2017 Annual Report of Organ Transplantation in Thailand

- Heart and Lung Transplantation
- Kidney Transplantation
- Kidney Transplantation in recipients under 18 years old

Thai Transplantation Society

Message from President of Thai Transplantation Society

The organ transplant information has been collected as a report and has a purpose in developing organ transplant system in Thailand. As we are aware that organ transplantation is important in medical profession advancement which has ability to have their lives improve dramatically from the chronic disease patients such as chronic kidney disease, cirrhosis, and last stage of heart failure to perform their activities like normal people once again. Nowadays, the transplant knowledge has fast evaluation in both width and depth related to Basic Transplantation Immunology and new immunosuppressive medication for organ transplant recipients. It is very necessary that physicians who work in transplantation should follow up with the recent knowledge.

Even though, there are a lot of advantages in organ transplant but the main problem is the shortage of organ donors when compare with recipients (5,851 of organ recipients and 5,573 of kidney recipients as at 31 December 2017) and the large difference amount of waiting lists each year when compare between recipients.

As we are aware that the shortage of kidney and other organs donation are a major problem in transplant process. The last stage renal disease is important to the public health's problem because the patients have higher risk to death and waste of medical expenses. However, the treatment which is suitable for the long-term quality of the patient life is kidney transplantation. To honor the Celebrations on the Auspicious Occasion of HRH Princess Maha Chakri Sirindhorn's 60th Birthday Anniversary in 2017, Kidney Foundation of Thailand, Thai Transplantation Society, cooperated parties and harvesting team organizing "the kidney transplant give a royal charity 60 years, HRH Princess Maha Chakri Sirindhorn" during 2 April 2015 – 1 April 2016 which covers the cost of special medication for kidney transplant patients to support and help increasing in donors and caring for patients in 2017 compare to the previous year.

On behalf of President and committee of Thai Transplant Society, would like to thank you, the registration subcommittee for organ transplantation report in 2017 and hope this report will be useful for physicians, nurses and medical staffs for future references.

Thanom Supaporn, LTG., M.D.

President of Thai Transplantation Society

Preface

The Thai Transplantation Society has been collecting the transplant information since 2002 and start to carrying out in The Thai Transplantation Society's annual meeting since 2004 which give the membership, doctors and nurses aware of situation in transplantation each year. In 2012, the registration subcommittee first published annual report and present the society website in both Thai and English to make it convenient in searching for information and reference, as well as make it useful for planning, strategic planning and research.

This Annual Report of Transplantation in 2017 is continuing part from last year's report of heart and lung transplantation, kidney transplant including recipients aged less than 18 years old. All the information has been supported by transplant coordinator nurses, surgeons, nephrologist and pediatric nephrologist from organ transplantation centers in order to analyze and aware of transplant situation in Thailand.

For heart- lung transplant information, Assistant Professor Pat Ongcharit and his colleagues has been collected the patients' information who received the surgery in 2017 and Dr. Kajornsak Noppakun and his colleagues has been brought out the information from all fields to analyze in several dimensions continuously from previous year. Also Dr. Pornpimol Rianthavorn has completely collected and analyzed kidney recipients less than 18 years old group.

The registration subcommittee would like to thank Thai Transplantation Society's organizing committee for supporting in establish annual report of organ transplantation, transplant coordinator nurses for sending patients' information from each institutes, Assistant Professor Pat Ongcharit, Dr. Kajornsak Noppakun, Dr. Pornpimol Rianthavorn and their colleagues for gathering and analyzing information, Ms. Nongnuch Kuttiya and Ms. Pharita Keelee for general coordination, including staffs, doctors and nurses from every kidney institutions which make this report completely and successfully. With expectation that 2017 annual report will be useful for surgeons, nurses, stuffs and those who interested to for their reference in other fields such as academic, public health economic including strategic planning in future kidney transplantation.

The registration subcommittee of organ transplantation

Thai Transplantation Society

Year 2017-2019

Executive Committee, Thai Transplantation Society

Year 2017-2019

Name	Surname	Position
LTG.Dr. Thanom	Supaporn	President
Dr. Surazee	Prommool	Vice-President
Assoc.Prof.Dr. Attapong	Vongwiwatana	Secretary General
LTG.Dr. Prajej	Ruangkanchanasetr	Treasurer
Prof. Adis	Tasanarong	Research Committee
LTG.Dr. Adisorn	Lumpaopong	Registration and Information
Assoc.Prof.Dr. Atiporn	Ingsathit	International Liaison
Asst.Prof. Kajohnsak	Noppakun	Public Relation
Asst.Prof. Natavudh	Townamchai	Transplant Clinical Practice Guideline Development
Asst.Prof. Somchai	Limsrichamrern	Liver / Pancreatic Transplantation Standard of Practice Development
Dr. Sakarn	Bunnag	Ministry of Public Health, Transplant Strategic Development and Coordination
Dr. Pat	Ongcharit	Cardiothoracic Organ Transplantation Standard of Practice Development
Assoc.Prof.Cholatip	Pongskul	Scientific Chairman
Assoc.Prof. Supanit	Nivatvongs	Thai Red Cross Organ Donation Centre Coordination
Prof.Dr. Suporn	Treepongkaruna	Pediatrics and Adult Gastroenterology Coordination

Dr. Siros	Jitpraphai	Surgical Kidney Transplantation Standard of Practice Development

Organ Transplant Registration Subcommittee
Year 2017 – 2019

Name	Surname	Position
LTG.Dr. Adisorn	Lumpaopng	President
Prof.Dr. Yingyos	Avihingsanon	Advisory
Dr. Visit	Dhitavaj	Advisory
Dr. Kowit	Danviriyasup	Advisory
Prof. Dr. Kriengsak	Vareesangthip	Advisory
Assoc.Prof.Supanit	Nivatvongs	Subcommittee
Dr. Pat	Ongcharit	Subcommittee
Assoc.Prof. Pornpimol	Rianthavorn	Subcommittee
Asst.Prof. Nutavudh	Townamchai	Subcommittee
Dr,Sarinya	Puwanant	Subcommittee
Dr. Nopanit	Pattanachaiwit	Subcommittee
Dr. Sakarn	Bunnag	Subcommittee
Assoc.Prof.Dr. Atiporn	Ingsathit	Subcommittee
Asst.Prof. Sathit	Kurathong	Subcommittee
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Dr. Nalinee	Premasathian	Subcommittee
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Ms. Aroonee	Juengsa-ngasom	Subcommittee
Dr.Sirin	Jiwakanon	Subcommittee
Dr.Thitiya	Puavilai	Subcommittee

Prof.Dr.Suporn	Treepongkaruna	Subcommittee
Dr.Anake	Yoosabai	Subcommittee
Assoc.Prof.Abhasnee	Sobhonslidsuk	Subcommittee
Dr.Goragoch	Gesprasert	Subcommittee
Dr.Tanun	Ngamvichukorn	Subcommittee
Asst.Prof.Somchai	Limsrichamrern	Subcommittee
Asst.Prof.Dr. Kajohnsak	Noppakun	Subcommittee and Secretary

Organ Transplant Coordinator Nurses

First name	Last name	Hospital
Thararat	Phudpart	Bangkok
Napaporn	Boonnaj	Chulalongkorn
Salin	Wattanatorn	Chulalongkorn
Naraporn	Wongkaew	Chonburi
Supan	Chunhanant	Police
Sasipim	Pirojkittrakul	Thammasat
Benjaporn	Taenawakul	Thammasat
Ornkamon	Pengkul	Bumrungrad
Panarat	Nopacoon	Bumrungrad
Suwapee	Chantornjetsada	Phyathai 1
Benjawan	Sookruan	Phyathai 1
Kanokporn	Ratanatrisri	Buddhachinaraj
Siriluk	Liewseng	Phramongkutklao
Kaenchai	Pipatpanawong	Praram 9
Panatchana	Aroonrojsiri	Bhumibol Adulyadej
Anchalee	Saikam	Maharajnakornchiangmai
Jugkree	Korsakul	Maharajnakhonratchasima
Panida	Opakawinkul	Rajavithi

Mallika	Sitthisarn	Rajavithi
Chutima	Charoenthanakit	Ramathibodi
Wararat	Wongwean	Vajira
Jongruk	Pongskul	Srinagarind
Nartsiri	Ratchawang	Siriraj
Nutjanat	Rintawut	Khonkaen
Budsaya	Dandacha	Songklanagarind
Wanida	Ratanasuwan	Samitivej Srinakarin
Pisinee	Namprom	Samitivej Sukhumvit
Phataraporn	Jit-im	Sappasitthiprasong
Tasana	Nilapat	Surat Thani
Jamaree	Pondee	Surat Thani
Kingkarn	Sirikarin	Hatyai
Sasipin	Mongkolchai	Udonthani
Amnuayporn	Nammun	Udonthani
Nichakorn	Pasook	Bumirajanagarindra Kidney Institute
Paphanida	Borsuwan	Vejthani
Jarunee	Meesri	Faculty of Medicine Srinakharinwirot University
Thanyapat	Pongwiwat	Chiang Rai Prachanukroh
Nitikan	Jaiklom	Chiang Rai Prachanukroh

Contents

Page

Information of Heart and Lung Transplantation

Information of Heart and Lung Transplantation

Intrathoracic organ transplantation

From 2008-2017, 113 patients have received heart transplantation from 6 hospitals e.g. Chulalongkorn, Siriraj, Rajavidhi, Ramathibodi, Central Chest Institute of Thailand and Bumrungrad Hospital.

	Year									
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Chulalongkorn	3	5	3	7	8	6	14	12	10	9
Siriraj	-	1	2	1	4	4	4	7	4	7
Ramathibodi	-	-	-	-	-	-	-	-	-	1
Rajavidhi	1	-	-	-	-	2	5	5	2	3
Central of Chest Institute of Thailand	-	2	-	-	-	-	-	-	-	-
Bumrungrad	1	-	-	-	-		-	-	-	-
Total	**5**	**8**	**5**	**8**	**12**	**12**	**23**	**24**	**16**	**20**

Table 1.1 Number of heart transplant recipients, separated by year and hospital.

In 2017, 20 patients were received heart transplantation which was increased from 2016 by 4 patients as shown in table 1.1.

In 2017, there is no heart-lung transplantation and single lung transplantation, only 24 patients received heart transplantation and 27 patients received heart-lung transplantation.

The recent waiting list information from The Thai Red Cross Organ Donation Centre shown that 21 patients for heart, 25 patients for heart-lung and 1 patients for long which 47 in total.

Information of Kidney Transplantation

Information of Kidney Transplantation

Number of Kidney Transplant Recipients in 2017

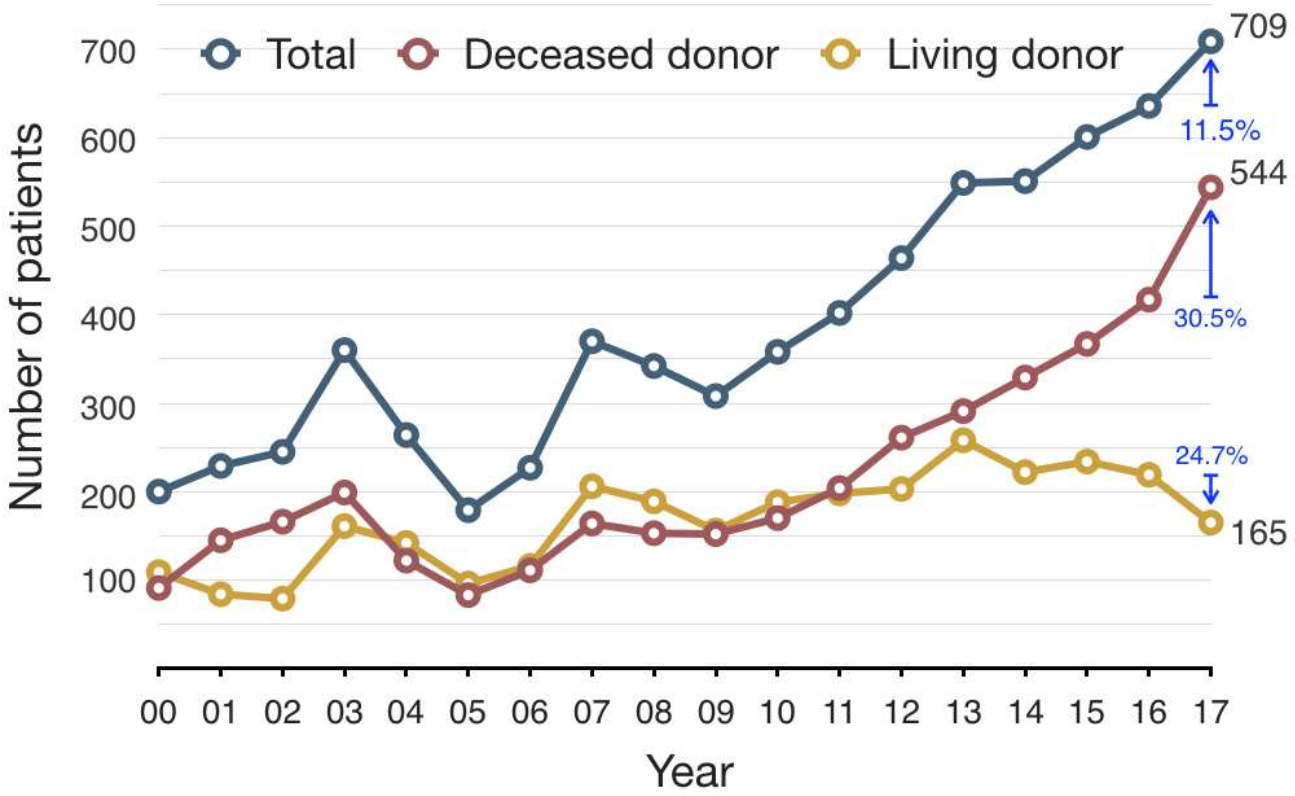
During 2017 (1 January 2017 – 31 December 2017), 709 patients have received kidney transplantation from 28 hospitals, by 165 of living donors and 544 of deceased donors, separated by hospital as shown in table 2.1.

Table 2.1 Number of Recipients in 2017, separated by hospital.

	Kidney Transplant Recipients from Deceased donors	Kidney Transplant Recipients from Living donors	Total
Siriraj	62	20	82
Chulalongkorn	38	23	61
Ramathibodi	128	56	184
Phramongkutklao	18	6	24
Praram 9	80	2	82
Bhumibol Adulyadej	11	0	11
Maharaj Nakorn CHiangmai	46	25	71
Rajavidhi	16	3	19
Vachira	1	4	5
Chonburi	0	1	1
Supphasitprasong	5	3	8
Srinagarind	55	3	58
Smithivej Sukhumvit	10	0	10

Bangkok	1	0	1
Phayathai 1	1	0	1
Bumrungrad International	20	4	24
Police General	26	2	28
Maharaj Nakornrachasima	0	2	2
Songklanakarin	2	3	5
Smithivej Srinakarin	2	0	2
Thammasat	10	2	12
Suratthani	0	1	1
Khonkaen	7	1	8
Hat Yai	1	1	2
Udonthani	4	0	4
Vejthani	0	1	1
Srinakarinwirot Ongkharak	0	1	1
Chiangrai Prachanukroh	0	1	1
Total	**544**	**165**	**709**

Compare to 2016, found that previous kidney transplant was increased by 11.5% (from 636 to 709), recipients from living donors were decreased by 24.7% (from 219 to 165) and from deceased donors were increased 30.5% (from 417 to 544).



Picture 2.1 Number of kidney transplantation each year since 2000, separated by kidney transplant category.

