

Slovenian Society of Nephrology

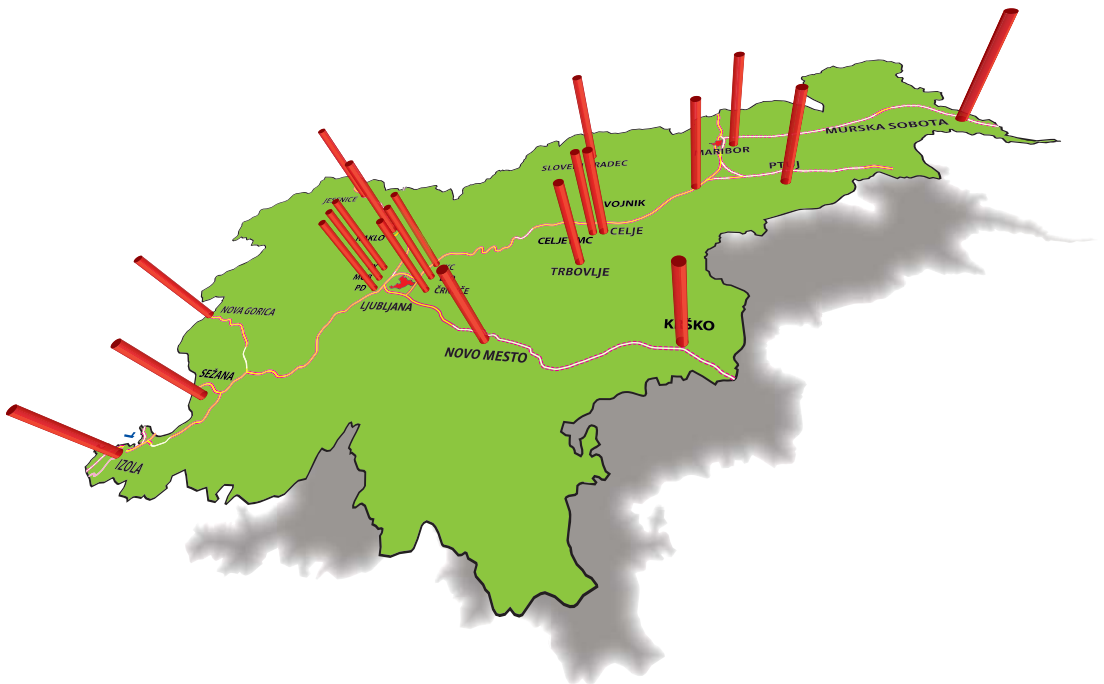
# Slovenian Renal Replacement Therapy Registry



# Annual Report 2005



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Published by: Slovenian Society of Nephrology (member of the Slovenian Medical Association)

Edited by: Jadranka Buturović-Ponikvar

Design: Future Art d. o. o.

Printed by: Tiskarna Oman, Peter Oman s. p.

Ljubljana, July 2007

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CIP - Kataložni zapis o publikaciji  
Narodna in univerzitetna knjižnica, Ljubljana

616.61-085(497.4)"2005"(047)

SLOVENIAN renal replacement therapy registry : annual report  
2005 / [edited by Jadranka Buturović-Ponikvar]. - Ljubljana :  
Slovenian Society of Nephrology, 2007

ISBN 978-961-238-889-8  
1. Buturović-Ponikvar, Jadranka  
234389504

**Suggested citation:** Slovenian Renal Replacement Therapy Registry: Annual Report 2005. Slovenian Society of Nephrology, Ljubljana, Slovenia, July 2007

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- Prof. Jadranka Buturović-Ponikvar, MD, PhD, senior councilor, Chief, Ultrasonography Unit, Department of Nephrology, University Medical Center Ljubljana: designing the individual and renal center questionnaire; collecting, extracting, checking and correcting the data; analyzing the data; preparing the data for ERA/EDTA registry questionnaire section B (aggregated data); presenting the annual report on Slovenian Society of Nephrology meeting; writing the annual report publication
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# Introduction

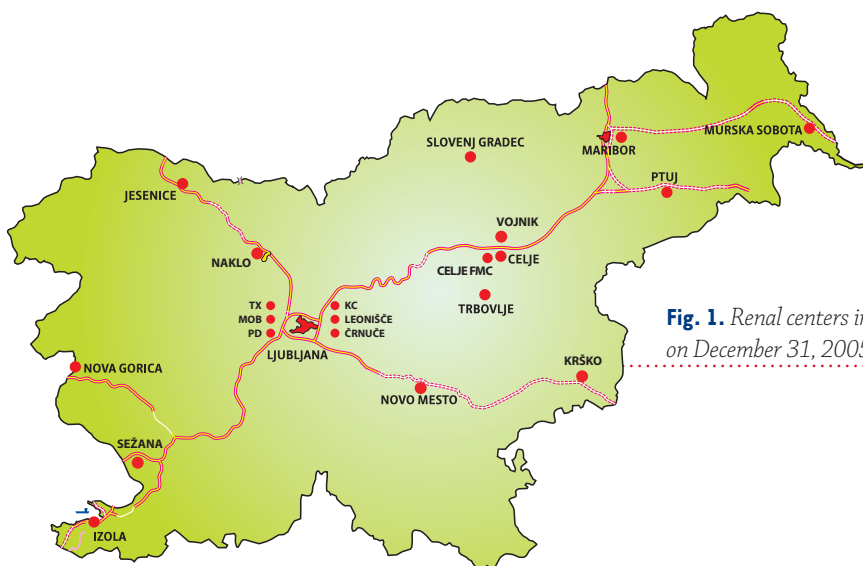
The present report provides an update of the epidemiology and treatment practices of the end-stage renal disease (ESRD) patients treated by renal replacement therapy (RRT) in Slovenia in 2005. The report is based on individual and center questionnaires, prepared by the Slovenian Renal Replacement Therapy Registry Group. The response rate to questionnaires was 100%. Pediatric data are included.

