

The Hong Kong Renal Registry: a recent update

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Introduction

The Hong Kong Hospital Authority (HA) provides >90% of renal replacement services for kidney failure with replacement therapy (KFRT) [previously termed end-stage renal failure] patients in Hong Kong.¹ The HA Renal Registry, established in April 1995,¹ is an online computerised registry system developed by the HA Central Renal Committee to capture data regarding all KFRT patients with treatment provided by the HA. Reports of the Renal Registry were published in 1999,² 2013,³ and 2015.¹ This report constitutes an update on the epidemiology of chronic kidney disease in Hong Kong based on data from the Renal Registry up to 31 December 2022.

Incidence of kidney failure with replacement therapy

During 2022, 1471 new patients entered the KFRT programme at an incidence of 197.5 per million population (pmp), an 0.34% increase compared with 2021. Since the establishment of the Renal Registry in 1995, the number of new patients increased by 139%, from 615 per year (95.1 pmp) in 1996 to a peak of 1471 per year (197.5 pmp) in 2022 (Fig 1).

As HA has had peritoneal dialysis (PD)—first policy,⁴ 82.3% (n=1211) of new patients received PD, 17.0% (n=250) received haemodialysis (HD), and 0.7% (n=10) underwent kidney transplantation in 2022. The male-to-female ratio among new patients was 1.8:1. For new patients in the HD and PD groups, the greatest increase was observed among those aged 45 to 64 years, followed by those aged 65 to 74 years. The median age of new KFRT patients in 2022 was 63.4 years, a substantial increase compared with the median age of 51.4 years in 2013.¹ Among new PD patients in 2022, 15.4% were aged >70 years.

Since 1997, diabetes mellitus (DM) has been the most common aetiology leading to kidney failure in Hong Kong (Fig 2). In 2022, the percentage of KFRT cases attributable to DM was 51.5% and among the highest percentages worldwide,⁵ followed by glomerulonephritis (18.7%) and hypertension (11.7%). Over the 26 years from 1996 to 2022, the percentage of KFRT cases attributable to DM increased from 26.2% in 1996 to >50% beginning in 2017. The percentage of KFRT cases attributable to glomerulonephritis steadily decreased from 28.9% in 1996 to 18.7% in 2022. The percentage of other causes remained relatively stable between 2012 and 2022 (Fig 2).

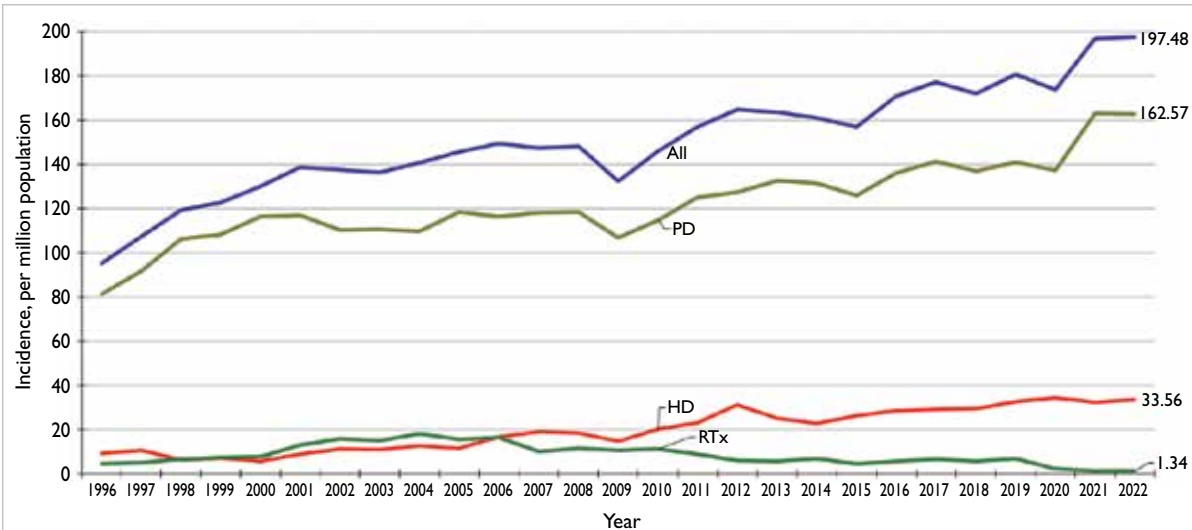


FIG 1. Incidence rates of different modalities of kidney failure with replacement therapy, 1996-2022
Abbreviation: HD = haemodialysis; PD = peritoneal dialysis; RTx = renal transplantation

