2016 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 purposed 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 updated 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 (5,018 of organ recipients and 4,748 of kidney recipients as at December 31, 2016) and the large difference amount of waiting lists every 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 MahaChakriSirindhorn's 60th Birthday Anniversary in 2016, Kidney Foundation of Thailand, Thai Transplantation Society, cooperated parties and harvesting team organizing "the kidney transplant give a royal charity 60 years, HRH Princess MahaChakriSirindhorn" during April 2, 2015 – April 1, 2016 which covers the cost of special medication for kidney transplant patients, also help increasing in donors and caring for patients compare to the previous year.

On behalf of President and committee of Thai Transplant Society, would like to thank you, the registration subcommittee for reporting organ transplantation of 2016 and hope that this report will be useful for physicians, nurses and medical staffs for future references.

ThanomSupaporn, LTG., M.D.
President of Thai Transplantation Society

Preface

This Annual Report of Transplantation in 2016 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 together with surgeons, nephrologist and pediatric nephrologist from organ transplantation centers in order to analyze and aware of transplant situation in Thailand. Also, it can be the reference information for both national and international.

For heart- lung transplant information, Assistant Professor Pat Ongcharit and his colleagues has been collected the patients' information who received the surgery in 2016 to be aware of the present advancement and challenging factor in heart- lung transplantation. For annual report of kidney transplantation, Dr. KajornsakNoppakun and his colleagues has been brought out the information from all fields to analyze in several dimensions continuously from previous year. For those kidney recipients less than 18 years old were taken careby pediatric nephrologists and some part will be taking care by nephrologists. We also received an honor from Dr. PornpimolRianthavorn in collecting and analyzing the stated patient's group progressively from last year.

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. KajornsakNoppakun, Dr. PornpimolRianthavorn and their colleagues for gathering and analyzing information, Ms. NongnuchKuttiya and Ms. PharitaKeelee for general coordination, including staffs,

doctors and nurses from each kidney institutions which make success in completing this report for liver and pancreas transplant information in Thailand and expected that it will be presented in the future.

The registration subcommittee expects that annual report of organ transplantation in 2016 will be useful for physicians, nurses, staffs and anyone interested in this report for their reference in other field such as academic, public health economic, including strategic management 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
Assoc.Prof. Adis	Tasanarong	Research Committee
LTG.Dr.Adisorn	Lumpaopng	Registration and Information
Assoc.Prof.Dr.Atiporn	Ingsathit	International Liaison
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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
Assit.Prof. Nutavudh	Townamchai	Subcommittee

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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	Pairojkittrakul	Thammasat
Ornkamon	Pengkul	Bumrungrad
Suwapee	Chantornjetsada	Phyathai1
Kanokporn	Ratanatrisri	Buddhachinaraj
Siriluk	Liewseng	Phramongkutklao
Kaenchai	Pipatpannawong	Praram9
Panatchana	Aroonrojsiri	BhumibolAdulyadej
Anchalee	Saikam	Maharajnakornchiangmai
Jugkree	Korsakul	MaharajNakhonratchasima
Panida	Opakawinkul	Rajavithi
Mallika	Sitthisarn	Rajavithi
Chutima	Charoenthanakit	Ramathibodi
Wararat	Wongwean	Vajira
Jongruk	Pongskul	Srinagarind
Nartsiri	Ratchawang	Siriraj
Wilaiwan	Saenhom	Khonkaen
Budsaya	Dandacha	Songklanagarind
Wanida	Ratanasuwan	SamitivejSrinakarin

Pisinee	Namprom	SamitivejSukhumvit
Phataraporn	Jit-im	Sappasitthiprasong
Tasana	Nilapat	SuratThani
Kingkarn	Sirikarin	Hatyai
Sasipin	Mongkolchai	Udonthani
Nichakorn	Pasook	Bumirajanagarindra Kidney Institute
Paphanida	Borsuwan	Vejthani
Jarunee	Meesri	Faculty of Medicine Srinakharinwirot University
Thanyapat	Pongwiwat	Chiang RaiPrachanukroh

Contents

Information of Heart and Lung Transplantation

Information of Heart and Lung Transplantation

Intrathoracic organ transplantation

From 2008-2016, 113 patients have received heart transplantation from 5 hospitals e.g. Chulalongkorn, Siriraj, Rajavidhi, Central Chest Institute of Thailand and Bumrungrad Hospital.

	Year								
	2008	2009	2010	2011	2012	2013	2014	2015	2016
Chulalongkorn	3	5	3	7	8	6	14	12	10
Siriraj		1	2	1	4	4	4	7	4
Rajavidhi	1					2	5	5	2
Central of Chest Institute of Thailand		2							0
Bumrungrad	1							0	0
Total	**5**	**8**	**5**	**8**	**12**	**12**	**23**	**24**	**16**

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

In 2016, 16 patients were received heart transplantation which decrease from 2015 by 8 patients as shown in table 1.1.

In 2016, there is no heart-lung transplantation and single lung transplantation, only 24 patients received heart transplantation and 27 patients received heart-lung transplantation.

Information of Kidney Transplantation

Information of kidney recipients

Number of Kidney Transplant Recipients in 2016

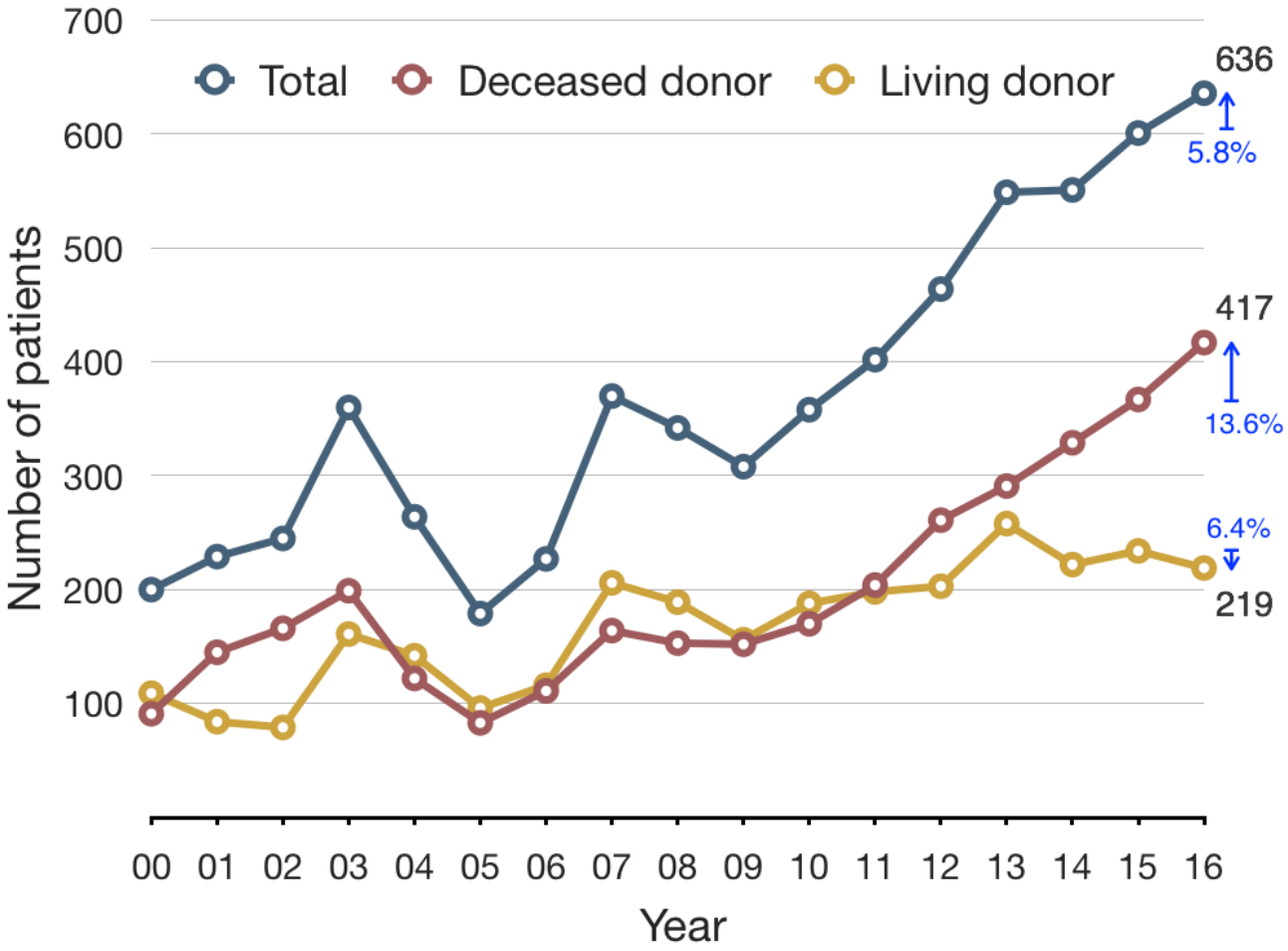
During 2016 (January 1, 2016 – December 31, 2016), 636 patients have received kidney transplantation from 30 hospitals, by 219 of living donors and 417 of deceased donors, separated by hospital as shown in table 2.1.

Table 2.1 Number of Recipients in 2016, separated by hospital.

	Kidney Transplant Recipients from Deceased donor	Kidney Transplant Recipients from Living donor	Total
Siriraj	35	28	63
Chulalongkorn	28	20	48
Ramathbodi	112	74	186
Phramongkutklao	15	5	20
Praram 9	35	8	43
BhumibolAdulyadej	13	3	16
MaharajNakornChianmai	35	24	59
Rajavidhi	9	5	14
Vachira	11	13	24
Chonburi	0	3	3
Supphasitprosong	12	2	14
Srinagarind	56	4	60

SmithivejSukhumvit	6	3	9
Bangkok	0	0	0
Phayathai 1	4	0	4
Bumrungrad International	10	8	18
Buddhachinnaraj	0	0	0
Police General	9	1	10
MaharajNakornrachasima	0	0	0
Songklanakarin	2	2	4
SmithivejSrinakarin	6	1	7
Thammarat	12	3	15
Suratthani	0	2	2
KhonKaen	1	1	2
Hat Yai	1	2	3
Udorntani	5	0	5
Vejthani	0	1	1
Bhumirajanagarindra	0	2	2
SrinakarinwirotOngkharak	0	2	2
ChiangraiPrachanukroh	0	2	2
Total	**417**	**219**	**636**

Compare to 2015, found that previous kidney transplant recipients from living donors were increased by 5.8% (from 601 to 636) and from deceased donors were increased 13.6% (from 367 to 417).



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

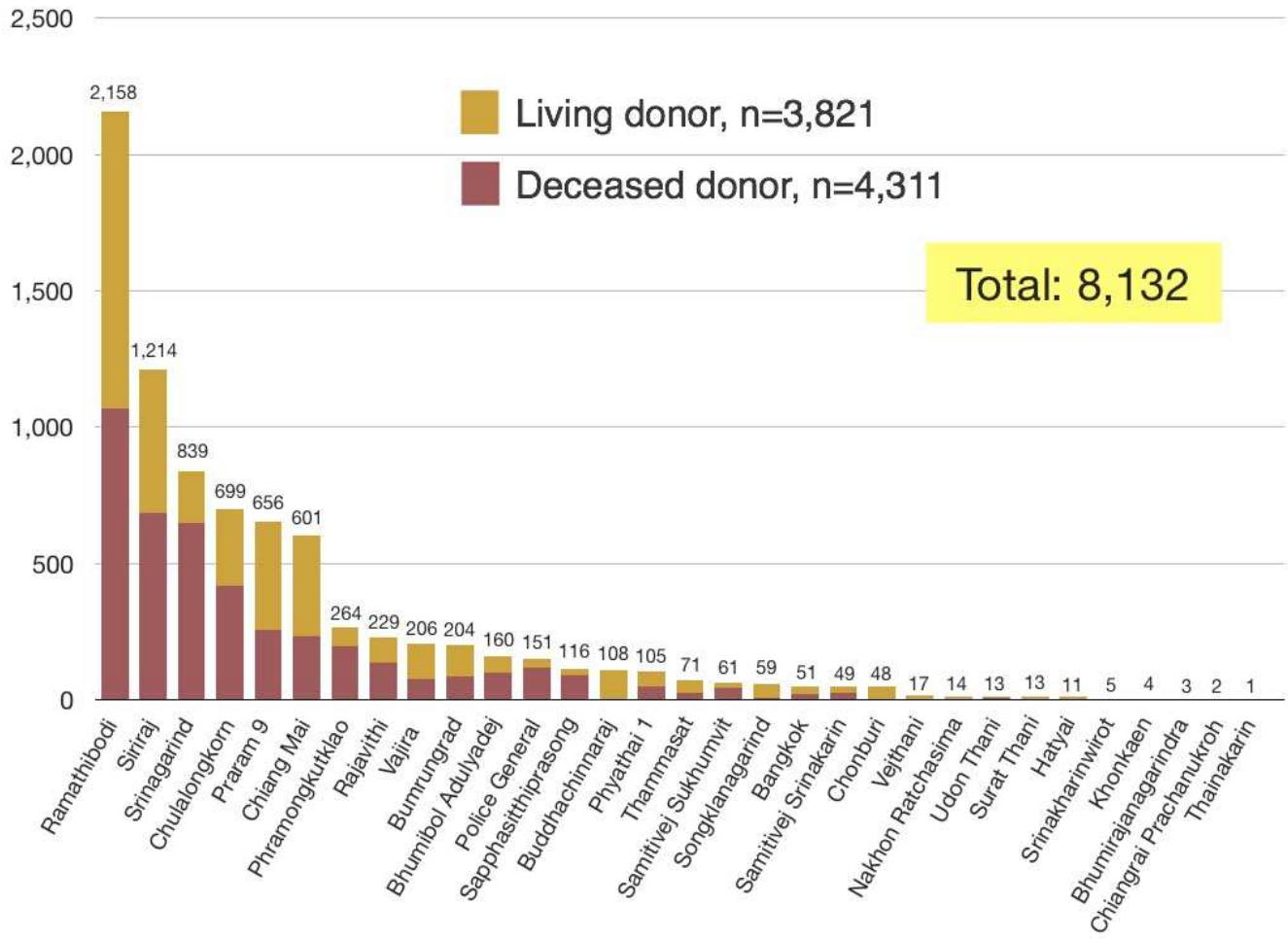
From picture 2.1 shown the information of kidney transplantation since 2000 who registered officially for kidney transplantation in Thailand. There are a lot of kidney transplant recipients who received kidney transplantation in 2003 and 2007. The Kidney Foundation of Thailand established the occasion to give a royal charity dedicated to HRH Princess GalyaniVadhana KrommaLuangNaradhiwasRajanagarindra for her 80th Birthday and in 2007, 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 BhumibolAdulyadej and HRH Princess GalyaniVadhana KrommaLuangNaradhiwasRajanagarindra 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 MahaChakriSirindhorn's 60th Birthday Anniversary in 2016, Kidney Foundation of Thailand and cooperated parties organizing "the kidney transplant give a royal charity 60 years, HRH Princess MahaChakriSirindhorn" during April 2, 2015 – April 1, 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 Officeapproved 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.