The Expert group for dialysis initiated annual RRT reports in 1999. Initially, these reports were based on data from renal center questionnaires, with each questionnaire tapping at the aggregate data for patients at one center. In 2002, we began collecting individual patient data as well and, by 2004, we have achieved a response rate of 100% for individual patients. With these data Slovenian RRT registry has joined ERA/EDTA (European Renal Association-European Dialysis and Transplant Association) registry (section B, aggregated data), and Slovenian RRT Registry Group was founded, as a working group of the Slovenian Society of Nephrology. The registry is voluntary.

The general population of Slovenia is about 2 million (in 2005 2.000 000, 979 000 men and 1021000 women).

## Renal centers

On December 31, 2005, there were 21 renal centers in Slovenia (1 dialysis center more than in 2004): 15 in-hospital dialysis centers, 5 private, out-patient hemodialysis centers (4 of them Fresenius Medical Care) and 1 transplant center (Fig. 1). One of 15 in-hospital centers is a Pediatric dialysis and transplant unit, and one is a Center for Peritoneal Dialysis at the University Medical Center Ljubljana. 12 out of 15 in-hospital centers perform hemodialysis procedures for patients with acute renal failure, including continuous renal replacement therapy. In addition to the specialized Center for Peritoneal Dialysis at the University Medical Center, peritoneal dialysis is performed in 8 in-hospital centers in Slovenia.

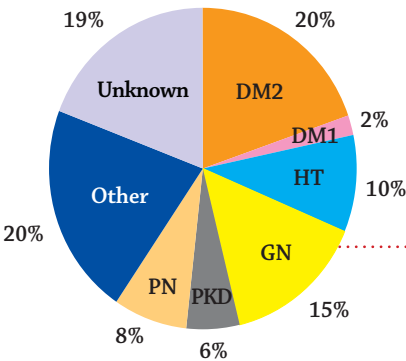


**Fig. 1.** Renal centers in Slovenia on December 31, 2005

# Incident patients

## a) Incident patients at day 1

There were 249 incident patients (day 1) in 2005, with incidence rate of 124.5 pmp (per million of population). Out of those 249 patients, 138 were men (141 pmp) and 111 women (108.7 pmp). Men represented 55.4% of the incident (day 1) patients. Mean age of incident (day 1) patients was  $63.3 \pm 13.3$  years, median age was 65 years. Mean age of incident (day 1) men was  $61.8 \pm 15.7$  years (median 65 years). Mean age of incident (day 1) women was  $65.2 \pm 17$  years (median 69.5 years).



**Fig. 2.** Primary renal disease in incident (at day 1) patients in Slovenia in 2005 (Abbreviations: DM: diabetic nephropathy; HT: hypertensive nephrosclerosis (+ischemic nephropathy); GN: glomerulonephritis; PKD: polycystic kidney disease; PN: pyelonephritis)

## b) Incident patients at day 91 (only patients that survived 91 days on RRT)

There were 238 incident patients (day 91) in 2005, with incidence rate 119 pmp, 134 men (136.9 pmp) and 104 women (101.9 pmp). Men represented 56.3% of the incident (day 91) patients. Mean age of incident (day 91) patients was  $62.8 \pm 16.3$  years (median 65). Mean age of incident (day 91) men was  $61.5 \pm 15.7$  years (median 64). Mean age of incident (day 91) women was  $64.5 \pm 17.1$  years (median 67).

The primary renal disease in incident patients at day 91 were almost the same as in the incident day 1.

## Prevalent patients

Data relating to prevalent ESRD patients on different forms of RRT are presented in Table 1 and Fig. 3. The annual increase in 2005 was 3.8%. After two years of increase, a decrease in number of patients treated with peritoneal dialysis was observed.

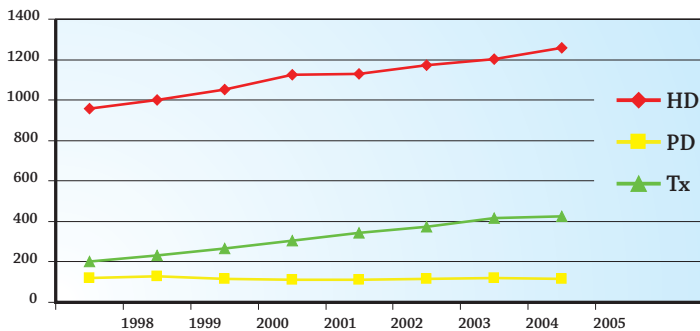


Fig. 3. Different forms of RRT from 1998-2005

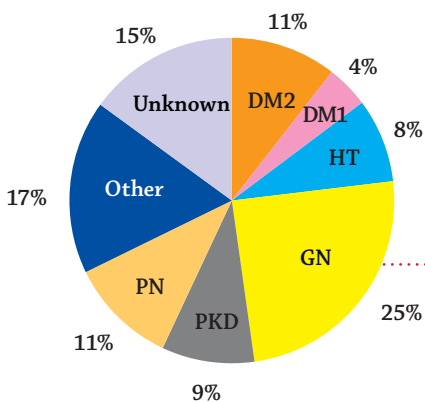
Table 1. Prevalence of end-stage renal disease patients on different forms of renal replacement therapy on December 31 in the period from 1998-2005 (residents only)

December 31	Hemodialysis	Peritoneal dialysis	Functioning graft	All
1998 (n)	957	121	201	1279
1999 (n)	1000	129	230	1359
2000 (n)	1051	117	267	1435
2001 (n)	1125	113	304	1542
2002 (n)	1131	110	343	1584
2003 (n)	1171	116	374	1661
2004* (n)	1202	119	415	1736
2005* (n)	1260	115	427	1802

