

Belgium's mixed private/public health care system and its impact on the cost of end-stage renal disease

Wim Van Biesen, Norbert Lameire, Patrick Peeters,
Raymond Vanholder

Renal Division, Department of Internal Medicine, University Hospital Ghent, Ghent, Belgium

Abstract

Belgium has a mixed, public–private health care system, with state-organized reimbursements but private providers. The system is fee for service. For end-stage renal disease (ESRD), the fee-for-service system discourages preventive strategies, early referral to the nephrology unit, and the use of home-based therapies. The aging of the general population is reflected in the rapidly increasing number of very old dialysis patients, requiring more complicated and, therefore, more costly care. As dialysis costs increase, the ability to provide unrestricted access to dialysis treatment may be unsustainable. To aid in decision-making processes, nephrologists must be aware of financial and organizational issues.



This paper is part of the International Study of Health Care Organization and Financing, which examines how the treatment of renal failure is paid for around the world. This study comprises 13 related papers published in a two-part special issue of the *International Journal of Health Care Finance and Economics*. The original published version of this paper (© Springer Science+ Business Media, LLC 2007) is available at www.springerlink.com.

The ISHCOF is a substudy of the Dialysis Outcomes and Practice Patterns Study (DOPPS). The ISHCOF is supported by the Arbor Research Collaborative for Health; the DOPPS is supported by research grants from Amgen and Kirin Pharma without restrictions on publications. Arbor Research thanks Springer for permission to reproduce this article.

Reference: Van Biesen W, Lameire N, Peeters P, Vanholder R. Belgium's mixed private/public health care system and its impact on the cost of end-stage renal disease. *Int J Health Care Finance Econ* 7(2-3):133-148, 2007.

Introduction

Belgium has a mixed health care system managed by third-party health insurance associations. The treatment of end-stage renal disease (ESRD) patients in Belgium falls under the public insurance system; however patients are responsible for small copayments on drugs and transportation. Reimbursement is based on fixed fee schedules negotiated annually by the national social security system and providers, but recent limits on reimbursement threaten the ability of physicians to treat the rapidly increasing number of ESRD patients. Dialysis is increasingly provided in satellite units, which have lower operating costs and are often much more convenient for patients. This paper describes the current organization of ESRD care in Belgium, with a focus on the impact of financing and reimbursement issues.

Belgium consists of two geographic and cultural regions: Flanders and Wallonia. Flanders, in the northern half of the country, is predominantly Dutch (Flemish) speaking, and Wallonia, in the South, is mostly French speaking. The two regions are different economically: With a 2002 per capita gross domestic product (GDP) of €18,671 (US\$21,145; PPP 2002) in the South, Walloons earned a third less than Flemish Belgians (€5,329 or US\$28,685 (PPP) per capita) (Kenniscentrum statistiek, 2005). In addition, the two regions maintain separate renal registries.

Methods

The International Study of Health Care Organization and Financing (ISHCOF) is a substudy of the Dialysis Outcomes and Practice Patterns Study (DOPPS) aiming to characterize economic structures and their impact on the delivery of dialysis care. The ISHCOF is based primarily on one-time commissioned surveys (2004–2005) and subsequent papers by authors from each of the 12 DOPPS countries: Australia, Belgium, Canada, France, Germany, Italy, Japan, New Zealand, Spain, Sweden, the United Kingdom, and the United States. Details of the methods are described in Dor, Pauly, Eichleay, and Held (2007).

The data in this report are based on secondary sources including the Dutch-speaking Society of Nephrology (NBVN, 2002), the French-speaking Belgian Society of Nephrology (GNFB, 2001, 2002), the Belgium Federal Portal (the official Belgian government website [<http://www.belgium.be/eportal/index.jsp>]), and published articles. Epidemiologic rates presented for Belgium in this paper were calculated from gross figures reported in the two separate registries, French and Dutch speaking. All monetary estimates were provided in national currency units and converted to U.S. dollars with OECD purchasing power parities (PPP) from the year of each figure (OECD, 2006). Most data in this study were for the year 2001; therefore, Belgian Euro data were divided by 0.899 to convert to US dollars. Due to the small number of economic investigators and countries in this study, all international comparisons reported here are informal and qualitative, unless otherwise noted.

To estimate the annual expenditure per ESRD patient in Belgium we used the distribution of patients among the various modalities as described in the registries and costs obtained from a study of patients at the University Hospital Ghent (personal unpublished data, Raymond Vanholder, University Hospital Ghent, 2001). We assumed that 10% of patients are transplanted

in a given year and that a transplant recipient obtains a kidney in the middle of the year thereby incurring dialysis costs for the first half year and transplant costs for the second half of the year.

Health care in Belgium

The Belgian social security and health care systems consist of a mix of private and public players. All Belgian citizens who are employed, who are related to an employed person (e.g., children or non-working spouses), or who are supported by a replacement income, such as unemployment payments, are covered by health insurance. In practice, all persons who have an official residence in Belgium can be covered. Even non-citizens, such as official refugees, can obtain coverage. For foreigners (mostly Dutch) who have social security in their country of origin, there is an agreement between the social security system in the country of origin and the Belgian system, and the Belgian social security system gets its expenses reimbursed.

The health insurance system is funded by employer and employee contributions. These compulsory, pre-defined taxes are paid to the government in addition to income taxes. Health insurance associations, also known as “sick funds” or “mutualities,” manage these contributions for the government. Although the sick funds are independent from the government, they are strongly connected to political parties and, in some cases, are also related to providers of medical care (hospitals and nursing homes). People tend to join the sick fund of their political preference: The three main players are the Catholic, the socialist, and the classic liberal (i.e. “market oriented”) funds. The mutualities take care of the reimbursement of medical expenses through a third-party payer system. In practice, for most medical expenses, the patient only pays a small amount, the “demotivation” fee (copayment). Health care providers bill each patient’s health insurance association, which then bills the social security system for the money spent and an additional handling fee. Although there are several sick funds, the social security system reimburses them equally for medications. Competition between sick funds, therefore, is based on the services they provide. Often, sick funds offer extra services as incentives, such as resort vacations or home care teams.