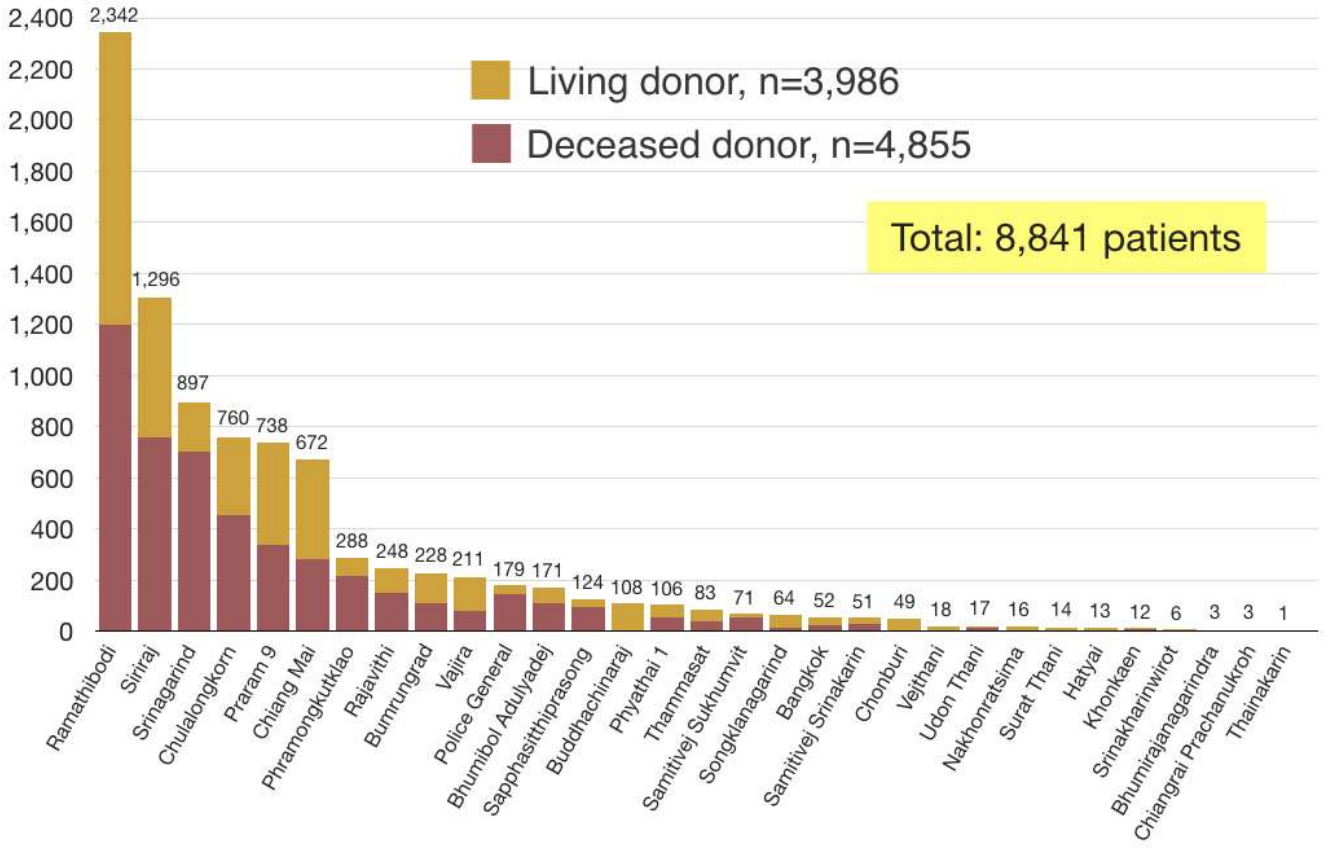
From picture 2.1 shown the information of kidney transplantation since 2000 who registered officially for kidney transplantation in Thailand. There are a lot of kidney transplant recipients who received kidney transplantation in 2003 and 2007. In 2003, The Kidney Foundation of Thailand established the occasion to give a royal charity dedicated to HRH Princess Galyani Vadhana Kromma Luang Naradhiwas Rajanagarindra for her 80th Birthday and in 2007, then established "The kidney is the charity dedicated 80/ 84 years "to give a royal charity dedicated on the occasion of 80th Birthday Anniversary for His Majesty The King Bhumibol Adulyadej and HRH Princess Galyani Vadhana Kromma Luang Naradhiwas Rajanagarindra on the occasion of 84th Birthday Anniversary which cause the increasing of kidney transplant recipients.

In 2015, in honor of the Celebrations on the Auspicious Occasion of HRH Princess Maha Chakri Sirindhorn's 60th Birthday Anniversary, Kidney Foundation of Thailand and cooperated parties organizing

"the kidney transplant give a royal charity 60 years, HRH Princess Maha Chakri Sirindhorn" during 2 April 2015 – 1 April 2016 which encourage kidney donation campaign, give additional support to hospital, staffs and harvesting team, altogether with covering the cost of special medication for kidney transplant patients by providing medical expenses from original affiliation such as Comptroller General's Department, Social Security Office and National Health Security Office which are cooperated parties of campaign.

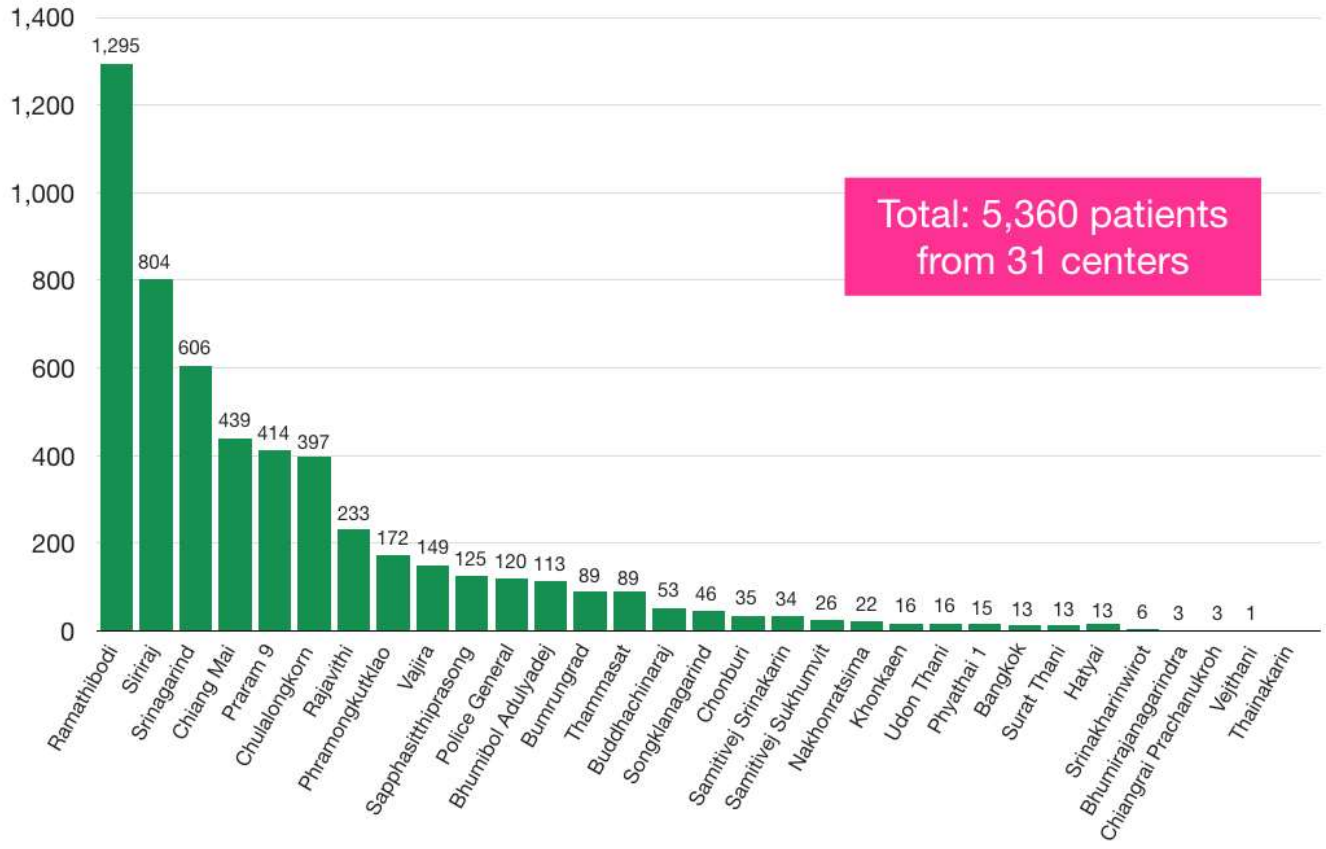
In 2004, Social Security Office implemented kidney transplant coverage for employee and in 2008, National Health Security Office approved to add the kidney transplant in the universal health care coverage. In addition, Ministry of Public Health implemented the decreased donor campaign and establishes the donor Hospital which shown that there are more deceased donors than living donors since 2011.

There were 8,841 kidney transplant recipients in Thailand, 3,986 of living donors and 4,855 of deceased donors as shown in picture 2.2.



Picture 2.2 Number of all kidney transplant recipients in Thailand, separated by hospital.

The prevalence of kidney transplant as of 31 December 2017 from 31 institutes were 5,360 as shown in picture 2.3.

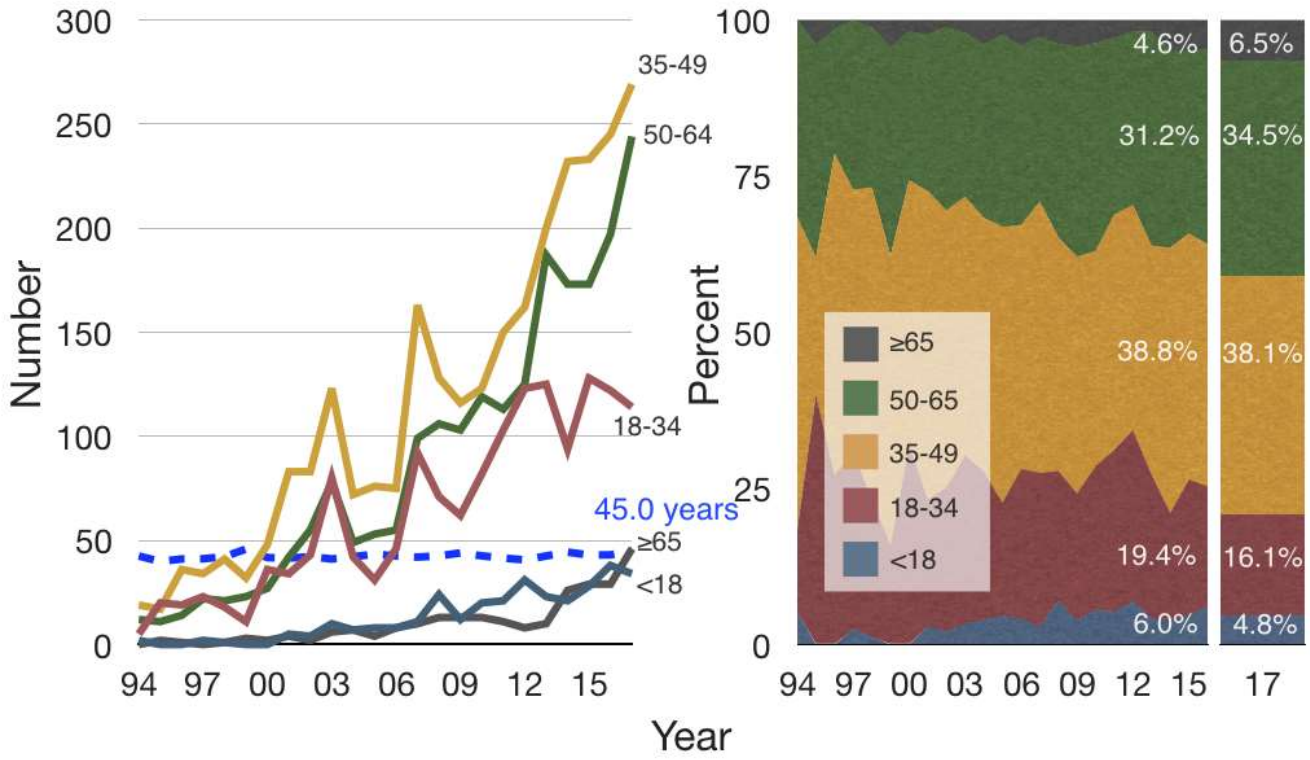


Picture 2.3 The prevalence shows kidney transplant recipients as of 31 December 2017

Information of kidney transplantation in 2017

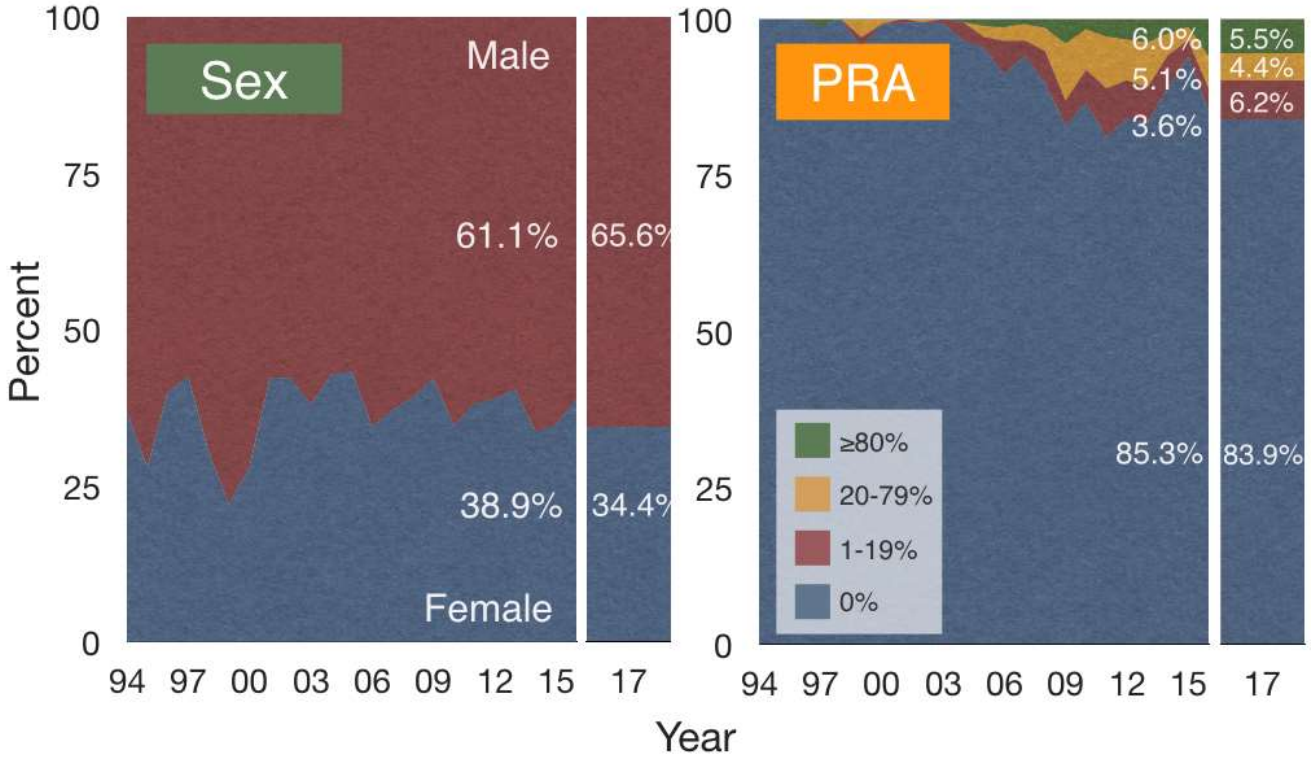
The average age of kidney transplant in 2017 equal to 45.0 years old, which was increased from 2016 equal to 43.0 years old and the maximum ages who was received the kidney transplant is during 35-49 years old. The proportion of kidney transplant in 2017 by span of age, found that 4.8% were recipients under 18 years old, 16.1% were recipients aged 18-34 years old and 38.1% were recipients aged 35-49 years old, 34.5% were recipients aged 50-65 years old and 6.5% were recipients aged more than 65 years old as shown in picture 2.4. When compare to 2016, found that the age of 50-65 has the most increased in

proportion of 3.3% and the age over 65 has secondly increased proportion of 1.9% while the age 18-34 and less than 18 has increased respectively.