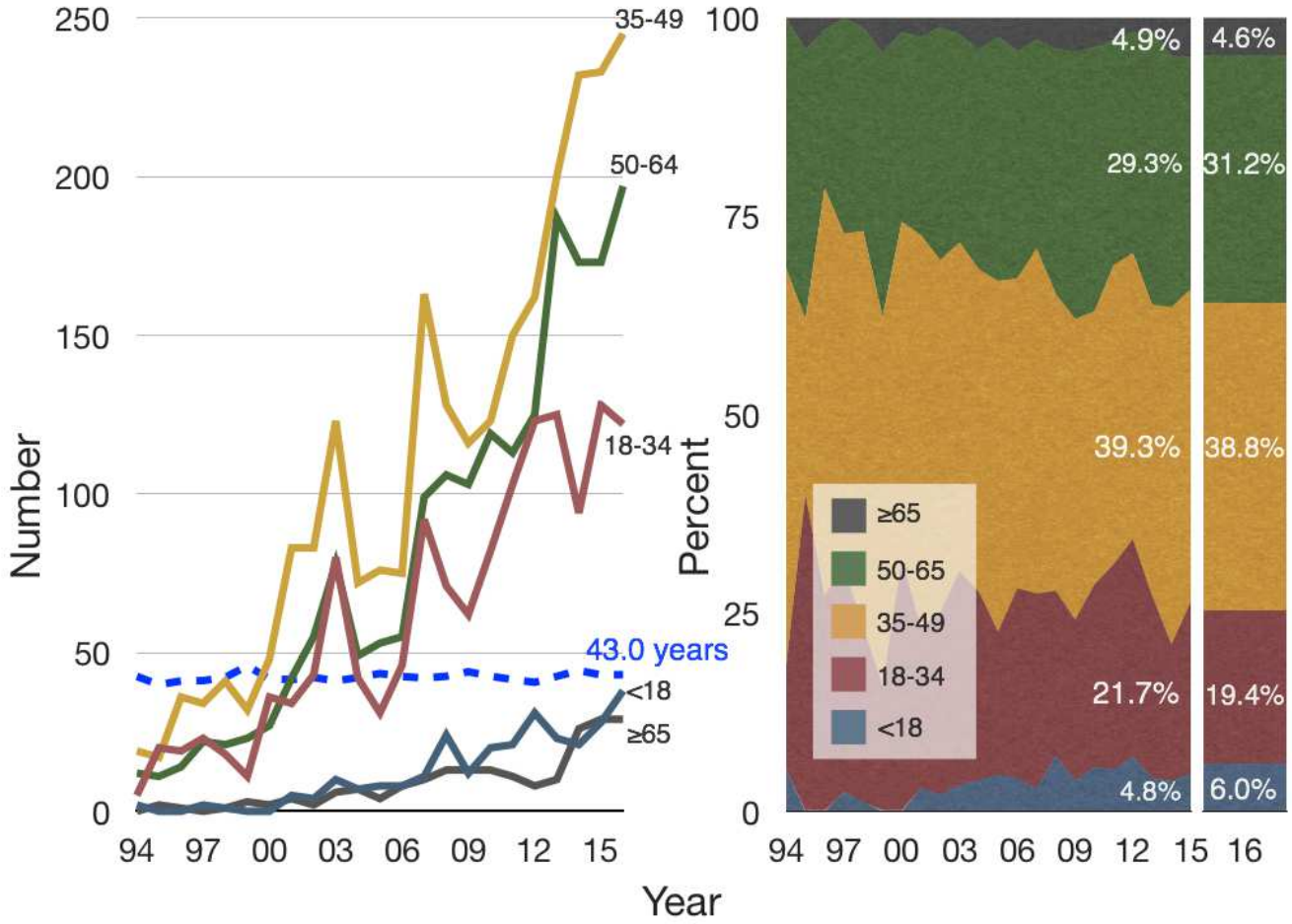
There were 8,132 kidney transplant recipients in Thailand, 3,821 of living donors and 4,311 of deceased donors as shown in picture 2.2.



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

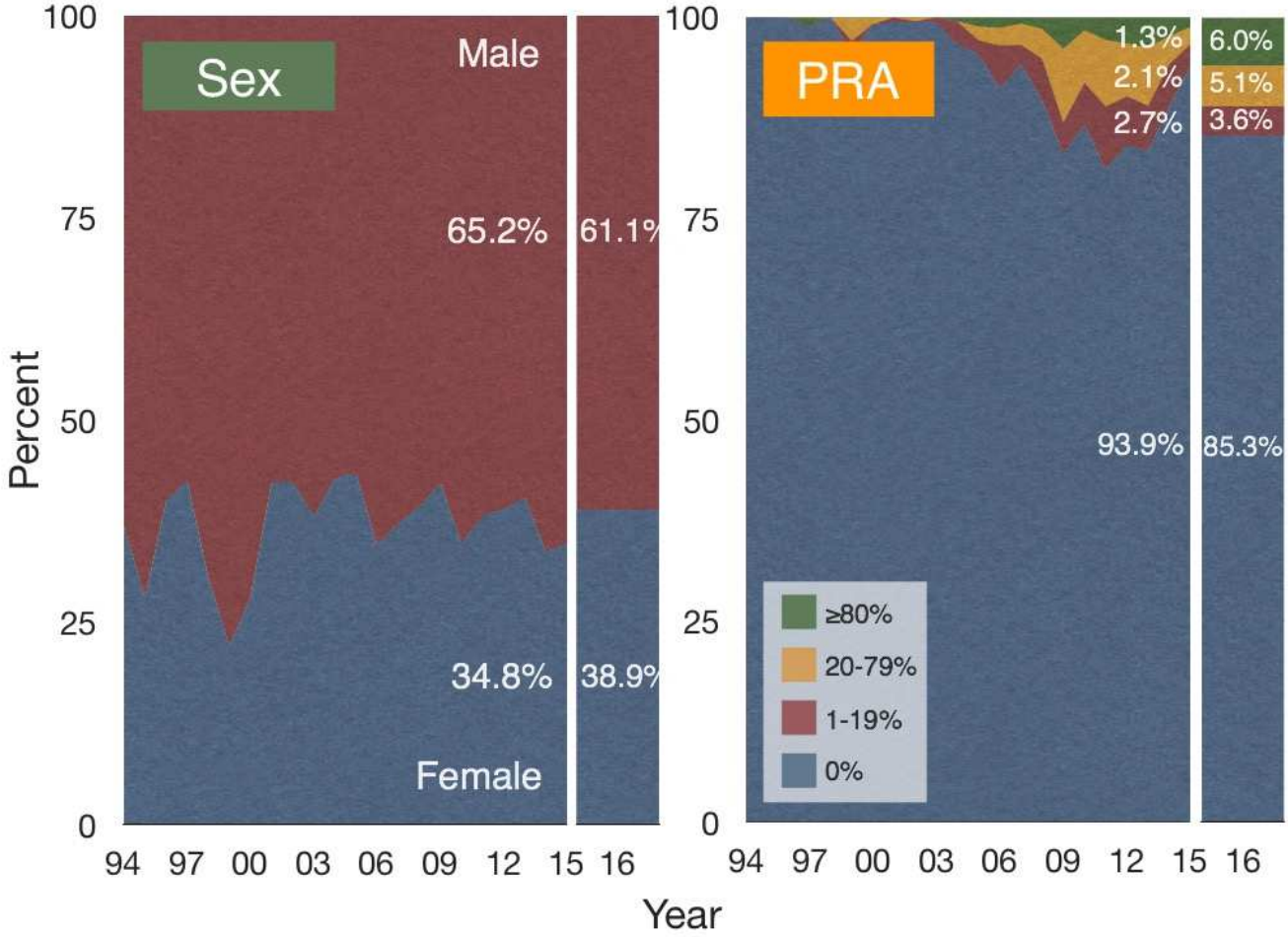
Information of kidney transplantation in 2015

The average age of kidney transplant in 2016 equal to 43.0 years old, which is not different from 2015 equal to 42.9 years old and the stage received the kidney transplant is during age of 35-49. The proportion of kidney transplant in 2016 by span of age, found that 6.0% were recipients under 18 years old, 19.4% were recipients aged 18-34 years old and 38.8% were recipients aged 35-49 years old, 31.2% were recipients aged 50-65 years old and 4.6% were recipients over 65 years old as shown in picture 2.3 when compare in 2015, found that the age of 50-65 and the age under 18 has increased proportion of 1.9% and 1.2% respectively.



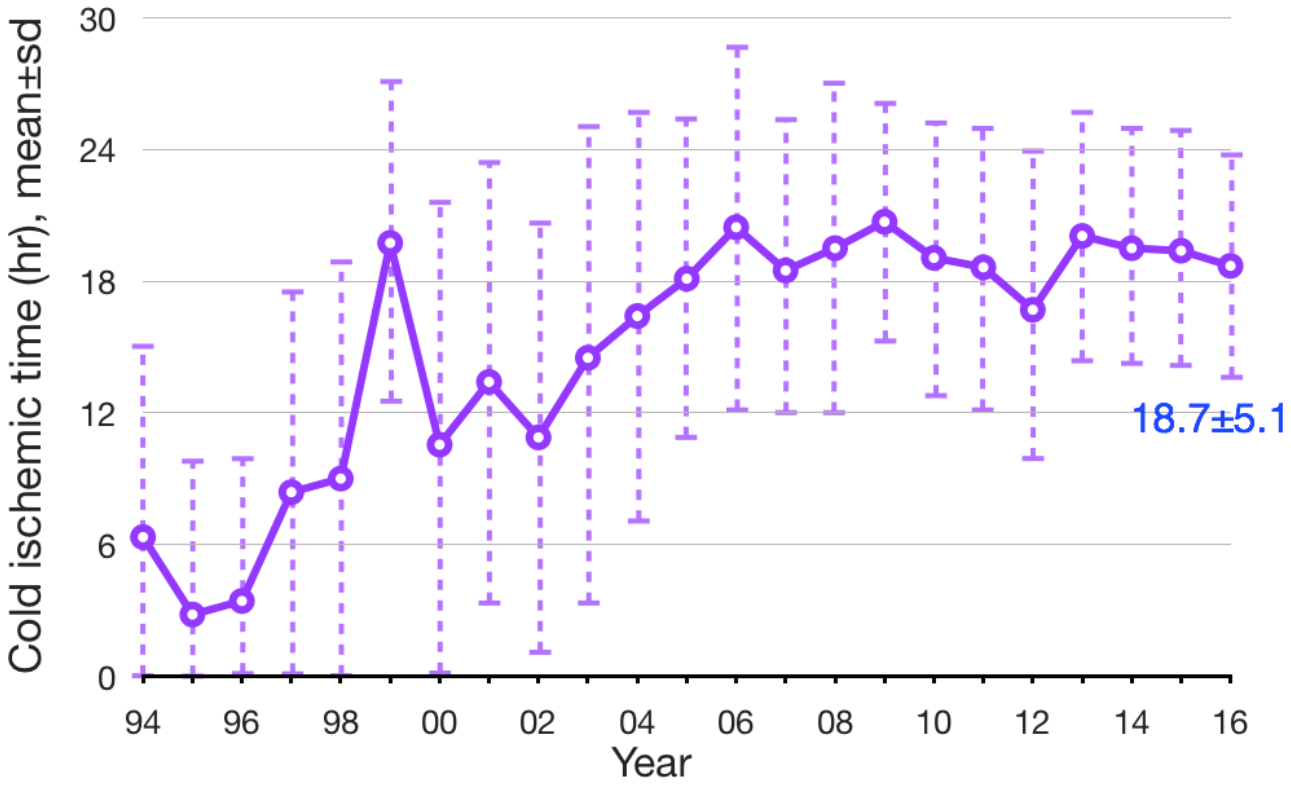
Picture 2.3 Number and proportion of kidney transplant recipients, separated by life span.

When separated by sex, found that there were more male than female kidney transplant recipients and the kidney transplant recipients. The proportion of kidney transplant in male has been decreased When compare between 2016 and 2015. The kidney transplant recipients of 85.3% has PRAequal to 0, 3.6% has PRA between 1-19, 5.1% has PRA between 20-79 and 6.0% has PRA more than 80 as shown in picture 2.4 which recipients who has PRA equal to 0 has been increasing when compare in 2015.



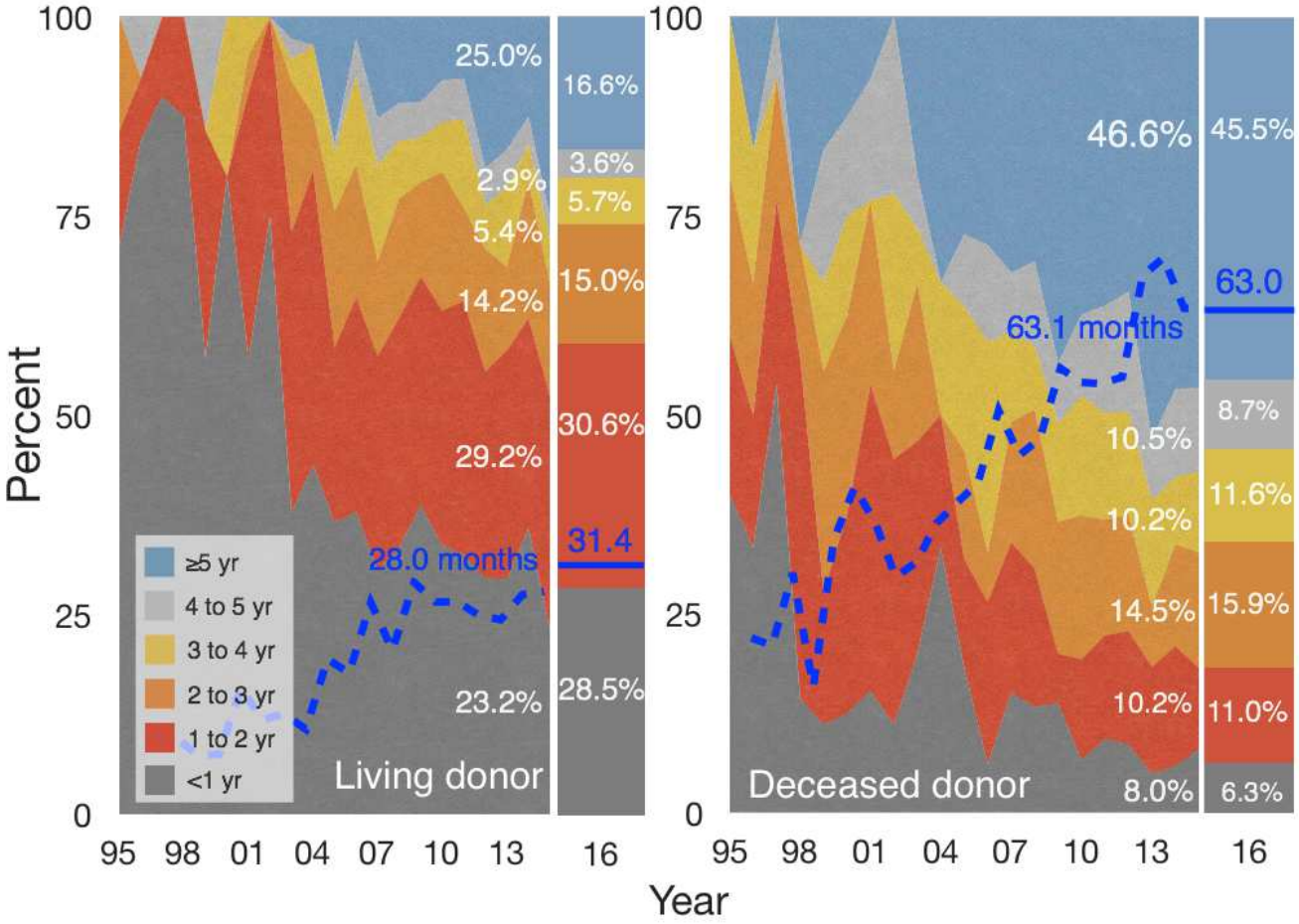
Picture 2.4 Sex and Panel Reactive Antibody (PRA) of kidney transplant recipients

For deceased donor group, found that the period of cold ischemic time in 2016 equal to 18.7 +/- 5.1 hours as shown in picture 2.5.



