Renal replacement therapy in Hungary: the decade of transition

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**Keywords:** central Europe; end-stage renal disease; financing; health economics; health policy

**Introduction**

Renal replacement therapy (RRT), i.e. haemodialysis (HD), peritoneal dialysis (PD) and transplantation, is an effective life-saving and life-sustaining treatment. On the other hand, it is one of the most expensive publicly financed health services. Ensuring universal coverage and offering a comprehensive package that includes treatments for end-stage renal disease (ESRD) is a real challenge for all OECD countries. This is especially true for the Central and Eastern European (CEE) countries that have faced severe social, economic and political difficulties during their transition and accession to the European Union (EU).

Here we summarize the main tendencies of the renal replacement programme in Hungary over the last decade. We also highlight some of the problems that have emerged. Finally, we suggest some themes for further urgent research.

**The Hungarian health care system**

In order to understand better the current context and practices of RRT in Hungary, let us first consider the key characteristics of the history of the Hungarian health care system.

In 1891, the Hungarian government implemented compulsory insurance for industrial workers. In 1927, the National Social Insurance Fund was established and, prior to the Second World War, ~30% of the population were covered. In those years, private providers dominated the health care market \cite{1}. Denial of hospitalization and/or life-saving treatments (e.g. HD) or withdrawal of life-sustaining treatments were part of medical decision making, without any public debate \cite{2}. Financing of institutions was based on capacity (e.g. number of beds and employees) and the historical budget. The revenue of health care providers was mainly independent from the quality of care provided. Consequently, the quality fell below Western European standards \cite{3}.

Following great political changes, a compulsory (statutory) social insurance was (re)-established in 1988. Opting out of the mandatory system is not allowed, but citizens have the right to purchase supplementary health insurance \cite{4}.

Although legal since 1989, there were only ~150–200 private medical enterprises in Hungary in 1991. Their number, however, has multiplied between 1990 and 2002. In 2000–2001, 97.5\% of pharmacies, 90\% of family physicians, ~89\% of home care providers, 83\% of patient transport services, ~70\% of dental service providers, 39\% of dialysis providers, 23\% of diagnostic imaging services and only 2.3\% of in-patient care providers were private \cite{1,5,6}. The market share of private providers is also increasing in the occupational health services market. Most of these enterprises work on a fee-for-service basis, and are covered either by the insurance fund or by money directly from consumers \cite{2,5}.
Despite the increasing number of private providers contracted to the Insurance Fund, their market share in value is <15%, and still negligible (<3%) in inpatient care. However, in a few areas, private providers had become the dominant type of providers (market share in value) by the end of 2001. Such areas were home care (93%), dialysis services (90%) and family physicians in primary care (77%). Some of these ‘submarkets’ show oligoplistic tendencies. For instance, the market share in value of the three largest dialysis providers was 80% in 1998, and slightly more than 90% in 2001, and some of the providers enjoy geographical monopoly [5].

The dialysis providers—dialysis capacity

During the 1970s and early 1980s, dialysis treatment was only available in university centres. In the second half of the 1980s, the number of dialysis units grew substantially (Table 1). The first privately owned dialysis centre was opened in 1989 in Budapest. In the years that followed, this private for-profit provider rented, renovated and equipped several publicly owned hospital-based dialysis units and also built some new units. The real boom for private enterprises started in 1993. Two years later, private providers delivered >60% of dialysis treatment. Investments were facilitated by the relatively sharp increase of reimbursement rates, which suggested a rapid return for investment. As a result, a dominantly private for-profit market environment has developed [5].

Also during that time, another form of enterprise emerged: a not-for-profit, foundation-based dialysis centre started to provide services and still successfully copes today with the financial/organizational uncertainties. However, the market share of this type of provider is negligible (~2%), with only two not-for-profit private dialysis centres operating in Hungary.

Prior to the transition, in 1986, only 16 centres existed, and there were 39 dialysis centres in 1989 (38 public and one private) in the country. Ten years later, 6 years after market liberalization, there were 56 dialysis centres, and only seven were publicly owned, with 87.5% of the facilities being operated or owned by private providers [7].

During the last decade, the number of dialysis stations nearly tripled from 372 in 1993 to 928 in 2000 (36.1 per million and 92.7 per million, respectively). Thus, the number of dialysis stations per million of the population is comparable with Austria (85.4 per million) or the Czech Republic (102.5 per million) [8], and the dialysis capacity in Hungary was about twice the capacity of that in Poland or Slovakia in 2000.