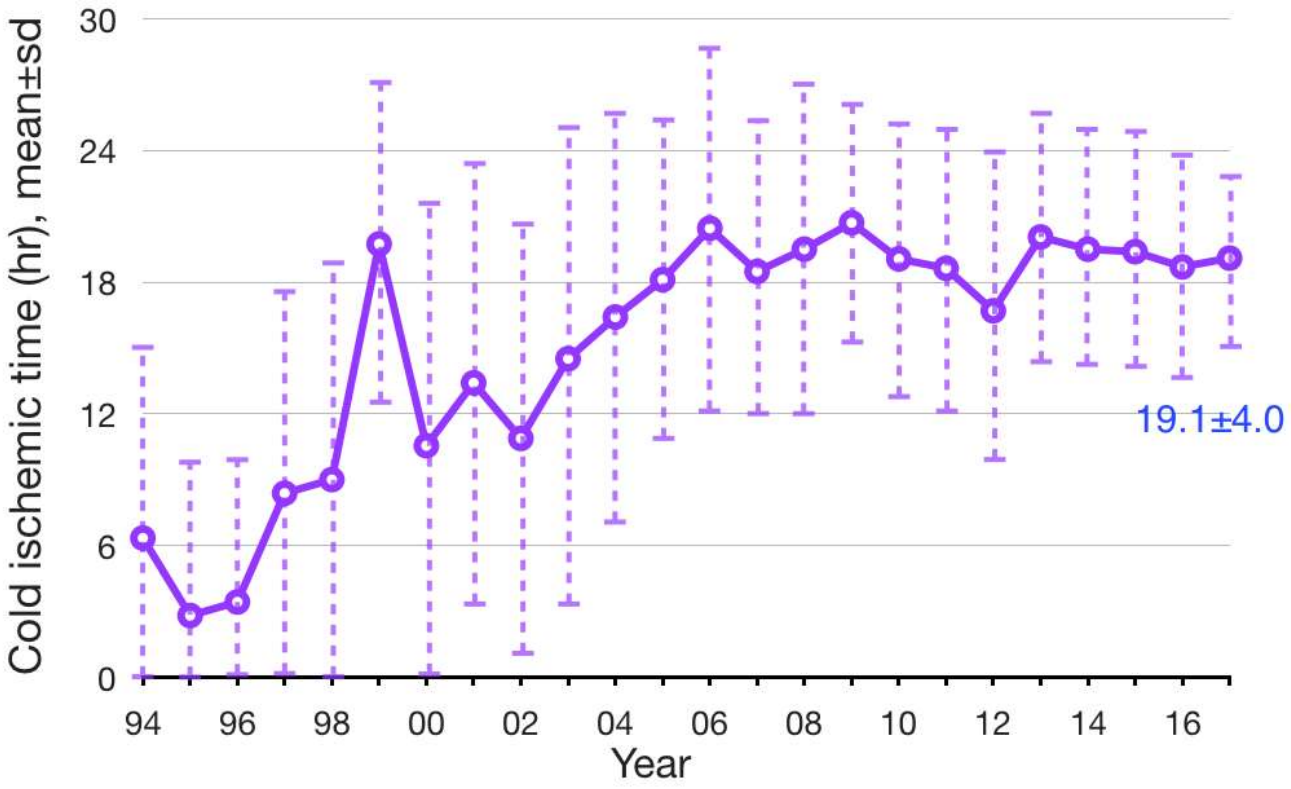
Picture 2.4 The proportion of kidney transplant recipients, separated by ages

When separated by sex, found that there were more male than female kidney transplant recipients by the proportion of 65.6% which was increased from 2016. The kidney transplant recipients of 83.9% has PRA equal to 0, 6.2% has PRA between 1-19, 4.4% has PRA between 20-79 and 5.5% has PRA more than 80 as shown in picture 2.5 which recipients who has PRA equal to 0 has been decreasing when compare to 2016.



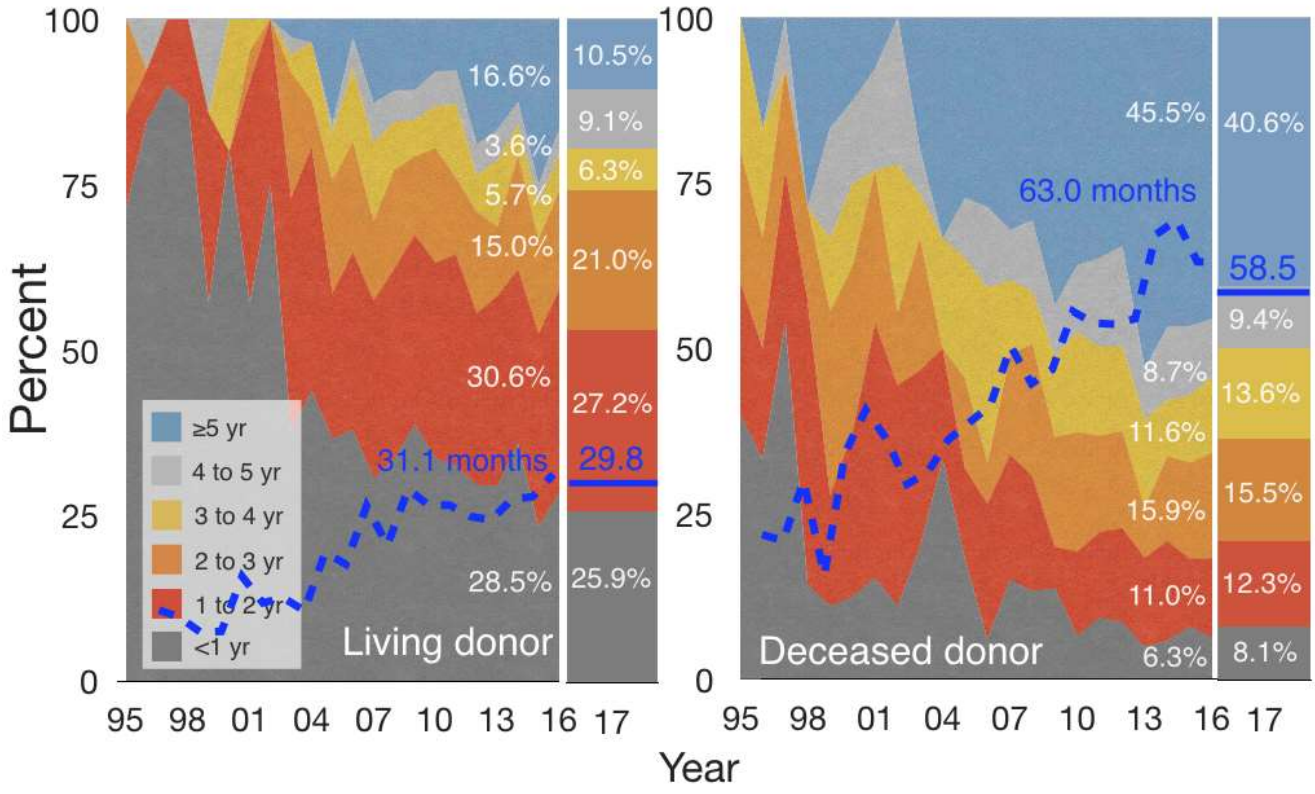
Picture 2.5 Sex and Panel Reactive Antibody (PRA) of kidney transplant recipients

For deceased donor group, found that the period of cold ischemic time in 2017 equal to 19.1 ± 4.0 hours as shown in picture 2.6.



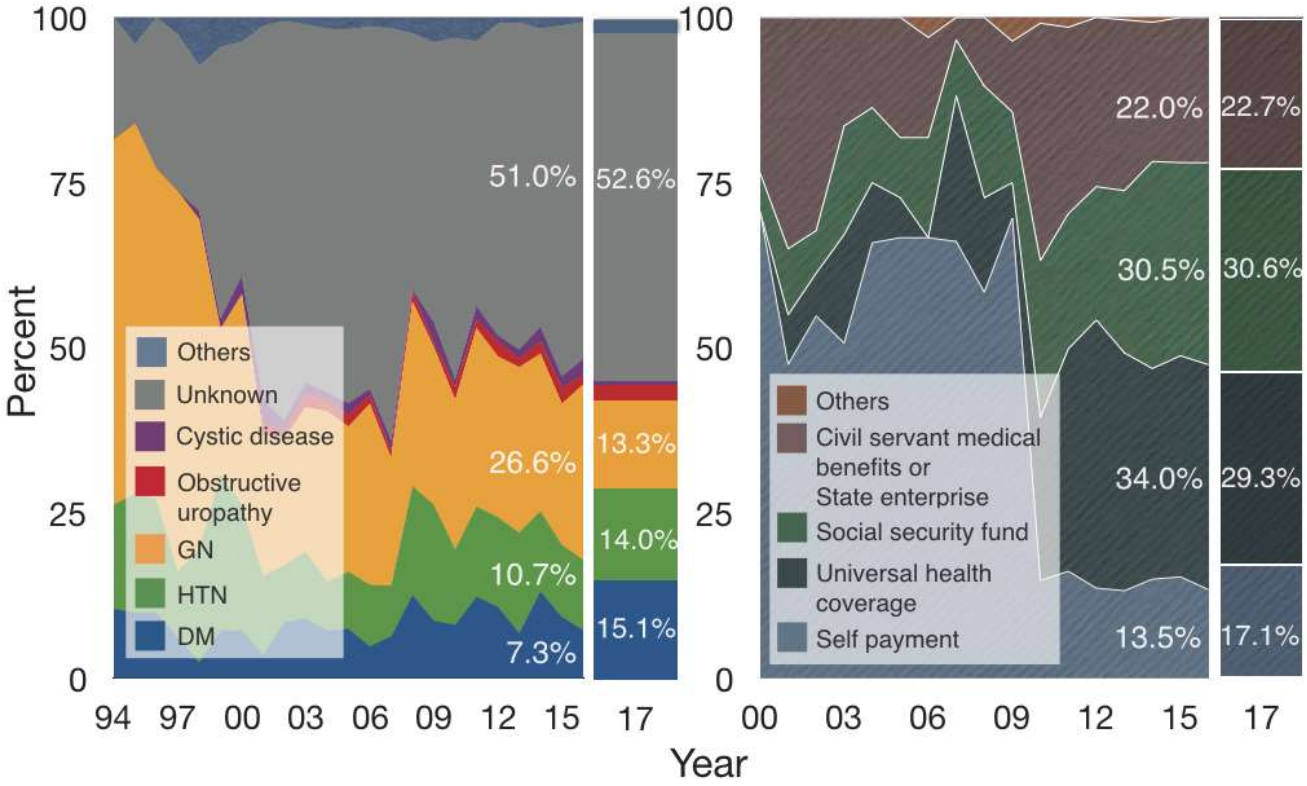
Picture 2.6 Period of Cold Ischemic Time of kidney transplant of deceased donors.

The waiting time for kidney transplant in 2017 of living donors equal to 29.8 months and deceased donors equal to 58.5 months which was decreased when compare to 2016 as shown in picture 2.7.



Picture 2.7 The waiting time of kidney transplant recipients of living donors and deceased donors.

The main cause of end-stage renal disease by kidney transplant categories, as shown in picture 2.8 are diabetes, hypertension and chronic glomerulonephritis. When compare to 2016, the proportion of diabetes was increased while chronic glomerulonephritis was decreased. And to consider from health care schemes, found that 29.3% use universal coverage scheme, 30.6% use social security scheme and 22.7% use government and state enterprise healthcare coverage as shown in picture 2.8.



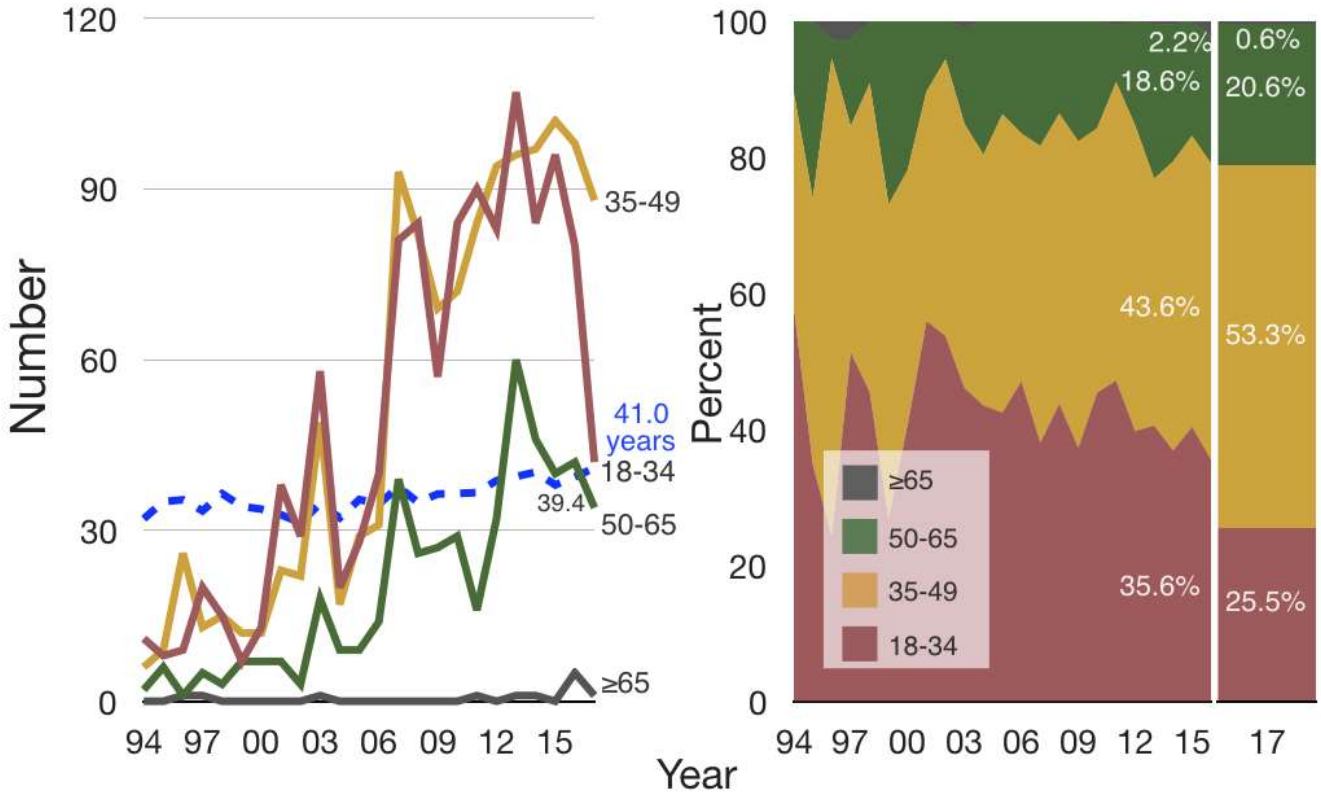
Picture 2.8 The causes of end-stage renal disease and Healthcare schemes.

In Summary of year 2017

- The amount of kidney transplantation in 2017 was increased from 636 to 709 as the proportion of living donors decreased by 24.7% and deceased donors was increased by 30.5% when compare to 2016.
- The main age of kidney transplant recipients is between 35-49 and 50-64 years old respectively.
- The major causes of end-stage renal disease were diabetes, hypertension and chronic glomerulonephritis respectively.
- The major healthcare coverage schemes in kidney transplant recipients were universal coverage scheme, social security scheme and government/ state enterprise healthcare coverage respectively.

Information of kidney transplant donors

In 2017, the average age of living donors equal to 41.0 years old which was increased by 39.4 years old from 2016, mostly between 35-49 years old of age by 53.5% which is the most increased age proportion as shown in table 2.9. While kidney transplant donors aged 18-34 years old is the most decreased age when compare to 2016.



Picture 2.9 Age of living donors

The main donors are 52.1% from female blood relations and 30.1% from male blood relations which were 15.3% wife donated to husband and 2.5% husband donated to wife as shown in picture 2.10.

Moreover, 65.8% and 28.3% were living donors which body mass index (BMI) less than 25 and between 25-30 kilograms per square meter respectively.

