

Global Trends in Rates of Peritoneal Dialysis

Arsh K. Jain,^{*†} Peter Blake,^{*} Peter Cordy,^{*} and Amit X. Garg^{*†}

^{*}Division of Nephrology and [†]Department of Epidemiology and Biostatistics, University of Western Ontario, London, Canada

ABSTRACT

Although there is a perception that the use of peritoneal dialysis is declining worldwide, compilations of global data are unavailable to test this hypothesis. We assessed longitudinal trends in the use of peritoneal dialysis from 1997 to 2008 in 130 countries. The preferred data sources were renal registries, followed by nephrology societies, health ministries, academic centers, national experts, and industry affiliates. In 2008, there were approximately 196,000 peritoneal dialysis patients worldwide, representing 11% of the dialysis population. In total, 59% were treated in developing countries and 41% in developed countries. Over 12 years, the number of peritoneal dialysis patients increased in developing countries by 24.9 patients per million population and in developed countries by 21.8 per million population. The proportion of all dialysis patients treated with peritoneal dialysis did not change in developing countries but significantly declined in developed countries by 5.3%. The use of automated peritoneal dialysis increased by 14.5% in developing countries and by 30.3% in developed countries. In summary, the number of patients treated with peritoneal dialysis rose worldwide from 1997 to 2008, with a 2.5-fold increase in the prevalence of peritoneal dialysis patients in developing countries. The proportion of all dialysis patients treated with this modality continues to decline in developed countries.

J Am Soc Nephrol 23: 533–544, 2012. doi: 10.1681/ASN.2011060607

Chronic dialysis is a life-sustaining treatment for patients with ESRD. Access to dialysis remains limited in several regions of the world due to a lack of financial and clinical resources.^{1–9} As countries look to develop dialysis programs to manage the growing burden of ESRD, it is important to place patterns of peritoneal dialysis (PD) use in the global context. This information is particularly helpful to individuals in member nations responsible for health care delivery to evaluate their PD programs through comparisons with countries of similar socioeconomic structure.

A comprehensive global assessment of PD use to date has been lacking. One study suggested that 11% of chronic dialysis patients around the world are treated with PD.¹⁰ Several renal registries report PD use at a national and regional level,^{11–14} but not on a global scale. There is a perception that PD use is declining worldwide. However, studies that showed declining PD use in the developed world are limited by the number of countries considered and the length of time examined.^{3,15–17} No study has

examined the global use of different PD modalities over a significant period of time, including continuous ambulatory PD (CAPD) and automated PD (APD). For these reasons, we assessed PD use worldwide by compiling data from multiple sources over a 12-year period. We examined the trends in PD use across developing and developed nations, focusing on crude numbers, prevalence per million population, and the proportion of dialysis patients who received PD. We hypothesized an increasing PD prevalence in the developing world and a decreasing prevalence in the developed world.

Received June 22, 2011. Accepted December 5, 2011.

Published online ahead of print. Publication date available at www.jasn.org.

Correspondence: Dr. Arsh K. Jain, London Kidney Clinical Research Unit, Room ELL-108, Westminster Tower, London Health Sciences Centre, 800 Commissioners Road East, London, Ontario N6A 4G5, Canada. Email: arsh.jain@lhsc.on.ca

Copyright © 2012 by the American Society of Nephrology

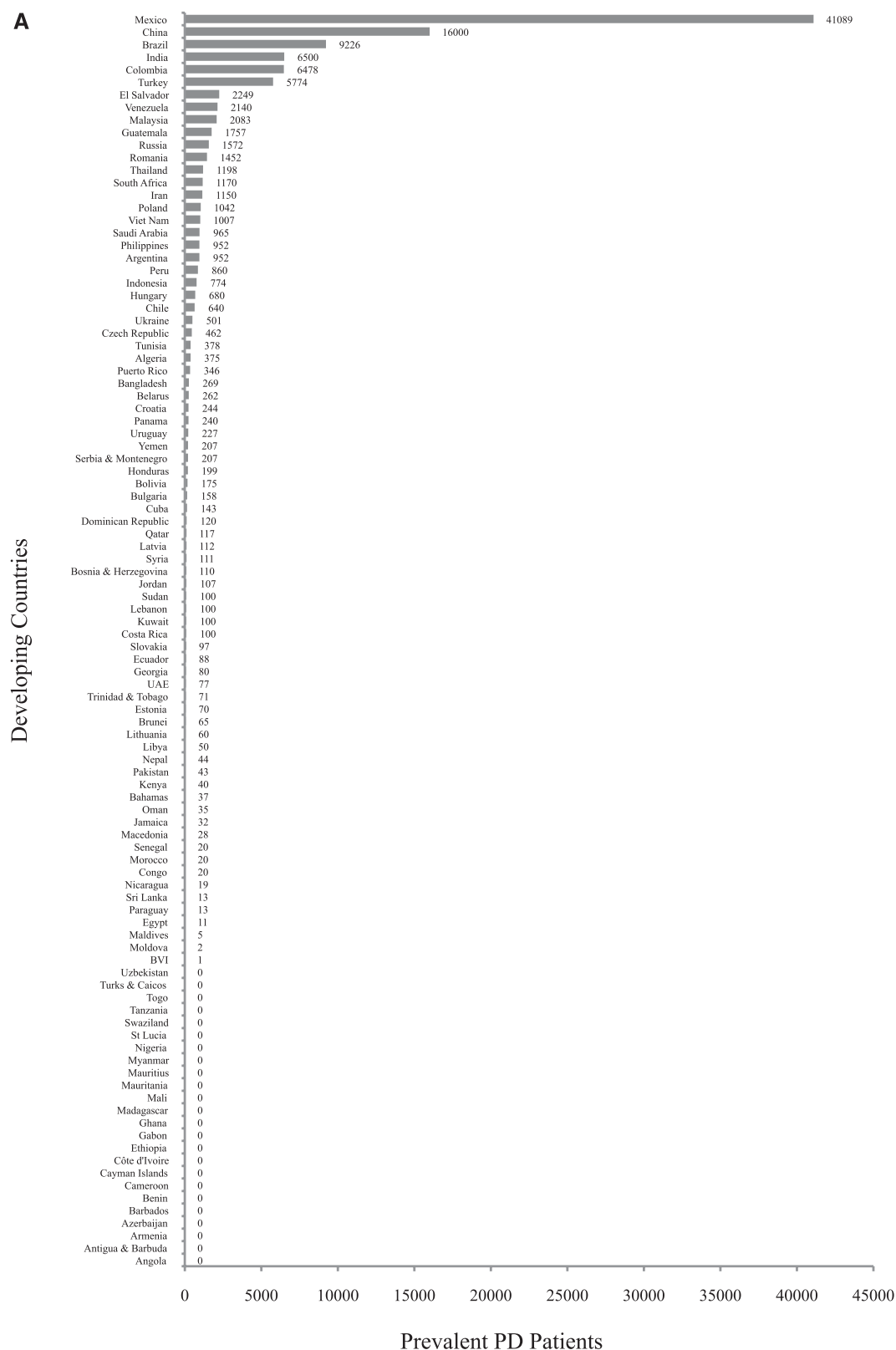


Figure 1. Current number of peritoneal dialysis patients. Crude number of prevalent patients treated with peritoneal dialysis in (A) developing countries and (B) developed countries.

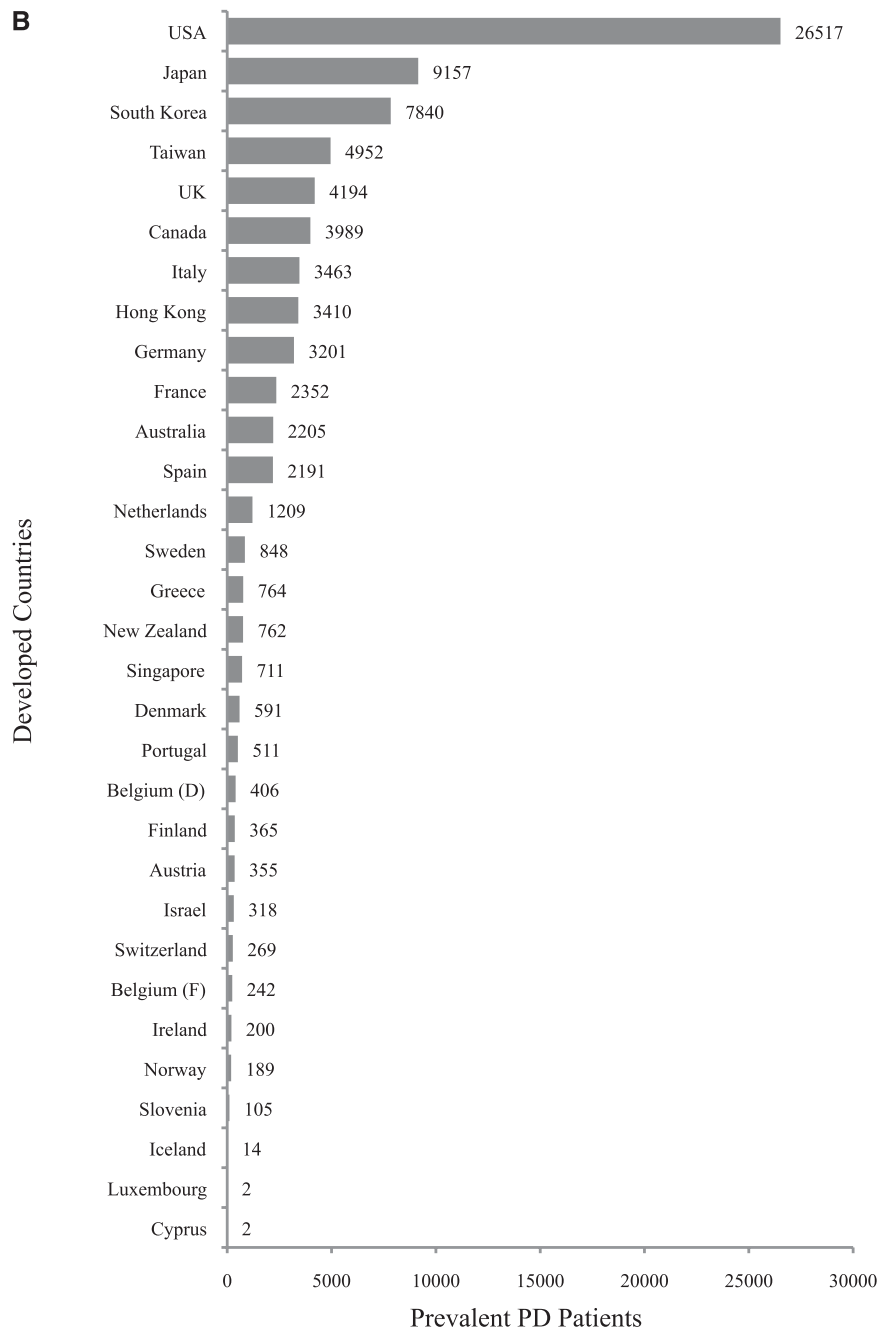


Figure 1. Continued.

RESULTS

We obtained data from 113 of the 122 countries (93%) in which dialysis is provided, per Grassmann *et al.*¹⁸ Seventeen additional countries reported PD use resulting in a total of 130 countries in our analysis. Our primary sources of data were renal registries ($n=68$), nephrology societies ($n=39$), academic centers ($n=10$), national representatives ($n=6$), Ministry of Health departments ($n=5$), industry affiliates ($n=1$), and other ($n=1$) (Supplemental Table 1). We collected

data from 1997 to 2008, with 73 countries (56%) reporting most recent data to 2008 (most recent data available from remaining countries included 44 countries for 2007, 11 countries for 2006, and 2 countries for 2004 and 2005) (Supplemental Table 2).

According to most recent data, 195,555 patients were treated with PD across the 130 countries. Fifty-eight percent of PD patients were treated in developing countries ($n=114,221$), and the remaining 42% in developed countries ($n=81,334$). Using a weighted average by world regions to impute missing data, we estimate that approximately 197,000 patients are treated with PD worldwide, with 59% of patients receiving treatment in developing countries and 41% in developed countries. In comparison, approximately 1,550,000 patients were treated with hemodialysis (HD) across the 130 countries, with 38% receiving treatment in developing countries and 62% in developed countries (Supplemental Figure 1). Overall, the proportion of all dialysis patients treated with PD worldwide was 11%.