December 31	Hemodialysis	Peritoneal dialysis	Functioning graft	All
Increase 1999 (n/%)	43 / 4.5 %	8 / 6.6 %	29 / 14.4 %	80 / 6.3 %
Increase 2000 (n/%)	51 / 5.1 %	- 12 / - 9.3 %	37 / 16.1 %	76 / 5.6 %
Increase 2001 (n/%)	74 / 7.04 %	- 4 / - 3.4 %	37 / 13.9 %	107 / 7.5 %
Increase 2002 (n/%)	6 / 0.5 %	- 3 / - 2.7 %	39 / 12.8 %	42 / 2.7 %
Increase 2003 (n/%)	40 / 3.5 %	6 / 5.5%	31 / 9.0 %	77 / 4.9 %
Increase 2004* (n/%)	31 / 2.6 %	3 / 2.6%	41 / 11.0 %	75 / 4.9 %
<b>Increase 2005* (n/%)</b>	<b>58 / 4.8 %</b>	<b>-4 / - 3.4%</b>	<b>12 / 2.9 %</b>	<b>66 / 3.8 %</b>

\* based on individual patient data

On December 31, 2005, there were 1802 prevalent RRT patients in Slovenia, with prevalence rate of 901 pmp, 1007 men (1028.6 pmp) and 795 women (778.6 pmp). Men represented 55.9% of the prevalent RRT patients. Mean age of prevalent patients was 58.1±15 years, median age was 59 years. Mean age of prevalent men was 57.4±14.6 years, median 59 years. Mean age of prevalent women was 59±15.6 years, median age 60 years.



**Fig. 4.** Primary renal disease in prevalent RRT patients in Slovenija in 2005 (Abbreviations: DM: diabetic nephropathy; HT: hypertensive nephrosclerosis (+ischemic nephropathy); GN: glomerulonephritis; PKD: polycystic kidney disease; PN: pyelonephritis)

In pediatric patients alone, the distribution of primary renal diseases would be different. However, since the absolute number of pediatric patients was very small, the inclusion of these patients did not have any significant effect on the statistical results.

The distribution of modalities of RRT is presented in Table 2. The majority of prevalent RRT patients are treated with chronic hemodialysis. These patients are older and with higher percentage of diabetics than patients treated by peritoneal dialysis or kidney transplantation.

**Table 2.** Patients treated by different forms of renal replacement therapy (RRT) in Slovenia on December 31, 2005

	No of patients (% of all RRT)	% Men	Median age (range) – years	% Diabetics	Crude death rate in 2005**
Hemodialysis	1260 (70%)	55%	64 (13-92)	18.3%	13.4%
Peritoneal dialysis	115 (6%)	59%	52 (1-80)	17.4%	6.8%
Transplantation*	427 (24%)	57%	51 (15-75)	4%	0.95%
<b>All†</b>	<b>1802 (100%)</b>	<b>56 %</b>	<b>59 (1-92)</b>	<b>15%</b>	<b>10.0%</b>

\*residents only; \*\* incident patients at day 1 included

**Table 3.** Number of prevalent and incident patients per million of the population (p.m.p.) from 1998-2005

December 31	1998	1999	2000	2001	2002	2003	2004*	2005*
Prevalence p.m.p.	651	692	723	771	807	846	869	901
Incidence p.m.p.	-	115	109	144	115	131	125	125

\*based on individual patient data

## Long-term ( $\geq 30$ years) RRT survivors

In May 2007, 27 patients (1.5% of prevalent RRT patients) treated by RRT for  $\geq 30$  years were alive. There were 15 men and 12 women, aged  $61 \pm 10$  years (47-83). Primary renal disease in these patients was: glomerulonephritis in 16, pyelonephritis in 3, unknown nephropathy in 5, analgesic in 1, lupus in 1 and Alport in 1. None had diabetes. Duration of RRT was  $32 \pm 1.8$  years (30-36.5).

Group 1. Chronic HD  $\geq 30$  years: 13 patients, 5 men and 8 women, aged  $62 \pm 12$  years (45-83), duration of RRT  $31.6 \pm 1.5$  years (30-34). One had a 18-month period of functioning cadaveric kidney graft, the other unsuccessful transplantation (Tx) with graft that never functioned. Vascular access in 10 is AV fistula, in 3 single-lumen temporary catheter, locked with citrate, used as permanent vascular access.

Group 2. Kidney graft in function  $\geq 30$  years: 2 patients (men), 75 and 68 years old, both received full-matched kidney from living related donor (LRD) on 2 June 1976 (after 2 months, and 2 years on HD, respectively), that functions today. Current immunosuppression are low-dose steroids.

Group 3. Current HD, with prolonged Tx period: 3 patients, 2 men, 62 years (24 years Tx and 11 years HD) and 71 years old (22 years Tx and 14 years HD) and a women 52 years old (25 years Tx, 7 years HD).

Group 4. Current Tx, with prolonged HD period: 9 patients, 6 men and 3 women, aged  $58 \pm 5$  years (51-70), duration of RRT  $31.7 \pm 1.4$  years (30-34). HD period was  $15.8 \pm 7$  years (7-28).

HD contributed to 590 years (68.4%) and Tx to 273 years (31.6%) of cumulative 863 years of life in long-term survivors on RRT.

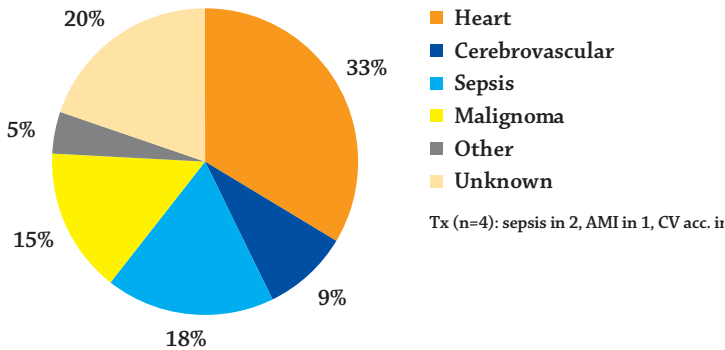
As of May 2007, the longest duration of RRT treatment was 36 years and 6 months (22 years of Tx, LRD, 14 years of HD). The longest duration of HD has been is 34 years, 4 months.