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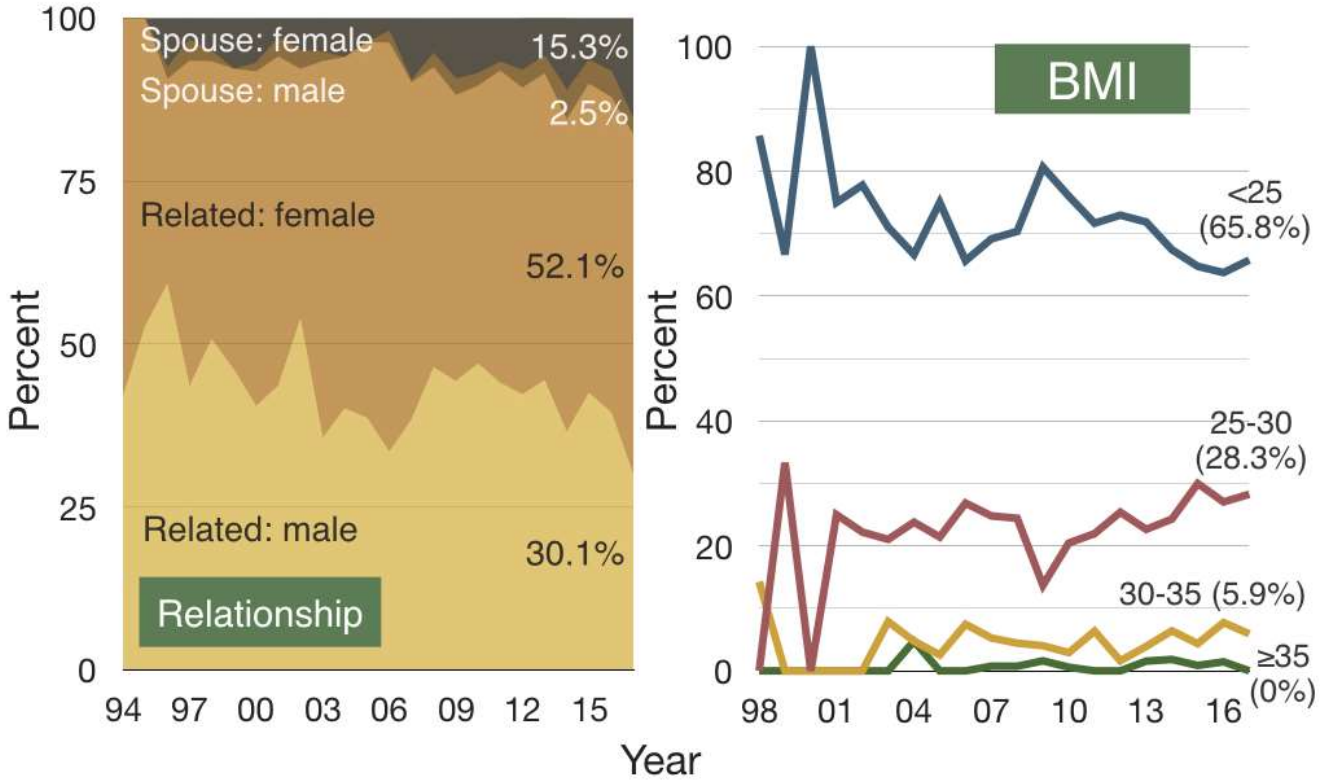
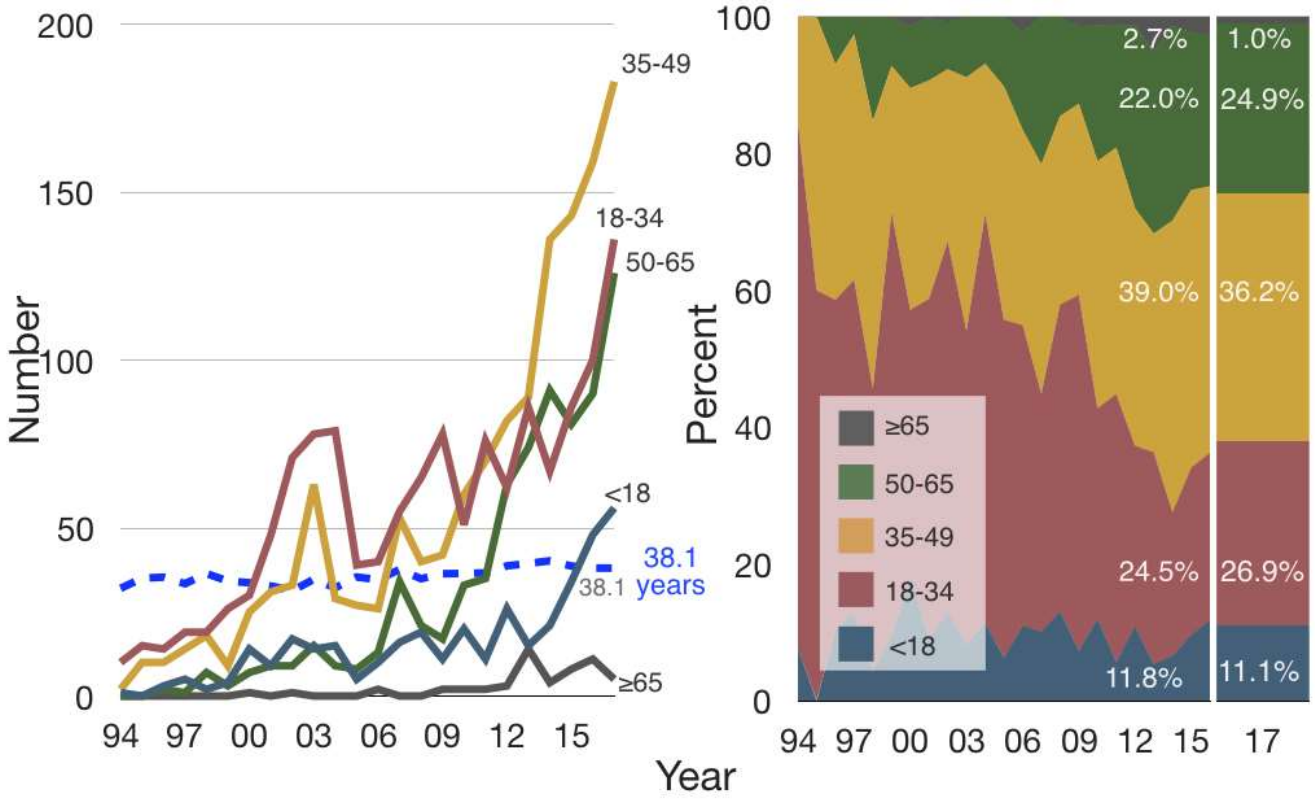


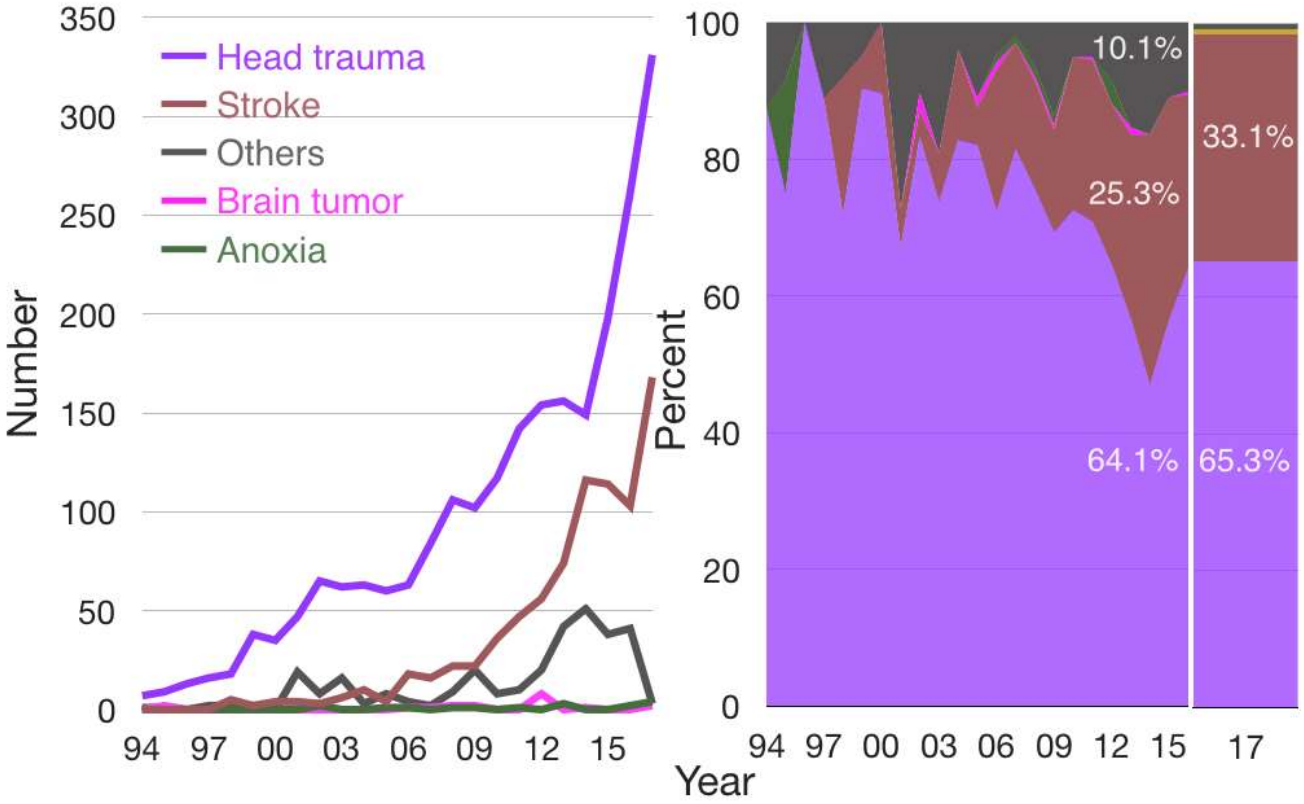
Picture 2.10 The relation between donors and recipients of living donors

In deceased donor group found the average age equal to 38.1 years old adjacent to year 2016 and the proportion of age span is not different as shown in picture 2.11.



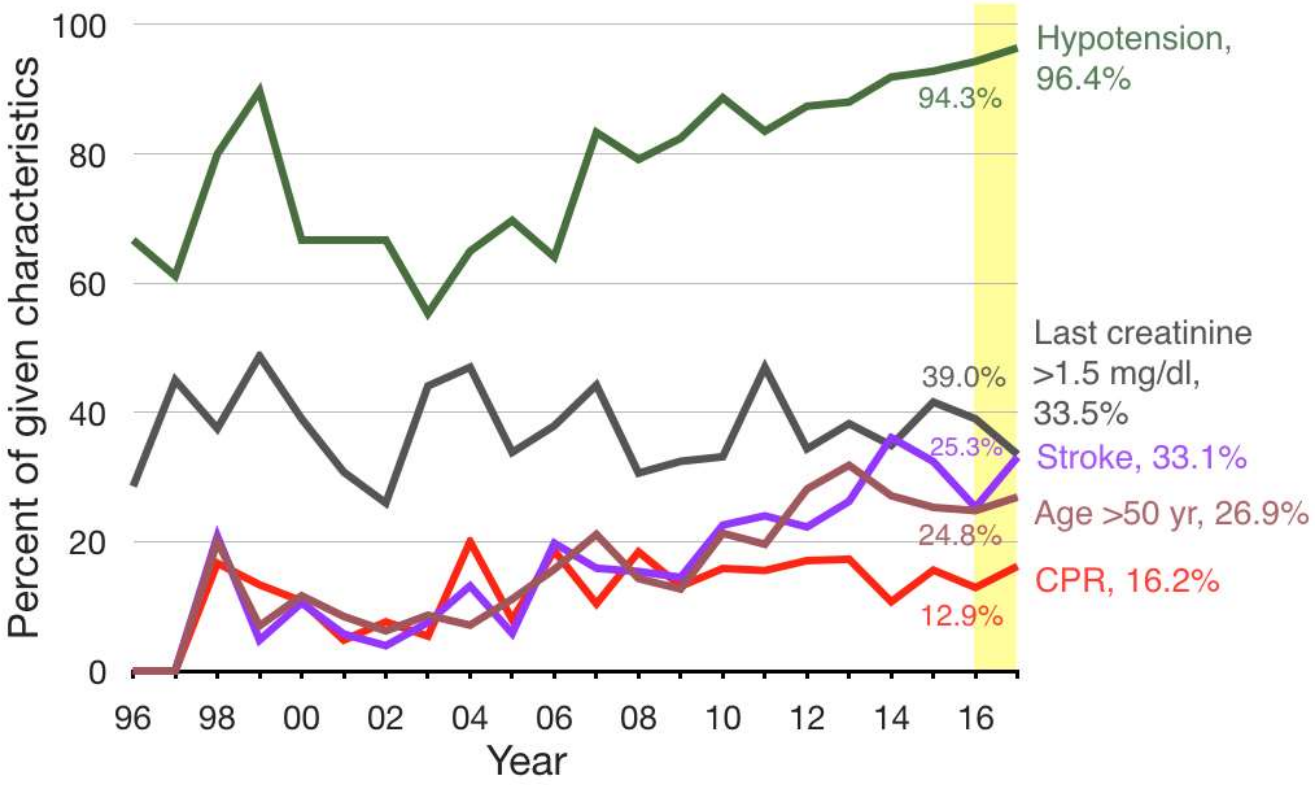
Picture 2.11 Age span of deceased donors

The main caused of brain death were head trauma and stroke respectively as shown in Picture 2.12 when comparing to 2016. The proportion of deceased donors caused by head injury was stable while deceased donors caused by stroke were increased from 25.3% to 33.1%.



Picture 2.12 The cause of brain death in deceased donors.

There were 96.4% of deceased donors had hypotension, 16.2% had been performed the cardiopulmonary resusitation (CPR). 33.5% had the serum creatinine more than 1.5 mg/dL, 26.9% were age older than 50 years old and 33.1% were caused by stroke as shown in Picture 2.13 when comparing to 2016. The proportion of deceased donor qualification stated above has increased but decreased in the donor who had the serum creatinine more than 1.5 mg/dL.



Picture 2.13 The qualification of deceased donors

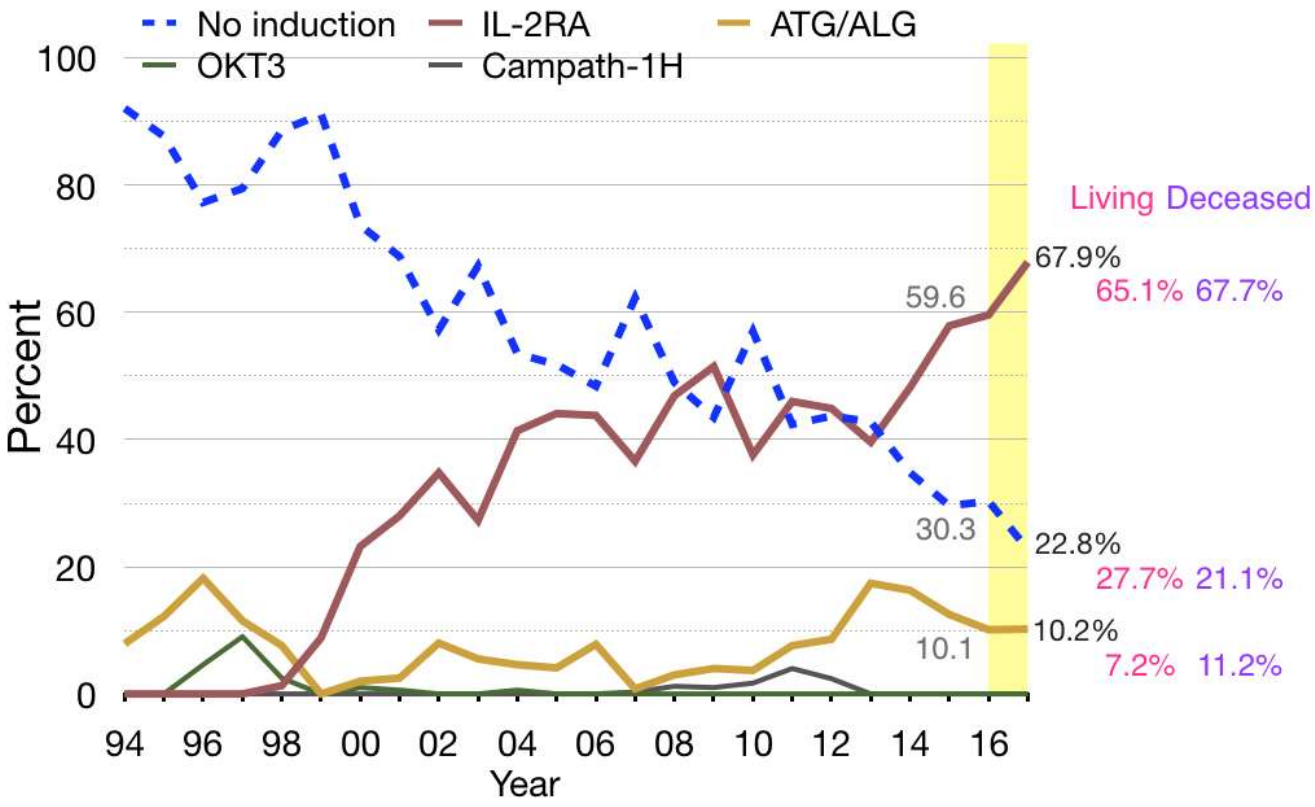
In Summary of kidney transplant in year 2017

- The kidney living donors and deceased donors have average age between 41.0 to 38.1 years old respectively.
- The main kidney recipients have blood relations in living donors and spouse related donors which female is the major living donors.
- In deceased donors, found that
    - The major causes of brain death were head trauma and stroke respectively.
    - When compare to 2016, the deceased donors who had hypotension that performed the cardiopulmonary resusitation (CPR) in proportion of more than 50 years old and deceased donors who had stroke were increased. While the proportion of deceased donors who had serum creatinine were more than 1.5 mg/dL were decreased.

