www.bdd.rdplf.org Volume 5, n°3, Septembre 2022
https://10.25796/bdd.v5i3.67593
ISSN 2607-9917

Bulletin de la Dialyse à Domicile

Cost of home dialysis in France

(According to the presentation made at the home dialysis day (DIADOM) during the congress Seminars of Nephrology which was held in Paris in January 2022)

(Coût de la Dialyse à Domicile en France)

Guy Rostoker[1, 2]

[1]Service de Néphrologie-Dialyse, Hôpital Privé Claude Galien, Ramsay Santé, 91480 Quincy-Sous-Sénart
[2]Collège de Médecine de Hôpitaux de Paris, 75005 Paris

Note : Cette publication est bilingue, le texte français est disponible au même url : https://10.25796/bdd.v5i3.67593

Summary

Medico-economic evaluation is defined as economic evaluation applied to the health field. It is a comparative analysis of different diagnostic, therapeutic or preventive strategies, based on their costs and health outcomes. We have only one medico-economic study on the costs of dialysis in France, carried out by the Haute Autorité de Santé, which covered the year 2012 and consisted of cross-referencing 3 databases: the Registre Réseau Épidémiologique et Information en Néphrologie and the Système National d'Informations Inter-régimes de l'Assurance Maladie et de l'Hospitalisation. Analyses focused on prevalent patients, incident patients and key patient characteristics: age, presence of diabetes and care trajectories. The average monthly cost varied considerably according to the management modality, from 3774 euros/month in autonomous continuous ambulatory peritoneal dialysis (CAPD) to 7253 euros/month in center-based hemodialysis. The monthly cost of therapies according to the patient profile appears to be strongly affected by the diabetic status of the patients. This analysis shows the high cost of transport for patients on in-center hemodialysis (20% of total expenditures), and even higher for nursing care in assisted CAPD (37% of total expenditures). The total tariff decreases from 2014 to 2020 were -17.6% for center-based hemodialysis and -9.8% for the low medicalized dialysis unit (LMDU), while the total 2014–2021 tariff increases were +9.3% for CAPD and +9.1% for automated peritoneal dialysis (APD). Paradoxically, these price changes have increased the cost of assisted peritoneal dialysis, which is now almost at the same level of overall cost as in-center hemodialysis for the French health insurance system. The ongoing study of the Physidia Laboratory's retrospective cohort on daily home hemodialysis (DHH) should allow us to know the current cost of each hemodialysis technique currently practiced in France, including DHH.

Key words : Costs, France, home dialysis, peritoneal dialysis, daily home hemodialysis, medico-economics

Résumé

L'évaluation médico-économique est définie comme l'évaluation économique appliquée au domaine de la santé. Il s'agit d'une analyse comparative des différentes stratégies diagnostiques, thérapeutiques ou préventives, sur la base de leurs coûts et de leurs résultats en santé. Nous disposons d'une seule étude médico-économique sur les coûts de la dialyse en France réalisée par la Haute Autorité de Santé qui a porté sur l'année 2012 et a consisté au croisement de 3 bases de données: le Registre Réseau Épidémiologique et Information en Néphrologie et le Système National d'Informations Inter-régimes de l'Assurance Maladie et de l'hospitalisation. Les analyses ont porté sur les patients prévalents, les patients incidents et les principales caractéristiques des patients : âge et présence d'un diabète et leurs trajectoires de soins. Le coût moyen mensuel varie considérablement selon les modalités de prise en charge, de 3774 euros/mois en dialyse péritonéale continue ambulatoire (DPCA) autonome à 7253 euros/mois en hémodialyse en centre. Le coût mensuel des thérapies en fonction du profil des patients apparaît fortement impacté par le statut diabétique ou non des patients. Cette analyse montre le coût important du transport pour les patients en hémodialyse en centre (20% des dépenses totales), encore plus élevé pour les soins infirmiers en DPCA assistée (37% des dépenses totales). La baisse tarifaire totale a été de 2014 à 2020 de -17,6% pour l'hémodialyse en centre et de -9,8% pour l'unité de dialyse médicalisée (UDM) alors que la majoration tarifaire totale 2014-2021 a été de +9,3% en DPCA et de +9,1% en dialyse péritonéale automatisée (DPA). Ces évolutions tarifaires ont paradoxalement renchéri la technique de dialyse péritonéale assistée qui se situe maintenant quasiment au même niveau de coût global que l'hémodialyse en centre pour l'Assurance Maladie. L'étude en cours de la cohorte rétrospective du laboratoire Physidia sur l'hémodialyse à domicile quotidienne (HDDQ) devrait nous permettre de connaître le coût actuel de chaque technique d'hémodialyse pratiquée actuellement en France dont l'HDDQ.