The longest functioning kidney graft is 31 years (2 patients), who both have kidney from full-matched LRD.

22/27 long-term ( $\geq 30$  years) survivors (11 hemodialysis patients and 11 patients with functioning kidney graft) have been treated at the Department of Nephrology, University Medical Center Ljubljana. Two patients have been treated in Dialysis Center Izola, one in Dialysis Center Šempeter, one in Dialysis Center Trbovlje, and one in Dialysis center Krško.

## Crude death rate of RRT patients

During 2005, 177 RRT patients died. Of these, there were 173 dialysis patients and 4 kidney graft recipients.



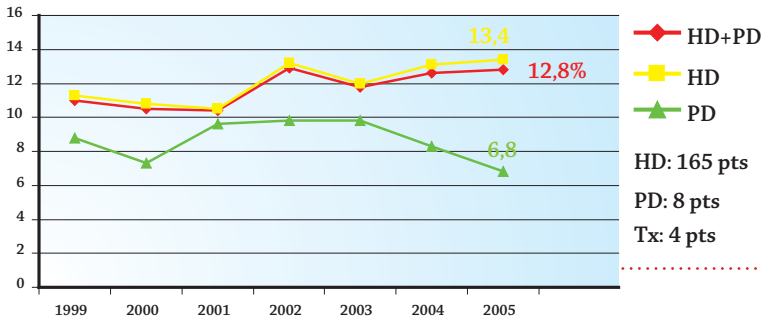
**Fig. 5.** Causes of death of dialysis patients in 2005 (n=173)

The crude death rate was calculated by dividing the number of patients who died with the average number of prevalent RRT patients at the end of 2004 and 2005 (Table 4). Crude death rate for dialysis patients in 2005 was 12.8/ (13.4% for HD patients and 6.8% for PD patients), 0.95% for the transplanted patients and 10% for all RRT patients. The most common cause of death in dialysis patients was cardiovascular disease (33%), followed by sepsis (18%), malignoma (15%) and cerebrovascular disease (9%), Fig. 5. There were three suicides in hemodialysis patients in 2005, two in patients with advanced malignant disease and one in the patient with depression. The cause of death in four renal transplant recipients was: sepsis in 2, acute myocardial infarction in one and cerebrovascular accident in one. The mortality rate of dialysis patients slightly increased between 1999-2005 (Table 4, Fig. 6).

**Table 4.** Crude death rate of dialysis patients in the period from 1999-2005 (for 2005: individual patient data, incident patients at day 1 included)

	1999	2000	2001	2002	2003	2004	2005
All dialysis (†HD+‡PD)	10.96%	10.45%	10.4 %	12.9%	11.8%	12.6%	12.8
HD	11.3%	10.8%	10.5%	13.2%	12.0%	13.1%	13.4%
PD	8.8%	7.3%	9.6%	9.8%	9.8%	8.3%	6.8%

† HD: Hemodialysis  
‡ PD: peritoneal dialysis



**Fig. 6.** Crude death rate of dialysis patients in the period from 1999-2005 (for 2005: individual patient data, incident patients at day 1 included)

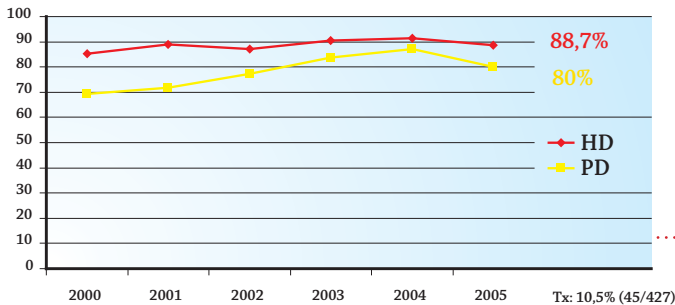
HD: 165 pts  
PD: 8 pts  
Tx: 4 pts

## Erythropoiesis stimulating agents (ESA) therapy in prevalent RRT patients

Hemodialysis patients (n=1260, median age 64 yrs (13-92), 55% men, 18,3% diabetics): 88.7% (1116/1260) have received ESA, almost all of them intravenously. Mean dose in the last week of December 2005 was ~ 8000 units (7910±5991, range 500-60000 units, with only the patients that received ESA were counted). 42% of the patients have received NeoRecormon, 44% Eprex and 4% Aranesp.

Peritoneal dialysis patients (n=115, median age 52 yrs, range 1-80, 59% men, 17,4% diabetics): 78.3% (90/115) have received ESA subcutaneously. Mean dose in the last week of December 2005 was approximately 6000 units (5996±4304, range 500-20000 units, with only the patients that received ESA were counted). 79% of the patients have received NeoRecormon, 21% Aranesp.

Transplant patients (n=427, Median age 51 yrs, range 15-75, 57% men, 4% diabetics): 10.5% (45/427) have received ESA subcutaneously. Mean dose in the last week of December 2005 was ~ 6000 units (5844±4011, range 2000-18000 units, only the patients that received ESA were counted). 67% of the patients received NeoRecormon, 33% Aranesp.



**Fig. 7.** Percentage of dialysis patients treated with erythropoiesis stimulating agents (ESA) from 2000-2005

# Hemodialysis in prevalent patients

The majority of Slovenian hemodialysis patients were treated in in-hospital centers (79.7% at the end of 2005). The percentage of patients treated in private, out-patient hemodialysis centers has been stable from 2002-2005. Four out of 5 private centers (that served 220 patients in 2004 and 253 patients in 2005) are owned by Fresenius Medical Care.

**Table 5.** Number and percentage of hemodialysis patients treated in private, out-patient hemodialysis centres on December 31, 1999-2005.