The social security program is organized and managed at the governmental level. It decides the reimbursement rates for different medical services and medications. As a result, out-of pocket costs to patients are low, and patients have no real idea of the actual costs of their care. The health insurance associations have no incentives to reduce health care spending, as they earn money from their handling fee and by pleasing their customers, the patients. The providers of medical services are paid fee-for-service. Under the current schedule of payments, it is thought that technical services are heavily overpaid (relative to the cost or work involved in their production), while “intellectual services” (consultations, counseling, prevention) are, in fact, underfinanced.

This complex interplay of patients, health insurance associations, medical service providers, and the government makes it very difficult to negotiate new reimbursement systems that potentially could reduce health care costs. Nobody in the system gains by reducing health care expenditures, and there is a strong link between political parties and mutualities. Mutualities gain more revenue if they spend more money, as their handling fee is a percentage of the money they

distribute. It is thus no surprise that the system is in heavy financial need; the expenditures always exceed the social security budget and, in the end, the government pays the difference out of general tax revenues.

The organization of medical services is almost completely private; no hospitals are run directly by the government and physicians are usually not government employees. Belgian hospitals are managed by universities, religious organizations, sick funds/mutualities (though rarely), or social welfare organizations. Social welfare organizations are community-elected boards that provide social services to the public. Most large cities have at least one social welfare hospital and one hospital with a religious affiliation, a situation that adds to redundancy of the available technical services. Hospitals run by social welfare committees are subject to the same reimbursement rules as other private hospitals, but they must treat all patients, regardless of the patient's ability to pay. In addition, physicians in social welfare hospitals may not charge more than the fixed social security prices for services. Therefore, citizens with low incomes are likely to be treated at these hospitals.

Every city has a social welfare committee, which is managed and governed by politically nominated people, but is not directly under the supervision of the town council or mayor. Legally, the directors of social welfare committees are independent of the government; however, because directors are elected to office, their actions are often thought to be politically motivated. Board members are also not required to have a medical or managerial background. These social welfare organizations are managed as private companies, and although they get a certain amount of money from the city budget, the way this money is spent is at the committee's discretion. These groups are nonprofit in the sense that they are allowed to make a tax-free profit as long as it is reinvested within the organization. However, many of these organizations own smaller businesses, like hotels, and the monies reinvested into these hotels are sometimes used for profitable or political ends. Many physicians are against this system, as a lot of money of the health care system is being re-routed for alternative projects. In this way, the health care system can be described as a public/private system.

The compulsory public insurance covers medical expenses to a varying degree (75–100%) depending upon the type of care, the household's total income, and the status of the patient (disabled people have a higher reimbursement rate and a lower copayment). On a yearly basis, the social security system and the providers of medical care (the hospitals, the physicians, and the paramedical associations such as the union of physical therapists) negotiate reimbursement rates for specific medical services, according to fixed fee schedules for sets of procedures. Although physicians are free to charge the fees they want, most respect the fixed reimbursement prices in order to remain competitive among physicians. Over the last few years, patient responsibility for costs has been increasing and it had reached 17% in 2005, albeit with a limit for the poor. In order to increase the patient share, reimbursements for services or medications may be withheld or copayments may be increased without a corresponding increase in the reimbursement for that intervention. In either case, the patient must pay the difference between the amount reimbursed and the amount charged.

This insurance system provides good coverage for financially vulnerable populations and thereby enables more equal access to care. Redistribution is the goal of social insurance; those who earn

more money contribute more in order to support those who have less. However, although those with high incomes pay the most, they do not get as much as they paid in return when they need it. Most of them do not complain that they pay too much (although this is also not very evident), but they do complain because they do not get very good coverage when they need it. There is thus some pressure on these people to have a second, private source of insurance to cover their higher out-of-pocket payments.

In the end, this dissatisfaction might lead to the creation of two parallel systems and the gradual breakdown of the redistribution system embodied in the principle of solidarity. Some political parties already advocate a partial separation of the system into a small compulsory part, organized by the state, and a voluntary part, to be organized by insurance companies. The concern is that this could end full coverage for both the poor and high-risk individuals, because private insurance companies may no longer accept them at the same premiums as the lower-risk individuals. Another problem is that the system is currently compulsory, meaning that the opportunity for cross-subsidization is greater. Should the system become partially voluntary, fewer people would subscribe to the supplementary coverage, potentially reducing the opportunity for higher-risk individuals to be cross-subsidized by lower-risk individuals. The extent of government subsidy and the desirability of a compulsory system are two current political issues in Belgium.

Most people obtain supplementary insurance for expenses not covered by public social security. Most companies offer these insurance plans as an added benefit to their employees. This voluntary form of insurance covers any patient copayments, home health care, hospital amenities, fees for single room hospitalization, and any physician charges over the reimbursed fee for that specific procedure. This system leads to distorted incentives in two ways. First, expensive medical services for fully covered people are completely free, and thus, there are no incentives to limit medical consumption. Second, because providers earn more money from patients with supplementary insurance, they may respond by providing better care to those individuals. This system risks the re-introduction of a dual standard for medical provision, with one standard of care for the “haves” and another standard for the “have-nots.” Some fear that this option of additional private insurance, although still limited, might initiate a breakdown of the public reimbursement system because most doctors/hospitals will preferentially care for patients with better insurance.

A key feature of the Belgian health system is that patients are free to choose their providers. Patients can obtain specialist care whenever they want, and can even have second or third opinions. As there is little communication between the different centers and specialists, this might lead to duplicate investigation and testing. The free choice of the patient also leads to some medical shopping and unnecessary use of specialist care. On the other hand, as prices are fixed, competition between providers is based only on the standard of care both for medical and non-medical aspects, which explains the high quality of care delivered and the high patient satisfaction in Belgium.

