USRDS 2023. SUMMARY

(DOCUMENT 3)

The CME learning objectives are linked next: (**CME LEARNING OBJECTIVES)**

Upon completion of the educational reading, participants should be able to:

- **Identify patient and vascular criteria selection for native vein access**
- **Appreciate the importance of atraumatic surgical technique**
- **Name the three principal types of arteriovenous fistulae**
- **Discuss the time duration for arteriovenous fistula maturation.**
- **Describe the techniques and importance of vascular mapping**
- **Assess a newly placed arteriovenous fistula regarding maturation**
- **Describe the associated pathology and treatment of early fistula failure**
- **Describe late arteriovenous late fistula failure and treatment options**
- **Define excessive blood flow in arteriovenous fistula and its management**
- **Discuss the prevention and the treatment options of aneurysms in AVF**
- **Define a "secondary fistula" implication for vascular access planning**

SECTION 2: METHOD OF PARTICIPATION (if CME will be included)

TARGET AUDIENCE

The activity has been designed to meet the educational needs of vascular surgeons, interventional radiologists, nephrologists, general surgeons and physicians who perform open and or interventional dialysis access procedures in patients in the US and Internationally.

METHOD OF PARTICIPATION

To obtain credit, a score of 70% or better on the post-test is required. Please proceed with the activity until you have reviewed module materials, successfully answered all post-test questions, completed the evaluation, and have received a digital copy of your CME certificate. You must participate in the entire activity to receive credit. If you have questions about this CME activity, please contact Complete Conference Management at cme@CCMCME.com.

ACCREDITATION STATEMENT

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Complete Conference Management is accredited by the ACCME to provide continuing medical education for physicians.

Physician Assistants

NCCPA accepts *AMA PRA Category 1 Credit*™ from organizations accredited by ACCME.

CREDIT DESIGNATION

FACULTY

Ingemar Davidson, MD, PhD, FACS

Dr. Davidson has no relevant financial relationships reported.

Gerald Beathard, MD, PhD

Dr. Beathard has no relevant financial relationships reported.

Nicholas Inston, MD, PhD

Dr. Inston has been an investigator for TVA and Humacyte and an educational consultant for Merit Medical, Gore and SynerMed.

Maurizio Gallieni MD, Editor J Vascular Access

Terry Lichtfield…

SUPPORTING FACULTY

Maurizio Gallieni, MD

Dr. Gallieni has no relevant financial relationships reported.

STAFF / REVIEWERS

COMMERCIAL SUPPORT

CME CREDIT HOURS EARNED: 3 Hour(s)

ADMISTARTIVE FEE

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Complete Conference Management makes every effort to develop CME activities that are scientifically based. This activity is designed for educational purposes. Participants have a responsibility to utilize this information to enhance their professional development to improve patient outcomes. Conclusions drawn by the participants should be derived from careful consideration of all available scientific information. The participant should use his/her clinical judgment, knowledge, experience and diagnostic decision-making before applying any information, whether provided here or by others, for any professional use.

REQUIRED HARDWARE / SOFTWARE

A computer with an internet connection. Internet Browser: Internet Explorer 7.x or higher, Firefox 4.x or higher, Safari 2.x or higher, or any other W3C standards compliant browser. Other additional software may be required such as PowerPoint or Adobe Acrobat Reader.

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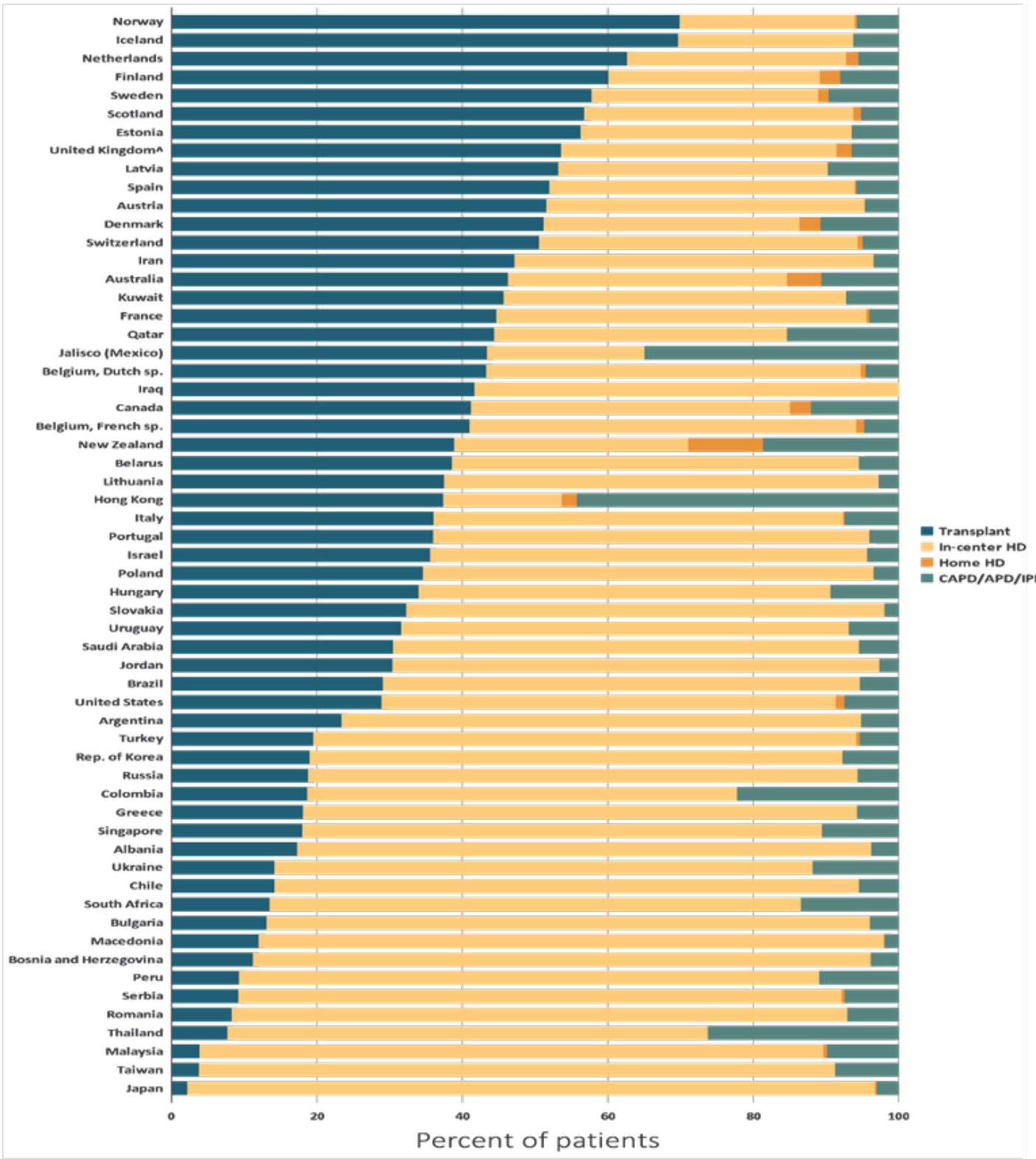
(DOCUMENT 3)

