composed of 8,165 machines which were distributed in 5 hemodialysis sectors in the Kingdom. See figure 3.1.4.1 for hemodialysis machines distribution by sector and fig 3.1.4.2 for Trends of dialysis machines distribution by sector.

Figure 3.1.4.1 Hemodialysis machines distribution by sector



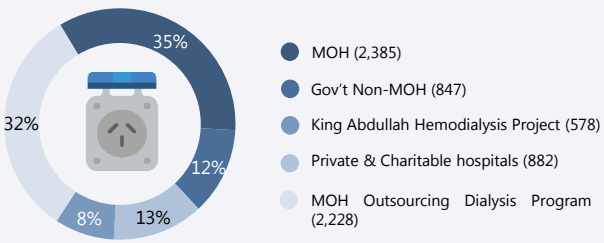
Total Machines: 8,165

Figure 3.1.4.2 Trends of hemodialysis machines distribution by sector



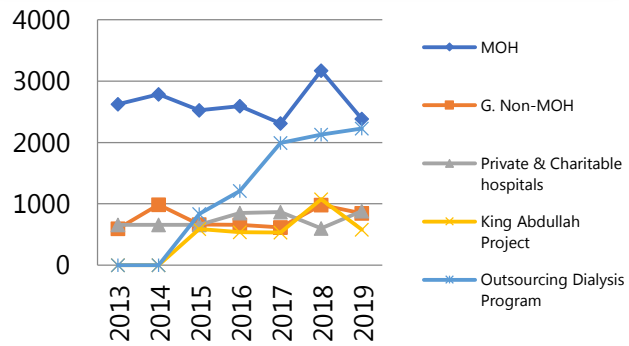
Outlets for hemodialysis centers were composed of 6,920 outlets for all sectors of hemodialysis in the Kingdom. See figure 3.1.4.3 for the hemodialysis outlet distribution and figure 3.1.4.4 for the trend of outlet distribution among the 5 hemodialysis sectors in the Kingdom.

Figure 3.1.4.3 Outlet distribution among hemodialysis sectors in the Kingdom



Total Outlets: 6,920

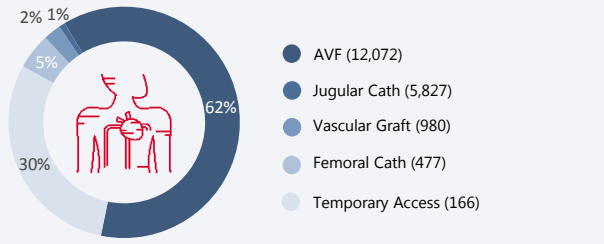
Figure 3.1.4.4 Trends of outlet distribution among hemodialysis sectors in the Kingdom



Modality of Treatment (Vascular Access, HD vs. HDF and Erythropoietin)

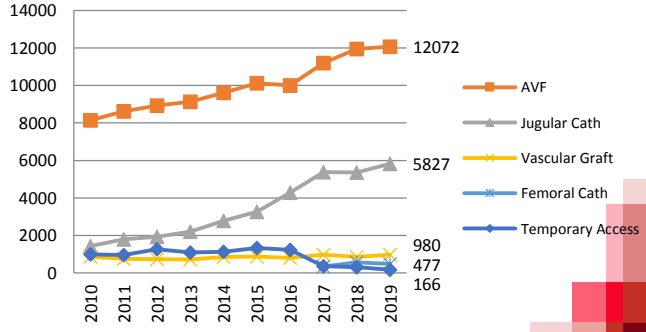
The most common site of vascular access is the (arteriovenousfistula) AVF with 62% of the total dialysis patients, followed by permanent jugular catheter with 30%, femoral catheter being the least used access with 2% (See figure 3.1.4.5 for Dialysis Vascular Access and figure 4.6.2 for trends of dialysis vascular access).

Figure 3.1.4.5 Hemodialysis vascular access



Total Dialysis Patients: 19,522

Figure 3.1.4.6 Trends of hemodialysis vascular access



In 2019, there were 278 hemodialysis centers inside the Kingdom. The MOH and the MOH outsourcing centers (Davita and Diaverum) have a total of 194 centers combined, followed by private & charitable institutions with 54 HD centers, Gov't Non-MOH with 24, and King Abdullah Hemodialysis Projects with 6 HD centers. (See table 3.1.4.1 and figure 3.1.4.7).

Table 3.1.4.1 Number of HD Pts., Centers & Machines in MOH & Non-MOH Hospitals 2019

	MOH Hospitals	MOH Outsourcing (Davita and Diaverum)	Military Hospitals	National Guard	University Hospitals	King Faisal Specialist Hospitals	Private & Charitable Hospitals	King Abdullah Project	Security	Other Hospitals
HD Centers: 278	132	62	10	4	3	2	54	6	1	4
HD Patients: 19,522	5,258	7,076	1,541	504	228	264	2,987	1,207	251	206
Machines: 8,165	3,159	2,212	540	154	125	122	1,102	598	63	90
Outlets: 6,920	2,385	2,228	428	79	138	74	882	578	43	85
Pts./Outlets : 2.8	2.2	3.2	3.6	6.4	1.7	3.6	3.4	2	5.8	2.4

Figure 3.1.4.7 HD Pts. & Machines in MOH Hospitals according to Region 2019

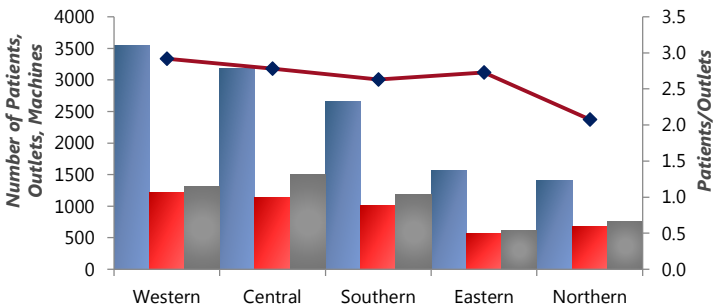


Table 3.1.4.2 Number of HD Pts., Centers & Machines in MOH by Region

	Western	Central	Southern	Eastern	Northern
Patients: 12,334	3538	3172	2653	1569	1402
Outlets: 4,613	1213	1141	1009	575	675
Machines: 5,371	1313	1498	1190	620	750
Pts/ Outlets: 2.4	2.9	2.8	2.2	2.5	1.9

Figure 3.1.4.8 HD Pts. & Machines in Non- MOH Hospital according to Sector 2019

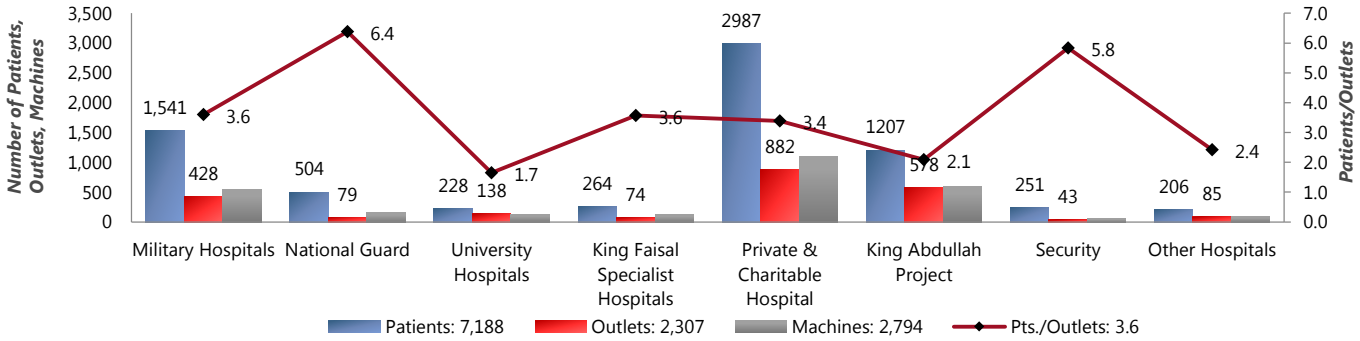
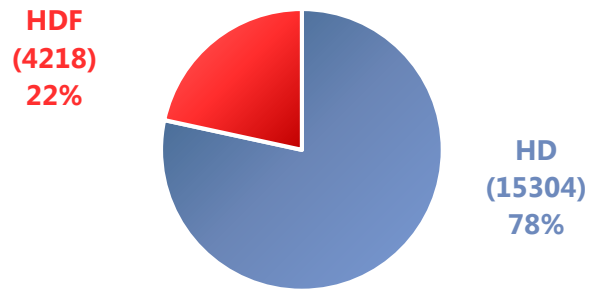


Table 3.1.4.3 Number of HD Pts., Centers & Machines in Non-MOH by Sector

	Military Hospitals	National Guard	University Hospitals	King Faisal Specialist Hospitals	Private & Charitable Hospitals	King Abdullah Project	Security	Other Hospitals
Patients: 7188	1,541	504	228	264	2,987	1,207	251	206
Outlets: 2,307	428	79	138	74	882	578	43	85
Machines: 2,794	540	154	125	122	1,102	598	63	90
Pts/Outlets: 3.6	3.6	6.4	1.7	3.6	3.4	2	5.8	2.4

Figure 3.1.4.9 HD and HDF treatment modality



Total Dialyzing Patients: 19,522

Hemodialysis is the most common modality use of treatment among the dialyzing patients, and hemodiafiltration (HDF) is gaining popularity among dialysis sectors. See fig. 3.1.4.9 of HD and HDF treatment modality

Erythropoietin treatment among HD patients was used in 14,363 patients, (74%) of the entire HD population. Over the years there was an increasing numbers of patients receiving EPO-r. See figure 3.1.4.10 for Patients receiving Erythropoietin by sector and figure 3.1.4.11 for Trend of Erythropoietin treatment.

Figure 3.1.4.10 Patients receiving Erythropoietin by sector

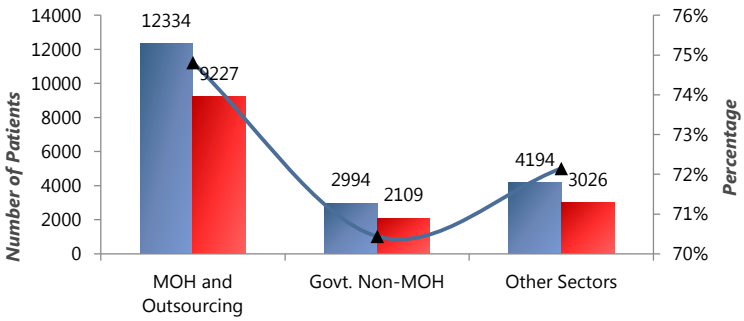
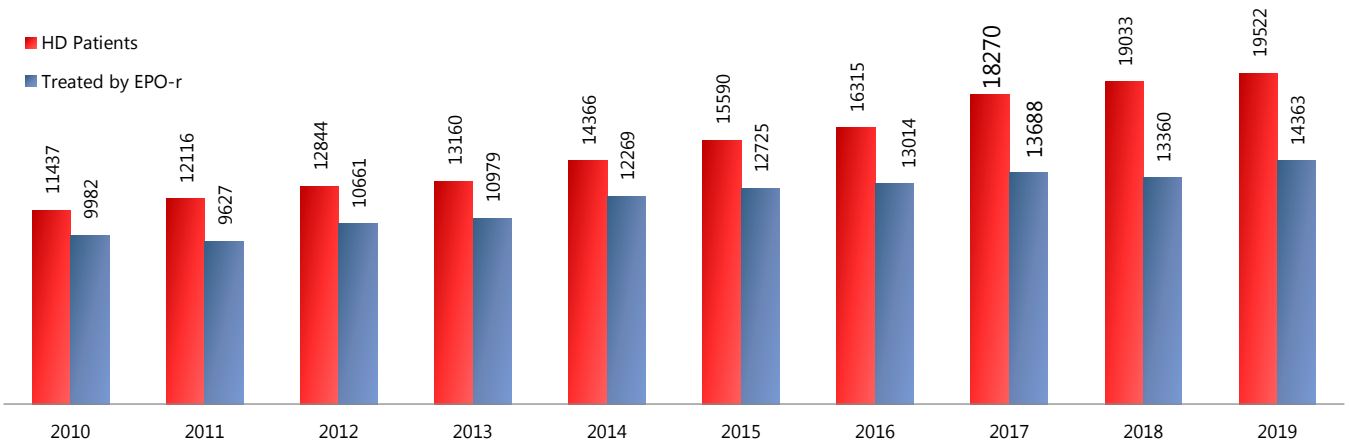


Figure 3.1.4.11 Number of receiving Erythropoietin by Sector

	MOH and outsourcing	Govt. Non-MOH	Other Sectors
Total HD Pt: 19,522	12334	2994	4194
Treated by EPO-r: 14,363	9227	2109	3026
Percentage: 74%	75%	70%	72%

Figure 3.1.4.12 Trend of patients receiving Erythropoietin by sector per year



Saudi Center for Organ Transplantation

Hemodialysis patient's quality care

Hemodialysis patient's blood were tested, these includes the following: Hemoglobin, albumin, pre-dialysis serum phosphorous and serum calcium levels. Medications such as patient's on Vitamin D, calcimimetics and non-calcium phosphate binders were also documented.

Table 3.1.4.4 Hemodialysis patients quality care management

Pre-dialysis serum phosphorous	N	%
Patients pre-dialysis phosphorous level >1.9 mmol/6 mg/dL	4,428	23%

Total HD patients: 19,522

Pre-dialysis serum calcium <2.1 mmol/L/8.4 mg/dL	N	%
Patients pre-dialysis calcium <2.1 mmol/L/8.4 mg/dL	7,515	38%

Total HD patients: 19,522

Patients Albumin Level <35 g/dL	N	%
Patients with <35 g/dL	3215	16%

Total HD patients: 19,522

Patients on Calcimimetics	N	%
Patients on calcimimetics	5,751	29%

Total HD patients: 19,522

Patients Hemoglobin Level g/dL	N	%
Hemoglobin level >12 g/dL	3761	19%
Hemoglobin level <10 g/dL	902	5%
Total HD patients: 19,522	4,663	24%

Patients on Non-calcium phosphate binders	N	%
Patients on Non-calcium phosphate binders	8,356	43%

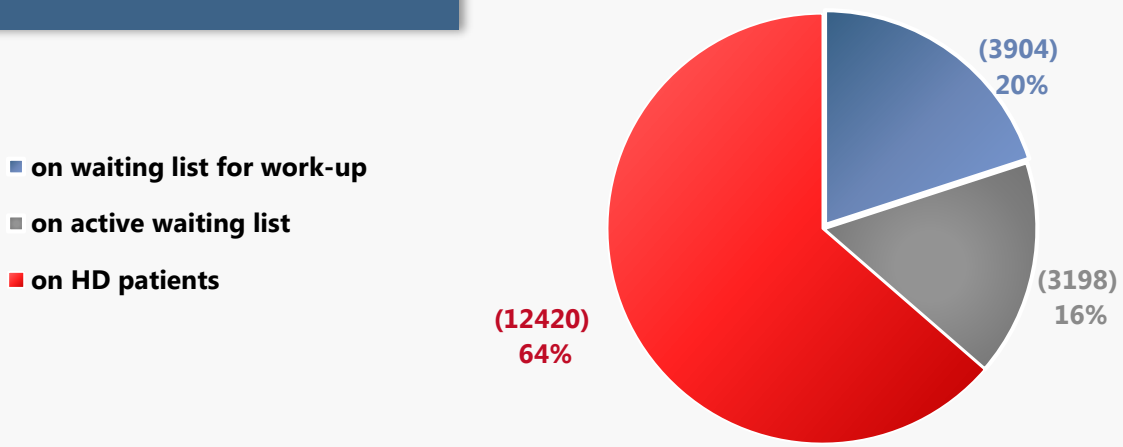
Total HD patients: 19,522

Patients on Vitamin D	N	%
Vitamin D Injectable	3481	18%
Vitamin D Oral	9401	48%
Total HD patients: 19,522	**13,026**	**66%**

Hemodialysis in the Kingdom of Saudi Arabia

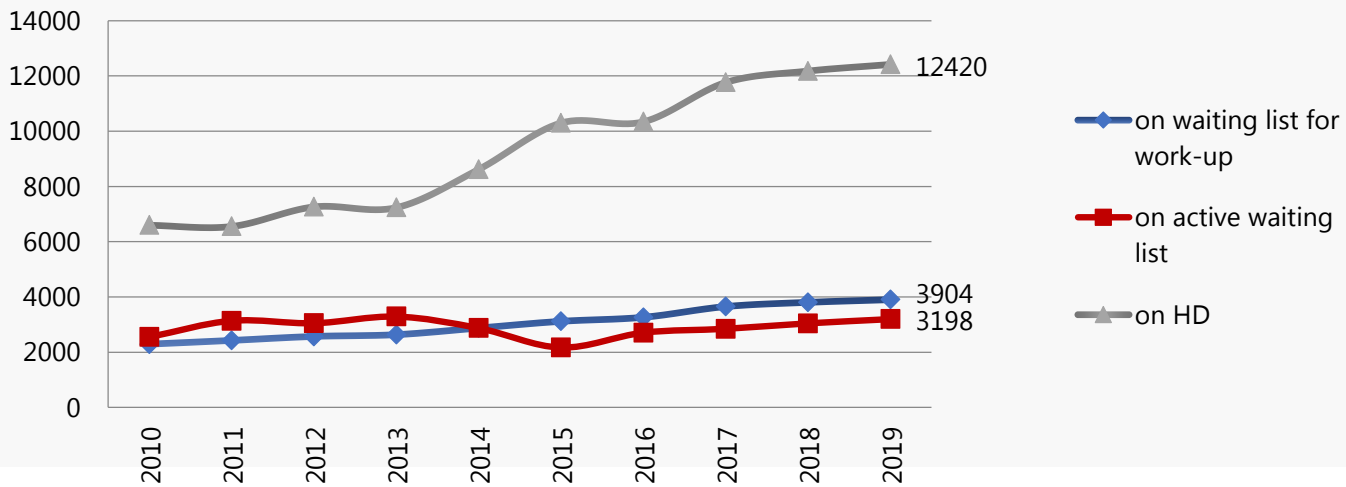
3.1.5 - Patient Waiting List

Figure 3.1.5.1 Patient Waiting List



Status of patients for work-up and on active waiting list were also monitored for HD patients and by the end of this year, a total of 3,198 patients (16%) were on the active list and ready for renal transplantation with another 3,904 (20%) on the waiting list for work-up. Comparing with the previous year numbers, the percentage of patients who on the list for work-up remain the same (20%) (See figure 4.8.1. and 4.8.2).

Figure 3.1.5.2 Trend of HD patients on active waiting list and waiting list for work-up



Hemodialysis in the Kingdom of Saudi Arabia

3.1.6 - Statistical Tables

Table 3.1.6.1 Hemodialysis Centers in Saudi Arabia MOH - Sector - Riyadh Region

No.	Dialysis Center Name	Consultant Nephrologists	Nephrology Specialists	Resident Doctor	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	King Salman for Kidney Disease Riyadh	1	8	22	95	96	124	292	9
2	King Saud Medical City, Riyadh	10	12	8	128	62	112	218	306
3	Wadi Dawasir General Hospital	0	1	3	8	17	35	90	3
4	King Khalid Hospital, Al Kharj	0	3	4	21	17	51	73	0
5	Al Aflaj General Hospital	0	1	1	11	24	32	54	0
6	King Khalid Hospital, Majma'ah	0	1	1	12	10	28	49	0
7	Dawadmi General Hospital	0	1	0	10	20	27	48	0
8	Al Iman General Hospital	2	1	3	16	17	27	43	0
9	Afif General Hospital	0	0	2	8	12	36	42	0
10	Hotat Bani Tamim General Hospital	0	0	2	9	15	17	42	0
11	Al Qawaeyah General Hospital	0	1	1	11	17	21	40	0
12	Shagra General Hospital	0	2	2	9	11	21	40	0
13	King Fahad Medical City, Riyadh	4	4	5	54	14	14	31	92
14	King Salman Hospital Riyadh	1	1	3	13	12	22	30	7
15	Al Zulfi General Hospital	0	0	1	9	13	22	30	0
16	Hotat Sudair General Hospital	0	0	1	7	17	16	20	0
17	Artawiya General Hospital	0	0	2	5	15	15	20	0
18	Al Muzahimiya General Hospital	0	1	2	4	6	12	18	0
19	Prince Salman Bn Mohd Hospital, Delim	0	0	2	7	12	14	18	0
20	Al Sulayel General Hospital	0	0	1	3	14	13	15	0
21	Rumah General Hospital	0	0	1	2	7	6	15	0
22	Huraimala General Hospital	0	1	1	4	6	11	14	0
23	Ruwaidah Hospital	0	0	2	5	8	9	14	0
24	Al Ghat General Hosptal (PNSSH)	0	0	1	3	16	16	12	0
25	Sajir General Hospital	0	0	1	2	16	10	12	0
26	Thadiq General Hospital	0	0	1	2	12	12	9	0
27	King Saud Medical City, Riyadh (Pediatric)	7	1	0	14	9	12	9	0
28	Durmah General Hospital	0	1	1	5	14	12	9	0
29	Tumair General Hospital	0	0	2	3	8	7	8	0
30	King Fahad Medical City Childrens Hospital, Riyadh	4	4	0	17	8	9	6	0
31	Nafee General Hospital	0	0	0	0	0	0	0	0
	TOTAL	**29**	**44**	**76**	**497**	**525**	**763**	**1321**	**417**