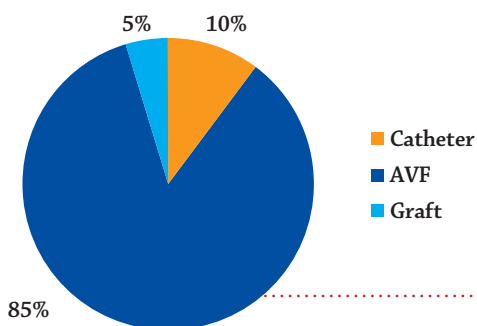
December 31	1999	2000	2001	2002	2003	2004*	2005*
private/all HD patients (n)	131/1000	157/1051	177/1125	223/1131	246/1171	243/1202	269/1260
% of private HD patients	13.1%	14.9%	15.7%	19.7%	21.0%	20.2%	21.3%

\*Individual patient data

The percentage of the patients treated by convective techniques (hemodiafiltration/hemofiltration) increased from 17.5% in 2004 to 26.9% of all hemodialysis patients (n=339). The majority of the patients at the end of 2005 (73.1%, n=921) have been treated by bicarbonate hemodialysis. In the majority of hemodialysis patients (66.4%, 837/1260) ultrapure dialysis fluid has been used.

Prescription of hemodialysis: the minority of patients (5.3%, 68/1260) are treated with 2x weekly dialysis, 9 patients (0.7%) by 4x weekly hemodialysis and the vast majority, 93.9% (1183/1260) by 3x weekly hemodialysis. The average weekly time on dialysis has been 13.1±2.1 hours (this includes patients treated by 2x weekly dialysis), the median weekly time on hemodialysis has been 13.5 hours. Regular night shift dialysis has been offered in Dialysis Center Zaloška to the employed patients, students and pupils. The mean dry body weight of hemodialysis patients was 67.8±15.7 kg (29.5-138.5 kg, median body weight 66 kg). The mean blood flow was 282±40 ml/min (140-400), and 101 patients (8%) were dialyzed in single-needle dialysis mode. Anticoagulation was performed by low molecular weight heparin in 18.6% (237/1269) of hemodialysis patients, while unfractionated heparin was used in the majority (81.4%) of hemodialysis patients. Mean heparin dose was 5337±2268 iu per hemodialysis (ranging from 2000-19.500 units, with dose of low molecular weight heparin, expressed in antiXa units, included).

## Vascular access in hemodialysis patients



**Fig. 8.** Vascular access in prevalent hemodialysis patients on December 31, 2005

Prevalent hemodialysis patients (n=1260): Vascular access were: native arteriovenous fistula (AV) in 85% (n=1072), PTFE graft in 4.8% (n=60) and HD catheter in 10.2% (n=128), Fig. 7. In patients with AV fistula and graft, location of fistula/anastomosis was on forearm in 65.6% (n=740), elbow/arm in 33% (n=374) and on thigh in 1.6% (n=18). AV fistula or graft were on the left side in 68.9% (n=780) and on the right side in 31.1% (n=292) of cases. Hemodialysis catheters (n=128) were: temporary (noncuffed) in 92.2% (n=118) and permanent silastic in 7.8% (n=10); precurved jugular in 80% (n=102), subclavian in 16% (n=21) and femoral in 4% (n=5); placed on the right side in 94.5% (n=121) and on the left in 5.5% (n=7); single-lumen in 80.5% (n=105) and double-lumen in 19.5% (n=23). The catheters were locked with citrate (4% or 30%) in interdialysis period in the majority of the patients. The most common type of catheter that has been used (also as a permanent access) is a precurved noncuffed single-lumen jugular catheter (Medcomp, Harleysville, PA, USA). In some patients this type of the catheter has been used for years.

Incident hemodialysis patients: On December 31, 2005, there were n= 208 (56,3% men, median age 66 years, range 14-92 years, 21.6% diabetics) patients who were alive and on hemodialysis, with a vascular

access (on December 31, 2005): native arteriovenous fistula in 71.6% (n=149), PTFE graft in 2.0% (n=4) and HD catheter in 26.4% (n=55). In patients with AV fistula and graft the location of fistula/anastomosis was on forearm in 63.4% (n=97), elbow/arm in 36.6% (n=56) of cases. AV fistula or graft were on the left side in 75.2% (n=115) and on the right side in 24.8% (n=38) of these patients. Hemodialysis catheters (n=55) were: temporary (noncuffed) in 96.5% (n=53) and permanent silastic in 3.5% (n=2); precurved jugular in 78% (n=43), subclavian in 18% (n=10) and femoral in 4% (n=2); placed on the right side in 94.5% (n=52) and on the left in 5,5% (n=3); single-lumen in 85.4% (n=47) and double-lumen in 14.6% (n=8) of all cases.

**Vascular access activity in Dialysis Center Zaloška, Department of Nephrology.** Two dedicated nephrologists (M. M. and R. P.) from the Department of Nephrology perform vascular access surgery for the majority of the slovenian hemodialysis patients (13 centers, 64% patients), including children. This includes vascular access surgeries for all private hemodialysis centers in Slovenia. In the rest of the country (6 centers, 36% of the patients) vascular access surgeries are performed by a dedicated surgeon at each hospital, with complicated cases being referred to nephrologists at the Dialysis Center Zaloška. These cases include salvage of the suddenly thrombosed AV fistula and graft. The surgical procedures are performed in the operative theatre at the Dialysis Center Zaloška, under local anesthesia and as outpatient procedure in the vast majority of the patients. In a few patients (mainly pediatric) AV fistula is created under general anesthesia, again by nephrologists.

In 2006, 273 surgical procedures were performed, and 61 of them were salvage procedures of thrombosed AV fistula or graft. In 2006, 843 hemodialysis catheters – mainly temporary (noncuffed) - were inserted. In addition, 445 ultrasonography examinations of AV fistula or graft (preoperative mapping, ultrasonography of dysfunctional or failed fistula) were performed.

In the previous five years (2001-2005) a total of 1108 surgical procedures (AV fistula and grafts: construction, reconstruction and salvage) and 3873 hemodialysis catheter insertions were performed. A total of 4534 AVF/graft construction/salvage procedures and 17943 of hemodialysis catheter insertions were performed in Dialysis Center Zaloška at the end of 2006.