Information of Immunosuppressive medication

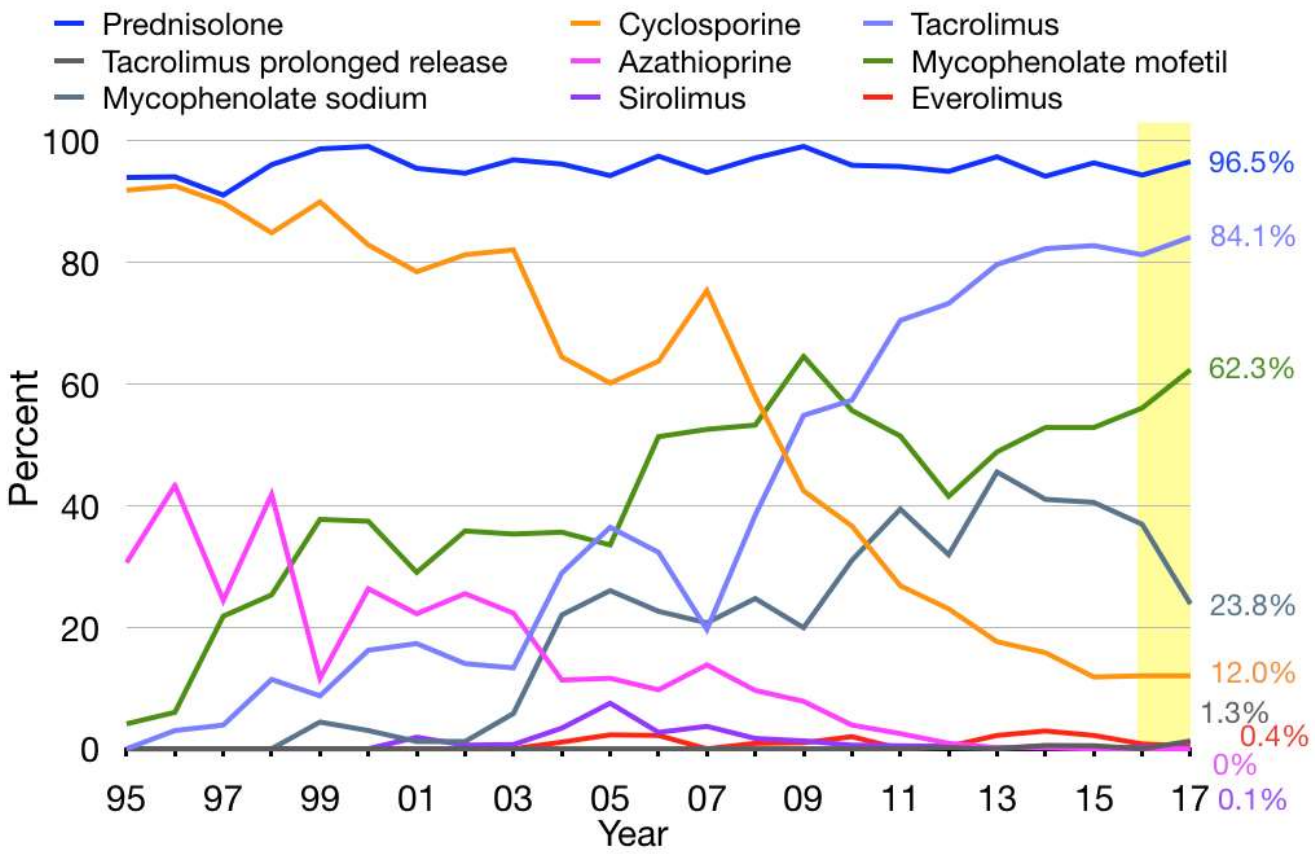
Immunosuppressive medication

In 2017, 77.2% of antibody induction therapy was used and was increased from 2016 which equal to 69.7%, divided to 67.9% interleukin-2 receptor antagonist (IL-2 RA) which was increased from 2016 equal to 59.6%, 10.2% of anti-thymocyteglobulin (ATG)/anti-lymphocyte globulin (ALG) which adjacent to 2016 that equal to 10.1% as shown in Picture 2.14: 65.1% of IL-2RA was used and 7.2% of ATG/ALG was used in kidney transplant of living donors; 67.7% of IL-2RA was used and 11.2% of ATG/ALG was used in kidney transplant of deceased donors.



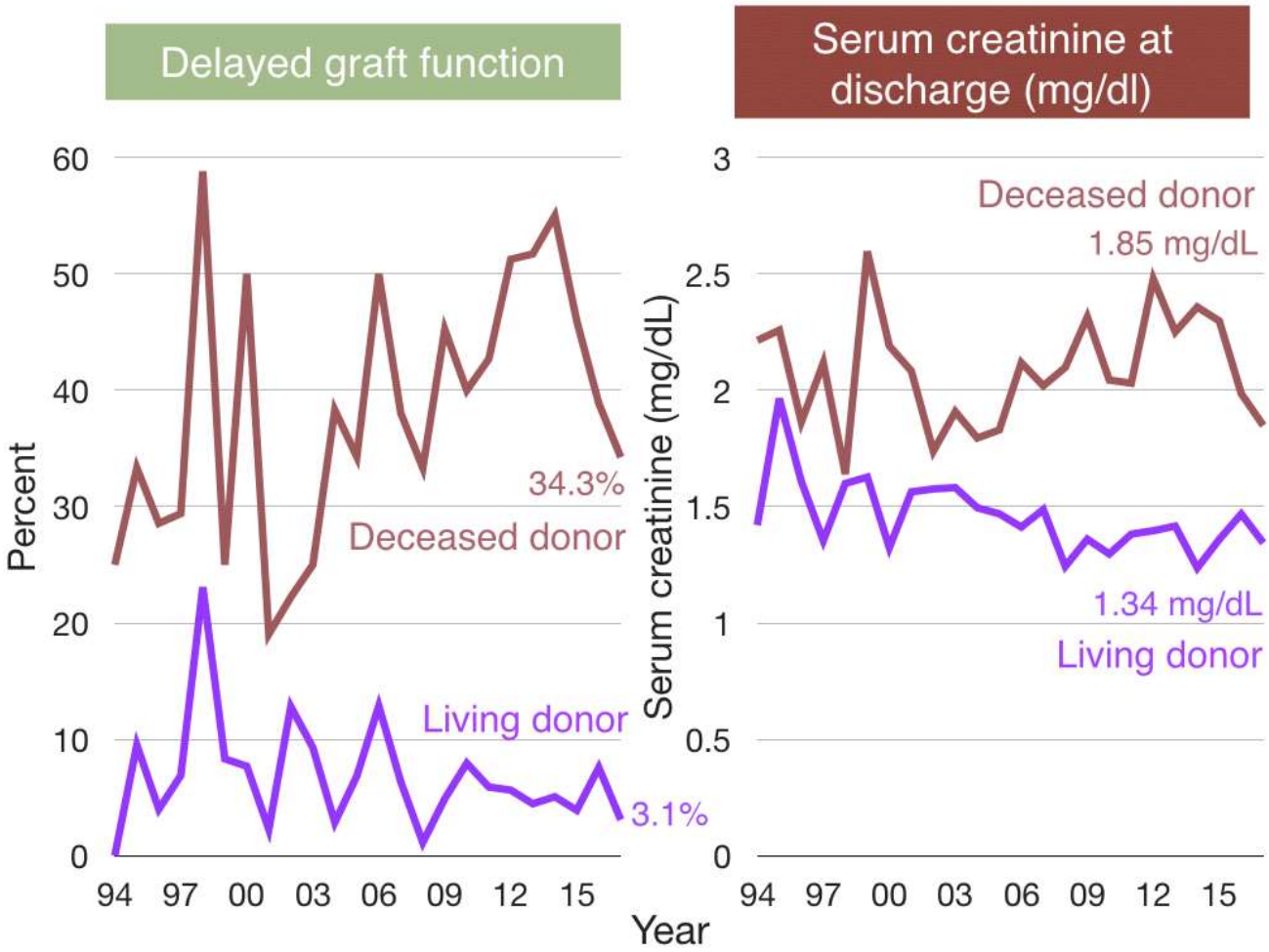
Picture 2.14 The proportion of recipients who received antibody induction therapy, separated by year of transplantation.

The proportion and tendency of immunosuppressive medication use on discharge date was shown in picture 2.15. In 2017, patients received prednisolone, tacrolimus, tacrolimus prolonged release, cyclosporine, mycophenolate mofetil and mycophenolate sodium at 96.5%, 84.1%, 1.3, 12.0%, 62.3%, 23.8% respectively. Less than 0.5% of the patients received azathioprine, sirolimus or everolimus on discharge date.



Picture 2.15 The proportion of immunosuppressive treatment on discharge date, separated by year of kidney transplantation.

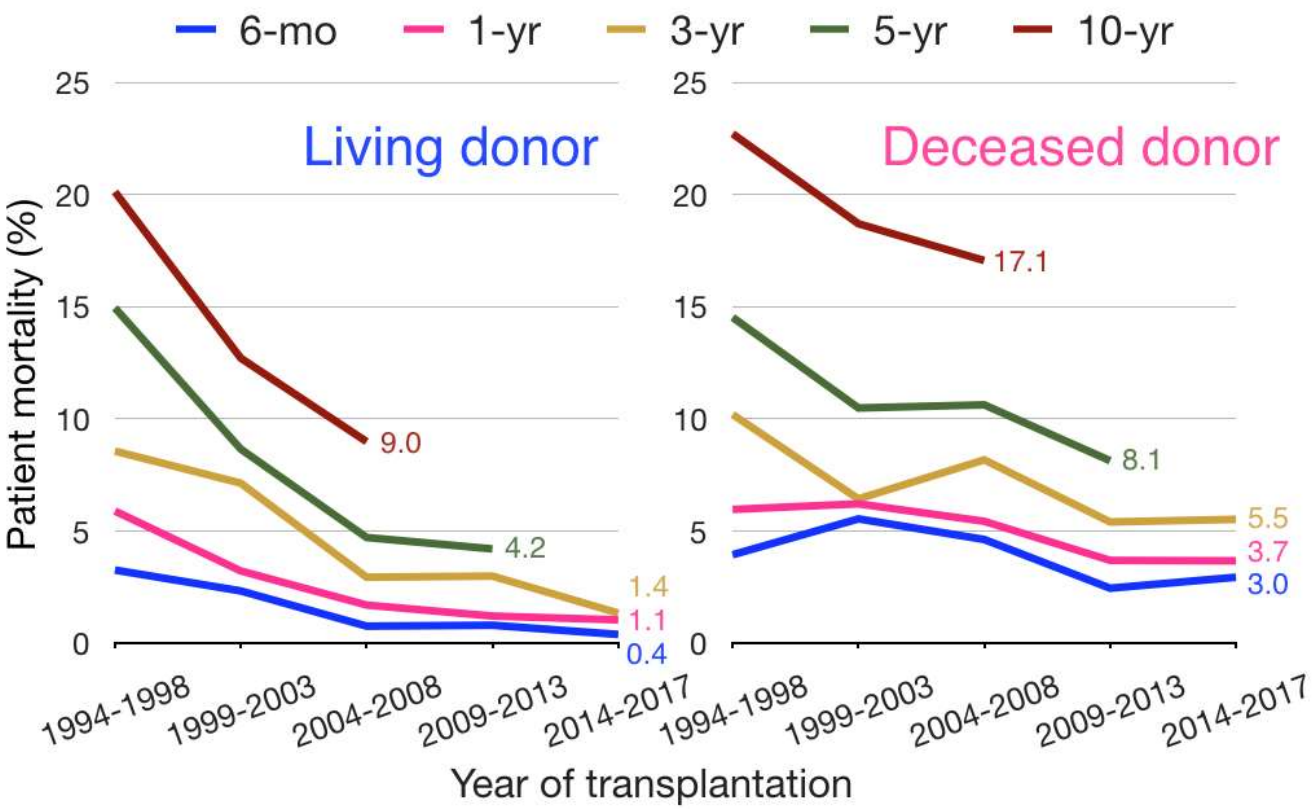
The comparison between proportion of delayed graft function (DGF) after kidney transplantation and serum creatinine level on discharge date of the recipients from the living donors and deceased donors as shown in Picture 2.16, found that delayed graft function and serum creatinine level of living and deceased donors on discharge date were decreased when compare to 2016.



Picture 2.16 Delayed graft function and serum creatinine on discharge date, separated by transplant types.

Patient survival rate

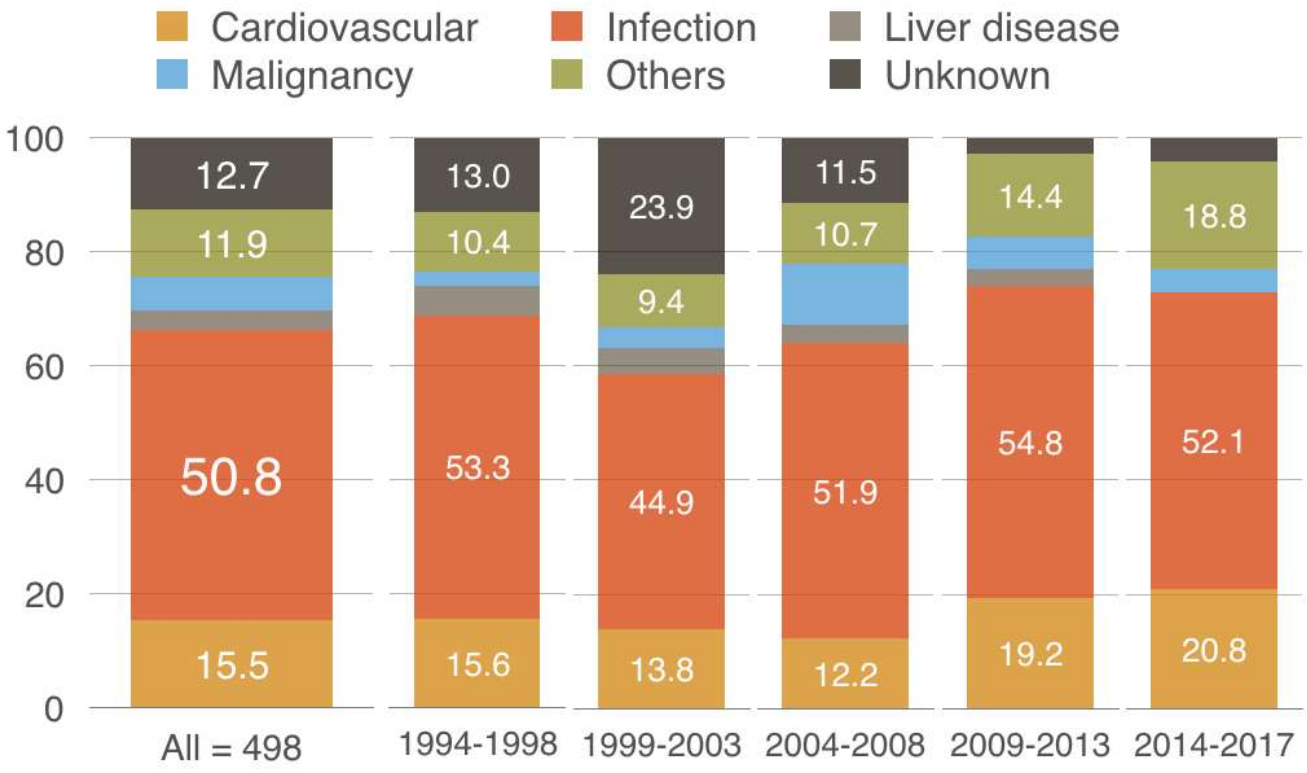
The patient survival rate after kidney transplantation has significantly increased from the previous period which the recipients of the living donors and deceased donors have death rate in various period of time as shown in picture 2.17.



Picture 2.17 Patient survival rate separated by types of kidney transplantation.

Cause of death

The cause of death in every age after kidney transplantation within the first year was infection, heart diseases and vascular diseases and as shown in picture 2.18.



Picture 2.18 The cause of patients' death in various period of time.

