

# RENAL REGISTRY

## Hong Kong Renal Registry 1995-1999

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### ABSTRACT

*This report was based on the data from the Renal Registry of the Hospital Authority of Hong Kong, accounted for 90% to 95% of all the patients on renal replacement therapy (RRT) in Hong Kong. Patients who received RRT under the private sectors were not included in this report. The data were as of 31 March 1999.*

*There were 11 renal units, five satellite centers and four major renal transplant centers. The number of patients on RRT was 4268 [627 patients per million (pmp)], of which 58% (2490 patients, 360 pmp) were on peritoneal dialysis (PD), 13% (576 patients, 85 pmp) on hemodialysis (HD) and 28% (1202 patients, 177 pmp) with functioning kidney transplants (TX). The net increase of the number of patients on RRT from previous year was 10%. The incidence of end-stage renal failure was 762 (112 pmp). The median age of the existing patients on RRT was 52, of which 33% were above the age of 61 years. The median age of the new patients was 56 years, of which 50% were above the age of 61 years. The major causes of renal failure for existing patients were glomerulonephritis 32%, unknown 26% and diabetes 21%. For the new cases, 34% were due to diabetic nephropathy. Of all the patients on RRT, 10% were serologically positive for hepatitis B infection while 6% were positive for hepatitis C infection.*

*Of all the patients on dialysis, 81% were on PD, of which 92% were on continuous ambulatory peritoneal dialysis (CAPD). Of the CAPD patients, 13% were still using "connect" systems, 75% were using "disconnect" systems and 12% using UV flash systems. Nineteen percent of all the patients on dialysis were on HD, of which 54% were on hospital based HD, 21% on satellite center based HD, 9% on charitable center based HD and 3% on home HD. Of the 1202 patients with kidney transplants, 629 (52%) were transplanted in Hong Kong. Of these, 325 (52%) were cadaveric kidney transplantation. For the year ending 31 March 1999, 113 patients (17 pmp) received a kidney transplantation, of which 58 transplants were performed in Hong Kong (30 cadaveric kidneys and 28 living related kidneys). Thirty-one percent of all the patients on RRT were receiving erythropoietin therapy.*

*The annual crude mortality rate for all RRT was 7% (8% for PD, 14% for HD and 1.6% with TX). The major causes of death were cardiovascular (24%), infection (22%) and cerebral vascular accident (6%). The 1 and 5 year patient survivals for kidney transplants performed in Hong Kong between 1 April 1993 to 31 March 1998 were 98%, 96% for living related kidney and 94%, 89% for cadaveric kidney. The 1 and 5 year graft survivals were 92%, 88% (censored), 91%, 85% (not censored) for living related kidney and 89%, 83% (censored), 86%, 79% (not censored) for cadaveric kidney. The overall peritonitis rate for all CAPD systems for the 7 months ending 31 March 1999 was one episode per 21 months. The peritonitis rate of the new disconnect systems was one episode per 20 to 27 months.*

*The point prevalence rate of RRT (1997 data) for Hong Kong was within 15% range of that for*

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*Australia, Canada and most European countries, but only 40% to 60% of that for Japan, USA and Taiwan. The percentage of dialysis patients being treated with PD was highest in the world.*

**Key words:** Renal registry, Peritoneal dialysis, Hemodialysis, Renal transplant

## 中文摘要

此份報告以香港醫院管理局腎科登記的資料為基礎，其病人佔全港接受腎臟代替治療患者的90%至95%。在私家醫院接受腎臟代替治療的病人不包括在此報告之內。數據截至1999年3月31日。

在香港共有11個腎科中心、五個衛星治療中心、四個主要的腎移植中心。接受腎臟代替治療患者的總數為4268位[627人/百萬人(pmp)]，其中58%(2490位，360pmp)進行腹膜透析、13%(576位，85pmp)進行血液透析、28%(1202位，177pmp)已成功接受腎臟移植(Tx)。與前一年相比，接受治療的患者每年增加10%。末期腎衰竭的發病數為762人(112pmp)。現存進行治療病人的中位年齡為52歲，其中33%超過61歲。在新症中，病人的中位年齡為56歲，其中50%超過61歲。腎功能衰竭的主要因為腎小球腎炎佔32%、不明26%、糖尿病21%。在新症中，34%由糖尿病腎病所致。在所有接受治療的患者當中，10%血清乙型肝炎陽性、6%丙型肝炎感染陽性。