United States Renal Data System. 2024 USRDS Annual Data Report: Epidemiology of kidney disease in the United States. National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, Bethesda, MD, 2024.This is Chapter 11 of the USRDS on the global aspects of ESRDS is attached in the link

International Comparisons


Norway
Iceland
Netherlands
Finland
Sweden
Scotland
Estonia
United Kingdom^
Latvia
Spain
Austria
Denmark
Switzerland
Iran
Australia
Kuwait
France
Qatar
Jalisco (Mexico)
Belgium, Dutch sp.
Iraq
Canada
Belgium, French sp.
New Zealand
Belarus
Lithuania
Hong Kong
Italy
Portugal
Israel
Poland
Hungary
Slovakia
Uruguay
Saudi Arabia
Jordan
Brazil
United States
Argentina
Turkey
Rep. of Korea
Russia
Colombia
Greece
Singapore
Albania
Ukraine
Chile
South Africa
Bulgaria
Macedonia
Bosnia and Herzegovina
Peru
Serbia
Romania
Thailand
Malaysia
Taiwan
Japan
0
20
40
60
80
100
Percent of patients
Transplant
In-center HD
Home HD
CAPD/APD/IPD

What's New

- This year, five new countries or regions contributed data to the Annual Data Report (ADR): Ethiopia, Fiji, Guatemala, and Nigeria contributed regional or national data, and Mexico provided nationwide data on kidney transplant for the first time. The USRDS gratefully acknowledges the efforts of these countries.
- Given growing interest in the use of hemodiafiltration (HDF), we requested contributing countries or regions to report whether HDF was available in their country or region.

- Taiwan had the highest incidence of treated ESRD in 2022, at 536 per million population (pmp) (Figure 11.1). Incidence was very low in South Africa (13 pmp) and Nigeria (11 pmp), which may reflect the availability of treatment for ESRD.
- Eight of the 12 reporting countries or regions with the highest incidence of treated ESRD were in Asia, led by Taiwan (Figure 11.2). Among reporting European countries, the highest incidence was in Greece, at 279 pmp; in South America, the highest incidence was in Brazil, at 251 pmp. In North America, Jalisco in Mexico had the highest incidence, at 443 pmp; for comparison, the United States had the second-highest incidence in North America, at 394 pmp.
- From 2012 to 2022, the incidence of treated ESRD grew by 63% in the Republic of Korea, 46% in Brazil, and 45% in Uruguay (Figure 11.3a). In the United States, for comparison, the incidence increased by 9%.
- Indonesia (20.1 pmp), Jalisco, Mexico (17.3 pmp), and the Republic of Korea (15.7 pmp) had the largest average yearly increase in the incidence of treated ESRD between 2012 and 2022 (Figure 11.3b). The annual incidence of treated ESRD decreased in 17 countries or regions, most notably in Thailand (-5.8 pmp), Serbia (-6.7 pmp), and Hungary (-11.1 pmp).
- There was substantial variation in the percentage of incident cases of treated ESRD attributed to diabetes globally in 2022 (Figure 11.4a). In Brunei Darussalam, nearly three-quarters (73.5%) of all incident cases of treated ESRD were attributed to diabetes; in Qatar (64.8%) and Singapore (64.7%), nearly two-thirds were. In Mainland China (14.9%), Aguascalientes in Mexico (13.8%), Italy (13.2%), Nigeria (12.6%), South Africa (12.0%), and Romania (10.9%), <15% of cases were attributed to diabetes.
- The incidence of treated ESRD was highest among individuals aged 65-74 years in most, but not all, countries, particularly in Europe (Figure 11.7).
- Fifty-four percent of countries or regions reported that hemodiafiltration was available for maintenance dialysis in their country or region and 28% reported that it was not; 18% did not respond to the question (Figure 11.9). HDF was available in North and South America, Europe, Asia, and Australia (Figure 11.10).
- The prevalence of treated ESRD varied by over 30-fold across reporting countries or regions (Figure 11.11). Countries or regions with the highest prevalence of treated ESRD in 2022 were Taiwan (3806 pmp), Japan (2753 pmp), the Republic of Korea (2608 pmp), Singapore (2575 pmp), and the United

States (2437 pmp). Countries or regions where the prevalence was <500 pmp were Montenegro (494 pmp), Ethiopia (415 pmp), Fiji (240 pmp), South Africa (151 pmp), Bangladesh (111 pmp), and Guatemala (111 pmp).

- Indonesia had the largest increase in the prevalence of treated ESRD between 2012 and 2022, during which the prevalence increased from 51 pmp to 607 pmp (or by roughly 12-fold) (Figure 11.14a). In the Republic of Korea, the prevalence of ESRD nearly doubled. The prevalence increased by at least 50% in Romania (65%), Thailand (56%), Malaysia (53%), and Brazil (50%). By comparison, the prevalence increased by 23% in the United States during this period.
- In 11 countries or regions, more than half of prevalent patients with ESRD were treated with a kidney transplant, led by the Czech Republic (73%), Iceland (72%), Norway (67%), and the Netherlands (66%) (Figure 11.15). Countries or regions in which <5% of prevalent patients with ESRD were treated with a transplant were Ethiopia (4%), Malaysia (4%), Montenegro (3%), Japan (3%), and Guatemala (1%).
- Worldwide, HD was the predominant treatment modality for ESRD. PD was used relatively infrequently; the leader was Hong Kong, where 46% of individuals were treated with PD (Figure 11.15). Other countries or regions where the penetration of PD was >10% were Colombia (22%), Guatemala (20%), Aguascalientes in Mexico (20%), Thailand (15%), New Zealand (14%), Brunei Darussalam (14%), Malaysia (12%), Canada (11%), and Singapore (11%).
- The prevalence of dialysis among the general population in 2022 was highest, by far, in Taiwan (3552 pmp) (Figure 11.16). Other countries or regions where the dialysis prevalence exceeded 1500 pmp were Japan (2683 pmp), Singapore (2180 pmp), Republic of Korea (2178 pmp), Brunei Darussalam (1944 pmp), the United States (1654 pmp), and Malaysia (1568 pmp).
- Indonesia had the largest increase in the prevalence of dialysis between 2012 and 2022: the prevalence in 2022 was 13 times that in 2012 (Figure 11.17a). In the Republic of Korea, the prevalence of dialysis dependence doubled.
- One-quarter or more of individuals receiving dialysis used a home dialysis modality only in Hong Kong (68% PD, 3% home HD), New Zealand (24% PD, 12% home HD), Jalisco, Mexico (36% PD, no home HD), Aguascalientes, Mexico (31% PD, no home HD), Colombia (28% PD, no home HD), Denmark (20% PD, 7% home HD), and Sweden (23% PD, 3% home HD) (Figure 11.18).
- The Netherlands (155 per thousand), Norway (126 per thousand), and Sweden (110 per thousand) had the highest incidence of kidney transplant in 2022 among individuals receiving dialysis (Figure 11.19b). Areas where the incidence was ≤5 per thousand were Japan (5 per thousand), Malaysia, Taiwan, and Serbia (all 4 per thousand), Ethiopia (3 per thousand), and Guatemala (1 per thousand).
- Bangladesh had the largest increase in the incidence of kidney transplant between 2012 and 2022, during which time incidence increased by 220% (Figure 11.20a). The incidence increased by 167% in Israel, 131% in Kuwait, and 81% in Malaysia.
- There was substantial geographic variation in use of deceased, as opposed to living, donor kidneys for transplant (Figure 11.21). In Uruguay (96.7%), Lithuania (93.9%), the Czech Republic (92.9%), Poland (91.5%), and the French-speaking

part of Belgium (90.8%), more than 90% of kidney transplants were from deceased donors.