We noted substantial variation in PD use across countries. Mexico ($n=41,089$), the United States ($n=26,517$), and China ($n=16,000$) reported the absolute largest number of patients receiving PD (Figure 1; median 158 PD patients per country; interquartile range [IQR], 14–952). In contrast, PD was not offered as a treatment modality in 24 countries in recent years. Hong Kong had the highest prevalence of PD (489 pmp), followed by Mexico (378 pmp) and El Salvador (324 pmp) (Figure 2; median 23.8 pmp; IQR, 1.6–65.3 pmp). The proportion of dialysis patients treated with PD varied around the world, ranging from 79% in Hong Kong to 0.02% in Egypt (Figure 3; median 8.2% of dialysis patients per country treated with PD; IQR, 2.3%–16.3%). PD was used by a majority of dialysis patients in four countries: Hong Kong, El Salvador, Mexico, and Guatemala.

We obtained sufficient data from 67 developing countries and 30 developed countries to examine trends in the proportion of dialysis patients treated with PD from 1997 to 2008 (Figure 4). There were significant differences between developing and developed countries ($P<0.001$). Over the study period, there was a nonsignificant decrease in the proportion of dialysis patients treated with PD in developing countries (from 13.8% to 12.4%, absolute change -1.35% [95%

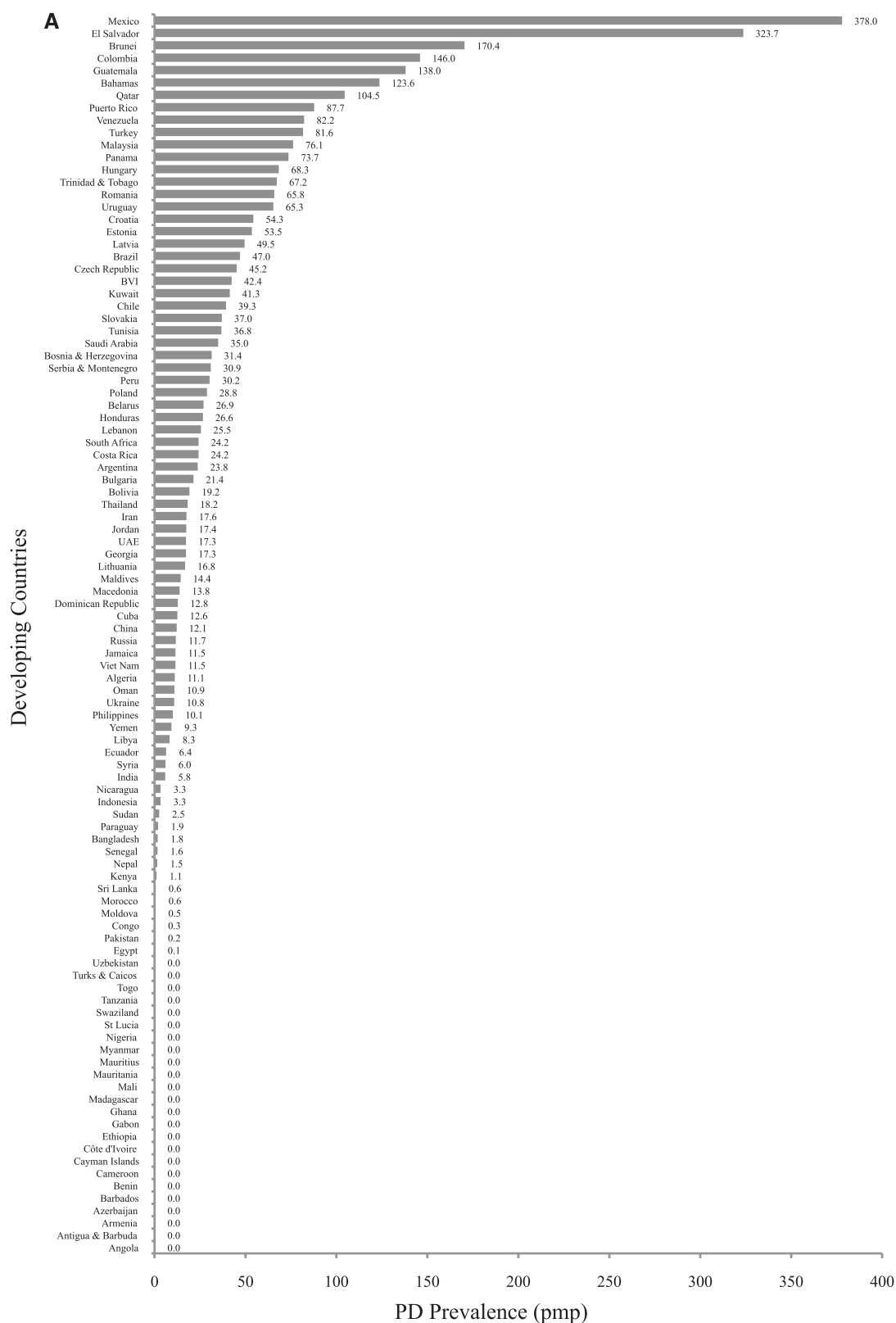


Figure 2. Current peritoneal dialysis prevalence. Peritoneal dialysis prevalence per million population in (A) developing countries and (B) developed countries.

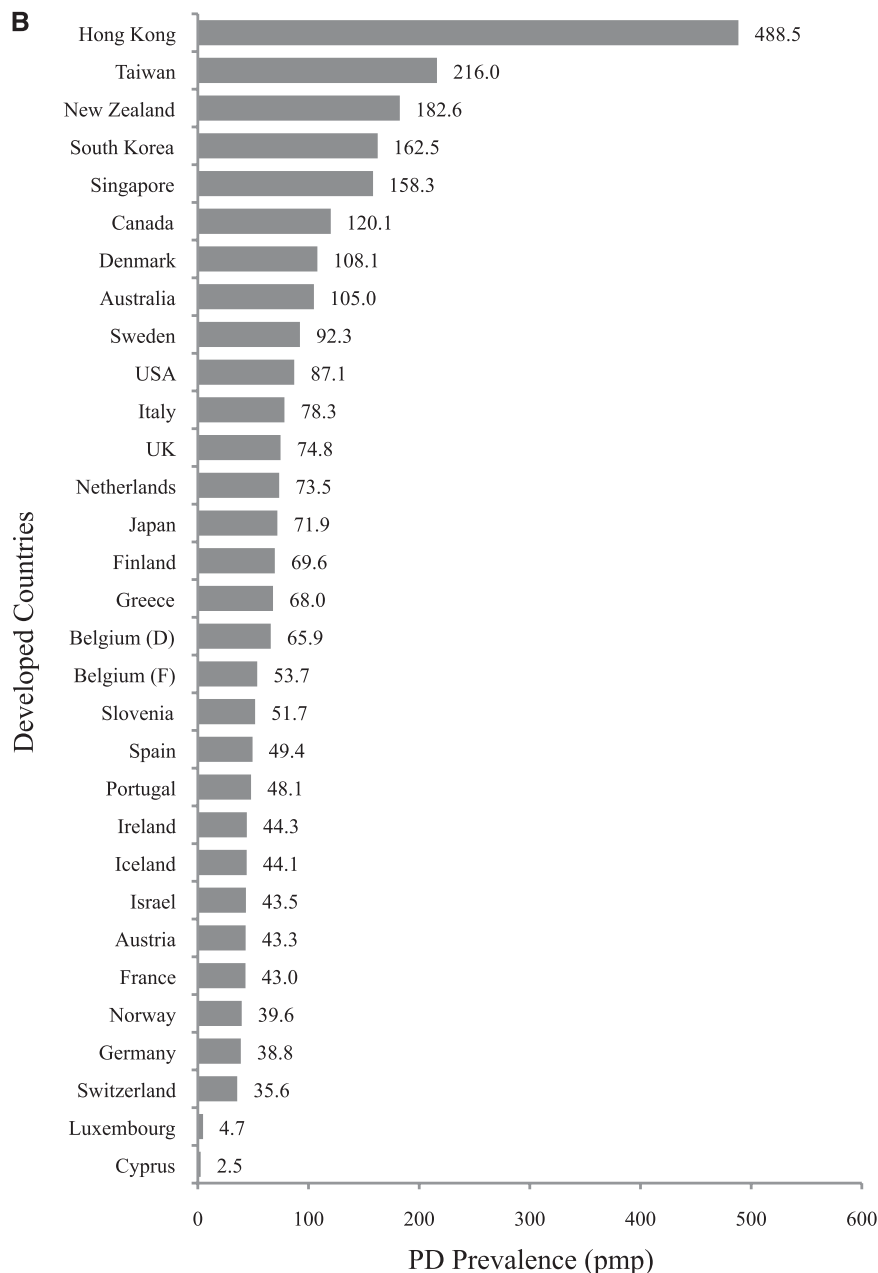


Figure 2. Continued.

confidence interval (95% CI), -2.9% , 0.2%). In developed countries, there was a significant decline in the proportion of dialysis patients treated with PD (from 20.6% to 15.3% , absolute change -5.3% ; [95% CI, -6.7% , -3.8%]).

We analyzed trends in the prevalence of PD per million population over the study period using data from 70 developing countries and 30 developed countries (Figure 5). The crude total number of patients receiving PD increased over time (Supplemental Material). The prevalence of PD grew in both developing and developed countries, with no significant difference between the two groups of countries

(developing countries: from 10.0 pmp to 34.9 pmp, increasing 24.9 pmp; [95% CI, 19.2 pmp, 30.6 pmp]); developed countries: from 69.7 pmp to 91.5 pmp, increasing 21.8 pmp; [95% CI, 16.0 , 27.6 pmp]; $P=0.45$ for comparison of groups of countries).

Trends in HD prevalence per million population over time were examined using data reported from 51 developing countries and 30 developed countries (Supplemental Figure 2). As with PD, the crude number of patients receiving HD increased over time (Supplemental Material). HD prevalence increased in both developing and developed countries, with a greater increase in developed countries (developing countries: from 128.5 pmp to 309.2 pmp, increasing 180.7 pmp [95% CI, 158.9 pmp, 202.5 pmp]; developed countries: from 347.8 pmp to 605.8 pmp, increasing 258.0 pmp [95% CI 237.4 pmp, 278.6 pmp]; $P<0.0001$ for comparison of groups of countries).

We noted substantial variation in the type of PD used across countries. The proportion of PD patients treated with APD is significantly lower in developing countries compared with developed countries (Figure 6) (APD use in developing countries: 15.8% [95% CI, 9.0% , 22.6%]; APD use in developed countries: 42.4% [95% CI, 34.4% , 50.5%]; difference between two groups of countries, $P<0.00001$). We obtained sufficient data from 23 developing countries and 24 developed countries to examine trends in APD use over time (Supplemental Figure 3). The proportion of PD patients treated with APD increased worldwide, with a greater increase in developed countries compared with developing countries (APD use in developing countries increased from 0.1% to 14.6% , increase of 14.5% [95% CI, 10.6% , 18.5%]; APD use in developed countries increased from 16.9% to 47.2% , increase of 30.3% [95% CI 26.8% , 33.7%]; difference between the two groups of countries, $P<0.001$).