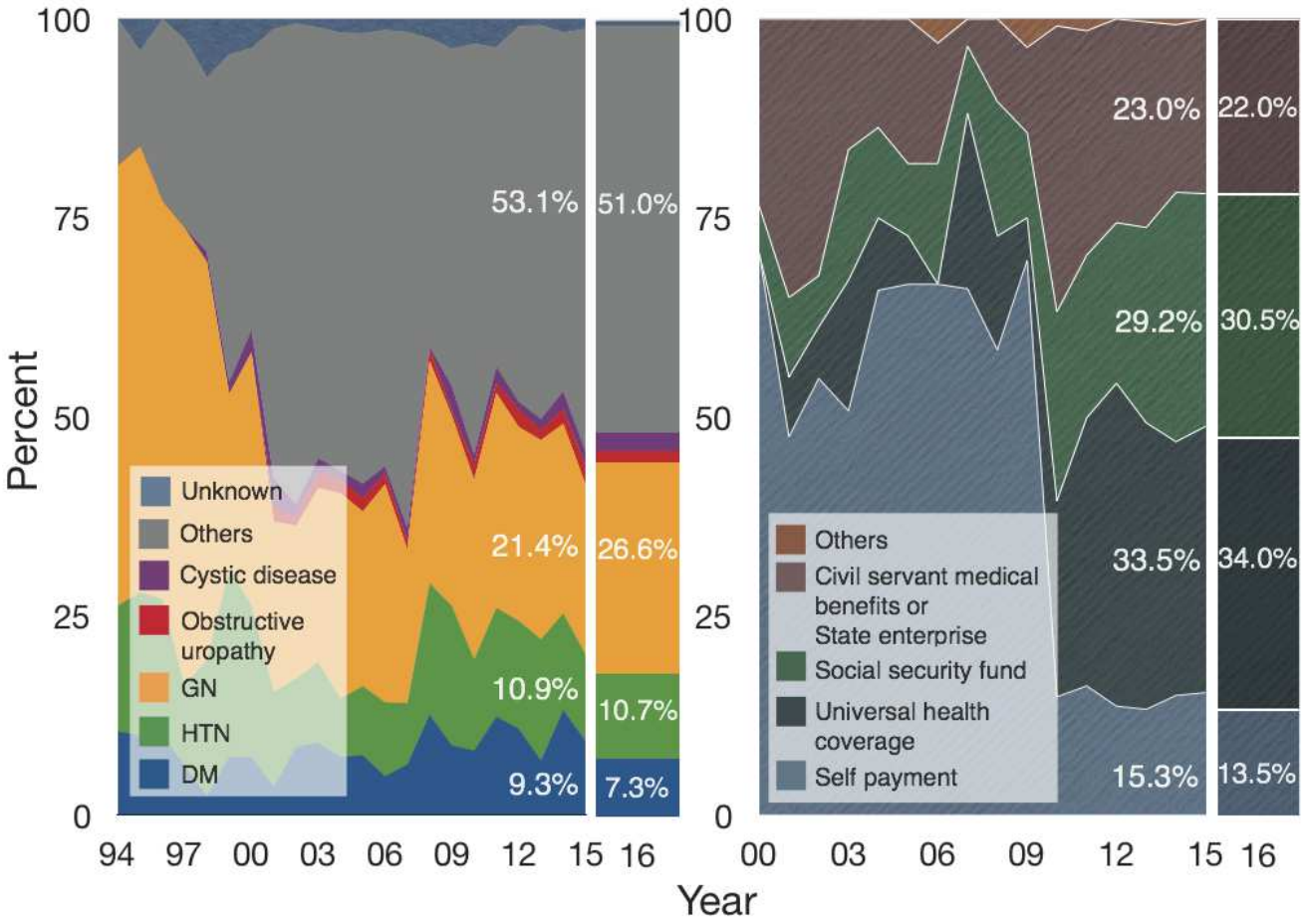
Picture 2.5 Period of Cold Ischemic Time of kidney transplant of deceased donors.

The waiting time for kidney transplant in 2016 of living donors equal to 31.4 months comparing in 2015 and deceased donors equal to 63.0 months which almost as same as in 2015 as shown in picture 2.6.



Picture 2.6 The waiting time of kidney transplant recipients of living donor and deceased donor.

The main cause of end-stage renal disease by kidney transplant categories, as shown in picture 2.7 are chronic glomerulonephritis, hypertension and diabetes. When consider from health care schemes, found that 34.0% use universal coverage scheme, 30.5% use social security scheme and 22.0% use government and state enterprise healthcare coverage as shown in picture 2.7.



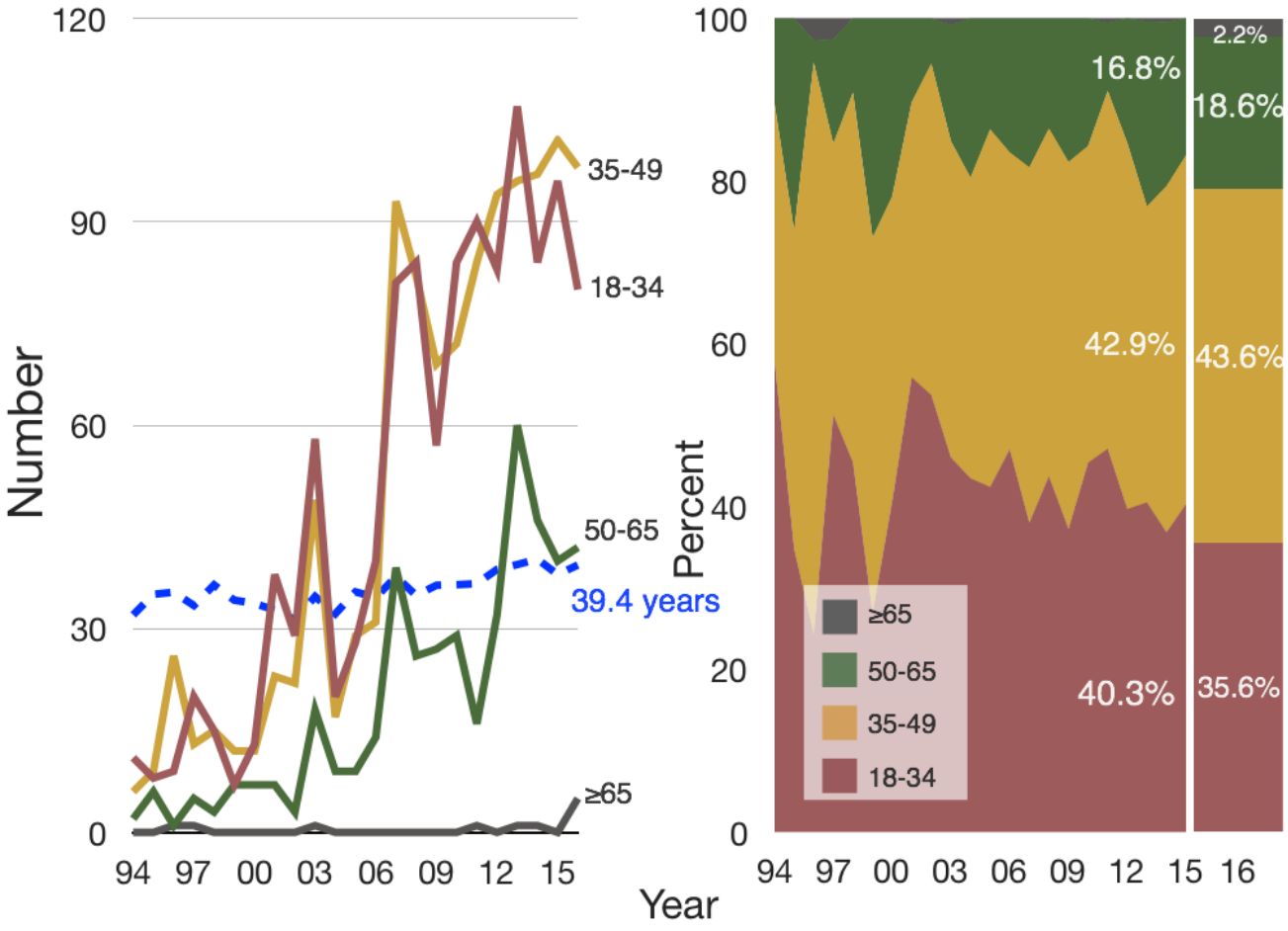
Picture 2.7 The causes of end-stage renal disease and Healthcare schemes

In Summary of year 2016

- The amount of kidney transplantation in 2016 increased from 601 to 636 as the proportion of living donors decreased by 6.4% and deceased donors increased by 13.6% when compare in 2015.
- The main age of kidney transplant recipients is between 35-49 and 50-64 years old.
- The major causes of end-stage renal disease are chronic glomerulonephritis, hypertension and diabetes respectively.
- The major healthcare coverage schemes in kidney transplant recipients are universal coverage scheme, social security scheme and government/ state enterprise healthcare coverage respectively.

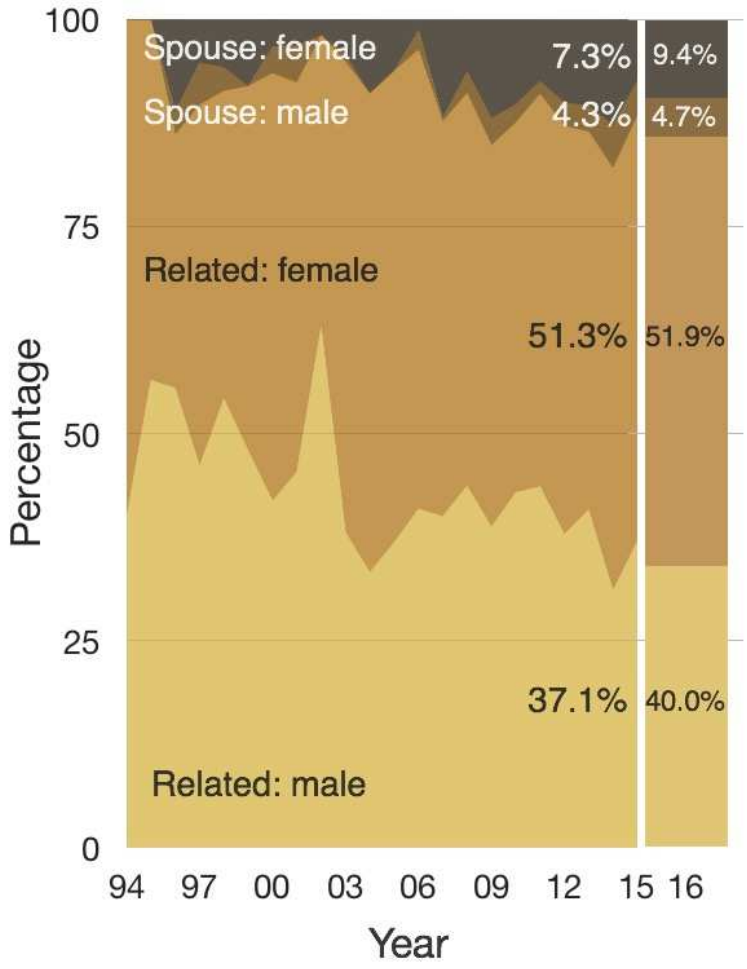
Information of kidney transplant donors

In 2016, the average age of living donors equal to 39.4 years old which is adjacently to 40.3 years old in 2016, mostly between 35-49 years old of age as shown in table 2.8. However, when comparing with 2015, there were more living donors in 65 years of age which increased from 0% to 2.2% in 2016, and 50-65 years of age from 16.8% to 18.6% respectively.



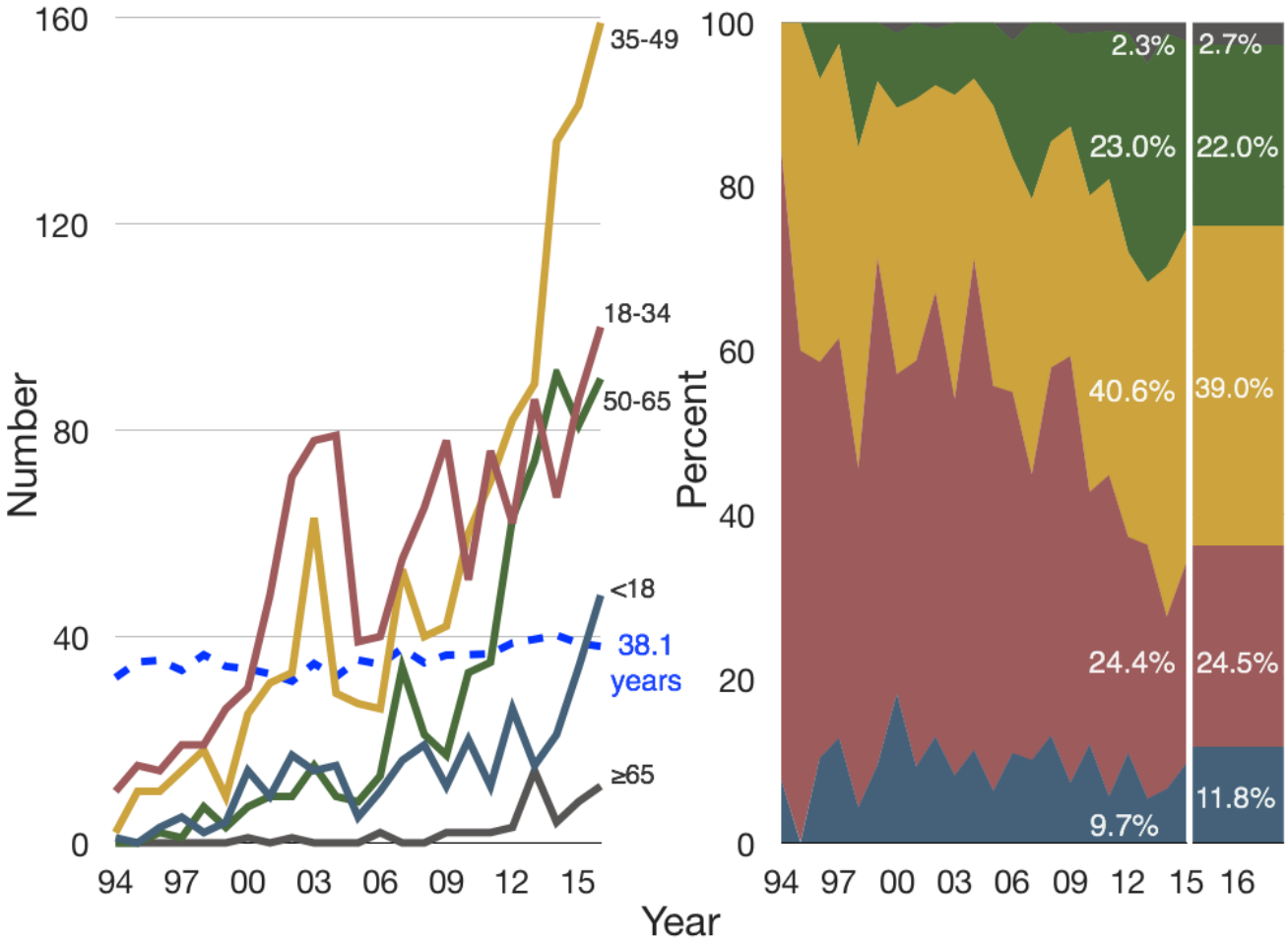
Picture 2.8 Age of living donor

The main donors are 51.9% from female blood relations which adjacent to information in 2015 and 40.0% from male blood relations by 9.4% wife donated to husband and 4.7% husband donated to wife as shown in picture 2.9.