在所有接受透析治療的病人中，81%進行腹膜透析，其中92%接受連續活動性腹膜透析治療(CAPD)；13%連續活動性腹膜透析患者應用『連接』系統、75%應用『分離』系統、12%應用紫外光消毒系統。所有接受透析治療的病人中有19%進行血液透析治療，其中54%在醫院接受血液透析、21%在衛星中心接受血液透析、9%在慈善中心接受血液透析、3%在家中接受血液透析。在1202名腎移植患者中，629位(52%)在香港進行移植術，其中325位(52%)為屍腎移植。在3月31日之前的12個月，113位患者(17pmp)接受了腎移植，其中58位在香港進行(30位屍腎移植，28位活體腎移植)。所有接受透析的病人中有31%在接受促紅細胞生成素治療。

接受了腎臟代替治療的患者並死亡率為7%(腹膜透析8%、血液透析14%、功能性腎移植1.6%)，主要死因為心血管疾病(24%)、感染(22%)、腦血管意外(6%)。從1993年4月1日至1998年3月31日在香港進行活體腎移植患者的1年及5年生存率分別為98%、96%，屍腎移植為94%及89%。在活體腎移植中，移植腎的1年及5年存活率為92%、88%(已終檢)、91%及85%(未終檢)；在屍腎移植中移植腎的1年及5年存活率為89%、83%(已終檢)、86%、79%(未終檢)。在截至1999年3月31日前的七個月中，接受連續活動性腹膜透析的患者的腹膜炎發病率為每21個月一次。最新『分離』系統的腹膜炎發病率為每20至27月一次。

在香港接受人工腎治療的患者的點發病率為澳大利亞、加拿大及大多數歐洲國家範圍的15%之內，約為日本、美國及台灣的40%至60%。本港接受腹膜透析治療的百分比為世界最高。

## INTRODUCTION

This Renal Registry Report was based on the data from the Renal Registry of the Hospital Authority, Hong Kong. It accounted for approximately 90% to 95% of all the patients on renal replacement therapy (RRT) in Hong Kong. Patients who received RRT under the private sectors were not included in this report. The data were as of 31 March 1999.

## THE RENAL REGISTRY/CLINICAL INFORMATION SYSTEM OF HONG KONG

The Renal Registry implemented by the Hospital

Authority of Hong Kong on 1 April 1995 is a new type of direct on-line computerized registry. Computer terminals installed at all renal units operated by the Hospital Authority are linked by cable network system to a central database at head office. Data are entered directly into the local computer terminals. There is no need to fill in manual annual report forms.

The Renal Registry is a computerized clinical information system, which can be used by individual renal unit as a database for clinical management and direct on-line data analysis. As all the data are stored in the central server, it allows Head Office to compile registry report for the whole of Hong Kong.

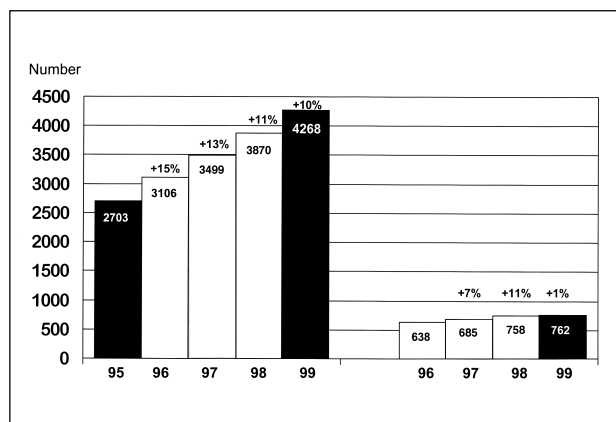
The Renal Registry is linked with other related computerized systems. It allows automatic download of 1. donor's data from the "Organ Procurement System" used by the Transplant Co-ordinator and 2. individual HLA data from the "Tissue Typing Laboratory System".

A steering committee determined the list of relevant data to be collected for the Hong Kong Registry. An implementation team consisted of nephrologists and staff from Information Technology Division of the Hospital Authority jointly designed, developed and implemented the system. The success in the system was mainly due to: 1. the development of the concept of a functional clinical information system with the renal registry report as a by-product; 2. on-site direct data entry; 3. ownership and accessibility of the data by individual unit; and 4. the combined team work between the clinicians and the IT team, making use of the latest advances in computer technology.

The registry has the potential of being very comprehensive, yet flexible in the way and the amount of data being collected. The collection of key data was made compulsory by the Central Renal Committee. The collection of non-essential data was optional for individual renal units.