Mots clés : Coûts, France, dialyse à domicile, dialyse péritonéale, hémodialyse quotidienne à domicile, médico-économie

To cite : Rostoker G. Cost of Home Dialysis in France. Bull Dial Domic [Internet]. 2022;5(3). Available from: https://10.25796/bdd.v5i3.67593

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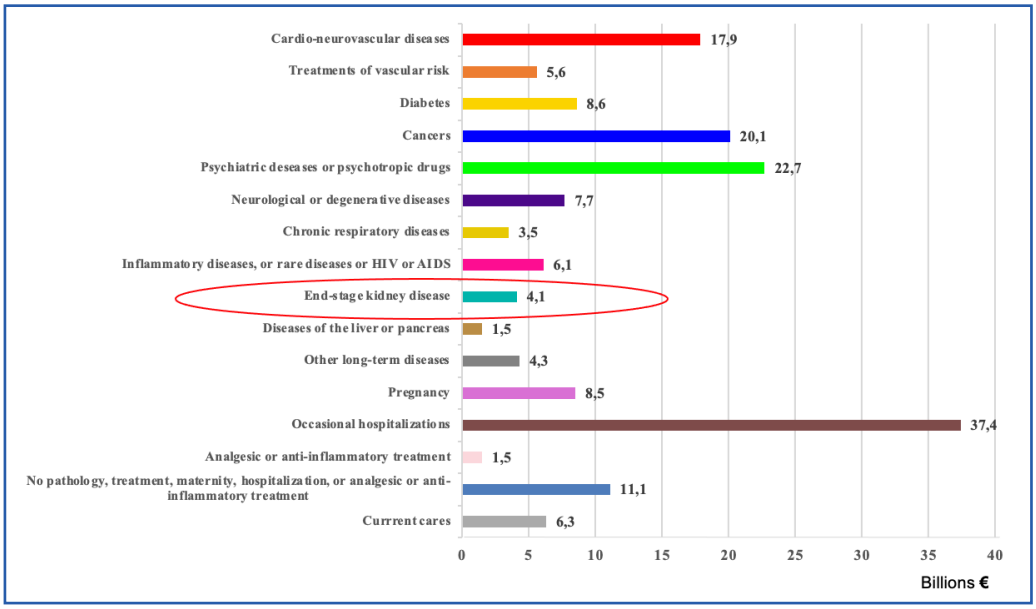
www.bdd.rdplf.org Volume 5, n°3, Septembre 2022
https://10.25796/bdd.v5i3.67593
ISSN 2607-9917

Abbreviations

ANSES Agence Nationale de sécurité Sanitaire de l'alimentation, de l'environnement et du travail **APD** Automated peritoneal dialysis **CAPD** Continuous ambulatory peritoneal dialysis **CEESP** Commission d'Évaluation Économique et de Santé Publique **CESREES** Comité Éthique et Scientifique pour les recherches, les études et les évaluations dans le domaine de la Santé **CKD** Chronic kidney disease **CNAM** Caisse nationale de l'assurance maladie **CNIL** Commission Nationale de l'Informatique et des Libertés **ESPIC** Établissements de santé privé d'intérêt collectif **HAS** Haute autorité de Santé **HD** Hemodialysis	**HHD** Home hemodialysis **IQWiG** Institut für Qualität und Wirtschaftlichkeit im Gesundheitwesen **NICE** National Institute for Health and Care Excellence **LMDU** Low medicalized dialysis unit **OECD** Organization for Economic Cooperation and Development **PD** Peritoneal dialysis **PMSI** Programme de médicalisation des systèmes d'information - Registre des hospitalisations **REIN**: Registre Réseau Épidémiologique et Information en Néphrologie **SNIIR-AM** Système National d'Informations Inter-régimes de l'Assurance Maladie **UMR** Unité mixte de recherche

1 - INTRODUCTION

Healthcare expenses reimbursed by the French health national insurance system called Assurance Maladie in France amounted to 167 billion euros in 2019 for all schemes; expenditures for the management of end-stage chronic renal failure amounted to 4.1 billion, or 2.45% of all expenditures for 98,427 patients (Figure 1) [1].