Graft Survival

The graft survival rate was increased from past period of time for both living donors and deceased donors. The graft survival rate in different time was decreased by period of time as shown in picture 2.19.

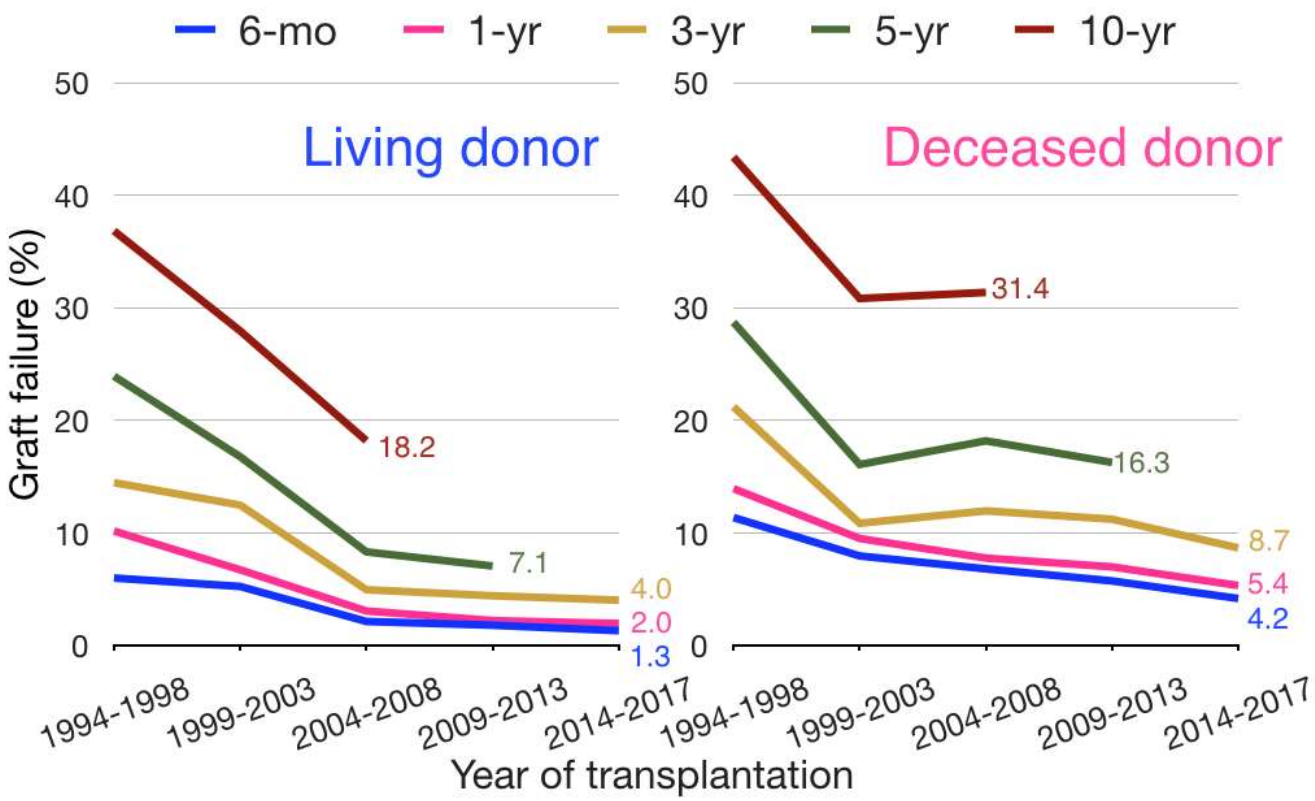
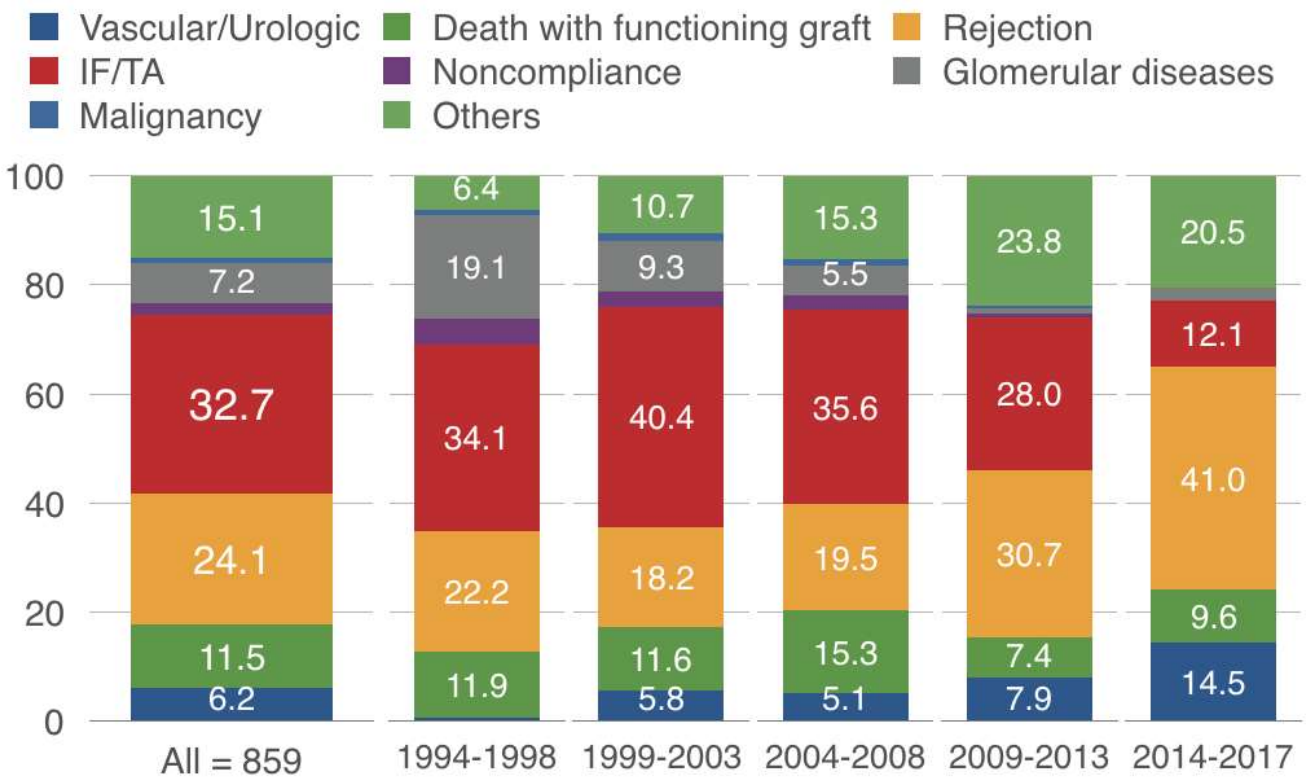


Table 2.19 The graft survival rate separated by types of kidney transplantation.

Graft loss in various period of time after kidney transplantation as shown in picture 2.20, found that the patients were received kidney transplant more than 10 years (between 1994 to 2008) and less than 10 years (between 2009 to 2017), the main reason of graft loss were interstitial fibrosis/tubular atrophy (IF/TA) and rejection respectively.



Picture 2.20 Graft loss of recipients in various period of time.

Kidney transplant 2016 Summary

- Comparing to the past, 77.2% antibody induction therapy has significantly increased.
- Immunosuppressive medication used on discharge date, 84.1% of tacrolimus was used by calcineurin inhibitor group. 62.3% of mycophenolatemofetil was used by antiproliferative and 23.8% of mycophenolate sodium.
- There are 34.3% and 3.1% of delayed graft function in recipients who received kidney transplant from deceased donors and living donor respectively.
- Infection was the major cause of death.
- The major cause of graft loss was IF/TA and rejection.
- The tendency of patient's survival rate and graft survival rate was increased compare to the past, especially from living donors.

Information of Kidney Transplantation in patients under 18 years old

Kidney Transplantation in patients under 18 years old

Number of kidney transplant recipients under 18 years old in 2017

From January to 31 December 2017, there were 34 patients of kidney transplant recipients under 18 years old, 5 recipients from living donors and 29 recipients from deceased donors, separated by hospitals as shown in table 3.1.

Table 3.1 Number of kidney transplant recipients under 18 years old in 2017, separated by hospital.

Hospital	Kidney transplant recipients of Living donors	Kidney transplant recipients of Deceased donors	Total
Phramongkutklao	1	11	12
Srinagarind Khonkhen	0	8	8
Siriraj	1	5	6
Ramathibodhi	2	3	5
Chiang Mai	1	1	2
Thammasat	0	1	1
Total	**5**	**29**	**34**

The comparison between 2016 and 2017, the kidney transplantation for children recipients were decreased by 15%. (picture 3.1).

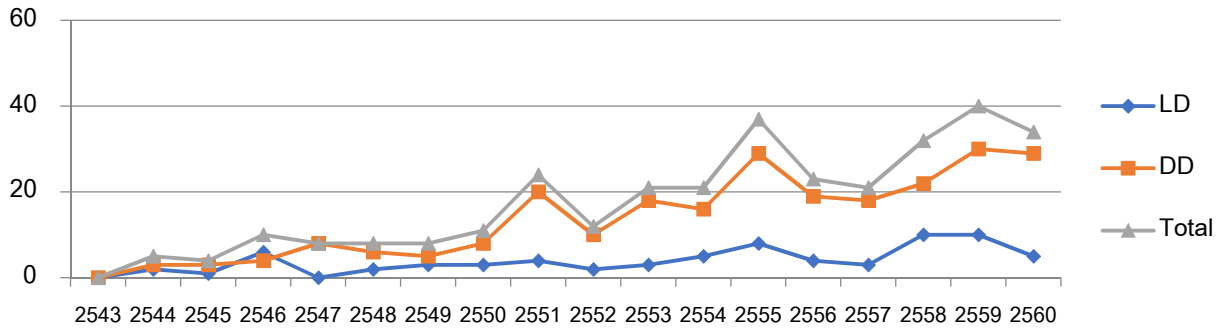


Table 3.1 Number of the kidney transplantation for children recipients each year since 2000, separated by transplantation types.

Information of kidney transplant recipients and donors under 18 years old in 2017

In 2016, from 34 of kidney transplant recipients under 18 years old, there were 5 recipients from living donors which 20% of recipients were male. The information provided for living donors 60% were female. The average age of donor equal to 40.0 ± 2.5 years old. The average age of recipients who received the first kidney transplant equal to 13.2 ± 3.3 years old and 60% received hemodialysis before transplantation (Table 3.2).

Table 3.2 Information of kidney transplant recipients under 18 years old received from living donors.

	Recipient	Donor
Male gender, %	20	40
Age (mean ± SD), years (range)	13.2 ± 3.3 (9–17)	40.0 ± 2.5 (36–43)
Number of transplant, % 1	100	
Mode of renal replacement therapy, %		

Preemptive	40	
Hemodialysis	0	
Peritoneal dialysis	60	
Serum creatinine at discharge (mg/dL)		
	0.61 ± 0.20	

SD: standard deviation

The 29 recipients of deceased donors, as shown in table 3.3, found that 69.0% were male, 83% were male deceased donors. The average age of donor equal to 30.1± 11.2 years old. The average age of recipients equal to 14.7 ± 2.4 years old. All recipients received first kidney transplantation and 89.7% of recipients who received hemodialysis before transplantation.

Table 3.3 Information of kidney transplant recipients under 18 years old received from deceased donors.

	Recipient	Donor
Male gender, %	69.0	79.3
Age (mean ± SD), years (range)	12.8 ± 3.8 (1–17)	30.0 ± 11.3 (12–51)
Number of transplant, % 1	96.6	
Mode of renal replacement therapy, %		
Preemptive	3.4	
Hemodialysis	17.2	
Peritoneal dialysis	76.3	
Serum creatinine at discharge (mg/dL)		
	1.50 ± 1.71	
Cold ischemic time (hour)		
	17.8 ± 4.4	

SD: standard deviation

Immunosuppressive medication usage and kidney transplant recipients under 18 years old outcomes for year 2017

In 2017, 34 kidney transplant recipients have information of induction therapy and immunosuppressive medication on discharge date, as shown in Table 3.4 and 3.5 respectively and indicated that 76.5% received basiliximab induction therapy which is the most formula used on discharge date were tacrolimus, mycophenolate mofetil and prednisolone formula.

Table 3.4 Kidney transplant recipients under 18 separated by induction therapy

Induction therapy	N (%)
No induction	5 (14.7)
Basiliximab	26 (76.5)
Antithymocyte globulin	3 (8.8)
Total	**34 (100)**

Table 3.5 Information of Immunosuppressive regimen on discharge date.

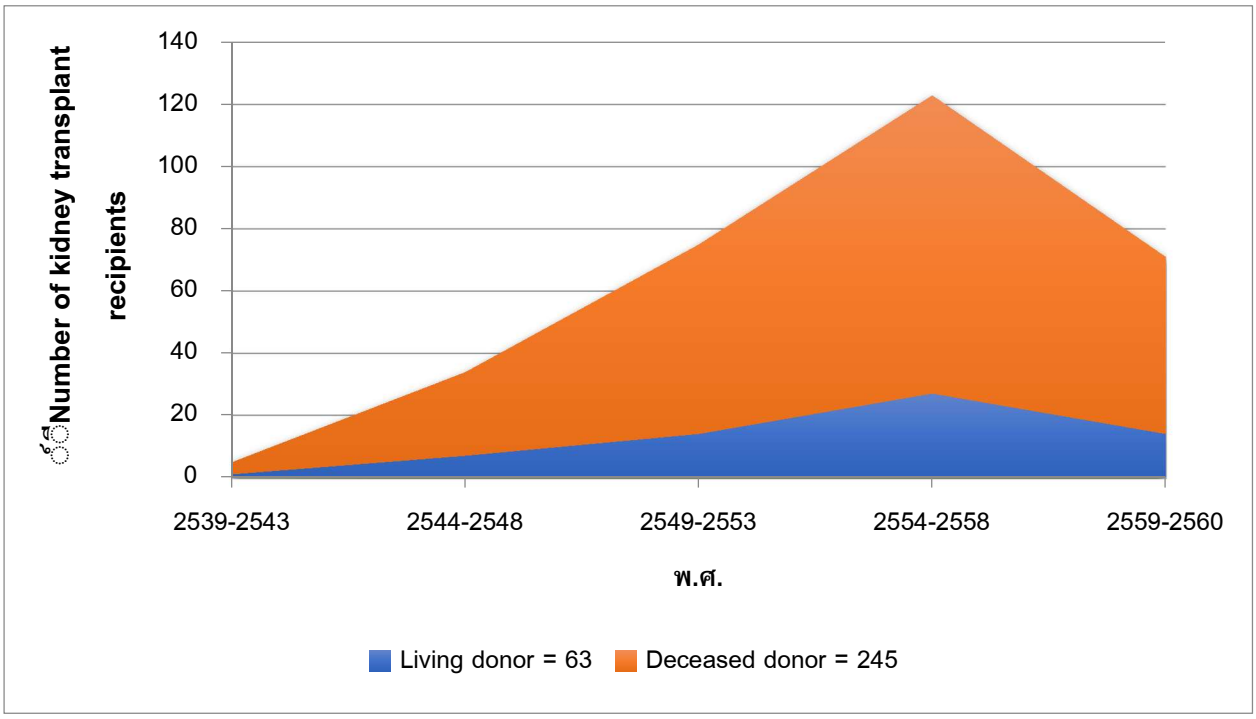
Immunosuppressive regimen	N (%)
Prednisolone + tacrolimus + mycophenolate sodium	9 (26.5)
Prednisolone + tacrolimus + mycophenolate mofetil	17 (50.0)
Prednisolone+cyclosporine A+mycophenolate sodium	1 (2.9)
Prednisolone + tacrolimus	5 (14.7)
Prednisolone + mycophenolate mofetil	1 (2.9)
Tacrolimus	1 (2.9)
Total	**34 (100)**

In 2017, the survival rate of living and deceased donors transplant patients after kidney transplantation were 100.0% and 100.0% respectively as in one year and one patient loss of kidney (2.9%) cause of sudden kidney transplant rejection.