## Hemodialysis monitors in Slovenia

On December 31, 2005, there were 465 hemodialysis monitors in Slovenia, 41.9% from Fresenius, 35.1% from Gambro, 13.1% from Braun, and 7.3% from Hospal-Gambro (Integra). There were 12 monitors for continuous renal replacement therapy, 10 of which were from Prisma-Hospal and two of which were from Braun (Table 6).

**Table 6.** Number and manufacturers of hemodialysis monitors used in Slovenia on 31 December in 2001-2005

HD monitors (n)	2001	2002	2003	2004	2005
All	351	400	413	429	465
Gambro	160	163	164	154	163
Fresenius	147	173	176	187	195
Hospal Integra	25	28	27	32	34
Braun	14	29	35	45	61
CRRT†	5	7	11 (Prisma 10)	11 (Prisma 9)	12 (Prisma 10)

†CRRT: continuous renal replacement therapy

## Transmissible diseases in dialysis patients

2.2% of dialysis patients had the hepatitis B or C virus infection in 2005, and their number and percentage has remained low over the years (Table 7). The number of methicillin resistant *Staphylococcus aureus* (MRSA)-positive dialysis patients has been decreasing in the last three years. All positive patients (including MRSA) have been isolated.

There were no HIV-positive patients on chronic renal replacement therapy through the end of the year 2005.

**Table 7.** Number and percentage of dialysis patients positive for hepatitis B or C virus and MRSA (methicillin resistant *Staphylococcus aureus*).

	1999	2000	2001	2002	2003	2004	2005
†HBV (n)	13	14	20	20	20	20	18
‡HCV (n)	22	22	21	22	20	15	12
HBV+HCV (%)	3.1	3.1	3.3	3.4	3.1	2.7	2.2
††MRSA(n) (††HD/††PD)	-	14/5	32/4	36/4	34/2	26/4	24/2
MRSA HD+PD (%)		1.6	2.9	3.2	2.8	2.3	1.9

† HBV: hepatitis B virus

‡ HCV: hepatitis C virus

††MRSA: methicillin resistant *Staphylococcus aureus*

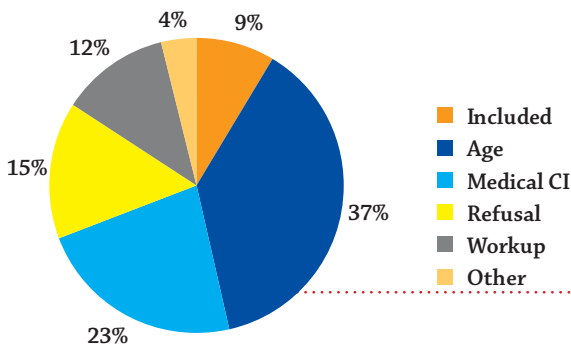
†† HD: hemodialysis

†† PD: peritoneal dialysis

## Dialysis patients and a waiting list for a cadaveric kidney transplantation

According to individual referral from dialysis centers, 108 hemodialysis patients (9%) were on the waiting list for cadaveric kidney transplantation at December 31, 2005, with additional 149 patients under work-up for the inclusion. 37% patients were not included because of the age (and associated comorbidities), 27% because of medical contraindications, 191 (15%) hemodialysis patients have refused to be transplanted. These patients were thoroughly informed about kidney transplantation, and have continuously been informed about new drugs, improvements in immunosuppressive protocols and other approaches that are expected to improve results and decrease side effects of immunosuppressive therapy after transplantation. Their decisions to refuse kidney transplantation were discussed during their regular visits to nephrologists.

28/115 (24.3%) of peritoneal dialysis patients were included on the waiting list, with additional 42 patients in the work-up for the inclusion to the waiting list.



**Fig. 9.** Hemodialysis patients and a waiting list for a cadaveric kidney transplantation.

# Kidney transplantation

There is one transplant center in Slovenia located at the University Medical Center Ljubljana. Slovenia has been a member of Eurotransplant since January 1, 2000.

In 2005, 28 cadaveric kidney transplantations were performed, which was a decrease compared to 55 cadaveric kidney transplantations performed in 2004. In 27 patients this was the first and in one patient it was the second graft. Three transplant recipients were older than 60 years, one transplant recipient was diabetic, none of the recipients was younger than 18 years. Four (out of 427) kidney graft recipients died in 2005, and 13 started a chronic dialysis because of the end-stage graft failure.

The total number of kidney transplantations in Slovenia from 1970 to December 31, 2005 was 636, of which 124 were from a living related donor and 512 from a cadaveric donor.

On December 31, 2005 there were 427 patients with functioning kidney graft in Slovenia (residents only), 403 from cadaveric and 24 from living related donor, 57% were men, median age 51 years (range 15-75), 4% were diabetics.

## Department of Nephrology, University Medical Center Ljubljana

The Department of Nephrology is the largest nephrological institution in the country. It is also one of the largest departments of the University Medical Center Ljubljana (one of two University Medical Centers in the country, with an over 7000 employees).

The Department of Nephrology has 178 employees (25 physicians, 143 nurses and technicians, 10 administrative workers) and is organized in seven units:

1. a hospital ward (32 beds),
2. an outpatient unit for general nephrology and hypertension (about 5000 patient visits per year)
3. the Center for Kidney Transplantation, which takes care of all renal transplant recipients in Slovenia and keeps a waiting list for kidney transplantation,
4. Center for Dialysis Zaloška: 41 dialysis stations operating in 4 shifts, 24 hour/day, ≈36 000 dialysis procedures per year, intensive-care dialysis operating in >15 dislocated intensive care units, including pediatric intensive care unit (where adult nephrologists and nurses perform hemodialysis and plasma exchange of newborns and infants), all kinds of vascular access, performed by nephrologists (temporary and permanent hemodialysis catheters, native and graft arteriovenous fistula), plasma exchange, LDL apheresis, immunoadsorption,
5. Center for Hemodialysis Leonišče: 18 dialysis stations, ≈10 000 dialysis procedures per year,
6. Center for Peritoneal Dialysis: ≈40-50 patients on peritoneal dialysis,
7. Ultrasound unit: biopsies of native and transplanted kidneys, ultrasonography/Doppler of kidneys and renal arteries, ultrasonography/Doppler related to vascular access for hemodialysis: preoperative mapping, ultrasonography/Doppler of dysfunctional and failed AV fistula, ultrasonography-guided hemodialysis catheter insertion, echocardiography, all performed by dedicated nephrologists.

