



Fresenius Medical Care AG is the world's leading provider of dialysis products and medical care for patients with chronic renal failure.

ESRD Patients in 2002

A Global Perspective

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Preface

At the end of the year 2002, the number of people undergoing dialysis exceeded 1.2 million – a number certainly unimaginable in the early days of dialysis. Just thirty years ago, only approximately 25,000 patients had access to this life-saving therapy.

Today, the global end-stage renal disease (ESRD) patient population continues to grow at an annual rate of 7% – a growth driven by an aging population, increased incidence of diseases involving renal failure, improved technology and better access to treatment.

In numerous countries, renal registries and other official bodies are valuable sources of extensive information on various aspects of ESRD demographics, treatment practices and outcomes. Such information provides a base for international comparisons and aids understanding of treatment policies and their implications for the well-being of patients.

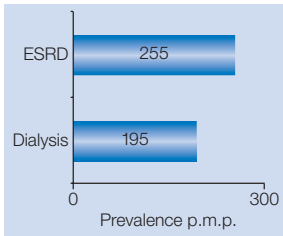
Conclusions drawn from such data provide knowledge of value to both medical communities and policy makers throughout the world. However, data collection and analysis on such a large scale requires extensive resources, and a time lapse between data collection and publication is inevitable.

122 countries now contribute to the annual Fresenius Medical Care survey. This brochure provides a comprehensive overview of ESRD epidemiology at the end of the year 2002 and, as such, offers a unique insight into this patient population, its global distribution and the treatment modalities employed.

Global View of ESRD Patients

ESRD Patients	1,587,000
thereof HD	1,094,000
thereof PD	133,000
thereof Tx	360,000
World Population	6.3 billion

The global ESRD patient population was estimated to have reached almost 1.6 million at the end of 2002. Of these patients, more than 1.2 million were undergoing dialysis treatment (haemodialysis (HD) or peritoneal dialysis (PD)) and around 360,000 people were living with kidney transplants (Tx).

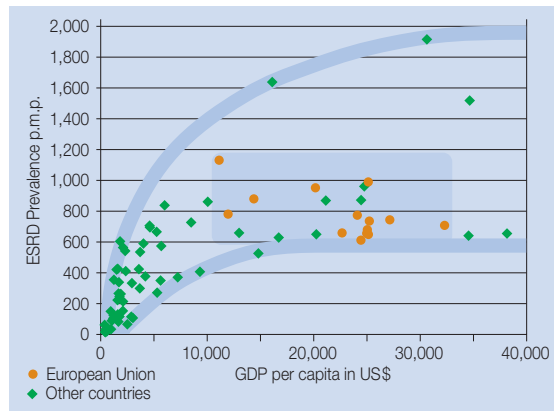


The prevalence of treated ESRD patients in the general population shows a high global variation, ranging from less than 100 to more than 1,500 patients per million population (p.m.p.). In Japan, ESRD prevalence exceeds 1,900 p.m.p., in the USA ESRD prevalence is around 1,500 p.m.p. and the European Union averages at around 830 p.m.p.. The much lower global average of 255 p.m.p. for ESRD suggests that, from the global perspective, access to treatment is still limited and a number of patients with terminal renal failure do not receive treatment.

The ESRD population continues to grow at a significantly higher rate than the world population, as shown by the 2001/2002 growth rates.

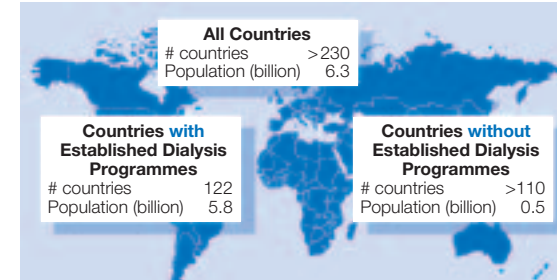
Annual Growth Rates	
World population	1.3%
ESRD	7%
HD	7%
PD	5%
Tx	7%

A comparison of national economic strength (expressed as gross domestic product (GDP)) with prevalence of ESRD suggests that economic factors may impose restrictions on treatment. A restriction is indicated in countries where the GDP per capita is below a limiting value. Further analysis shows that there is no correlation between economic strength and ESRD prevalence in the countries of the European Union.