The gross epidemiology of kidney disease and provision of care in Belgium

In 2001, with a population of more than 10 million inhabitants, Belgium had 8,572 chronic kidney disease (CKD) stage 5D and 5T patients (GNFB, 2002; NBVN, 2002). CKD 5D (dialysis) and CKD 5T (transplantation) are the new classifications for ESRD in the KDIGO guidelines (Levey et al., 2005). This represents an ESRD prevalence rate of 836 per million population (pmp), which is relatively high among ISHCOF countries (Dor et al., 2007). Of these patients, 36% were treated in hospital-based hemodialysis centers (HBD centers) and 14% in collective auto-dialysis centers (CAD centers). Five percent of ESRD patients used peritoneal dialysis (PD), and 45% had a functional kidney transplant in 2001.

The Dutch-speaking and French-speaking parts of Belgium conduct ESRD surveillance separately. Between 1995 and 2000, the number of prevalent ESRD patients in Dutch-speaking Belgium increased from 3,624 to 5,252, a rather high increase of 44% (NBVN, 2002). For the same period, the incidence increased from 120 to 170 pmp (+41%). The kidney transplantation prevalence rate was 380 pmp in the year 2001, an increase of 78% over 6 years. From 1995 to 2000 in French-speaking Belgium, the number of dialysis patients increased by 18% (1,670 to 2,038) and the total number of ESRD patients increased by 20% (3,107 to 3,886) (GNFB, 2002). In 2000, the incidence in the French-speaking areas was 167 pmp (GNFB, 2001).

Life expectancy at birth in Belgium is 82 years for women and 76 years for men. Belgium has an increasing percentage of elderly (over 65 years) and very old (over 85 years) inhabitants; this changing demographic creates the problem of a decreasing number of people contributing to social security and an increasing number of people requiring funds (Pacolet et al., 2006).

Most dialysis centers operate during the day and for emergencies at night. Only three centers are open for nightly dialysis. The care for all CKD stage 5D patients is organized in 57 hospital-based facilities, which also have satellite units (CAD centers) outside the hospital location. These CAD centers were originally planned for patients who can manage most of their dialysis treatment by themselves, without medical supervision. However, in order to reduce costs, the government implemented a moratorium preventing regional hospitals from opening new HBD centers. This moratorium does not apply to larger hospitals. Therefore, most regional hospitals now collaborate with larger hospitals to open CAD centers. As a result, the coverage of dialysis centers in Belgium is high; the maximum distance between a dialysis center and a patient's home is estimated at less than 20 km. This situation leads indirectly to an increase in medical and paramedical surveillance, resulting in a comparable standard of care in HBD and CAD centers.

Although the patient mix in HBD centers and CAD centers is becoming increasingly similar, reimbursements for dialysis differ greatly between them. In HBD centers, dialysis is reimbursed as a fee-for-service, treated as payment for the nephrologist, which is fixed and equal for all dialysis centers. In addition, there is a hospitalization fee that is paid directly to the hospital. The amount of this reimbursement is different for all centers, and depends on parameters like the estimated severity or comorbidity of patients treated at that hospital. Therefore, the cost of a dialysis treatment in an HBD center is different from center to center. In contrast, the reimbursement for the CAD centers consists of a flat fee that is equal for all CAD centers. The

total cost of a dialysis treatment in a CAD center is substantially lower than the cost of HBD treatment.

The reimbursement of hospital-based dialysis treatment is further complicated by the fact that the additional reimbursement fee for the hospital depends upon the percentage of “low-cost dialysis” (i.e., PD and CAD) performed at that center. Most HBD centers want to cooperate with regional and local hospitals for the organization of CAD centers, because this increases their reimbursement. The exact rates are provided in our section on expenditures below.

In principle, all hospitals are private institutions. Each hospital has its own individual financial responsibilities and none is actually funded or organized directly by the federal government. However, at present, no dialysis units in Belgium are owned by private chains or managed care organizations.

There are no waiting lists for dialysis, placement of permanent vascular access for dialysis, or other treatment procedures related to CKD stage 5D treatment. However, like most ISHCOF countries, Belgium has waiting lists for transplantation due to a shortage of cadaveric donors. Belgium has a cadaveric organ opt-out rule, which means that you must register *not* to be a donor. About 50,000 Belgians are registered as opting out (2%). This rule has led to a relatively high cadaveric donation rate (20 pmp) compared to the Netherlands (13 pmp) and shorter wait times (time to transplant is more than 5 years in 11.1% of Belgian patients compared to 32.6% of Dutch patients (Cohen & Persijn, 2005). The number of transplantations from live donors is low (< 10%).

Belgium has almost 22,000 primary care physicians (PCPs) and approximately 200 nephrologists (Belgische Federale Overheidsdiensten, 2005). Not all the PCPs practice medicine, however, as some of them are employed in administration. Compared to other ISHCOF countries (Ashton & Marshall, 2007; Durand-Zaleski, Combe, & Lang, 2007; Hirth, 2007; Kleophas & Reichel, 2007; Luño, 2007; Pontoriero, Pozzoni, Del Vecchio, & Locatelli, 2007; Nicholson & Roderick, 2007; Wikström et al., 2007), Belgium’s doctor-to-patient ratio is average, amounting to just over 750 patients per practicing PCP and 46 ESRD patients per nephrologist. The Flemish government limits the number of new practicing physicians through university entrance examinations, whereas the Walloon government organizes a *numerus clausus* exam after three years of university study after which only the highest ranked students may continue their education. The number of nephrologists trained is dependent upon the available positions in the registered training centers, which are based in university hospitals. Although there are no legislatively imposed limitations, the social security system does not allow an unlimited number of nephrologists in training. Each university hospital is “certified” or “accredited” for a specific number of nephrologists in training that can become “accepted” specialists in nephrology.

Although the number of nephrologists is sufficient, the increasing prevalence of ESRD has caused a relative shortage of experienced dialysis nurses. There is no official educational program for dialysis nurses. Their training is organized in part by the individual centers and in part by the Belgian Renal Nursing Association. Most centers require dialysis nurses to follow these courses during the first years of practice.