- Living donor kidneys made up at least 75% of all transplanted kidneys in Montenegro (75.0%), Malaysia (79.7%), Brunei Darussalam (80.0%, Aguascalientes (88.0%) and Jalisco (88.6%) in Mexico, Serbia (88.9%), Japan (89.0%), and Turkey (92.2%); all kidneys were from living donors in Ethiopia, Guatemala, and Bangladesh, (Figure 11.21).
- Countries or regions with the highest prevalence of individuals with a functioning kidney transplant in 2022 were Aguascalientes in Mexico (855 pmp), the United States (783 pmp), and Portugal (719 pmp) (Figure 11.23). Countries or regions where the prevalence was <100 pmp were Japan (70 pmp), Malaysia (58 pmp), South Africa (28 pmp), Montenegro (16 pmp), Ethiopia (16 pmp), Bangladesh (9 pmp), and Guatemala (6 pmp).

INTRODUCTION.

The focus of this chapter is on international comparisons of the incidence and prevalence of treated ESRD and use of kidney replacement therapy (KRT). This year, a record 57 countries or regions contributed data to this chapter.

We first report incidence of treated ESRD by country or region in 2022 and the change in treated ESRD incidence globally in the decade between 2012 and 2022. We next show rates of ESRD attributed to diabetes worldwide, followed by figures showing the incidence of treated ESRD by age and sex in countries or regions in which this data is available.

We then move to the prevalence of ESRD. In a fashion analogous to ESRD incidence, we show the prevalence of treated ESRD by country or region in 2022 as well as the change in prevalence of treated ESRD between 2012 and 2022. The prevalence of treated ESRD by age and sex across countries or regions is shown next.

The prevalence of dialysis worldwide and its change over time are then reported, followed by displays of the distribution of KRT modalities used worldwide. Global rates and trends in kidney transplantation follow.

This year, given growing interest in the potential benefits of hemodiafiltration (HDF, as opposed to “conventional” hemodialysis, or HD), we requested that contributing countries or regions respond to the question, “To your knowledge, is hemodiafiltration used anywhere in your country or region for the care of patients receiving maintenance dialysis?”. The results are shown in Figure 11.9.

Methods

The findings in this chapter are based on analyses of data generously collected and supplied by individuals in each participating country or region. Each entrant completes a standardized collection form; for trends over time, the ADR also uses data supplied by contributors in past years. Extensive efforts are made by the USRDS to contact individuals or authorities across the world who may have access to relevant data, and we welcome new contributors each year. Individuals who have access to data in their country or region are requested to reach out to the USRDS at usrds@niddk.nih.gov so that their data may be included in future ADRs.

Because methods of data collection vary considerably by country or region, readers should exercise caution when making direct comparisons across countries or regions. First, data collection can improve over time in countries or regions, especially for incidence of treated ESRD. Second, in the United States and some other countries or regions, regulatory and reimbursement frameworks make nearly complete acquisition of data on treated ESRD possible; however, this is not the case in many other countries or regions because regulatory and reimbursement frameworks differ considerably. Third, the COVID-19 pandemic altered the process and completeness of data collection in many areas, and its effects on data collection linger to this day in some countries or regions.

Note that in the United States and most other countries or regions, information is available only for *treated* ESRD; many individuals with ESRD do not undergo treatment (maintenance dialysis or kidney transplantation, collectively known as kidney replacement therapy or KRT). This could be because conservative care is deliberately selected or because KRT is not available. In addition to variation in their ability to provide access to dialysis or kidney transplant for ESRD, countries and regions vary in geographic, economic, cultural, historical, religious, and other ways that doubtless affect the treatment of kidney disease, particularly ESRD.

There are several important methodological issues that should be noted. First, data presented in this chapter are not adjusted or standardized in any way; age, sex, and race/ethnicity mixtures differ widely among countries or regions. As such, this chapter is designed to provide only broad descriptive data about the landscape of treated ESRD around the world. Second, for Figure 11.1, a map representing ESRD incidence worldwide, ESRD incidence for Aguascalientes and Jalisco, two Federal Entities (“states”) in Mexico, are combined in a weighted average and are shown, for convenience, as representative of Mexico. Although ESRD incidence and prevalence data for Mexico was not available, Mexico was able to provide data on kidney transplant.

Data tables for the content presented in this chapter can be found in Reference Table N. A complete explanation of the analytical methods used to generate the study cohorts and figures in this chapter can be found in the Chapter 11 section of the ESRD Analytical Methods.

Data collection for this chapter is possible only through major efforts by individuals in the many participating countries and regions who contribute to the USRDS mission of understanding the epidemiology of kidney disease. In many, and perhaps most, cases these individuals contribute data without direct financial support to do so. The USRDS gratefully acknowledges their contributions and welcomes additional data from other contributors so that the USRDS can continually improve its kidney disease surveillance efforts worldwide. Full acknowledgments, as best the USRDS can determine them, are listed at the end of the chapter; any corrections from contributors are welcome and will be incorporated into future ADRs.

in incidence of treated ESRD per million population, by country or region, 2022

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Data source: USRDS ESRD database and internationally supplied data. Data presented only for countries or regions from which relevant information was available. The incidence is unadjusted. Data for Mexico includes Aguascalientes and Jalisco only. Data for Belgium includes both Dutch-speaking and French-speaking. Data for United Kingdom includes England, Wales, Northern Ireland, and Scotland. Data for Ethiopia includes the following 3 regions: Addis Ababa, Gondar, and Mekele. NOTE: Data collection methods vary across countries and regions, requiring caution in making direct comparisons.

Figure 11.1 displays the incidence of treated ESRD in 2022 for countries or regions that provided data to the USRDS. Taiwan, at 536 per million population (pmp), had the highest incidence, followed by the weighted average of Jalisco and Aguascalientes in Mexico, at 430 pmp (shown, for convenience, as Mexico as a whole). For comparison, the United States was fourth, at 394 pmp. The incidence of treated ESRD was notably high in Asia: countries or regions that had an incidence of ≥250 pmp were Brunei Darussalam (424 pmp), Singapore (375 pmp), Republic of Korea (360 pmp), Japan (295 pmp), Malaysia (293 pmp), Greece (279 pmp), Thailand (270 pmp), Indonesia (266 pmp), and Brazil (251 pmp). Areas with an ESRD incidence <100 pmp in 2022 were Iceland (86 pmp), Estonia (83 pmp), Lithuania (81 pmp), Montenegro (79 pmp), Colombia (75 pmp), Serbia (74 pmp), Bangladesh (63 pmp), Ethiopia (45 pmp), South Africa (13 pmp), and Nigeria (11 pmp).