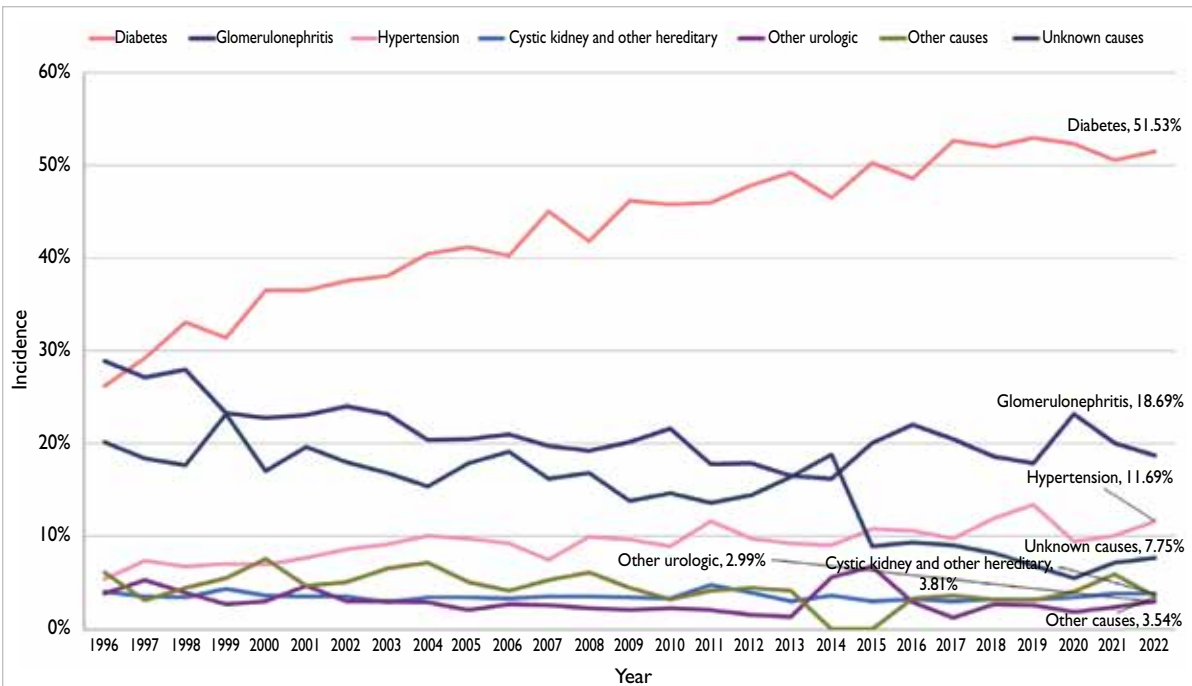


FIG 2. Incidence trends by diagnosis, 1996-2022

Point prevalence of kidney failure with replacement therapy

As of 31 December 2022, there were 11 115 patients registered in the Renal Registry, representing a prevalence of 1492 pmp. Among these patients, 5148 (46.3%) were receiving PD, 2452 (22.1%) were receiving HD, and 3515 (31.6%) had a functioning graft kidney. From 1996 to 2022, the number of

KFRT patients in Hong Kong increased by 236%, despite 49 fewer patients in 2022 causing a decrease in the prevalence by 0.4%. This was likely due to the substantial decrease (4.3%) in the prevalence of patients with a functioning graft kidney, from 493.4 pmp in 2021 to 471.1 pmp in 2022 (online supplementary Fig 1). Between 1996 and 2022, the median patient age increased from 49.1 years to

61.0 years; in 2022, 12.4% of patients were aged >75 years and the male-to-female ratio among all KFRT patients was 1.38:1.