The salaries for nurses and PCPs are about average for ISHCOF countries (data not shown). The salaries of all nurses are defined according to nationally determined standards and are equal for all nurses regardless of their specific occupation (e.g., intensive care nurse or dialysis nurse).

PCP salaries are completely funded by fee-for-service. This payment structure may negatively affect referral patterns for ESRD patients because referrals diminish the possibility of further consultations, and thus income, for the PCP.

Although published income data for nephrologists does not exist in Belgium, indirect communication with nephrologist colleagues suggests that they earn relatively high salaries in Belgium. At about €150,000–200,000 (US\$166,852–222,469; PPP 2001) per year nephrologists' incomes in Belgium are similar to those in Australia (Harris, 2007) and Canada (Manns, Mendelssohn, & Taub, 2007) and higher than all other ISHCOF countries, after adjustment for purchasing power parity (data not shown). However, tax rates in Belgium are high, reaching over 55% for people at this level of income.

Nephrologists' salaries differ according to the center. In hospitals, salaries are used to partially cover dialysis unit expenses. Hospital-based nephrologists pay for the use of hospital rooms, personnel, and other hospital services. Often, because dialysis is a well-reimbursed medical service, nephrologists' salaries are used to "correct" deficits in other departments. For example, care for diabetic patients is organized by diabetes teams that are very poorly financed. In most hospitals, the income of the diabetes specialist (usually an endocrinologist) is partly sponsored by a contribution from the nephrology department. In some hospitals, the nephrologists are in a pool with the other internal subspecialties, and incomes are redistributed accordingly. Although this redistribution seemingly diminishes the nephrologists' salaries, it is an indirect benefit, because including specialists on the team attracts more patients to the hospital. For this reason, the direct impact of the fee-for-service regulation on nephrologist income is somewhat dampened, although still present.

In Belgium, part of the reimbursement goes directly to the hospital and part of the reimbursement goes to the physician. The hospitals are mostly reimbursed through lump sums awarded for specific services, which must cover any service-specific staff, materials, and rent of the facility. Doctors, on the other hand, are paid on a fee-for-service basis. Thus, for the hospital, more patients mean higher turnover and throughput, more work, and thus higher personnel and other costs with no additional revenue received. For doctors, more patients yield additional income, but require more personnel (e.g., nursing) and time. In addition, for consultation and technical services, such as radiology, labs, and gastroscopy, there is only fee-for-service to the physician, not to the hospital. To compensate the hospital, most physicians working in the hospital (and not in private practice) share part of their fee with the hospital. In the case of dialysis, for example, the nephrologist is reimbursed for the act of dialysis. This sum includes disposables, water treatment, and the dialysis machine, which, in principle, should be procured and paid for by the nephrologist. In most centers, hospitals provide all the "hardware," and the nephrologist shares part of his fee with the hospital in return. In some centers, all the money goes to the hospital and nephrologists are paid a salary.

The net income of nephrologists has probably increased at a lower rate than inflation, whereas, in contrast, the workload has increased. This is caused by a special mechanism introduced 2 years ago whereby, national, pre-defined total budget limits for each specialty cannot be exceeded. In practice, this implies that once a certain number of dialysis sessions have been exceeded, the reimbursement per treatment goes down, with net income held constant. Up to now, this mechanism has not led Belgian nephrologists to ration care, but in light of the increasing prevalence of patients, some problems are likely if this regulation is not changed. Typically, because of the skewed reimbursement system that pays more highly for technical procedures than for evaluation and diagnosis, some of the revenues of nephrology are redistributed to other services, like diabetes teams. The amount of this redistribution and the final goal of this money are different in all hospitals and units, and are negotiated by all the involved partners. As a diabetologist attracts a lot of diabetics, and thus potential ESRD patients, the link is clear. In addition, you need to have a certified diabetologist to get reimbursement for home glycemia control for your patients. The growing attention to this type of “integrated team” suggests that younger nephrologists/physicians are more likely to accept this redistribution now than they were in the past, when the gap between the income of the nephrologist and other staff members (e.g., the geriatric internist) was quite substantial.

Expenditures

Belgium spent 9% of its gross domestic product (GDP) on health care expenditures in 2001, which was €2,291 (US\$2,548; PPP 2001) per inhabitant (Belgische Vereniging van Verzekerings-organismen, 2004). This represents the median health care expenditure for the ISHCOF countries and is well below U.S. health care spending (about 13.9% of its GDP) (OECD, 2004). Unlike some other countries, Belgium finances health care entirely through public funding, which is distributed by the health insurance associations (sick funds) to their members.

Dialysis expenditures

In 1999, Belgium spent 1.8% of its health care budget on ESRD treatment, yet ESRD patients represented only 0.04% of the population (Belgische Vereniging van Verzekeringsorganismen, 2005; Belgische Federale Overheidsdiensten, 2005). For a hemodialysis (HD) patient in Belgium, the social security fund pays a mean of €44,000 per year (US\$48,943; PPP 2001) for only the technical act of dialysis (Belgische Federale Overheidsdiensten, 2005). For a sample of 36 patients, we have calculated the median real cost of a HD patient at our university hospital (HBD center) over 1 year, and found a total sum of €53,000 (US\$58,954; PPP 2001) for strictly dialysis-related costs, €10,000 (US\$10,638; PPP 1999) for medication, €6,600 (US\$7,341; PPP 2001) for hospitalization, €6,500 (US\$7,230; PPP 2001) for technical investigations (labs and diagnostic tests), and €1,900 (US\$2,113; PPP 2001) for extra supplies such as dressings and orthotics (see Table 1). Therefore, the total annual expenditure for a hemodialysis patient in Belgium was €78,000 (US\$86,763; PPP 2001) (personal unpublished data, Raymond Vanholder, University Hospital Ghent, 2001).