ESRD prevalence and economic welfare in 75 countries representing 99% of the global ESRD patient population

Countries Reporting Data on Dialysis Patients



Number of countries with and without an established dialysis programme

Of the more than 230 countries (or areas of special sovereignty) worldwide, 122 countries reported that they provide dialysis care to patients with renal failure. Thus, approximately 90% of the world population has access to dialysis treatment, at least theoretically.

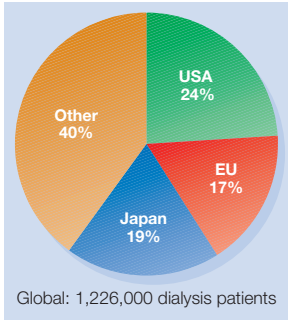
57% of the global dialysis patient population is treated in just five countries – USA, Japan, Germany, Brazil and Italy. Together these account for less than 12% of the world population. The different values for the prevalence of dialysis in these five countries, ranging from 330 p.m.p. in Brazil to 1,820 p.m.p. in Japan, are an indication of the widely varying situation regarding dialysis treatment practices and outcomes.

The next 10 countries ranked by the size of their dialysis patient population (i.e. countries 6–15 in the table below) account for 22% of the global dialysis patient population and 29% of the world population. The remaining 21% of global dialysis patients are treated in more than 100 different countries representing more than 50% of the world population (i.e. countries 16–122).

Regional concentration of dialysis patients

Countries ranked by dialysis population	Population (million)	% of world population	Dialysis patients (thousand)	% of total dialysis patients	Prevalence of dialysis (p.m.p.)
USA	282	4.5%	299	24%	1,060
Japan	128	2.0%	232	19%	1,820
Germany	83	1.3%	63	5%	750
Brazil	177	2.8%	59	5%	330
Italy	58	0.9%	43	4%	750
Countries 6 to 15	1,803	28.8%	268	22%	150
Countries 16 to 122	3,266	52.2%	262	21%	80
Countries 123 to 232	461	7.4%	0	0%	0
Total	6,257		1,226		195

Global View of Dialysis Patients



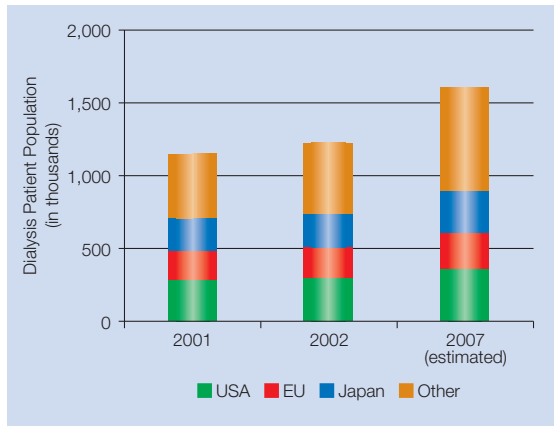
From a global view, most dialysis patients can be allocated to three major geographical regions: the USA, the European Union (EU) and Japan. 60% of all dialysis patients are treated in these 17 countries. The remaining 40% of dialysis patients are distributed throughout different geographical regions (designated "Other" in the figures).

Growth rates from 2001 to 2002 are similar in the USA, Japan and the European Union. In contrast, the prevalence of dialysis in the general population varies significantly in these regions: values for Japan, the USA and the European Union are 1,820, 1,060 and 550 p.m.p., respectively.

Furthermore, growth rates in these three major geographical regions are significantly lower than those in regions such as Asia, Latin America, Middle East and Africa. This variation in growth rates may be partially explained by differences in demographics and the maturity of dialysis programmes, i.e. an increasing access to dialysis programs in developing countries.