DISCUSSION

PD is currently used as a chronic life-sustaining treatment by approximately 197,000 ESRD patients, or 11% of the global dialysis population. The number of patients per million population treated with PD in both developing and developed countries has increased over the last decade, although the

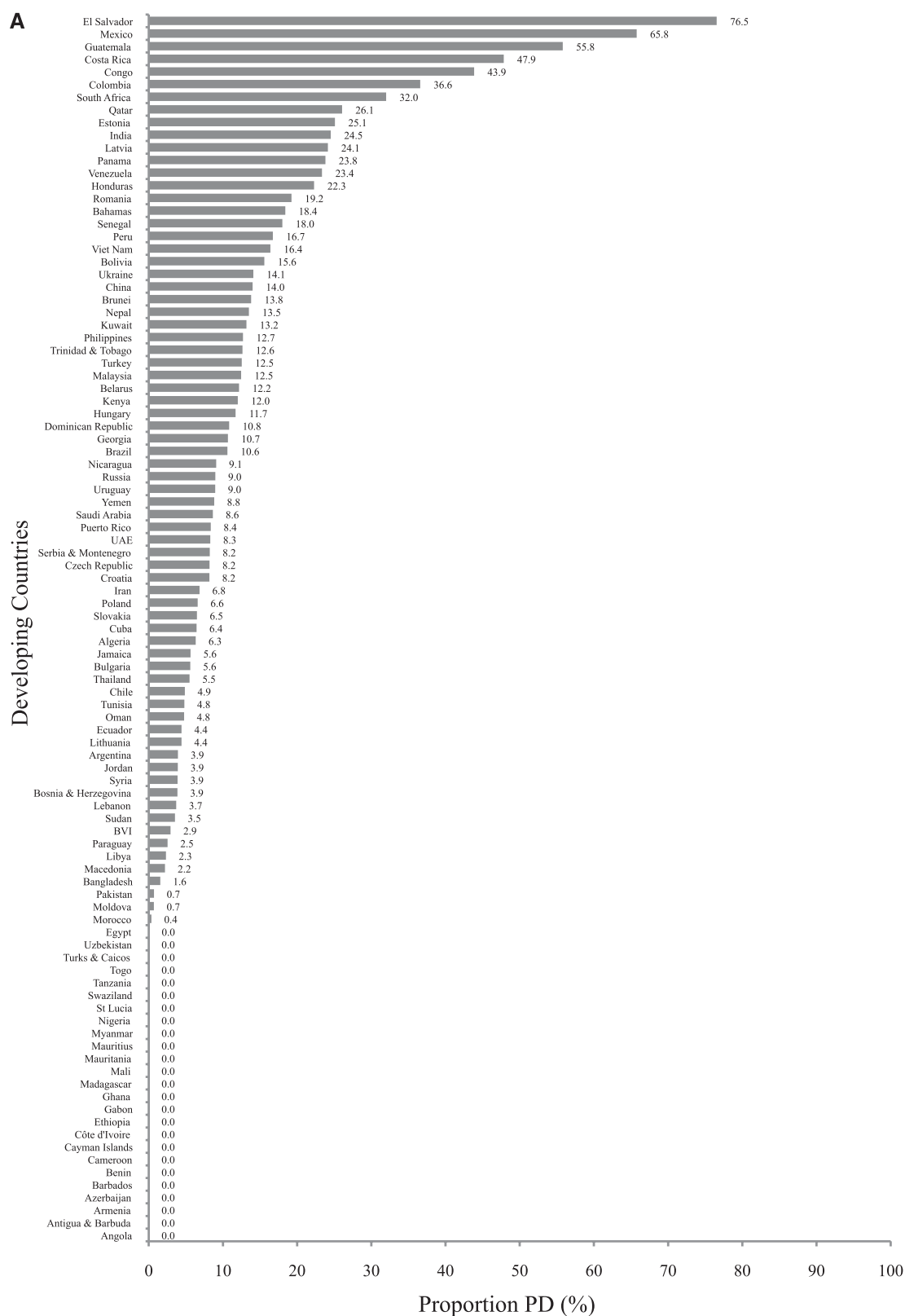


Figure 3. Current proportion of total dialysis that is peritoneal dialysis. Proportion (%) of chronic dialysis patients treated with peritoneal dialysis in (A) developing countries and (B) developed countries.

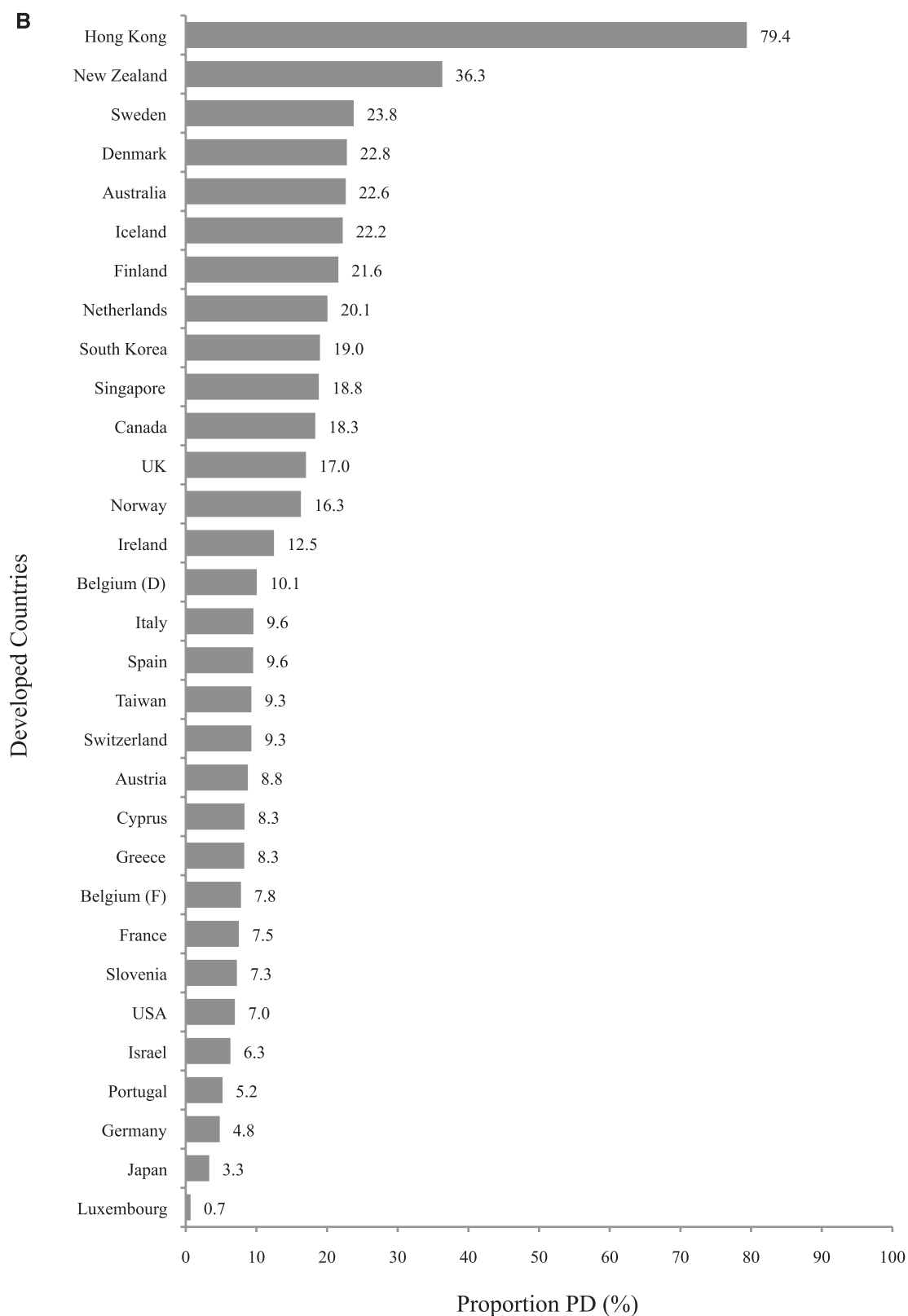


Figure 3. Continued.

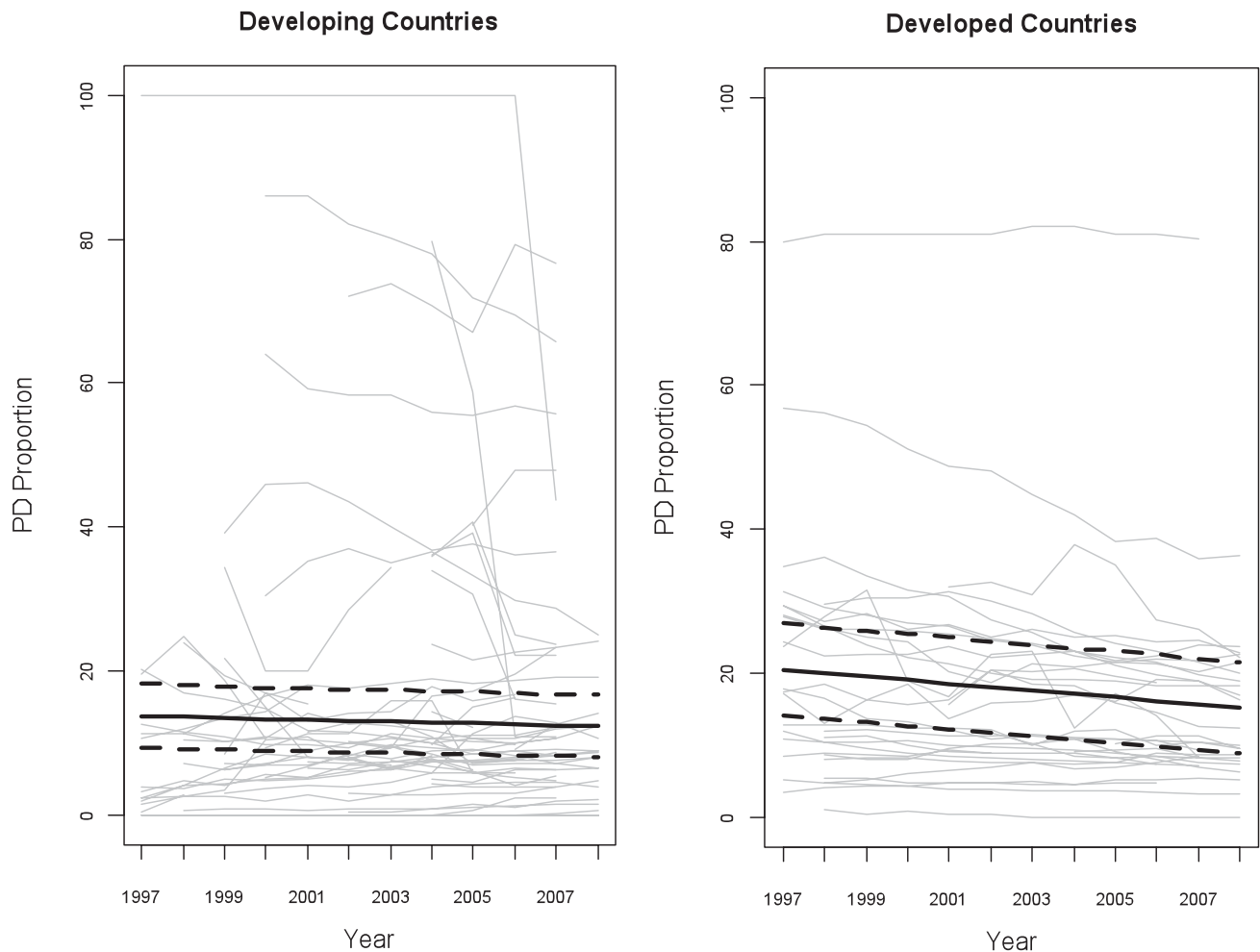


Figure 4. Trends in peritoneal dialysis as a proportion of total dialysis. Trends in the proportion (%) of dialysis patients treated with peritoneal dialysis from 1997 to 2008 in (A) developing countries and (B) developed countries.

proportion of dialysis patients treated with PD is declining in developed countries.

Variability in the practice and rate of PD across countries provides insight into the ways to manage the growing demand for dialysis services. Countries with successful PD programs demonstrate the feasibility of developing and maintaining sizable PD populations and can serve as models for other countries. With knowledge of global rates, health policy makers can examine the use of PD within their countries and put them in context with other countries of similar socioeconomic structure.

We found that 59% of PD patients were from developing countries, a set of countries that are estimated to account for 80% of the world's population.^{19,20} PD use is increasing dramatically in developing countries, with a 2.50-times increase in PD prevalence over 12 years. Growth in PD prevalence coincides with the growth of HD prevalence in developing countries. As a result of the similar growth pattern of these two modalities, there was no significant change in the proportion of dialysis patients using PD in the developing countries.