Figure 11.2

Incidence of treated ESRD, by country or region, 2022

Taiwan had the world's highest incidence of treated ESRD in 2022, at 536 pmp (Figure 11.2). Eight of the 12 reporting countries or regions with the highest incidence were in Asia. Among reporting European countries, the highest incidence was in Greece, at 279 pmp; among reporting South American countries, the highest incidence was in Brazil, at 251 pmp. In North America, Jalisco, Mexico, had the highest incidence, at 443 pmp; for comparison, the United States had the second-highest incidence, at 394 pmp. Three

African countries reported data this year: Ethiopia (specifically, the regions of Addis Ababa, Gondar, and Mekele) at 45 pmp, South Africa at 13 pmp, and Nigeria at 11 pmp. Particularly low rates in some countries or regions are likely a reflection of limited availability of treatment for ESRD.

Year ESRD incidence (per million population)2012201320142015201620172018201920202021202201002003004005000

Data source: USRDS ESRD database and internationally supplied data. Data presented only for countries or regions from which relevant information was available. The incidence is unadjusted. Shown are the ten countries or regions having the highest percentage increase in 2021/22 versus that in 2012/13, plus the U.S. NOTE: Data collection

Figure 11.3a shows the countries or regions with the highest percentage increase in the incidence of treated ESRD between 2012 and 2022. In 2022 relative to 2012, the incidence of treated ESRD grew by 63% in the Republic of Korea, 46% in Brazil, 45% in Uruguay, approximately 30-40% in Bangladesh, Iceland, Indonesia, Greece, and Singapore, and about 28% in Malaysia and Qatar. In the United States, which is included for purposes of comparison, incidence increased by 9%.

Data source: USRDS ESRD database and internationally supplied data. Data presented only for countries or regions from which relevant information was available. NOTE: Data collection methods vary across countries and regions, requiring caution in making direct comparisons.

Indonesia (20.1 pmp), Jalisco, Mexico (17.3 pmp), and the Republic of Korea (15.7 pmp) had the largest average yearly increase in the incidence of treated ESRD between 2012 and 2022 (Figure 11.3b). Taiwan, with the highest overall incidence of ESRD in 2022 (536 pmp; Figure 11.2), had an average yearly increase of 9.6 pmp. Other countries or regions with an increase >5 pmp per year were Singapore (9.1 pmp), Greece (7.4 pmp), Brazil (7.1 pmp), Malaysia (6.2 pmp), and Uruguay (5.1 pmp). For comparison, the United States was 10th, at 4.0 pmp. The annual incidence of treated ESRD decreased in 17 countries or regions, most notably in Thailand (-5.8 pmp), Serbia (-6.7 pmp), and Hungary (-11.1 pmp).

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There was substantial variation in the percentage of incident cases of treated ESRD attributed to diabetes globally in 2022 (Figure 11.4a). In Brunei Darussalam, nearly three-quarters (73.5%) of all incident cases of treated ESRD were attributed to diabetes; in Qatar (64.8%) and Singapore (64.7%), nearly two-thirds were. Other countries or regions where more than half of cases of incident treated ESRD were attributed to diabetes were Fiji (60.7%), Malaysia (52.0%), Hong Kong (51.5%), and New Zealand (50.1%). Countries or regions where <20% of incident cases were attributed to diabetes were the Netherlands (19.5%), Serbia (19.4%), the French-speaking region of Belgium (19.3%), Estonia (17.9%), Norway (16.8%), Lithuania (16.3%), Mainland China (14.9%), Aguascalientes in Mexico (13.8%), Italy (13.2%), Nigeria (12.6%), South Africa (12.0%), and Romania (10.9%).

AfricaNigeria02550751001251501752002252502753003253…
Data source: USRDS ESRD database and internationally supplied data. Data presented only for countries or regions from which relevant information was available. NOTE: Data collection methods vary across countries and regions, requiring caution in making direct comparisons.

Brunei Darussalam (312 pmp), Taiwan (247 pmp), and Singapore (242 pmp) had the highest incidence of treated ESRD attributed to diabetes in 2022, followed some ways behind by the Republic of Korea (172 pmp), the United States (170 pmp), and Malaysia (152 pmp) (Figure 11.4b). Countries or regions with incidence ≤20 pmp were Mainland China (19 pmp), Iceland (18 pmp), Norway (17 pmp), Estonia (15 pmp), Ethiopia (specifically the Addis Ababa, Gondar, and Mekele metropolitan areas, 15 pmp), Serbia (14 pmp), Lithuania (13 pmp), Italy (10 pmp), South Africa (2 pmp), and Nigeria (1 pmp).

The largest average yearly increases in the incidence of treated ESRD attributed to diabetes between 2012 and 2022 occurred in Indonesia (8.2 pmp), the Republic of Korea (7.3 pmp), Singapore (6.4 pmp), Qatar (6.3 pmp), and Taiwan (5.4 pmp) (Figure 11.5). The United States, for comparison, ranked eleventh, at 1.8 pmp. The incidence of treated ESRD attributed to diabetes decreased in 16 countries, but the decrease was <1 pmp in 13 of them; incidence decreased most in Thailand (-1.7 pmp) and Serbia (-1.9 pmp).

Asia
Europe
The Americas
Percent change in ESRD incidence due to diabetes from 2012/13 to 2021/22Percent change in ESRD incidence from2012/13 to 2021/22AsiaIndonesiaIndonesiaQatar QatarRepublic of KoreaRepublic of KoreaSingaporeSingaporeHong KongHong KongTaiwanTaiwanThailandThailandMalaysiaMalaysiaJapanJapan-2502550751001251501752002 25-50050100150
Data source: USRDS ESRD database and internationally supplied data. Data presented only for countries or regions from which relevant information was available. Reference line (in red) represents 1:1 ratio of percentage change in ESRD incidence to the percentage change in ESRD incidence due to diabetes from 2012/13-2021/22. NOTE: Data collection methods vary across countries and regions, requiring caution in making direct comparisons.

Reference Line (1:1 ratio)
The correlation between the percentage change in the incidence of treated ESRD and the percentage change of ESRD attributed to diabetes appears to be higher in Asia and the Americas relative to Europe (Figure 11.6). This suggests that diabetes drove the growth of incident (treated) ESRD more strongly in Asia and the Americas than in Europe.

Data source: USRDS ESRD database and internationally supplied data. Data presented only for countries or regions from which relevant information was available. NOTE: Data collection methods vary across countries and regions, requiring caution in making direct comparisons.