Access to services

Between 1990 and 2000, the number of patients receiving RRT increased substantially in Hungary from ~1000 in 1990 to somewhat more than 5000 patients (527.9 per million population), of whom ~1500 were living with a functioning transplanted kidney in 2000 (Figure 1) [7]. The rate of increase in the number of ESRD patients receiving RRT was higher (about twice as much) in Hungary between 1980 and 1990, and between 1990 and 2000 than in the developed economies, but lower than in Portugal between 1980 and 1990, and in Turkey between 1990 and 2000 according to the OECD database [8]. If this trend continued, Hungary would exceed the OECD average in the next decade, although it is likely that the rate of increase will slow down over the next few years, as has happened in industrialized countries.

In 1993, only 65–67 new patients per million population were enrolled into dialysis programmes, while, by 2000, the number had doubled to 131.8 new patients/million population (Table 1). In 1996, 104 new ESRD patients/million citizens were recruited in Austria, 126 in Italy and 156 in Germany [9]. Experts have estimated that the number of patients treated by RRT will increase by 14–16% during the next few years. These numbers suggest that the Hungarian ESRD patients have similar access to dialysis as patients in the EU countries [10].

Similar to international trends, more and more elderly people (>65 years) are being recruited into

Table 1. Development of RRT in Hungary during the last decade

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of dialysis centres</th>
<th>No. of dialysis stations</th>
<th>Total no. of HD patients</th>
<th>Total no. of PD patients</th>
<th>Total no. of patient living with a transplanted kidney</th>
<th>No. of new patients on HD/year</th>
<th>No. of transplanted patients/year</th>
<th>Proportion of patients receiving Epo (%)</th>
<th>Crude death rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986–1989</td>
<td>16</td>
<td>35</td>
<td>82</td>
<td>52</td>
<td>78</td>
<td>180</td>
<td>52</td>
<td>41</td>
<td>21</td>
</tr>
<tr>
<td>1997</td>
<td>54</td>
<td>927</td>
<td>4000</td>
<td>2000</td>
<td>1237</td>
<td>1170</td>
<td>309</td>
<td>87</td>
<td>14.7</td>
</tr>
<tr>
<td>2000</td>
<td>56</td>
<td>927</td>
<td>4263</td>
<td>141</td>
<td>1568</td>
<td>1320</td>
<td>265</td>
<td>87</td>
<td>13.8</td>
</tr>
</tbody>
</table>

From [7].

Fig. 1. Number of patients on RRT in Hungary in selected years. Shaded bars represent patients treated in chronic dialysis programmes, and open bars represent patients living with a renal allograft (from [6]).
RRT programmes, with a proportion of nearly 40% of dialysis patients being in that age group [7,11].

There are at least three possible reasons why the new patient enrolment rate is still slightly lower in Hungary than in Germany or in some other European countries: (i) shorter life expectancy, by 7–9 years, than in the EU member states (patients may die before reaching end-stage renal failure); (ii) practice pattern differences (late referral/non-referral); and (iii) differences in resources and facilities (supply side factors) [10].

Despite this remarkable development in capacity, considerable regional inequalities in access to renal replacement services still exist. There was a difference of 2.9 times in the number of treatments per 10 000 citizens, and a difference of 2.5 times in the number of patients treated by RRT per 1000 population between counties with the lowest and the highest numbers, and a 40% difference between the counties with the lowest and highest numbers in terms of the number of treatments per patient. At the same time, very small variations can be found in financing (only 10%) [6]. There may be at least three reasons why this difference exists: (i) practice pattern differences (e.g. late referrals/non-referral or differences in pre-dialysis management and dialysis practice pattern differences); (ii) regional (geographical) differences in capacity; and (iii) variations in patient (socio-economic) characteristics and preferences.

**Health technology used**

During the last decade, the process quality of dialysis treatment in Hungary has also improved substantially, reaching European standards. Acetate dialysis has practically disappeared, and bicarbonate dialysis has become the accepted standard. Biocompatible membrane utilization is also growing steadily. In 1998, ~20% of the centres employed automated reprocessing. At present, reprocessing is not practised in Hungary due to administrative obstacles (labelling and licensing problems). The majority of patients are treated with traditional in-centre HD. The market share of haemodiafiltration (HDF) increased substantially, from 2.8% in 1995 to 22.9% by 1998, and declined thereafter to 10.2% in 2000, but went up again in 2001 [6,12].