## PROVISION OF RENAL SERVICE IN HONG KONG

Approximately 90% to 95% of the RRT were provided by the Hospital Authority of Hong Kong, a statutory Government body responsible for the provision of secondary/tertiary health service in Hong Kong. The remaining 5% to 10% of the RRT were provided by the private sector and charitable organizations.



**Figure 1.** Point prevalence (as of 31 March of each year) and incidence (for 12 months ending 31 March of each year) of renal replacement therapy (RRT).

There were 11 renal units and five satellite centers [2.4 unit per million population (pmp)] operated by the Hospital Authority. There were 177 hemodialysis machines, of which 15 were earmarked for patients with hepatitis B infection. There were four major renal transplant centers. Two other centers also performed some renal transplantation.

## PREVALENCE AND INCIDENCE OF RENAL REPLACEMENT THERAPY

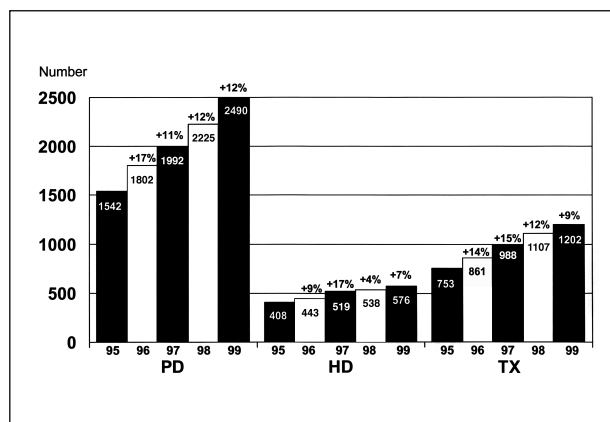
As of 31 March 1999, 4268 patients (627 pmp) were on RRT, of which 58% (n = 2490, 366 pmp) were on peritoneal dialysis (PD), 13% (n = 576, 85 pmp) on hemodialysis (HD) and 29% (n = 1202, 177 pmp) with functioning kidney transplants (TX). The net increase of number of patients on RRT from previous year was 10%.

For the year ending 31 March 1999, 762 new patients required RRT, of which 691 were commenced on PD, 50 on HD and 21 had kidney transplantation (without prior dialysis treatment at any renal unit of the Hospital Authority). For the same period, the total number of patients who had received kidney transplantation in or outside Hong Kong was 113.

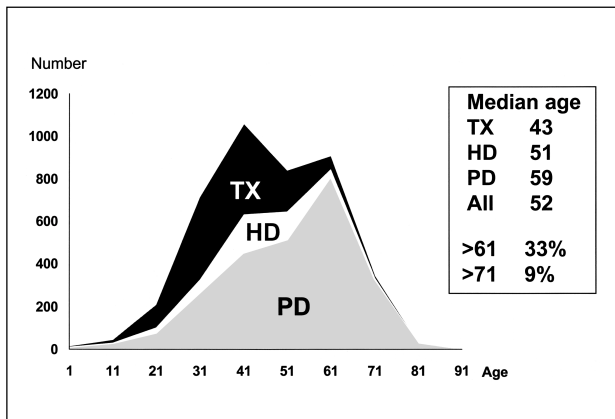
The increasing trend of the prevalence and incidence of RRT and for the different types of RRT were as shown in figures 1 and 2.

## AGE AND GENDER

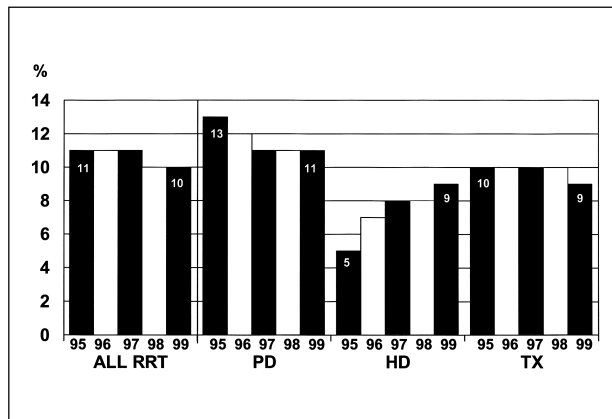
The median age of all the patients on RRT was 52 years (HD 51, PD 59, TX 43). Of the patients, 33% were above the age of 61 years and 9% above the age of 71 years. The age distribution was as shown in figure 3.