The incidence of treated ESRD by age group in 2022 is shown in Figure 11.7. In most, although not all, countries in Europe, the highest incidence of treated ESRD occurred among individuals aged ≥75 years. The pattern was more variable in other regions. In Asia, for example, ESRD incidence was highest in the oldest age group in Taiwan, Japan, Turkey, Singapore and, by a small margin, Mainland China; in contrast, in Hong Kong and, particularly, Malaysia, growth was highest among individuals aged 65-74 years. In North America, incidence was highest among the oldest age group in the United States and Canada, but in Guatemala and Aguascalientes, Mexico, it was highest among individuals aged 65-74 years. Patterns varied by country in South America and Oceania.

The incidence of treated ESRD was higher in men than in women in every reporting country or region (Figure 11.8). Note that in some countries or regions, the ratio of treated men to treated women was >2:1; in Japan, the ratio was nearly 2.5:1 and in Iceland it was 3:1.

Given growing interest in the potential benefits of HDF, this year, we requested contributing countries or regions to respond to whether HDF was available as a maintenance dialysis modality in their country or region (Figure 11.9). Fifty-four percent of countries or regions reported that HDF was available in their country or region and 28% reported that it was not; 18% did not provide an answer.

Countries or regions in which HDF is available are shown in Figure 11.10. HDF was reported as being available in North and South America, Europe, Asia, and Australia and New Zealand.

Figure 11.11

Prevalence of treated ESRD, by country or region, 2022

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The prevalence of treated ESRD varied by over 30-fold across reporting countries or regions (Figure 11.11). Countries or regions with the highest prevalence of treated

ESRD in 2022 were Taiwan (3806 pmp), Japan (2753 pmp), the Republic of Korea (2608 pmp), Singapore (2575 pmp), the United States (2437 pmp), Aguascalientes in Mexico (2328 pmp), Brunei Darussalam (2054 pmp), and Portugal (2049 pmp). Thus, 5 of the 8 countries or regions where the prevalence exceeded 2000 pmp were in Asia. Countries or regions where the prevalence was <500 pmp were Montenegro (494 pmp), Ethiopia (415 pmp for the Addis Ababa, Gondar, and Mekele metropolitan areas), Fiji (240 pmp), South Africa (151 pmp), Bangladesh (111 pmp), and Guatemala (111 pmp).

The prevalence of treated ESRD in 2022 was generally higher among individuals aged 65-74 and ≥75 years than among individuals aged 45-64 and, especially, 20-44 years (Figure 11.12).

Prevalence of treated ESRD was higher in men than in women in virtually all reporting countries or regions (Figure 11.13). In Guatemala, the prevalence in men as about 2.5% lower than in women. The ratio of prevalence in men to women exceeded 2 in Japan and Greece.

Year ESRD prevalence (per million population)2012201320142015201620172018201920202021202201000200030000

Data source: USRDS ESRD database and internationally supplied data. Data presented only for countries or regions from which relevant information were available. Ten countries having the highest percentage increase in 2021/22 versus that in 2012/13, plus the U.S. NOTE: Data collection methods vary across countries and regions, requiring caution in making direct comparisons.

Indonesia had the largest increase in the prevalence of treated ESRD between 2012 and 2022, during which the prevalence increased from 51 pmp to 607 pmp, or by roughly 12-fold (Figure 11.14a). (Note that 2012 data was not available for Estonia, so 2013 was used as the baseline year; the Analytical Methods describes the approach used to include or exclude countries or regions from consideration for this analysis.)

In the Republic of Korea, the prevalence of ESRD nearly doubled between 2012 to 2022. The prevalence increased by at least 50% in Romania (65%), Thailand (56%), Malaysia (53%), and Brazil (50%). By comparison, the prevalence increased by 23% in the United States during this period.

Data source: USRDS ESRD database and internationally supplied data. Data presented only for countries or regions from which relevant information were available. Estimates derived from linear regression. NOTE: Data collection methods vary across countries and regions, requiring caution in making direct comparisons.

The five countries or regions with the largest average yearly increase in the prevalence of treated ESRD between 2012 and 2022 were in Asia: the Republic of Korea (123 pmp), Singapore (88 pmp), Taiwan (84 pmp), Indonesia (74 pmp), and Malaysia (57 pmp); the United States ranked sixth (50 pmp) (Figure 11.14b). In contrast, a decrease of -5 pmp was reported in Bosnia and Herzegovina as well as in Austria.

KoreaSingaporeSerbiaRomania*Bangladesh*Thailand*Taiwan*Brunei DarussalamEthiopiaMalaysiaMontenegro*JapanGuatemala0102030405060708090100

Data source: USRDS ESRD database and internationally supplied data. Data presented only for countries or regions from which relevant information was available. Denominator is calculated as the sum of patients receiving HD, PD, home HD, or treated with a functioning transplant; does not include patients with other/unknown modality. NOTE: Data collection methods vary across countries and regions, requiring caution in making direct comparisons. *No data supplied for home hemodialysis or CAPD/APD/IPD; percentage presumed to be 0 to permit inclusion of the country or

or regions, more than half of prevalent patients with ESRD were treated with a kidney transplant: the Czech Republic (73%), Iceland (72%), Norway (67%), the Netherlands (66%), Estonia (62%), Sweden (60%), Scotland (60%), England/Wales/Northern Ireland (56%), Denmark (56%), Switzerland (56%), and Ireland (52%) (Figure 11.15). Countries or regions in which <5% of prevalent patients with ESRD were treated with a transplant were Ethiopia (4%), Malaysia (4%), Montenegro (3%), Japan (3%), and Guatemala (1%).

Worldwide, HD was the predominant treatment modality for ESRD. PD was used relatively infrequently; Hong Kong, where 46% of individuals with ESRD were treated with PD, stands out. Other countries or regions where the penetration of PD was >10% were Colombia (22%), Guatemala (20%), Aguascalientes in Mexico (20%), Thailand (15%), New Zealand (14%), Brunei Darussalam (14%), Malaysia (12%), Canada (11%), and Singapore (11%). Countries or regions where <3% of patients with ESRD were treated with PD were Japan, Brazil, Lithuania, Poland, and Bangladesh; no use of PD was reported in Ethiopia or Montenegro. In New Zealand, 7% of patients were treated with home HD; in no other country or region was the total more than 4%.

Data source: USRDS ESRD database and internationally supplied data. Data presented only for countries or regions from which relevant information was available. NOTE: Data collection methods vary across countries and regions, requiring caution in making direct comparisons.

The prevalence of dialysis among the general population in 2022 was highest, by far, in Taiwan (3552 pmp) (Figure 11.16). Other contributing countries or regions where the dialysis prevalence exceeded 1500 pmp were Japan (2683 pmp), Singapore (2180 pmp), Republic of Korea (2178 pmp), Brunei Darussalam (1944 pmp), the United States (1654 pmp), and Malaysia (1568 pmp). Thus, six of the seven countries or regions in which the prevalence of dialysis exceeded 1500 pmp in the general population in 2022 were in Asia. The prevalence was ≤300 pmp in Fiji (240 pmp), Iceland (230 pmp), South Africa (123 pmp), Bangladesh (108 pmp), Guatemala (105 pmp), and Nigeria (20 pmp).

