

# Home Dialysis Does Not Have the Monopoly on Low Cost



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## INTRODUCTION

End-stage kidney disease (ESKD) is a major challenge for health care systems around the world because of its ever-rising rates and the ensuing rise in health care costs. In France, the cost of caring for patients with ESKD was estimated at €4.1 billion in 2019, which is 2.5% of the total budget of the health insurance funds that is spent on 1.4% of the general population.

Health care systems must attempt to provide appropriate, high-quality, and economically sustainable care that meets the needs and desires of patients with ESKD. Patients aspire to remain independent if at all possible, continuing to have a social life and pursue their profession.<sup>1–3</sup>

The objective of this study was to compare the cost of 4 dialysis modalities that enable patients to play a substantial role in their own care and have social and professional lives. The dialysis modalities include the following: (i) nonassisted hemodialysis in self-care units (scHD), (ii) nonassisted automated peritoneal dialysis (naAPD), (iii) daily home hemodialysis (dhHD), and (iv) non-facility-based nocturnal extended hours hemodialysis (neHD) ([Supplementary Population and Method](#)).

## RESULTS

A total of 1932 patients were included accounting for 39,966 months of treatment ([Supplementary Figure S1](#)). Some patients may have received >1 type of treatment.

The relatively low median age of this cohort (49.4 years, interquartile range 39.0–57.6) reflects the

preferential referral of mobile, independent patients to these modalities. Patients on naAPD were older and more often female ([Supplementary Table S1](#)). The frequency of comorbidities may vary between groups.

The median monthly cost for one patient was €6154 (interquartile range €5088–€7566) and varied from €5700 for naAPD to €7903 for dhHD ([Table 1](#)). Analysis by cost subcategories shows that the highest cost (56%) was due to dialysis fees ([Supplementary Table S2](#)). Hospitalization was the second leading cost (12%).

The costs of the different subcategories varied between dialysis modalities ([Table 1](#)). Dialysis costs were similar for scHD, naAPD, and neHD and were about twice as high for dhHD. Expenses for transport and laboratory tests were lower for patients at home, but cost for hospitalization was higher. Expenses for drugs were lowest for neHD and naAPD patients. Technical medical acts and paramedical remuneration costs (outside dialysis session) were highest for naAPD. Medical remuneration was highest for neHD and was lower for dhHD.

During the periods considered, the hospitalization rate was 33 per 100 months at risk, distributed as follows: 14 for hospital stays and 19 for day hospitalization. Day hospitalization was more frequent for patients with home treatment ([Table 2](#)).

Various compensatory allowances were paid to 49% of the patients. Those treated by naPD received disability benefits most frequently, and approximately 30% of all groups had patients receiving an allowance because of inability to work ([Supplementary Table S3](#)).

**Table 1.** Distribution of the monthly cost by cost subcategories in each subgroups

Monthly cost (€)	Nocturnal extended HD			HD in self-care unit			Nonassisted APD			Daily home HD		
	Median	q1	q3	Median	q1	q3	Median	q1	q3	Median	q1	q3
Total	5801	4859	7193	6020	5055	6981	5701	4872	6922	7903	6894	8975
Dialysis <sup>a</sup>	3024	2804	3231	2933	2826	2995	3246	3137	3395	5731	5283	6237
Various compensatory allowance	449.8	114.8	954.3	740	373.1	1007	603.4	182.2	1022	657.9	268	1014
Hospitalization	352.4	99.7	776.2	299.5	107.9	733.1	560.5	262.9	1137	441.5	186.2	826.7
Drugs	218	123.4	367.5	301.3	173.5	411	228.4	134.1	379.9	311.1	168.6	518
Technical medical acts	36.7	15	75	28.4	11.8	59.3	251.8	233.9	283.3	46.6	15.6	95.7
Transport	810.1	202.8	1449	810	466	1327	65.1	20.6	163	82.1	23.2	192.5
Laboratory	135.9	107.1	179.6	142.5	116.4	169.5	80.4	47.8	116.6	77	30.6	121.8
Imaging	47	26.1	78.9	45.6	27.3	65.8	39.5	20.6	69.4	49.2	23.8	85.8
Equipment	23.7	8.1	77	28.3	11.1	68.7	36.7	13.1	84.6	33	13.1	85.7
Medical remuneration	51.3	26	157	37.5	27.1	54.9	32.5	19.3	48.8	29.6	18.6	42.6
Paramedical remuneration	4.6	1.1	18.7	4.7	1.7	14.8	18.6	6	81.5	4.6	1.4	16.7
Other	392.5	8.7	1401	586.6	9.6	1417	336.2	9.5	1346	30.3	4.7	922.1

APD, automated peritoneal dialysis; HD, hemodialysis.