⬆ *Figure 1 : Distribution of health insurance expenses reimbursed in 2019 by category of pathologies, chronic treatments and episodes of care: 167 billion euros for all schemes*
Costs and income report - health insurance proposals for 2022 (July 2021) [1]
Source: CNAM (mapping July 2021 version)

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ISSN 2607-9917

The annual expenditure per patient for end-stage chronic renal failure is the highest, regardless of the pathology, chronic treatment or episode of care, and amounts to an average of 41,701 euros/year/patient (Table I) [1].

⬇ *Table I: Numbers and average expenditure cost per patient for each group of pathology or episode of care, in 2019 in France*

Pathology, treatment or health event	Numbers	Total average cost	*including outpatient care*	*including hospitalizations*	*including cash services*
Cardio-neurovascular diseases	**5 129 236**	**3 448 €**	***1 542 €***	***1 740 €***	***215 €***
Including acute cardio-neurovascular diseases	454 615	9 142 €	*1 481 €*	*7 967 €*	*237 €*
Including chronic cardio-neurovascular diseases	4 982 836	2 716 €	*1 452 €*	*1 064 €*	*200 €*
Treatment of vascular risk (independently of pathology)	**8 476 179**	**661 €**	***508 €***	***47 €***	***106 €***
Diabetes	**3 964 561**	**2 164 €**	***1 810 €***	***211 €***	***143 €***
Cancers	**3 297 155**	**6 097 €**	***2 502 €***	***3 243 €***	***352 €***
Including active cancers	1 467 392	12 270 €	*4 661 €*	*7 091 €*	*518 €*
Including cancers under medical supervision	1 930 730	1 086 €	*730 €*	*149 €*	*207 €*
Psychiatric deseases or psychotropic drugs	**8 103 919**	**2 804 €**	***799 €***	***1 359 €***	***646 €***
Including Psychiatric diseases	2 508 405	6 413 €	*1 252 €*	*4 179 €*	*982 €*
Including Psychotropic drugs	5 595 514	1 187 €	*597 €*	*95 €*	*495 €*
Neurological or degenerative diseases	**1 673 904**	**4 576 €**	***2 879 €***	***1 341 €***	***355 €***
Chronic respiratory diseases (excluding cystic fibrosis)	**3 656 804**	**954 €**	***589 €***	***267 €***	***98 €***
Inflammatory diseases, or rare diseases or HIV or AIDS	**1 286 272**	**4 744 €**	***3 292 €***	***1 025 €***	***427 €***
End-stage kidney disease	**98 427**	**41 701 €**	***12 692 €***	***28 194 €***	***815 €***
Including chronic dialysis	54 566	60 557 €	*16 965 €*	*43 097 €*	*496 €*
Including kidney transplantation	3 514	68 127 €	*15 590 €*	*50 333 €*	*2 204 €*
Including follow up of kidney transplantatioon	40 347	13 897 €	*6 660 €*	*6 111 €*	*1 126 €*
Diseases of the liver or pancreas (excluding cystic fibrosis)	**604 162**	**2 545 €**	***1 391 €***	***913 €***	***241 €***
Other long-term diseases	**1 975 489**	**2 177 €**	***1 627 €***	***364 €***	***186 €***
Pregnancy (with or without pathologies)	**1 265 621**	**6 698 €**	***979 €***	***2 856 €***	***2 863 €***
Occasional hospitalizations (with or without pathologies, treatments or	**9 417 185**	**3 972 €**	***553 €***	***3 054 €***	***365 €***
Analgesic or anti-inflammatory treatment (excluding pathologies, treatr	**1 308 126**	**1 159 €**	***608 €***	***89 €***	***462 €***
No pathology, treatment, maternity, hospitalization, or analgesic or anti-inflammatory treatment	**36 194 044**	**308 €**	***196 €***	***32 €***	***79 €***

Costs and income report - health insurance proposals for 2022 (July 2021) [1]

Source: CNAM (mapping July 2021 version, expenses reimbursed).