Table 3.1.6.1 Hemodialysis Patients in Saudi Arabia – MOH Sector Riyadh Region

No	Dialysis Center Name	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	King Salman for Kidney Disease Riyadh	0	40	31	4	20	0	0	28	17	99	110	30
2	King Saud Medical City, Riyadh	17	0	31	0	3	1	0	7	50	80	67	16
3	Wadi Dawasir General Hospital	3	32	4	1	2	0	1	9	7	13	70	24
4	King Khalid Hospital, Al Kharj	25	17	10	6	2	0	0	9	26	14	16	8
5	Al Aflaj General Hospital	2	9	8	2	0	0	0	9	1	29	23	9
6	King Khalid Hospital, Majma'ah	2	14	7	0	1	0	0	1	0	18	23	6
7	Dawadmi General Hospital	2	10	1	1	1	0	0	6	14	20	14	5
8	Al Iman General Hospital	24	20	0	0	0	0	0	3	6	20	10	6
9	Afif General Hospital	2	13	2	0	1	0	0	9	0	15	19	5
10	Hotat Bani Tamim General Hospital	0	6	1	0	0	0	0	6	18	11	5	2
11	Al Qawaeyah General Hospital	2	4	3	2	0	0	0	3	4	8	28	1
12	Shagra General Hospital	2	9	1	0	0	0	1	3	5	17	8	2
13	King Fahad Medical City, Riyadh	1	50	3	2	1	0	0	5	7	10	13	0
14	King Salman Hospital Riyadh	1	22	3	0	2	0	0	2	9	6	9	4
15	Al Zulfi General Hospital	1	5	5	1	1	0	0	2	0	13	13	6
16	Hotat Sudair General Hospital	1	5	1	0	0	0	0	3	0	1	12	3
17	Artawiya General Hospital	1	5	1	0	0	0	0	1	0	6	13	1
18	Al Muzahimiya General Hospital	0	6	0	0	0	0	0	4	0	7	6	5
19	Prince Salman Bn Mohd Hospital, Delim	0	2	3	3	0	0	0	0	4	5	6	2
20	Al Sulayel General Hospital	1	5	0	0	0	0	0	2	0	7	8	4
21	Rumah General Hospital	0	4	0	0	0	0	0	4	0	8	7	0
22	Huraimala General Hospital	1	2	2	1	0	0	0	3	0	7	5	0
23	Ruwaidah Hospital	0	3	1	0	0	0	0	5	2	4	7	1
24	Al Ghat General Hosptal (PNSSH)	4	3	0	0	0	0	0	0	1	2	5	1
25	Sajir General Hospital	1	0	1	2	1	0	0	3	1	4	1	0
26	Thadiq General Hospital	0	0	0	0	0	0	0	0	0	3	6	1
27	King Saud Medical City, Riyadh (Pediatric)	3	1	0	0	0	0	7	0	0	2	0	0
28	Durmah General Hospital	0	2	0	0	1	0	0	0	2	3	2	1
29	Tumair General Hospital	0	2	0	0	0	0	0	0	0	3	3	2
30	King Fahad Medical City Childrens Hospital, Riyadh	0	2	0	0	0	0	5	0	0	2	0	1
31	Nafee General Hospital	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	**96**	**293**	**119**	**25**	**36**	**1**	**14**	**127**	**174**	**437**	**509**	**146**

Table 3.1.6.1 Hemodialysis Patient's Characteristics in Saudi Arabia – MOH Sector Riyadh Region

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	King Salman for Kidney Disease Riyadh	292	67	52	11	162	174	118	182	25	80	5	0
2	King Saud Medical City, Riyadh	218	54	39	6	119	114	104	105	20	79	10	4
3	Wadi Dawasir General Hospital	90	31	13	2	44	48	42	52	1	32	2	3
4	King Khalid Hospital, Al Kharj	73	17	16	4	36	39	34	39	3	23	2	6
5	Al Aflaj General Hospital	54	16	4	3	31	27	27	33	5	15	1	0
6	King Khalid Hospital, Majma'ah	49	10	12	2	25	28	21	20	3	24	0	2
7	Dawadmi General Hospital	48	12	9	2	25	24	24	13	1	32	0	2
8	Al Iman General Hospital	43	9	10	5	19	26	17	27	1	13	2	0
9	Afif General Hospital	42	9	12	1	20	25	17	8	0	34	0	0
10	Hotat Bani Tamim General Hospital	42	5	6	2	29	22	20	17	3	20	2	0
11	Al Qawaeyah General Hospital	40	11	9	0	20	22	18	26	2	11	0	1
12	Shagra General Hospital	40	6	8	1	25	18	22	11	1	26	2	0
13	King Fahad Medical City, Riyadh	31	8	6	2	15	12	19	7	1	21	2	0
14	King Salman Hospital Riyadh	30	6	7	1	16	21	9	19	2	8	1	0
15	Al Zulfi General Hospital	30	6	3	0	21	17	13	17	0	13	0	0
16	Hotat Sudair General Hospital	20	5	4	0	11	12	8	14	0	6	0	0
17	Artawiya General Hospital	20	5	2	4	9	14	6	4	0	16	0	0
18	Al Muzahimiya General Hospital	18	5	4	0	9	11	7	10	1	7	0	0
19	Prince Salman Bn Mohd Hospital, Delim	18	6	2	0	10	18	0	15	0	3	0	0
20	Al Sulayel General Hospital	15	4	4	0	7	9	6	11	1	3	0	0
21	Rumah General Hospital	15	3	5	0	7	9	6	6	0	9	0	0
22	Huraimala General Hospital	14	3	4	0	7	6	8	6	1	7	0	0
23	Ruwaidah Hospital	14	3	2	1	8	9	5	9	0	0	0	5
24	Al Ghat General Hosptal (PNSSH)	12	2	2	2	6	7	5	6	1	4	1	0
25	Sajir General Hospital	12	4	2	0	6	4	8	8	1	3	0	0
26	Thadiq General Hospital	9	2	3	0	4	6	3	5	2	1	1	0
27	King Saud Medical City, Riyadh (Pediatric)	9	3	0	0	6	7	2	0	0	8	1	0
28	Durmah General Hospital	9	5	0	0	4	6	3	5	0	4	0	0
29	Tumair General Hospital	8	3	2	0	3	4	4	3	0	4	1	0
30	King Fahad Medical City Childrens Hospital, Riyadh	6	0	3	0	3	4	2	0	0	0	0	6
31	Nafee General Hospital	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	**1321**	**320**	**245**	**49**	**707**	**743**	**578**	**678**	**75**	**506**	**33**	**29**

Table 3.1.6.2 Hemodialysis Centers in Saudi Arabia – MOH Sector Makkah / Jeddah /Taif Region

No.	Dialysis Center Name	Consultant Nephrologists	Nephrology Specialists	Resident Doctor	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	Al Noor Specialist Hospital	6	7	10	97	77	107	358	50
2	King Faisal Hospital Makkah	3	4	2	36	28	49	67	0
3	Raniah General Hospital	0	0	1	5	14	18	38	1
4	Rabiq General Hospital	0	1	5	10	11	17	37	0
5	Al Khurma Hospital	0	0	1	4	18	26	36	0
6	Al Laith General Hospital	0	1	0	7	16	16	33	2
7	Turabah General Hospital	0	0	1	4	15	25	32	0
8	Adhum General Hospital	1	0	0	4	8	10	13	0
9	Messan General Hospital	0	0	1	5	8	12	5	0
10	Al Qunfudah General Hospital	0	1	0	2	2	11	3	0
11	King Fahad Hospital Jeddah	5	4	8	0	4	31	0	3
12	King Abdul Aziz Hospital, Makkah	0	0	0	0	0	0	0	0
13	King Abdul Aziz Hospital, Jeddah	0	0	0	0	0	0	0	0
	Total	**15**	**18**	**29**	**174**	**201**	**322**	**622**	**56**

Table 3.1.6.2 Hemodialysis Patients in Saudi Arabia – MOH Sector Makkah / Jeddah /Taif Region

No	Dialysis Center Name	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	Al Noor Specialist Hospital	6	58	74	9	20	0	0	17	20	30	300	15
2	King Faisal Hospital Makkah	0	10	3	0	3	0	0	8	0	21	28	0
3	Raniah General Hospital	0	8	1	0	0	0	1	3	4	8	25	3
4	Rabiq General Hospital	5	14	0	0	0	0	0	4	1	13	8	8
5	Al Khurma Hospital	1	7	3	0	1	0	0	2	0	9	12	2
6	Al Laith General Hospital	0	4	6	0	4	0	0	6	0	12	8	3
7	Turabah General Hospital	3	8	1	1	1	0	0	2	0	10	21	1
8	Adhum General Hospital	1	4	0	0	1	0	0	2	0	10	3	0
9	Messan General Hospital	0	1	1	0	0	0	0	0	0	3	0	1
10	Al Qunfudah General Hospital	3	0	0	0	0	0	0	0	0	3	0	0
11	King Fahad Hospital Jeddah	0	0	0	0	0	0	0	0	0	0	0	0
12	King Abdul Aziz Hospital, Makkah	0	0	0	0	0	0	0	0	0	0	0	0
13	King Abdul Aziz Hospital, Jeddah	0	0	0	0	0	0	0	0	0	0	0	0
	Total	**19**	**114**	**89**	**10**	**30**	**0**	**1**	**44**	**25**	**119**	**405**	**33**

Table 3.1.6.2 Hemodialysis Patient's Characteristics in Saudi Arabia – MOH Sector Makkah / Jeddah /Taif Region

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	Al Noor Specialist Hospital	358	130	174	26	28	157	201	277	20	59	2	0
2	King Faisal Hospital Makkah	67	20	19	8	20	38	29	23	2	41	1	0
3	Raniah General Hospital	38	5	15	0	18	23	15	12	2	20	3	1
4	Rabiq General Hospital	37	10	9	1	17	23	14	15	0	21	0	1
5	Al Khurma Hospital	36	6	3	1	26	20	16	25	2	8	1	0
6	Al Laith General Hospital	33	0	10	0	23	20	13	20	0	12	0	1
7	Turabah General Hospital	32	13	5	0	14	16	16	11	0	21	0	0
8	Adhum General Hospital	13	3	4	0	6	5	8	6	1	6	0	0
9	Messan General Hospital	5	2	3	0	0	4	1	3	0	2	0	0
10	Al Qunfudah General Hospital	3	1	1	0	1	1	2	2	0	1	0	0
11	King Fahad Hospital Jeddah	0	0	0	0	0	0	0	0	0	0	0	0
12	King Abdul Aziz Hospital, Makkah	0	0	0	0	0	0	0	0	0	0	0	0
13	King Abdul Aziz Hospital, Jeddah	0	0	0	0	0	0	0	0	0	0	0	0
	Total	**622**	**190**	**243**	**36**	**153**	**307**	**315**	**394**	**27**	**191**	**7**	**3**

Table 3.1.6.3 Hemodialysis Centers in Saudi Arabia – MOH Sector Madinah Region

No.	Dialysis Center Name	Consultant Nephrologists	Nephrology Specialists	Resident Doctor	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	King Fahad Hospital, Madinah	5	4	10	64	154	154	272	369
2	Prince Abdul Mohsin Hospital. Al Ulla	1	0	0	7	32	36	46	0
3	Badr General Hospital	0	2	0	7	21	23	39	0
4	Khaiber General Hospital	0	1	0	8	30	30	36	0
5	Al Eass General Hospital	0	1	1	5	18	23	34	0
6	Al Hanakiya General Hospital	0	1	1	9	17	29	28	0
7	Al Mhad General Hospital	0	2	0	6	20	18	21	0
8	Yanbu General Hospital	0	0	1	10	28	17	18	0
9	Maternity and Children Hospital, Madina	0	0	0	0	0	0	0	0
	Total	**6**	**11**	**13**	**116**	**320**	**330**	**494**	**369**

Table 3.1.6.3 Hemodialysis Patients in Saudi Arabia – MOH Sector Madinah Region

No	Dialysis Center Name	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	King Fahad Hospital, Madinah	24	137	18	6	18	1	3	20	22	80	138	34
2	Prince Abdul Mohsin Hospital. Al Ulla	45	10	4	0	2	0	0	4	5	5	15	10
3	Badr General Hospital	0	7	4	0	2	0	0	1	3	12	8	4
4	Khaiber General Hospital	1	7	1	1	1	0	0	1	16	6	14	3
5	Al Eass General Hospital	1	3	0	0	0	0	0	2	9	12	9	3
6	Al Hanakiya General Hospital	1	4	0	0	0	0	0	7	0	7	20	3
7	Al Mhad General Hospital	0	4	1	0	2	0	0	2	0	5	10	3
8	Yanbu General Hospital	6	0	0	0	0	0	0	0	1	5	10	0
9	Maternity and Children Hospital, Madina	0	0	0	0	0	0	0	0	0	0	0	0
	Total	**78**	**172**	**28**	**7**	**25**	**1**	**3**	**37**	**56**	**132**	**224**	**60**

Table 3.1.6.3 Hemodialysis Patient's Characteristics in Saudi Arabia in Saudi Arabia – MOH Sector Madinah Region

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	King Fahad Hospital, Madinah	272	76	47	16	133	139	133	158	4	103	4	3
2	Prince Abdul Mohsin Hospital. Al Ulla	46	8	6	2	30	20	26	32	1	12	0	1
3	Badr General Hospital	39	20	4	2	13	29	10	36	1	2	0	0
4	Khaiber General Hospital	36	8	5	6	17	16	20	16	0	19	1	0
5	Al Eass General Hospital	34	11	4	2	17	22	12	20	0	14	0	0
6	Al Hanakiya General Hospital	28	9	4	1	14	16	12	18	10	0	0	0
7	Al Mhad General Hospital	21	5	3	1	12	10	11	9	1	10	1	0
8	Yanbu General Hospital	18	5	1	0	12	11	7	13	0	5	0	0
9	Maternity and Children Hospital, Madina	0	0	0	0	0	0	0	0	0	0	0	0
	Total	**494**	**142**	**74**	**30**	**248**	**263**	**231**	**302**	**17**	**165**	**6**	**4**

Table 3.1.6.4 Hemodialysis Centers in Saudi Arabia – MOH Sector Tabuk Region

No.	Dialysis Center Name	Consultant Nephrologists	Nephrology Specialists	Resident Doctor	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	King Khalid Hospital, Tabuk	1	3	0	4	36	36	65	58
2	Al Hawraa Hospital Amloj	0	1	1	9	30	30	40	0
3	Tayma General Hospital	0	1	1	9	28	37	33	1
4	Dhuba General Hospital	0	1	2	10	30	30	23	0
5	Al Wajeh General Hospital	0	1	1	8	15	18	17	3
6	Al Bada General Hospital	0	1	0	7	13	9	17	0
7	Haql General Hospital	0	1	1	7	16	16	16	0
	Total	**1**	**9**	**6**	**54**	**168**	**176**	**211**	**62**

Table 3.1.6.4. Hemodialysis Patients in Saudi Arabia – MOH Sector Tabuk Region

No	Dialysis Center Name	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	King Khalid Hospital, Tabuk	19	0	1	4	3	1	0	0	28	19	9	11
2	Al Hawraa Hospital Amloj	0	11	2	0	2	0	0	4	1	13	13	1
3	Tayma General Hospital	1	4	1	0	1	0	0	4	0	13	16	3
4	Dhuba General Hospital	0	4	1	0	1	0	0	2	0	12	9	3
5	Al Wajeh General Hospital	1	3	0	0	0	0	0	1	1	10	4	1
6	Al Bada General Hospital	0	4	0	0	0	0	0	0	1	7	1	0
7	Haql General Hospital	0	2	1	0	0	0	0	0	3	4	2	2
	Total	**21**	**28**	**6**	**4**	**7**	**1**	**0**	**11**	**34**	**78**	**54**	**21**

Table 3.1.6.4 Hemodialysis Patient's Characteristics in Saudi Arabia – MOH Sector Tabuk Region

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	King Khalid Hospital, Tabuk	65	12	18	6	29	39	26	28	0	27	10	0
2	Al Hawraa Hospital Amloj	40	11	4	2	23	22	18	19	9	11	1	0
3	Tayma General Hospital	33	8	7	2	16	18	15	25	0	8	0	0
4	Dhuba General Hospital	23	8	4	1	10	15	8	22	0	0	1	0
5	Al Wajeh General Hospital	17	2	3	0	12	7	10	6	0	9	1	1
6	Al Bada General Hospital	17	4	3	1	9	9	8	11	1	5	0	0
7	Haql General Hospital	16	6	5	1	4	6	10	10	0	5	1	0
	Total	**211**	**51**	**44**	**13**	**103**	**116**	**95**	**121**	**10**	**65**	**14**	**1**

Table 3.1.6.5 Hemodialysis Centers in Saudi Arabia – MOH Sector Eastern Region Al Hasa / Hafar Al Batin Region

No.	Dialysis Center Name	Consultant Nephrologists	Nephrology Specialists	Resident Doctor	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	King Fahad Hospital, Hofuf	1	8	9	89	71	88	197	120
2	Dammam Medical Complex	3	5	9	93	47	91	124	62
3	King Khalid General Hospital, Hafar al Baten	2	2	5	34	42	42	110	110
4	Al Jubail General Hospital	1	0	3	19	36	22	42	17
5	Al Nairiyiah General Hospital	3	1	2	8	25	21	38	0
6	Al Khafji General Hospital	0	1	1	9	17	14	34	0
7	King Fahad Specialist Hospital, Dammam	9	5	0	23	14	28	33	204
8	Abgaig General Hospital	0	0	1	9	12	12	21	0
9	Rastanoura General Hospital	0	1	1	11	10	10	16	0
10	Al Gaissoma General Hospital	0	1	0	7	11	11	12	0
11	Al Rafiyah General Hospital	0	0	1	4	5	5	11	0
12	Qariya Oliya General Hospital	0	0	1	1	10	6	9	0
13	Prince Sultan bin Abdulaziz Hospital Urairah	0	0	1	2	5	5	2	0
	Total	**19**	**24**	**34**	**309**	**305**	**355**	**649**	**513**

Table 3.1.6.5. Hemodialysis Patients in Saudi Arabia – MOH Sector Eastern Region Al Hasa / Hafar Al Batin Region

No	Dialysis Center Name	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	King Fahad Hospital, Hofuf	13	119	28	2	2	2	0	21	9	58	78	15
2	Dammam Medical Complex	97	29	11	3	4	1	0	6	41	38	25	6
3	King Khalid General Hospital, Hafar al Baten	8	28	6	0	4	0	0	6	43	21	22	14
4	Al Jubail General Hospital	7	7	3	0	0	0	0	1	14	8	15	2
5	Al Nairiyiah General Hospital	3	10	3	0	0	0	0	3	10	6	20	4
6	Al Khafji General Hospital	1	4	1	1	0	0	0	2	4	3	20	3
7	King Fahad Specialist Hospital, Dammam	1	21	1	0	1	0	8	0	7	6	20	0
8	Abgaig General Hospital	5	6	1	0	0	0	0	2	4	9	6	2
9	Rastanoura General Hospital	0	3	3	2	2	0	0	3	6	4	4	1
10	Al Gaissoma General Hospital	1	3	1	0	0	0	0	0	0	1	8	6
11	Al Rafiyah General Hospital	0	4	1	1	0	0	0	3	3	2	6	1
12	Qariya Oliya General Hospital	1	3	1	1	0	0	0	2	1	2	5	1
13	Prince Sultan bin Abdulaziz Hospital Urairah	0	2	0	0	0	0	0	1	0	0	2	0
	Total	**137**	**239**	**60**	**10**	**13**	**3**	**8**	**50**	**142**	**158**	**231**	**55**

Table 3.1.6.5 Hemodialysis Patient's Characteristics in Saudi Arabia – MOH Sector Eastern Region Al Hasa / Hafar Al Batin Region

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	King Fahad Hospital, Hofuf	197	35	34	7	121	119	78	101	4	86	6	0
2	Dammam Medical Complex	124	37	32	7	48	77	47	49	3	64	7	1
3	King Khalid General Hospital, Hafar al Baten	110	29	34	6	41	58	52	53	4	48	5	0
4	Al Jubail General Hospital	42	15	6	3	18	32	10	28	0	14	0	0
5	Al Nairiyiah General Hospital	38	10	14	2	12	23	15	10	2	26	0	0
6	Al Khafji General Hospital	34	4	4	2	24	20	14	16	1	17	0	0
7	King Fahad Specialist Hospital, Dammam	33	8	8	1	16	17	16	8	0	25	0	0
8	Abgaig General Hospital	21	7	1	1	12	13	8	11	3	4	3	0
9	Rastanoura General Hospital	16	4	3	0	9	8	8	7	1	8	0	
10	Al Gaissoma General Hospital	12	2	2	0	8	5	7	5	0	6	1	0
11	Al Rafiyah General Hospital	11	3	2	0	6	5	6	5	1	5	0	0
12	Qariya Oliya General Hospital	9	2	2	1	4	4	5	5	0	4	0	0
13	Prince Sultan bin Abdulaziz Hospital Urairah	2	0	0	0	2	2	0	0	0	2	0	0
	Total	**649**	**156**	**142**	**30**	**321**	**383**	**266**	**298**	**19**	**309**	**22**	**1**

Table 3.1.6.6 Hemodialysis Centers in Saudi Arabia – MOH Sector Qassim Region

No.	Dialysis Center Name	Consultant Nephrologists	Nephrology Specialists	Resident Doctor	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	Al Bukariya General Hospital	0	1	3	12	15	23	51	0
2	Al Midnab General Hospital	0	1	1	9	12	21	42	0
3	Riyadh Al Khabra General Hospital	0	0	1	7	9	19	28	0
4	Al Asyah General Hospital	0	0	1	5	7	14	27	0
5	Al Badaya General Hospital	0	0	1	9	8	18	26	0
6	Dhariyah General Hospital	0	0	1	4	12	16	22	0
7	Ayun Al Juwah General Hospital	0	0	1	8	5	13	19	0
8	King Fahd Specialist Hospital, Buraida	6	4	2	11	19	32	18	0
9	Oklat Al-Sugour General Hospital	0	0	0	4	5	4	12	0
10	Qusaibah General Hospital	0	0	1	3	4	5	10	0
11	Qiba General Hospital	0	0	1	5	10	7	9	0
12	Buraida Central Hospital, Qassim	2	1	2	13	8	22	5	0
	Total	**8**	**7**	**15**	**90**	**114**	**194**	**269**	**0**

Table 3.1.6.6 Hemodialysis Patients in Saudi Arabia – MOH Sector Qassim Region

No	Dialysis Center Name	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	Al Bukariya General Hospital	0	13	4	0	0	0	0	7	0	21	21	6
2	Al Midnab General Hospital	6	12	5	1	2	0	0	5	2	12	25	3
3	Riyadh Al Khabra General Hospital	2	9	0	0	2	0	0	3	0	12	12	2
4	Al Asyah General Hospital	5	10	3	0	0	0	0	5	0	18	8	1
5	Al Badaya General Hospital	4	6	0	0	4	0	0	4	0	14	12	2
6	Dhariyah General Hospital	0	3	1	0	1	0	0	4	0	8	9	1
7	Ayun Al Juwah General Hospital	7	5	1	0	0	0	0	0	0	7	12	2
8	King Fahd Specialist Hospital, Buraida	1	9	0	0	0	0	0	7	0	4	10	0
9	Oklat Al-Sugour General Hospital	0	5	0	0	0	0	0	1	4	7	0	4
10	Qusaibah General Hospital	2	5	0	0	0	0	0	3	1	7	1	0
11	Qiba General Hospital	1	3	2	0	1	0	0	1	0	5	4	2
12	Buraida Central Hospital, Qassim	0	0	0	0	1	0	0	0	1	3	1	0
	Total	**28**	**80**	**16**	**1**	**11**	**0**	**0**	**40**	**8**	**118**	**115**	**23**