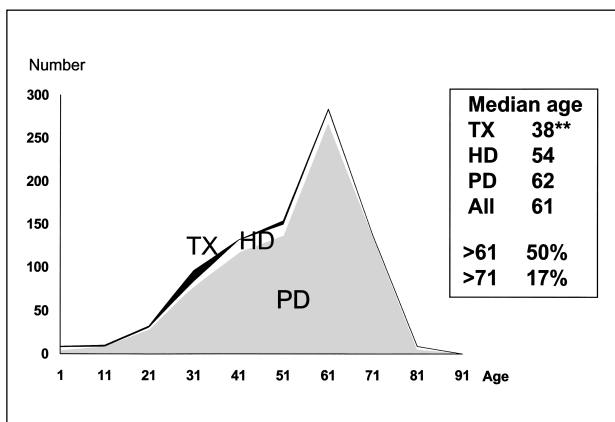
**Figure 2.** Point prevalence (as of 31 March of each year) of the different modes of renal replacement therapy. (PD = Peritoneal Dialysis; HD = Hemodialysis; Tx = Transplant).



**Figure 3.** Age distribution of all patients on RRT (cumulative of different modes of RRT) as of 31 March 1999.



**Figure 5.** Comorbidity – Hepatitis B infection (as of 31 March of each year).



**Figure 4.** Age distribution of all new patients on RRT (cumulative of different modes of RRT) for 12 months ending 31 March 1999 (\*\* for new transplant cases).

The median age of all the new patients commenced on RRT for year ending 31 March 1999 was 61 years (HD 54, PD 62, TX 38). Of the new patients, 50% were above the age of 61 years and 17% above the age of 71 years. The age distribution was as shown in figure 4.

The median age of the patients on RRT and new patients commenced on RRT increased by 5 years for the past 4 years.

Of all the patients on RRT, the ratio of male to female was 53 to 47 (49:51 for PD, 56:44 for HD and 59:41 for TX).

**PRIMARY RENAL DISEASE**

The causes of renal failure for all the patients on RRT and for the new patients entered into the RRT program was as shown in table 1.

The prevalence of diabetic nephropathy increased from 13% in 1995 to 21% in 1999. The number of patients

**Table 1.** Primary underlying renal disease for all patients as of 31 March 1999 and for new patients for the 12 months ending 31 March 1999 (GN = Glomerulonephritis; DM = Diabetes mellitus).

Primary renal disease	Existing patients	New patients
GN	32%	27%
Infection/reflux	3%	1%
Inherited/congenital	4%	3%
Obstructive/urolithiasis	4%	3%
Hypertensive/vascular	5%	8%
DM	21%	34%
Others	4%	3%
Unknown (ESRF)	26%	20%

presenting with diabetic nephropathy increased from 28% in 1996 to 34% in 1999.

Of the glomerulonephritis (GN), 47% were primary GN, 10% were secondary GN, 5% were advanced sclerosing GN and 38% had suspected of GN but not proven by biopsy. Of all the biopsy proven primary GN, 54% were IgA nephropathy, 15% focal segmental glomerulosclerosis, 7% mesangial-capillary GN, 7% membranous GN and 5% crescentic GN. The main cause of secondary GN was systemic lupus erythematosus (75%).

**COMORBID RISK FACTORS**

**Hepatitis B and C Infection**

Of all the patients on RRT, 10% were serologically positive for hepatitis B infection (PD 11%, HD 9%, TX 9%), 6% were positive for hepatitis C infection (PD 3%, HD 12%, TX 8%). The trend of hepatitis B and C infection over the past 5 years were as shown in figures 5 and 6.

**Diabetes Mellitus**

Twenty-three percent of all the patients on RRT were

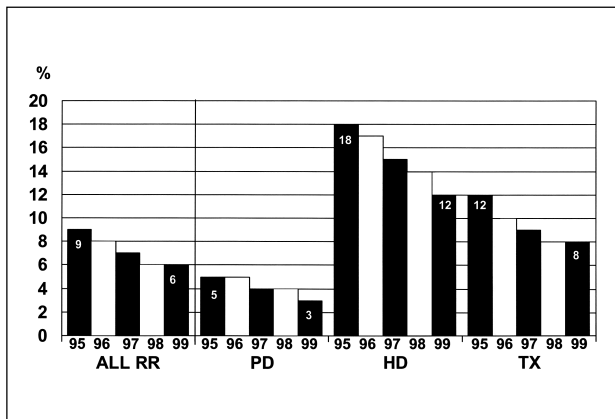


Figure 6. Comorbidity - Hepatitis C infection (as of 31 March of each year).