Given the importance of such financial volumes, medico-economic analysis is of paramount importance. Medico-economic evaluation is defined as the economic evaluation applied to the field of health; it is a comparative analysis of the different diagnostic, therapeutic or preventive strategies on the basis of their costs and their health outcomes [2]. The use of medico-economic analysis has been imposed for 30 years by various French and European health agencies: the High Authority for Health (Haute autorité de Santé (HAS) and the National Health Security Agency of Food, Environment and Labor (Agence Nationale de sécurité Sanitaire de l'alimentation, de l'environnement et du travail (ANSES)) in France, The National Institute for Health and Care Excellence (NICE) in England, and the Institut für Qualität und Wirtschaftlichkeit im Gesundheitwesen (IQWiG) in Germany [2].

2 - HAS METHODOLOGY

The analytical methodology initially included the drafting of a framework note defining the feasibility and scope of the project, validated by the Commission for Economic and Public Health Assessment (Commission d'Évaluation Économique et de Santé Publique (CEESP)) of HAS on July 6, 2010 and secondarily validated by the College of HAS on November 3, 2010. A multidisciplinary and multiprofessional working group comprising health economists, metho-

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https://10.25796/bdd.v5i3.67593
ISSN 2607-9917

dologists, nephrologists (all types of practice), caregivers, administrators and representatives of associations of patients with renal insufficiency was then formed [3]. This working group met from February 2011 to June 2014, for a total of 7 working meetings [3]. The report drawn up by the working group was submitted to a multidisciplinary and multiprofessional review group [3]. The final report was approved by the Commission for Economic and Public Health Assessment (Commission d'Évaluation Économique et de Santé Publique (CEESP)) and then validated by the HAS board [3].

3 - MAIN RESULTS OF HAS WORK

3-1. What were the conclusions of the HAS concerning the data from the literature on medico-economic studies carried out abroad and in France ?

The HAS, after detailed analysis of data from the literature on medico-economic studies carried out outside France, determined that these were not or only slightly informative and could not be applied to the French healthcare system [3]. At the same time, the HAS, after detailed analysis of data from the medico-economic studies carried out in France, determined that these were insufficiently informative and not very relevant [3].

3-2. Specific study set up by HAS

The analysis covered the year 2012 and consisted of crossing 3 databases:

- The Nephrology Epidemiological and Information Network Registry (Registre Réseau Épidémiologique et Information en Néphrologie (REIN))

- The National Inter-scheme Information System for Health Insurance (Système National d'Informations Inter-régimes de l'Assurance Maladie (SNIIR-AM)) and Hospitalization (Programme de médicalisation des systèmes d'information - Registre des hospitalisations (PMSI))

The analyses focused on:
- prevalent patients
- incident patients (new patients)
- the main characteristics of the patients: age and presence of diabetes mellitus
- patients' care trajectories

The statistical study was carried out by the Health Biostatistics Laboratory UMR 5558 of the Hospices Civils de Lyon [3, 4].

3-3. Variation in the average monthly cost according to the methods of coverage

For the year 2009, the average monthly cost varied considerably according to the terms of care, from 3774 euros/month in self-care (or non-assisted) CAPD to 7253 euros/month in-center hemodialysis (Figure 2) [3, 4].