PD may have certain advantages over HD in the developing world, including simplicity of therapy, reduced need for trained medical staff, and minimal requirement for technical support and electricity.⁶ Patients living in remote and rural locations could use PD as a home-based treatment option.^{21,22} PD is sometimes thought to be more expensive than HD in the developing world because staffing costs for HD are low and the costs to import PD supplies are high.^{1,3,7,9,22} However, the economics of dialysis vary between countries, and a paucity of well conducted studies makes it difficult to determine if this perception is reality.^{7,9} Several avenues to circumvent financial barriers have been suggested and include increasing local production of PD solutions and promoting international trade agreements to help importing countries avoid expensive tariffs and transportation costs.^{3,7,22}

Whereas PD prevalence increased in developed countries, the proportion of all dialysis patients using PD declined. This decline in PD use has been noted by others and may be explained by a few factors.^{3,15–17,23,24} Several economic influences, including health care financing and delivery, physician

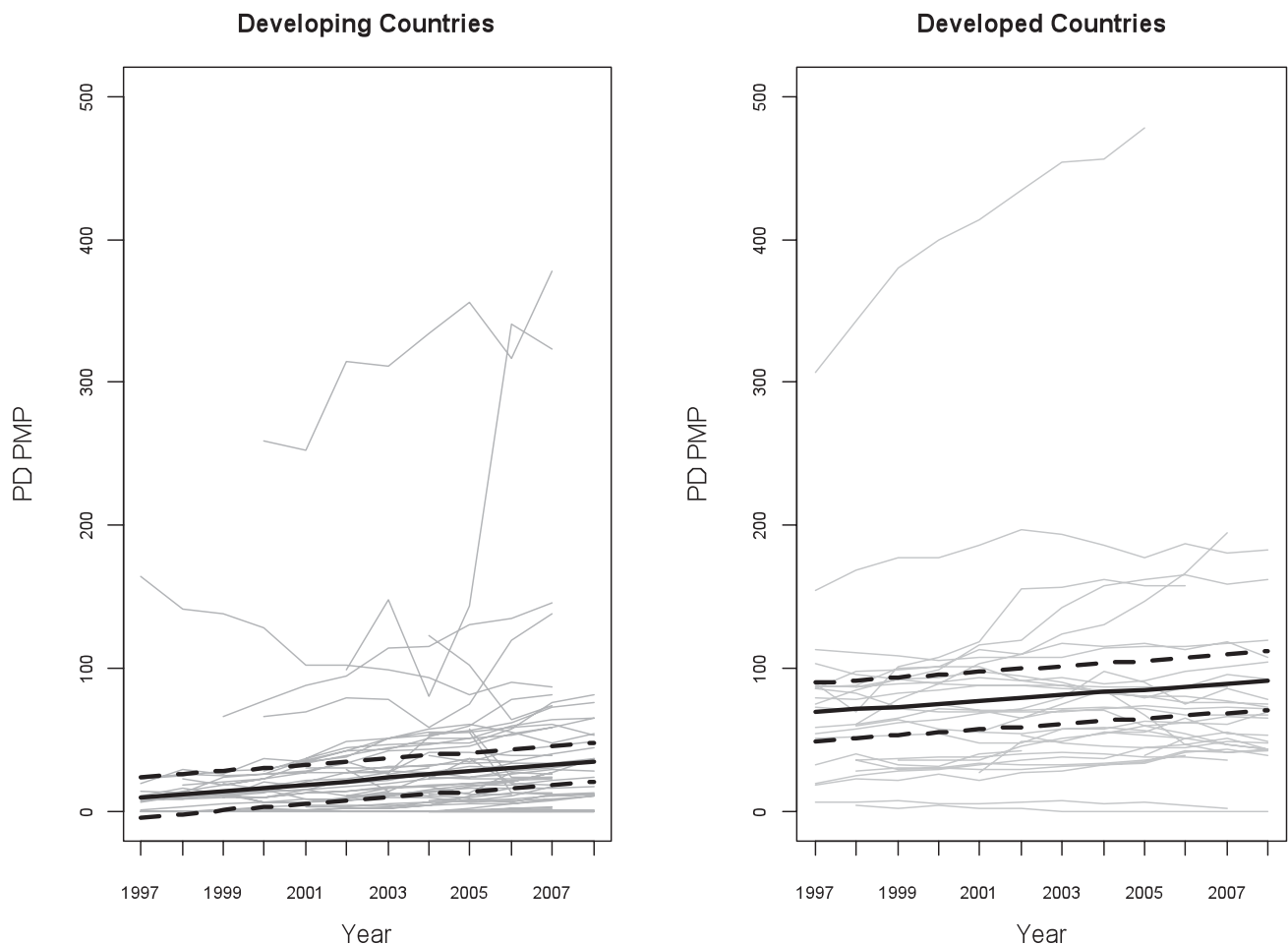


Figure 5. Trends in peritoneal dialysis prevalence. Trends in the prevalence of peritoneal dialysis per million population from 1997 to 2008 in (A) developing countries and (B) developed countries.

reimbursement, and resource availability, have been suggested to affect trends in use.³ For example, countries with private dialysis providers generally use PD for a smaller proportion of dialysis patients than countries in which public providers dominate.^{25–27} The proliferation of HD units in some countries has increased the availability of HD, creating an incentive to use that capacity rather than home dialysis modalities.^{23,28} Some have raised concerns that nephrology training programs are deficient in PD and do not adequately prepare young nephrologists to provide care for PD patients.^{29,30} Declining use seems unexpected because PD has been reported to be less expensive than HD in many developed countries.^{7–9}

APD use is on the rise in both developing and developed countries. The data presented here suggest that APD expansion is also possible in the developing world where the potential for growth was previously thought to be limited.³¹ Some researchers have suggested that this indicates that individuals in developing countries are willing to invest in more expensive technology that is considered to be more advanced.^{17,32} The increasing use serves as a call to action to conduct trials to

address the paucity of data demonstrating the benefits of this increasingly popular modality.

Strengths and Limitations

Our study has several strengths. We took a comprehensive approach and compiled data from 130 countries over a 12-year period. This extends the work of previous studies that considered between 9 and 42 countries for a period of time of 1–5 years.^{11–13,15,33,34} We reviewed all data on two occasions for accuracy, and we sent preliminary data tables and graphs to country representatives to verify data and for final confirmation. When necessary, we translated all information into English. Some of the data we compiled for this report are not easily accessible elsewhere.

The limitations of our approach merit consideration. Similarly to all studies that draw from multiple databases and nonvalidated data sources, the accuracy of the results is largely dependent on the quality of captured data. Because many countries struggle to establish and maintain reputable renal registries, data were not always complete or representative; thus, inaccurate reporting may be an issue for some countries.⁴

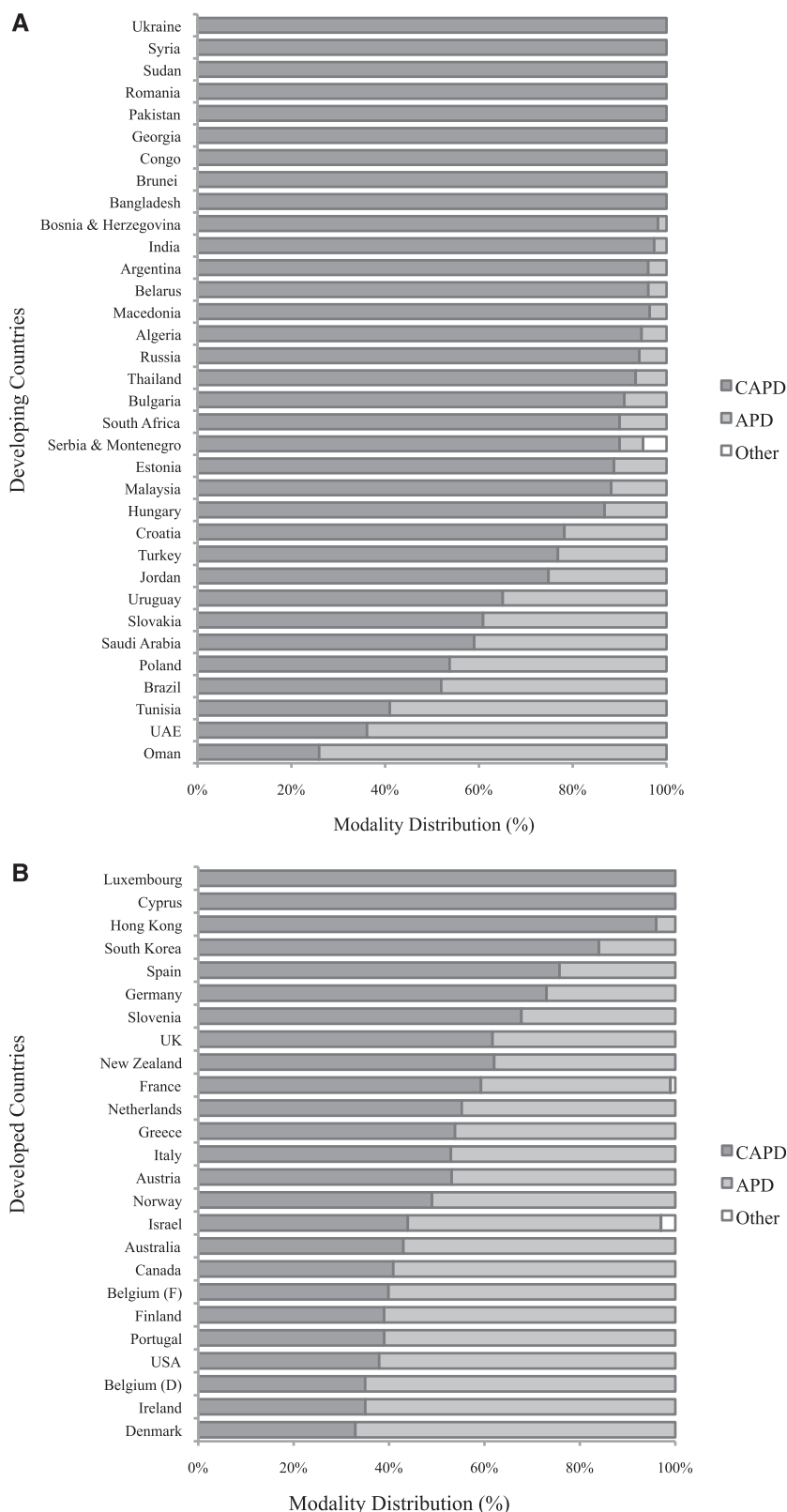


Figure 6. CAPD versus APD use. The types of peritoneal dialysis used in (A) developing countries and (B) developed countries.

For example, some national registries, including France, Italy, Spain, and Mexico, cover select regions rather than the entire country.^{12,35,36} Some populous countries, including India and China, were not maintaining national registries at the time of this study. Rather, national representatives, tertiary care centers, and industry reports provided the data we used to represent these countries.⁵ In some cases, data reported by different sources were discrepant. Although we present the best data available, it remains difficult to determine which source most accurately represents dialysis use within a country. Previous studies evaluating global dialysis trends have been limited to countries that report validated data.^{12,13} Because this was not a criterion for inclusion in our study, we were able to present trends for a larger pool of developing and developed countries. To minimize information biases, we reconciled the accuracy of data using multiple sources whenever possible.

As the prevalence of ESRD increases worldwide, it is important to evaluate the role of PD as a treatment option. Using data from multiple international sources, we found that the number of patients per million population treated with PD in both the developing and developed worlds has increased, although developed countries seemed to be turning to PD less often. Future research will help to better understand global dialysis practices and characterize barriers to PD in developing and developed nations. Communication and collaboration between countries will allow PD use to be evaluated in an international context, improving the efficiency of global dialysis practices for current and future patients who suffer from ESRD.

CONCISE METHODS

Data of Interest

We used a list of 122 countries estimated to account for 99% of the global ESRD population as a reference for data collection.¹⁸ The methodology of our approach is described elsewhere.³⁷ For each country, we attempted to contact a representative from a national renal or dialysis registry. When available, we collected the following data on an annual basis from 1997 to 2008:

(1) the crude number of prevalent chronic PD patients, (2) the crude number of prevalent chronic HD patients (including home HD), and (3) a categorization of all PD use in which patients were subdivided into CAPD, APD, and other PD (other PD included intermittent peritoneal dialysis [IPD]). Data were the sum of the chronic dialysis population including pediatric patients. We cited the most recent registry report from which data were captured. We translated data obtained in seven different languages into English. When multiple sources supplied the desired data, we reviewed all options and selected the most complete dataset. For countries with no registry available, we collected data (in order of preference) from national nephrology societies, ministries of health, academic centers, national experts, and/or industry affiliates. Our approach to data from Mexico deserves mention. Unlike a previous report that used data from the state of Jalisco (in Mexico) to represent the entire country,¹² we determined national-level statistics. We did this by reconciling data from the state registry with national-level data available from the Latin American Dialysis and Transplant Registry.^{11,38} We found PD prevalence rates and percentage of PD use to be very similar; thus, we were able to extrapolate national-level statistics.

Data Abstraction

We completed the data collection from May 2008 to September 2010. In some cases, contacts within renal or dialysis organizations were provided with blank data tables that they completed. We reviewed all data for accuracy on two occasions. In addition, we sent preliminary data tables and graphs to country representatives to verify data and for final confirmation.

Statistical Analyses

We classified countries as developing or developed according to International Monetary Fund guidelines.¹⁹ Nonmember nations of the International Monetary Fund were classified based on information available through the Central Intelligence Agency.³⁹ We calculated annual PD and HD prevalence rates, measured in patients per million population, by dividing the crude number of patients by total mid-year census population estimates from the US Census Bureau International Database.²⁰ We calculated the proportion of all dialysis patients (HD and PD) treated with PD. To present a worldwide estimate of PD use, we used a simple weighted average by region (as defined by the World Health Organization)⁴⁰ to impute the crude number of prevalent PD patients for countries reported to use PD but for which data were not available. We used the most recent data available (typically 2007 or 2008 data) for each country to generate current estimates of PD use.