Extrapolation of patient populations based on current growth rates suggests a change in the regional distribution of patients over the next 5 years: a significantly higher proportion of patients may possibly undergo dialysis treatment in Asia, Latin America, Eastern Europe, Middle East and Africa.

Annual Regional Dialysis Population Growth Rates	
USA	~5%
European Union	~4%
Japan	~5%
Other	~10%
Total	~7%

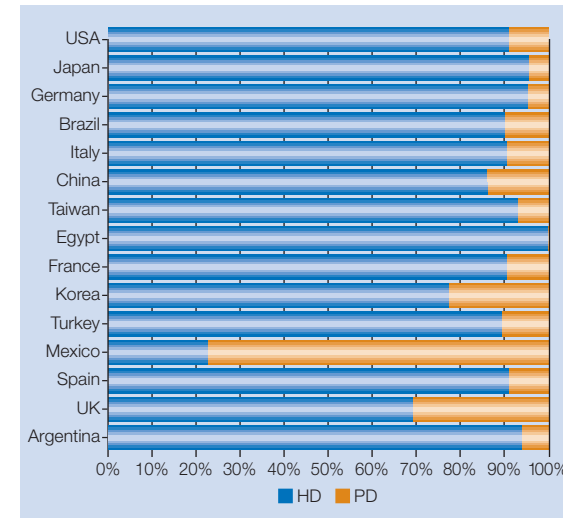
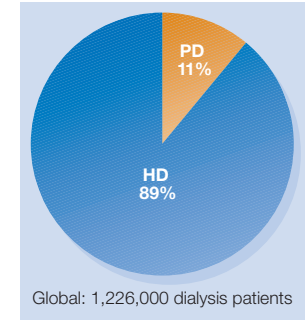


Development of dialysis patient population split by geographic region

At the end of year 2002, HD remained the most common treatment modality, with around 1,094,000 patients undergoing haemodialysis (89% of all dialysis patients) and around 133,000 patients undergoing peritoneal dialysis (11% of all dialysis patients).

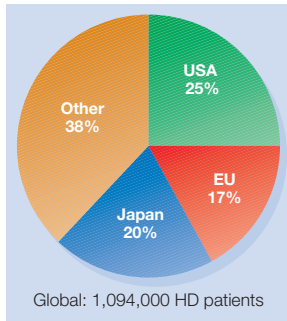
Analysis of the 15 countries with the largest dialysis patient populations indicates that the global HD:PD distribution ratio is not reflected in all countries. Countries such as the Republic of Korea, Mexico and UK have a significantly higher proportion of PD patients, while Japan, Germany, Taiwan, Egypt and Argentina have less PD patients compared to the global average. With the exception of Mexico, HD is the predominant treatment modality in all countries.

Furthermore, growth rates calculated on the basis of HD and PD populations at the end of 2002 indicate a stronger growth in the HD patient population than in the PD population. Significant differences in the growth rates of the various therapy modalities within HD and PD were also evident.



HD-PD patient split in the 15 largest countries ranked by dialysis patient population

Global View of Haemodialysis Patients



The global distribution of haemodialysis patients strongly reflects the global general dialysis patient distribution. However, growth rates for patient numbers on haemodialysis tend to lie slightly above those for dialysis in general (i.e. an average of 5% as opposed to 4% in the three major geographical regions and an average of 11% as opposed to 10% in the remaining regions).

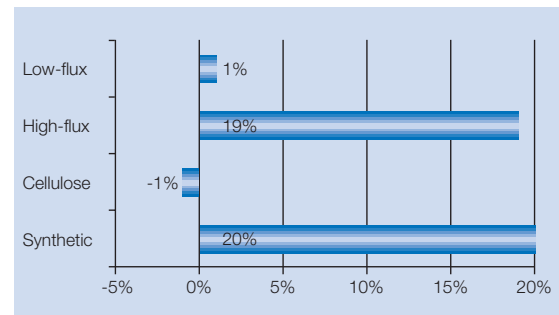
Most haemodialysis patients undergo treatment in dialysis centres. At the end of year 2002, it was estimated that the great majority of the 1,094,000 HD patients were treated in 20,750 centres worldwide with an average of 53 patients per centre.