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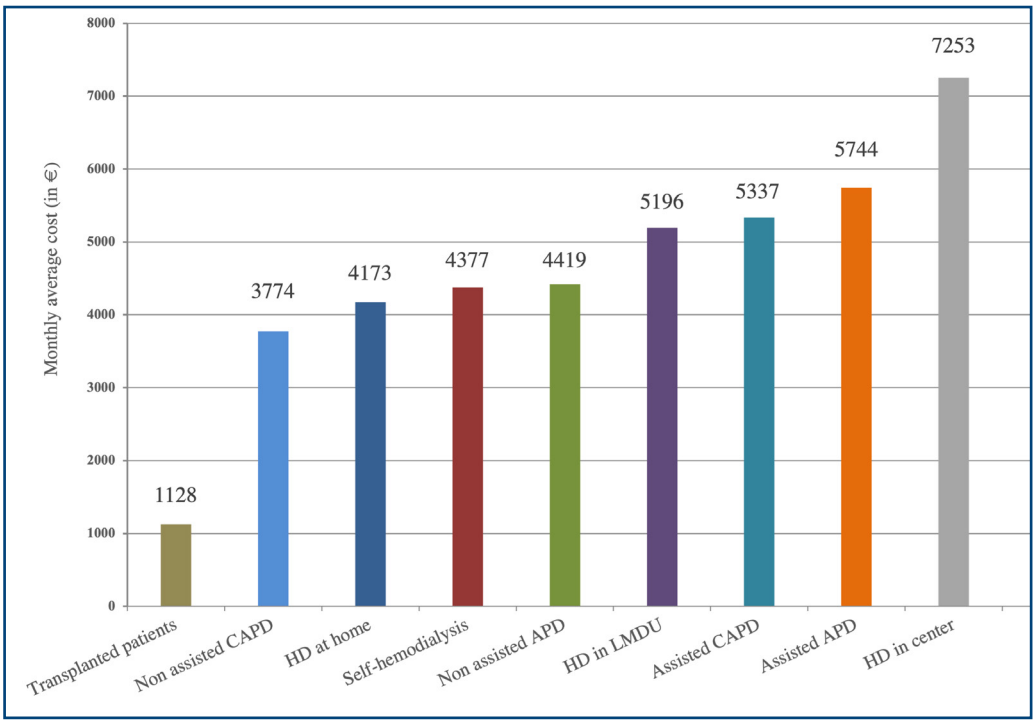

⬆ *Figure 2 : Average monthly cost by treatment modality for a stable prevalent patient*

Medico-economic evaluation report of management strategies for end-stage chronic renal failure in France [3]

3-4. Monthly cost of therapies based on patient profile.

This appeared to be strongly affected by the diabetic or non-diabetic status of the patients (Table II) [3, 4].

Modality of treatment	18-44 years diabetic	18-44 years non diabetic	45-69 years diabetic	45-69 years non diabetic	70+ years diabetic	70+ years non diabetic
Number	**634**	**8 364**	**5 049**	**19 156**	**4 220**	**10 439**
In centre Hemodialysis	**8 298**	**6 915**	**7 992**	**6 964**	**7 736**	**6 916**
Assisted APD	**6 717**	**5 550**	**6 543**	**6 274**	**5 796**	**5 265**
Assisted CAPD	**6 018**	**4 850**	**6 497**	**4 899**	**5 923**	**4 932**
Hemodialysis in LMDU	**5 886**	**4 739**	**5 810**	**5 136**	**5 425**	**5 003**
Non-assisted APD	**5 376**	**4 208**	**4 984**	**4 324**	**5 118**	**4 085**
Hemodialysis in self hemodialysis unit	**5 360**	**4 083**	**4 940**	**4 304**	**4 696**	**4 340**
Home Classical Hemodialysis (3 sessions/week)	**5 038**	**4 159**	**5 439**	**4 118**	**4 374**	**3 484**
Non-assisted CAPD	**4 382**	**3 214**	**4 093**	**3 856**	**4 295**	**3 462**
Transplantation	**2 091**	**1 043**	**1 640**	**1 075**	**1 475**	**1 038**

⬆ *Table II : Average monthly cost in euros (adjusted for small numbers) by modality of treatment, according age and prsence of diabetes for 47,862 stable french dialysis patients.*

Medico-economic evaluation report of management strategies for end-stage chronic renal failure in France [3]