The quality of dialysis care may be reduced by the fixed fee reimbursement, which must cover all dialysis-related expenses regardless of the duration of the session, the use of biocompatible membranes, or the use of hemodiafiltration. No additional revenue is received for costly steps to improve quality, like hemofiltration or high flux membranes. Thus, improving the quality of care through the introduction of more sophisticated and more expensive techniques leads to decreased profits for the hospital and the nephrologist. Nevertheless, there is no evidence that the lack of additional reimbursement for high-quality dialysis techniques reduces the actual quality of care delivered. In fact, the use of low-quality but cheap cuprophane membranes has been nearly abandoned in Belgium, and most centers use high flux dialysis or on-line hemodiafiltration for at least some of their patients. This is partly induced by competition between centers, the control of peers in local quality groups, and the already high reimbursement for dialysis.

Table 1. Annual expenditures per dialysis patient in Belgium, by modality, 2001

Cost category	Hemodialysis center type		Peritoneal dialysis (€)
	Hospital (€)	CAD (€)	
Dialysis	53,000	30,000	32,000
Medications	10,000	10,000	5,500
Hospitalizations	6,600	6,600	5,500
Labs/Diagnostics	6,500	6,500	2,000
Extra supplies	1,900	1,900	-
Total	78,000	55,000	45,000

Peritoneal dialysis is reimbursed at a rate of about €625 per week (US\$695; PPP 2001) for continuous ambulatory peritoneal dialysis (CAPD) and €725 per week (US\$806; PPP 2001) for automated peritoneal dialysis (APD). These sums are paid directly to the hospital and cover all treatment-related expenses, such as dialysates, but also disinfection caps, disinfection fluids, paper towels, and even electricity for APD. When a patient on PD is hospitalized, the reimbursement is temporarily discarded. When the PD patient needs assistance at home from a private nurse to perform his exchanges, an additional fee of €175 per week (US\$195; PPP 2001) is reimbursed.

At our center, the yearly median cost of a PD patient was found to be €45,000 (US\$50,056; PPP 2001) (Table 1). The cost of medications differs greatly for PD and HD patients due to the lower need for erythropoietin (EPO) and anticoagulants in PD patients. These estimates are substantially lower than those for patients on other modalities. Admittedly, the case mix of patients may differ to some extent between modalities, without accounting for the above-mentioned large differences.

The total cost of a CAD center patient can be estimated at about €55,000 per year (US\$61,179; PPP 2001) (Table 1). Costs in CAD centers differ from those in HBD centers only in the reimbursement for actual dialysis. This explains why the government is trying to increase the number of patients treated at CAD centers or on PD. Efforts to encourage low-cost options include the moratorium on HBD centers in favor of CAD centers.

Transplant expenditures

As the costs for transplant patients are highly dependent on time elapsed since transplant (Laupacis et al., 1996), the costs of transplant patients at various stages were estimated in Table 2. The cost of a new, uncomplicated kidney transplant is estimated at about €24,356 (US\$27,092; PPP 2001) for the transplant procedure (all inclusive) and an average of €12,810 (US\$14,249; PPP 2001) for the following year (unpublished data, doctoral thesis Patrick Peeters, University Hospital Ghent, in preparation).

Table 2. Annual expenditures for renal transplantation patients in Belgium, 2001

Cost category	Transplantation		
	Operation (€)	First year post-op (€)	Subsequent years (€)
Hospitalization	6,611	6,732	-
HLA typing	456	-	-
Donor stabilization	877	-	-
Operation	1,153	-	-
Logistical overhead	3,768	-	-
Medications	11,491	5,883	5,883
Physician visits	-	195	195
Total	24,356*	12,810*	6,078

* Doctoral thesis, Patrick Peeters, University Hospital Ghent, in preparation.

To estimate the cost for a renal transplant operation, patients were assumed to require two intensive care unit days (€780) and 17 standard care hospitalization days at €343 per day (OECD, 2005), which sums to €6,611 (US\$7,353; PPP 2001) for the transplant procedure. Organ procurement is reimbursed as a flat rate per transplanted organ; however the reimbursement for stabilization of the donor is paid to the donating hospital, while that for the transplantation operation is paid to the transplanting center. The cost of anti-rejection medications and antibiotics (€11,491 or US\$12,782; PPP 2001), nearly doubles the total cost of the transplant operation. In sum, an uncomplicated transplant procedure costs around €24,356 (US\$27,072; PPP 2001).

For a follow-up year of a stable transplant patient, the cost of drugs and physician visits were calculated (Table 2). When mycophenolate or azathioprine, methylprednisolone, and a calcineurin inhibitor are used for 1 year, the cost amounts to €5,883 (US\$6,543; PPP 2001).¹ Nephrologist visits typically cost €30 per visit; assuming stable transplant patients visit their nephrologists once every 8 weeks, these visits would cost €195 (US\$217; PPP 2001) per year. Therefore, in an uncomplicated year, care for a patient who has had a transplant for over 1 year costs roughly €6,078 (US\$6,761; PPP 2001). However, in the first year after transplantation, the mean costs are higher since episodes of rejection, infection and surgical complications are

¹ Enough Medrol for 80 days of treatment costs €11.5. Enough Cellcept for 50 days of treatment costs €405. Azathioprine for 100 days of treatment costs €33.33 and 25 days of treatment with Neoral (cyclosporine) costs €181.9.

common in this period. Considering these costs, a patient in the first year post-transplant has an annual expenditure of roughly €12,810 (US\$14,249; PPP 2001).

To use the point-prevalent count of patients as our weights in the calculation of annual expenditure per ESRD patient, we need an estimate of the year of transplantation, rather than the year after transplantation. Assuming that each transplant procedure occurs in the middle of the year, each patient accrues costs for 6 months as a dialysis patient and 6 months as a transplant patient. To estimate the cost for these 6 months of dialysis, the modality specific expenditures from Table 1 were weighted by the percentage of patients receiving HBD, CAD, and PD and then divided in half to account for only half the year. For the transplant component, recently transplanted patients were assumed to be more costly just after their operations than they are in the latter part of their first year post-transplant; therefore, the first 6 months post-transplant account for 75% of the first year transplant cost, or €9,608 (US\$10,687; PPP 2001). Adding the half year of dialysis and the half year post-transplant to the cost of the transplant operation, we obtain a total cost of €68,502 (US\$76,198; PPP 2001) in the year of transplant (Table 3).