Annual Regional HD Population Growth Rates	
USA	5%
European Union	4%
Japan	6%
Other	11%
Total	7%

Further global analysis of dialysis centres reveals that 47% of dialysis centres lie within the public sector or belong to healthcare organisations, while the remaining 53% are private. However, large geographical variations are evident; for example, more than 98% of centres are private in the USA (private nephrologists and company providers) while only around 40% are so in the European Union.

Global Patient and Centre numbers	
HD patients	1,094,000
HD centres	20,750
Average number of patients per centre	53

An analysis of the different dialyser types selected for the treatment of haemodialysis patients in 2002 showed a prevailing trend towards high-flux dialysers and synthetic dialysis membranes. Whereas the low-flux dialyser segment increased only slightly (by 1%) in 2002, high-flux dialysers recorded a growth of 19%. The total number of dialysers with a cellulose or modified cellulose membrane declined in 2002 by 1%, while the number of dialysers with a synthetic membrane increased by 20%.



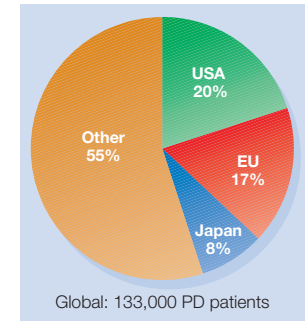
Annual growth rates for dialysers split by type

Global View of Peritoneal Dialysis Patients

The regional distribution of peritoneal dialysis patients differs from that of both HD patients and dialysis patients in general in that Japan has less patients and the 'other' countries (e.g. Asia and Latin America) have more patients. This may be considered a result of the low peritoneal dialysis utilization in Japan, where less than 5% of patients choose this treatment modality, and the relatively high popularity of this treatment modality in some countries in Latin America and Asia. As already mentioned, large PD patient populations, relative to HD, are to be found in Mexico, the UK and the Republic of Korea.

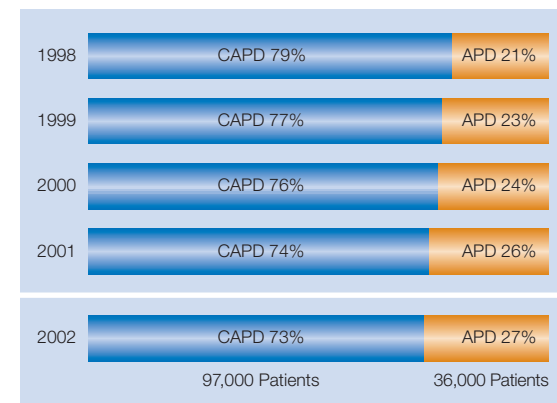
With an average of 5%, peritoneal dialysis growth rates in 2002 were below those of haemodialysis. As in the case of HD, significantly higher growth rates were observed in Asia, Latin America, Middle East and Africa (region "Other") than in the three major single geographical regions (USA, EU and Japan).

Growth in peritoneal dialysis was again driven by automated peritoneal dialysis (APD). Use of this modality increased by 9% in 2002 compared to a 4% increase for continuous ambulatory peritoneal dialysis (CAPD). Since 1998 utilization of APD has increased from 21% of the total PD population to 27% today. Again, strong regional variations in the allocation of patients to either CAPD or APD are evident, with as many as 30% to more than 50% of patients undergoing APD in some countries.



Annual Regional PD Population Growth Rates	
USA	0%
European Union	1%
Japan	-2%
Other	9%
Total	5%

Annual PD System Growth Rates	
CAPD	4%
APD	9%
Total	5%



PD patient population split by treatment modality

The data presented here is derived from information consolidated from 122 countries worldwide.

All data referring to ESRD patients, unless labelled otherwise, refer to the end of year 2002. Growth rates displayed are the 2001 to 2002 annual growth rates.