Table 3.1.6.6 Hemodialysis Patient's Characteristics in Saudi Arabia – MOH Sector Qassim Region

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	Al Bukariya General Hospital	51	12	9	2	28	31	20	21	2	25	2	1
2	Al Midnab General Hospital	42	9	12	1	20	23	19	15	1	26	0	0
3	Riyadh Al Khabra General Hospital	28	9	7	2	10	20	8	15	3	6	0	4
4	Al Asyah General Hospital	27	8	7	0	12	13	14	6	0	20	1	0
5	Al Badaya General Hospital	26	6	5	2	13	15	11	16	1	8	1	0
6	Dhariyah General Hospital	22	3	5	1	13	13	9	10	0	12	0	0
7	Ayun Al Juwah General Hospital	19	2	4	2	11	11	8	3	2	13	1	0
8	King Fahd Specialist Hospital, Buraida	18	5	4	1	8	11	7	3	0	13	2	0
9	Oklat Al-Sugour General Hospital	12	6	0	1	5	5	7	4	0	7	1	0
10	Qusaibah General Hospital	10	1	1	1	7	5	5	2	0	8	0	0
11	Qiba General Hospital	9	2	2	0	5	5	4	2	2	5	0	0
12	Buraida Central Hospital, Qassim	5	1	1	0	3	3	2	1	0	0	4	0
	Total	**269**	**64**	**57**	**13**	**135**	**155**	**114**	**98**	**11**	**143**	**12**	**5**

Table 3.1.6.7 Hemodialysis Centers in Saudi Arabia – MOH Sector Al Baha Region

No.	Dialysis Center Name	Consultant Nephrologists	Nephrology Specialists	Resident Doctor	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	King Fahad Hospital, Al Baha	1	3	1	17	10	33	61	0
2	Al Mikhwah General Hospital	0	1	1	11	14	16	35	0
3	Gilwah General Hospital	0	0	1	7	15	12	24	0
4	Aqiq General Hospital	0	0	1	5	10	10	16	0
5	Al Mandag General Hospital	0	0	1	6	22	17	16	0
6	Al Qaraah Hospital, Al Baha	0	0	2	5	11	7	4	0
	Total	**1**	**4**	**7**	**51**	**82**	**95**	**156**	**0**

Table 3.1.6.7 Hemodialysis Patients in Saudi Arabia – MOH Sector Al Baha Region

No	Dialysis Center Name	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	King Fahad Hospital, Al Baha	8	10	1	0	1	0	0	5	10	15	26	4
2	Al Mikhwah General Hospital	0	0	2	0	0	0	0	1	0	20	12	8
3	Gilwah General Hospital	0	3	2	1	0	0	0	4	0	8	13	2
4	Aqiq General Hospital	1	2	0	0	0	0	0	8	6	4	1	0
5	Al Mandag General Hospital	0	0	1	0	0	0	0	7	2	4	7	2
6	Al Qaraah Hospital, Al Baha	0	0	0	0	0	0	0	0	0	0	3	1
	Total	**9**	**15**	**6**	**1**	**1**	**0**	**0**	**25**	**18**	**51**	**62**	**17**

Table 3.1.6.7 Hemodialysis Patient's Characteristics in Saudi Arabia – MOH Sector Al Baha Region

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	King Fahad Hospital, Al Baha	61	12	8	10	31	31	30	30	2	27	2	0
2	Al Mikhwah General Hospital	35	11	2	0	22	20	15	24	0	10	1	0
3	Gilwah General Hospital	24	6	3	2	13	11	13	13	0	11	0	0
4	Aqiq General Hospital	16	10	2	1	3	11	5	7	0	9	0	0
5	Al Mandag General Hospital	16	10	2	1	3	10	6	7	0	9	0	0
6	Al Qaraah Hospital, Al Baha	4	1	0	1	2	2	2	3	0	1	0	0
	Total	**156**	**50**	**17**	**15**	**74**	**85**	**71**	**84**	**2**	**67**	**3**	**0**

Table 3.1.6.8 Hemodialysis Centers in Saudi Arabia – MOH Sector Al-Jouf Region

No.	Dialysis Center Name	Consultant Nephrologists	Nephrology Specialists	GP's	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	Domat Al Jundal General Hospital	0	2	3	14	15	25	46	0
2	Tabarjal General Hospital	1	0	2	11	18	22	45	3
	Total	**1**	**2**	**5**	**25**	**33**	**47**	**91**	**3**

Table 3.1.6.8 Hemodialysis Patients in Saudi Arabia – MOH Sector Al-Jouf Region

No	Dialysis Center Name	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	Domat Al Jundal General Hospital	2	9	2	0	0	0	0	7	2	11	23	3
2	Tabarjal General Hospital	1	19	3	0	0	0	0	4	5	16	20	15
	Total	**3**	**28**	**5**	**0**	**0**	**0**	**0**	**11**	**7**	**27**	**43**	**18**

Table 3.1.6.8 Hemodialysis Patient's Characteristics in Saudi Arabia – MOH Sector Al-Jouf Region

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	Domat Al Jundal General Hospital	46	10	14	2	20	24	22	30	4	12	0	0
2	Tabarjal General Hospital	45	4	9	0	32	22	23	20	0	24	0	1
	Total	**91**	**14**	**23**	**2**	**52**	**46**	**45**	**50**	**4**	**36**	**0**	**1**

Table 3.1.6.9 Hemodialysis Centers in Saudi Arabia – MOH Sector Northern Borders / Qurrayat Region

No.	Dialysis Center Name	Consultant Nephrologists	Nephrology Specialists	GP's	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	Rafah General Hospital	1	1	2	10	32	27	60	2
2	Ar-ar Central Hospital	0	3	4	15	37	35	54	0
3	Turaif General Hospital	0	1	1	14	20	31	37	0
4	Al Qurrayat General Hospital	0	1	3	16	8	8	23	63
5	Al Owaigila General Hospital	0	0	0	3	8	8	5	0
6	Shobat Nissab General Hospital	0	0	1	2	4	4	3	0
	Total	**1**	**6**	**11**	**60**	**109**	**113**	**182**	**65**

Table 3.1.6.9 Hemodialysis Patients in Saudi Arabia – MOH Sector Northern Borders / Qurrayat Region

No	Dialysis Center Name	*Non-Saudi Pts*	*New Pts.*	*HCV+ve pts.*	HCV PCR +ve Pts.	*HBsAg+ve Pts*	*HIV+ve Pts.*	*Pts < 15 Yrs*	*Pts > 75 yrs*	*Diabetic Pts (DM)*	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	Rafah General Hospital	4	6	0	0	1	0	0	4	10	18	24	5
2	Ar-ar Central Hospital	12	5	4	0	2	0	3	4	5	15	29	6
3	Turaif General Hospital	0	7	5	1	1	0	1	3	5	6	10	2
4	Al Qurrayat General Hospital	4	3	4	0	1	0	0	3	0	6	14	5
5	Al Owaigila General Hospital	0	2	0	0	0	0	0	0	0	2	2	2
6	Shobat Nissab General Hospital	0	1	0	0	0	0	0	0	1	1	1	0
	Total	**20**	**24**	**13**	**1**	**5**	**0**	**4**	**14**	**21**	**48**	**80**	**20**

Table 3.1.6.9 Hemodialysis Patients Characteristics in Saudi Arabia – MOH Sector Northern Borders / Qurrayat Region

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	Rafah General Hospital	60	16	19	0	25	34	26	37	0	17	6	0
2	Ar-ar Central Hospital	54	15	13	2	24	30	24	26	0	27	1	0
3	Turaif General Hospital	37	6	9	1	21	21	16	19	0	17	1	0
4	Al Qurrayat General Hospital	23	7	7	0	9	14	9	20	0	3	0	0
5	Al Owaigila General Hospital	5	0	2	0	3	2	3	3	0	2	0	0
6	Shobat Nissab General Hospital	3	1	1	0	1	1	2	1	0	2	0	0
	Total	**182**	**45**	**51**	**3**	**83**	**102**	**80**	**106**	**0**	**68**	**8**	**0**

Table 3.1.6.10 Hemodialysis Centers in Saudi Arabia – MOH Sector Hail Region

No.	Dialysis Center Name	Consultant Nephrologists	Nephrology Specialists	Resident Doctor	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	King Khalid Hospital, Hail	1	5	7	28	40	65	135	0
2	Baqaa General Hospital	0	0	2	10	21	36	43	2
3	Mawqaq General Hospital	0	0	2	7	12	15	15	0
4	Samira General Hospital	0	0	1	3	9	10	10	1
5	Shenan General Hospital	0	0	1	4	6	11	10	0
6	Al Sulaymi General Hospital	0	0	1	2	8	11	8	0
7	Ghazallah General Hospital	0	0	2	2	5	5	6	0
8	Al Shammali General Hospital	0	0	1	4	12	12	6	0
	Total	**1**	**5**	**17**	**60**	**113**	**165**	**233**	**3**

Table 3.1.6.10 Hemodialysis Patients in Saudi Arabia – MOH Sector Hail Region

No	Dialysis Center Name	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	King Khalid Hospital, Hail	4	86	9	2	4	0	1	28	36	65	25	16
2	Baqaa General Hospital	2	9	4	2	1	0	0	6	0	10	31	3
3	Mawqaq General Hospital	0	4	1	0	0	0	0	5	1	5	9	3
4	Samira General Hospital	0	2	2	0	0	0	0	1	0	3	7	1
5	Shenan General Hospital	0	8	0	0	0	0	0	3	0	2	8	4
6	Al Sulaymi General Hospital	0	1	0	0	0	0	0	3	1	3	3	0
7	Ghazallah General Hospital	0	2	0	0	0	0	0	2	0	1	5	0
8	Al Shammali General Hospital	0	0	0	0	0	0	0	5	0	0	6	1
	Total	**6**	**112**	**16**	**4**	**5**	**0**	**1**	**53**	**38**	**89**	**94**	**28**

Table 3.1.6.10 Hemodialysis Characteristics in Saudi Arabia – MOH Sector Hail Region

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	King Khalid Hospital, Hail	135	36	16	9	74	77	58	72	7	53	3	0
2	Baqaa General Hospital	43	6	13	0	24	25	18	26	0	17	0	0
3	Mawqaq General Hospital	15	4	2	3	6	6	9	9	0	6	0	0
4	Samira General Hospital	10	4	1	0	5	5	5	4	0	4	2	0
5	Shenan General Hospital	10	2	3	0	5	7	3	7	0	3	0	0
6	Al Sulaymi General Hospital	8	2	2	0	4	3	5	5	0	3	0	0
7	Ghazallah General Hospital	6	0	0	0	6	3	3	4	0	2	0	0
8	Al Shammali General Hospital	6	1	2	0	3	5	1	4	0	2	0	0
	Total	**233**	**55**	**39**	**12**	**127**	**131**	**102**	**131**	**7**	**90**	**5**	**0**

Table 3.1.6.11 Hemodialysis Centers in Saudi Arabia – MOH Sector Gizan Region

No.	Dialysis Center Name	Consultant Nephrologists	Nephrology Specialists	Resident Doctor	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	King Fahad Central Hospital, Gizan	1	2	5	51	71	87	179	65
2	Sabia General Hospital	1	3	1	28	26	68	137	0
3	Samtha General Hospital	0	1	3	13	25	39	71	0
4	Al Arda General Hospital, Gizan	0	1	2	10	14	23	48	0
5	Gizan General Hospital	0	1	1	13	16	24	45	0
6	Faifa General hospital, Gizan	0	1	0	8	10	12	41	0
7	Aldarb General Hospital, Gizan	0	0	2	9	7	12	21	0
8	Fursan General Hospital	0	2	0	3	3	6	6	0
	Total	**2**	**11**	**14**	**135**	**172**	**271**	**548**	**65**

Table 3.1.6.11 Hemodialysis Patients in Saudi Arabia – MOH Sector Gizan Region

No	Dialysis Center Name	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	King Fahad Central Hospital, Gizan	61	50	22	8	11	0	10	8	2	110	22	17
2	Sabia General Hospital	52	0	10	7	4	0	0	11	43	62	14	7
3	Samtha General Hospital	37	18	15	10	8	0	0	8	10	31	5	15
4	Al Arda General Hospital, Gizan	19	0	0	0	0	0	0	5	8	16	4	1
5	Gizan General Hospital	27	1	0	0	0	0	0	2	6	30	4	1
6	Faifa General hospital, Gizan	2	0	0	0	0	0	0	4	2	17	16	1
7	Aldarb General Hospital, Gizan	4	3	0	0	0	0	0	4	5	10	3	2
8	Fursan General Hospital	0	1	0	0	0	0	0	0	1	1	3	1
	Total	**202**	**73**	**47**	**25**	**23**	**0**	**10**	**42**	**77**	**277**	**71**	**45**

Table 3.1.6.11 Hemodialysis Patients in Saudi Arabia – MOH Sector Gizan Region

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	King Fahad Central Hospital, Gizan	179	41	17	2	119	76	103	124	2	51	2	0
2	Sabia General Hospital	137	45	9	5	78	74	63	76	0	54	1	6
3	Samtha General Hospital	71	8	5	10	48	31	40	25	1	30	10	5
4	Al Arda General Hospital, Gizan	48	8	2	0	38	24	24	31	1	14	2	0
5	Gizan General Hospital	45	12	4	1	28	24	21	33	0	10	1	1
6	Faifa General hospital, Gizan	41	12	0	0	29	23	18	21	1	17	2	0
7	Aldarb General Hospital, Gizan	21	3	1	0	17	16	5	15	0	5	1	0
8	Fursan General Hospital	6	1	2	0	3	2	4	1	0	4	1	0
	Total	**548**	**130**	**40**	**18**	**360**	**270**	**278**	**326**	**5**	**185**	**20**	**12**

Table 3.1.6.12 Hemodialysis Centers in Saudi Arabia – MOH Sector Najran Region

No.	Dialysis Center Name	Consultant Nephrologists	Nephrology Specialists	Resident Doctor	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	King Khalid Hospital, Najran	1	5	3	28	33	65	89	10
2	Sharurah General Hospital	0	3	0	8	24	27	51	4
3	Yadama Hospital, Najran	0	0	2	3	7	10	16	0
4	Habona General Hospital	0	0	1	3	11	11	7	0
5	Thar Hospital, Najran	0	0	1	2	5	8	6	0
6	Bader Al Janob General Hospital	0	0	1	2	9	8	2	0
	Total	**1**	**8**	**8**	**46**	**89**	**129**	**171**	**14**

Table 3.1.6.12 Hemodialysis Patients in Saudi Arabia – MOH Sector Najran Region

No	Dialysis Center Name	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	King Khalid Hospital, Najran	33	18	4	0	16	0	0	15	19	10	20	3
2	Sharurah General Hospital	0	26	4	0	5	0	0	6	0	18	20	6
3	Yadama Hospital, Najran	0	6	2	0	0	0	0	3	0	6	8	2
4	Habona General Hospital	0	1	0	0	0	0	0	2	0	3	4	1
5	Thar Hospital, Najran	0	3	0	0	0	0	0	4	0	2	4	0
6	Bader Al Janob General Hospital	0	2	0	0	0	0	0	2	0	0	2	0
	Total	**33**	**56**	**10**	**0**	**21**	**0**	**0**	**32**	**19**	**39**	**58**	**12**

Table 3.1.6.12 Hemodialysis Patients Characteristics in Saudi Arabia – MOH Sector Najran Region

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	King Khalid Hospital, Najran	89	50	36	0	3	57	32	58	1	20	10	0
2	Sharurah General Hospital	51	7	18	4	22	25	26	26	0	21	4	0
3	Yadama Hospital, Najran	16	4	0	1	11	6	10	3	0	13	0	0
4	Habona General Hospital	7	0	6	0	1	2	5	6	0	0	0	1
5	Thar Hospital, Najran	6	1	2	0	3	3	3	2	0	3	1	0
6	Bader Al Janob General Hospital	2	0	0	0	2	2	0	1	0	1	0	0
	Total	**171**	**62**	**62**	**5**	**42**	**95**	**76**	**96**	**1**	**58**	**15**	**1**

Table 3.1.6.13 Hemodialysis Centers in Saudi Arabia – MOH Sector Assir / Bisha Region

No.	Dialysis Center Name	Consultant Nephrologists	Nephrology Specialists	Resident Doctor	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	King Abdullah Hospital, Besha	0	0	3	19	34	47	107	0
2	Sabt Al Alayah General Hospital	0	1	0	8	14	21	38	0
3	Sarat Obaidah General Hospital	0	1	0	4	18	22	31	0
4	Dharan Al Janoub Hospital	0	1	1	7	11	15	30	0
5	Tathleeth General Hospital	0	1	1	5	16	24	23	0
6	Rijal Almaa General Hospital	0	1	0	6	13	16	21	0
7	Ahad Rufaidah General Hospital	0	0	0	0	12	14	19	0
8	Al Ghamah General Hospital	0	0	1	3	9	9	16	0
9	Balasmar General Hospital	0	1	0	3	16	16	14	0
10	Tabalah Hospital	0	1	1	4	7	11	9	0
11	Albirk General Hospital	0	0	1	3	4	4	3	0
	Total	**0**	**7**	**8**	**62**	**154**	**199**	**311**	**0**

Table 3.1.6.13 Hemodialysis Patients in Saudi Arabia – MOH Sector Assir / Bisha Region

No	Dialysis Center Name	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg +ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	King Abdullah Hospital, Besha	0	13	10	1	1	0	0	16	48	22	20	1
2	Sabt Al Alayah General Hospital	1	4	0	0	3	0	0	13	0	10	28	2
3	Sarat Obaidah General Hospital	0	5	2	0	0	0	0	5	0	5	26	3
4	Dharan Al Janoub Hospital	2	10	2	2	1	0	2	8	12	6	7	2
5	Tathleeth General Hospital	0	2	3	2	0	0	0	5	0	6	17	2
6	Rijal Almaa General Hospital	0	5	1	0	3	0	0	4	0	12	6	3
7	Ahad Rufaidah General Hospital	1	2	8	0	1	0	0	0	1	15	1	1
8	Al Ghamah General Hospital	0	7	0	0	0	0	0	3	1	10	3	0
9	Balasmar General Hospital	0	2	0	0	0	0	0	1	1	3	7	1
10	Tabalah Hospital	0	3	0	0	0	0	0	0	1	2	5	0
11	Albirk General Hospital	0	1	0	0	0	0	0	0	1	1	1	0
	Total	**4**	**54**	**26**	**5**	**9**	**0**	**2**	**55**	**65**	**92**	**121**	**15**

Table 3.1.6.13 Hemodialysis Patient's Characteristics in Saudi Arabia – MOH Sector Assir / Bisha Region

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	King Abdullah Hospital, Besha	107	23	11	7	66	53	54	64	1	39	3	0
2	Sabt Al Alayah General Hospital	38	16	5	1	16	18	20	23	1	10	3	1
3	Sarat Obaidah General Hospital	31	10	1	4	16	14	17	13	1	17	0	0
4	Dharan Al Janoub Hospital	30	9	2	0	19	14	16	15	0	15	0	0
5	Tathleeth General Hospital	23	5	1	2	15	12	11	11	1	9	2	0
6	Rijal Almaa General Hospital	21	5	3	0	13	12	9	17	0	4	0	0
7	Ahad Rufaidah General Hospital	19	4	0	0	15	9	10	14	1	0	0	4
8	Al Ghamah General Hospital	16	7	1	0	8	11	5	8	1	5	2	0
9	Balasmar General Hospital	14	6	2	0	6	10	4	7	1	6	0	0
10	Tabalah Hospital	9	1	1	1	6	7	2	4	0	5	0	0
11	Albirk General Hospital	3	1	0	0	2	1	2	2	0	1	0	0
	Total	**311**	**87**	**27**	**15**	**182**	**161**	**150**	**178**	**7**	**111**	**10**	**5**

Table 3.1.6.14 Hemodialysis Centers in Saudi Arabia MOH Davita Outsourcing Dialysis Program

No.	Dialysis Center Name	Consultant Nephrologists	Nephrology Specialists	Resident Doctor	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	King Abdul Abdulaziz Specialist Hospital, Taif	2	4	2	34	75	56	229	8
2	Davita East, Jeddah	3	3	3	37	58	65	228	0
3	Mohayel General Hospital	1	3	3	29	41	45	184	0
4	Davita 1, Buraida	1	3	3	25	48	53	171	0
5	King Abdul Aziz Hospital, Jeddah (Davita)	2	2	2	25	52	53	165	0
6	Qateef Central Hospital	1	2	2	29	36	41	161	0
7	Davita, Makkah 1	1	2	1	19	35	39	121	0
8	Davita Clinic, Samtha	1	2	1	17	35	35	119	0
9	Davita Health Care, Riyadh	1	2	1	16	33	36	111	0
10	Davita Kidney Care, Al Kharj	1	1	2	17	34	34	106	0
11	Davita West, Madina	1	2	1	16	32	32	106	0
12	King Faisal Hospital, Al Ahsa	1	2	1	18	30	35	103	0
13	Davita Sabia Clinic	1	2	1	14	32	35	102	0
14	King Fahad Hospital, Tabuk	1	2	1	15	33	30	98	0
15	Abha Maternity and Pediatric Hospital	1	3	1	15	38	42	97	0
16	Davita, Jizan	1	2	2	14	30	33	96	0
17	Davita 2, Buraida	1	2	1	15	26	28	94	4
18	South Riyadh, Azizia	1	1	2	12	22	21	77	0
19	Al Majardah General Hospital	1	1	2	13	19	19	76	0
20	Al Jaber Davita Clinic, Al Ahsa	1	1	1	10	32	35	73	0
21	Davita Madina 2	1	1	1	9	33	20	55	0
22	Imam Abdulrahman Al Faisal, Riyadh	1	1	1	9	14	16	47	0
23	Davita Alkhobar Clinic	1	1	1	10	33	36	43	0
	Total	**27**	**45**	**36**	**418**	**821**	**839**	**2662**	**12**

Table 3.1.6.14 Hemodialysis Patients in Saudi Arabia MOH Davita Outsourcing Dialysis Program