Information of kidney transplant recipients under 18 years old during 1996-2017

Number of kidney transplant recipients under 18 years old by year of transplantation

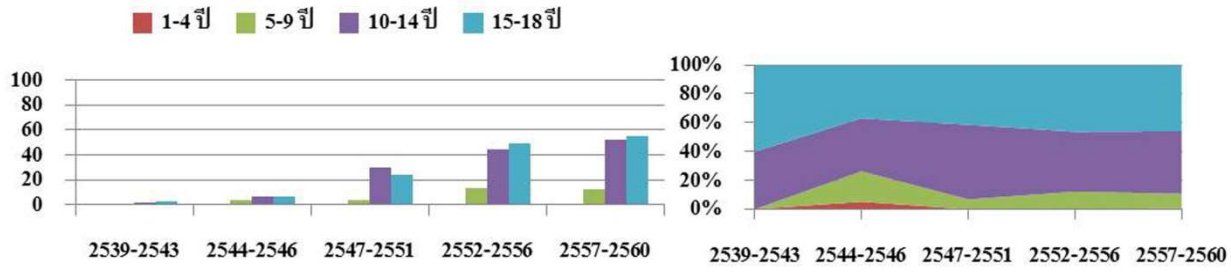
From kidney transplant database by Thai Transplantation Society, there were 308 recipients under 18 years old, which divided into 63 recipients from living donor and 245 recipients from deceased donor. (Picture 3.2).



Picture 3.2 Number of kidney transplant recipients under 18 years old per year since 1996 and kidney transplant types.

Analysis of kidney transplant information from 1996 – 2017

The report based on the data, there were 308 recipients under 18 years old, 57.1% were male. The average of age of transplant occurrence was 13.5 ± 3.1 years old. The number and proportion of recipients under 18 years old as shown in Picture 3.3. 99.9% of recipients were received first transplantation and 55.6% received hemodialysis before transplantation. On the donor side, 66.6% were male. The average age at the donation were 33.8 ± 12.3 years old, as shown in table 3.6.



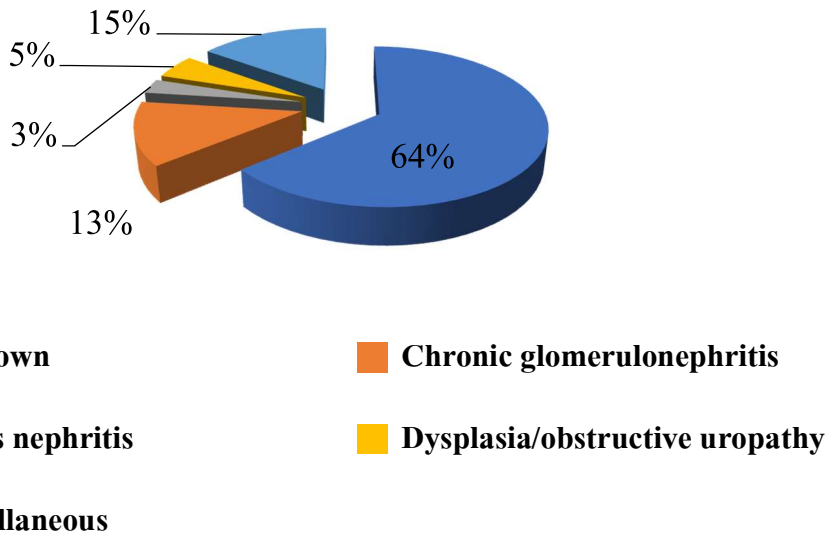
Picture 3.3 Number and proportion of recipients under 18 years old, separated by age.

Table 3.6 Information of transplant kidney recipients and donors under 18 years old.

	Recipient	Donor
Male gender, %	57.1	66.6
Age (mean ± SD), years (range)	13.5 ± 3.1 (1–17)	33.4 ± 12.0 (3–58)
Number of transplant, %		
1	98.7	
Mode of renal replacement therapy, %		
Preemptive	5.2	
Hemodialysis	26.9	
Peritoneal dialysis	62.7	
Missing	5.2	

SD: standard deviation

The major causes of chronic kidney disease were 13% of chronic glomerulonephritis such as IgA nephropathy, focal segmental glomerulosclerosis (FSGS) or rapidly progressive glomerulonephritis, 13% of miscellaneous e.g. diabetic nephropathy, hypertensive nephropathy or ischemic nephropathy, 5% of dysplasia/ obstructive uropathy, 3% of lupus nephritis, 3% and 64% of unidentified causes (Picture 3.4).



Picture 3.4 Causes of chronic kidney disease in children recipients.

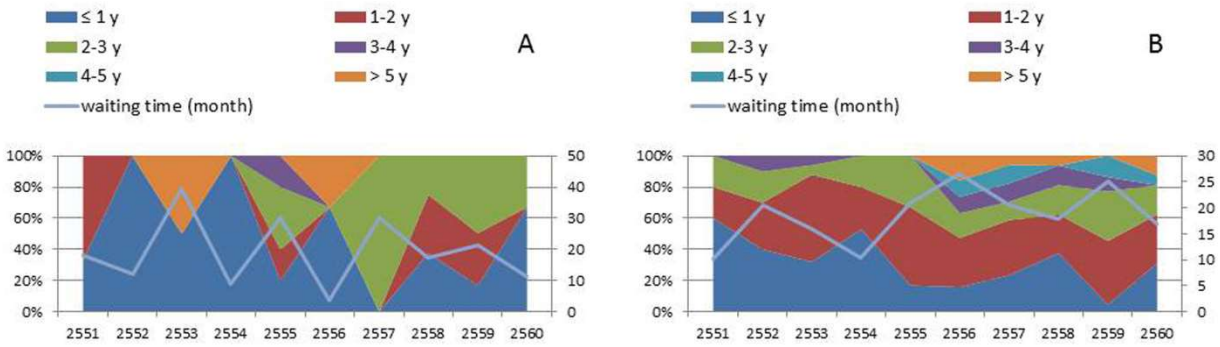
The comparison between the living donors and deceased donors were shown in Table 3.7. With reference to that information, totaling 308 cases, there were 77 cases of living donor and 243 cases of deceased donor.

Table 3.7 Information of recipients from living donor and deceased donor.

	Kidney transplant from Living donor	Kidney transplant from Deceased donor
Number	63	245
Recipient age, year	13.4 ± 3.3	13.5 ± 3.1
Donor age, year	39.3 ± 7.7	31.9 ± 12.5
Waiting time, month (IQR)	15.8 (8.0–29.7)	19.6 (11.5–30.5)
Payment type, %		
ข้าราชการ	15.9	6.1
ประกันสังคม	0	0.4
สปสช	52.4	62.4
จ่ายเอง	7.9	2.0
อื่นๆ	23.8	29.1

IQR, interquartile range

Since 2008, found that there is tendency of longer waiting time when consider from renal replacement therapy before kidney transplantation (picture 3.5) which the recipients from deceased donors has longer waiting time than living donors (table 3.7). In 2017, the renal replacement therapy duration of recipients from deceased donors and living donors were 11.4 and 16.9 months respectively when compare to 2016.



Picture 3.5 The duration of renal replacement therapy before kidney transplantation, separated by donor types, recipients from living donors (a), recipients from deceased donors (b)

Information of Donor

From 63 living donors, 31.7% were male. 11 cases were unidentified relationship between donors and recipients from 11 patients as shown in table 3.9.

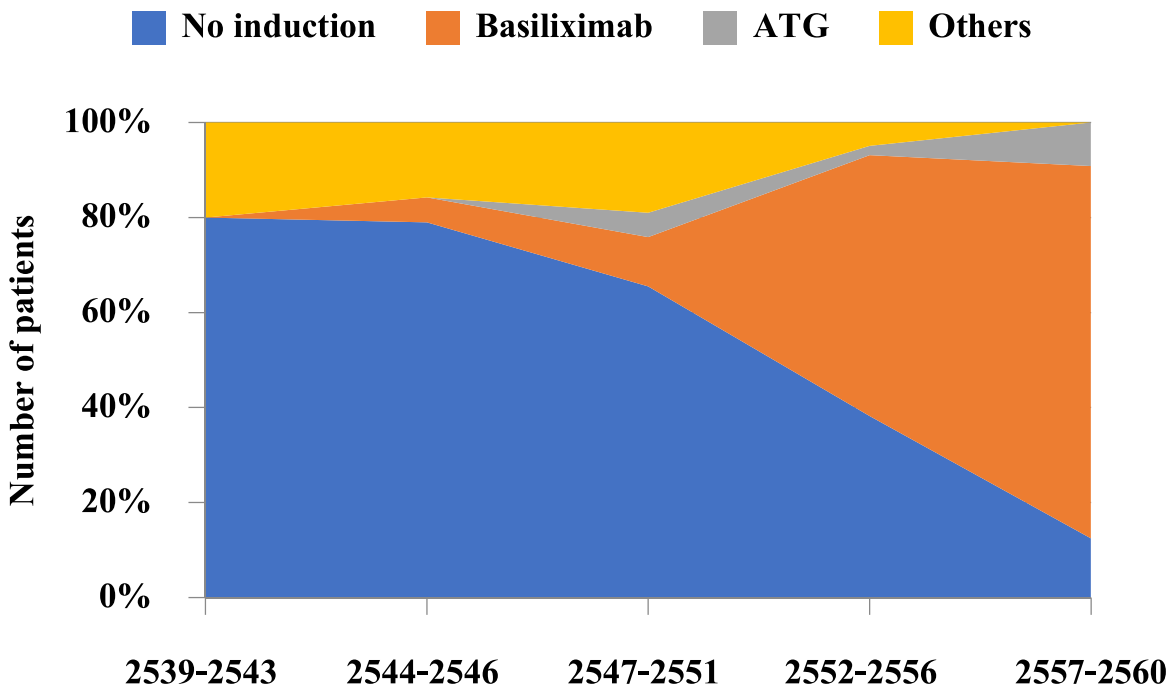
Table 3.9 Relationship between living donors and recipients.

Relationship between recipients	Number of living donors (%)		
	Male	Female	Total
Parents	10 (50.0)	42 (97.7)	52 (82.5)
Siblings	2 (10.0)	1 (2.3)	3 (4.8)
Others e.g. twins, cousins, etc.	8 (40.0)	0 (0.0)	8 (12.7)
Total	20	43	63

From 245 deceased donors, 79.2% were male. The causes of brain death were car accident, cerebrovascular accident, and others; for example; falling accident, gun accident. The percentage of which were 63.3%, 17.6%, and 12.2%, respectively, while the remaining 6.9% could not identify the causes. 87.0% of deceased donors had hypotension symptom before transplant, 11.5% had been performed the cardiopulmonary resuscitation (CPR).

Immunosuppressive medication used and kidney transplant outcome.

The tendency of antibody induction therapy has been used in young patient cases was significantly increased and non-antibody induction therapy was decreased. (Picture 3.6)



Picture 3.6 The proportion of recipients who received antibody induction therapy, by year of transplantation.

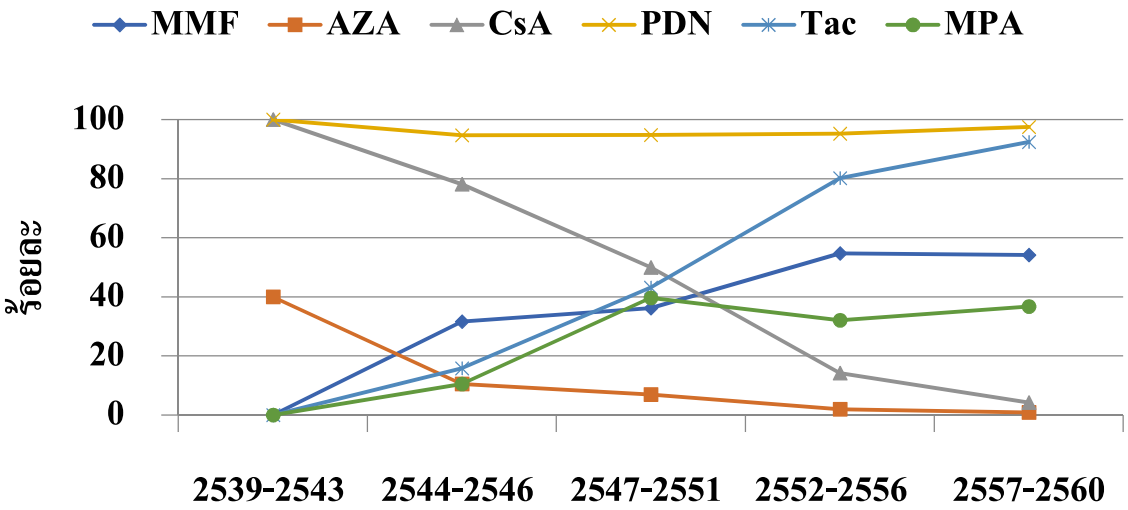
The Proportion of antibody induction therapy from 1996 – 2017, which separated by types of kidney transplant were shown in table 3.10. The data was from 63 recipients of living donors and 245 recipients of deceased donors.

Table 3.10 The proportion of antibody induction therapy, by types of kidney transplantation

	Number of kidney transplant recipient (%)	
	Living donors (N=63)	Deceased donors (N=245)
No induction	24 (38.1)	87 (35.5)
IL-2R antagonist	31 (49.2)	141 (57.6)
ATG	5 (7.9)	11 (4.5)
OKT3	0 (0.0)	1 (0.4)
Others	2 (3.2)	2 (0.8)

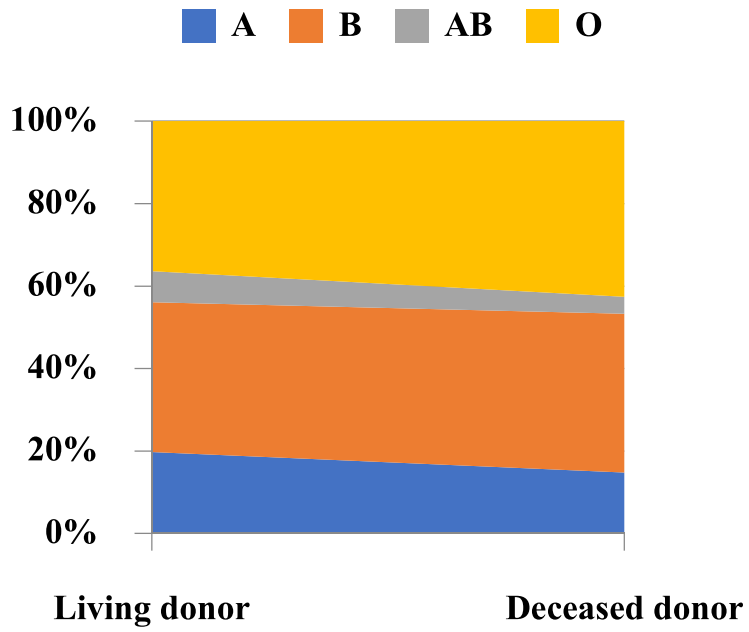
Missing	1 (1.6)	3 (1.2)

Proportion and tendency of immunosuppressive medication use on discharge date was shown in picture 3.7. The patients under 18 received prednisolone, tacrolimus, mycophenolatemofetil or mycophenolicacid were significantly increased.



Picture 3.7 The proportion of immunosuppressive treatment on discharge date, separated by years.

For blood types of recipients from living donors, type O, B, A and AB which represented 32.2%, 38.7%, 21% and 8.1% respectively. On the other hand, blood types of recipients from deceased donors, the percentage were 42.6%, 38.5%, 14.8% and 4.1% respectively (Picture 3.8).



Picture 3.8 The proportion of kidney transplant recipients, separated by blood types.