At the end of 2005, 746/1802 (41.4%) of all RRT patients in Slovenia have been treated at the Department of Nephrology (as their primary center). Among these, 278 were chronic hemodialysis patients, 41 patients were on peritoneal dialysis, and 427 patients had a functioning kidney graft. In 2005, ≈46 000 hemodialysis procedures were performed. The Department of Nephrology is also a tertiary referral center for all complicated cases in the areas of nephrology and dialysis for the whole country.

## Apheresis procedures at the Department of Nephrology, University Medical Center Ljubljana

Apheresis procedures (membrane plasma exchange, LDL apheresis with dextrane-sulphate columns - Kaneka and protein A immunoadsorption) are performed at the Dialysis Center Zaloška, Department of Nephrology, University Medical Center Ljubljana. From 1997-2005, an increase in the number of plasma exchange procedures has been observed, with a comparatively stable number of immunoadsorption procedures in the last 3 years (Table 8).

**Table 8.** Number of apheresis (membrane plasma exchange, LDL apheresis and protein A immunoadsorption) procedures performed in the period from 1997-2005

	All apheresis procedures	Membrane plasma exchange	LDL apheresis	Immunoadsorption (protein A)
1997	183	113	27	43
1998	251	136	17	98
1999	296	180	64	52
2000	452	293	65	94
2001	443	231	61	151
2002	480	235	54	191
2003	572	242	80	250 (24 new)
2004	569	246	78	245 (22 new)
2005	673	410	34	229 (21 new)

## International comparison

**Table 9.** Some data from other countries, selected from ERA-EDTA registry, Annual report 2005

Country	General population in thousands*	Incidence at day 1 (N)	Incidence pmp	Incident diabetics pmp	Prevalence (N)	Prevalence pmp	Tx pmp*
Austria	8131	1234	152	51	7242	891	430
Bosnia and Herzegovina	3832	398	104	21	2012	525	36
Croatia	4437	637	144	42	3708	836	166
Denmark	5419	652	120	29	4243	783	314
Finland	5246	495	94	33	3724	710	417
Germany	82437	16766	203	71	87151	1057	288
Greece	11104	2139	193	57	10648	959	181
Norway	4623	549	99	13	3384	732	520
Poland	38157	4578	120	33	20479	537	194
Romania	21673	1857	86	10	6957	321	17
Russia	143473	3485	24	3	16483	115	25
Slovenia	2000	249	125	27	1802	901	214
Sweden	9030	1079	119	31	7385	818	439
The Netherlands	16320	1698	104	16	12023	737	403
UK, England	45389	4618	102	18	30326	668	293
UK, Scotland	5095	619	121	24	3838	753	353
Turkey	68267	12758	187	51	35983	527	60

\*general population covered by the registry

\*\* number of patients with functioning kidney graft pmp

In USA, a prevalence rate of RRT patients in 2004 was 1563 pmp (459043 patients), incidence rate 342 pmp, and a transplant rate 464 pmp. In Japan there were 236 505 dialysis patients in 2004, with a prevalence rate of 1857 pmp, an incidence rate 267 pmp, and almost all RRT patients being treated by dialysis.

## Summary – Renal Replacement therapy in Slovenia 2005

- 21 renal centers (+1 in 2005), 20 dialysis, 1 kidney transplant center
- Prevalence rate 901 pmp (+3.8%), an incidence rate 125 pmp (22% diabetics), median age of incident patients 65 years, 55% men.
- RRT modality of prevalent patients: 70% HD, 24% functioning graft, 6% PD
- HDF in 27% of HD patients, automated PD in 26% of PD patients, cadaveric graft in 93% of patients with a functioning kidney graft
- Crude death rate of dialysis patients 12.8%, of transplant patients 0.95%, of all RRT 10%.
- 27 patients alive in May 2007,  $\geq 30$  years on RRT (1.5% of all prevalent patients)
- Vascular access in prevalent HD patients: 85% native AV fistula, 5% graft, 10% catheter
- Approximate epoetin weekly dose: HD 8000 (iv), PD 6000 (sc), Tx 6000 (sc)

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**The patient on RRT that died in 2005 in your renal center:**

Date of death: \_\_\_\_\_ Cause of death: \_\_\_\_\_ EDTA code: \_\_\_\_\_

Epoetin dose (per week) at the last week of December 2005: Dose: \_\_\_\_\_ No of applications/week: \_\_\_\_\_

**EPO (mark):**      Eprex      NeoRecormon      Aranesp      Route of application: i.v. s.c. \_\_\_\_\_

Is **dialysis patient**, that is treated in your renal center on 31 December 2005, included on the **waiting list for cadaveric kidney transplantation**:      **yes**      **no**

If no, please explain why?

a) medical contraindications

\_\_\_\_\_

b) refusal

c) diagnostic workup (preparing for including)

d) age

e) other

\_\_\_\_\_

Remarks:

\_\_\_\_\_

Signature:

# Additional Questionnaire: For Hemodialysis Patients, Treated at Your Dialysis Center (For ESRD) on December 31, 2005

Name: \_\_\_\_\_

If »positive« for transmissible disease, mark the isolation policy:

- A) isolated room      B) isolated HD monitor      C) last in the dialysis shift      D) Not isolated

Type of hemodialysis procedure on the last week of December 2005:

- BHD                      Online HDF                      On line HF                      AFBF

Ultrapure dialysis fluid:              yes              no

Number of HD procedures per week on the last week in December 2005: \_\_\_\_\_

Number of hours of HD per week on the last week in December 2005 (e.g. 12; 13,5; 15...): \_\_\_\_\_