No	Dialysis Center Name	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	King Abdul Abdulaziz Specialist Hospital, Taif	0	50	15	4	17	0	10	15	35	120	60	20
2	Davita East, Jeddah	0	38	24	1	7	0	0	22	8	80	100	24
3	Mohayel General Hospital	0	40	16	0	14	0	0	10	30	50	20	12
4	Davita 1, Buraida	0	31	6	1	2	0	0	7	26	48	84	10
5	King Abdul Aziz Hospital, Jeddah (Davita)	0	52	15	2	5	0	0	6	36	59	40	12
6	Qateef Central Hospital	0	24	20	1	3	0	0	13	5	47	89	24
7	Davita, Makkah 1	0	8	22	1	8	0	0	10	11	66	29	6
8	Davita Clinic, Samtha	0	5	15	3	5	0	0	15	9	65	30	9
9	Davita Health Care, Riyadh	0	28	3	2	3	0	0	0	3	45	50	4
10	Davita Kidney Care, Al Kharj	0	40	6	0	0	0	0	7	5	36	42	1
11	Davita West, Madina	0	15	8	7	4	0	0	11	9	40	42	4
12	King Faisal Hospital, Al Ahsa	0	11	5	0	0	0	0	10	0	28	72	12
13	Davita Sabia Clinic	0	16	2	2	5	0	0	11	16	40	26	5
14	King Fahad Hospital, Tabuk	0	15	8	2	0	0	0	4	6	34	25	1
15	Abha Maternity and Pediatric Hospital	0	6	0	0	2	0	0	11	36	25	30	2
16	Davita, Jizan	0	45	4	1	4	0	0	12	26	33	16	5
17	Davita 2, Buraida	0	24	7	0	0	0	0	7	29	18	7	8
18	South Riyadh, Azizia	0	12	3	0	1	0	0	9	13	19	29	3
19	Al Majardah General Hospital	0	5	5	2	7	0	0	9	21	29	20	3
20	Al Jaber Davita Clinic, Al Ahsa	0	23	7	0	1	0	0	7	0	28	44	2
21	Davita Madina 2	0	31	1	0	0	0	0	6	5	12	31	2
22	Imam Abdulrahman Al Faisal, Riyadh	47	12	0	0	0	0	0	2	13	9	25	4
23	Davita Alkhobar Clinic	0	15	1	0	0	0	0	1	1	16	21	5
	Total	**47**	**546**	**193**	**29**	**88**	**0**	**10**	**205**	**343**	**947**	**932**	**178**

Table 3.1.6.14 Hemodialysis patient's Characteristics in Saudi Arabia – MOH Davita Outsourcing Dialysis Program

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	King Abdul Abdulaziz Specialist Hospital, Taif	229	59	34	8	128	92	137	155	5	66	3	0
2	Davita East, Jeddah	228	78	44	10	96	148	80	161	14	53	0	0
3	Mohayel General Hospital	184	60	15	18	91	109	75	145	5	31	3	0
4	Davita 1, Buraida	171	34	42	6	89	95	76	126	8	31	6	0
5	King Abdul Aziz Hospital, Jeddah (Davita)	165	56	25	6	78	86	79	144	6	10	5	0
6	Qateef Central Hospital	161	30	43	4	84	97	64	105	8	42	6	0
7	Davita, Makkah 1	121	35	23	3	60	63	58	94	9	17	1	0
8	Davita Clinic, Samtha	119	5	8	2	104	61	58	82	5	32	0	0
9	Davita Health Care, Riyadh	111	28	18	3	62	60	51	51	13	45	2	0
10	Davita Kidney Care, Al Kharj	106	25	21	5	55	61	45	40	4	60	2	0
11	Davita West, Madina	106	24	15	10	57	55	51	69	7	29	1	
12	King Faisal Hospital, Al Ahsa	103	22	19	2	60	52	51	74	2	27	0	0
13	Davita Sabia Clinic	102	56	26	8	12	57	45	84	8	10	0	0
14	King Fahad Hospital, Tabuk	98	25	19	2	52	57	41	65	2	28	2	1
15	Abha Maternity and Pediatric Hospital	97	23	11	3	60	7	90	73	5	18	1	0
16	Davita, Jizan	96	28	10	3	55	48	48	68	4	22	2	0
17	Davita 2, Buraida	94	17	22	3	52	61	33	78	0	14	2	0
18	South Riyadh, Azizia	77	18	13	3	43	48	29	50	4	18	5	
19	Al Majardah General Hospital	76	17	6	2	51	39	37	50	2	22	2	0
20	Al Jaber Davita Clinic, Al Ahsa	73	17	19	4	33	43	30	44	4	19	0	6
21	Davita Madina 2	55	18	11	2	24	37	18	22	5	28	0	0
22	Imam Abdulrahman Al Faisal, Riyadh	47	11	5	1	30	24	23	35	3	7	2	0
23	Davita Alkhobar Clinic	43	11	13	2	17	20	23	22	3	18	0	0
	Total	**2662**	**697**	**462**	**110**	**1393**	**1420**	**1242**	**1837**	**126**	**647**	**45**	**7**

Table 3.1.6.15 Hemodialysis Centers in Saudi Arabia MOH Diaverum Outsourcing Dialysis Program

No.	Dialysis Center Name	Consultant Nephrologists	Nephrology Specialists	Resident Doctor	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	Prince Abdul Majid Dialysis Center 9004, Jeddah	5	7	6	6	104	94	437	0
2	Khamis Mushayt General Hospital, 9017	1	3	3	26	58	58	189	0
3	King Faisal Medical City 9007, Taif	2	3	2	25	60	61	186	12
4	Prince Mohammad Bin Abdulaziz Hospital Hospital 9003, Riyadh	2	3	2	31	53	53	171	0
5	Diaverum North Jeddah 9012	2	2	2	29	37	33	170	0
6	Diaverum Abha, 9030	1	5	2	22	77	53	168	10
7	Diaverum Renal Center Awali 9026, Makkah	2	3	2	26	30	33	167	0
8	Diaverum AB 9011, Makkah	2	3	2	25	30	33	162	0
9	Diaverum 9034, Hail	2	2	3	22	40	44	150	0
10	Diavarum AB 9014, Dammam	1	3	1	22	30	35	149	8
11	Diaverum 9005, Al Hassa	1	2	1	24	36	36	131	0
12	King Saud Hospital 9009, Unaiza	1	1	1	18	39	45	131	3
13	Diaverum 9038, Skaka	2	2	2	21	46	48	131	0
14	Majduie, Dammam 3, 9019	1	2	1	18	30	23	116	14
15	Diaverum Dammam 9020	2	2	1	17	33	30	116	10
16	Diaverum Kidney Center 9028, Buraidah	1	2	1	15	33	33	111	0
17	Diaverum 9037, Abu Arish	1	3	0	17	30	33	110	0
18	Diaverum AB 9010, Madinah	1	2	2	16	30	33	108	0
19	Diaverum 9023, Madinah	1	2	2	17	33	33	107	0
20	Diaverum AB/Riyadh West Clinic 9008	1	1	2	16	29	32	105	0
21	Hafar Al baten Central Hospital 9033	1	2	1	15	28	33	104	7
22	New Najran General Hospital 9013	1	1	1	21	45	39	102	0
23	Al Omran General Hospital 9047	1	2	1	15	30	29	95	0
24	South Qunfudah General Hospital 9006	1	2	1	13	30	33	94	0
25	Al Rass General Hospital 9046	1	1	1	13	24	27	92	0
26	Yanbu General Hospital, Diaverum 9016	1	2	1	13	30	30	89	0
27	Baish General Hospital 9021	1	1	1	12	30	29	82	0
28	Qunfudah Dialysis Clinic 9041	1	1	1	11	33	33	80	0
29	Wadi Dawasir , Diaverum	1	1	1	12	21	25	65	0
30	Gurrayat General Hospital 9035	1	2	1	10	39	32	60	0

Table 3.1.6.15 Hemodialysis Centers in Saudi Arabia MOH Diaverum Outsourcing Dialysis Program (Continuation)

No.	Dialysis Center Name	Consultant Nephrologists	Nephrology Specialists	Resident Doctor	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
31	Diaverum Ar-Ar 9043	1	1	2	10	34	34	60	0
32	Ahad Almasarha 9025	1	2	1	10	25	25	60	0
33	Diaverum 9042, Dawadmi	0	2	1	11	22	21	59	0
34	Khulais General Hospital 9032	1	1	1	8	20	18	54	0
35	Namera Kidney Center 9052, Makkah	0	2	1	10	30	23	50	0
36	Diaverum, Riyadh Central Ab 9029	1	1	1	10	33	29	45	0
37	Prince Meshari Bin Saud Kidney Center Beljurashi, 9031	0	2	1	9	30	28	43	0
38	Al Nammas General Hospital, 9048	0	2	0	7	22	22	39	0
39	Diaverum Clinic 9001, Al Khobar	1	0	1	7	23	20	26	0
	Total	**47**	**81**	**57**	**630**	**1407**	**1373**	**4414**	**64**

Table 3.1.6.15 Hemodialysis Patients in Saudi Arabia MOH Diaverum Outsourcing Dialysis Program

No	Dialysis Center Name	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	Prince Abdul Majid Dialysis Center 9004, Jeddah	0	36	50	4	14	8	0	30	73	136	145	51
2	Khamis Mushayt General Hospital, 9017	0	0	1	0	4	0	0	22	30	40	72	14
3	King Faisal Medical City 9007, Taif	0	30	28	1	0	0	0	25	10	58	88	20
4	Prince Mohammad Bin Abdulaziz Hospital Hospital 9003, Riyadh	0	15	10	0	3	0	0	10	50	71	50	15
5	Diaverum North Jeddah 9012	0	26	18	5	4	0	2	10	5	59	86	9
6	Diaverum Abha, 9030	0	75	12	1	2	0	0	23	10	40	80	21
7	Diaverum Renal Center Awali 9026, Makkah	0	20	13	0	0	0	0	5	0	63	81	8
8	Diaverum AB 9011, Makkah	0	52	16	2	4	0	0	6	37	29	56	12
9	Diaverum 9034, Hail	0	13	15	0	2	0	0	25	1	43	87	15
10	Diavarum AB 9014, Dammam	0	19	17	5	9	0	0	15	14	35	64	16
11	Diaverum 9005, Al Hassa	0	0	6	1	3	0	2	14	58	17	17	5
12	King Saud Hospital 9009, Unaiza	0	21	8	0	2	0	1	13	63	26	40	13
13	Diaverum 9038, Skaka	0	21	9	0	4	0	1	8	52	40	13	3
14	Majduie, Dammam 3, 9019	0	25	11	0	0	0	0	13	17	28	46	11
15	Diaverum Dammam 9020	0	9	3	0	0	0	0	8	46	45	25	6
16	Diaverum Kidney Center 9028, Buraidah	0	26	3	0	0	0	0	8	13	25	37	1
17	Diaverum 9037, Abu Arish	0	28	10	2	4	0	0	11	0	73	32	8
18	Diaverum AB 9010, Madinah	0	4	18	0	0	0	0	5	17	25	30	7
19	Diaverum 9023, Madinah	0	5	5	0	0	0	0	5	31	11	38	6
20	Diaverum AB/Riyadh West Clinic 9008	0	10	10	0	0	0	0	5	9	23	48	4
21	Hafar Al baten Central Hospital 9033	0	22	0	0	0	0	0	8	42	34	22	4
22	New Najran General Hospital 9013	0	0	5	3	4	0	0	15	35	25	35	5
23	Al Omran General Hospital 9047	95	18	2	1	0	0	0	8	2	23	65	7
24	South Qunfudah General Hospital 9006	0	19	12	1	5	0	0	9	30	22	24	8
25	Al Rass General Hospital 9046	0	18	9	0	1	0	2	12	44	0	39	3
26	Yanbu General Hospital, Diaverum 9016	89	3	8	0	3	0	0	9	42	20	15	5
27	Baish General Hospital 9021	0	5	6	1	9	0	0	7	1	40	33	12
28	Qunfudah Dialysis Clinic 9041	0	15	12	0	2	0	0	10	6	31	24	15
29	Wadi Dawasir , Diaverum	0	19	0	0	3	0	0	2	13	18	34	0
30	Gurrayat General Hospital 9035	0	0	6	0	3	0	1	8	12	27	15	1

Table 3.1.6.15 Hemodialysis Patients in Saudi Arabia MOH Diaverum Outsourcing Dialysis Program

No	Dialysis Center Name	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
31	Diaverum Ar-Ar 9043	0	2	0	0	0	0	0	5	0	24	36	0
32	Ahad Almasarha 9025	0	20	0	0	3	0	0	5	0	32	26	0
33	Diaverum 9042, Dawadmi	0	4	4	2	2	0	0	8	0	17	41	3
34	Khulais General Hospital 9032	0	9	1	0	3	0	0	7	0	31	17	1
35	Namera Kidney Center 9052, Makkah	0	3	8	0	2	0	0	6	1	23	15	4
36	Diaverum, Riyadh Central Ab 9029	0	2	4	0	1	0	0	3	0	21	24	3
37	Prince Meshari Bin Saud Kidney Center Beljurashi, 9031	0	8	5	1	1	0	0	4	4	15	22	2
38	Al Nammas General Hospital, 9048	0	1	0	0	0	0	0	8	14	10	15	7
39	Diaverum Clinic 9001, Al Khobar	12	3	1	0	1	0	0	2	0	7	16	3
	Total	**196**	**606**	**346**	**30**	**98**	**8**	**9**	**397**	**782**	**1307**	**1653**	**328**

Table 3.1.6.15 Hemodialysis Centers in Saudi Arabia MOH Diaverum Outsourcing Dialysis Program

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	Prince Abdul Majid Dialysis Center 9004, Jeddah	437	114	83	21	219	245	192	322	26	87	1	1
2	Khamis Mushayt General Hospital, 9017	189	56	20	3	110	103	86	2	155	31	1	0
3	King Faisal Medical City 9007, Taif	186	45	35	5	101	114	72	147	9	30	0	0
4	Prince Mohammad Bin Abdulaziz Hospital Hospital 9003, Riyadh	171	52	36	3	80	98	73	132	7	32	0	0
5	Diaverum North Jeddah 9012	170	44	33	9	84	102	68	117	7	43	3	0
6	Diaverum Abha, 9030	168	64	16	3	85	129	39	136	3	29	0	0
7	Diaverum Renal Center Awali 9026, Makkah	167	55	29	10	73	97	70	156	6	5	0	0
8	Diaverum AB 9011, Makkah	162	42	31	11	78	91	71	157	2	3	0	0
9	Diaverum 9034, Hail	150	44	48	3	55	83	67	115	4	29	2	0
10	Diavarum AB 9014, Dammam	149	46	29	5	69	96	53	112	10	24	3	0
11	Diaverum 9005, Al Hassa	131	31	27	3	70	71	60	115	6	10	0	0
12	King Saud Hospital 9009, Unaiza	131	33	25	7	66	76	55	91	2	36	2	0
13	Diaverum 9038, Skaka	131	28	35	4	64	75	56	98	6	25	2	0
14	Majduie, Dammam 3, 9019	116	33	24	7	52	73	43	88	5	22	1	0
15	Diaverum Dammam 9020	116	34	28	0	54	81	35	91	8	17	0	0
16	Diaverum Kidney Center 9028, Buraidah	111	20	30	6	55	64	47	86	5	20	0	0
17	Diaverum 9037, Abu Arish	110	28	11	5	66	60	50	96	2	12	0	0
18	Diaverum AB 9010, Madinah	108	33	19	1	55	67	41	73	6	26	3	0
19	Diaverum 9023, Madinah	107	36	19	6	46	66	41	81	3	21	2	0
20	Diaverum AB/Riyadh West Clinic 9008	105	24	20	2	59	59	46	90	2	12	1	0
21	Hafar Al baten Central Hospital 9033	104	25	25	7	47	61	43	88	0	16	0	0
22	New Najran General Hospital 9013	102	27	19	5	51	41	61	77	2	22	1	0
23	Al Omran General Hospital 9047	95	29	24	5	37	47	48	77	6	12	0	0
24	South Qunfudah General Hospital 9006	94	21	12	4	57	38	56	73	8	12	1	0
25	Al Rass General Hospital 9046	92	25	19	7	41	47	45	71	3	17	1	0
26	Yanbu General Hospital, Diaverum 9016	89	28	9	2	50	49	40	71	4	13	1	0
27	Baish General Hospital 9021	82	24	3	3	52	47	35	67	3	11	1	0
28	Qunfudah Dialysis Clinic 9041	80	25	10	5	40	45	35	55	6	18	1	0
29	Wadi Dawasir , Diaverum	65	18	13	1	33	33	32	43	0	22	0	0
30	Gurrayat General Hospital 9035	60	12	11	7	30	24	36	48	2	10	0	0

Table 3.1.6.15 Hemodialysis Patient's Characteristics in Saudi Arabia MOH Diaverum Outsourcing Dialysis Program (Continuation)

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
31	Diaverum Ar-Ar 9043	60	14	19	0	27	28	32	36	0	21	3	0
32	Ahad Almasarha 9025	60	16	11	3	30	22	38	39	1	20	0	0
33	Diaverum 9042, Dawadmi	59	11	16	2	30	26	33	43	4	12	0	0
34	Khulais General Hospital 9032	54	20	5	4	25	29	25	37	0	15	2	0
35	Namera Kidney Center 9052, Makkah	50	13	4	4	29	28	22	43	3	2	2	0
36	Diaverum, Riyadh Central Ab 9029	45	9	9	2	25	29	16	41	1	3	0	0
37	Prince Meshari Bin Saud Kidney Center Beljurashi, 9031	43	16	3	0	24	24	19	32	3	7	1	0
38	Al Nammas General Hospital, 9048	39	14	3	4	18	31	8	32	0	7	0	0
39	Diaverum Clinic 9001, Al Khobar	26	10	5	1	10	17	9	16	1	9	0	0
	Total	**4414**	**1219**	**818**	**180**	**2197**	**2516**	**1898**	**3294**	**321**	**763**	**35**	**1**

Table 3.1.6.16 **Hemodialysis Centers in Saudi Arabia GOVT. NON-MOH Hospitals**

No.	Dialysis Center Name	Consultant Nephrologists	Nephrology Specialists	Resident Doctor	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	Prince Sultan Military Medical City, Riyadh (Adult)	13	9	6	159	100	130	366	134
2	Armed Forces Hospital Southern Region, Khamis Mushayt	12	16	6	95	79	118	313	2360
3	King Fahad Armed Forces Hospital, Jeddah	5	16	0	91	81	90	305	12
4	King Abdulaziz Medical City & National Guard Hospital, Riyadh	2	4	0	114	40	75	297	0
5	Security Forces Hospital	2	3	3	55	43	63	251	0
6	King Salman Military Hospital Tabuk	3	4	2	79	38	56	182	320
7	Al Hada Armed Forces Hospital, Taif	7	9	0	45	56	67	165	48
8	King Faisal Specialist Hospital and Research Center, Riyadh	6	4	7	68	45	94	162	1650
9	King Abdulaziz Medical City and National Guard, Jeddah	5	2	5	8	18	32	104	148
10	King Faisal Specialist Hospital and Research Center, Jeddah	6	5	6	44	29	28	102	226
11	King Fahad University Hospital, Dammam	7	4	0	45	34	31	100	0
12	King Abdul Aziz Medical City, Ahsa (NG)	3	6	2	25	13	29	96	51
13	King Fahad Military Medical Complex, Dhahran	3	4	0	29	33	33	94	150
14	Al Kharj Military Industrial Corp. Hospital, Riyadh	1	3	1	23	21	22	83	0
15	King Saud University Medical City, Riyadh	10	12	0	39	69	48	81	0
16	Johns Hopkins Health Center (ARAMCO), Dahran	5	5	0	32	26	28	70	44
17	Royal Commission Medical Center, Yanbu	1	2	0	14	24	24	65	4
18	Royal Commission Hospital- Jubail	2	1	1	0	25	31	55	0
19	King Abdul Aziz University Hospital, Jeddah	6	3	0	8	35	46	47	0
20	Prince Sultan Military Hospital Hospital, Madinah	1	1	3	12	6	6	17	0
21	Al Khafji Joint Operation Hospital	1	0	1	8	10	7	16	3
22	Northern Area Armed Forces Hospital, Hafar Al Batin	1	0	0	5	8	8	12	0
23	King Abdullah Specialized Children Hospital National Guard, Riyadh	4	7	0	18	8	18	7	0
24	Prince Sultan Military Medical City, Riyadh (Pediatric)	5	4	4	5	6	10	4	53
	Total	**111**	**124**	**47**	**1021**	**847**	**1094**	**2994**	**5203**

Table 3.1.6.16 Hemodialysis Patients in Saudi Arabia GOVT. NON-MOH Hospitals

No	Dialysis Center Name	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	Prince Sultan Military Medical City, Riyadh (Adult)	4	41	26	1	13	1	2	72	0	142	210	34
2	Armed Forces Hospital Southern Region, Khamis Mushayt	0	85	4	0	5	0	4	76	61	68	136	35
3	King Fahad Armed Forces Hospital, Jeddah	0	129	5	4	15	1	4	6	38	42	216	49
4	King Abdulaziz Medical City & National Guard Hospital, Riyadh	1	82	20	0	11	0	1	86	15	104	148	42
5	Security Forces Hospital	4	65	20	0	17	0	0	29	11	99	110	13
6	King Salman Military Hospital Tabuk	179	0	3	0	3	0	10	8	48	46	73	29
7	Al Hada Armed Forces Hospital, Taif	3	27	4	4	7	0	0	27	46	41	15	10
8	King Faisal Specialist Hospital and Research Center, Riyadh	5	36	24	0	4	0	5	25	19	63	27	13
9	King Abdulaziz Medical City and National Guard, Jeddah	1	10	11	2	4	0	1	22	11	16	73	9
10	King Faisal Specialist Hospital and Research Center, Jeddah	0	18	10	0	5	0	5	0	22	34	20	11
11	King Fahad University Hospital, Dammam	7	20	8	2	0	0	0	10	20	40	30	17
12	King Abdul Aziz Medical City, Ahsa (NG)	0	10	7	4	3	0	0	16	2	34	55	9
13	King Fahad Military Medical Complex, Dhahran	2	11	3	2	7	0	0	3	27	19	44	6
14	Al Kharj Military Industrial Corp. Hospital, Riyadh	0	18	7	5	4	0	0	14	8	21	25	6
15	King Saud University Medical City, Riyadh	8	0	4	4	0	0	0	7	15	28	27	8
16	Johns Hopkins Health Center (ARAMCO), Dahran	3	62	1	0	0	0	0	17	9	8	35	25
17	Royal Commission Medical Center, Yanbu	5	24	2	1	2	0	0	6	0	38	24	2
18	Royal Commission Hospital- Jubail	3	15	4	1	1	0	0	8	4	10	36	5
19	King Abdul Aziz University Hospital, Jeddah	35	6	0	0	0	0	0	1	8	10	12	5
20	Prince Sultan Military Hospital Hospital, Madinah	0	0	0	0	0	0	0	2	1	6	9	2
21	Al Khafji Joint Operation Hospital	0	3	0	0	1	0	0	4	5	5	4	1
22	Northern Area Armed Forces Hospital, Hafar Al Batin	1	7	0	0	1	0	0	2	1	1	5	1
23	King Abdullah Specialized Children Hospital National Guard, Riyadh	7	0	0	0	0	0	7	0	0	0	0	0
24	Prince Sultan Military Medical City, Riyadh (Pediatric)	0	2	0	0	0	0	4	0	0	4	0	1
	Total	**268**	**671**	**163**	**30**	**103**	**2**	**43**	**441**	**371**	**879**	**1334**	**333**