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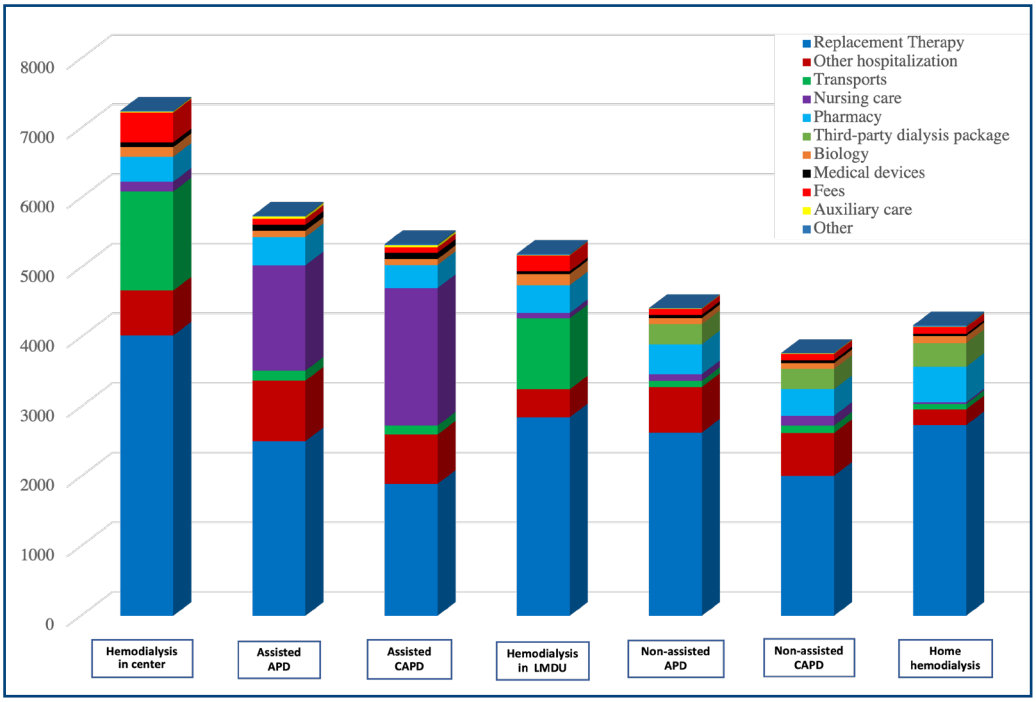
3-5. Distribution of monthly costs by therapy and by item of expenditure.

This analysis showed the significant cost of transport for patients on hemodialysis in centers (20% of total expenses) and even a higher cost for nursing care in assisted CAPD (37% of total expenses), while autonomous (or self-care) CAPD and APD led to substantial savings on transport and nursing care. Interestingly, this work showed that the cost of dialysis consumables has little impact on the total cost of dialysis (9%) (Figure 3) [3, 4].



⬆ *Figure 3 : Distribution of the monthly costs for a prevalent patient by therapy and by item of expenditure*
Medico-economic evaluation report of management strategies for end-stage chronic renal failure in France [3]

4 - RECENT TARIFF DEVELOPMENTS 2014-2021 AND THEIR IMPACTS

Over the years 2014–2021, the supervisory authorities wished to reduce the financial attractiveness of hemodialysis in medical dialysis centers and units (LMDU) and to increase peritoneal dialysis packages, hoping, through this macro-economic action, to redirect the offer of dialysis care toward home dialysis. From 2014 to 2020, the total price reduction (averaged for the public sector, private health establishments of collective interest (Établissements de santé privé d'intérêt collectif (ESPICs)) and the private sector) was -17.6% for center hemodialysis and -9.8% for LMDU, while the total tariff increase for 2014–2021 was +9.3% in CAPD and +9.1% in APD. It is interesting to note that these very significant price changes had no restructuring effect on the care offer [5].

Between 2014 and 2022, the price changes for the average monthly replacement treatment, according to the dialysis modalities were -622 euros/month for hemodialysis in a center and -314 euros/month for LMDU. This significant negative financial impact for healthcare institutions regardless of their status has to be put into perspective, and balanced with the monthly gain of 200 euros for the CAPD package and 252 euros for the APD package [5]. If we extrapolate these data to the distribution of monthly costs by therapy and item of expenditure (considering

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ISSN 2607-9917

that the other items have remained almost identical), the importance of the cost of transport remains as high as ever, and has even increased for hemodialysis in centers and the MDUs. The cost of nursing care remains just as important, but has decreased, for assisted CAPD and assisted APD (Figure 4). However, these price changes have generally made the assisted PD technique (CAPD/APD) more expensive, so that it is now almost at the same level of overall cost as HD in the center (Figure 4).