We examined temporal trends of PD and HD use from 1997 to 2008 for countries that provided a minimum of 3 years of data. We used random intercept linear regression models to control for the within-country correlation and used an unstructured correlation matrix for all models. We calculated the 95% CIs for the best-fit lines using parameter estimates and the estimated covariance structure from each of the fitted models. We performed sensitivity analyses on countries that reported at least 4 or 5 years of data between 1997 and 2008 and the results were qualitatively similar. To compare the use of APD in the developing and developed worlds, we used an independent samples two-tailed *t* test and analyzed for a significance level of $P < 0.05$. We

performed statistical analyses with SAS software (version 9.2; SAS Institute, Cary, NC) and generated plots in R (version 2.10.1) and Excel 2007 software (Microsoft, Redmond, WA).

ACKNOWLEDGMENTS

We thank the representatives from 64 countries who provided or reviewed data for accuracy, Valerie Bloomfield for her dedication to this project, Heather ThiessenPhilbrook for providing statistical support, and Ms. Lucy Horvat for her help.

Grant support was provided by the Lawson Health Research Institute. A.J. was supported by a fellowship award, and A.X.G. was supported by a clinician scientist award, both from the Canadian Institutes of Health Research.

The interpretation and reporting of these data are the responsibility of the authors and in no way should be seen as official policy or interpretation of those programs or organizations cited within.

DISCLOSURES

A.J. and P.B. have received grant support and honoraria from Baxter Inc.

REFERENCES

- Aviles-Gomez R, Luquin-Arellano VH, Garcia-Garcia G, Ibarra-Hernandez M, Briseño-Renteria G: Is renal replacement therapy for all possible in developing countries? *Ethn Dis* 16[Suppl 2]: S2–S70, 2, 2006
- Barsoum RS: Chronic kidney disease in the developing world. *N Engl J Med* 354: 997–999, 2006
- Just PM, de Charro FT, Tschosik EA, Noe LL, Bhattacharyya SK, Riella MC: Reimbursement and economic factors influencing dialysis modality choice around the world. *Nephrol Dial Transplant* 23: 2365–2373, 2008
- White SL, Chadban SJ, Jan S, Chapman JR, Cass A: How can we achieve global equity in provision of renal replacement therapy? *Bull World Health Organ* 86: 229–237, 2008
- Kher V: End-stage renal disease in developing countries. *Kidney Int* 62: 350–362, 2002
- Finkelstein FO, Abu-Aisha H, Najafi I, Lo WK, Abraham G, Pecoits-Filho R, Süleymanlar G: Peritoneal dialysis in the developing world: Recommendations from a symposium at the ISPD meeting 2008. *Perit Dial Int* 29: 618–622, 2009
- Just PM, Riella MC, Tschosik EA, Noe LL, Bhattacharyya SK, de Charro F: Economic evaluations of dialysis treatment modalities. *Health Policy* 86: 163–180, 2008
- Dor A, Pauly MV, Eichleay MA, Held PJ: End-stage renal disease and economic incentives: The International Study of Health Care Organization and Financing (ISHCOF). *Int J Health Care Finance Econ* 7: 73–111, 2007
- Neil N, Walker DR, Sesso R, Blackburn JC, Tschosik EA, Sciaraffia V, Garcia-Contreras F, Capsa D, Bhattacharyya SK: Gaining efficiencies: Resources and demand for dialysis around the globe. *Value Health* 12: 73–79, 2009
- Fresenius Medical Care: Fresenius Medical Care Annual Report 2008—Dialysis Market, Bad Homburg, Germany, Fresenius Medical Care, 2008

11. Cusumano A, Garcia Garcia G, Gonzalez Bedat C: The Latin American Dialysis and Transplant Registry: Report 2006. *Ethn Dis* 19[Suppl 1]: S1–S3, 6, 2009
12. US Renal Data System: 2010 Annual Data Report: Atlas of Chronic Kidney Disease and End-Stage Renal Disease in the United States, Bethesda, MD, National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, 2010
13. ERA-EDTA Registry: ERA-EDTA Registry 2008 Annual Report, Amsterdam, The Netherlands, Academic Medical Center, Department of Medical Informatics, 2010
14. Brown F, Excell L, Livingston B, McDonald S: Peritoneal dialysis. In: Australia & New Zealand Dialysis and Transplant Registry Report 2009, edited by McDonald S, Excell L, Livingston B, Adelaide, South Australia, Australia and New Zealand Dialysis and Transplant Registry, 2009, p 6-2
15. Lo WK: Peritoneal dialysis utilization and outcome: What are we facing? *Perit Dial Int* 27[Suppl 2]: S42–S47, 2007
16. van Biesen W, Veys N, Lameire N, Vanholder R: Why less success of the peritoneal dialysis programmes in Europe? *Nephrol Dial Transplant* 23: 1478–1481, 2008
17. Lameire N, Van Biesen W: Epidemiology of peritoneal dialysis: A story of believers and nonbelievers. *Nat Rev Nephrol* 6: 75–82, 2010
18. Grassmann A, Gioberge S, Moeller S, Brown G: ESRD patients in 2004: Global overview of patient numbers, treatment modalities and associated trends. *Nephrol Dial Transplant* 20: 2587–2593, 2005
19. International Monetary Fund: World Economic and Financial Surveys: Country Composition of World Economy Outlook Groups. Available at: <http://www.imf.org/external/pubs/ft/weo/2007/01/data/groups.htm#ae>. Accessed June 7, 2008
20. US Census Bureau—International Programs: International Data Base. Available at: <http://www.census.gov/population/international/>. Accessed January 9, 2010
21. Vikrant S: Continuous ambulatory peritoneal dialysis: A viable modality of renal replacement therapy in a hilly state of India. *Indian J Nephrol* 17: 165–169, 2007
22. Nayak KS, Prabhu MV, Sinoj KA, Subramanyam SV, Sridhar G: Peritoneal dialysis in developing countries. *Contrib Nephrol* 163: 270–277, 2009
23. Blake P: Proliferation of hemodialysis units and declining peritoneal dialysis use: An international trend. *Am J Kidney Dis* 54: 194–196, 2009
24. Heaf J: Underutilization of peritoneal dialysis. *JAMA* 291: 740–742, 2004
25. Hörl WH, de Alvaro F, Williams PF: Healthcare systems and end-stage renal disease (ESRD) therapies—an international review: Access to ESRD treatments. *Nephrol Dial Transplant* 14[Suppl 6]: 10–15, 1999
26. Gokal R, Hörl W, Lameire N: Healthcare systems. An international review. Introduction. *Nephrol Dial Transplant* 14[Suppl 6]: 1, 1999
27. De Vecchi AF, Dratwa M, Wiedemann ME: Healthcare systems and end-stage renal disease (ESRD) therapies—an international review: costs and reimbursement/funding of ESRD therapies. *Nephrol Dial Transplant* 14[Suppl 6]: 31–41, 1999
28. Mehrotra R, Khawar O, Duong U, Fried L, Norris K, Nissenson A, Kalantar-Zadeh K: Ownership patterns of dialysis units and peritoneal dialysis in the United States: Utilization and outcomes. *Am J Kidney Dis* 54: 289–298, 2009
29. Mehrotra R, Blake P, Berman N, Nolph KD: An analysis of dialysis training in the United States and Canada. *Am J Kidney Dis* 40: 152–160, 2002
30. Troidle L, Kliger A, Finkelstein F: Barriers to utilization of chronic peritoneal dialysis in network #1, New England. *Perit Dial Int* 26: 452–457, 2006
31. Correa-Rotter R: APD in the developing world: Is there a future? *Semin Dial* 15: 385–387, 2002
32. Grassmann A, Gioberge S, Moeller S, Brown G: End-stage renal disease: Global demographics in 2005 and observed trends. *Artif Organs* 30: 895–897, 2006
33. Barsoum RS: Overview: End-stage renal disease in the developing world. *Artif Organs* 26: 737–746, 2002
34. Najafi I: Peritoneal dialysis in Iran and the Middle East. *Perit Dial Int* 29 [Suppl 2]: S217–S221, 2009
35. ERA-EDTA Registry: ERA-EDTA Registry 2006 Annual Report, Amsterdam, The Netherlands, Academic Medical Center, Department of Medical Informatics, 2008
36. Gesualdo L, Alloatti S, Cicchetti T, Iannuzziello F, Ktena M, Roselli D, Casino F, Marino C, Postorino M: [Census 2004 of the Italian renal and dialysis units. Basilicata - Calabria - Puglia]. *G Ital Nefrol* 23: 323–336, 2006
37. Horvat LD, Shariff SZ, Garg AX: Donor Nephrectomy Outcomes: Global trends in the rates of living kidney donation. *Kidney Int* 75: 1088–1098, 2009
38. Cusumano A, Garcia GG, Di Gioia C, Hermida O, Lavorato C: Latin American Registry of Dialysis and Transplantation: The Latin American Dialysis and Transplantation Registry (RLDT) annual report 2004. *Ethn Dis* 16[Suppl 2]: S2–S10, 3, 2006
39. Central Intelligence Agency: Appendix B: International organizations and groups, In: *CIA World Factbook*, Washington, DC, Central Intelligence Agency, 2010
40. World Health Organization: World Health Organization Regional Offices. Available at: <http://www.who.int/about/regions/en>. Accessed June 7, 2008

This article contains supplemental material online at <http://jasn.asnjournals.org/lookup/suppl/doi:10.1681/ASN.2011060607/-/DCSupplemental>.

Appendix Table 1a. Data sources for developing countries

	Country	Source	Source type
1	Algeria	Sudan Peritoneal Dialysis Program ⁴¹ and Charles Nicolle Hospital (Ben Abdallah, T. Tunis, Tunisia. August 2008)	Journal article and personal communication
2	Angola	Sudan Peritoneal Dialysis Program ⁴¹	Journal article
3	Antigua and Barbuda	Caribbean Renal Registry ⁴²	Report
4	Argentina	Argentina Society of Nephrology ⁴³	Report
5	Armenia	Arabkir Joint Medical Centre (Sarkissian, A. Yerevan, Armenia. July 2010)	Personal communication
6	Azerbaijan	Azerbaijan Republic Ministry of Health (Rehimova, L. Azerbaijan Republic. July 2008)	Personal communication
7	Bahamas	Caribbean Renal Registry ⁴²	Report
8	Bangladesh	Kidney Foundation of Bangladesh (Ur-Rashid, H. Dhaka, Bangladesh. July 2010)	Personal communication
9	Barbados	Caribbean Renal Registry ⁴²	Report
10	Belarus	The Belarusian Medical Academy of Postgraduate Education - Nephrology Division (Komisarov, K. Minsk, Belarus. June 2008)	Personal communication
11	Benin	Sudan Peritoneal Dialysis Program ⁴¹ and Charles Nicolle Hospital (Ben Abdallah, T. Tunis, Tunisia. August 2008)	Journal article and personal communication
12	Bolivia	The Latin American Dialysis and Transplant Registry ¹¹ (Cusumano, A. Buenos Aires, Argentina. August 2010)	Report and personal communication
13	Bosnia and Herzegovina	Bosnian Renal Registry ⁴⁴ (Mesic, E. Sarajevo, Bosnia. May 2008) and European Renal Association - European Dialysis and Transplant Association ¹³	Report and personal communication
14	Brazil	Brazilian Society of Nephrology (Egidio Romao, J. and Zatz, R. São Paulo, Brazil. September 2009)	Personal communication
15	British Virgin Islands (BVI)	Caribbean Renal Registry ⁴²	Report
16	Brunei Darussalam	Brunei Darussalam Ministry of Health ⁴⁵	Report
17	Bulgaria	National Program for Nephrology and Dialysis ⁴⁶ and ISN-COMGAN Central and Eastern European Committee (Vazellov, E. Sofia, Bulgaria. July 2010)	Journal article and personal communication
18	Cameroon	Sudan Peritoneal Dialysis Program ⁴¹ and Charles Nicolle Hospital (Ben Abdallah, T. Tunis, Tunisia. August 2008)	Journal article and personal communication
19	Cayman Islands	Caribbean Renal Registry ⁴²	Report
20	Chile	The Latin American Dialysis and Transplant Registry ¹¹ (Cusumano, A. Buenos Aires, Argentina. August 2010)	Report and personal communication
21	China	Baxter Renal Asia Pacific (Industry representatives. Shanghai, China. July 2008) and Tung Wah Hospital ⁴⁷	Journal article and personal communication
22	Colombia	The Latin American Dialysis and Transplant Registry ¹¹ (Cusumano, A. Buenos Aires, Argentina. August 2010)	Report and personal communication
23	Costa Rica	The Latin American Dialysis and Transplant Registry ¹¹ (Cusumano, A. Buenos Aires, Argentina. August 2010)	Report and personal communication
24	Côte d'Ivoire	Sudan Peritoneal Dialysis Program ⁴¹ and Charles Nicolle Hospital (Ben Abdallah, T. Tunis, Tunisia. August 2008)	Journal article and personal communication
25	Croatia	European Renal Association - European Dialysis and Transplant Association ¹³	Report
26	Cuba	The Latin American Dialysis and Transplant Registry ¹¹ (Cusumano, A. Buenos Aires, Argentina. August 2010)	Report and personal communication
27	Czech Republic	European Renal Association - European Dialysis and Transplant Association ¹³	Report
28	Democratic Republic of Congo (Congo)	Nephrology Unit: University of Kinshasa ⁴⁸ (Sumaili, EK. Kinshasa, Democratic Republic of Congo. July 2008)	Journal article and personal communication
29	Dominican Republic	The Latin American Dialysis and Transplant Registry ¹¹ (Cusumano, A. Buenos Aires, Argentina. August 2010)	Report and personal communication
30	Ecuador	The Latin American Dialysis and Transplant Registry ¹¹ (Cusumano, A. Buenos Aires, Argentina. August 2010)	Report and personal communication