Modes of renal replacement therapy

Peritoneal dialysis

Hong Kong has had a PD-first policy since 1985.⁴ All new patients requiring dialysis therapy receive PD unless they have medical contraindications to such treatment. As of 31 December 2022, there were 5148 patients receiving PD in Hong Kong, representing a prevalence of 691 pmp. These patients constituted 48.2% of all patients receiving renal replacement therapy and 73.2% of all patients receiving dialysis therapy. The number of patients receiving PD was 1.2% higher in 2022 than in 2021. Since establishment of the Renal Registry, the number of patients receiving PD has increased by 176%, from 1865 in 1995 to 5148 in December 2022. Beginning in 2020, the number of patients receiving automated PD therapy also substantially increased. In 2022, 1330 patients received automated PD, constituting 25.8% of all PD patients. The overall peritonitis rate among patients receiving continuous ambulatory PD has greatly improved, from 0.55 episode per patient-year in 1999 to 0.27 episode per patient-year in 2022. Moreover, patients receiving automated PD had a peritonitis rate of 0.23 episode per patient-year, which was better than the rate among patients receiving continuous ambulatory PD.

Haemodialysis

As of 31 December 2022, there were 2452 patients receiving HD in the Renal Registry, representing a prevalence of 329 pmp; this rate constituted a 2.0% increase compared with 2021. Although PD remains the main treatment for KFRT patients in Hong Kong, there has been an increase in the provision of HD services by the HA for patients with PD failure or not suitable to receive PD. As of 31 December 2022, 1866 patients received HD services provided by HA, including 1294 who were receiving in-centre HD in HA facilities; this represented a 249% increase compared with 371 patients in 1996. The proportion of HD among all KFRT treatment modalities also increased from 11% in 1996 to 17.6% in 2022, resulting in the HD-to-PD ratio of 0.37:1. Since the introduction of the nocturnal home dialysis programme in 2006 and New Generation Home HD in 2020, HA home HD services have expanded. In 2022, 220 patients participated in home HD programmes, representing 12% of all HD services provided by the HA.

Kidney transplantation

In 2022, the number of patients with a functioning

graft kidney continued to decline for the fourth consecutive year since 2019. As of 31 December 2022, there were 3515 patients with a functioning graft kidney (3058 deceased donor transplants and 457 living donor transplants), representing a prevalence of 472 pmp; this rate constituted a 4.3% decrease compared with 2021. Among the 3515 transplant recipients, 1198 patients underwent transplantation in Hong Kong; these patients comprised 34.1% of the overall kidney transplant population. The number of patients with a functioning graft kidney increased during 1995 (956 patients) and 2019 (3779 patients); since then, the number has continuously decreased. The overall increase during the analysis period was due to the 364% increase in the number of deceased donor transplant recipients (from 659 in 1996 to 3058 in 2022), whereas the increase in the number of living donor transplant recipients was relatively modest (ranging from 297 in 1996 to 457 in 2022).

In 2022, there were 45 deceased donor (6.2 pmp) and 11 living donor (1.5 pmp) kidney transplant surgeries performed in Hong Kong, among the lowest rates worldwide.⁵ In terms of transplant outcomes, the death-censored graft survival rates for living donor kidney transplant surgeries performed in Hong Kong during 2010 and 2019 were 0.97 at 1 year and 0.94 at 5 years, while that for deceased donor kidney transplant surgeries were 0.97 at 1 year and 0.89 at 5 years.

Mortality

The crude mortality rate among KFRT patients in Hong Kong remained stable at approximately 100 deaths per 1000 patient-years from 2012 to 2021 (online supplementary Fig 2). In 2022, possibly due to the coronavirus disease 2019 pandemic, there was an increase in the crude annual mortality rate to 147.9 deaths per 1000 patient-years. The annual mortality rate increased with increasing age for all KFRT treatment modalities. The highest rate was observed among patients aged ≥ 75 years: >300 deaths per 1000 patient-years for both PD and HD patients. Overall, transplant recipients had better survival than PD or HD patients. Even among patients aged ≥ 75 years, those receiving PD had a relative mortality risk 2.7-fold higher than the risk for transplant recipients.

Infection remained the most common cause of death among KFRT patients (46.0% in 2022), followed by cardiovascular disease (26.2%) and cerebrovascular disease (4.1%) [online supplementary Fig 3]. Malignancy caused 12.4% of all deaths in transplant recipients. Because of improved hepatitis treatment for transplant recipients, liver failure has caused <1% of deaths in recent years.