Table 3.1.6.16 Hemodialysis Patient's Characteristics in Saudi Arabia GOVT. NON-MOH Hospitals

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	Prince Sultan Military Medical City, Riyadh (Adult)	366	106	69	13	178	195	171	109	4	243	8	2
2	Armed Forces Hospital Southern Region, Khamis Mushayt	313	116	24	6	167	168	145	134	1	170	8	0
3	King Fahad Armed Forces Hospital, Jeddah	305	111	65	25	104	146	159	188	15	0	102	0
4	King Abdulaziz Medical City & National Guard Hospital, Riyadh	297	81	56	14	146	128	169	92	12	193	0	0
5	Security Forces Hospital	251	79	43	10	119	130	121	102	3	124	21	1
6	King Salman Military Hospital Tabuk	182	47	35	9	91	75	107	179	1	1	1	0
7	Al Hada Armed Forces Hospital, Taif	165	44	28	4	89	83	82	95	3	59	8	0
8	King Faisal Specialist Hospital and Research Center, Riyadh	162	47	25	9	81	70	92	104	33	24	1	0
9	King Abdulaziz Medical City and National Guard, Jeddah	104	28	20	3	53	59	45	50	0	52	2	0
10	King Faisal Specialist Hospital and Research Center, Jeddah	102	31	15	1	55	46	56	24	1	77	0	0
11	King Fahad University Hospital, Dammam	100	16	15	9	60	53	47	54	6	33	7	0
12	King Abdul Aziz Medical City, Ahsa (NG)	96	22	17	3	54	34	62	44	2	42	8	0
13	King Fahad Military Medical Complex, Dhahran	94	30	16	1	47	63	31	65	7	21	0	1
14	Al Kharj Military Industrial Corp. Hospital, Riyadh	83	21	14	2	46	51	32	25	0	54	3	1
15	King Saud University Medical City, Riyadh	81	21	18	2	40	42	39	51	4	21	4	1
16	Johns Hopkins Health Center (ARAMCO), Dahran	70	18	13	2	37	35	35	30	20	20	0	0
17	Royal Commission Medical Center, Yanbu	65	28	12	3	22	39	26	42	1	19	0	3
18	Royal Commission Hospital-Jubail	55	23	19	8	5	30	25	26	0	26	3	0
19	King Abdul Aziz University Hospital, Jeddah	47	16	5	2	24	24	23	23	1	21	1	1
20	Prince Sultan Military Hospital Hospital, Madinah	17	6	2	1	8	8	9	12	0	5	0	0
21	Al Khafji Joint Operation Hospital	16	4	2	0	10	9	7	7	0	8	1	0
22	Northern Area Armed Forces Hospital, Hafar Al Batin	12	5	3	0	4	5	7	7	1	3	1	0
23	King Abdullah Specialized Children Hospital National Guard, Riyadh	7	3	2	0	2	7	0	2	0	5	0	0
24	Prince Sultan Military Medical City, Riyadh (Pediatric)	4	0	1	0	3	2	2	0	0	4	0	0
	Total	**2994**	**903**	**519**	**127**	**1445**	**1502**	**1492**	**1465**	**115**	**1225**	**179**	**10**

Table 3.1.6.17 Hemodialysis Centers in Saudi Arabia Private & Charitable Hospitals

No.	Dialysis Center Name	Consultant Nephrologists	Nephrology Specialists	Resident Doctor	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts.
1	Hisham Attar Dialysis Center	0	0	4	17	53	61	199	0
2	Dr. Bassam Al Hemsi Medical Center	1	2	0	18	39	39	188	40
3	Dr. Suleiman Al Fakeeh Hospital, Jeddah	5	5	5	25	40	66	138	86
4	Dr. Erfan and Bagedo, Jeddah	6	4	1	24	23	32	110	12
5	Charity Community Dialysis Center, Makkah	0	1	2	16	26	26	110	0
6	Omran Dialsysis Center, Jeddah	0	2	0	5	16	16	109	0
7	Al Salam Dialysis Center	1	1	3	12	25	26	107	3
8	Dr. Ali Lehbi Dialysis Center,Takhasusi Branch, Riyadh	1	1	2	14	17	25	105	0
9	Demas Dialysis Center	2	1	1	10	19	19	100	0
10	Al Takaful Al- Khairy K.D.C, Makkah	0	2	0	11	27	27	85	0
11	Al Moosa General Hospital, Ahsa	2	2	0	27	31	47	84	0
12	Al Mansour Medical Center, Jeddah	1	1	1	8	22	30	82	0
13	Al Faisal Polyclinic, Jeddah	1	1	2	10	15	15	81	0
14	Al Mana Hospital, Dammam	3	3	5	33	40	68	79	28
15	International Renal Care Center, Jeddah	1	1	1	12	30	30	77	2
16	Al Mouwasat Hospital, Dammam	1	3	0	13	20	26	70	0
17	Dr. Abdulhadi Taher Charity Foundation	1	0	2	9	25	22	70	3
18	Al Shomoly Medical Polyclinic	1	1	1	7	14	20	67	0
19	Abdulakarim Bakr Medical Center, Jeddah	1	1	0	11	21	18	65	0
20	Dr. Abdurahman Baksh Hospital, Jeddah	1	1	0	16	23	61	61	0
21	Saudi German Hospital, Jeddah	2	2	0	10	10	15	59	8
22	Al Faiha Medical Center	0	1	0	6	14	14	56	3
23	Al Mouwasat Hospital, Qateef	1	2	0	11	18	22	49	2
24	Saudi German Hospital, Riyadh	1	2	0	9	9	16	47	5
25	Arab Medical Dar Dialysis Center, Riyadh	1	1	1	10	14	16	46	0
26	Al Ahsa Hospital	1	0	1	15	26	22	44	5
27	Al Mana General Hospital, Al Khobar	1	3	0	18	9	23	42	45
28	Al Khawalid kidney & dialysis Center, Riyadh	0	1	0	6	18	30	41	0
29	Asia Dialysis Center, Makkah	1	1	0	7	21	17	40	0
30	Riyadh Care Hospital	1	0	2	12	14	26	40	0
31	Care National Hospital	2	0	1	13	17	17	39	1
32	Taibah Dialysis Center, Madinah	1	0	1	5	20	14	39	0

Table 3.1.6.17 Hemodialysis Centers in Saudi Arabia Private & Charitable Hospitals (Continuation)

No.	Dialysis Center Name	Consultant Nephrologists	Nephrology Specialists	GP's	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
33	Dr. Suleiman Al Habeeb Medical Center Rayan, Riyadh	2	1	0	12	10	13	38	25
34	Al Mustagbal Hospital, Jeddah	0	1	2	4	6	6	38	5
35	International Medical Center	2	3	0	14	10	12	38	0
36	Al Hammadi Hospital, Suwaidi	1	2	0	12	10	11	37	0
37	Al Mana General Hospital, Al Hassa	1	0	2	20	17	35	36	10
38	New Jeddah Clinic Hospital	1	0	0	5	13	15	34	7
39	Dr. Suleiman Al Habib Medical Center (Suweidi)	2	1	2	11	14	14	33	2
40	Saudi German Hospital, Madina	0	1	2	4	10	10	24	0
41	Basharahil Hospital, Makkah	1	1	0	3	5	6	24	0
42	Jeddah Clinic Hospital Kandarah	0	2	0	4	5	5	24	0
43	Dr. A. Al Mishari Hospital, Riyadh	1	1	0	5	8	8	22	10
44	Al Hammadi Hospital, Riyadh	1	1	0	6	10	7	22	8
45	Olaya Medical Complex Clinic	0	1	1	6	5	6	20	0
46	New Al Jedani Hospital	1	0	0	3	8	8	17	0
47	Saudi German Hospital, Abha	2	1	1	4	7	8	17	3
48	Madina National Hospital	0	1	0	4	9	7	12	0
49	Dr. Suleiman Al Habeeb Medical Center, Qassim	1	0	0	2	6	7	8	0
50	Bugshan General Hospital, Jeddah	0	1	0	2	5	6	8	3
51	Kingdom Hospital, Riyadh	0	1	1	5	2	3	6	3
52	Abha International Private Hospital	0	2	0	3	0	2	0	0
53	Hussein Al Ahli General Hospital, Al Hassa	0	0	0	0	0	0	0	0
54	Abha Private Hospital	0	2	0	2	6	7	0	0
	Total	**57**	**69**	**47**	**551**	**882**	**1102**	**2987**	**319**

Table 3.1.6.17 Hemodialysis Patients in Saudi Arabia Private & Charitable Hospitals

No	Dialysis Center Name	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	Hisham Attar Dialysis Center	199	52	20	0	12	0	0	7	35	123	35	19
2	Dr. Bassam Al Hemsi Medical Center	187	58	19	16	8	0	0	0	42	37	79	2
3	Dr. Suleiman Al Fakeeh Hospital, Jeddah	49	25	6	0	0	0	1	14	28	28	72	7
4	Dr. Erfan and Bagedo, Jeddah	52	28	10	4	0	0	0	8	40	36	29	6
5	Charity Community Dialysis Center, Makkah	110	73	20	0	3	0	2	2	37	22	42	23
6	Omran Dialsysis Center, Jeddah	109	18	2	0	0	0	0	0	0	22	57	0
7	Al Salam Dialysis Center	107	13	0	0	0	0	0	5	20	30	45	26
8	Dr. Ali Lehbi Dialysis Center,Takhasusi Branch, Riyadh	10	52	0	0	0	0	0	9	37	39	23	4
9	Demas Dialysis Center	94	20	6	4	3	0	0	5	50	25	15	3
10	Al Takaful Al- Khairy K.D.C, Makkah	84	5	24	11	6	0	0	0	9	33	43	15
11	Al Moosa General Hospital, Ahsa	3	16	1	0	1	0	1	12	10	13	59	12
12	Al Mansour Medical Center, Jeddah	82	5	13	0	0	0	0	1	0	36	10	5
13	Al Faisal Polyclinic, Jeddah	79	17	12	0	0	0	0	0	5	36	31	6
14	Al Mana Hospital, Dammam	6	15	6	2	6	0	0	16	4	8	51	9
15	International Renal Care Center, Jeddah	39	20	1	1	3	0	0	12	25	15	10	5
16	Al Mouwasat Hospital, Dammam	1	25	4	4	3	0	0	11	10	21	39	8
17	Dr. Abdulhadi Taher Charity Foundation	70	70	0	0	0	0	0	0	25	20	25	5
18	Al Shomoly Medical Polyclinic	63	4	1	0	0	0	0	1	10	29	22	8
19	Abdulakarim Bakr Medical Center, Jeddah	64	6	11	1	0	0	0	2	24	22	16	2
20	Dr. Abdurahman Baksh Hospital, Jeddah	46	10	3	1	0	0	0	16	8	28	16	0
21	Saudi German Hospital, Jeddah	44	12	7	2	0	0	0	0	0	26	33	0
22	Al Faiha Medical Center	56	5	6	3	0	0	0	5	21	18	8	2
23	Al Mouwasat Hospital, Qateef	0	8	3	0	0	0	0	13	14	19	11	0
24	Saudi German Hospital, Riyadh	41	14	3	0	0	0	0	2	0	17	28	4
25	Arab Medical Dar Dialysis Center, Riyadh	43	7	7	0	0	0	0	1	2	25	16	4
26	Al Ahsa Hospital	1	0	1	1	2	0	0	5	0	7	37	9
27	Al Mana General Hospital, Al Khobar	13	20	0	0	0	0	0	4	10	4	27	4
28	Al Khawalid kidney & dialysis Center, Riyadh	41	0	16	0	5	0	0	0	2	18	10	4
29	Asia Dialysis Center, Makkah	40	4	21	7	0	0	1	0	4	11	15	3
30	Riyadh Care Hospital	15	6	1	0	3	0	0	2	10	5	25	9
31	Care National Hospital	24	16	1	1	1	0	0	0	11	16	12	6
32	Taibah Dialysis Center, Madinah	39	2	12	1	0	0	0	0	0	23	4	7

Table 3.1.6.17 Hemodialysis Patients in Saudi Arabia Private & Charitable Hospitals (Continuation)

No	Dialysis Center Name	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
33	Dr. Suleiman Al Habeeb Medical Center Rayan, Riyadh	3	7	0	0	0	0	0	3	8	4	25	3
34	Al Mustagbal Hospital, Jeddah	36	10	0	0	3	0	0	3	0	16	20	3
35	International Medical Center	14	7	4	3	0	0	0	8	11	18	9	2
36	Al Hammadi Hospital, Suwaidi	16	22	3	0	0	0	0	2	0	16	19	3
37	Al Mana General Hospital, Al Hassa	0	8	4	3	0	0	0	7	1	7	23	4
38	New Jeddah Clinic Hospital	31	7	3	2	0	0	0	1	7	16	6	3
39	Dr. Suleiman Al Habib Medical Center (Suweidi)	4	11	3	0	0	0	1	6	2	10	18	2
40	Saudi German Hospital, Madina	11	10	3	1	0	0	0	1	4	10	5	2
41	Basharahil Hospital, Makkah	23	8	1	1	0	0	0	0	3	8	6	4
42	Jeddah Clinic Hospital Kandarah	23	7	0	0	0	0	0	1	0	10	13	2
43	Dr. A. Al Mishari Hospital, Riyadh	18	10	2	0	0	0	0	1	0	13	9	3
44	Al Hammadi Hospital, Riyadh	16	6	0	0	0	0	0	0	0	12	8	1
45	Olaya Medical Complex Clinic	19	5	0	0	0	0	0	0	0	5	15	0
46	New Al Jedani Hospital	15	10	0	0	0	0	0	0	3	5	4	4
47	Saudi German Hospital, Abha	10	6	2	0	0	0	0	0	0	7	10	0
48	Madina National Hospital	2	3	1	0	0	0	0	1	8	4	0	0
49	Dr. Suleiman Al Habeeb Medical Center, Qassim	3	2	3	0	0	0	0	3	0	0	8	0
50	Bugshan General Hospital, Jeddah	8	4	0	0	0	0	0	0	0	6	2	0
51	Kingdom Hospital, Riyadh	5	2	0	0	0	0	0	2	2	1	2	0
52	Abha International Private Hospital	0	0	0	0	0	0	0	0	0	0	0	0
53	Hussein Al Ahli General Hospital, Al Hassa	0	0	0	0	0	0	0	0	0	0	0	0
54	Abha Private Hospital	0	0	0	0	0	0	0	0	0	0	0	0
	Total	**2068**	**771**	**266**	**69**	**59**	**0**	**6**	**192**	**542**	**980**	**1147**	**253**

Table 3.1.6.17 Hemodialysis Patients in Saudi Arabia Private & Charitable Hospitals

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	Hisham Attar Dialysis Center	199	60	29	7	103	139	60	147	1	43	4	4
2	Dr. Bassam Al Hemsi Medical Center	188	36	49	9	94	138	50	134	13	36	3	2
3	Dr. Suleiman Al Fakeeh Hospital, Jeddah	138	36	26	7	69	80	58	94	7	0	1	36
4	Dr. Erfan and Bagedo, Jeddah	110	28	31	14	37	68	42	43	24	39	1	3
5	Charity Community Dialysis Center, Makkah	110	19	30	6	55	74	36	93	1	14	2	0
6	Omran Dialsysis Center, Jeddah	109	28	21	5	55	67	42	78	1	30	0	0
7	Al Salam Dialysis Center	107	12	18	3	74	79	28	81	1	21	2	2
8	Dr. Ali Lehbi Dialysis Center,Takhasusi Branch, Riyadh	105	22	16	4	63	62	43	31	1	72	0	1
9	Demas Dialysis Center	100	10	20	20	50	75	25	40	5	51	2	2
10	Al Takaful Al- Khairy K.D.C, Makkah	85	28	19	4	34	49	36	74	0	9	2	0
11	Al Moosa General Hospital, Ahsa	84	20	14	3	47	57	27	31	21	30	1	1
12	Al Mansour Medical Center, Jeddah	82	16	9	10	47	58	24	76	1	4	1	0
13	Al Faisal Polyclinic, Jeddah	81	15	12	14	40	52	29	73	1	7	0	
14	Al Mana Hospital, Dammam	79	22	13	11	33	45	34	37	13	27	2	0
15	International Renal Care Center, Jeddah	77	15	12	15	35	57	20	54	2	20	1	0
16	Al Mouwasat Hospital, Dammam	70	10	15	5	40	35	35	30	8	30	2	0
17	Dr. Abdulhadi Taher Charity Foundation	70	10	8	6	46	46	24	58	2	1	0	9
18	Al Shomoly Medical Polyclinic	67	12	15	10	30	38	29	46	4	15	2	0
19	Abdulakarim Bakr Medical Center, Jeddah	65	18	12	6	29	34	31	46	3	16	0	0
20	Dr. Abdurahman Baksh Hospital, Jeddah	61	20	18	5	18	44	17	33	1	25	1	1
21	Saudi German Hospital, Jeddah	59	22	5	1	31	33	26	36	1	22	0	0
22	Al Faiha Medical Center	56	23	12	5	16	36	20	33	1	19	3	0
23	Al Mouwasat Hospital, Qateef	49	21	11	1	16	22	27	23	11	13	2	0
24	Saudi German Hospital, Riyadh	47	13	5	2	27	28	19	18	2	25	2	0
25	Arab Medical Dar Dialysis Center, Riyadh	46	15	10	0	21	30	16	38	0	7	1	0
26	Al Ahsa Hospital	44	8	11	3	22	25	19	26	8	9	1	0
27	Al Mana General Hospital, Al Khobar	42	12	19	3	8	30	12	30	4	8	0	0
28	Al Khawalid kidney & dialysis Center, Riyadh	41	7	6	0	28	24	17	30	5	0	6	0
29	Asia Dialysis Center, Makkah	40	12	8	0	20	27	13	37	0	3	0	0
30	Riyadh Care Hospital	40	10	8	2	20	26	14	18	1	21	0	0
31	Care National Hospital	39	12	4	0	23	28	11	18	1	17	3	0
32	Taibah Dialysis Center, Madinah	39	12	8	1	18	19	20	33	1	4	1	0

Table 3.1.6.17 Hemodialysis Patient's Characteristics in Saudi Arabia Private & Charitable Hospitals (Continuation)

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
33	Dr. Suleiman Al Habeeb Medical Center Rayan, Riyadh	38	10	7	2	19	16	22	25	1	12	0	0
34	Al Mustagbal Hospital, Jeddah	38	19	2	0	17	28	10	16	1	15	1	5
35	International Medical Center	38	12	10	2	14	15	23	19	2	16	1	0
36	Al Hammadi Hospital, Suwaidi	37	7	6	0	24	29	8	15	0	21	0	1
37	Al Mana General Hospital, Al Hassa	36	11	9	1	15	19	17	20	4	11	1	0
38	New Jeddah Clinic Hospital	34	10	12	9	3	15	19	13	0	14	2	5
39	Dr. Suleiman Al Habib Medical Center (Suweidi)	33	0	2	3	28	21	12	18	1	14	0	0
40	Saudi German Hospital, Madina	24	8	9	4	3	14	10	16	0	8	0	0
41	Basharahil Hospital, Makkah	24	6	5	6	7	13	11	15	1	5	0	3
42	Jeddah Clinic Hospital Kandarah	24	6	3	0	15	14	10	13	0	2	1	8
43	Dr. A. Al Mishari Hospital, Riyadh	22	8	2	3	9	14	8	7	2	12	1	0
44	Al Hammadi Hospital, Riyadh	22	12	0	1	9	18	4	16	1	5	0	0
45	Olaya Medical Complex Clinic	20	3	10	4	3	18	2	10	0	9	0	1
46	New Al Jedani Hospital	17	5	1	4	7	14	3	10	0	7	0	0
47	Saudi German Hospital, Abha	17	7	3	4	3	12	5	12	2	3	0	0
48	Madina National Hospital	12	6	3	2	1	8	4	10	0	0	0	2
49	Dr. Suleiman Al Habeeb Medical Center, Qassim	8	3	1	0	4	5	3	5	0	2	1	0
50	Bugshan General Hospital, Jeddah	8	2	4	0	2	5	3	5	1	2	0	0
51	Kingdom Hospital, Riyadh	6	1	1	0	4	5	1	2	2	2	0	0
52	Abha International Private Hospital	0	0	0	0	0	0	0	0	0	0	0	0
53	Hussein Al Ahli General Hospital, Al Hassa	0	0	0	0	0	0	0	0	0	0	0	0
54	Abha Private Hospital	0	0	0	0	0	0	0	0	0	0	0	0
	Total	**2987**	**740**	**584**	**227**	**1436**	**1908**	**1079**	**1886**	**163**	**798**	**54**	**86**

Table 3.1.6.18 Hemodialysis Centers in Saudi Arabia King Abdullah Project Hospitals

No.	Dialysis Center Name	Consultant Nephrologists	Nephrology Specialists	Resident Doctor	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	King Abdullah Hemodialysis Project, Riyadh South Center	2	1	8	66	97	110	317	0
2	King Abdullah Hemodialysis Project, Riyadh North Center	2	8	0	65	101	101	291	23
3	King Abdullah Hemodialysis Project, Jeddah	2	1	8	93	194	194	265	0
4	King Abdullah Project Hemodialysis, Al Madinah	2	0	3	27	48	53	125	0
5	King Abdullah Dialysis Project, Makkah	1	0	5	32	100	100	118	0
6	King Abdullah Hemodialysis Project, Hail	1	1	2	18	38	40	91	0
	Total	**10**	**11**	**26**	**301**	**578**	**598**	**1207**	**23**

Table 3.1.6.18 Hemodialysis Patients in Saudi Arabia King Abdullah Project Hospitals

No	Dialysis Center Name	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	King Abdullah Hemodialysis Project, Riyadh South Center	1	121	31	6	7	0	0	33	141	140	36	15
2	King Abdullah Hemodialysis Project, Riyadh North Center	10	48	17	0	2	0	1	36	32	78	129	6
3	King Abdullah Hemodialysis Project, Jeddah	74	54	27	2	4	1	0	34	6	107	126	16
4	King Abdullah Project Hemodialysis, Al Madinah	31	12	7	0	0	0	0	13	30	20	50	6
5	King Abdullah Dialysis Project, Makkah	16	18	6	1	2	0	0	15	27	25	55	6
6	King Abdullah Hemodialysis Project, Hail	1	11	8	0	0	0	0	17	7	25	34	3
	Total	**133**	**264**	**96**	**9**	**15**	**1**	**1**	**148**	**243**	**395**	**430**	**52**