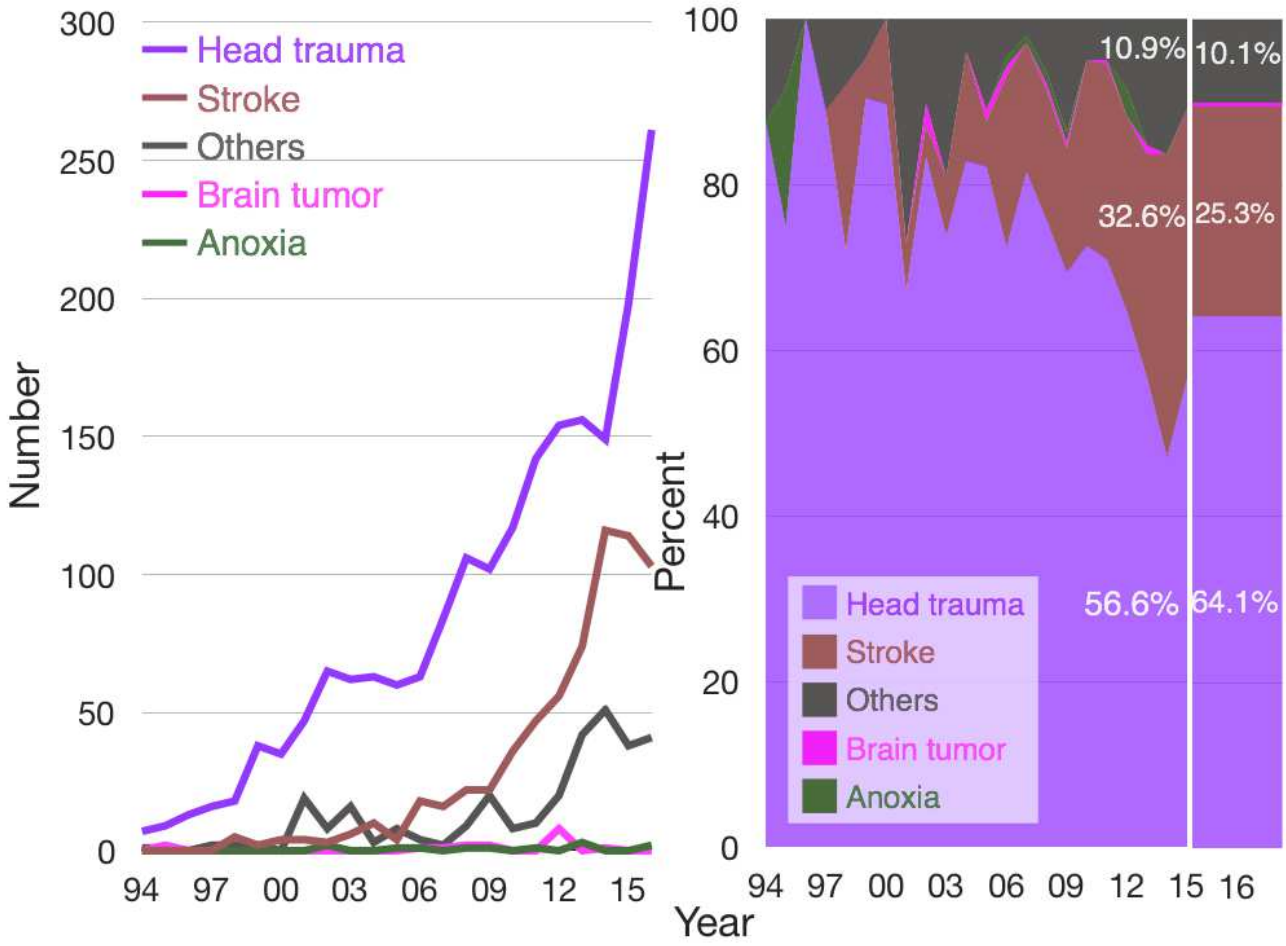
Picture 2.9 The relation between donor and recipient of living donor

In deceased donor group found the average age equal to 38.1 years old adjacent to year 2015 and the proportion of age span is not different as shown in picture 2.10.



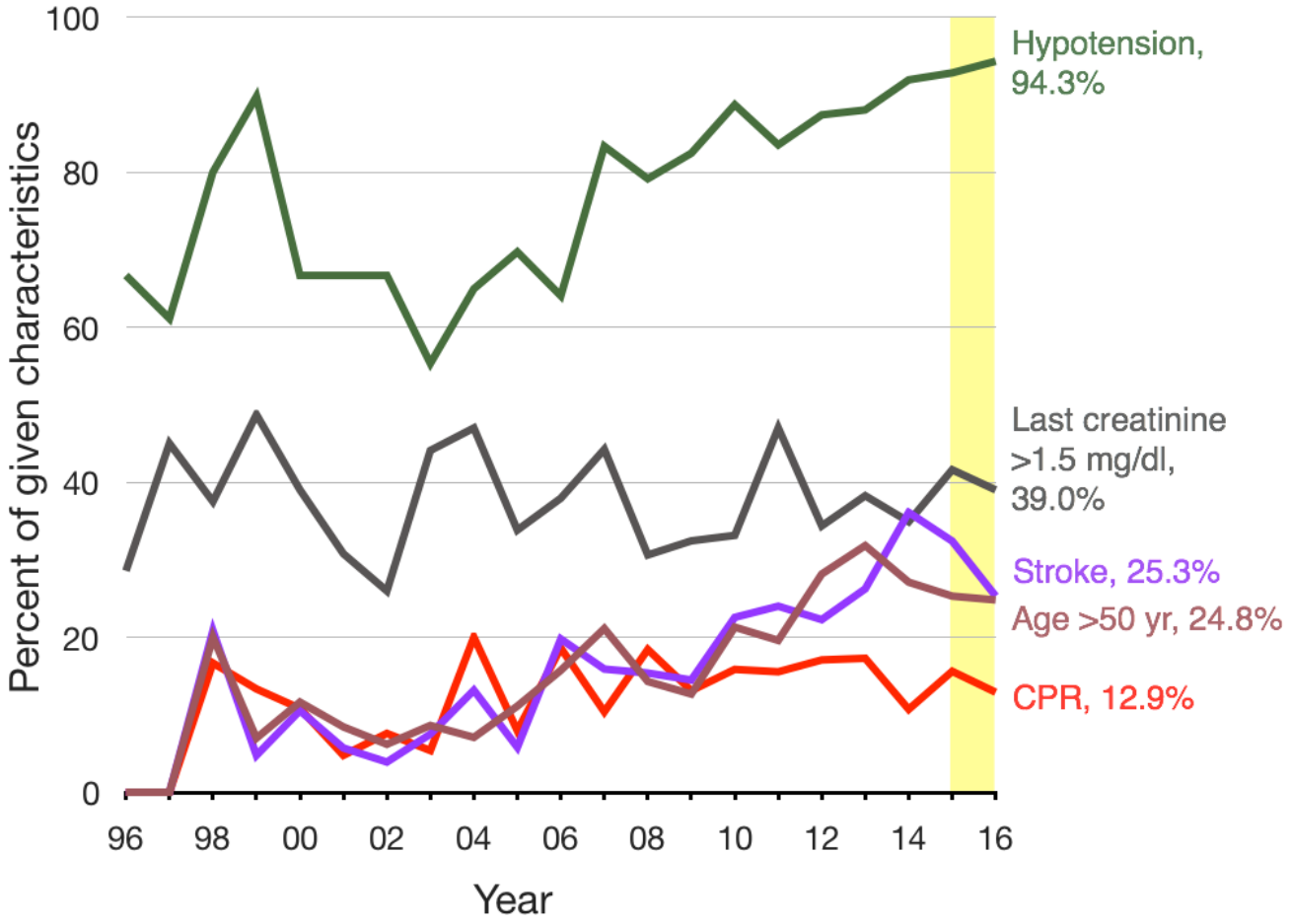
Picture 2.10 Age span of deceased donor and cause of brain death

The main caused of brain death were head trauma and stroke respectively as shown in Picture 2.11 when comparing in 2015. The proportion of deceased donor caused by injury increased from 56.5% to 64.1% while deceased donor caused by stroke decreased from 32.6% to 25.3%.



Picture 2.11 The cause of brain death in deceased donor

There were 94.3% of deceased donors had hypotension, 12.9% had been performed the cardiopulmonary resusitation (CPR). 39.0% had the serum creatinine more than 1.5 mg/dL, 24.8% were age older than 50 years old and 25.3% were caused by stroke as shown in Picture 2.12 when comparing in 2015. The proportion of deceased donor qualification stated above has decreased but increased in the cause of hypotention.



Picture 2.12 The qualification of deceased donor

In Summary of kidney transplant in year 2016

- The kidney living donor and deceased donor has average age between 39.4 to 38.1 years old respectively.

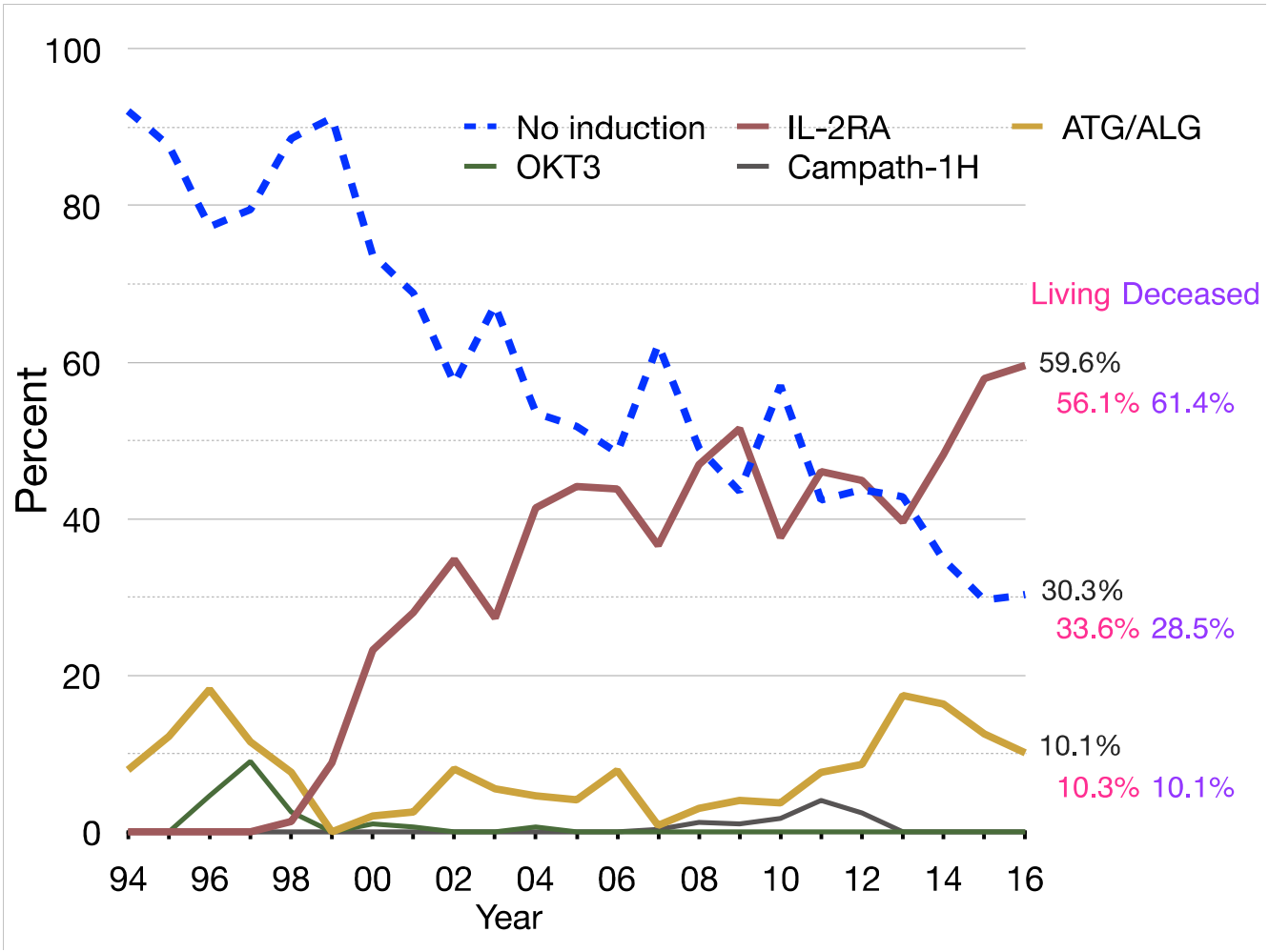
  The main kidney recipient has blood relations in living donor and spouse related donor which female is the the major living donor

- In deceased donor, demonstrated that
  - The major causes of brain death were head itrauma and stroke respectively.
  - The rate of deceased donors who had hypotension symptoms was increased in 2015.

Information of Kidney Transplantation

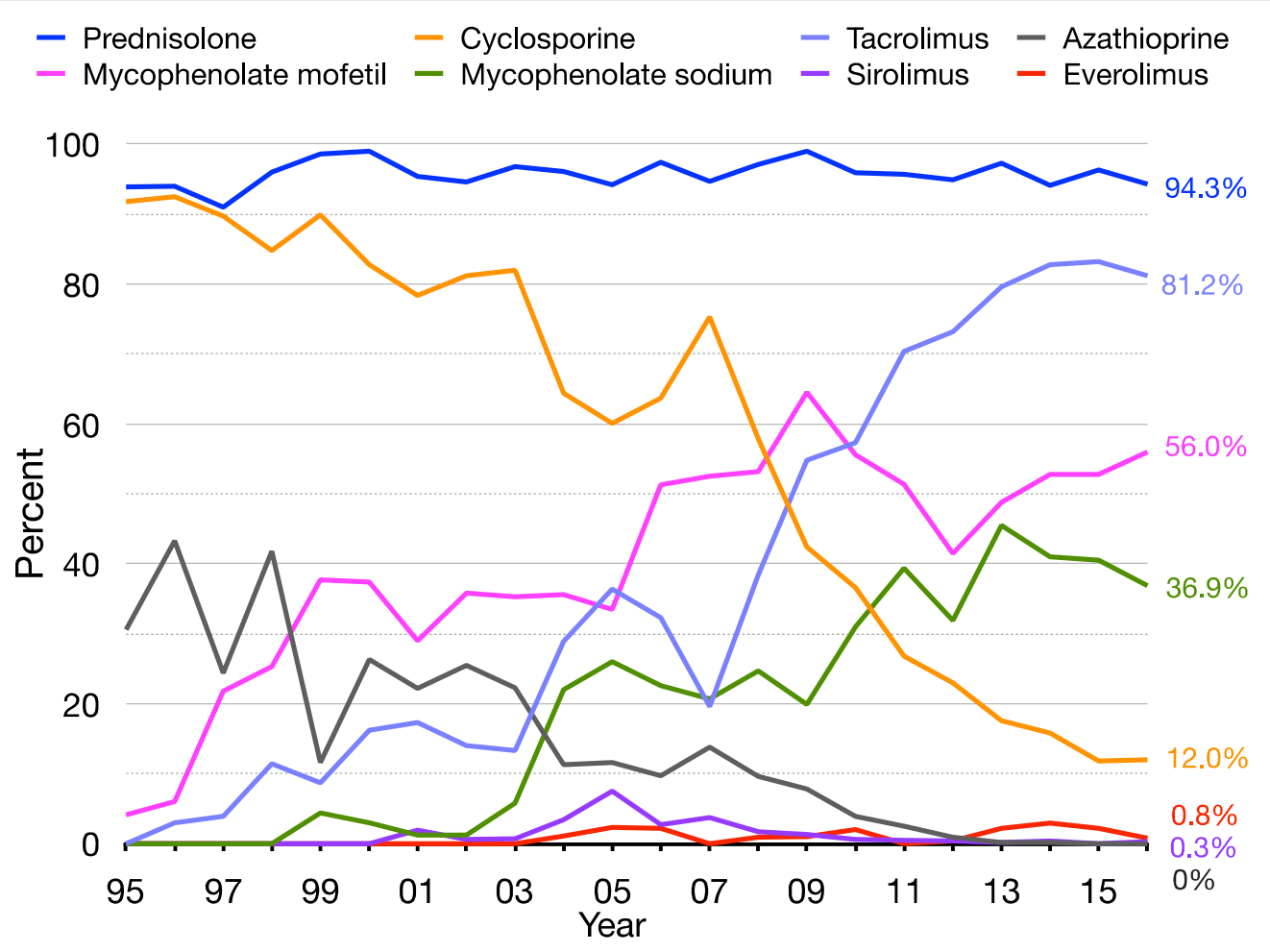
Immunosuppressive medication

In 2016, 69.7% of antibody induction therapy was used which divided into 59.6% of interleukin-2 receptor antagonist (IL-2 RA), 10.1% of anti-thymocyteglobulin (ATG)/anti-lymphocyte globulin (ALG) as shown in Picture 2.11: 56.1% of IL-2RA was used and 10.3% of ATG/ALG was used in kidney transplant of living donor; 61.4% of IL-2RA was used and 10.1% of ATG/ALG was used in kidney transplant of deceased donor.