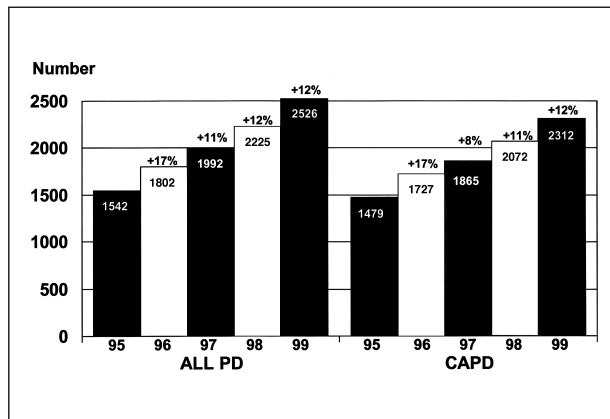


Figure 8. The number of patients on PD (as of 31 March of each year).

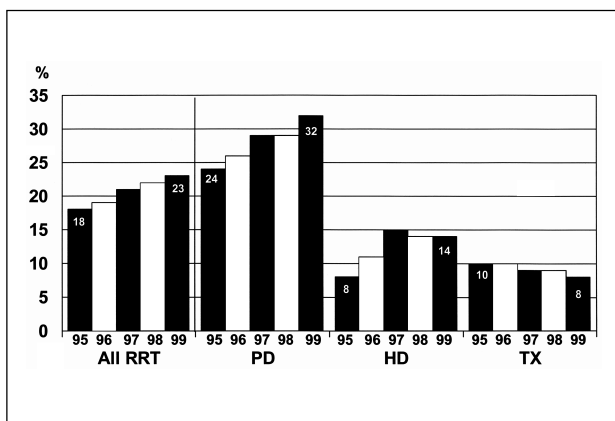


Figure 7. Comorbidity - Diabetes Mellitus (as of 31 March of each year).

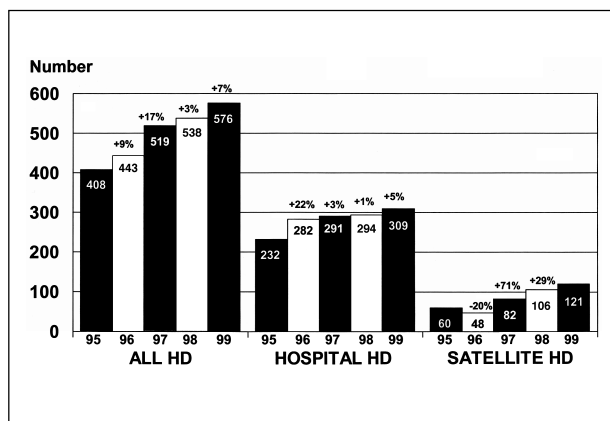


Figure 9. The number of patients on HD (as of 31 March of each year).

diabetics (PD 32%, HD 14%, TX 8%). The growing trend of patients with diabetes was as shown in figure 7.

## RENAL REPLACEMENT THERAPY

### Peritoneal Dialysis

Eighty-one percent of the patients requiring RRT were on PD. Of these 2490 patients (366 pmp) maintained on PD, 2312 (92%) were on continuous ambulatory peritoneal dialysis (CAPD) and 100 (4%) were on night intermittent peritoneal dialysis (NIPD) or continuous cyclic peritoneal dialysis (CCPD). The net increase in the number of patients maintained on PD from previous year was 274 ( $\pm 12\%$ ). The growing trend of the number of patients supported by PD was as shown in figure 8.

Only 13% of the patients on CAPD were on connect systems, 75% were on disconnecting systems and 12% on UV flash systems.

All new patients requiring RRT were commenced on CAPD unless there were contraindications to do so. The

funding of the dialysis fluid was mainly by Hospital Authority (96%). About 1% of the CAPD fluid was supported by charitable funds.

### Hemodialysis

There were 576 patients (85 pmp) on HD, of which 309 (54%) were on hospital based HD, 121 (21%) on satellite center based HD, 54 (9%) on charitable center based HD and 15 (3%) on home HD. The net increase in the number of patients on HD from previous year was 38 ( $\pm 7\%$ ). The growing trend of the number of patients supported by HD was as shown in figure 9.

Majority of the patients commenced on HD were transferred from other modes of therapy, in particular following failure of CAPD treatment.

Hospital based and satellite HD were funded by The Government via the Hospital Authority. Patients were only required to pay a small amount of hospital attendance fee. Patients receiving HD at charitable centers paid for their own HD at a subsidized rate.