Only 3.2% of dialysis patients received PD in Hungary in 2000. This was one of the lowest rates amongst the OECD countries and even amongst the former socialist countries. Despite several other former socialist countries showing a similar picture (the percentage of PD patients is 5.4% in Lithuania, 5% in the Czech Republic and Croatia, 4.4% in Bulgaria and 3.8% in Byelorussia), the average of the CEE former socialist countries is still higher, 8.8% (Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovenia and Slovakia) [11,13]. However, probably as a result of the changes in the reimbursement of continuous ambulatory peritoneal dialysis (CAPD), the number of CAPD patients doubled between 2000 and 2002. (Since 1999, HD and PD have been reimbursed equally; the monthly reimbursement fee for the treatment of a PD patient and an HD patient is the same.) In 2002, >300 patients received CAPD compared with 141 in 2000. Currently, ~5.9% of the dialysis population is treated by CAPD, which is still one of the lowest percentages among the OECD countries.

The underutilization of PD in Hungary may be explained in part by: (i) administrative obstacles (pre-authorization of the PD fluids by the Insurance Fund before 1999); (ii) economic disincentives in the reimbursement system (small fixed budget for PD fluids before 1999); (iii) provider structure (for-profit dialysis providers dominate the market, and nephrologists are usually employed by the dialysis providers); (iv) late referral; and (v) patients’ and physicians’ attitude/compliance/ preferences [10,13,14]. In the late 1980s and early 1990s, when PD (CAPD) started to gain ground, domestically manufactured PD fluids provoked an ‘epidemic’ of chemical peritonitis, and this created a longstanding resistance towards this modality among nephrologists.

The current Hungarian situation is very similar to that of Japan and the USA, where private providers predominantly deliver RRT (78 and 77%, respectively). In these countries, home treatments (PD and home HD) remain a very small proportion, 6 and 17%, respectively [11,13] (Figure 2).

**Outcome of dialysis treatment**

The yearly death rate of ESRD patients was nearly 40% in Hungary in the 1970s. This rate decreased steadily during the 1980s and stabilized at ~15% in the 1990s. The current death rate (13.8%) is comparable with the OECD average. However, the available data suggest that there are significant variations in the survival of dialysis patients across the country. Reported 5-year survival in the best and worst dialysis units was ~80 and 20%, respectively [7]. Correction for case mix is unlikely to reduce these huge differences significantly. Further analysis of the available data and
medical audit would be necessary to make recommendations on how to reduce unnecessary variations in outcome.

There are at least three additional factors, beyond the quality of dialysis care per se, that could improve the outcome of ESRD care in Hungary further: (i) early appropriate treatment of pre-ESRD patients (e.g. antihypertensives, diet, lifestyle modification); (ii) reduction in the rate of late referral, which could probably be achieved through a systematic education of GPs and internists; and (iii) increasing the number of renal transplantations (effective donor-coordinator system and/or utilization of living donor transplantation).

Renal transplantation

The scarcity of dialysis equipment in the 1970s and early 1980s created an opportunity for transplantation to be used as an alternative way of saving ESRD patients’ lives. The first successful kidney transplant in Hungary was performed in 1973 [15], and the number of transplants has grown notably over the decades since then. There were only 10–17 transplants per year in the 1970s, 50–60 in the 1980s and 250–300 in the late 1990s (Table 1). This means that ~25 transplants are performed per million population annually and ~30% of ESRD patients are living with a functioning renal allograft. This is higher than the average of the former socialist countries in the CEE, which is 25.3%, but in line with the average for the Czech Republic, Hungary, Poland, Slovakia and Slovenia, which is 28.2% [11].

Despite the fact that since 1990 elderly people (> 60 years) can also be placed on the transplant waiting list, and that transplantation is more cost effective than dialysis, only 20% of ‘chronic dialysis patients’ were on the transplant waiting list in 2000 (only 14.7% according to the Insurance Fund) [7,16]. There is a widening gap between the number of patients on dialysis and the number of patients on the waiting lists [7]. This trend may be explained partly by (i) the changing case mix of the dialysis population, similar to the trend in both the USA and Europe, that an increasing proportion of the dialysis patients are elderly with significant co-morbidities (e.g. diabetes, cardiovascular disorders); (ii) patients’ preferences (negative attitude towards transplantation); (iii) physicians’ preferences; (iv) lack of adequate patient information; (v) rapid dialysis capacity development; and (vi) the current incentives in the RRT market [7,17]. Further research is necessary to determine the major barriers and the most efficient way to increase the proportion of waiting list patients in Hungary.

Payment system for RRT in Hungary

Prior to 1989, dialysis centres were not reimbursed separately. Rather, resources for ESRD treatments were allocated to the hospitals as a bulk sum per year.