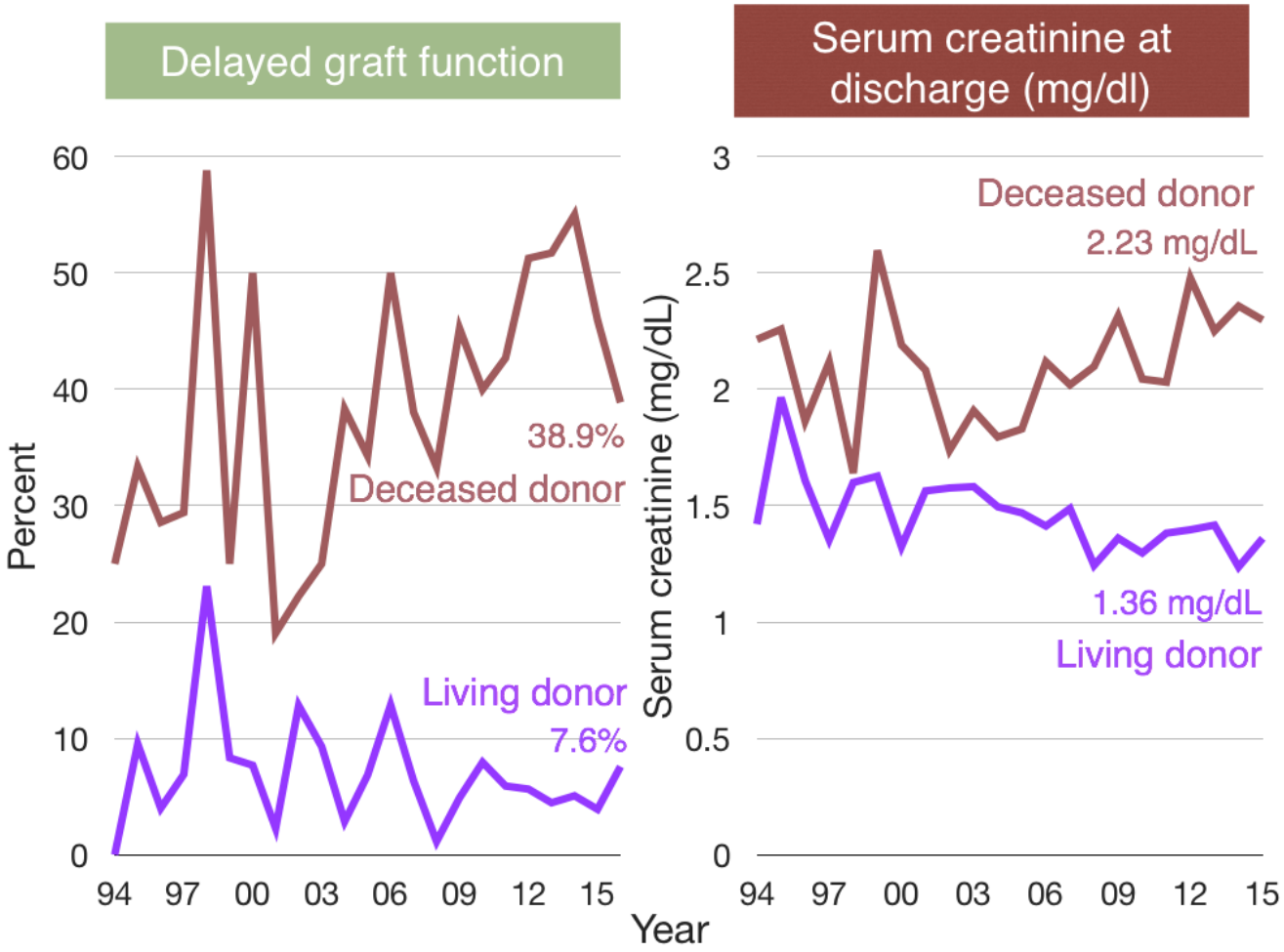
Picture 2.13 The proportion of recipients who received antibody induction therapy, separated by year of transplantation.

The proportion and tendency of immunosuppressive medication use on discharge date was shown in picture 2.14. In 2016, patients received prednisolone, tacrolimus, cyclosporine, mycophenolatemofetil and mycophenolate sodium at 94.6%, 81.2%, 12.0%, 56.0%, 36.9% respectively. Less than 1% of the patients received azathioprine, sirolimus or everolimus on discharge date.



Picture 2.14 The proportion of immunosuppressive treatment on discharge date, separated by year of kidney transplantation.

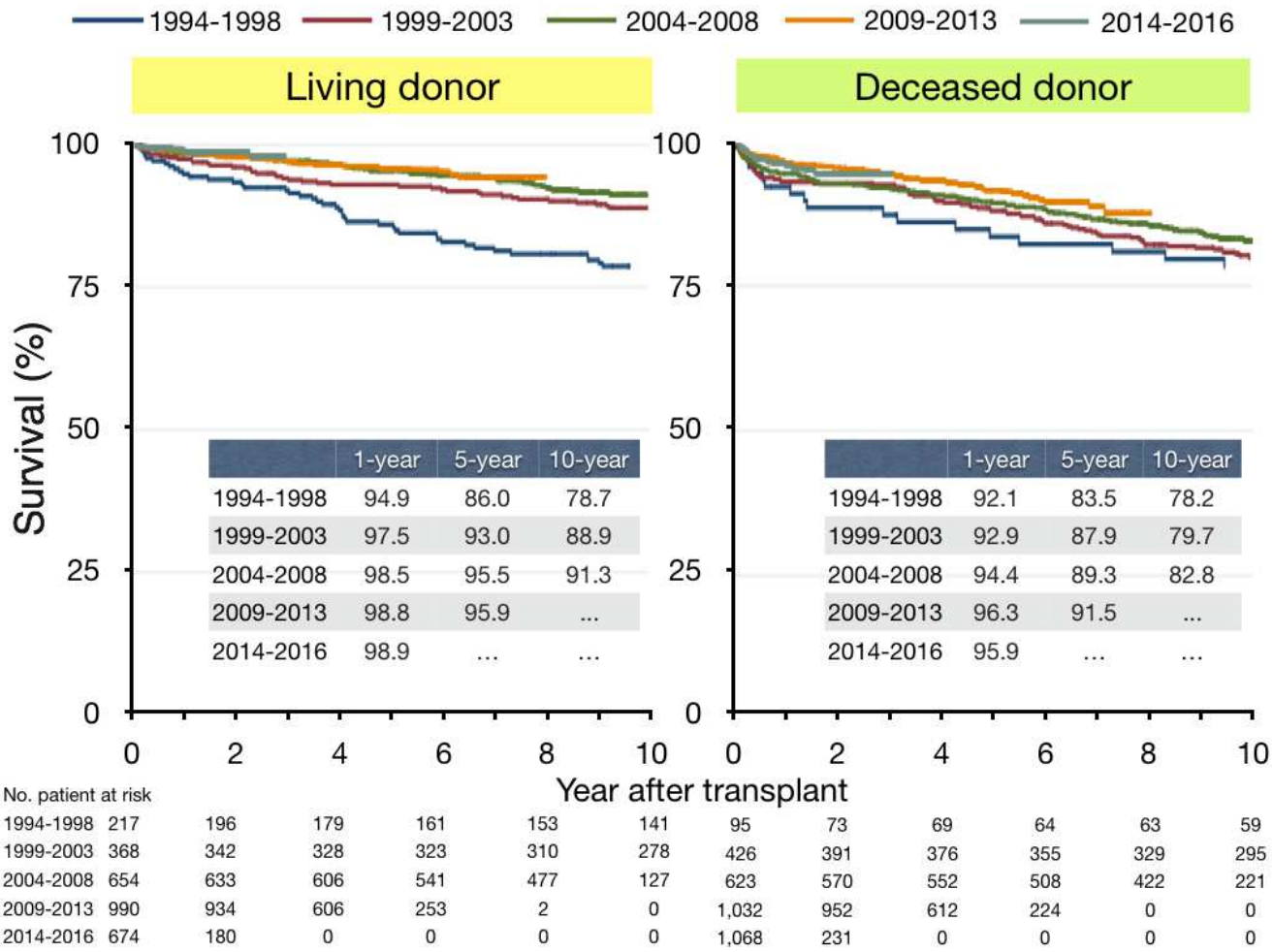
The comparison between proportion of delayed graft function (DGF) after kidney transplantation and serum creatinine level on discharge date of the recipients from the living donor and deceased donor as shown in Picture 2.15.



Picture 2.15 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 recipients of the living donors and deceased donors in various period of time as shown in picture 2.16.



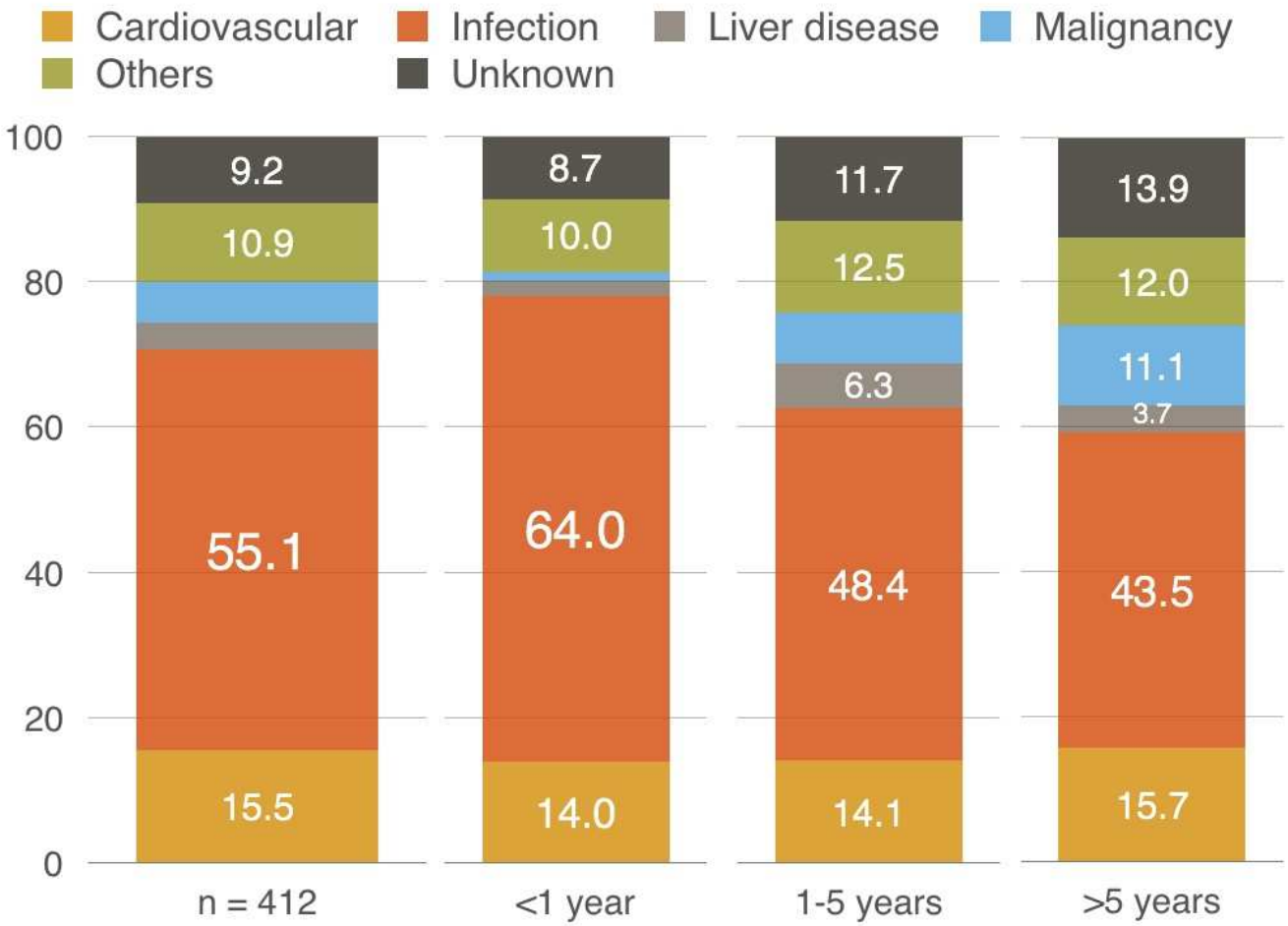
	1-year	5-year	10-year
1994-1998	94.9	86.0	78.7
1999-2003	97.5	93.0	88.9
2004-2008	98.5	95.5	91.3
2009-2013	98.8	95.9	...
2014-2016	98.9	...	...

	1-year	5-year	10-year
1994-1998	92.1	83.5	78.2
1999-2003	92.9	87.9	79.7
2004-2008	94.4	89.3	82.8
2009-2013	96.3	91.5	...
2014-2016	95.9	...	...

Picture 2.16 Patient survival rate separated by types of kidney transplantation.