31	Egypt	The Egyptian Renal Registry ^{49 50}	Report and journal article
32	El Salvador	The Latin American Dialysis and Transplant Registry ¹¹ (Cusumano, A. Buenos Aires, Argentina. August 2010)	Report and personal communication
33	Estonia	Estonian Renal Registry (Rosenberg, M. Tartu, Estonia. August 2008) and European Renal Association - European Dialysis and Transplant Association ¹³	Report and personal communication
34	Ethiopia	Sudan Peritoneal Dialysis Program ⁴¹	Journal article
35	the Former Yugoslav Republic of Macedonia (Macedonia)	European Renal Association - European Dialysis and Transplant Association ¹³	Report
36	Gabon	Sudan Peritoneal Dialysis Program ⁴¹ and Charles Nicolle Hospital (Ben Abdallah, T. Tunis, Tunisia. August 2008)	Journal article and personal communication
37	Georgia	Kidney Transplantation Union of Georgia (Tchokhanelidze, I. Tbilisi, Georgia. August 2010)	Personal communication
38	Ghana	Sudan Peritoneal Dialysis Program ⁴¹ and Charles Nicolle Hospital (Ben Abdallah, T. Tunis, Tunisia. August 2008)	Journal article and personal communication
39	Guatemala	The Latin American Dialysis and Transplant Registry ¹¹ (Cusumano, A. Buenos Aires, Argentina. August 2010)	Report and personal communication
40	Honduras	The Latin American Dialysis and Transplant Registry ¹¹ (Cusumano, A. Buenos Aires, Argentina. August 2010)	Report and personal communication
41	Hungary	St. Margit Hospital: Department of Nephrology and Dialysis Unit (Harris, A. Budapest, Hungary. August 2010)	Personal communication
42	India	Sri Ramachandra Medical College and Research Institute ^{51;52}	Journal article
43	Indonesia	University of Indonesia ⁵³	Journal article
44	Iran	Management Center for Transplantation and Special Diseases ⁵⁴ (Mahdavi-Mazdeh, M. Tehran, Iran. September 2008)	Report and personal communication
45	Jamaica	Caribbean Renal Registry ⁴²	Report
46	Jordan	Jordan Society of Nephrology (Suheimat, T. Amman, Jordan. August 2010)	Personal communication
47	Kenya	Sudan Peritoneal Dialysis Program ⁴¹	Journal article
48	Kuwait	Tehran University of Medical Sciences: Shafa CAPD Research Center and Urology Research Center ³⁴	Journal article
49	Latvia	European Renal Association - European Dialysis and Transplant Association ¹³	Report
50	Lebanon	Tehran University of Medical Sciences: Shafa CAPD Research Center and Urology Research Center ³⁴	Journal article
51	Libya	Sudan Peritoneal Dialysis Program ⁴¹	Journal article
52	Lithuania	Lithuanian Association of Nephrology, Dialysis and Transplantation (Kuzminskis, V. Kaunas, Lithuania. July 2008)	Personal communication
53	Madagascar	Sudan Peritoneal Dialysis Program ⁴¹	Journal article
54	Malaysia	The National Renal Registry ⁵⁵ (Day Guat, L. Kuala Lumpur, Malaysia. July 2008)	Report and personal communication
55	Maldives	Sri Ramachandra Medical College and Research Institute ⁵²	Journal article
56	Mali	Sudan Peritoneal Dialysis Program ⁴¹ and Charles Nicolle Hospital (Ben Abdallah, T. Tunis, Tunisia. August 2008)	Journal article and personal communication
57	Mauritania	Sudan Peritoneal Dialysis Program ⁴¹ and Charles Nicolle Hospital (Ben Abdallah, T. Tunis, Tunisia. August 2008)	Journal article and personal communication
58	Mauritius	Sudan Peritoneal Dialysis Program ⁴¹	Journal article
59	Mexico	The Latin American Dialysis and Transplant Registry ¹¹ (Cusumano, A. Buenos Aires, Argentina. August 2010) and Jalisco Dialysis and Transplant Registry (García-García, G. Jalisco, Mexico. August 2008)	Report and personal communication
60	Moldova	Moldova Kidney Foundation (Codreanu, I. Moldova. August 2008)	Personal communication
61	Morocco	Sudan Peritoneal Dialysis Program ⁴¹	Journal article
62	Myanmar	Sri Ramachandra Medical College and Research Institute ⁵²	Journal article
63	Nepal	BP Koirala Institute of Health Sciences (Sharma, S. Dharan, Nepal. September 2008)	Personal communication
64	Nicaragua	The Latin American Dialysis and Transplant Registry ¹¹ (Cusumano, A. Buenos Aires, Argentina. August 2010)	Report and personal communication

65	Nigeria	Sudan Peritoneal Dialysis Program ⁴¹	Journal article
66	Oman	Royal Hospital: Department of Nephrology (Mohsin, N. Seeb, Oman. July 2010)	Personal communication
67	Pakistan	The Kidney Foundation of Pakistan ⁵⁶	Report
68	Panama	The Latin American Dialysis and Transplant Registry ¹¹ (Cusumano, A. Buenos Aires, Argentina. August 2010)	Report and personal communication
69	Paraguay	The Latin American Dialysis and Transplant Registry ¹¹ (Cusumano, A. Buenos Aires, Argentina. August 2010)	Report and personal communication
70	Peru	The Latin American Dialysis and Transplant Registry ¹¹ (Cusumano, A. Buenos Aires, Argentina. August 2010)	Report and personal communication
71	Philippines	Philippines Renal Disease Registry (Padilla, B. Quezon City, Philippines. September 2008)	Personal communication
72	Poland	European Renal Association - European Dialysis and Transplant Association ¹³	Report
73	Puerto Rico	United States Renal Data System ¹²	Report
74	Qatar	Hamad Medical Corporation: Nephrology Division ⁵⁷	Journal article
75	Romania	European Renal Association - European Dialysis and Transplant Association ¹³	Report
76	Russia	European Renal Association - European Dialysis and Transplant Association ¹³	Report
77	Saint Lucia	Caribbean Renal Registry ⁴²	Report
78	Saudi Arabia	Saudi Center for Organ Transplantation ⁵⁸	Report
79	Senegal	Sudan Peritoneal Dialysis Program ⁴¹	Journal article
80	Serbia and Montenegro	European Renal Association - European Dialysis and Transplant Association ¹³	Report
81	Slovakia	European Renal Association - European Dialysis and Transplant Association ¹³	Report
82	South Africa	Sudan Peritoneal Dialysis Program ⁴¹ and Charles Nicolle Hospital (Ben Abdallah, T. Tunis, Tunisia. August 2008)	Journal article and personal communication
83	Sri Lanka	Sri Ramachandra Medical College and Research Institute ⁵²	Journal article
84	Sudan	Sudan Peritoneal Dialysis Program ⁴¹ (Elamin, S. Khartoum, Sudan. July 2008)	Journal article and personal communication
85	Swaziland	Sudan Peritoneal Dialysis Program ⁴¹	Journal article
86	Syria	Syrian Society of Nephrology (Saeed, B. Damascus, Syria. August 2008)	Personal communication
87	Tanzania	Sudan Peritoneal Dialysis Program ⁴¹	Journal article
88	Thailand	Thailand Renal Replacement Therapy Registry ^{59;60}	Journal article and report
89	Togo	Sudan Peritoneal Dialysis Program ⁴¹ and Charles Nicolle Hospital (Ben Abdallah, T. Tunis, Tunisia. August 2008)	Journal article and personal communication
90	Trinidad and Tobago	Caribbean Renal Registry ⁴²	Report
91	Tunisia	European Renal Association - European Dialysis and Transplant Association ¹³ and Charles Nicolle Hospital ⁶¹ (Ben Abdallah, T. Tunis, Tunisia. August 2008)	Report, journal article and personal communication
92	Turkey	European Renal Association - European Dialysis and Transplant Association ¹³	Report
93	Turks and Caicos Islands	Caribbean Renal Registry ⁴²	Report
94	Ukraine	European Renal Association - European Dialysis and Transplant Association ¹³	Report
95	United Arab Emirates (UAE)	Emirates Medical Association Nephrology Society (AlRukhaimi, MN. Dubai, United Arab Emirates. June 2008)	Personal communication
96	Uruguay	Uruguayan Dialysis Registry ⁶² (González Bedat, MC. Montevideo, Uruguay. August 2008)	Report and personal communication
97	Uzbekistan	Tashkent City Nephrology Center (Tashkent City, Uzbekistan. October 2008)	Personal communication
98	Venezuela	The Latin American Dialysis and Transplant Registry ¹¹ (Cusumano, A. Buenos Aires, Argentina. August 2010)	Report and personal communication
99	Viet Nam	University Training Center for Health Care Professionals: Nephrology–Urology–Transplantation Center ⁶³	Journal article
100	Yemen	The Renal Diseases Friendship Society (Sheiban, AK. Sana, Yemen. July 2008)	Personal communication

Country names in parentheses indicate abbreviations used in figures.

Appendix Table 1b. Data sources for developed countries

	Country	Source	Source type
1	Australia	Australia and New Zealand Dialysis and Transplant Registry ¹⁴	Report
2	Austria	European Renal Association - European Dialysis and Transplant Association ¹³	Report
3	Belgium		
	-Dutch speaking (<i>Belgium (D)</i>)	European Renal Association - European Dialysis and Transplant Association ¹³	Report
	-French speaking (<i>Belgium (F)</i>)	European Renal Association - European Dialysis and Transplant Association ¹³	Report
4	Canada	Canadian Organ Replacement Registry ⁶⁴ (Na, Y. Ontario, Canada. September 2008)	Report and personal communication
5	Cyprus	Cyprus Ministry of Health Monitoring Unit (Athanasiadou, M. Nicosia, Cyprus. April 2009)	Personal communication
6	Denmark	Danish Nephrology Registry ⁶⁵ and European Renal Association - European Dialysis and Transplant Association ¹³	Report
7	Finland	Finnish Registry of Kidney Diseases ⁶⁶	Report
8	France	European Renal Association - European Dialysis and Transplant Association ¹³	Report
9	Germany	European Renal Association - European Dialysis and Transplant Association ¹³	Report
10	Greece	Board of Registry, Coordination and Control of RRT: General Hospital of Athens (Ioannidis, GA. Athens, Greece. July 2008) and European Renal Association - European Dialysis and Transplant Association ¹³	Report and personal communication
11	Hong Kong	Hong Kong Renal Registry ⁶⁷ and United States Renal Data System ¹²	Report
12	Iceland	European Renal Association - European Dialysis and Transplant Association ¹³	Report
13	Ireland	Irish Nephrology Society ⁶⁸ and Irish Kidney Association (Hand, A. Dublin, Ireland. March 2009)	Report and personal communication
14	Israel	The Israel Center for Disease Control and The Israeli Society of Nephrology and Hypertension ^{69;70}	Report
15	Italy	Niguarda Ca' Granda Hospital: Service of Biostatistics ³⁶ (Nichelatti, M. Milan, Italy. July 2008) and European Renal Association - European Dialysis and Transplant Association ¹³	Report and personal communication
16	Japan	Japanese Society of Dialysis Therapy ^{71 72}	Journal article and report
17	Luxembourg	United States Renal Data System ¹²	Report
18	Netherlands	European Renal Association - European Dialysis and Transplant Association ¹³	Report
19	New Zealand	Australia and New Zealand Dialysis and Transplant Registry (ANZDATA) ¹⁴	Report
20	Norway	Norwegian Renal Registry ⁷³ and European Renal Association - European Dialysis and Transplant Association ¹³	Report
21	Portugal	Portuguese Renal Registry ⁷⁴ and European Renal Association - European Dialysis and Transplant Association ¹³	Report
22	Singapore	Singapore Renal Registry ⁷⁵	Report
23	Slovenia	Slovenian Renal Replacement Therapy Registry ⁷⁶ and European Renal Association - European Dialysis and Transplant Association ¹³	Report
24	South Korea	Korean Society of Nephrology ⁷⁷ (Jin, DC. Seoul, Republic of Korea. May 2008)	Report and personal communication
25	Spain	Spanish Registry of Renal Patients ⁷⁸	Report
26	Sweden	Swedish Renal Registry (Schön, S. Jönköping, Sweden. September 2008) and European Renal Association - European Dialysis and Transplant Association ¹³	Report and personal communication
27	Switzerland	Swiss Association of Health Insurance ⁷⁹ and Federal Statistical Office: Swiss Statistics ⁸⁰	Journal article and online database
28	Taiwan	United States Renal Data System ¹²	Report
29	United Kingdom (<i>UK</i>)	United Kingdom Renal Registry ⁸¹ (Ansell, D. Bristol, United Kingdom. May 2008)	Report and personal communication
30	United States of America (<i>USA</i>)	United States Renal Data System ¹²	Report

Country names in parentheses indicate abbreviations used in figures.