Weighting each modality expenditure by the percentage of patients using that modality, the total expenditure per ESRD patient in Belgium is €45,023 (US\$50,081; PPP 2001).

Table 3. Annual expenditures per ESRD patient in Belgium, 2001

Modality	Weight	Annual expenditure per patient		
		Not weighted (€)	Weighted (€)	weighted (USD, PPP)
HD	0.5	71,790	35,895	39,927
PD	0.05	45,000	2,250	2,503
Year of transplant	0.02	68,502	1,370	1,524
Stable transplant	0.43	12,810	5,508	6,127
Total	1.00		45,023	50,081

PPP = 0.898 for Belgium, 2001 (OECD, 2005)

Specific aspects of treatment and financing

Prescription drugs

All registered medications are reimbursed at different levels. Life-saving medications such as insulin (class A) are completely reimbursed. Other medications with proven benefit (class B) are reimbursed at 75–90%, according to the patient's social status and income level. Patients are responsible for paying the demotivation fee (copayment), which is intended to discourage ineffective use of medications (e.g., over-the-counter pain killers and antibiotics). However, the cumulative amount of the demotivation fee cannot exceed €250 per year (US\$278; PPP 2001) for persons with low incomes. For some medications (class Bf), permission for reimbursement has to be obtained from an advisory physician from the sick fund. The criteria for reimbursement for these medications are well defined and issued by the social security system. Most class Bf medications are quite expensive, which is the reason the government wants to control their use.

Medications with only limited benefit are not reimbursed at all (class C). The amount paid for class C medications is not included in the maximum cumulative demotivation fee.

All medications directly related to ESRD, including EPO and anti-rejection drugs for transplant patients, are covered entirely by social security. Nephrologists are free to prescribe as much EPO as they deem necessary and there are no target levels of hemoglobin or hematocrit. EPO is also reimbursed for CKD stages 3 and 4 patients if their clearance is below 45 ml/min and if their hematocrit is below 35%. However, permission to distribute EPO is strictly limited to nephrologists and hospital pharmacies with supervising nephrologists. This rule was mainly introduced to reduce the number of late referrals.

Active vitamin D is almost completely reimbursed; only a small demotivation fee is paid by the patient. Intravenous active vitamin D is not reimbursed by Social Security in Belgium; it can only be administered in special cases in the form of compassionate use samples provided by drug companies.

There are no additional fees for the intravenous or subcutaneous administration of drugs during dialysis or for “additional nursing” such as wound dressings. However, for most dressings (e.g., hydrogels), bandages, and ointments for wound care, reimbursement is limited. As most of these are class C, such costs can be substantial for some patients. There is no special regulation for ESRD patients. They pay the same demotivation fee as other patients with the same income level and social status.

Permanent tunneled catheters are not reimbursed by the social security system. Some dialysis centers cover this cost themselves, while others bill it to the patient.

Hospitalization

Hospitalization costs are completely covered by social security, with the exception of “hotel costs,” which are paid by the patient. These hotel costs are a fixed daily rate that the hospital asks to cover catering and non-medical supplies such as telephones and televisions for patients. In most hospitals, the hotel costs depend on the service provided—for example, patients who want a single room or who have special requirements regarding food (except medically indicated dietary measures) incur higher costs. For renal transplant patients, hotel costs are often the largest part of their hospital bill after transplantation. During hospitalization, patients also pay a fixed contribution per day for medications. This amount is the same for all hospitalized patients in Belgium, regardless of the medications received. In addition, the hospitals are free to charge extra costs for non-reimbursed medications (class C) and medical supplies. For instance, most single use disposables for laparoscopy are not reimbursed by social security and hospitals can bill them to the patient.

Transplantation

Belgium has a relatively high prevalence of kidney transplantation. Seven hospitals perform this surgery.

To find cadaveric organ donors, Belgium cooperates with the Eurotransplant International Foundation. In Belgium there is an opting-out system, whereby brain-dead patients are considered willing to donate unless they have made a special appeal during their lifetime. Although permission of the relatives is not theoretically necessary, all hospitals inform the family and do not remove organs if the family objects. The social security system encourages cadaveric donor programs by providing financial support to hospitals that procure organs for the pool. Eurotransplant also reimburses procuring hospitals. Unfortunately, this financial support is paid as a fixed amount per transplanted organ. This practice means that the hospital harvesting the organs only gets money if the organs are actually transplanted, which potentially could lead to the use of sub-optimal organs. Both the opting-out formula and the financial involvement of the procuring hospitals may contribute to the high incidence and prevalence of cadaveric transplantation in Belgium. Despite the increasing cadaveric donation and the initiation of living relative donation, the number of ESRD patients on the waiting list is increasing exponentially due to the increasing prevalence of ESRD.

The cost of transplantation is covered completely by social security with a low demotivation fee. Transplant patients spend a mean of 15–20 days in the hospital for recovery, more days than in any other ISHCOF country (data not shown). After discharge, patients are seen as outpatients two times per week during the first 3 months. After 3 months, the frequency decreases to once every 6–8 weeks for stable transplants. These consultations are reimbursed nearly completely by the social security system.

All anti-rejection medications, including the newer induction therapies, are reimbursed completely for all transplanted patients. Some drugs, like acyclovir and peroral gancyclovir, are class Bf, and permission for reimbursement must be obtained from the social security system. However, this is merely a formality; in nearly all cases, the drugs are completely reimbursed.

Dialysis

Because dialysis is reimbursed as a fixed sum, the duration and type of dialysis is at the discretion of the attending nephrologists. Although longer dialysis may lead to higher costs without additional reimbursement, thereby decreasing profit, the average HD treatment in Belgium is relatively long, lasting 3.8 h, according to DOPPS II data.

There is no national standard for Kt/V level in Belgium, but the average is 1.3 eKt/V. The only limitation for dialysis dose is that patients cannot have more than three dialysis sessions reimbursed per week.