Indonesia had the largest increase in the prevalence of dialysis between 2012 and 2022: the prevalence in 2022 was 13 times that in 2012 (Figure 11.17a). In the Republic of Korea, the prevalence of dialysis dependence doubled. Prevalence increases of at least 50% were also reported in Romania (63%), Thailand (60%), Singapore (59%), Malaysia (57%), and Brazil (53%). During this period, the prevalence of dialysis increased in the United States by 17%.

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All countries or regions in which the average increase in dialysis prevalence between 2012 and 2022 exceeded 50 pmp were in Asia: the Republic of Korea (106 pmp), Singapore (85 pmp), Indonesia (75 pmp), Taiwan (63 pmp), and Malaysia (58 pmp) (Figure 11.17b). The average yearly increase in the United States, for comparison, was 27 pmp. There were 14 countries or regions in which there was a decrease, but only three in which the decrease was at least 5 pmp: Jalisco, Mexico (-5 pmp), the Czech Republic (-6 pmp), and Bosnia and Herzegovina (-13 pmp).

Data source: USRDS ESRD database and internationally supplied data. Data presented only for countries or regions from which relevant information was available. Denominator was calculated as the sum of patients receiving HD, PD, home HD; does not include patients with other/unknown modality. NOTE: Data collection methods vary across countries and regions, requiring caution in making direct comparisons. *No data supplied for home hemodialysis; percentage presumed to be 0 to permit inclusion of the country or region in the figure.

Only in Hong Kong (68% PD, 3% home HD), New Zealand (24% PD, 12% home HD), Jalisco, Mexico (36% PD, no home HD), Aguascalientes, Mexico (31% PD, no home HD), Colombia (28% PD, no home HD), Denmark (20% PD, 7% home HD), and Sweden (23% PD, 3% home HD) did one-quarter or more of individuals receiving dialysis use a home dialysis modality (Figure 11.18). Areas where ≤5% of patients received a home-based therapy were the Republic of Korea, Greece, Lithuania, and Romania (all approximately 5% PD; no home HD); Poland, Brazil, and Bosnia and Herzegovina (all approximately 4% PD; no home HD); Japan (3%, PD, 0.2% home HD); Bangladesh (1% PD, no home HD); and Ethiopia, Fiji, and Montenegro (each with no reported use of either PD or home HD).

19a

The incidence of kidney transplant in the general population varied by three orders of magnitude among countries or regions in 2022 (Figure 11.19a). The incidence of kidney transplant was highest in the United States (79 pmp), followed by Spain (72 pmp) and by Jalisco (67 pmp) and Aguascalientes (55 pmp) in Mexico. Other countries or regions where the incidence exceeded 50 pmp were the Netherlands (54 pmp), Israel (52 pmp), and the Czech Republic (52 pmp). Most of the reporting European countries had

incidences of 30-50 pmp. Areas where the incidence was <10 pmp were Hong Kong (8 pmp), Malaysia (7 pmp), Montenegro (7 pmp), Bosnia and Herzegovina (4 pmp), Serbia (3 pmp), Bangladesh (2 pmp), Ethiopia (1 pmp for Addis Ababa, Gondar, and Mekele metropolitan areas), and Guatemala (only 0.1 pmp).

Data source: USRDS ESRD database and internationally supplied data. Data presented only for countries or regions from which relevant information was available. NOTE: Data collection methods vary across countries and regions, requiring caution in making direct comparisons.

The Netherlands (155 per thousand), Norway (126 per thousand), Sweden (110 per thousand), Scotland (107 per thousand), Jalisco, Mexico (102 per thousand), and England/Wales/Northern Ireland (101 per thousand) had the highest incidence of kidney transplant in 2022 among individuals receiving dialysis (Figure 11.19b). Areas where the incidence was ≤10 per thousand were Romania (9 per thousand), Singapore and Thailand (both 8 per thousand), Bosnia and Herzegovina and Hong Kong (both 7 per thousand), Brunei Darussalam (6 per thousand), Japan (5 per thousand), Malaysia, Taiwan, and Serbia (all 4 per thousand), Ethiopia (3 per thousand), and Guatemala (1 per thousand).

Incidence of kidney transplantation in countries or regions with the largest percentage increase in transplantation between 2012 and 2022

Year Transplantation (per million population)2012201320142015201620172018201920202021202201002550 75

Data source: USRDS ESRD database and internationally supplied data. Ten countries or regions having the highest percentage increase in kidney transplantation: 2021/22 versus that in 2012/13, plus the U.S. NOTE: Data collection methods vary across countries and regions, requiring caution in making direct comparisons.

Republic of Korea

Bangladesh had the largest relative increase in the incidence of kidney transplant between 2012 and 2022; incidence increased by 220% over the period (Figure 11.20a). Incidence increased by 167% in Israel, 131% in Kuwait, and 81% in Malaysia. For comparison, the increase in the United States over this period was 42%.

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The countries or regions in which the average yearly increase in the incidence of kidney transplant from 2012 to 2022 was ≥1.0 pmp were Israel (2.7 pmp), the United States (2.6 pmp), Finland (1.4 pmp), Spain (1.3 pmp), New Zealand (1.2 pmp), and Kuwait (1.1 pmp) (Figure 11.20b). The incidence of kidney transplant decreased in 21 countries or

regions over this period, most notably in Serbia, the Dutch-speaking part of Belgium, and Poland (all approximately -1.1 pmp), Norway (-1.5 pmp), and Austria (-2.0 pmp).

. Denominator is calculated as the sum of deceased, living donor, and unknown transplants. NOTE: Data collection methods vary across countries and regions, requiring caution in making direct comparisons. *No data supplied for unknown donor type; percentage presumed to be 0 to permit inclusion of

There was substantial geographic variation in use of deceased, as opposed to living donor, kidneys for transplant (Figure 11.21). In Uruguay (96.7%), Lithuania (93.9%), the Czech Republic (92.9%), Poland (91.5%), and the French-speaking part of Belgium (90.8%), more than 90% of kidney transplants were from deceased donors. (For comparison, in the United States, it was 77.8%.) In contrast, living donor kidneys made up at least 75% of all transplanted kidneys in Montenegro (75.0%), Malaysia (79.7%), Brunei Darussalam (80.0%, although 20.0% of kidneys were of an unknown or unrecorded origin), Aguascalientes (88.0%) and Jalisco (88.6%) in Mexico, Serbia (88.9%), Japan (89.0%), and Turkey (92.2%); in Ethiopia, Guatemala, and Bangladesh, all kidneys were from living donors. (Note that countries or regions with an asterisk did not supply data for unknown donor type; because the percentage of unknown donors was likely to be very small, it was presumed to be 0 to permit inclusion of the country or region in the figure.)