Appendix Table 2. Economic status and world region of countries reported to be performing dialysis

	Country	Economic Status	WHO World Region	Data collected?	Year of most recent data
1	Albania	Developing	EUR	No	
2	Algeria	Developing	AFR	Yes	2008
3	Angola ^a	Developing	AFR	Yes	2008
4	Antigua and Barbuda ^a	Developing	AMR	Yes	2007
5	Argentina	Developing	AMR	Yes	2007
6	Armenia	Developing	EUR	Yes	2008
7	Australia	Developed	WPR	Yes	2008
8	Austria	Developed	EUR	Yes	2008
9	Azerbaijan	Developing	EUR	Yes	2008
10	Bahamas ^a	Developing	AMR	Yes	2005
11	Bahrain	Developing	EMR	No	
12	Bangladesh	Developing	SEAR	Yes	2008
13	Barbados ^a	Developing	AMR	Yes	2005
14	Belarus	Developing	EUR	Yes	2007
15	Belgium – Dutch speaking region	Developed	EUR	Yes	2008
16	Belgium – French speaking region	Developed	EUR	Yes	2008
17	Benin	Developing	AFR	Yes	2008
18	Bolivia ^a	Developing	AMR	Yes	2007
19	Bosnia and Herzegovina - Federation	Developing	EUR	Yes	2008
20	Bosnia and Herzegovina - Republika Sprska	Developing	EUR	Yes	2008
21	Brazil	Developing	AMR	Yes	2008
22	British Virgin Islands ^a	Developing ^b	AMR	Yes	2007
23	Brunei Darussalam	Developing	WPR	Yes	2008
24	Bulgaria	Developing	EUR	Yes	2005
25	Cameroon	Developing	AFR	Yes	2008
26	Canada	Developed	AMR	Yes	2008
27	Cayman Islands ^a	Developing ^b	AMR	Yes	2007
28	Chile	Developing	AMR	Yes	2007
29	China	Developing	WPR	Yes	2008
30	Colombia	Developing	AMR	Yes	2007
31	Costa Rica	Developing	AMR	Yes	2007
32	Côte d'Ivoire	Developing	AFR	Yes	2008
33	Croatia	Developing	EUR	Yes	2008
34	Cuba	Developing ^b	AMR	Yes	2007
35	Cyprus	Developed	EUR	Yes	2007
36	Czech Republic	Developing	EUR	Yes	2008
37	Democratic Republic of Congo ^a	Developing	AFR	Yes	2007
38	Denmark	Developed	EUR	Yes	2008
39	Dominican Republic	Developing	AMR	Yes	2007
40	Ecuador	Developing	AMR	Yes	2007
41	Egypt	Developing	EMR	Yes	2008
42	El Salvador	Developing	AMR	Yes	2007
43	Estonia	Developing	EUR	Yes	2008
44	Ethiopia ^a	Developing	AFR	Yes	2008
45	Finland	Developed	EUR	Yes	2008
46	the Former Yugoslavic Republic of Macedonia	Developing	EUR	Yes	2008
47	France	Developed	EUR	Yes	2008
48	Gabon	Developing	AFR	Yes	2008
49	Georgia	Developing	EUR	Yes	2008
50	Germany	Developed	EUR	Yes	2005
51	Ghana	Developing	AFR	Yes	2008
52	Greece	Developed	EUR	Yes	2008
53	Guatemala	Developing	AMR	Yes	2007
54	Honduras	Developing	AMR	Yes	2007
55	Hong Kong	Developed	WPR	Yes	2007
56	Hungary	Developing	EUR	Yes	2008
57	Iceland	Developed	EUR	Yes	2008
58	India	Developing	SEAR	Yes	2005
59	Indonesia	Developing	SEAR	Yes	2007
60	Iran	Developing	EMR	Yes	2007
61	Iraq	Developing	EMR	No	
62	Ireland	Developed	EUR	Yes	2008
63	Israel	Developed	EUR	Yes	2008
64	Italy	Developed	EUR	Yes	2008
65	Jamaica ^a	Developing	AMR	Yes	2007
66	Japan	Developed	WPR	Yes	2008

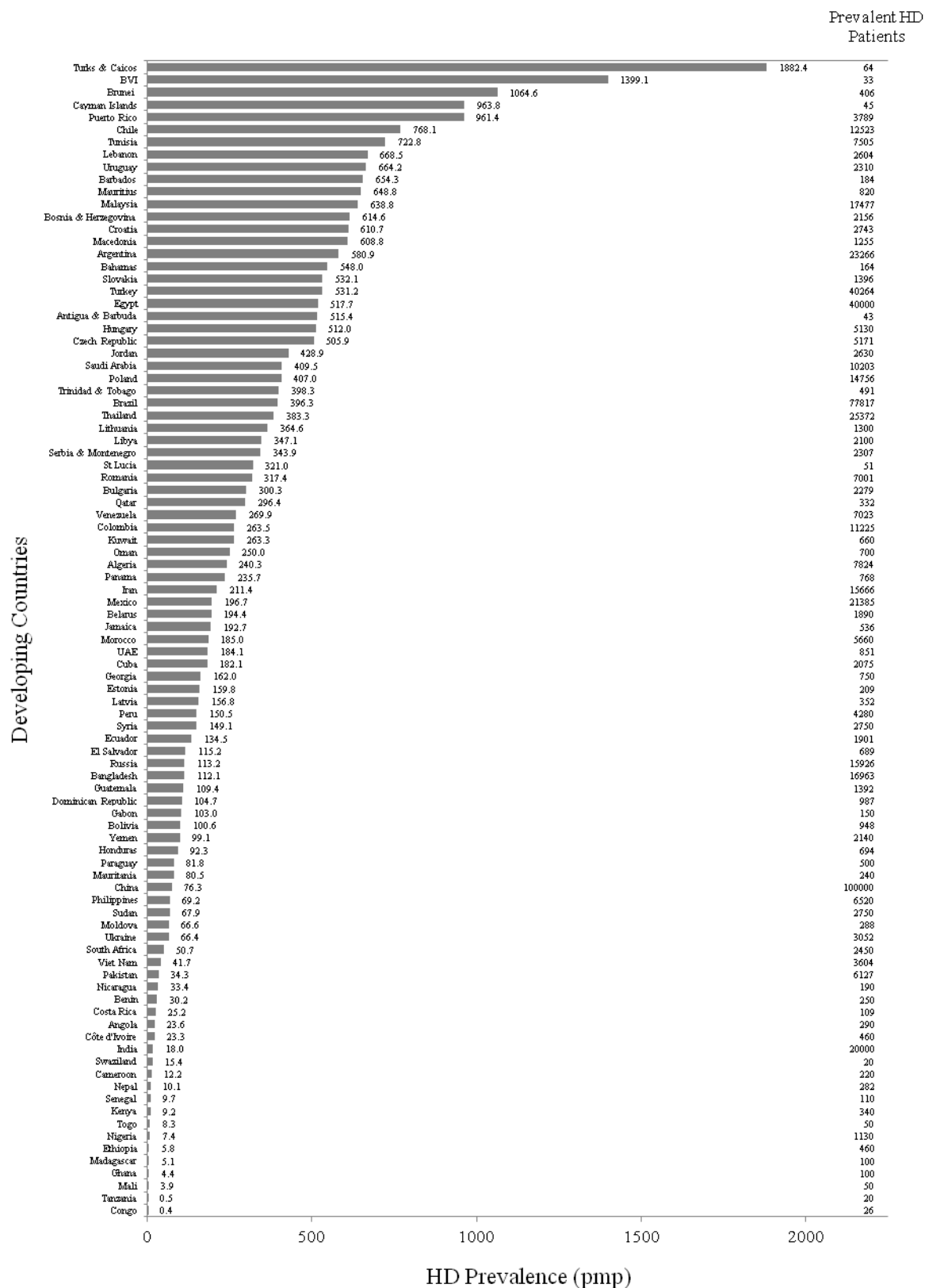
67	Jordan	Developing	EMR	Yes	2008
68	Kazakhstan	Developing	EUR	No	
69	Kenya	Developing	AFR	Yes	2007
70	Kuwait	Developing	EMR	Yes	2007
71	Kyrgyzstan	Developing	EUR	No	
72	Latvia	Developing	EUR	Yes	2008
73	Lebanon	Developing	EMR	Yes	2007
74	Libya	Developing	EMR	Yes	2007
75	Lithuania	Developing	EUR	Yes	2008
76	Luxembourg	Developed	EUR	Yes	2008
77	Madagascar ^a	Developing	AFR	Yes	2008
78	Malaysia	Developing	WPR	Yes	2008
79	Maldives ^a	Developing	SEAR	Yes	2005
80	Mali	Developing	AFR	Yes	2008
81	Malta	Developed	EUR	No	
82	Mauritania	Developing	AFR	Yes	2008
83	Mauritius	Developing	AFR	Yes	2008
84	Mexico	Developing	AMR	Yes	2007
85	Moldova	Developing	EUR	Yes	2008
86	Morocco	Developing	EMR	Yes	2007
87	Myanmar	Developing	SEAR	Yes	2005
88	Nepal	Developing	SEAR	Yes	2007
89	Netherlands	Developed	EUR	Yes	2008
90	New Zealand	Developed	WPR	Yes	2008
91	Nicaragua	Developing	AMR	Yes	2007
92	Nigeria	Developing	AFR	Yes	2008
93	Norway	Developed	EUR	Yes	2008
94	Oman	Developing	EMR	Yes	2007
95	Pakistan	Developing	EMR	Yes	2008
96	Panama	Developing	AMR	Yes	2007
97	Paraguay	Developing	AMR	Yes	2007
98	Peru	Developing	AMR	Yes	2005
99	Philippines	Developing	WPR	Yes	2007
100	Poland	Developing	EUR	Yes	2008
101	Portugal	Developed	EUR	Yes	2008
102	Puerto Rico ^a	Developing ^b	AMR	Yes	2007
103	Qatar	Developing	EMR	Yes	2005
104	Romania	Developing	EUR	Yes	2008
105	Russia	Developing	EUR	Yes	2008
106	Saint Lucia ^a	Developing	AMR	Yes	2007
107	Saudi Arabia	Developing	EMR	Yes	2008
108	Senegal	Developing	AFR	Yes	2007
109	Serbia and Montenegro	Developing	EUR	Yes	2004
110	Singapore	Developed	WPR	Yes	2005
111	Slovakia	Developing	EUR	Yes	2008
112	Slovenia	Developed	EUR	Yes	2008
113	South Africa	Developing	AFR	Yes	2007
114	South Korea	Developed	WPR	Yes	2008
115	Spain	Developed	EUR	Yes	2008
116	Sri Lanka	Developing	SEAR	Yes	2005
117	Sudan	Developing	EMR	Yes	2007
118	Swaziland ^a	Developing	AFR	Yes	2008
119	Sweden	Developed	EUR	Yes	2008
120	Switzerland	Developed	EUR	Yes	2007
121	Syria	Developing	EMR	Yes	2006
122	Taiwan	Developed	^c	Yes	2008
123	Tanzania ^a	Developing	AFR	Yes	2008
124	Thailand	Developing	SEAR	Yes	2007
125	Togo	Developing	AFR	Yes	2008
126	Trinidad and Tobago	Developing	AMR	Yes	2007
127	Tunisia	Developing	EMR	Yes	2008
128	Turkey	Developing	EUR	Yes	2008
129	Turkmenistan	Developing	EUR	No	
130	Turks and Caicos Islands ^a	Developing ^b	AMR	Yes	2007
131	Ukraine	Developing	EUR	Yes	2008
132	United Arab Emirates	Developing	EMR	Yes	2008
133	United Kingdom	Developed	EUR	Yes	2008
134	United States of America	Developed	AMR	Yes	2008
135	Uruguay	Developing	AMR	Yes	2008
136	Uzbekistan	Developing	EUR	Yes	2008
137	Venezuela	Developing	AMR	Yes	2007
138	Viet Nam	Developing	WPR	Yes	2008
139	Yemen	Developing	EMR	Yes	2007