With the appearance of the first private centres, the payment system was changed to fee-for-service. Initially, the fees varied substantially depending on the technology used: low-flux HD being the reference modality, high-flux HD (haemofiltration; HF) and HDF received 20 and 40% higher reimbursement fees, respectively. Automated reuse was relatively widely employed and its reimbursement fee was equal to the reference modality (low-flux HD). This reimbursement system created an incentive to use two modalities (high-flux and HDF) more frequently and also favoured reprocessing.

Since 1998, the dialysis budget has been capped, and the reimbursement fee has started to be floated. (The reimbursement fee was calculated from the remaining budget on a monthly basis, and divided by the actual number of treatments performed.) These changes coincided with the fast diffusion of newer and more expensive dialysis technologies (HF and HDF), which inflated the reimbursement value of the reference (low-flux HD) treatment and posed a significant threat to the financial stability of providers using predominantly traditional technologies. In addition, the 20 and 40% higher reimbursement fees for HF and HDF were not justified by sound scientific evidence or cost-effectiveness studies.

Since July 1999, within the capped dialysis budget, all dialysis modalities (low-flux, high-flux, HDF and PD) have been reimbursed at the same rate, except for automated review, which is being reimbursed at 93% of the standard rate. (Note that reuse has not been available in Hungary since 1999 due to administrative barriers.)

The average reimbursement fee for one HD treatment was 74.4 Euro [or US$64, using an exchange rate of 1 Euro = 248 Hungarian Forint (HUF), US$1 = 288 HUF] in 2000 and the HD expenditure per patient per year was 9350 Euro (US$8205) [12]. This sum does not include the costs of erythropoietin (Epo), hospitalization and/or transportation. When the costs of Epo, transportation and some other drugs are added, the costs of one dialysis can be estimated to be ~89 Euro (US$75), and the cost of dialysis per patient per year is ~11 140 Euro (US$9590). These figures are much lower than those which were published earlier. A previous study estimated that one dialysis session cost US$125 in Hungary, US$127 in the USA and US$118 in the Czech Republic [18]. One possible reason behind these different results could be the different methods used for calculation.

International comparison of dialysis fees is methodologically rather difficult, in part due to different salary scales, and different costs covered by fees in different countries, and the purchasing power of the fees, etc. In low- and middle-income countries, supply (disposables, machines, etc.) is the largest cost item, and salary could account for <7–15% [19]. The gross annual salary of health professionals in Hungary was 3968 Euros (US$3417) in 2000 according to the Central Statistical Office. The vertically integrated provision of dialysis by equipment producers in
Hungary might be more economical, and could partially explain why the costs of treatment are lower, while the quality of care is similar in Hungary to that in other OECD countries.

Epo has been available in Hungary since the late 1980s. Epo is 100% reimbursed from a separate, capped budget. Recently, Epo has been distributed directly to the dialysis units at a dose of \(~18\ 000\) U/patient/month. More than 80% of dialysis patients receive this medication, which is the second highest rate among the former socialist countries after Lithuania (90%). The average proportion of patients receiving Epo in the CEE former socialist countries is 61.3%; the average of the Czech Republic, Hungary, Poland, Slovakia, and Slovenia is 67.7% [11].

### Trends and the future

During the last decade, substantial capacity building took place in Hungary. At the same time, dialysis expenditure grew faster than public health care expenditure, and dialysis expenditure started to crowd out other public expenditures in the mid 1990s (Table 2). In 1994, only 1% of public health care expenditure (percentage of the in kind expenditure) was spent on dialysis; in 2000 it was \(~1.8\)%, and in 2002 it was 1.9%. The whole of RRT, including kidney transplantation, was \(~2.2\)% of public health care expenditure in 2001, while RRT patient groups represent \(<0.2\)% of the out-patient population. Surprisingly limited data are available to make international comparisons about the trends of dialysis expenditures. However, it seems that most publicly funded health care systems in Europe spend a considerable proportion (0.7–1.8%) of their budget on dialysis [20].

Assuming that the number of patients will grow at a gradually decreasing rate until it reaches a plateau, dialysis expenditure can be estimated to be \(>5.1\)% (4.2–5.7%) of total public expenditure in 2017, when equilibrium could be reached. If Epo, transplantation and transport are included, the RRT programme will consume 5.8% (4.9–6.6%) of public expenditure.

High spending for a relatively few RRT patients will keep cost containment high on the dialysis agenda, and will provoke health policy debate about equity, access, quality and efficiency trade-offs. Spending \(5–7\)% of public expenditure on \(<0.6\)% of the out-patient population might not be equitable or socially optimal, but on the other hand refusing life-saving technologies may not be ethically acceptable in Hungary. Therefore, it seems to be necessary to strengthen cost containment in this market in the next decade (Table 3).