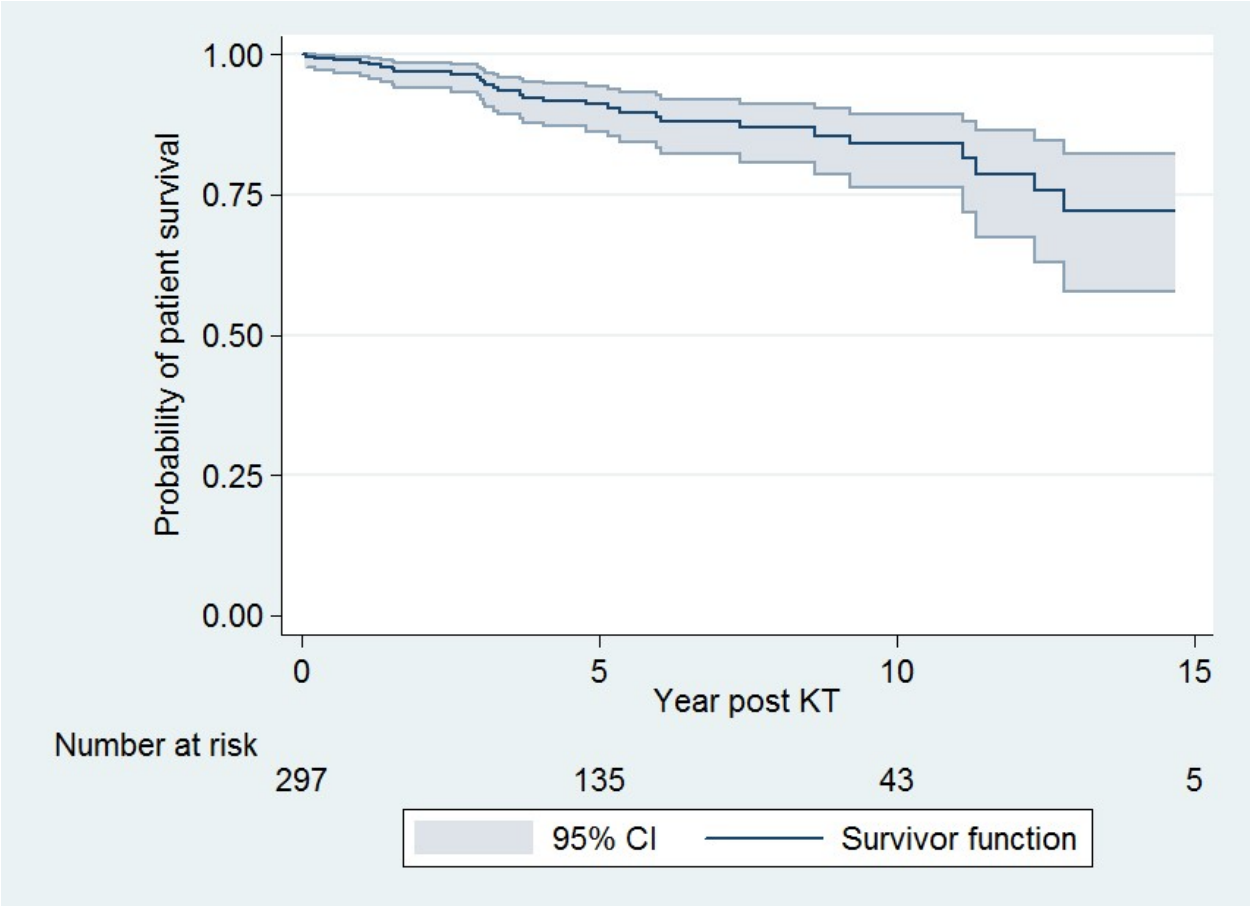
The table 3.11 was shown the comparison between proportion of delayed graft function after transplantation and serum creatinine level on discharge date of the recipients of living donors and deceased donors.

Table 3.11 The delayed graft function and serum creatinine as on discharge date, separated by type of kidney transplant

	Kidney transplant of Living donor	Kidney transplant of Deceased donor
Delayed graft function, %	5.1	23.9
Serum creatinine at discharge, mg/dL	0.92 ± 0.64	1.38 ± 1.18

Patient survival rate

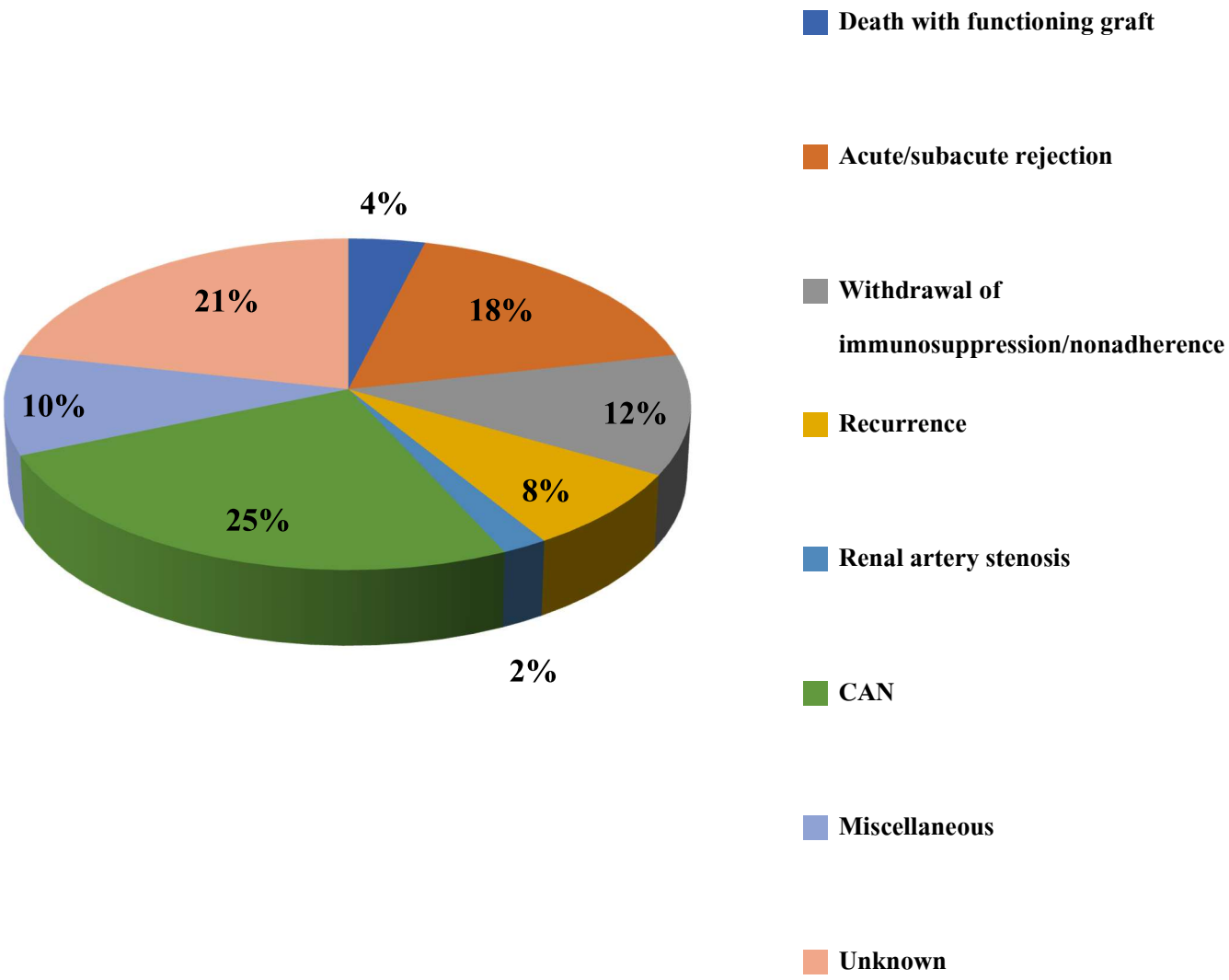
In the past 20 years, the survival rate after kidney transplant has significantly increased. During 1996 – 2017, 30 patients died after kidney transplantation which was 9.7%. The causes of death were 7 cases of septicemia which divided into 1 case of heart failure, 1 case of pulmonary infection (virus), 1 case of pulmonary infection (fungus), 1 case of stroke and 1 case of kidney failure, 2 others cases and 17 unidentified caused cases. The patient survival rate at the 1,5 and 10 years were 98.6% ,91.3% and 84.4% respectively (Picture 3.9).



Picture 3.9 Patient survival rate of children kidney transplant recipients.

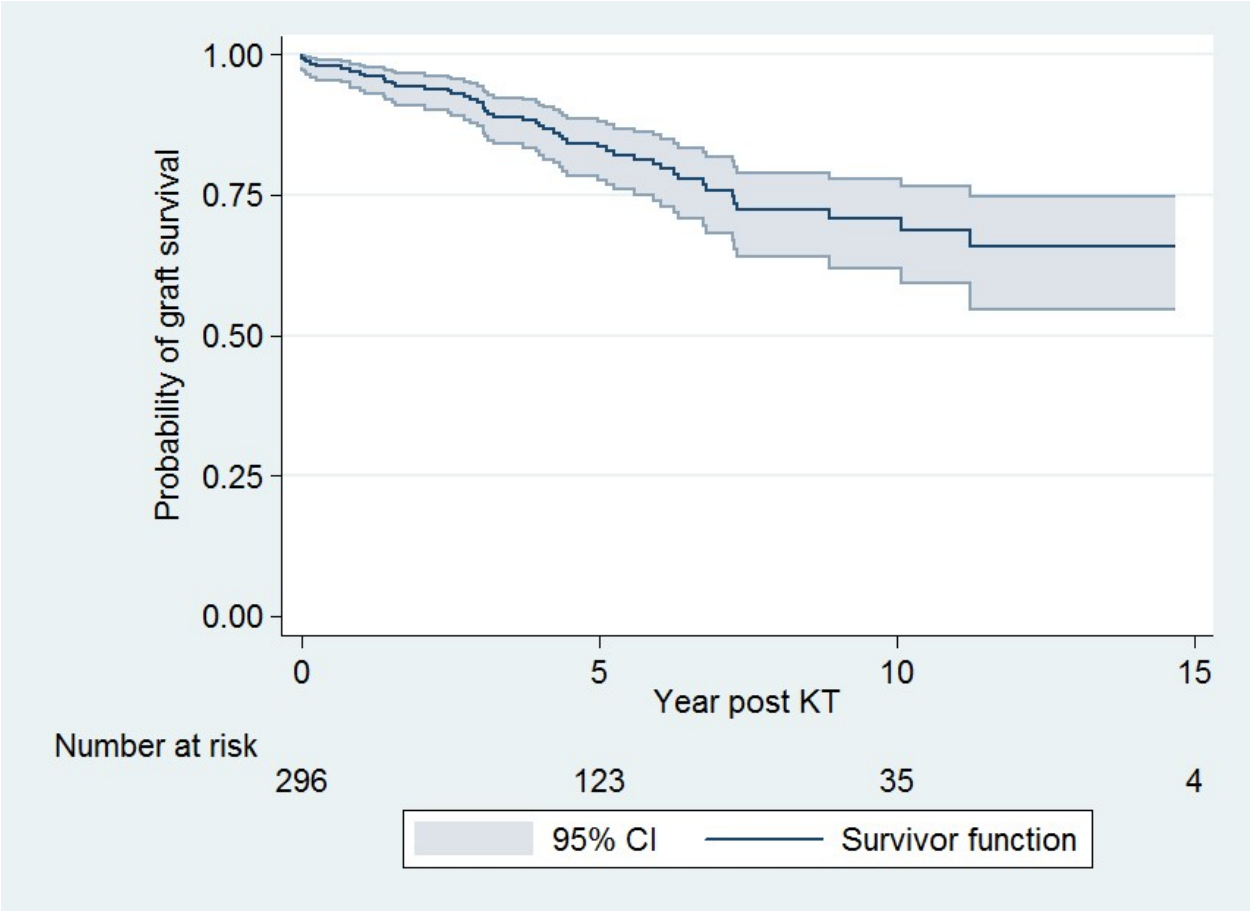
Graft survival

During 1996 – 2017, there were 51 cases which lost kidneys, the causes were chronic renal allograft nephropathy, acute rejection, subacute rejection, withdrawal immunosuppression/nonadherance, recurrence of primary disease, death with functioning graft, renal artery stenosis and other causes which represented 13, 7, 2, 6, 4, 2, 1, 5 cases respectively and 11 unidentified caused cases (Picture 3.10).



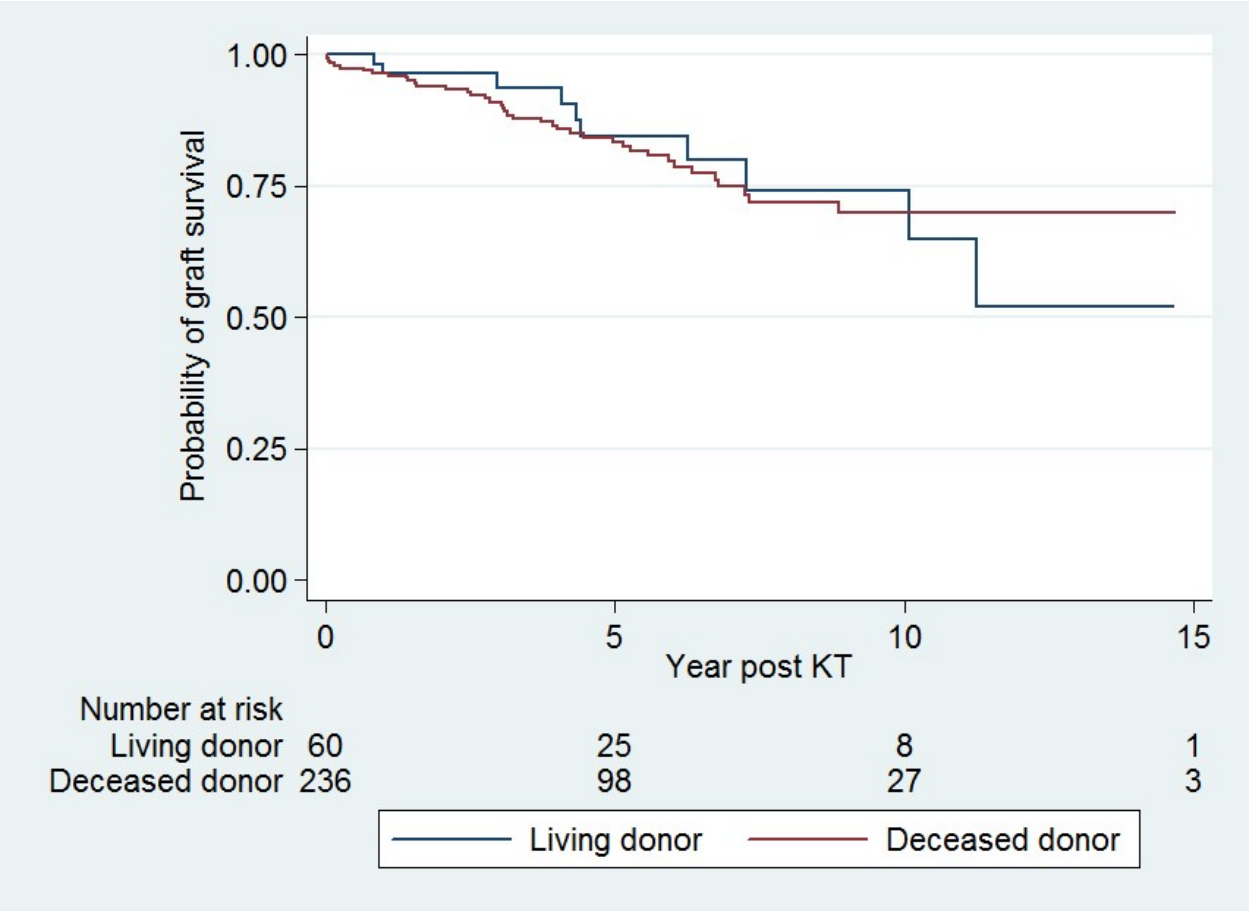
Picture 3.10 Causes of children kidney transplant recipients who lost kidneys.

The graft survival rate at the 1,5 and 10 years were 96.4% ,84.3% and 71.4% respectively (Picture 3.11).



Picture 3.11 The graft survival rate of children kidney transplant recipients.

The comparison between the graft survival rate from living donors and deceased donors were not significantly different statistically (picture 3.12).



Picture 3.12 The graft survival rate of children kidney transplant recipients from living donors compare to deceased donors.

Index

Hemodialysis	38,39,42,43,46
Hypertensive nephropathy	46
Hypotension	27,28
I	
IgA nephropathy	46
IL-2R antagonist	50
Intrathoracic organ transplantation	12
Interleukin-2 receptor antagonist (IL-2RA)	29
Interstitial fibrosis/tubular atrophy (IF/TA)	34
Ischemic nephropathy	46
L	
Living donor	14,15,17,21,22,23,24,25,28,29,31,32,34,35,37, 38,40,41,42,44,45,47,48,50,51
Lung transplantation	12
Lupus nephritis	46
M	
Male gender	38,39,42,43,46
Miscellaneous	46
Mode of renal replacement therapy	38,39,42,43,46
Month (IQR)	47
Mycophenolic acid	50
Mycophenolate mofetil	30,35,39,40,44,50
Mycophenolate sodium	30,35,40,44
N	
No induction	39,44,50
Number	47
Number of transplant	38,39,42,43,46
O	

Tacrolimus prolonged release	30
W Waiting time, month (IQR) Withdrawal immunosuppression/nonadherance	 47 52

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