AfricaMontenegroEthiopiaBangladeshGuatemala0100200300400500600700800900
Data source: USRDS ESRD database and internationally supplied data. Data presented only for countries or regions from which relevant information was available. The prevalence is unadjusted. NOTE: Data collection methods vary across countries and regions, requiring caution in making direct comparisons.

Countries or regions with the highest prevalence of individuals with a functioning kidney transplant in 2022 were Aguascalientes in Mexico (855 pmp), the United States (783 pmp), and Portugal (719 pmp) (Figure 11.22). Other countries or regions where the prevalence exceed 600 pmp were the Netherlands (672 pmp), Norway (662 pmp), Scotland (625 pmp), Canada (614 pmp), France (613 pmp), Sweden (609 pmp), and the French-speaking part of Belgium (604 pmp). Countries or regions where the prevalence was <100 pmp were Japan (70 pmp), Malaysia (58 pmp), South Africa (28 pmp), Montenegro (16 pmp), Ethiopia (16 pmp in Addis Ababa, Gondar, and Mekele metropolitan areas), Bangladesh (9 pmp), and Guatemala (6 pmp).

Countries or regions where the average increase in the prevalence of individuals with a functioning kidney transplant exceeded 15.0 pmp were Spain (25 pmp), Estonia (22 pmp), Taiwan (21 pmp), Scotland (19 pmp), Iceland (18 pmp), Lithuania (18 pmp), the United States (18 pmp), the Republic of Korea (17 pmp), and England/Wales/Northern Ireland (16 pmp) (Figure 11.23). The prevalence of patients with a functioning kidney

transplant decreased in Malaysia and Japan (about -1 pmp), Austria (-4 pmp), the Kingdom of Saudi Arabia (-5 pmp), Qatar (-10 pmp), and Kuwait (-12 pmp).

SUMMARY.

The Global State of ESRD

As a result of decreasing mortality from infectious diseases and other sources of premature mortality in many lower-income countries, decreasing rates of cardiovascular mortality in many higher-income countries, and other factors, ESRD continues to grow as a global public health threat. Kidney disease, although not currently listed by the World Health Organization as one of the top five noncommunicable diseases (NCDs) contributing to premature mortality, is estimated to become the 5th-highest cause of years-of-life-lost among NCDs by 2040 (Francis et al., 2024). Unfortunately, comprehensive registry data on ESRD as a whole – as opposed to ESRD treated with KRT (maintenance dialysis and kidney transplant) – is not widely available because registry data on advanced (non-dialysis-dependent) CKD, particularly stages 4 and 5 CKD, is not widely available. As a result, only ESRD that results in the provision of KRT can be reliably tracked by the USRDS and many other national or regional registries. Therefore, *untreated* ESRD, or ESRD that results in death due to lack of access to KRT or in elective use of conservative care, cannot typically be tracked by registries.

The worldwide burden of treated ESRD is ultimately a product of the incidence of diagnosed CKD, the availability and implementation of strategies designed to prevent the progression of CKD, treatment of CKD-related comorbidities and complications that contribute to death prior to the development of ESRD, availability of KRT for individuals who progress to ESRD, and survival among individuals receiving KRT. This chapter, made possible only by the generous contributions of scores of individuals worldwide who supply data to the USRDS, is charged with reporting trends in treated ESRD across regions, countries, and continents. The findings presented herein can be contextualized by recent work from the International Society of Nephrology's Global Kidney Health Atlas (ISN-GKHA) (Bello et al., 2024) and an international consensus statement by the ISN, European Renal Association, American Society of Nephrology, and three regional nephrology societies (Francis et al., 2024). The work of the ISN-GKHA investigators and others suggest that about 700 million individuals worldwide are likely to have CKD. If the burden of AKI and ESRD are added to this, the number of individuals with some form of kidney disease rises to 850 million, meaning that the prevalence of kidney disease in all its major forms is approximately 10% (Francis et al., 2024; GBD Chronic Kidney Disease Collaboration, 2020; Jager et al., 2019). The immense burden of CKD foreshadows an increasing incidence and prevalence of ESRD (in both its treated and untreated forms), particularly because CKD prevalence increased by one-third from 1990 to 2017 (GBD Chronic Kidney Disease Collaboration, 2020). The growth of CKD will likely accelerate in coming decades given the combination of population growth among the low- and low-middle income countries, increased diagnosis and recognition of CKD in countries with under-resourced healthcare systems, and the worldwide aging of the population (most notably in China

and India) (Francis et al., 2024; United Nations Department of Economic and Social Affairs, 2019). Detection of CKD and treatment to slow its progression before ESRD develops are immense challenges because only about half of national health ministry's declare CKD to be a public health priority (Francis et al., 2024; Bello KI Suppl 8:41, 2018). Further, there is a paucity of nephrologists in less-resourced countries, with a 100-fold difference in nephrologists per capita in high-income, relative to low-income, countries (Riaz et al., 2021). In addition, the availability of a wealth of newer agents to slow the progression of CKD, including SGLT2 inhibitors, GLP-1 receptor agonists, non-steroidal selective mineralocorticoid receptor antagonists, and dual endothelin and angiotensin II receptor antagonists, is likely to lag in non-high-income countries given the cost of these drugs (Bello et al., 2024; Francis et al., 2024).

As a result of these and other factors, the number of individuals confronting ESRD is likely to grow worldwide. This is particularly true in Asia, Africa, and South America, especially among the non-high-income countries of these continents (Bello et al., 2024; Francis et al., 2024). Predictions about patterns of growth appear to be borne out by the data presented in this chapter. For example, a persistent theme of this chapter has been the high and growing rates of treated ESRD in Asia. Of the 12 countries or regions with the highest incidence of treated ESRD in 2022, eight were in Asia (Figure 11.2). Asian countries or regions were also overrepresented among the areas with the greatest increases in incidence of ESRD (Figure 11.3b). Correspondingly, of the eight countries or regions in which the prevalence of treated ESRD exceeded 2000 pmp, five were in Asia (Figure 11.11). High rates of ESRD are also present in Mexico. Jalisco and Aguascalientes, two of the 32 Federal Entities ("states") of Mexico, have a combined population of approximately 10 million individuals (out of a total of approximately 131 million inhabitants of Mexico). These states are in many ways representative of Mexico because they encompass both urban and rural areas. Because Mexico is a quickly developing upper-middle income country (according to the World Health Organization), findings from these Mexican states may serve as a bellwether for other rapidly developing counties or regions with similar economic and social trajectories. Detection and treatment of diabetes will doubtless play a major role in ESRD growth: much of the growth of (treated) ESRD, at least in the quickly developing continents of Asia and South America, appears attributable to diabetes (Figure 11.6), which is likely the result of increasing affluence – and associated lifestyle changes – that have occurred across these continents over the past several decades.