### Table 2. Dialysis public expenditure in Hungary

<table>
<thead>
<tr>
<th>Year</th>
<th>Dialysis therapy</th>
<th>Transplantation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dialysis service expenditures (billion HUF)</td>
<td>Change (previous year = 100%)</td>
</tr>
<tr>
<td>1992</td>
<td>0.8&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.6&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>1993</td>
<td>2.3</td>
<td>1.3</td>
</tr>
<tr>
<td>1994</td>
<td>2.5</td>
<td>109.1</td>
</tr>
<tr>
<td>1995</td>
<td>3.7</td>
<td>148.3</td>
</tr>
<tr>
<td>1996</td>
<td>5.4</td>
<td>143.3</td>
</tr>
<tr>
<td>1997</td>
<td>6.7</td>
<td>124.5</td>
</tr>
<tr>
<td>1998</td>
<td>7.4</td>
<td>110.4</td>
</tr>
<tr>
<td>1999</td>
<td>8.9</td>
<td>120.2</td>
</tr>
<tr>
<td>2000</td>
<td>10.4</td>
<td>120</td>
</tr>
<tr>
<td>2001</td>
<td>11.6</td>
<td>110.8</td>
</tr>
<tr>
<td>2002</td>
<td>13.0&lt;sup&gt;b&lt;/sup&gt;</td>
<td>112.3</td>
</tr>
</tbody>
</table>

**Source:** Ministry of Health and Annual State Budget.
<sup>a</sup>From [7].
<sup>b</sup>From the government annual budget plan.

### Table 3. Health care expenditure in Hungary

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total population (thousands)</td>
<td>10 579</td>
<td>10 346</td>
<td>10 193</td>
<td>10 114</td>
</tr>
<tr>
<td>Total expenditure on health (% of GDP)</td>
<td>4.7&lt;sup&gt;a&lt;/sup&gt;</td>
<td>7.1</td>
<td>7.2</td>
<td>6.9</td>
</tr>
<tr>
<td>Total expenditure on health per capita (US$, PPP)</td>
<td>NA</td>
<td>534</td>
<td>671</td>
<td>751</td>
</tr>
<tr>
<td>GDP (US$, PPP) per capita</td>
<td>NA</td>
<td>7477</td>
<td>9312</td>
<td>10 841</td>
</tr>
</tbody>
</table>

**Source:** OECD Health Data 2002 [8].
<sup>a</sup>OECD (1998).
Dialysis care in Hungary

Conclusion

During the past decade, Hungary has taken significant steps toward the ‘publicly funded–privately provided’ health care model and, at the same time, relied more on privately funded and privately provided services. Market liberalization and privatization, accompanied by positive economic incentives, could quickly close the ‘capacity gap’ between East and West, as the Hungarian dialysis capacity and utilization data show.

Social and economic consequences of this transition have emerged slowly. The new dialysis market is oligopolistic, and concentrated; some providers also enjoy geographical monopoly. Substantial regional inequalities can be observed in utilization and also in outcome. The Insurance Fund collects huge amounts of data about RRT, but has been unable to assess the performance of dialysis providers regularly.

Dialysis expenditure showed a crowding-out phenomenon as its share in health insurance expenditure rose from 1.0 to 1.9% between 1994 and 2002. Other privatized and liberalized submarkets, such as pharmaceutical or medical device expenditures, showed similar trends [5].

While some segments of the health care system have quickly reached EU standards, others have been left a long way behind. If this partial modernization consumes too many resources, it could jeopardize the development of the whole system. One of the major challenges for the government is how to regulate the RRT market to improve efficiency and quality, and at the same time ensure equity in resource allocation.

There is a need for a national ESRD registry, with regular data acquisition, that could support outcomes’ research and detect differences in practice patterns in Hungary. Furthermore, factors behind regional inequalities need to be studied. It is also important to explore the cost-effectiveness of alternative modalities for treating ESRD in Hungary and how market concentration affects efficiency and quality of services.

Acknowledgements. The authors are grateful to Drs K. Berta, I. Kiss and K. Polner for useful discussions and information, and to Angela Bate and Stephanie Cooper for their comments. I. M. is a Békésy Postdoctoral Fellow of the Ministry of Education. This work was supported by Hungarian Research Foundation (OTKA 34409).

Conflict of interest statement. I. M. has a contract with Fresenius Medical Care Hungary Ltd to work as a nephrologist for the company. Z. M. and L. R. have no conflict of interest to declare.

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Received for publication: 12.10.02
Accepted in revised form: 17.1.03