Cause of death

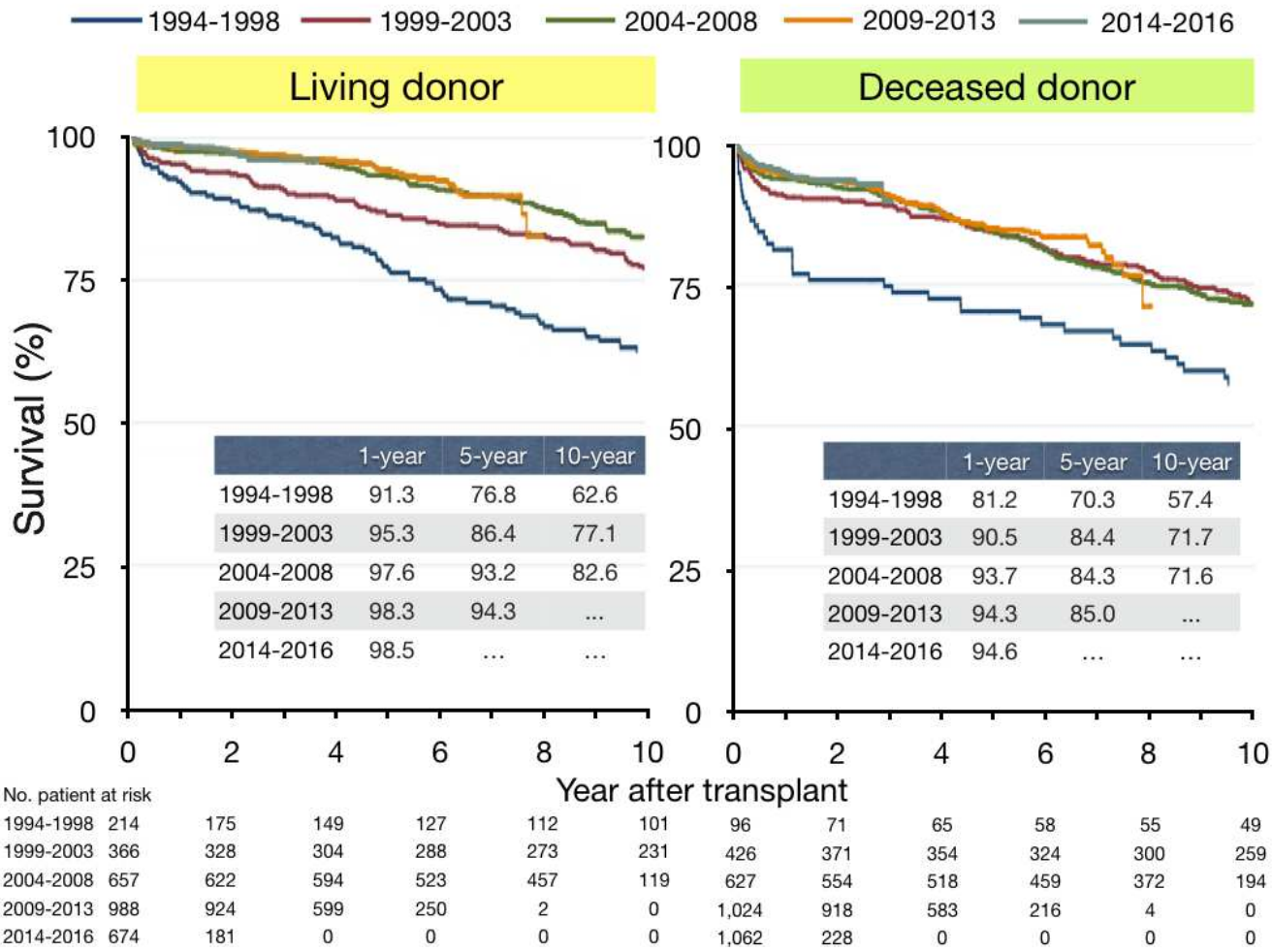
The cause of death after kidney transplantation within the first year, during 1-5 years and after 5 years of transplantation was infection as shown in picture 2.17.



Picture 2.17 The cause of patients' death in various period of time.

Graft Survival

The graft survival rate after 2001 of kidney transplantation for the living donors and deceased donors were shown in picture 2.18.

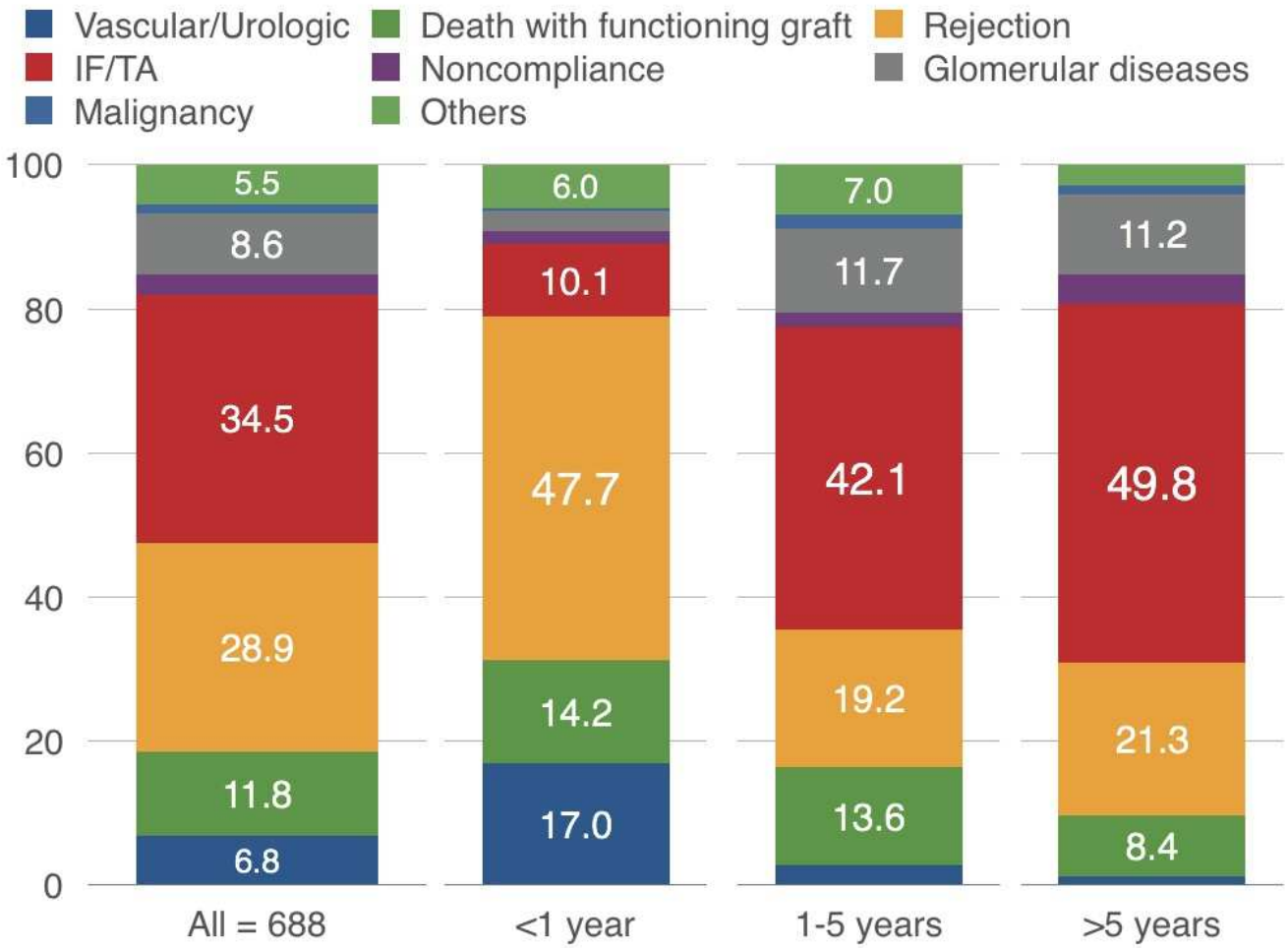


	1-year	5-year	10-year
1994-1998	91.3	76.8	62.6
1999-2003	95.3	86.4	77.1
2004-2008	97.6	93.2	82.6
2009-2013	98.3	94.3	...
2014-2016	98.5	...	...

	1-year	5-year	10-year
1994-1998	81.2	70.3	57.4
1999-2003	90.5	84.4	71.7
2004-2008	93.7	84.3	71.6
2009-2013	94.3	85.0	...
2014-2016	94.6	...	...

Table 2.18 The graft survival rate separated by types of kidney transplantation.

Graft loss in various period of time after kidney transplantation as shown in picture 2.19.



Picture 2.19 Graft loss of recipients in various period of time.

Kidney transplant 2016 Summary

- Comparing to the past, 69.7% antibody induction therapy was significantly increased.
- Immunosuppressive medication used on discharge date, 81.2% of tacrolimus was used by calcineurin inhibitor group. 56.0% of mycophenolatemofetil was used by antiproliferative and 36.9% of mycophenolate sodium.
- There are38.9% of delayed graft function in recipients who received kidney transplant from deceased donors.
- 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 is increasing 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 2015

From January 1 to December 31, 2016, there were 40 patients of kidney transplant recipients under 18 years old,10 recipients from living donors and 30 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 2016, separated by hospital.

Hospital	Kidney transplant recipients of Living donor	Kidney transplant recipients of Deceased donor	Total
Ramathibodhi	3	8	11
Siriraj	3	5	8
Phramongkutklao	1	7	8
SrinagarindKhonkhen	0	6	6
Chiang Mai	1	3	4
Chonburi	1	0	1
Suratthani	1	0	1
Sunpasitthiprasong	0	1	1
Total	10	30	40

The comparison between 2015 and 2016, the kidney transplantation for children recipients have increased by 20%. (picture 3.1).

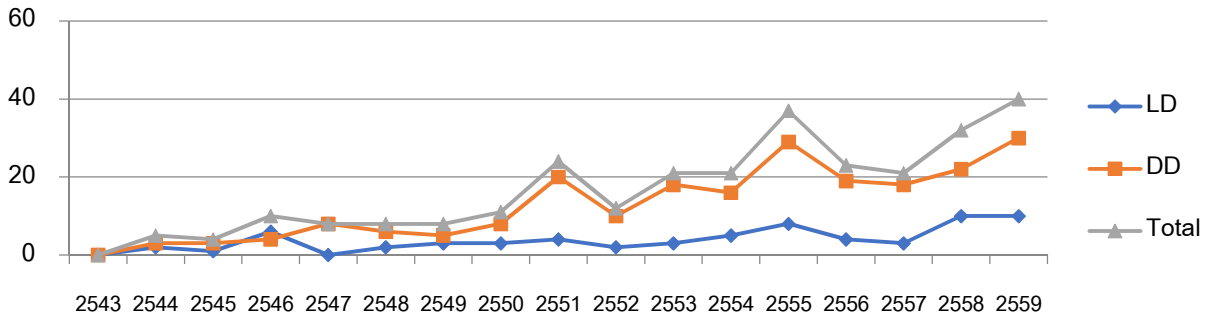


Table 3.1 Number of the kidney transplantation for children recipients each year since 2000, separated by transplantation types.

Information of kidney transplant recipients and donors under 18 years old in 2016

In 2016, from 40 of kidney transplant recipients under 18 years old, there were 10 recipients from living donors which 70% of recipients were male. The information provided for living donors 80% were female. The average age of donor equal to 40.4 ± 7.0 years old. The average age of recipients who received the first kidney transplant equal to 12.6 ± 4.1 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, %	70	20
Age (mean ± SD), years (range)	12.6± 4.1 (6 – 17)	40.4 ± 7.0 (29 – 51)
Number of transplant, %		
1	100.0	
Mode of renal replacement therapy, %		
Preemptive	30	
Hemodialysis	10	
Peritoneal dialysis	60	

SD: standard deviation

The 30 recipients of deceased donors, as shown in table 3.3, found that 56.7% 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, %	56.7	83
Age (mean ± SD), years (range)	14.7± 2.4 (8 – 18)	30.1± 11.2 (13 – 52)
Number of transplant, %		
1	100.0	
Mode of renal replacement therapy, %		
Hemodialysis	10.3	
Peritoneal dialysis	89.7	

SD: standard deviation

Immunosuppressive medication usage and kidney transplant recipients under 18 years old outcomes for year 2016

In 2016, 40 kidney transplant recipients have information of induction therapy and immunosuppressive medication on the discharge date, as shown in Table 3.4 and 3.5 respectively and indicated that 80% received basiliximab induction therapy which is the most formula used on discharge date were tacrolimus, mycophenolatemofetil and prednisolone and 1 patient (2.5%) did not have information of the immunosuppressive medication formula.

Table 3.4 Kidney transplant recipients under 18 separated by induction therapy

Induction therapy	N (%)
No induction	4 (10.0)
Basiliximab	32 (80..0)

Antithymocyte globulin	4 (10.0)
Total	**40 (100)**

Table 3.5 Information of Immunosuppressive regimen on discharge date.

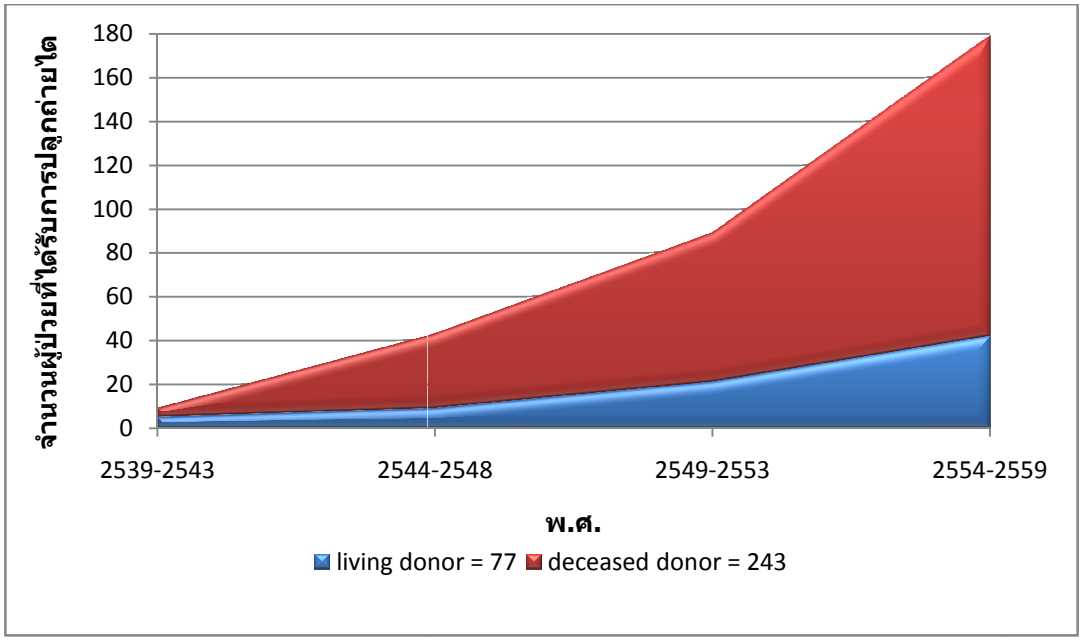
Immunosuppressive regimen	N (%)
Prednisolone + tacrolimus + mycophenolate sodium	11 (28.2)
Prednisolone + tacrolimus + mycophenolatemofetil	25 (64.1)
Prednisolone+cyclosporineA+mycophenolate sodium	2 (5.1)
Tacrolimus	1 (2.6)
Total	39 (100)

In 2016, the survival rate of living donor transplant and deceased donor transplant patients after kidney transplantation were 100.0% and 100.0% respectively. In one year, the patient survival rate were 100.0% and 100.0% respectively and one patient loss of kidney (2.5%) cause of sudden kidney transplant rejection.