Table 3.1.6.18 Hemodialysis Patient's Characteristics in Saudi Arabia King Abdullah Project Hospitals

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	King Abdullah Hemodialysis Project, Riyadh South Center	317	82	60	16	159	134	183	194	28	93	2	0
2	King Abdullah Hemodialysis Project, Riyadh North Center	291	76	55	14	146	174	117	168	22	99	2	0
3	King Abdullah Hemodialysis Project, Jeddah	265	74	53	8	130	153	112	165	4	91	5	0
4	King Abdullah Project Hemodialysis, Al Madinah	125	41	22	7	55	77	48	81	6	38	0	0
5	King Abdullah Dialysis Project, Makkah	118	31	22	6	59	61	57	72	5	41	0	0
6	King Abdullah Hemodialysis Project, Hail	91	20	20	4	47	33	58	48	5	38	0	0
	Total	**1207**	**324**	**232**	**55**	**596**	**632**	**575**	**728**	**70**	**400**	**9**	**0**

Table 3.1.6.19 Total No. of Hemodialysis Centers in MOH Hospitals According to Region

No	Hemodialysis Center region wise	No. of HD units	Consultant Nephrologists	Nephrology Specialists	Resident Doctor	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	Riyadh	31	29	44	76	497	525	763	1321	417
2	Madinah	9	6	11	13	116	320	330	494	369
3	Eastern	13	19	24	34	309	305	355	649	513
4	Makkah/Jeddah/Taif	13	15	18	29	174	201	322	622	56
5	Gizan	8	2	11	14	135	172	271	548	65
6	Tabuk	7	1	9	6	54	168	176	211	62
7	Assir	11	0	7	8	62	154	199	311	0
8	Qassim	12	8	7	15	90	114	194	269	0
9	Hail	8	1	5	17	60	113	165	233	3
10	Northern Borders	6	1	6	11	60	109	113	182	65
11	Najran	6	1	8	8	46	89	129	171	14
12	Al Baha	6	1	4	7	51	82	95	156	0
13	Al Jouf	2	1	2	5	25	33	47	91	3
		132	**85**	**156**	**243**	**1679**	**2385**	**3159**	**5258**	**1567**

Table 3.1.6.19 Hemodialysis Patients in Saudi Arabia in MOH Hospitals According to Region

No	Hemodialysis Center region wise	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	Riyadh	96	293	119	25	36	1	14	127	174	437	509	146
2	Madinah	78	172	28	7	25	1	3	37	56	132	224	60
3	Eastern	137	239	60	10	13	3	8	50	142	158	231	55
4	Makkah/Jeddah/Taif	19	114	89	10	30	0	1	44	25	119	405	33
5	Gizan	202	73	47	25	23	0	10	42	77	277	71	45
6	Tabuk	21	28	6	4	7	1	0	11	34	78	54	21
7	Assir	4	54	26	5	9	0	2	55	65	92	121	15
8	Qassim	28	80	16	1	11	0	0	40	8	118	115	23
9	Hail	6	112	16	4	5	0	1	53	38	89	94	28
10	Northern Borders	20	24	13	1	5	0	4	14	21	48	80	20
11	Al Baha	9	15	6	1	1	0	0	25	18	51	62	17
12	Najran	33	56	10	0	21	0	0	32	19	39	58	12
13	Al Jouf	3	28	5	0	0	0	0	11	7	27	43	18
	Total	**656**	**1288**	**441**	**93**	**186**	**6**	**43**	**541**	**684**	**1665**	**2067**	**493**

Table 3.1.6.19 Hemodialysis Patient's Characteristics in Saudi Arabia in MOH Hospitals According to Region

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	Riyadh	1321	320	245	49	707	743	578	678	75	506	33	29
2	Madinah	494	142	74	30	248	263	231	302	17	165	6	4
3	Eastern	649	156	142	30	321	383	266	298	19	309	22	1
4	Makkah/Jeddah/Taif	622	190	243	36	153	307	315	394	27	191	7	3
5	Gizan	548	130	40	18	360	270	278	326	5	185	20	12
6	Tabuk	211	51	44	13	103	116	95	121	10	65	14	1
7	Assir	311	87	27	15	182	161	150	178	7	111	10	5
8	Qassim	269	64	57	13	135	155	114	98	11	143	12	5
9	Hail	233	55	39	12	127	131	102	131	7	90	5	0
10	Northern Borders	182	45	51	3	83	102	80	106	0	68	8	0
11	Al Baha	156	50	17	15	74	85	71	84	2	67	3	0
12	Najran	171	62	62	5	42	95	76	96	1	58	15	1
13	Al Jouf	91	14	23	2	52	46	45	50	4	36	0	1
	Total	**5258**	**1366**	**1064**	**241**	**2587**	**2857**	**2401**	**2862**	**185**	**1994**	**155**	**62**

Table 3.1.6.20 Total No. of Hemodialysis Centers of MOH DAVITA Outsourcing Dialysis Program According to Region

No.	Hemodialysis Center region wise	No. of HD units	Consultant Nephrologists	Nephrology Specialists	Resident Doctor	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	Makkah/Jeddah/Taif	4	8	11	8	115	220	213	743	8
2	Eastern	4	4	6	5	67	131	147	380	0
3	Assir	3	3	7	6	57	98	106	357	0
4	Riyadh	4	4	5	6	54	103	107	341	0
5	Gizan	3	3	6	4	45	97	103	317	0
6	Qassim	2	2	5	4	40	74	81	265	4
7	Madinah	2	2	3	2	25	65	52	161	0
8	Tabuk	1	1	2	1	15	33	30	98	0
	Total	**23**	**27**	**45**	**36**	**418**	**821**	**839**	**2662**	**12**

Table 3.1.6.20 Total No. Hemodialysis Patients in Saudi Arabia of MOH DAVITA Outsourcing Dialysis Program According to Region

No	Hemodialysis Center region wise	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	Makkah/Jeddah/Taif	0	148	76	8	37	0	10	53	90	325	229	62
2	Eastern	0	73	33	1	4	0	0	31	6	119	226	43
3	Assir	0	51	21	2	23	0	0	30	87	104	70	17
4	Riyadh	47	92	12	2	4	0	0	18	34	109	146	12
5	Gizan	0	66	21	6	14	0	0	38	51	138	72	19
6	Qassim	0	55	13	1	2	0	0	14	55	66	91	18
7	Madinah	0	46	9	7	4	0	0	17	14	52	73	6
8	Tabuk	0	15	8	2	0	0	0	4	6	34	25	1
	Total	**47**	**546**	**193**	**29**	**88**	**0**	**10**	**205**	**343**	**947**	**932**	**178**

Table 3.1.6.20 Total No. Hemodialysis Patient's Characteristics in Saudi Arabia of MOH DAVITA Outsourcing Dialysis Program According to Region

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	Makkah/Jeddah/Taif	743	228	126	27	362	389	354	554	34	146	9	0
2	Eastern	380	80	94	12	194	212	168	245	17	106	6	6
3	Assir	357	100	32	23	202	155	202	268	12	71	6	0
4	Riyadh	341	82	57	12	190	193	148	176	24	130	11	0
5	Gizan	317	89	44	13	171	166	151	234	17	64	2	0
6	Qassim	265	51	64	9	141	156	109	204	8	45	8	0
7	Madinah	161	42	26	12	81	92	69	91	12	57	1	0
8	Tabuk	98	25	19	2	52	57	41	65	2	28	2	1
	Total	**2662**	**697**	**462**	**110**	**1393**	**1420**	**1242**	**1837**	**126**	**647**	**45**	**7**

Table 3.1.6.21 Total No. of Hemodialysis Centers of DIAVERUM Outsourcing Dialysis Program According to Region

No.	Hemodialysis Center region wise	No. of HD units	Consultant Nephrologists	Nephrology Specialists	Resident Doctor	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	Makkah/Jeddah/Taif	4	16	24	18	153	374	361	1400	12
2	Eastern	7	8	13	7	118	210	206	737	39
3	Riyadh	3	5	8	7	80	158	160	445	0
4	Assir/Bisha	1	2	10	5	55	157	133	396	10
5	Qassim	1	3	4	3	46	96	105	334	3
6	Madinah	3	3	6	5	46	93	96	304	0
7	Gizan	3	3	6	2	39	85	87	252	0
8	Hail	1	2	2	3	22	40	44	150	0
9	Al Jouf	1	2	2	2	21	46	48	131	0
10	Northern Borders	2	2	3	3	20	73	66	120	0
11	Najran	1	1	1	1	21	45	39	102	0
12	Al Baha	1	0	2	1	9	30	28	43	0
	Total	**39**	**47**	**81**	**57**	**630**	**1407**	**1373**	**4414**	**64**

Table 3.1.6.21 Total No. Hemodialysis Patients in Saudi Arabia of DIAVERUM Outsourcing Dialysis Program According to Region

No	Hemodialysis Center region wise	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	Makkah/Jeddah/Taif	0	210	158	13	34	8	2	108	162	452	536	128
2	Eastern	107	96	40	7	13	0	2	68	179	189	255	52
3	Riyadh	0	50	28	2	9	0	0	28	72	150	197	25
4	Qassim	0	65	20	0	3	0	3	33	120	51	116	17
5	Madinah	89	12	31	0	3	0	0	19	90	56	83	18
6	Gizan	0	53	16	3	16	0	0	23	1	145	91	20
7	Assir	0	76	13	1	6	0	0	53	54	90	167	42
8	Hail	0	13	15	0	2	0	0	25	1	43	87	15
9	Al Jouf	0	21	9	0	4	0	1	8	52	40	13	3
10	Northern Borders	0	2	6	0	3	0	1	13	12	51	51	1
11	Najran	0	0	5	3	4	0	0	15	35	25	35	5
12	Al Baha	0	8	5	1	1	0	0	4	4	15	22	2
	Total	**196**	**606**	**346**	**30**	**98**	**8**	**9**	**397**	**782**	**1307**	**1653**	**328**

Table 3.1.6.21 Total No. Hemodialysis Patient's Characteristics in Saudi Arabia of DIAVERUM Outsourcing Dialysis Program According to Region

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	Makkah/Jeddah/Taif	1400	379	242	73	706	789	611	1107	67	215	10	1
2	Eastern	737	208	162	28	339	446	291	587	36	110	4	0
3	Riyadh	445	114	94	10	227	245	200	349	14	81	1	0
4	Assir	396	134	39	10	213	263	133	170	158	67	1	0
5	Qassim	334	78	74	20	162	187	147	248	10	73	3	0
6	Madinah	304	97	47	9	151	182	122	225	13	60	6	0
7	Gizan	252	68	25	11	148	129	123	202	6	43	1	0
8	Hail	150	44	48	3	55	83	67	115	4	29	2	0
9	Al Jouf	131	28	35	4	64	75	56	98	6	25	2	0
10	Northern Borders	120	26	30	7	57	52	68	84	2	31	3	0
11	Najran	102	27	19	5	51	41	61	77	2	22	1	0
12	Al Baha	43	16	3	0	24	24	19	32	3	7	1	0
	Total	**4414**	**1219**	**818**	**180**	**2197**	**2516**	**1898**	**3294**	**321**	**763**	**35**	**1**

Table 3.1.6.22 Total of Hemodialysis Centers in GOVT. NON-MOH Hospitals According to Region

No	Hemodialysis Center region wise	No. of HD units	Consultant Nephrologists	Nephrology Specialists	Resident Doctor	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	Riyadh	8	43	46	21	481	332	460	1251	1837
2	Makkah/Jeddah/Taif	5	29	35	11	196	219	263	723	434
3	Eastern	7	22	20	4	144	149	167	443	248
4	Assir	1	12	16	6	95	79	118	313	2360
5	Tabuk	1	3	4	2	79	38	56	182	320
6	Madinah	2	2	3	3	26	30	30	82	4
	Total	**24**	**111**	**124**	**47**	**1021**	**847**	**1094**	**2994**	**5203**

Table 3.1.6.22 Total Hemodialysis Patients in Saudi Arabia in GOVT. NON-MOH Hospitals According to Region

No	Hemodialysis Center region wise	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	Riyadh	29	244	101	10	49	1	19	233	68	461	547	117
2	Makkah/Jeddah/Taif	39	190	30	10	31	1	10	56	125	143	336	84
3	Eastern	16	128	23	9	13	0	0	60	68	117	209	64
4	Assir	0	85	4	0	5	0	4	76	61	68	136	35
5	Tabuk	179	0	3	0	3	0	10	8	48	46	73	29
6	Madinah	5	24	2	1	2	0	0	8	1	44	33	4
	Total	**268**	**671**	**163**	**30**	**103**	**2**	**43**	**441**	**371**	**879**	**1334**	**333**

Table 3.1.6.22 Total Hemodialysis Patient's Characteristics in Saudi Arabia in GOVT. NON-MOH Hospitals According to Region

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	Riyadh	1251	358	228	50	615	625	626	485	56	668	37	5
2	Makkah/Jeddah/Taif	723	230	133	35	325	358	365	380	20	209	113	1
3	Eastern	443	118	85	23	217	229	214	233	36	153	20	1
4	Assir	313	116	24	6	167	168	145	134	1	170	8	0
5	Tabuk	182	47	35	9	91	75	107	179	1	1	1	0
6	Madinah	82	34	14	4	30	47	35	54	1	24	0	3
	Total	**2994**	**903**	**519**	**127**	**1445**	**1502**	**1492**	**1465**	**115**	**1225**	**179**	**10**

Table 3.1.6.23 Total of Hemodialysis Centers in Private & Charitable Sector According to Region

No.	Hemodialysis Center region wise	No. of HD units	Consultant Nephrologists	Nephrology Specialists	GP's	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	Makkah/Jeddah/Taif	22	26	31	23	228	429	520	1576	129
2	Riyadh	17	17	18	12	162	234	284	907	97
3	Eastern	8	10	13	8	137	161	243	404	90
4	Madinah	3	1	2	3	13	39	31	75	0
5	Assir	3	2	5	1	9	13	17	17	3
6	Qassim	1	1	0	0	2	6	7	8	0
	Total	**54**	**57**	**69**	**47**	**551**	**882**	**1102**	**2987**	**319**

Table 3.1.6.23 Total Hemodialysis Patients in Saudi Arabia in Private & Charitable Sector According to Region

No	Hemodialysis Center region wise	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	Makkah/Jeddah/Taif	1324	411	158	33	27	0	4	80	284	567	539	140
2	Riyadh	655	245	68	24	20	0	1	39	197	290	334	58
3	Eastern	24	92	19	10	12	0	1	68	49	79	247	46
4	Madinah	52	15	16	2	0	0	0	2	12	37	9	9
5	Assir	10	6	2	0	0	0	0	0	0	7	10	0
6	Qassim	3	2	3	0	0	0	0	3	0	0	8	0
	Total	**2068**	**771**	**266**	**69**	**59**	**0**	**6**	**192**	**542**	**980**	**1147**	**253**

Table 3.1.6.23 Total Hemodialysis Patient's Characteristics in Saudi Arabia in Private & Charitable Sector According to Region

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	Makkah/Jeddah/Taif	1576	399	295	124	758	1011	565	1114	51	315	20	76
2	Riyadh	907	201	173	65	468	606	301	499	40	338	23	7
3	Eastern	404	104	92	27	181	233	171	197	69	128	9	1
4	Madinah	75	26	20	7	22	41	34	59	1	12	1	2
5	Assir	17	7	3	4	3	12	5	12	2	3	0	0
6	Qassim	8	3	1	0	4	5	3	5	0	2	1	0
	Total	**2987**	**740**	**584**	**227**	**1436**	**1908**	**1079**	**1886**	**163**	**798**	**54**	**86**

Table 3.1.6.24 Total of Hemodialysis Centers King Abdullah Project Hospitals According to Region

No.	Hemodialysis Center region wise	No. of HD units	Consultant Nephrologists	Nephrology Specialists	Resident Doctor	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	Riyadh	2	4	9	8	131	198	211	608	23
2	Makkah/Jeddah/Taif	2	3	1	13	125	294	294	383	0
3	Madina	1	2	0	3	27	48	53	125	0
4	Hail	1	1	1	2	18	38	40	91	0
	Total	**6**	**10**	**11**	**26**	**301**	**578**	**598**	**1207**	**23**

Table 3.1.6.24 Total Hemodialysis Patients in Saudi Arabia King Abdullah Project Hospitals According to Region

No	Hemodialysis Center region wise	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	Riyadh	11	169	48	6	9	0	1	69	173	218	165	21
2	Makkah/Jeddah/Taif	90	72	33	3	6	1	0	49	33	132	181	22
3	Madina	31	12	7	0	0	0	0	13	30	20	50	6
4	Hail	1	11	8	0	0	0	0	17	7	25	34	3
	Total	**133**	**264**	**96**	**9**	**15**	**1**	**1**	**148**	**243**	**395**	**430**	**52**

Table 3.1.6.24 Total Hemodialysis Patient's Characteristics in Saudi Arabia King Abdullah Project Hospitals According to Region

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	Riyadh	608	158	115	30	305	308	300	362	50	192	4	0
2	Makkah/Jeddah/Taif	383	105	75	14	189	214	169	237	9	132	5	0
3	Madina	125	41	22	7	55	77	48	81	6	38	0	0
4	Hail	91	20	20	4	47	33	58	48	5	38	0	0
	Total	**1207**	**324**	**232**	**55**	**596**	**632**	**575**	**728**	**70**	**400**	**9**	**0**

Table 3.1.6.25 Total of Hemodialysis Centers in All Sectors According to Region

No.	Hemodialysis Center region wise	No. of HD units	Consultant Nephrologists	Nephrology Specialists	Resident Doctor	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	Makkah/Jeddah/Taif/Qunfudah	55	99	120	105	1018	1785	2026	5572	639
2	Riyadh	67	102	130	130	1405	1550	1985	4873	2374
3	Eastern/Al Ahsa/Hafar Al Baten	39	63	76	58	775	956	1118	2613	890
4	Assir	21	19	45	26	278	501	573	1394	2373
5	Jizan	14	8	23	20	219	354	461	1117	65
6	Madinah	20	14	25	26	226	547	539	1116	373
7	Qassim	18	14	16	22	178	290	387	876	7
8	Tabuk	9	5	15	9	148	239	262	491	382
9	Hail	10	4	8	22	100	191	249	474	3
10	Northern Borders/Qurrayat	8	3	9	14	80	182	179	302	65
11	Najran	7	2	9	9	67	134	168	273	14
12	Al Jouf	3	3	4	7	46	79	95	222	3
13	Al Baha	7	1	6	8	60	112	123	199	0
	Total	**278**	**337**	**486**	**456**	**4600**	**6920**	**8165**	**19522**	**7188**

Table 3.1.6.25 Total of Hemodialysis Patients in Saudi Arabia in All Sectors According to Region

No	Hemodialysis Center region wise	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	Makkah/Jeddah/Taif/Qunfudah	1503	1157	551	77	165	10	27	403	749	1758	2276	475
2	Riyadh	838	1093	376	69	127	2	35	514	718	1665	1898	379
3	Eastern/Al Ahsa/Hafar Al Baten	284	628	175	37	55	3	11	277	444	662	1168	260
4	Assir	14	272	66	8	43	0	6	214	267	361	504	109
5	Jizan	224	269	86	17	34	1	3	83	173	321	422	97
6	Madinah	202	192	84	34	53	0	10	103	129	560	234	84
7	Qassim	31	202	52	2	16	0	3	90	183	235	330	58
8	Tabuk	200	43	17	6	10	1	10	23	88	158	152	51
9	Hail	7	136	39	4	7	0	1	95	46	157	215	46
10	Northern Borders/Qurrayat	20	26	19	1	8	0	5	27	33	99	131	21
11	Najran	33	56	15	3	25	0	0	47	54	64	93	17
12	Al Jouf	3	49	14	0	4	0	1	19	59	67	56	21
13	Al Baha	9	23	11	2	2	0	0	29	22	66	84	19
	Total	**3368**	**4146**	**1505**	**260**	**549**	**17**	**112**	**1924**	**2965**	**6173**	**7563**	**1637**

Table 3.1.6.25 Total of Hemodialysis Patient's Characteristics in Saudi Arabia in All Sectors According to Region

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	Makkah/Jeddah/Taif/Qunfudah	5447	1531	1114	309	2493	3068	2379	3786	208	1208	164	81
2	Riyadh	4873	1233	912	216	2512	2720	2153	2549	259	1915	109	41
3	Eastern/Al Ahsa/Hafar Al Baten	2613	666	575	120	1252	1503	1110	1560	177	806	61	9
4	Assir	1394	444	125	58	767	759	635	762	180	422	25	5
5	Jizan	1241	382	203	69	587	702	539	812	50	356	14	9
6	Madinah	1117	287	109	42	679	565	552	762	28	292	23	12
7	Qassim	876	196	196	42	442	503	373	555	29	263	24	5
8	Tabuk	491	123	98	24	246	248	243	365	13	94	17	2
9	Hail	474	119	107	19	229	247	227	294	16	157	7	0
10	Northern Borders/Qurrayat	302	71	81	10	140	154	148	190	2	99	11	0
11	Najran	273	89	81	10	93	136	137	173	3	80	16	1
12	Al Jouf	222	42	58	6	116	121	101	148	10	61	2	1
13	Al Baha	199	66	20	15	98	109	90	116	5	74	4	0
	Total	**19522**	**5249**	**3679**	**940**	**9654**	**10835**	**8687**	**12072**	**980**	**5827**	**477**	**166**

Table 3.1.6.26 Total of Hemodialysis Centers in All Sectors According to Global Region

No.	Hemodialysis Center Global Region	No. of HD units	Consultant Nephrologists	Nephrology Specialists	Resident Doctor	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	Western	74	111	142	129	1219	2272	2504	6502	1000
2	Central	86	117	154	161	1672	1911	2460	5946	2501
3	Southern	49	30	83	63	624	1101	1325	2983	2452
4	Eastern	38	62	68	49	686	885	1030	2416	770
5	Northern	31	17	39	54	399	751	846	1675	465
	Total	**278**	**337**	**486**	**456**	**4600**	**6920**	**8165**	**19522**	**7188**

Table 3.1.6.26 Total of Hemodialysis Patients in Saudi Arabia in All Sectors According to Global Region