AFR, African Region; AMR, Americas Region; EMR, East Mediterranean Region; EUR, European Region; SEAR, South East Asia Region; WPR, West Pacific Region

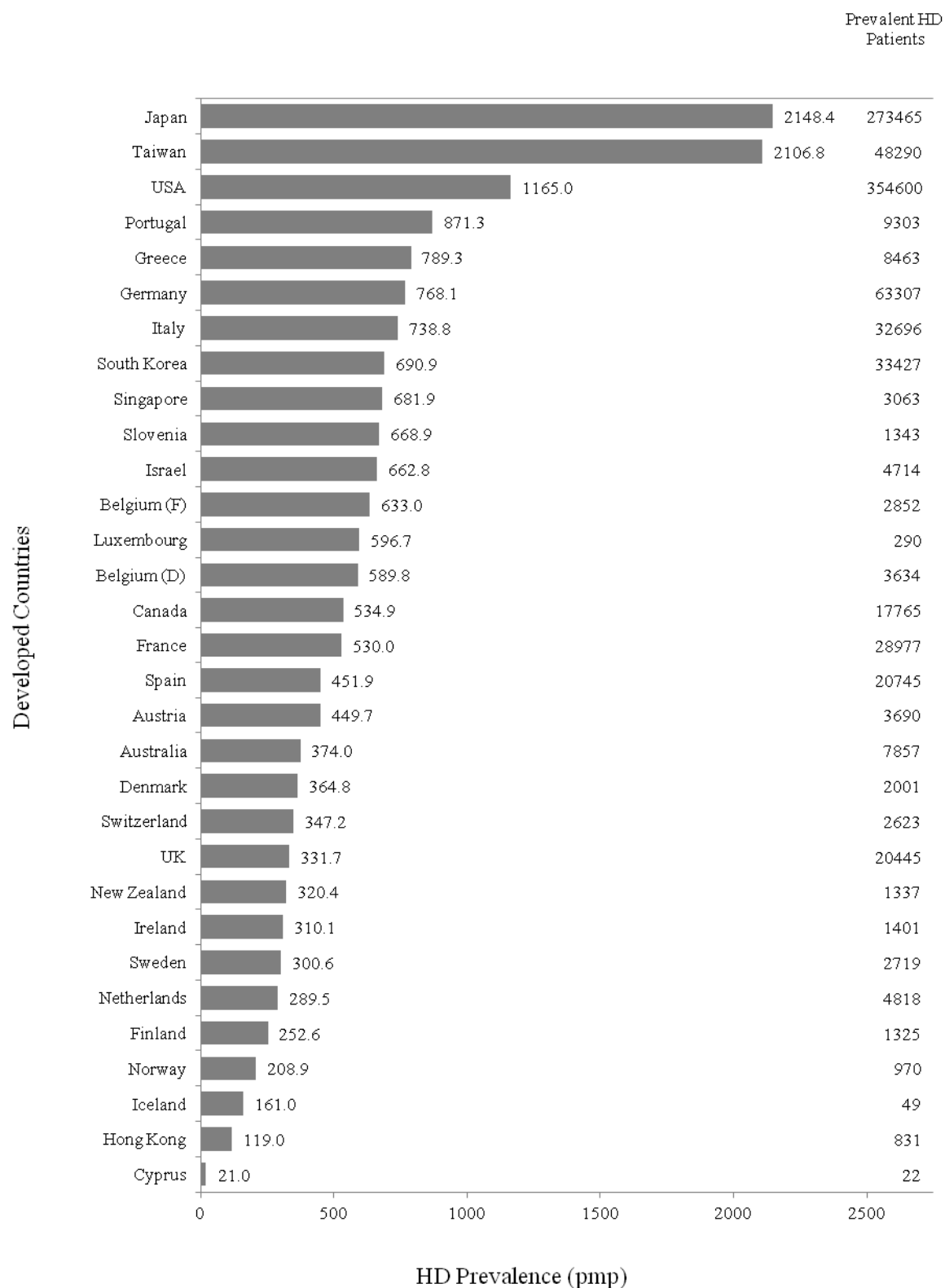
^a Indicates nations reporting dialysis use not identified by Grassmann et al. ¹⁸

^b Indicates a non-member nation of the International Monetary Fund. ¹⁹ Classifications based on Central Intelligence Agency guidelines. ³⁹

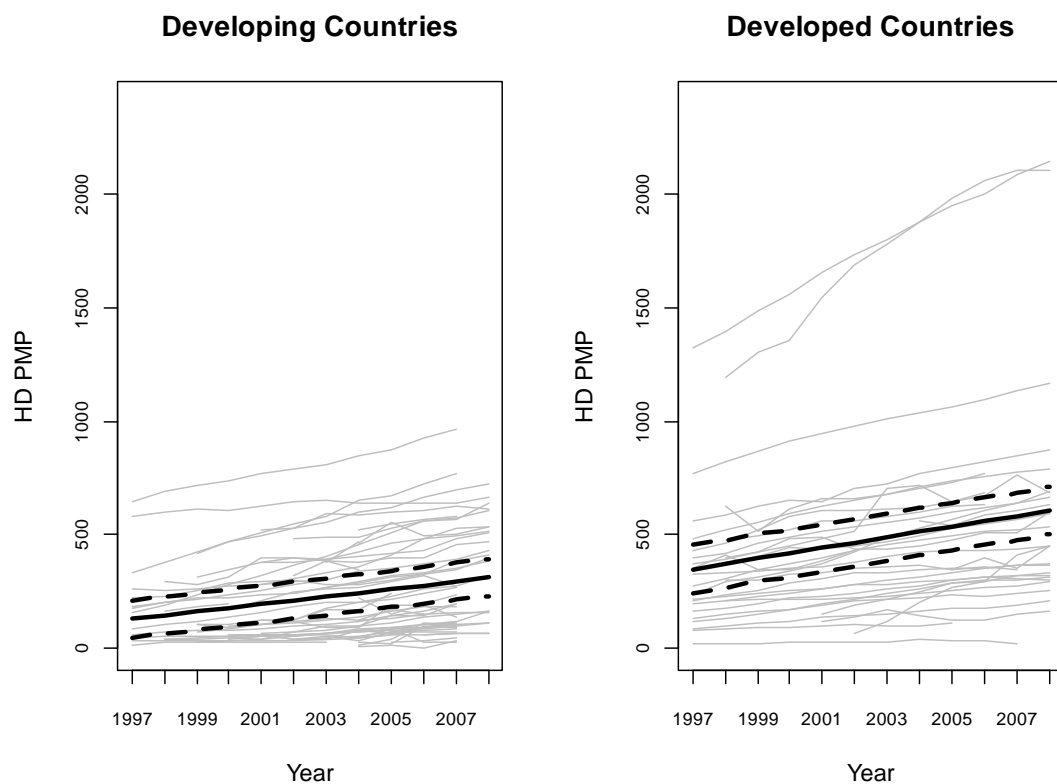
^c Indicates a non-member nation of the World Health Organization. ⁴⁰



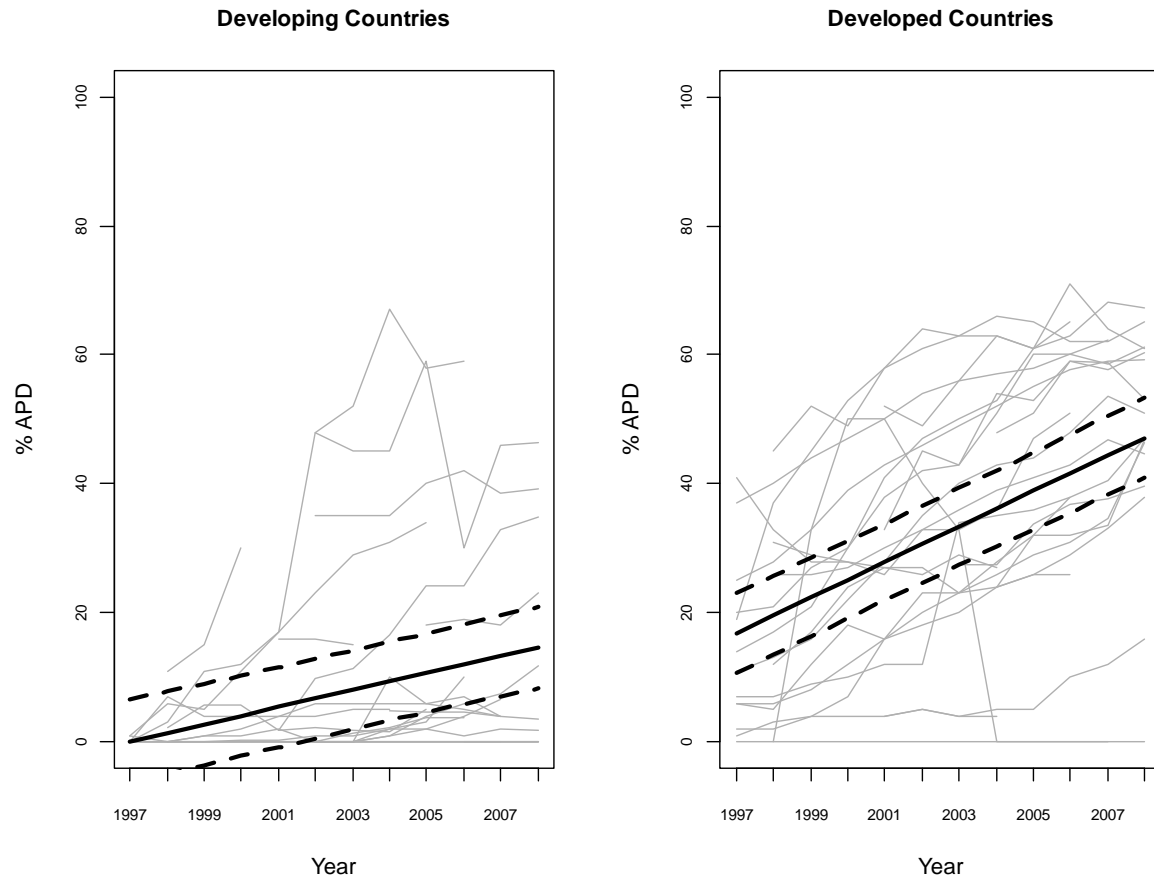
Appendix Figure 1a. HD prevalence in developing countries according to most recent data



Appendix Figure 1b. HD prevalence in developed countries according to most recent data



Appendix Figure 2. Trends in the prevalence of hemodialysis per million population from 1997 to 2008 in developing and developed countries. The grey lines represent trends in individual countries, and the black lines the overall trend with 95% confidence intervals.



Appendix Figure 3. Trends in the proportion of peritoneal dialysis patients treated with automated peritoneal dialysis (APD) from 1997 to 2008 in developing and developed countries. The grey lines represent trends in individual countries, and the black lines the overall trend with 95% confidence intervals.

Assessment of total dialysis population growth

To assess growth in the crude number of prevalent PD and HD patients worldwide, we summed the total number of dialysis patients from countries reporting annual data from 1999 to 2006.

Results

In total, 46 countries reported sufficient data to assess trends in the global PD population. From 1999 to 2006, there was a steady increase in the crude number of patients using PD worldwide:
n = 75 125 (year 1999); n = 77 264 (year 2000); n = 80 988 (year 2001); n = 83 124 (year 2002);
n = 90 813 (year 2003); n = 95 535 (year 2004); n = 99 616 (year 2005); n = 101 826 (year 2006).

Similarly, we assessed trends in HD growth using data reported from 46 countries. From 1999 to 2006, there was an increase in the number of prevalent HD patients: n = 690 732 (year 1999);
n = 736 269 (year 2000); n = 788 718 (year 2001); n = 831 196 (year 2002); n = 890 661 (year 2003);
n = 937 580 (year 2004); n = 973 377 (year 2005); n = 1 016 727 (year 2006).