There is no required nurse/patient ratio in Belgium. As reimbursement is a flat fee, increasing the nurse/patient ratio reduces profit for the center. There is a consensus among Belgian nephrologists that one nurse should be employed per 500 dialysis sessions/year, resulting in about one nurse for every four patients. There is no reimbursement for other paramedical care, like psychological care, and only a few centers have a psychologist at their disposal, although it is clear from DOPPS results that psychological well being is an important factor in survival (Lopes et al., 2004).

Renal replacement therapy is, in principle, completely reimbursed to the patient by the third-payer system. The only exception is transportation to the dialysis center, which is reimbursed by the social security system at only a very low level. To reduce the costs, most health insurance associations organize their own transport service at no charge to members. However, shuttle services are often centrally organized and collective, which limits the ability of providers to lengthen dialysis sessions according to the needs of individual patients (e.g., interdialytic weight gain, or the need for additional investigations).

Patients still have to buy their own oral medications, and the normal reimbursement rules apply; they are reimbursed at a rate of 75–100%, depending on the patient's income and the class of medication.

The penetration of PD is low in Belgium (only 6% of ESRD patients and 10% of all dialysis patients). This is at least partly due to the problematic reimbursement regulation for PD. The reimbursement fee is paid as a fixed lump sum (per patient per week) directly to the hospital. In principle, this sum does not cover the fee for the nephrologist, so there is no financial reward for the nephrologist when a patient is on PD. In addition, the amount of the fixed fee is barely sufficient to cover all the real expenses, so profit is minimal for the hospital; under certain conditions (e.g., high volume APD, or a long hospitalization), the hospital's balance becomes negative. PD can only be profitable in large centers with a large pool of PD patients, where the fixed overhead costs, such as those for nurses and housing, can be spread over a larger number of patients. As a result, the PD population is concentrated in larger centers.

Trends and Outcomes

Certain demographic characteristics have a slight association with the incidence of ESRD. Certain regions have a high prevalence of analgesic nephropathy, which is related to the industrial character of these regions (GNFB, 2001, 2002). These regions have the highest prevalence of ESRD, in part because of the aging population. The mean age of HD patients has increased from 64 years in 1993 to 69 years in 2002. In general, the increase in ESRD prevalence is mostly due to an increase in renovascular and diabetic kidney disease. The prevalence of ESRD due to glomerulonephritis, for example, has been nearly stable over the last 5 years.

The restriction on the HBD centers has led to an increase in the CAD population, and to a lesser degree to an increase of PD.

The mean age at start of dialysis is substantially higher in Belgium compared to the Netherlands, despite the fact that in principle, the population characteristics of these two countries do not differ. Belgium also has a much higher acceptance rate than the Netherlands (170 pmp and 100 pmp, respectively), and a higher prevalence (900 pmp and 650 pmp, respectively), which suggests that Belgium's liberal reimbursement enables all medically suitable patients to be dialyzed, whereas the Netherlands probably has some hidden rationing. Despite these differences, outcomes are similar in both countries, with a median survival of ± 50 months (Nierstichting Nederland, 2006).

Socioeconomic status is moderately negatively associated with the cost of ESRD. It appears that the cost for renal replacement therapy is higher in the lower-income South of Belgium than in the higher-income North. Reimbursements for dialysis are comparable in both parts of the country; therefore, this difference is probably attributable to a difference in hospitalization rates and the use of technical investigations (Persmededeling Vlaams Artsensyndicaat, 2001). In part, this could be explained by the lower average income in the South (Kenniscentrum statistiek, 2005), which results in longer hospitalizations; Because home care is quite expensive and its costs are reimbursed at a very limited level, staying in the hospital for aftercare is more economical for most people.

Conclusion

Although reimbursement for renal replacement therapy is high, ESRD patients are still responsible for copayments. However, individual patients, or groups of patients (e.g., the very old or very poor), who cannot make the payments are not refused dialysis care. There is increasing pressure on the health care budget, particularly for renal replacement therapy, which has led to financial punishments for nephrologists who exceed budgets. This, together with the exponential growth of the ESRD population, might lead to an unsanctioned, but informal rationing of care.

Late referral is problematic in Belgium, partly because the fee-for-service system makes physicians hesitant to refer patients to other specialists for fear of losing business. In addition, the high reimbursement for technical activities (like dialysis) and the low reimbursement for intellectual activities (prevention, counseling) limit nephrologist interest in preventing the progression of chronic kidney disease. Renal and general practitioner societies are working to change these views; however, their campaigns are typically privately funded and not national government initiatives.

Belgium's total health care expenditure as a percentage of GDP (9%) is average among ISHCOF countries. Yet, the liberal ESRD reimbursement system constitutes 1.8% of total health care expenditure, one of the highest percentages among ISHCOF countries and comparable to Germany (Kleophas & Reichel, 2007) and the United States (Hirth, 2007). The reimbursement system is disadvantageous for PD, which is reflected in its low penetration. In general, patient satisfaction is high (FOD Economie, 1998) and outcomes are comparable with surrounding countries.

Nevertheless, the quality of delivered care could still improve if part of the high reimbursement for technical activities was put toward prevention.

Acknowledgments

The International Study of Health Care Organization and Financing is supported by the Arbor Research Collaborative for Health. The Dialysis Outcomes and Practice Patterns Study is supported by research grants from Amgen and Kirin without restrictions on publications.