Discussion

The incidence and prevalence of KFRT have substantially increased since the establishment

of the Renal Registry. Considering these trends, the kidney disease epidemic constitutes a serious burden on the healthcare system in Hong Kong. Diabetes mellitus continues to be a leading cause of KFRT in Hong Kong; this rate is among the top quartile worldwide.⁵ There may be multiple reasons, including the increasing prevalence of young-onset DM^{6,7} and improved survival of DM patients with cardiovascular disease.⁷ In 2020, the Asian Pacific Society of Nephrology published a clinical practice guideline that focused on the management of diabetic kidney disease (DKD) in the Asia-Pacific region.⁸ The Kidney Disease: Improving Global Outcomes group also updated its Guideline for Diabetes Management in Chronic Kidney Disease in 2022.⁹ Based on the collaborative efforts to provide better care for patients with DKD, we hope to see fewer new cases of KFRT attributable to DKD and a decrease in the growth of KFRT incidence in Hong Kong in the coming years.

By the end of 2022, >70% of prevalent KFRT patients received PD. When considered in combination with home HD, around 75% of the dialysis population in Hong Kong is receiving home-based dialysis therapy; this is the highest rate worldwide.⁵ The benefits of this therapy were evident during the coronavirus disease 2019 era.¹⁰ However, home HD patients constituted approximately 3% of all dialysis patients. It may be time to explore the feasibility of modifying the PD-first policy to a home-dialysis-first policy with further expansion of home HD services for suitable patients, allowing patients to maintain greater autonomy and freedom when selecting their dialysis modality; this approach could also serve as a transitional treatment method for patients with PD failure before they begin in-centre HD therapy.

Kidney transplant recipients continue to display the lowest annual mortality rates. However, the number of transplant surgeries in Hong Kong remains low. In 2022, the transplant rate (including both living and deceased donor surgeries) was 7.2 pmp, which ranked in the lowest quartile worldwide.⁵ Furthermore, only around 34% of patients with a functioning graft kidney underwent surgery in Hong Kong; many of the remaining patients chose to undergo surgery elsewhere. Currently, there are >2000 patients on the waiting list for a kidney transplant in Hong Kong. It appears that there are further opportunities for improvement in transplantation services, particularly concerning the promotion of living organ donation activities, the willingness of relatives of potential brain-dead donors to permit organ donation, and further expansion of the donor pool. Considering the implementation of the paired kidney donation programme and ABO-incompatible transplantation programme, we look forward to seeing increases in organ transplantation

activities within Hong Kong that will benefit KFRT patients in the future.

Author contributions

Concept or design: All authors.
Acquisition of data: All authors.
Analysis or interpretation of data: All authors.
Drafting of the manuscript: JYH Chan.
Critical revision of the manuscript for important intellectual content: KM Chow, CC Szeto, SCW Tang, SL Lui.

All authors had full access to the data, contributed to the study, approved the final version for publication, and take responsibility for its accuracy and integrity.

Conflicts of interest

All authors have disclosed no conflicts of interest.

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Supplementary material

The supplementary material was provided by the authors and some information may not have been peer reviewed. Accepted supplementary material will be published as submitted by the authors, without any editing or formatting. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by the Hong Kong Academy of Medicine and the Hong Kong Medical Association. The Hong Kong Academy of Medicine and the Hong Kong Medical Association disclaim all liability and responsibility arising from any reliance placed on the content. To view the file, please visit the journal online (<https://doi.org/10.12809/hkmj2411504>).

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Answers to CME Programme

Hong Kong Medical Journal June 2024 issue

Hong Kong Med J 2024;30:202-8

I. Changes in cardiovascular disease risk predicted by the Framingham risk model in the Hong Kong population between 2003-2005 and 2014-2015: data from Population Health Surveys

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|---|----------|----------|---------|---------|---------|
| A | 1. False | 2. True | 3. True | 4. True | 5. True |
| B | 1. True | 2. False | 3. True | 4. True | 5. True |

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II. Recommendations for eligibility criteria concerning bariatric and metabolic surgical and endoscopic procedures for obese Hong Kong adults 2024: Hong Kong Society for Metabolic and Bariatric Surgery Position Statement

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|---|----------|----------|---------|---------|----------|
| A | 1. False | 2. False | 3. True | 4. True | 5. False |
| B | 1. True | 2. True | 3. True | 4. True | 5. True |