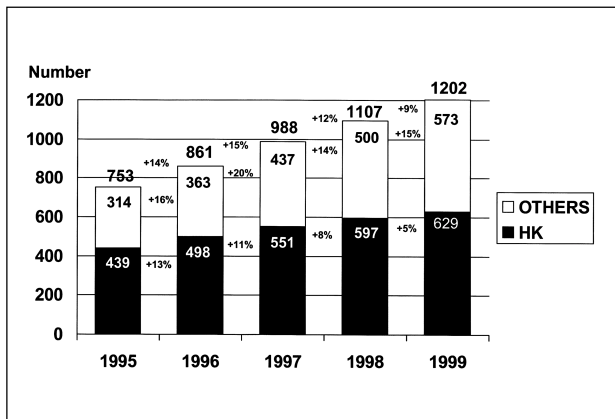


Figure 10. The number of patients with transplants performed in and outside Hong Kong (as of 31 March of each year).

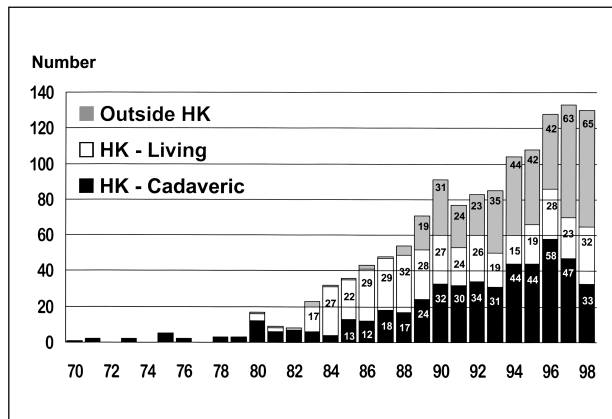


Figure 12. The number of cadaveric and living related transplants performed in Hong Kong and outside Hong Kong (for the year ending 31 December).

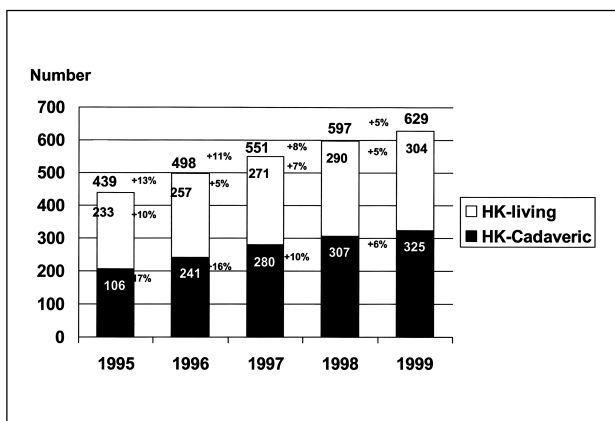


Figure 11. The number of patients with cadaveric and living related transplants performed in Hong Kong (as of 31 March of each year).

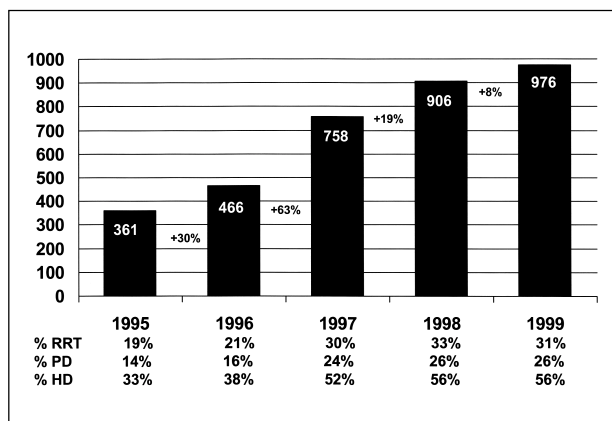


Figure 13. The number of patients treated with erythropoietin (as of 31 March of each year).

Table 2. Cause of death (%) for the 12 months ending 31 March 1999.

	PD	HD	TX	All
Cardiovascular	21	32	16	24
Cerebrovascular	6	8	0	6
Liver failure	1	3	0	1
Infection	25	13	21	22
Malignancy	5	1	16	5
Termination	5	6	0	5
Others	19	17	31	19
Unknown	18	20	16	18
Total number	210	78	19	307
Mortality rate	8%	14%	1.6%	7%

Patients receiving HD at private centers were not included in this report.