References

- Ashton, T., & Marshall, M. R. (2007). The organization and financing of dialysis and kidney transplantation services in New Zealand. *International Journal of Health Care Finance and Economics*. DOI: 10.1007/s10754-007-9023-x
- BVVO. (2004). *Assurinfo: de nationale uitgaven in de Gezondheidszorg*. Brussels: Beroepsvereniging der verzekeringsondernemingen; huis der verzekering.
- BVVO. (2005). *Assurinfo: de nationale uitgaven in de Gezondheidszorg*. Brussels: Beroepsvereniging der verzekeringsondernemingen; huis der verzekering.
- Belgische Federale Overheidsdiensten. (2005). *Federale Overheidsdienst Sociale Zekerheid*. Brussels Belgisch Tijdschrift voor Sociale Zekerheid. Retrieved February 25, 2007, at <http://socialsecurity.fgov.be/EN>
- Cohen, B., & Persijn, G. G. (Eds.). (2005). *Eurotransplant international foundation: Annual report 2004*. Leiden, Netherlands: Eurotransplant International Foundation. Retrieved February 22, 2007, at http://www.eurotransplant.nl/files/annual_report/AR2004.pdf
- Dor, A., Pauly, M. V., Eichleay, M. A., & Held, P. J. (2007). End stage renal disease and economic incentives: The International Study of Health Care Organization and Financing (ISHCOF). *International Journal of Health Care Finance and Economics*. DOI: 10.1007/s10754-007-9024-9
- Durand-Zaleski, I., Combe, C., & Lang, P. (2007). International Study of Health Care Organization and Financing for end-stage renal disease in France. *International Journal of Health Care Finance and Economics*. DOI: 10.1007/s10754-007-9025-8
- FOD Economie, KMO, Middenstand en Energy. (1998). *Internationale vergelijking 1998*. Brussels: FPS Economy, Directorate General Statistics and Economic Information. Retrieved May 25, 2006 at http://statbel.fgov.be/press/fl047_nl.asp.
- GNFB. (2001). *Registre de Néphrologie de la Communauté Français de Belgique: Rapport annuel d'activité des Centres no 8 – Année 2000*. Brussels: Groupement des Néphrologues Francophones de Belgique.
- GNFB. (2002). *Registre de Néphrologie de la Communauté Français de Belgique: Rapport annuel d'activité des Centres no 9 – Année 2001*. Brussels: Groupement des Néphrologues Francophones de Belgique.
- Harris, A. (2007). The organization and funding of the treatment of end-stage renal disease in Australia. *International Journal of Health Care Finance and Economics*. DOI: 10.1007/s10754-007-9018
- Hirth, R. A. (2007). The organization and financing of dialysis and kidney transplant care in the United States of America. *International Journal of Health Care Finance and Economics*. DOI: 10.1007/s10754-007-9019-6
- Kenniscentrum statistiek. (2005). Brussels: Retrieved May 26, 2006 at http://aps.vlaanderen.be/statistiek/nieuws/algemeen/2005-02_wallonie.htm
- Kleophas, W., & Reichel, H. (2007). International study of health care organization and financing: Development of renal replacement therapy in Germany. *International Journal of Health Care Finance and Economics*. DOI: 10.1007/s10754-007-9020-0
- Laupacis, A., Keown, P., Pus, N., Krueger, H., Ferguson, B., Wong, C., & Muirhead, N. (1996). A study of the quality of life and cost-utility of renal transplantation. *Kid International*, 50, 235–242.
- Levey, A., Eckardt, K., Tsukamoto, Y., Levin, A., Coresh, J., Rossert, J., De Zeeuw, D., Hostetter, T., Lameire, N., & Eknoyan, G. (2005). Definition and classification of chronic kidney disease: A position statement from Kidney Disease: Improving Global Outcomes (KDIGO). *Kidney International*, 67, 2089–2100.

Lopes, A. A., Albert, J. M., Young, E. W., Satayathum, S., Pisoni, R. L., Andreucci, V. E., Mapes, D. L., Mason, N. A., Fukuhara, S., Wikstrom, B., Saito, A., & Port, F. K. (2004). Screening for depression in hemodialysis patients: associations with diagnosis, treatment, and outcomes in the DOPPS. *Kidney International*, 66, 2047–2053. Erratum in: *Kidney International*, 66, 2486.

Luño, J. (2007). The organization and financing of end-stage renal disease in Spain. *International Journal of Health Care Finance and Economics*. DOI: 10.1007/s10754-007-9021-z

Manns, B. J., Mendelssohn, D. C., & Taub, K. J. (2007). The economics of end-stage renal diseases care in Canada: Incentives and impact on delivery of care. *International Journal of Health Care Finance and Economics*. DOI: 10.1007/s10754-007-9022

NBVN. (2002). *Annual report 2002*. Edegem, Belgium: Nederlandstalige Belgische Vereniging voor Nefrologie.

Nierstichting Nederland. (2006). *Feiten en cijfers*. Bussum: Nierstichting Nederland. Retrieved February, 2007, at http://www.nierstichting.nl/ziekte/feiten_en_cijfers

Nicholson, T., & Roderick, P. (2007). International study of health care organization and financing of renal services in England and Wales. *International Journal of Health Care Finance and Economics*. DOI: 10.1007/s10754-007-9015-x

OECD (2004). OECD Health Data 2004. Version 06/07/2004. CD Rom.

OECD. (2006). *Purchasing Power Parities (PPPs) for OECD countries 1980–2005*. Paris: Organization for Economic Cooperation and Development. Retrieved February, 2007, at http://www.oecd.org/statisticsdata/0,2643,en_2649_34357_1_119656_1_1_1,00.html

Pacolet, J., Deliège, D., Artoisenet, C., Cattaert, G., Coudron, V., Leroy, X., Peetermans, A., & Swine, C. (2006). Vergrijzing, gezondheidszorg en ouderenzorg in België. Retrieved February, 2006, at http://socialsecurity.fgov.be/NL/specifieke_info/onderzoekers/publicaties/wp_vergrijzing/nl.pdf.

Persmededeling Vlaams Artsensyndicaat (VAS). (2001). Retrieved May 26, 2006, at <http://users.pandora.be/asgb/P010612.htm>.

Pontoriero, G., Pozzoni, P., Del Vecchio, L., & Locatelli, F. (2007). International Study of Health Care Organization and Financing of renal replacement therapy in Italy: An evolving reality. *International Journal of Health Care Finance and Economics*.

Wikström, B., Fored, M., Eichleay, M. A., & Jacobson, S. H. (2007). The financing and organization of medical care for patients with end-stage renal disease in Sweden. *International Journal of Health Care Finance and Economics*. DOI 10.1007/s10754-007-9013-y