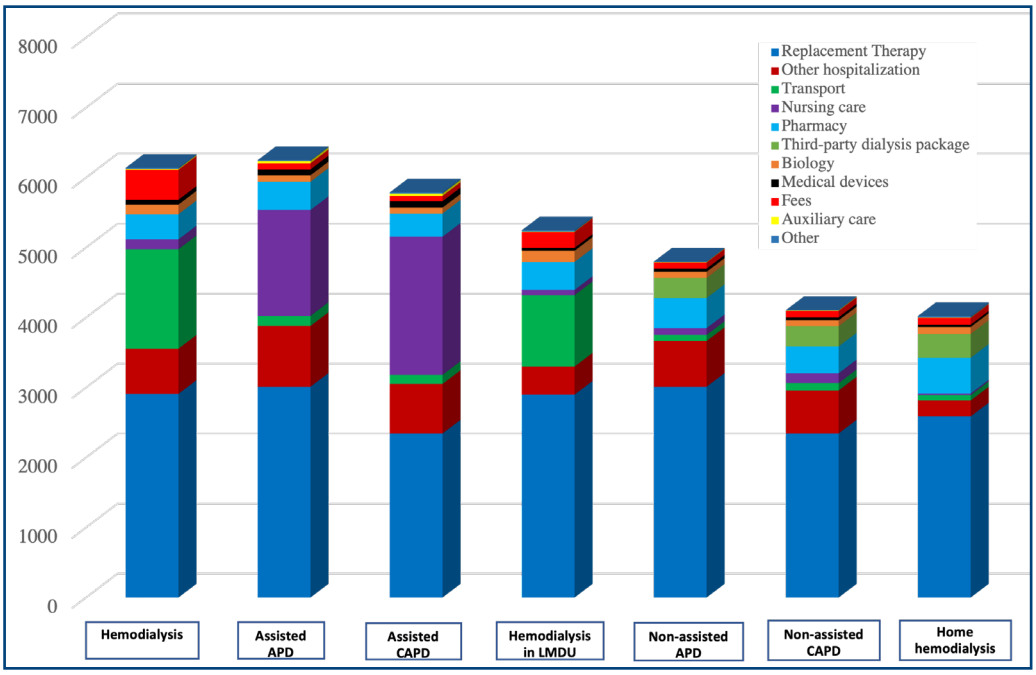

Figure 4: Extrapolation of the distribution of the monthly costs of a prevalent patient by therapy and by item of expenditure

5 - WHAT DO WE KNOW ABOUT THE COST OF DAILY HOME HEMODIALYSIS (Daily HHD)?

The real cost of daily HHD was not evaluated in the HAS work of 2014. At that time, the number of patients on daily HHD was too low, unlike the number of patients in traditional home hemodialysis with 3 weekly sessions [3]. The High Authority for Health recognized, however, that «Some innovative strategies such as daily low-flow dialysate hemodialysis (…) deserve to be considered, because they favor home care or autonomy or proximity of taking charge» [3].

In addition, home hemodialysis (traditional with 3 sessions and daily HHD) has a significant financial handicap compared to PD: the absence of reimbursement adapted to 3 essential items for the proper deployment of these methods of renal function replacement: acts of medical surveillance, nursing acts at home (in particular the cannulation of the fistula) and the reimbursement of telemedicine.

The retrospective cohort study conducted by the Physidia Laboratory on daily HHD should enable us to know the current cost of each hemodialysis technique practiced in France, including daily HHD [6].

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This is a retrospective cohort study on the years 2019 and 2020, inspired by the HAS methodology of 2014 [3], which will provide the detailed costs of 5 hemodialysis techniques and compared them:

- Daily home hemodialysis (defined by 5 sessions and more/week),
- Traditional home hemodialysis (defined as less than 5 sessions/week)
- Autodialysis (self in center hemodialysis)
- LMDU
- In-center hemodialysis

The study is planned to analyze 3 age groups: 18–44 years old, 45–69 years old, and 70 years old and over.

This study received a favorable opinion from the Ethics and Scientific Committee for Research, Studies and Evaluations in the field of Health (Comité Éthique et Scientifique pour les recherches, les études et les évaluations dans le domaine de la Santé (CESREES)) and the National Commission for Computing and Liberties (Commission Nationale de l'Informatique et des Libertés (CNIL)). The SNIIR-AM data are currently awaiting transfer by the French national health insurance fund (Assurance Maladie) [6]. The philosophy of this study, inspired by the precepts of Walker and co-authors, could theorically make possible to integrate the quantifiable benefits of daily HHD for indicators of health and quality of life as compared to the apparent additional costs for the payer (Assurance Maladie) (Figure 5) [7].