Information of kidney transplant recipients under 18 years old during 1996-2016

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

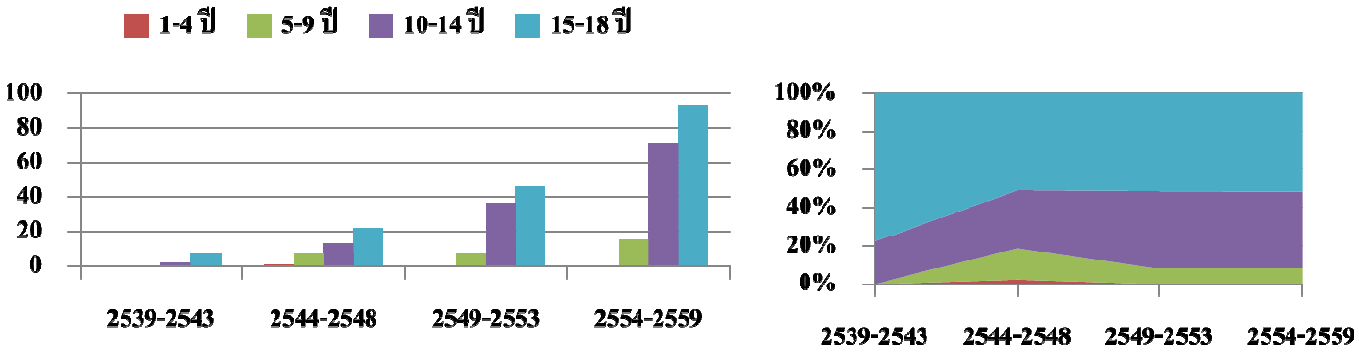
From kidney transplant database by Thai Transplantation Society, there were 320 recipients under 18 years old, which divided into 77 recipients from living donor and 243 recipients from deceased donor. (Picture 3.2).



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 – 2016

The report based on the data, there were 320 recipients under 18 years old, 56.6% were male. The average of age of transplant occurrence was 14.2 ± 3.3 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.



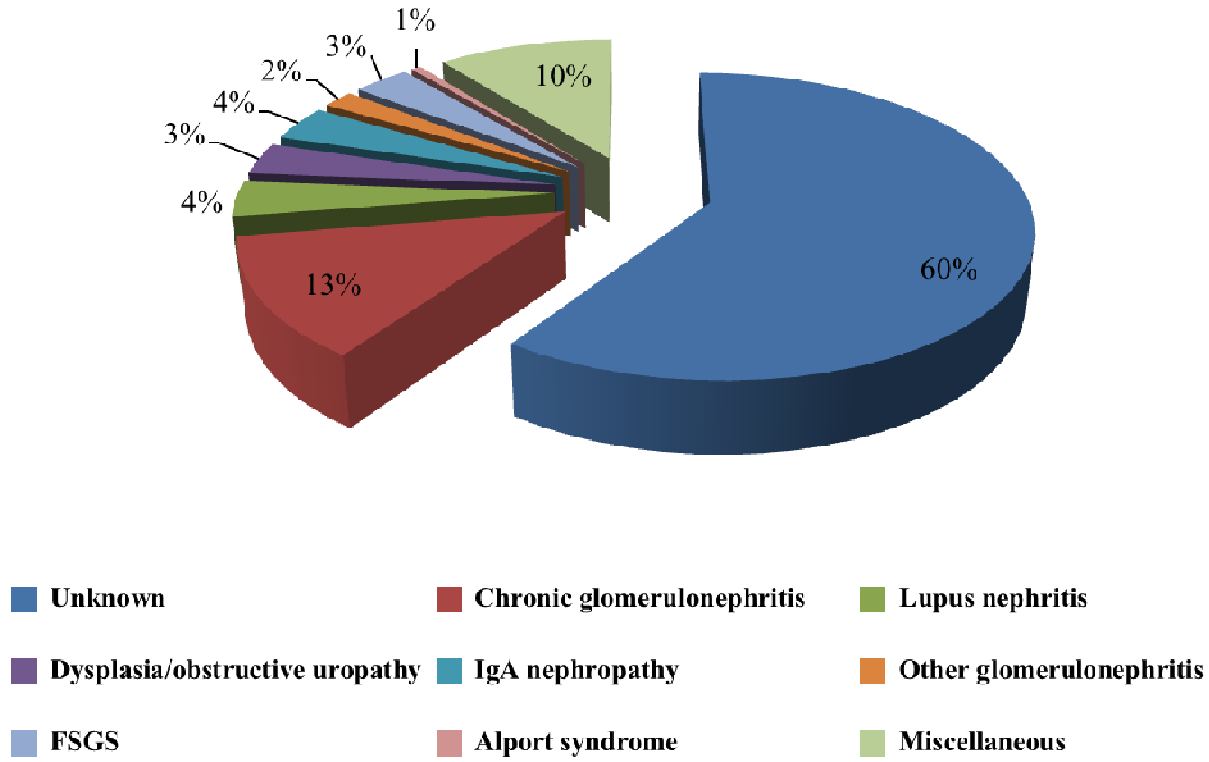
Picture 3.3 Number and proportion of recipients under 18 years old, separated by age.

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

	Recipient	Donor
Male gender, %	56.6	66.6
Age (mean ± SD), years (range)	14.2±3.3 (1 – 18)	33.8±12.3 (3 – 59)
Number of transplant, %		
1	99.9	
Mode of renal replacement therapy, %		
Preemptive	4.1	
Hemodialysis	34.4	
Peritoneal dialysis	55.6	
Missing	5.6	

SD: standard deviation

The major causes of chronic kidney disease were 13% of chronic glomerulonephritis, 4% of lupus nephritis, 4% of dysplasia/ obstructive uropathy, 3% of IgA nephropathy, 3% focal segmental glomerulosclerosis (FSGS), 3% of chronic glomerulonephritis and 61% 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 320 cases, there were 77 cases of living donor and 243 cases of deceased donor.

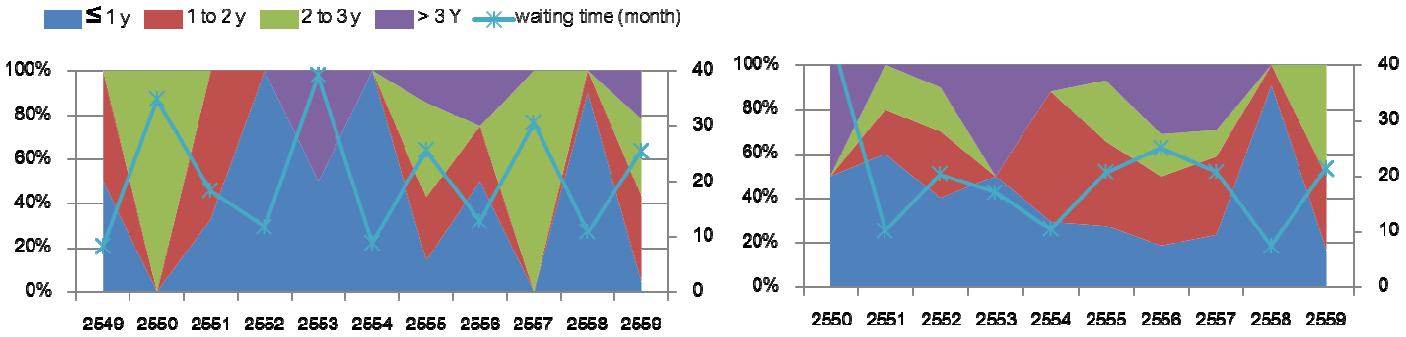
Table 3.7 Information of recipients from living donor and deceased donor.

	Kidney transplant of Living donor	Kidney transplant of Deceased donor
Number	77	243
Recipient age, year	14.2 ± 3.6	14.1 ± 3.1
Donor age, year	39.2 ± 8.5	32.1 ± 12.9
Waiting time, month (IQR)	14.1 (8.2 – 26.5)	19.6 (11.6 – 30.5)

Median HLA mismatch (IQR)	3 (2 – 3)	3 (2 – 4)
Median PRA (P_5-P_{95}), %	0 (0 – 0)	0 (0 – 0)
Payment type, %		
Governmental	15.6	6.2
Social Security	0	0.4
National Health Security	44.2	59.7
Self-affordable	6.5	2.5
Others	33.8	31.3

HLA, human leukocyte antigen; IQR, interquartile range; PRA, panel reactive antibody; P_5, 5th percentile; P_{95}, 95th percentile

Since 2009, 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 donor has longer waiting time than living donor (table 3.7). In 2016, the renal replacement therapy duration of recipients from deceased donor and living donor were 21.4 and 25.5 months respectively.



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

Information of Donor

From 77 living donors, 28.6% were male. 11 cases were unidentified relationship between donors and recipients from 11 patients as shown in Table 3.9.

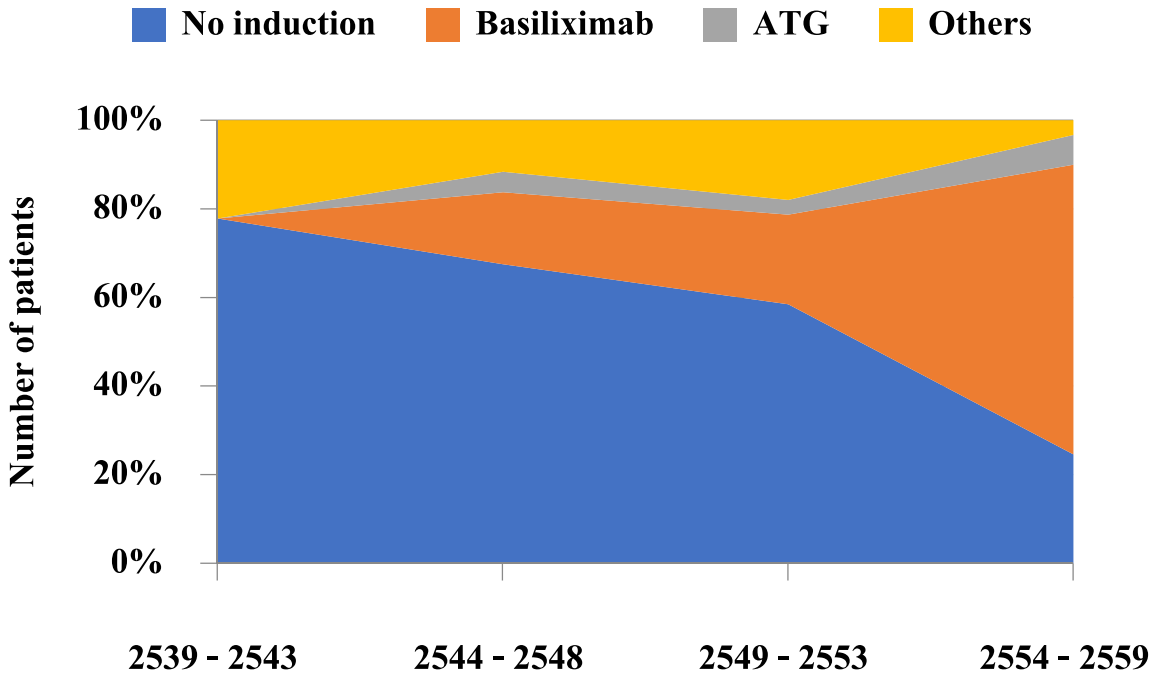
Table 3.9 Relationship between living donor and recipient.

Relationship between recipients	Number of living donor (%)		
	Male	Female	Total
Parents	13 (59.1)	47 (85.5)	60 (77.9)
Siblings	3 (13.6)	3 (5.5)	6 (7.8)
Others e.g. twins, cousins, etc.	6 (27.3)	5 (9)	11 (14.3)
Total	22	55	77

From 243 deceased donors, 77.4% 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 63.8%, 17.3%, and 12.3%, respectively, while the remaining 6.6% could not identify the causes. 73.7% of deceased donors had hypotension symptom before transplant, 9.9% of them had been performed the cardiopulmonary resuscitation (CPR).

Immunosuppressive medication used and kidney transplant outcome.

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



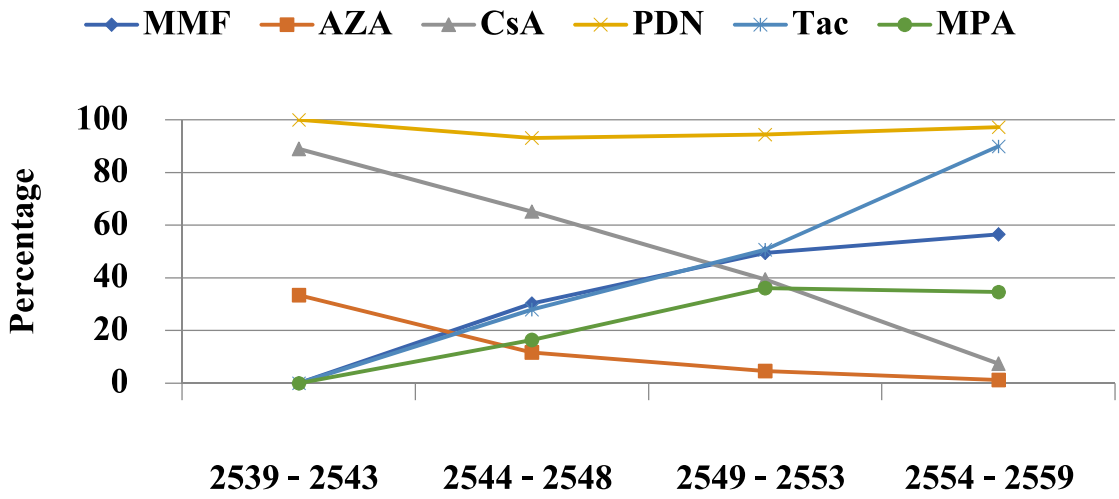
Picture 3.6 The proportion of recipients who received antibody induction therapy, by year of transplantation.

The Proportion of antibody induction therapy from 1996 – 2016, which separated by types of kidney transplant were shown in table 3.10. The data was from 80 recipients of living donors and 208 recipients of deceased donors

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

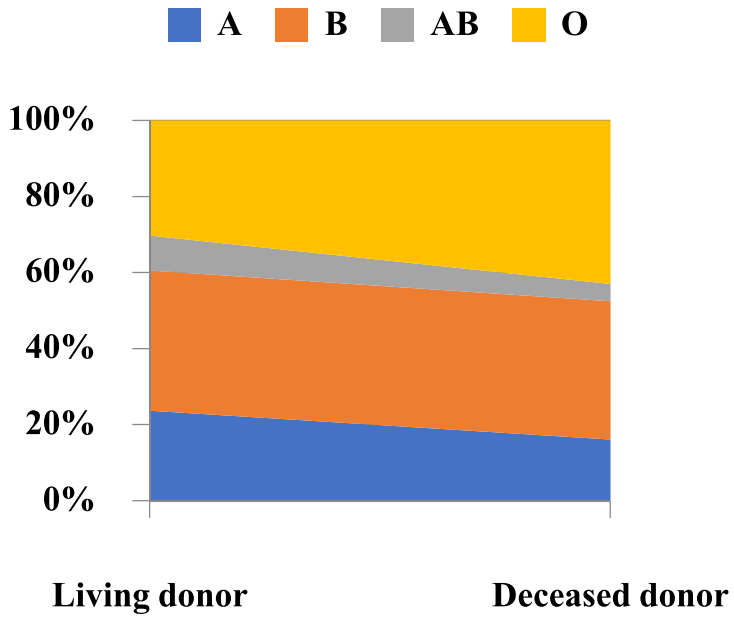
	Number of kidney transplant recipients(%)	
	Living donor (N=77)	Deceased donor (N=243)
No induction	37 (48.1)	95 (39.1)
IL-2R antagonist	28 (36.4)	131 (53.9)
ATG	5 (6.5)	12 (4.9)
OKT3	2 (2.6)	0 (0)
Others	5 (6.5)	5 (2.1)

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 has significantly increased.