If HF/HDF, the amount of fluid exchanged per procedure: \_\_\_\_\_

If HF/HDF (mark)    predilutional              postdilutional              combination

**Dialyzer in the last week of December, 2005:** \_\_\_\_\_

**Dry body weight in the last week of December, 2005:** \_\_\_\_\_

**Blood flow in the last week of December, 2005 (ml/min):** \_\_\_\_\_

Single-needle procedure:              yes              no

**Anticoagulation (last week of December 2005):**      Unfractionated heparin:              dose per HD: \_\_\_\_\_

Low molecular weight heparin (original name):              dose per HD: \_\_\_\_\_

**Vascular access on December 31, 2005: AV FISTULA (mark)**

Type                                      native      Gore-tex  
 Position of anastomosis              forearm      elbow      arm      thigh  
 Side                                      right      left

**CATHETER**

jugular      subclavian                      femoral  
 right      left  
 temporary (noncuffed)                      silastic  
 single-lumen                                      double-lumen

Remarks: \_\_\_\_\_

Signature: \_\_\_\_\_

## Appendix 2. Dialysis center questionnaire

Date: \_\_\_\_\_

### Renal Replacement Therapy Questionnaire for 2005 – Dialysis Center

Renal center: \_\_\_\_\_

Number of RRT patients on December 31, 2005

All: \_\_\_\_\_

HD: \_\_\_\_\_

PD: \_\_\_\_\_

Number of hemodialysis stations on December 31, 2005: \_\_\_\_\_

Number of »positive« dialysis patients on December 31, 2005:

Hepatitis B \_\_\_\_\_

Hepatitis C \_\_\_\_\_

HBV+HCV \_\_\_\_\_

HIV: \_\_\_\_\_

MRSA: \_\_\_\_\_

Other: \_\_\_\_\_

The isolation policy of »positive« patients (mark):

**HBV pos.**    A) Dedicated rooms    B) Dedicated monitors    C) Last in shift    D) No isolation

**HCV pos.**    A) Dedicated rooms    B) Dedicated monitors    C) Last in shift    D) No isolation

**MRSA pos.**    A) Dedicated rooms    B) Dedicated monitors    C) Last in shift    D) No isolation

Remarks: \_\_\_\_\_

Number of employed physicians in renal center: \_\_\_\_\_

Number of employed graduated renal nurses: \_\_\_\_\_

Number of employed medical technicians: \_\_\_\_\_

Number of employed administrative persons: \_\_\_\_\_

Number of employed technicians for hemodialysis monitors maintenance: \_\_\_\_\_

Additional personal employed in renal center: \_\_\_\_\_

Remarks: \_\_\_\_\_

Number of HD procedures performed in 2005 (data for health insurance):

All: \_\_\_\_\_ Type I \_\_\_\_\_ Type III: \_\_\_\_\_

Number of acute HD procedures performed in 2005 (data for health insurance):

Acute renal failure, treated by dialysis – number of patients in 2005:

From these treated a) only by intermittent HD : \_\_\_\_\_ patients

b) only by CRRT: \_\_\_\_\_ patients

c) combined HD and CRRT: \_\_\_\_\_ patients

Number of dialysis patients treated by epoetins on December 31, 2005:

All: \_\_\_\_\_ HD: \_\_\_\_\_ PD: \_\_\_\_\_

Number of predialysis patients treated by epoetin on 31 December 2005 (approximations according to available data, assuming that predominantly nephrologists from dialysis center prescribe epoetins to predialysis patients):

New patients, starting chronic dialysis in 2005:

All: \_\_\_\_\_ HD: \_\_\_\_\_ PD: \_\_\_\_\_

Number of dialysis patients that died in (even if they have been dialyzed for ESRD only once):

All: \_\_\_\_\_ HD: \_\_\_\_\_ PD: \_\_\_\_\_

Number of dialysis patients included on waiting list for cadaveric renal transplantation on December 31, 2005:

All: \_\_\_\_\_ HD: \_\_\_\_\_ PD: \_\_\_\_\_

Number of hemodialysis monitors on December 31, 2005:

Types of hemodialysis monitors on December 31, 2005: Fresenius:

Gambro: \_\_\_\_\_ Integra: \_\_\_\_\_ Prisma: \_\_\_\_\_ Other: \_\_\_\_\_

Remarks: \_\_\_\_\_

Signature: \_\_\_\_\_ E-mail: \_\_\_\_\_

## Appendix 3. Transplant center questionnaire

Date: \_\_\_\_\_

### Renal Replacement Therapy Questionnaire for 2005 – Center For Kidney Transplantation

Number of kidney transplantations performed in 2005: \_\_\_\_\_

Out of that it was: 1. Tx \_\_\_\_\_

2. Tx \_\_\_\_\_

Cadaveric: \_\_\_\_\_

Living related: \_\_\_\_\_

From all transplantations performed in 2005, functioning kidney grafts on December 31, 2005: \_\_\_\_\_

From all transplantations in 2005 there were diabetics: \_\_\_\_\_

Number of kidney transplantations according to age of the patients:

< 15 years \_\_\_\_\_

< 18 years \_\_\_\_\_

> 60 years \_\_\_\_\_

Total number of kidney transplantations from 1970 to December 31, 2005:

All: \_\_\_\_\_

LRD: \_\_\_\_\_

Cadaveric: \_\_\_\_\_

Number of patients with functioning kidney graft on December 31, 2005 \_\_\_\_\_

Number of patients that died in 2005, with functioning kidney graft: \_\_\_\_\_

Number of patients with failed kidney graft, that started chronic dialysis in 2005: \_\_\_\_\_

Number of Tx patients receiving epoetin on December 31, 2005: \_\_\_\_\_

Number of dialysis patients on the waiting list for cadaveric kidney transplantation on December 31, 2005: \_\_\_\_\_

*Chief, Center for Kidney Transplantation:*

*Prof. dr. Aljoša Kandus, dr. med.*