No	Hemodialysis Center Global Region	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	Western	1727	1396	609	93	199	11	30	461	912	2021	2610	552
2	Central	882	1414	456	73	145	4	38	625	910	1958	2306	452
3	Southern	258	543	176	47	123	0	16	393	472	1051	915	229
4	Northern	230	284	117	12	29	1	17	189	236	539	642	159
5	Eastern	271	509	147	35	53	1	11	256	435	604	1090	245
	Total	**3368**	**4146**	**1505**	**260**	**549**	**17**	**112**	**1924**	**2965**	**6173**	**7563**	**1637**

Table 3.1.6.26 Total of Hemodialysis Patient's Characteristics in Saudi Arabia in All Sectors According to Global Region

		Pts.	Blood Group				Sex		Vascular Access				
No	Hemodialysis Center Global Region	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	Western	6502	1868	1282	373	2979	3656	2846	4451	249	1534	178	90
2	Central	5946	1464	1142	265	3075	3342	2604	3205	292	2264	139	46
3	Southern	2983	886	335	125	1637	1569	1414	1813	216	868	68	18
4	Northern	1675	400	379	64	832	884	791	1144	50	441	37	3
5	Eastern	2416	631	541	113	1131	1384	1032	1459	173	720	55	9
	Total	**19522**	**5249**	**3679**	**940**	**9654**	**10835**	**8687**	**12072**	**980**	**5827**	**477**	**166**

Table 3.1.6.27 Total of Hemodialysis Centers in Saudi Arabia According to Sector

No	Hemodialysis Centers by Sectors	No. of HD units	Consultant Nephrologists	Nephrology Specialists	Resident Doctor	Nurses	No. of Outlet Connections	Total No. of HD Machines	Total HD Pts.	No. of Follow up Tx. Pts
1	Ministry of Health (MOH)	132	85	156	243	1679	2385	3159	5258	1567
2	MOH Diaverum	39	47	81	57	630	1407	1373	4414	64
3	MOH Davita	23	27	45	36	418	821	839	2662	12
4	Gov't Non-MOH Centers	24	111	124	47	1021	847	1094	2994	5203
5	Private and Charity Dialysis Centers	54	57	69	47	551	882	1102	2987	319
6	King Abdullah Hemodialysis Projects	6	10	11	26	301	578	598	1207	23
	Total	**278**	**337**	**486**	**456**	**4600**	**6920**	**8165**	**19522**	**7188**

Table 3.1.6.27 Total of Hemodialysis Patients in Saudi Arabia According to Sector

No	Hemodialysis Center region wise	Non-Saudi Pts	New Pts.	HCV+ve pts.	HCV PCR +ve Pts.	HBsAg+ve Pts	HIV+ve Pts.	Pts < 15 Yrs	Pts > 75 yrs	Diabetic Pts (DM)	Hypertensiv Pts (HTN)	Both DM & HTN	HD Pts. Died 2019
1	Ministry of Health (MOH)	656	1288	441	93	186	6	43	541	684	1665	2067	493
2	MOH Diaverum	196	606	346	30	98	8	9	397	782	1307	1653	328
3	MOH Davita	47	546	193	29	88	0	10	205	343	947	932	178
4	Gov't Non-MOH Centers	268	671	163	30	103	2	43	441	371	879	1334	333
5	Private and Charity Dialysis Centers	2068	771	266	69	59	0	6	192	542	980	1147	253
6	King Abdullah Hemodialysis Projects	133	264	96	9	15	1	1	148	243	395	430	52
	Total	**3368**	**4146**	**1505**	**260**	**549**	**17**	**112**	**1924**	**2965**	**6173**	**7563**	**1637**

Table 3.1.6.27 Total of Hemodialysis Patient's Characteristics in Saudi Arabia According to Sector

		Pts.	Blood Group				Sex		Vascular Access				
No	Dialysis Center Name	Total HD Pts.	A	B	AB	O	Male	Female	AVF	Vascular graft	Permanent jugular cath.	Permanent Femoral Cath.	Temporary Access
1	Ministry of Health (MOH)	5258	1366	1064	241	2587	2857	2401	2862	185	1994	155	62
2	MOH Diaverum	4414	1219	818	180	2197	2516	1898	3294	321	763	35	1
3	MOH Davita	2662	697	462	110	1393	1420	1242	1837	126	647	45	7
4	Gov't Non-MOH Centers	2994	903	519	127	1445	1502	1492	1465	115	1225	179	10
5	Private and Charity Dialysis Centers	2987	740	584	227	1436	1908	1079	1886	163	798	54	86
6	King Abdullah Hemodialysis Projects	1207	324	232	55	596	632	575	728	70	400	9	0
	Total	**19522**	**5249**	**3679**	**940**	**9654**	**10835**	**8687**	**12072**	**980**	**5827**	**477**	**166**

Peritoneal Dialysis in the Kingdom of Saudi Arabia

Chapter 3 Section 3.2

Peritoneal Dialysis in the Kingdom of Saudi Arabia

3.2.1 Characteristic of Peritoneal Dialysis in KSA

3.2.1 Peritoneal dialysis

In 2019, a total of 36 active peritoneal dialysis centers were recorded from MOH, Gov't. Non-MOH, and Private dialysis centers. Among these centers, 18 centers were from MOH, 16 from Gov't Non-MOH, and 2 from private centers. Types of PD modalities were Automated/Continuous Cyclic Peritoneal Dialysis or (APD/CCPD) with 76% of patients, 15% were on Continuous Ambulating Peritoneal Dialysis (CAPD) and 9% were on Intermittent Peritoneal Dialysis (IPD).

In 2019, a total of 1,546 patients were on peritoneal dialysis, of these 594 were new patients. Age Distribution of patients with ESRD have shown that 86% were adults and 14% were pediatric age less than 15 (<15). Patient serology have shown that HCV+ve patient were 38 (2%) and HBsAg+ve patients 15 (1%).

Active PD patients and treatment modality

In 2019 Total PD patients have increased by 6% this year with a total of 1,546 PD patients. Patient treatment modality have shown that (CCPD/APD) was the most preferred with 1,182 patients, followed by CAPD 224 and IPD 140 patients. (See figure 3.2.1.1 trend of PD patients, figure 3.2.1.2 treatment modality 2019 and figure 3.2.1.3 trend of patient treatment modality)

Total active PD in KSA 1995-2019

Figure 3.2.1.1

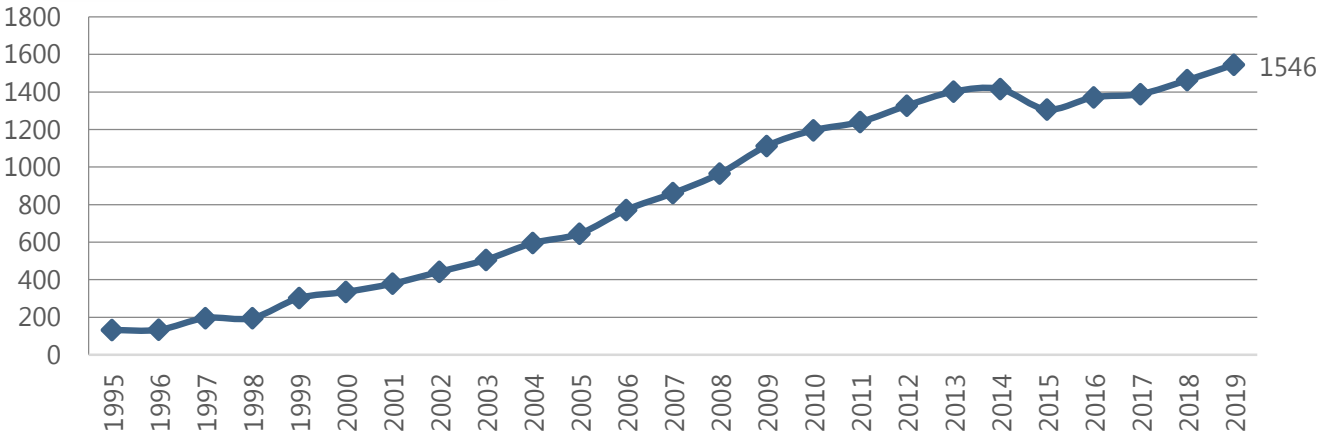


Figure 3.2.1.2 PD patient; treatment modality 2019

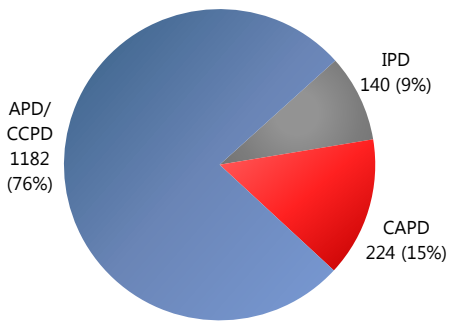
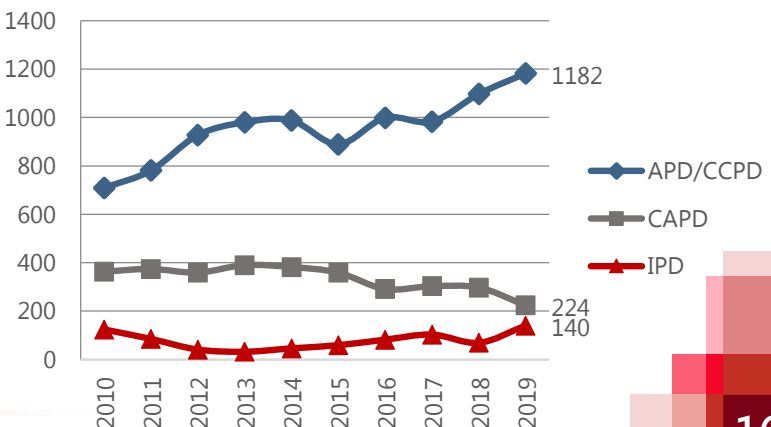


Figure 3.2.1.3 Trend of the modality of treatment among PD patients



Adult and pediatric PD patients

Among the 1,546 PD patients, 1,333 (86%) were adults and 213 (14%) were pediatric patients, age <15 years old. (See figure 5.2.1). Please see figure 5.2.2. for the trend of adult and pediatric PD patients since 2010.

Figure 3.2.1.4 PD patients; adult and pediatric 2019

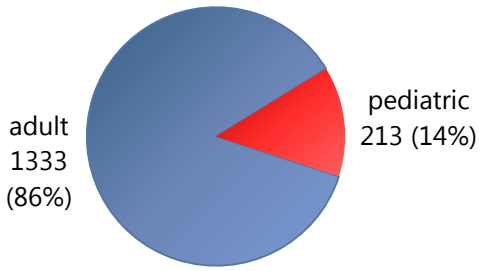
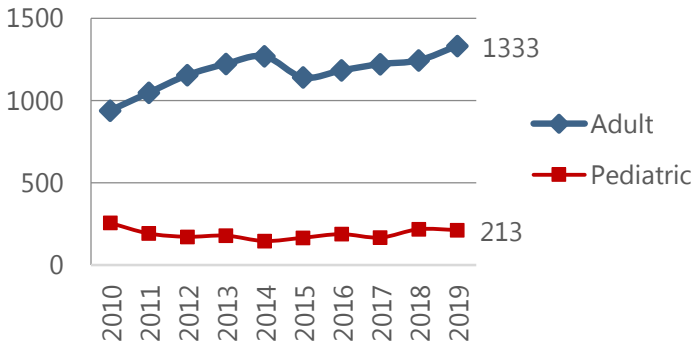


Figure 3.2.1.5 Trend of adult and pediatric PD patients 2019



Serology status of HBsAg and HCV among PD patients

In 2019, HBsAg+ve and HCV+ve status among PD patients were reported in SCOT and have shown that HBsAg+ve infected patients were 15 (1%) showing less infection rate for the past 2 years. (See figures 3.2.1.6 and figure 3.2.1.7). HCV+ve PD patients during the year have shown and slight increase compared to previous with an infection rate of 2% this year. (See figures 5.3.3. and figure 5.3.4.).

Figure 3.2.1.6 PD patients; HBsAg status 2019

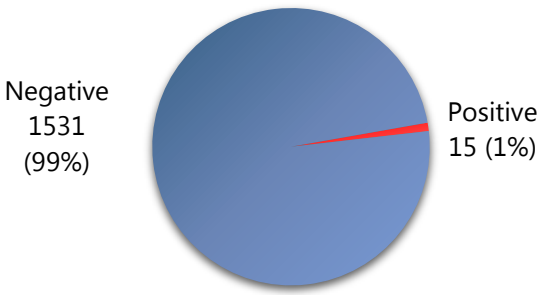


Figure 3.2.1.7 Trend of HBsAg status on PD patients

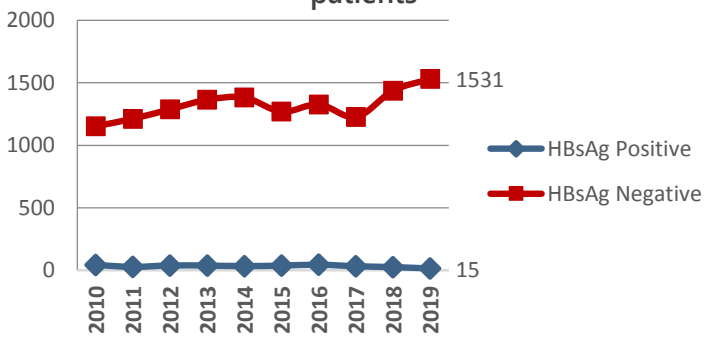
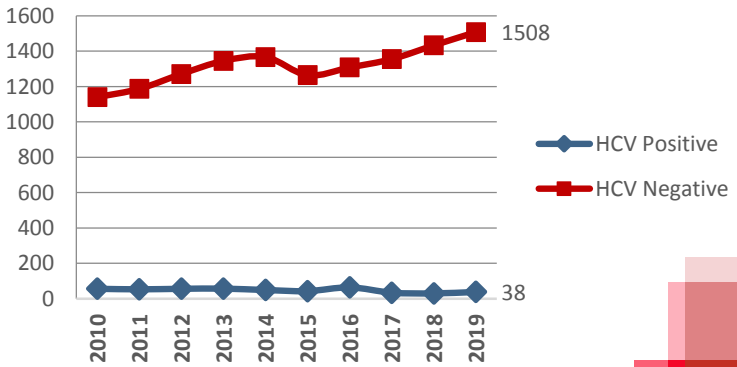


Figure 3.2.1.8 PD patients; HCV antibody status 2019

Figure 3.2.1.9 Trend of HCV status on PD patients

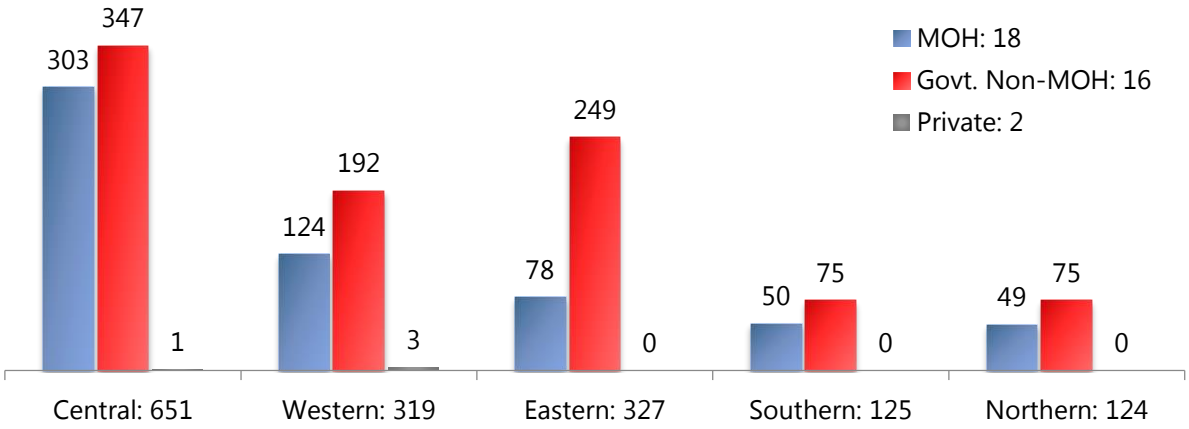


PD distribution region wise

PD patients distribution per region and affiliation were recorded. Central region have the most patients with (42%) followed by the western region (21%), Eastern (21%), Southern (8%) and Northern (8%). As per PD affilation Gov't Non-MOH has the most patient with 938 (60.7%), followed by the MOH 604 (39%) and Private Hospitals 4 (0.3%) (figure 3.2.1.10 PD distribution region wise)

PD distribution region wise 2019

Figure 3.2.1.10



Peritoneal Dialysis in the Kingdom of Saudi Arabia

3.2.2 Statistical Tables

Table 3.2.2.1 Peritoneal Dialysis in the Kingdom of Saudi Arabia

No	Hospital Name	Total No. of Pts	New Pts 2019	Type of Peritoneal Dialysis			Pediatrics	Adults	HBsAg+ve	HCV+ve	No. of Non-Saudi Pts	No. of Deaths 2019
				CAPD	IPD	CCPD/ APD						
1	King Fahad University Hospital, Dammam	228	63	2	0	226	4	224	3	5	0	8
2	King Saud Medical City, Riyadh	95	37	28	0	67	0	95	1	4	4	4
3	Armed Forces Hospital Southern Region, Khamis Mushayt	75	17	56	0	19	9	66	0	4	0	5
4	King Salman Military Hospital Tabuk	75	16	0	0	75	7	68	0	0	0	11
5	King Fahd Specialist Hospital, Buraida	74	11	13	0	61	0	74	0	2	1	3
6	Al Hada Armed Forces Hospital, Taif	71	30	4	16	51	5	66	3	2	3	8
7	Prince Sultan Military Medical City, Riyadh (Adult)	70	22	12	17	41	0	70	0	2	4	4
8	King Faisal Specialist Hospital and Research Center, Riyadh	68	23	13	0	55	19	49	0	2	1	0
9	King Saud University Medical City, Riyadh	65	14	15	5	45	0	65	0	2	4	7
10	Security Forces Hospital	56	29	4	0	52	0	56	1	0	0	6
11	King Fahad Hospital, Madinah	52	38	0	33	19	0	52	0	0	3	4
12	King Abdulaziz Medical City & National Guard Hospital, Riyadh	51	21	15	0	36	0	51	0	2	3	3
13	King Fahad Central Hospital, Gizan	50	24	9	30	11	20	30	0	0	5	6
14	Dammam Medical Complex	49	28	0	0	49	0	49	0	0	1	3
15	King Faisal Specialist Hospital and Research Center, Jeddah	49	35	12	0	37	4	45	0	0	0	3
16	King Fahad Armed Forces Hospital, Jeddah	46	39	28	0	18	3	43	1	0	1	4
17	King Fahad Hospital, Hofuf	35	18	0	0	35	2	33	0	2	1	5
18	King Fahad Medical City Childrens Hospital, Riyadh	35	13	0	0	35	35	0	0	0	1	3
19	King Khalid Hospital, Hail	33	17	0	0	33	0	33	1	1	1	1

Table 3.2.2.1 Peritoneal Dialysis in the Kingdom of Saudi Arabia (Continuation)

No	Hospital Name	Total No. of Pts	New Pts 2019	Type of Peritoneal Dialysis			Pediatrics	Adults	HBsAg+ve	HCV+ve	No. of Non-Saudi Pts	No. of Deaths 2019
				CAPD	IPD	CCPD/ APD						
20	Al Noor Specialist Hospital	30	7	3	0	27	0	30	1	3	0	1
21	King Fahad Medical City, Riyadh	29	8	1	0	28	0	29	2	2	0	3
22	King Abdulaziz Medical City and National Guard, Jeddah	26	11	2	24	0	3	23	1	3	0	2
23	King Abdullah Specialized Children Hospital National Guard, Riyadh	24	8	0	0	24	24	0	0	0	0	0
24	King Fahad General Hospital	23	8	0	0	23	0	23	0	1	0	1
25	King Saud Medical City, Riyadh (Pediatric)	20	7	0	0	20	20	0	0	0	6	1
26	King Fahad Specialist Hospital, Dammam	19	5	0	0	19	19	0	0	1	0	0
27	Maternity and Children Hospital, Madina	19	7	1	0	18	19	0	0	0	0	1
28	King Khalid Hospital, Tabuk	16	12	1	15	0	0	16	0	0	4	0
29	Johns Hopkins Health Center (ARAMCO), Dahran	14	7	1	0	13	1	13	0	0	1	0
30	Prince Sultan Military Medical City, Riyadh (Pediatric)	13	6	0	0	13	13	0	0	0	0	0
31	King Salman for Kidney Disease Riyadh	12	2	1	0	11	0	12	1	0	0	0
32	Al Jubail General Hospital	10	4	2	0	8	0	10	0	0	1	3
33	King Abdul Aziz Medical City, Ahsa (NG)	7	2	1	0	6	3	4	0	0	0	0
34	Oklat Al-Sugour General Hospital	3	2	0	0	3	0	3	0	0	0	0
35	Dr. Suleiman Al Fakeeh Hospital, Jeddah	3	3	0	0	3	3	0	0	0	3	0
36	Saudi German Hospital, Riyadh	1	0	0	0	1	0	1	0	0	1	0
	Total : 36	**1546**	**594**	**224**	**140**	**1182**	**213**	**1333**	**15**	**38**	**49**	**100**

Table 3.2.2.2 Total Peritoneal dialysis in All Sector According to Global Region 2019

Hospital Name	No. of Hospitals	Total No. of Pts	New Pts 2019	Type of Peritoneal Dialysis			Pediatrics	Adults	HBsAg+ve	HCV+ve	No. of Non-Saudi Pts	No. of Deaths 2019
				CAPD	IPD	CCPD /APD						
Central	16	651	221	102	22	527	113	538	5	18	26	39
Western	9	319	178	50	73	196	37	282	6	9	10	24
Eastern	6	327	109	6	0	321	27	300	3	6	3	14
Northern	3	124	45	1	15	108	7	117	1	1	5	12
Southern	2	125	41	65	30	30	29	96	0	4	5	11
Total	**36**	**1546**	**594**	**224**	**140**	**1182**	**213**	**1333**	**15**	**38**	**49**	**100**

Table 3.2.2.2 Total Peritoneal dialysis in All Sector According to Global Region 2019

Hospital Name	No. of Hospitals	Total No. of Pts	New Pts 2019	Type of Peritoneal Dialysis			Pediatrics	Adults	HBsAg+ve	HCV+ve	No. of Non-Saudi Pts	No. of Deaths 2019
				CAPD	IPD	CCPD /APD						
MOH Hospitals	18	604	248	59	78	467	115	489	6	16	28	39
GOVT. NON-MOH Hospitals	16	938	343	165	62	711	95	843	9	22	17	61
Private Hospital	2	4	3	0	0	4	3	1	0	0	4	0
Total	**36**	**1546**	**594**	**224**	**140**	**1182**	**213**	**1333**	**15**	**38**	**49**	**100**