Picture 3.7The 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 30.3%, 36.8%, 23.7% and 9.2% respectively. On the other hand, blood types of recipients from deceased donors, the percentage were 43.0%, 36.4%, 16.1% and 4.5% respectively (Picture 3.8).



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

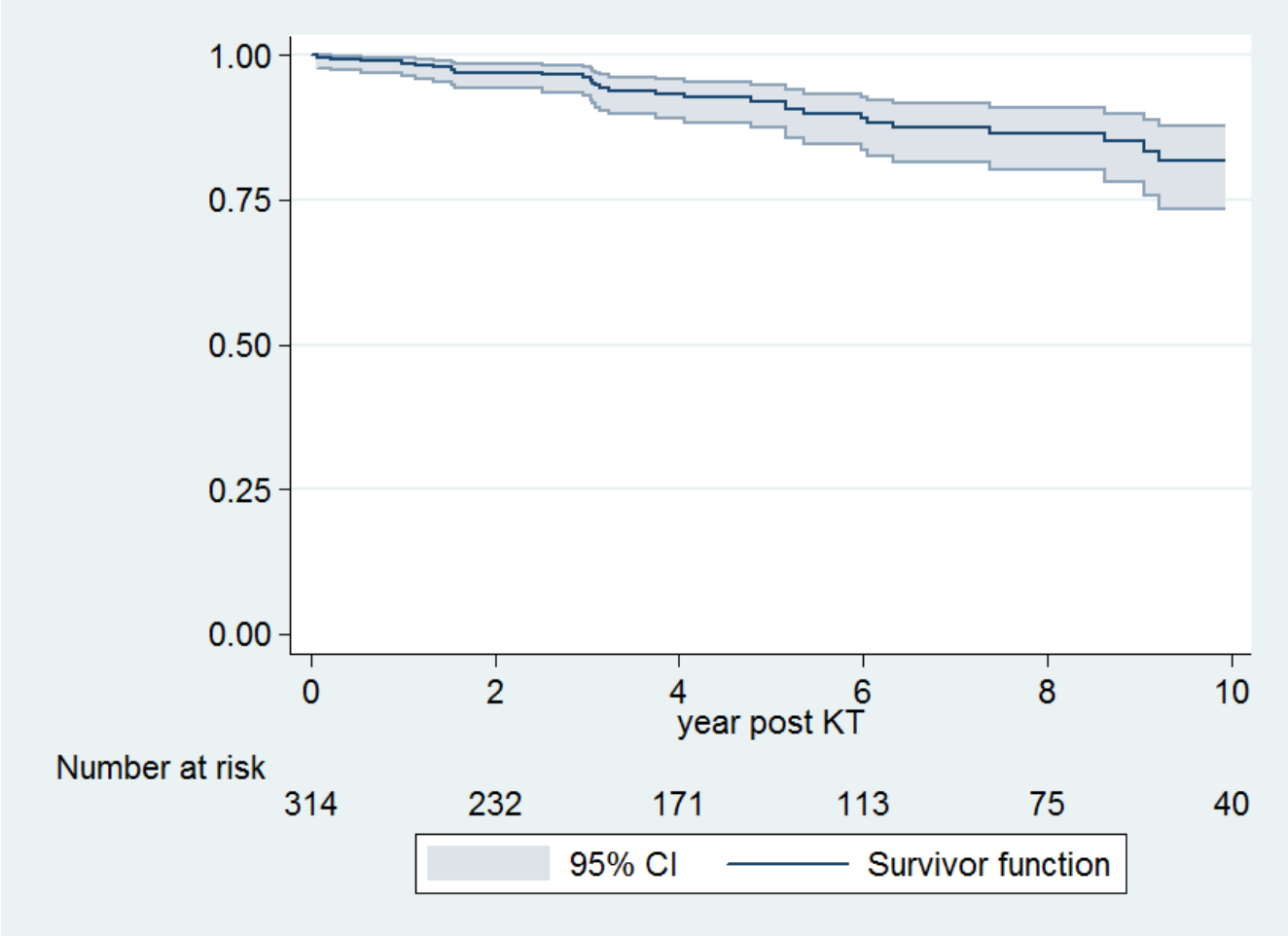
The table 3.11 was shown the comparison between proportion of delayed graft function after transplantation and serum creatinine level on discharge date of the recipients of living donors and deceased donors.

Table 3.11 The proportion of delayed graft function and serum creatinine level on discharge date of the recipients, separated by transplant types.

	Kidney transplant of Living donor	Kidney transplant of Deceased donor
Delayed graft function, %	3.9	19.8
Serum creatinine at discharge, mg/dL	1.12 ± 1.18	1.42 ± 1.28

Patient survival rate

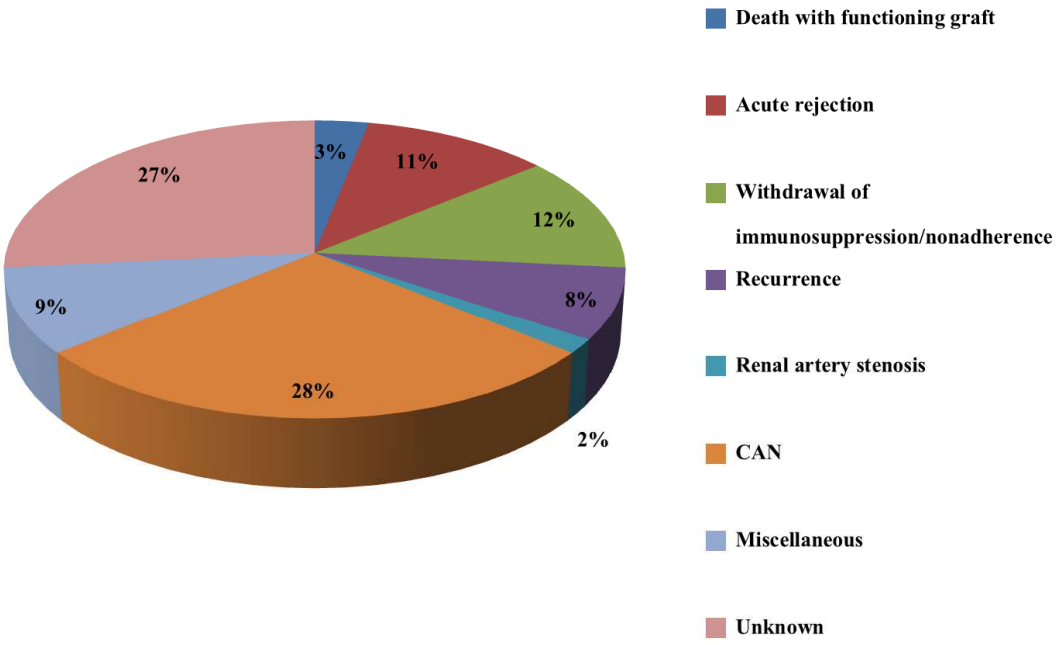
In the past 20 years, the survival rate after kidney transplant has significantly increased. During 1996 – 2016, 31 patients died after kidney transplantation which was 9.7%. The causes of death were 7 cases of septicemia which divided into 1 case of pulmonary infection (virus) and 1 case of pulmonary infection (fungus), 2 cases of heart failure, 2 others cases and 17 unidentified caused cases. The patient survival rate at the 1,5 and 10 years were 98.6% ,92.0% and 82.2% respectively (Picture 3.9).



Picture 3.9 Patient survival rate of children kidney transplant recipients.

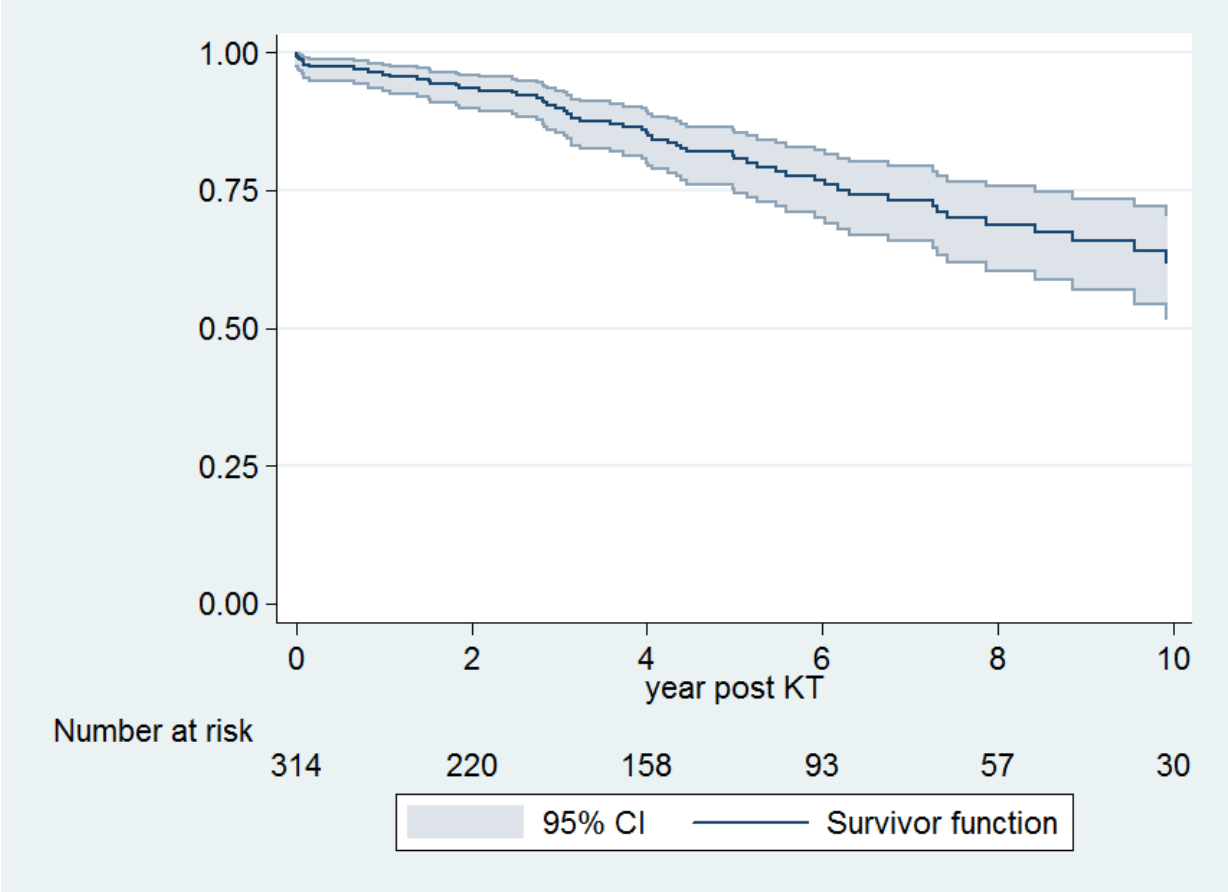
Graft survival

During 1996 – 2016, there were 62 cases which lost kidneys, the causes were chronic renal allograft nephropathy, withdrawal immunosuppression/ nonadherance, acute rejection, recurrence of primary disease, renal artery stenosis and others which represented 18, 8, 7, 5, 1, 6 cases respectively and 17 unidentified caused cases (Picture 3.10).



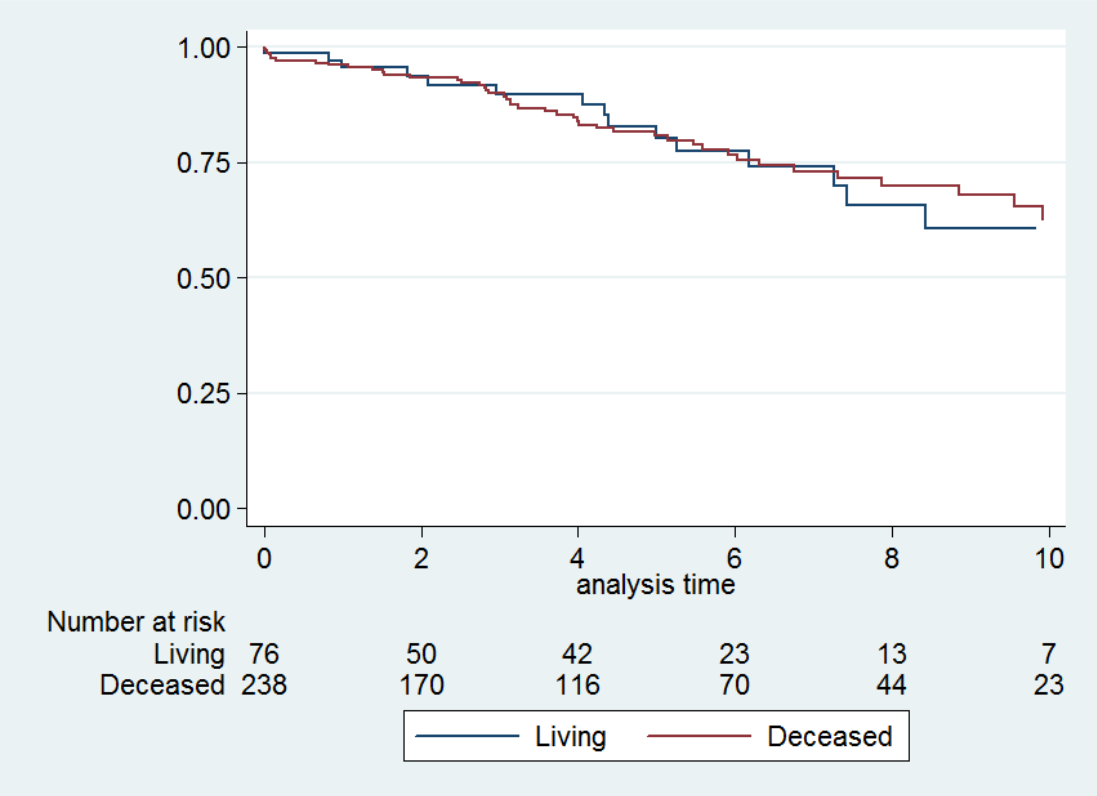
Picture 3.10 Causes of children kidney transplant recipients who lost kidneys.

The graft survival rate at the 1,5 and 10 years were 95.6% ,81.0% and 64.5% 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 donor compare to deceased donor.

Index

ECMO Everolimus	
G Graft survival	
H Head injury Heart transplantation Heart-Lung transplantation Hemodialysis HLA – A mismatch HLA – B HLA - DR mismatch HLA mismatch Human leukocyte antigen Hypotension	
I Idiopathic pulmonary fibrosis IgA nephropathy IL-2R antagonist Immunosuppressive regimen Induction therapy Interleukin-2 receptor antagonist (IL-2RA)	
L Living donor Lung transplantation Lupus nephritis	

M Male gender Median HLA mismatch (IQR) Median PRA Mode of renal replacement therapy Month (IQR) Mycophenolatemofetil Mycophenolate sodium	
N Number of transplant	
O Obstructive uropathy OKT3 Other infections	
P Panel reactive antibody (PRA) Parents Patient survival Payment type Peritoneal dialysis Postchemotherapy myocarditis PRA Prednisolone Preemptive Pulmonary infection (bacteria) Pulmonary infection (fungus) Pulmonary infection (virus) Pulmonary tuberculosis	

R Recipient Recipient age Recurrent of primary disease Rejection Renal artery stenosis Retransplantation	
S Septicemia Serum creatinine Serum creatinine at discharge, mg/dl Siblings Single Lung transplantation Sirolimus Stroke	
T Tacrolimus	
U Underlying disease	
V Ventricular assist device	
W Waiting time Withdrawal immunosuppression/ nonadherence	

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