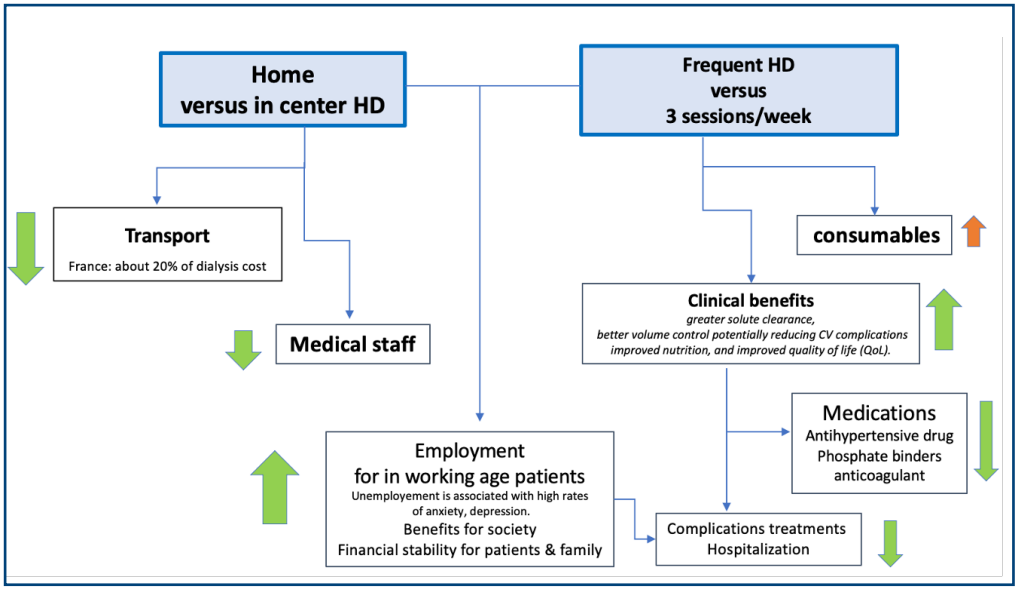

Figure 5: Daily hemodialysis at home: cost-effectiveness data

Walker RC, Howard K, Morton RL. Home hemodialysis: a comprehensive review of patient-centered and economic considerations. Clinicoecon Outcomes Res. 2017;9:149-161. doi : 10.2147/CEOR.S69340 [7].

6 - INTEREST AND PROSPECTS OF MEDICO-ECONOMIC DATA ON HOME DIALYSIS

The development of home dialysis in France remains insufficient, limited until recently by the inconstant, partial and often biased information given to patients with chronic kidney disease

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ISSN 2607-9917

(CKD) stages 4 and 5, which has inclined them toward hemodialysis. This bias has now theoretically been counteracted by the implementation of the CKD course in 2019. Too little training of doctors and dialysis caregivers in PD, as well as the absence of incentive funding, has negatively amplified this phenomenon [8]. In a recent review published in JASN, Baerman and co-authors suggested the importance of financial incentives for the different performers of the technique to implement independent peritoneal dialysis in the US and in OECD countries where the percentages of patients remain very low [9]. If we are interested in the benefit to the payer in France, a patient aged between 70 and 80 (currently mainly referred to an HD center), trained in autonomy (personal or couple, which is a reality observed in daily practice in centers practicing PD), will create a net gain for the payer is 1300 euros/month in cases of autonomous APD and 2000 euros/month in those of autonomous CAPD (Figure 5). In order to promote a significant development of autonomous PD, we could apply the precepts of Baerman and co-authors to France: 70% of the sums saved would be kept by the Assurance Maladie, and 30% redistributed equally between the health establishments, doctors and patients. The latter would amount to between 170 and 250 euros per month, or nearly double the medical fees for monitoring and of the flat rate for compensatory assistance for patients (autonomy flat rate). This would make a positive increase in tariff of PD packages of 4.1% for APD and 7.9% for CAPD [10].

7 - CONCLUSIONS

Medico-economic data and analyses can prove very useful in clarifying the medicalized control of health expenditures for dialysis that are implemented by supervisory authorities. They make it possible to avoid an accounting-focused vision capable of amplifying the loss of meaning currently felt by doctors and dialysis caregivers during the persistent COVID-19 epidemic. This is aggravated by the observed impoverishment of the care given to patients with end-stage renal failure in France following the price reductions of the last seven years.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest with this work.

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ISSN 2607-9917

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