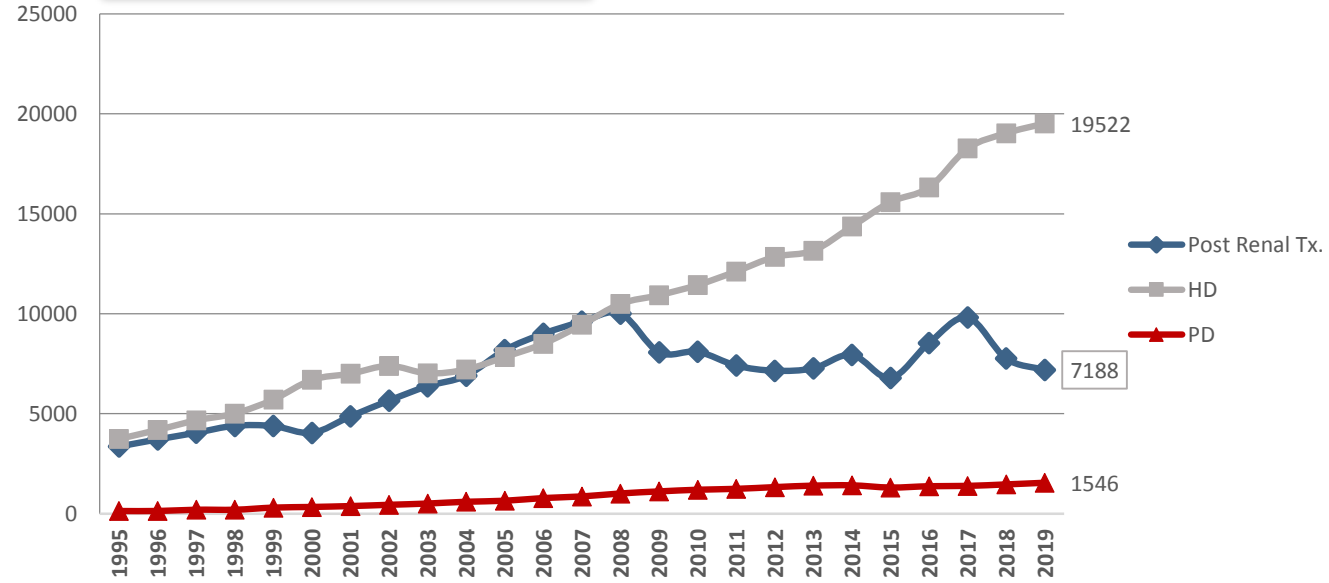
Dialysis in the Kingdom of Saudi Arabia

3.3.3 Summary of Renal Replacement Therapy

Figure 3.3.3.1 Dialysis Centers in KSA 2019; @Dialysis Centers; #More than one (1) Dialysis Center

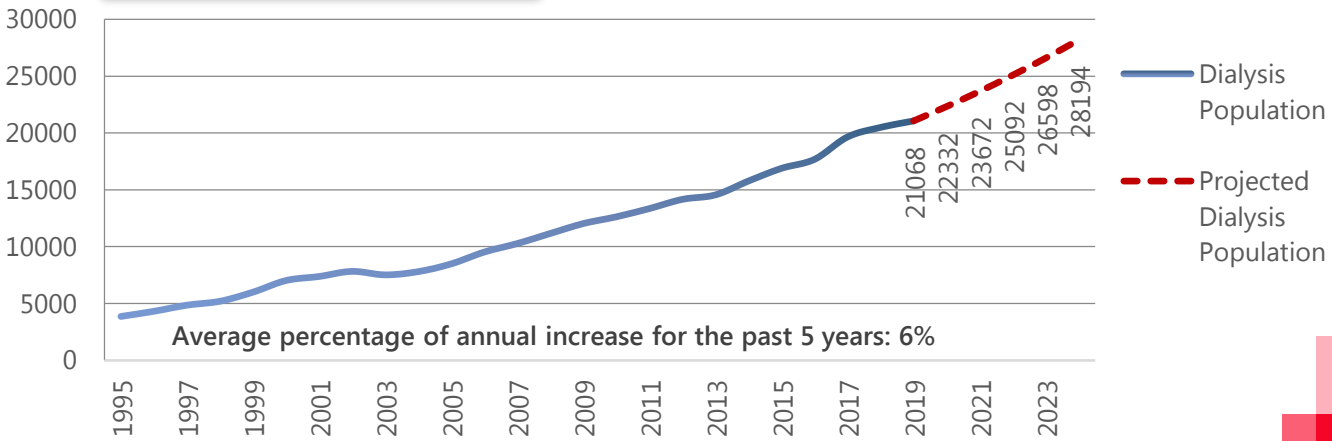
Renal Replacement Therapy in KSA 1995-2019

Figure 3.3.3.2



Dialysis population: current and projected: 1995-2020

Figure 3.3.3.3



Renal Replacement Therapy

In 2019, Patients on renal replacement therapy were composed of HD patients which had a total of 19,522 (69%), then patients who had followed- up post-transplant 7,188 (25%) and patients on PD 1,546 (6%); see figure 6.1. The current and projected dialysis population had an average of 658 patients per year which is having a net annual increase of 7.7%.

Figure 3.3.3.4 Renal replacement therapy 2019

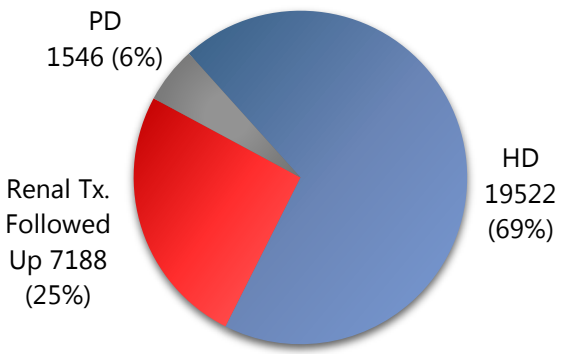


Table 3.3.3.5 Prevalence of dialysis patients (HD and PD) According to region 2019

Region	Population 2019	Dialysis Pts. 2019	Prevalence (pmp)
Western	10,991,683	6821	621
Central	9,902,559	6597	666
Eastern	5,028,753	2743	545
Southern	4,948,090	3108	628
Northern	2,542,575	1799	708
Total	**33,413,660**	**21,068**	**631**

Table 3.3.3.6 Incidence of dialysis patients (HD and PD) According to region 2019

Region	Population 2019	New Dialysis Pts. 2019	Incidence (pmp)
Western	10,991,683	1,574	143
Central	9,902,559	1,635	165
Eastern	5,028,753	618	123
Southern	4,948,090	584	118
Northern	2,542,575	329	129
Total	**33,413,660**	**4,740**	**142**

Appendices

Responsibilities of the Saudi Center for Organ Transplantation (SCOT)

1. Setting up a national registry for end-stage organ failure patients, organ transplant recipients and organ donors with their follow-up and outcome, and setting up the necessary procedures.
2. Receiving and following-up of brain death cases in intensive care units, coordinating the removal of organs after getting the necessary approvals and distributing the organs to the organ transplant centers in the various health institutions in the Kingdom.
3. Coordinating with the concerned authorities to send medical teams to the various areas in the Kingdom and abroad, to remove the organs from the person mentioned in paragraph 2 of this clause and transplant it to a patient.
4. Cooperating and coordinating with the health authorities in the field of organ transplantation, both inside the Kingdom and abroad.
5. Preparing and updating the necessary procedures for organ transplantation from living donors in accordance with Sharia law restrictions.
6. Preparing and updating the policies and procedures (measures, descriptions, conditions and restrictions) related to organ transplantation in the Kingdom.
7. Monitoring and following-up on the application of organ transplantation programs, carrying out regular appraisals of the establishments and following-up with the specialized bodies.
8. Preparing administrative and financial roles for the personnel of the center, the researchers and those collaborating with it.
9. Holding symposia and conferences and educational and training programs, in the field of organ failure, organ donation and transplantation, on regional and international levels and holding orientation programs.
10. Offering awareness and educational health programs, in the field of organ failure and organ donation and transplantation in the community.
11. Publishing a scientific journal specializing in organ transplantation on the subjects of organ failure, organ donation and transplantation.
12. Taking part in scientific research related to organ transplantation and organ failure, in the Kingdom and abroad.
13. Cooperating with charities to support organ failure patients.

Regulations for Organ Transplantation in the Kingdom of Saudi Arabia

Regulations are essential to the process of organ donation and transplantation and therefore, the Higher National Committee for the Development of Organ Donation and Transplantation in the Kingdom of Saudi Arabia (KSA), which was formed according to the Ministerial resolution 14853/84 dated 30/2/1431, reviewed the regulations and passed them as follows:

Item 1: The following terms are defined as follows:

Council:	The Council for the Health Services
Center:	The Saudi Center for Organ Transplantation (SCOT)
Directory:	The Directory for Organ Donation and Transplantation in the KSA.

Item 2: Only authorized specialized physicians can perform organ transplantation from the living or deceased human donors to a human recipient with intention for cure and rescue according to the regulations included in this document.

Item 3: Any rightful person can donate or place a directive for donation of one of his body organs to rescue or treat a patient with end-stage organ failure. A statement should be signed by the donor as a will for donation. Nevertheless, only those who attain 18 years of age can donate to their relatives.

Item 4: Fully known medical investigations as advised by the specialist in the field should be performed before approving the organ donation from living donors. Full discussion of the risks and possible outcomes should be conducted with the donor before donation.

Item 5: Donors have the right to withdraw their consent for donation any time before the operation without penalties. No donor can claim his organ after transplantation is completed.

Item 6: It is prohibited for living donors to donate vital organs, donation of which could result in the death of the donor or complete disabling of vital functions.

Item 7: Organ donation can be from the persons only after full documentation of death by a committee of specialized physicians and in the absence of a directive by the donor objecting to donation during his life.

Item 8: Organ donations, as in item 7, can be performed if brain stem death is documented by the available means of technology.

Item 9: Commercial transplantation is prohibited in any manner.

Item 10: Transplantation is performed only in centers authorized by the Ministry of Health in the GCC Countries.

Item 11: Penalties will be levied in case of any violation of the above regulations according to system of the medical practice, after intensive investigation by the SCOT and the concerned authorities.

Memorandum by the Minister of Health on Deceased Organ Donation
Ref.: 328025/11 Dated: 17/12/1432H

Ref: 328025/11
Date: 17/12/1432H
13/11/2011G

Important Memo

His Excellency the Director of the National Guard Health Affairs

His Excellency the Executive Administrator of the General Organization

King Faisal Specialist Hospital and Research Center

Deputy Minister of Higher Education

His Excellency Deputy Minister for Executive Affairs

His Excellency Director General of Medical Services of the Armed Forces

Director General of Security Forces Hospital Program

Due to the importance of supporting the national program for organ donation and transplantation and the large increase in the number of patients on waiting lists for transplantation and the resulting health and social burden on the patients and financial burden on different health sectors , I appeal to the staff in all hospitals and especially those in the intensive care units, emergency departments, neurology and neurosurgical departments, and all relevant departments to cooperate with the **Saudi Center for Organ Transplantation** of the administration of each hospital to fulfill the following:

1. **Early Notification** of cases of brain death to Saudi Center for Organ Transplantation and considering that as the core tasks of intensive care physicians and other relevant departments.

2. **Support** for organ donation in the hospital and put the appropriate plan with the Saudi Center for Organ Transplantation for optimizing cases of organ donation after death and overcome the obstacles faced by.

3. **Facilitate continuous co**mmunication of medical and administrator coordinators inside the hospitals with intensive care units and emergency departments and relevant departments with respect to the organ donation and transplantation program.

DR. ABDULLAH BIN ABDELAZIZ AL RABEEAH

Minister of Health

Chairman of the Health Services Council

Memorandum by the Minister of Health on Deceased Organ Donation

Ref.: 130125 Dated: 14/21/1438H

Ministerial Resolution
No. 130125 Dated 14/21/1438H

The Minister of Health

According to his prerogative,

Based on the Council of Minister resolution no. 38 dated 26/01/1434H regarding the approval of the Saudi Center for Organ Transplantation Organization and assigning the center to prepare a general project for organ transplant program and take the action towards its application according to statutory procedures.

Based on the recommendation of the 71th meeting of the Saudi Health Council dated 07/05/1437H to support the program and find suitable solution to the obstacles which it faces.

Based on requirements of work interest.

1. Adopt assignment of medical and administrative coordinator in each of accredited hospital from SCOT with the specified duties enclosed within the resolution.

2. Medical coordinator will be an ICU physician; either specialists or consultant highly qualified to be the supervisor and responsible to follow up the program inside the hospital.

3. Administrative coordinator will be a specialist in social services department or patient relationship or religious affairs department and should be of a suitable and high qualification to be the responsible of administrative and social aspects of the program.

4. This resolution will be reported to whom it may concern to implement:

5. Copy to his Excellency, the Minister of Education

6. Copy to his Excellency, Deputy Minister of Health for Health Affairs

7. Copy to his Excellency, Deputy Minister of Health for Planning and Development

8. Copy to his Excellency, General Executive Director of Health Affairs in National Guard

9. Copy to his Excellency, General Executive Supervisor of King Faisal Specialist Hospital and Research Center.

10. Copy to his Excellency, General Director of the Health Service of General Administration in the Ministry of Defense

11. Copy to his Excellency, General Director of the Health Service of General Administration in the Ministry of Interior

12. Copy to his Excellency, General Secretariat of the Saudi Health Council

13. Copy to his Excellency, Deputy Ministry of Therapeutic Services

14. Copy to his Excellency, Deputy Minister of the Human Resources

15. Copy to his Excellency, Councilor of the Deputy Minister of Health Supervising Private Health Sector

16. Copy to his Excellency, Secretary General of the Board of Directors of Medical Cities and Specialized Hospitals

17. Original to General Director of Saudi Center for Organ Transplantation for Implementation.

Minister of Health

President of Saudi Health Council

Tawfiq bin Fawzan Al Rabiah

Official Statement of the National Committee for the Diagnosis of Death by Neurological Criteria and Ventilator System

The members of National Committee for diagnosis of death by Neurological Criteria held a meeting in Saudi Center for Organ Transplantation (SCOT) on Sunday 31/01/2010 (23/11/1431H) to discuss what has been published recently in the media about the reluctance of some medical doctors on the "fatwa" on removing the ventilator machine from brain dead case where some consider it as killing a person.

Accordingly the following steps were done by the committee:

- Review of these articles and international global scientific publications emerging on the subject.
- Review of the medical ethics of diagnosis of death by neurological criteria.
- Review the legal opinion "Fatwa" issued within the Kingdom of Saudi Arabia (Senior Ulama Commission) or abroad, especially the resolution of the Council of Islamic Jurisprudence on Resuscitation Apparatus.

Hence, we have decided unanimously the following:

1. The diagnosis of death by the time was, and continues to be a medical decision made by the experienced professionals.
2. The concept of brain death based on evidence has not undergone any recent disputing developments both in the definition or diagnosis using the Saudi protocol. Moreover, the protocol used within the Kingdom of Saudi Arabia is one of the most demanding protocols in the world.
3. According to the diagnosis of brain death by neurological criteria using the strict scientific protocol, the deceased person reaches the point of no return and no chance that he will regain his life.
4. It is permissible to remove the respirator from the persons diagnosed dead by the neurological criteria according to the scientific protocol applied in all the health institutions in the Kingdom and supervised by the committees of ethics and medical expertise.

The National Committee For The Diagnosis Of Death By Neurological Criteria

Dr. Mohammad Zuheir Alkawi
Chairman,
Senior Consultant Neurologist
King Faisal Specialist Hospital & Research Center, Riyadh

Dr. Abdullah Turki
Consultant Pediatric Intensivist,
Director, Pediatric Critical Care Unit
King Faisal Specialist Hospital & Research Center, Riyadh

Dr. Mohammed Al-Bar
Consultant, Islamic Medicine
King Abdul Aziz University - Jeddah

Dr. Mohammad Ibrahim Almajeed
Consultant Anesthesiologist,
King Khalid University Hospital – Riyadh

Dr. Nabil Biary
Consultant, Neurologist
Riyadh Military Hospital

Dr. Amin M. Yousef
Consultant Intensivist,
Riyadh Military Hospital

statement is approved by the Saudi Society of Critical Care (SCCS):

Dr. Yasser Mandourah
Consultant Intensivist,
Head, Saudi Society of Critical Care
Head, Intensive Care Unit
Riyadh Military Hospital

Dr. Awad Addasi
Consultant Intensivist,
Deputy Head, Saudi Society of Critical Care
Head, Intensive Care Unit
King Saud Medical Complex , Riyadh

Purport of the Senior Ulama Commission
Decision No. 99 Dated 06-11-1402 H

The board unanimously resolved the permissibility to remove an organ, or a part thereof from a Moslem or Thimmi living person and graft it onto him, should the need arise, should there be no risk in the removal and should the transplantation seem likely successful.

The board also resolved, by majority the following:

The permissibility to remove an organ or part thereof from a dead person for the benefit of a Moslem, should the need arise, should the removal cause no harm and should the transplantation seem likely successful.

The permissibility for the living person to donate one of his organs or part thereof for the benefit of a Moslem in need thereof.

Senior Ulama Commission.

Resolution of the Council of Islamic Jurisprudence on Resuscitation Apparatus Decision No. (5) D 3/07/86

The council of Islamic Jurisprudence in its third meeting held in Amman, capital of Jordan from 8 to 13 Safar 1407 H corresponding to 11 to 16 October 1986 and after discussing all relevant aspects of resuscitation apparatus and after hearing the detailed explanation from specialist doctors, decide the following:

A person is pronounced legally dead and consequently, all dispositions of the Islamic law in case of death apply if one of the two following conditions has been established:

There is total cessation of cardiac and respiratory functions, and doctors have ruled that such cessation is irreversible.

There is total cessation of all cerebral functions and experienced specialized doctors have ruled that such cessation is irreversible and that brain has started to undergo autolysis.

In this case, it is permissible to take the person off resuscitation apparatus, even if the function of some organs e.g., heart are still artificially maintained

Glossary, Abbreviation and Index

Brain Death

Irreversible cessation of cerebral and brain stem; characterized by the absence of electrical activity in the brain, blood flow to the brain, and brain function as determined by clinical assessment of responses. A brain dead person is dead, although his or her cardiopulmonary functioning may be artificially maintained for some time.

Critical Pathway of Deceased Organ Donation

Provides a systematic approach to the organ donation process, considering both donations after cardiac death than donation after brain death. The pathway provides a tool for assessing the potential of deceased donation and for the prospective identification and referral of possible deceased donors.

Donor

Someone from whom at least one organ or tissue is recovered for the purpose of transplantation. A deceased donor is a patient who has been declared brain death or cardiac death criteria.

Deceased Donor or DD

An individual from whom at least one solid organ is recovered or the purpose of transplantation after suffering brain death or cardiac death.

Living Donor

Is one who donates an organ or segment of an organ for the intent of transplantation.

Possible Deceased Organ Donor

A patient with a devastating brain injury or lesion or a patient with a circulatory failure and apparently medically suitable for organ donation

Potential DBD donor

A person whose clinical condition is suspected to fulfill brain death criteria.

Eligible DBD donor

A medically suitable person who has been declared dead based on neurologic criteria as stipulated by the law of the relevant jurisdiction.

Actual DBD donor

A Consented eligible donor:

a. In whom an operative incision was made with the intent of organ recovery for the purpose of transplantation.

b. From whom at least one organ was recovered for the purpose of transplantation.

Utilized DBD donor

An actual donor from whom at least one organ was transplanted.

Organ Donation

Organ Donation is the donation of biological tissue or an organ of the human body to a recipient in need of transplantation.

Living Organ Donation

Organ donation from living donor to living recipient

Deceased Organ Donation

Organ donation from deceased donor who is pronounced brain dead or circulatory death who is apparently medically suitable for organ donation

Organ Recovery / Procurement

The obtaining of organs for transplantation, which included methods of obtaining through programs, systems or organization. It includes also the transporting of donor organs, after surgical removal to the hospital for processing and transplant.

Organ Failure

Is altered organ function in an acutely ill patient requiring medical intervention to achieve homeostasis.

Organ Transplant

An operation moving an organ from one organism (donor) to another one (recipient)

Allograft

An organ or tissue that is transplanted from one person to another of the same species: i.e. human-to-human.

Biopsy

A tissue sample from the body, removed and examined under a microscope to diagnose for disease, determine organ rejection, or assess donated organ or tissues.

Chronic

Developing slowly and lasting for a long time, possible the rest of person's life. e.g. chronic kidney disease.

Split Liver Transplantation

The division of a donor liver into parts in order to transplant the tissue into a child or small recipient

Enbloc Kidney Transplantation

The transplant of both kidneys into a single receiver and using the donor aorta and vena cava for vascular anastomosis.

Cold Ischemia Time or CIT or in surgery

The time between the chilling of a tissue, organ, or body part after its blood supply has been reduced or cut off and the time it is warmed by having its blood supply restored. This can occur while the organ is still in the body or after it is removed from the body if the organ is to be used for transplantation.

Kidney Donor Risk Index or KDRI

Is an estimate of the relative risk of post-transplant kidney graft failure (in an average, adult recipient) from a particular deceased donor compared to the median (50th percentile) donor.

Expanded-criteria donors or ECD

Refer to older kidney donors (≥60 yr.) or donors who are aged 50 to 59 yr. and have two of the following three features: Hypertension, terminal serum creatinine>1.5 mg/dl, or death from cerebrovascular accident.

Standard Criteria Donor or SCD

Is a donor who is under 50 years of age and suffered brain death from any number of causes. This would include donors under the age of 50 who suffer from traumatic injuries or other medical problems such as a stroke.

List of Abbreviations

SCOT	Saudi Center for Organ Transplantation
NFK	National Kidney Foundation
DBD	Donation after Brain Death
DD	Deceased Donor
PMP	Per Million Population
CVA	Cerebrovascular accident
MVA	Motor Vehicle Accident
ICU	Intensive Care Unit
FFH	Fall from Height
DHT	Direct Head Trauma
CNS	Central Nervous System
GCC	Gulf Cooperation Council
MOH	Ministry of Health
Gov't	Government
HFV	Heart for Valves
HCV	hepatitis C Virus
TB	Tuberculosis
LR	Living Related
LUR	Living Unrelated
MSCT	Musculoskeletal Connective Tissue
SCD	Standard Criteria Donor
ECD	Expanded-criteria donors
KDRI	Kidney Donor Risk Index
CIT	Cold Ischemia Time

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