### Kidney Transplantation

There were 1202 patients (177 pmp) with a functioning kidney graft, of which 629 (52%) were transplanted in Hong Kong. The others were performed overseas. Of all the kidney transplants performed in Hong Kong, 325

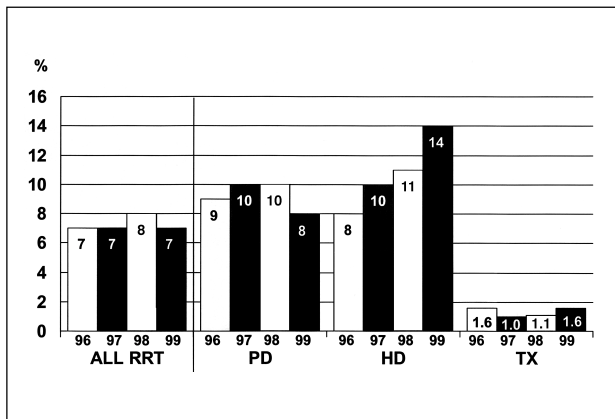
(52%) were cadaveric kidney transplantation and 304 were living related kidney transplantation. The growing trend of the number of patients with transplant was as shown in figures 10 and 11.

For the year ending 31 March 1999, 113 patients (17 pmp) received kidney transplantation. Of these, 58 transplants were performed in Hong Kong (30 were with cadaveric kidneys and 28 with living related kidneys). The other 55 patients received transplants overseas. The number of transplants performed over the past 18 years was as shown in figure 12.

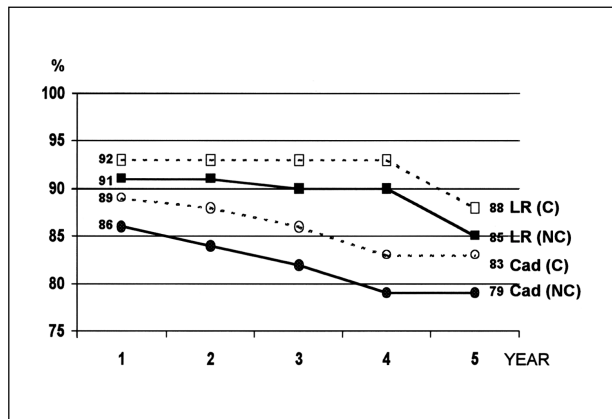
### Erythropoietin

Thirty-one percent of all the patients on RRT (976 patients, 143 pmp) received erythropoietin therapy, an increase of 8% from the previous year. Twenty-six percent of all the patients on PD versus 56% of all the patients on HD were on erythropoietin. The growing trend of the number of patients treated with erythropoietin was as shown in figure 13.

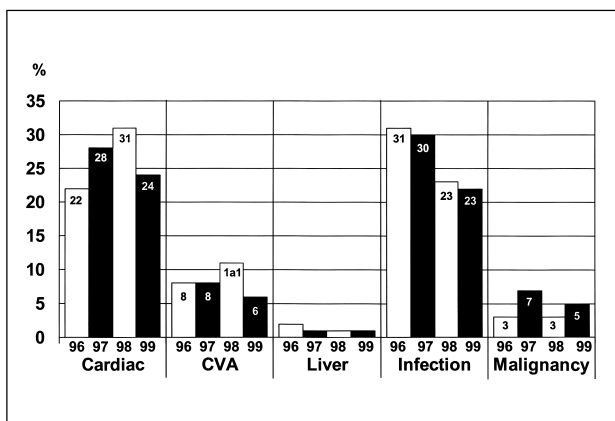




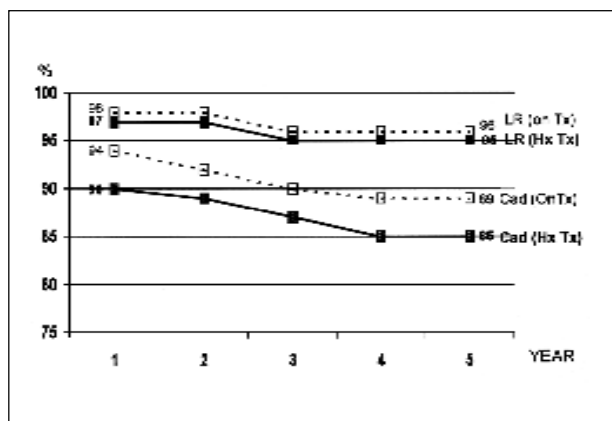
**Figure 14.** The annual crude mortality rate (for the 12 months ending 31 March of each year).



**Figure 16.** One to 5 year graft survivals for transplants performed in Hong Kong between 1 April 1993 and 31 March 1998 (LR = Living related; Cad = Cadaveric; C = Censored; NC = Not censored).