Growth in the prevalent treated ESRD population is governed primarily by two factors: growth in the incident treated ESRD population and survival of people once they initiate treatment for ESRD. In developing countries or regions, the increases in prevalent dialysis population are attributable mainly to growth in the incident treated ESRD population (Thomas et al., 2015). In some developed countries or regions, however – for example, the United States and Taiwan – the substantial growth in the prevalent ESRD population is due, at least in part, to the fact that patients receiving dialysis are living longer than in the past (although ESRD incidence also remains high in many developed countries such as the U.S and Taiwan). The ISN-GKHA survey revealed that the prevalence of treated ESRD varied by over two orders of magnitude between high-

and low-income countries, a finding nearly identical to that presented herein (Figure 11.11). Much of the difference in prevalence of treated ESRD worldwide is because large numbers of individuals who reach ESRD still have little access to KRT, particularly in low- and low-middle income countries. Nominally, access to KRT appears to be relatively widespread: chronic HD is available in 98% of the 162 countries surveyed by the ISN-GKHA, chronic PD in 79%, and kidney transplant in 70% (Bello et al., 2024). However, only about three-quarters of surveyed countries were able to provide KRT to at least half of their ESRD populations, demonstrating an immense “KRT gap” that belies nominal KRT availability. Indeed, lack of access to KRT, particularly dialysis, is likely the reason why South Africa, Bangladesh, Guatemala, and Nigeria have such a low prevalence of dialysis (Figure 11.16). If KRT were to become universally available, the prevalent dialysis population could well double, triple, or even quadruple (Liyanage et al., 2015). Such scenarios can easily be envisioned: trends in Asia and the developing countries of the Americas suggest that, as these countries continue to become more affluent, the incidence of treated ESRD may rise precipitously (Thomas et al., 2015).

The finances of KRT, which play a major role in the incidence and prevalence of treated ESRD, have also come under scrutiny (Francis et al., 2024). Public financing for maintenance HD, perhaps unexpectedly, is reportedly available in 45% of countries (Bello et al., 2024). Even so, this means that billions of people live in countries in which there is little to no public financing for dialysis. In South Africa, for example, patients must pay for maintenance dialysis directly because there is no universal government insurance program to support maintenance dialysis. In practice, however, funding may be time-limited or insufficient to cover all the costs associated with maintenance dialysis even when it is available. Worldwide, annual costs of KRT in US dollars were recently estimated to be approximately $19,000 for HD and PD alike and $27,000 for the first year of kidney transplant (Bello et al., 2024) – an immense sum when the per capita GDP worldwide (adjusted for purchasing power parity) is approximately $21,000. In India, about two-thirds of patients in a state-funded maintenance dialysis program discontinued dialysis by one year due to inability to pay for dialysis-related costs (Shaikh et al., 2018), and in sub-Saharan Africa, only about 1 in 10 individuals receiving dialysis was able to continue dialysis beyond three months (Ashuntantang et al., 2017). As such, treated ESRD represents a substantial undercount of total ESRD globally, and, due to the relatively short duration of dialysis among incident ESRD patients in many countries that do not finance KRT, current estimates of the prevalence of treated ESRD are far below what they would be if maintenance dialysis were financially sustainable across the globe.

Consistent with ISN-GKHA data on the relative availability of the various KRT modalities (Bello et al., 2024), we show that in-center HD remains the most common treatment modality for ESRD, by a large margin. In only 11 reporting countries or regions were more than half of prevalent ESRD patients treated with a kidney transplant (Figure 11.15); only in Hong Kong (where 46% of prevalent ESRD patients were treated with PD) were more than one-quarter of patients on dialysis treated with PD. Home HD was comparatively rare: the leaders were New Zealand (7%) and Australia (4%) (Figure

11.15). Availability of the various KRT modalities is critical, especially for developing countries, because the infrastructure requirements for in-center HD (the dialysis facility itself and its complex and expensive reverse osmosis system, plus systems of transportation to ferry patients to the HD facility) entail substantial costs for healthcare systems and patients that may not be supportable over the long term. Emphasis on growth of home-based dialysis modalities may therefore be a more fruitful approach for these countries. Fortunately, there is evidence that global KRT infrastructure for all modalities has grown: between the 2019 and 2023 ISN-GKHA surveys, the density of HD centers grew by about 10%, PD centers by 13%, and transplant centers by 7% (Bello et al., 2024). Unfortunately, in many under-resourced countries, the absolute growth of centers providing KRT was modest. Kidney transplant remains under-utilized in many countries, particularly but not exclusively in non-high-income countries, due to a combination of social, historical, cultural, and economic factors. In addition, among non-high-income countries, there is a lack of availability of expertise required to establish and maintain a kidney transplant program.

Hemodiafiltration

Interest in HDF was rekindled with the recent publication of the CONVINCE trial, which reported a hazard ratio for all-cause mortality of 0.77 (95% confidence intervals, 0.65-0.93) for HDF relative to high-flux HD (Blankestijn et al., 2023). This year, we asked contributing countries or regions to report whether HDF was available in their area. Perhaps surprisingly, 54% of countries responded in the affirmative (Figure 11.9). Because 18% of countries or regions did not respond, this means that HDF is available in 75% of the responding countries or regions. HDF was relatively widely available (Figure 11.10). In the United States, HDF has long been unavailable due to a requirement by the Food and Drug Administration (FDA) that online production of sterile replacement fluid demonstrate sterility and low (non-pyogenic) levels of endotoxin (Ward et al., 2018). However, in February 2024, the FDA granted approval to a specific hemodialysis system and its associated dialyzer, meaning that HDF may become available in the United States as early as 2025 (Persaud, 2024). Future ADRs will aim to report on the uptake of HDF in the United States.

Conclusions

To understand how governments are dealing with the immense challenges of ESRD, efforts to increase the availability of information on ESRD generally and on kidney disease more broadly should be vigorously supported by the nephrology and public health communities. Registries for dialysis are, reportedly, available in 63% of countries, of kidney transplant in 58% of countries, and of CKD in 19% of countries (Bello et al., 2024). However, registries vary in depth, completeness, and long-term sustainability. Maintaining and supporting registries are especially difficult when they are not supported by government funding or subject to government oversight and, instead, rely primarily on the goodwill of industrious and conscientious individual physicians or other care providers. Growth in kidney disease registries is a consensus priority of kidney health advocacy

bodies worldwide (Francis et al., 2024). As such, the ISN has undertaken a multi-year effort to foster the growth of kidney disease registries worldwide (https://www.theisn.org/in-action/research/share-rr). A toolkit designed to assist prospective registries has been recently developed, and the ISN conducts programs at each World Congress of Nephrology designed to assist countries in the principles and practices required to create kidney disease registries in the hopes of improving the understanding of the epidemiology of kidney disease.

As the number of people with diagnosed ESRD grows, governments and health ministries in countries and regions at all stages of economic development will have to manage the huge attendant economic and social costs. Facilitating access to self-care dialysis modalities may be the best way to meet these needs (Wetmore & Collins, 2015). Most fundamentally, governments must improve access to CKD care in an attempt decrease the incidence of ESRD.

Disclaimers

Parts of this material are based on data and information provided by the Canadian Institute for Health Information. However, the analyses, conclusions, opinions and statements expressed herein are those of the author and not necessarily those of the Canadian Institute for Health Information.

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