**Figure 15.** The major causes of death for the 12 months ending 31 March of each year.



**Figure 17.** One to 5 year patient survivals for transplants performed in Hong Kong between 1 April 1993 and 31 March 1998 (LR = Living related; Cad = Cadaveric; on TX = While with transplant; Hx TX = With history of transplant).

**Table 3.** Comparison of worldwide renal registry data (Dx = Dialysis).

	HK	SIN	TAI	JAP	AUS	CAN	USA	GER
Year (pmp)	97	97	97	97	97	97	97	96
RRT (pmp)	587	NA	1013	1397	530	690	1131	683
Rate (pmp/yr)	113	158	316	229	79	116	296	153
Tx (pmp)	168	NA	NA	41	252	299	323	161
Rate (pmp/yr)	10	NA	NA	1	28	32	45	42
% of RRT	29	NA	NA	5	47	43	27	23
Dx (pmp)	411	646	NA	1356	278	391	808	522
CAPD%	80	17	NA	5	32	29	12	7

**OUTCOME INDICATORS  
Crude Mortality Rates and Cause of Death**

The mortality rate was defined as the mortality rate of all patients treated during the period of the report. The annual crude mortality rate for year ending 31 March 1999 for all modes of RRT was 7% (8% for PD, 14% for

HD and 1.6% with TX). The trend of mortality rate was as shown in figure 14. The causes and the trend of death were as shown in table 2 and figure 15. The main causes of death were cardiovascular (24%) and infection (22%).

**Transplant Survival Rates**

For living related kidney transplants performed in Hong Kong between 1 April 1993 and 31 March 1998, 1 and 5 year patient survivals were 98% and 96% respectively. One and 5 year graft survivals were 92% and 88% (censored) and 91% and 85% (not censored).

For cadaveric related kidney transplants performed in Hong Kong between 1 April 1993 and 31 March 1998, 1 and 5 year patient survivals were 94% and 89%. One and 5 year graft survivals were 89% and 83% (censored) and 86% and 79% (not censored). These data were as shown in figures 16 and 17.

## Peritonitis Rate

The overall peritonitis rate for all CAPD systems for the 7 months ending 31 March 1999 was one episode per 21 months. The peritonitis rate for different systems was: Baxter spike system had one in 14, Ultraset one in 25, Ultrabag one in 27, UV flash one in 17, UVXD one in 11, Fresenius conventional one in 14 and Stay-safe one in 20.

## COMPARISON OF WORLDWIDE 1997 DATA

The point prevalence rate of 587 pmp for Hong Kong in 1997 was 9% greater than that for Australia, 15% less than that for Canada and most European countries and was only 40% to 60% of that for Japan, USA and Taiwan (Table 3).

The incidence rate of 113 pmp per year for Hong Kong was greater than that for Australia, similar to Canada and was only 35% to 49% of that for Taiwan, USA and Japan.

The percentage of dialysis patients being treated with PD was 81%, which was the highest in the world.

## Acknowledgements

*Participating renal units: Alice Ho Mui Ling Nethersole Hospital, Caritas Medical Centre, Ha Kwai Chung Renal Dialysis Centre, Kwong Wah Hospital, Pamela Youde Nethersole Eastern Hospital, Pamela Youde Polyclinic, Prince of Wales Hospital, Princess Margaret Hospital, Queen Elizabeth Hospital, Queen Mary Hospital, Tuen Mun Hospital, Tung Wah Hospital, United Christian Hospital, Yan Chai Hospital, Yaumatei Specialist Clinic.*

*Transplant coordinators: Ms. Shelley Ho (Queen Mary Hospital), Ms. Angela Wong (Queen Elizabeth Hospital), Ms. Maria Szeto (Queen Elizabeth Hospital), Ms. YF Tong (Prince of Wales Hospital), Ms. Eliza Lau and Ms. Liza Cheung (ex-transplant coordinator).*

*Tissue typing laboratory: Dr. B Hawkins and the staffs of the Tissue Typing Laboratory, Queen Mary Hospital.*

*Implementation team: (Clinicians) Dr. SF Lui, Dr. YW Ho, Dr. KF Chau, Dr. CB Leung, Dr. BY Choy; (Information Technology Division, HAHO) Ms. Freda Chan, Hakmen Wong, Kevin Cheng, Warren Cheung.*

*Steering committee: Dr. MC Chiu, Dr. IKP Cheng, Dr. KO Cheung, Dr. B Hawkins, Dr. WM Ko, Dr. KK Lai, Dr. CS Li, Dr. SF Lui, Dr. KL Tong*