<sup>a</sup>Including dialysis fees and third-party allowance.

## DISCUSSION

Payment for dialysis fees accounts for 56% of the amount spent, followed by hospitalizations (12%), drugs (6%), transport (4%), and direct compensatory allowances to patients (5%). The total cost is strongly influenced by the number of sessions. Transport, which increases the cost of facility-based care, is partially balanced by the payment of third-party compensatory allowances to patients on home dialysis.

Without difficult-to-implement randomized trials, it is complex if even possible to conclude that one technique or another yields superior clinical benefits. Although there are no binding recommendations, in the absence of significant comorbidities, younger patients are encouraged to use techniques that allow daytime activities or self-care techniques that can be performed either at home or in scHD.<sup>4</sup> Many studies associate home dialysis with a better quality of life because of the flexibility it offers to patients. It can nonetheless have negative effects counterbalancing the flexibility because of the additional workload and time burden for patients and families. Other forms of dialysis that may be as suitable have not been evaluated or promoted. They may be suitable for some of the patients who make a reasoned choice not to opt for a home technique for psychological or practical reasons such as the desire not to bring the disease home, the risk of isolation, or the unsuitability of the home.

In France, over the past decade, response to the high cost of dialysis has included an incentive policy aimed at lowering the price for facility-based HD sessions and increasing the weekly flat rate of reimbursement for peritoneal dialysis as well as expanding home dialysis (Supplementary Table S4). The number of sessions determines the cost of HD; the costs of scHD and neHD

are close because the session fee does not take the duration into account. The development of cyclers that allow shorter and more frequent sessions has raised the cost of home HD, which had long been called the least expensive technique, to be very close to that of facility-based HD.<sup>5,6</sup> In another study, home nocturnal HD had a lower cost relative to conventional in-center HD.<sup>7</sup>

The cost of hospitalizations appeared higher for facility-based HD than for home techniques. Previous studies have shown similar hospitalization rates for dhHD and standard HD but divergent causes, with more infectious causes for the former and more cardiovascular causes for the latter.

Only home dialysis patients receive third-party allowances, which provide a median monthly income of €282 for PD patients and €569 for dhHD patients. Compensatory allowances for either sick or treatment leave or for disability are approximately €800 per month. They are paid to approximately 30% of the patients in group and might be considered equivalent to the loss of professional income attributable to the ESKD. It should be noted that neHD and naAPD both take place entirely at night, so that dialysis does not disrupt any daytime activities, including work. Further analyses are planned to detail the level of reintegration of patients and in particular the share of full employment in each treatment class. Job quality should also be measured in all its dimensions.<sup>8</sup>

The strength of this study is its data source: the linkage of 2 national databases. This enabled a comprehensive assessment of different cost categories and subcategories among 4 groups of patients, which were never previously compared. Nonetheless, our study has some limitations. First, it only compares payments and not real costs. This is particularly problematic for neHD,

**Table 2.** Hospitalization rates and costs (per 100 months at risk) by cause (principal diagnosis) and by modality of treatment

Indicators	Nocturnal extended HD	Daily home HD	Nonassisted APD	HD in self-care unit
Number of months at risk	6000	8122	22,521	3323
Median duration of a hospital stay (IQR), d	3 (1–5)	3 (1–6)	3 (2–7)	2 (1–5)
Number of hospital stays for 100 mo at risk				
Total	8.0	8.2	11.2	9.5
Nephrological or urological domain	0.7	1.1	2.6	0.8
Other	3.2	3.4	4.8	3.4
Cancer	0.2	0.1	0.2	0.5
Cardiovascular domain	0.7	1.1	1.5	0.9
Peritonitis	0.0	0.0	1.2	0.0
Vascular access	0.7	0.5	0.4	1.0
Infection	0.4	0.5	0.6	0.5
Number of day hospitalizations for 100 mo at risk				
Total	5.9	11.8	27.3	5.5
Nephrological or urological domain <sup>a</sup>	0.5	0.9	13.9	0.3
Other	2.6	2.8	5.5	2.0
Nontumoral chemotherapy	1.5	4.8	3.5	0.2
Cancer	0.9	2.4	2.4	1.4
Cardiovascular domain	0.2	0.2	0.2	0.9
Peritonitis	0.0	0.0	0.6	0.0
Vascular access	0.2	0.4	0.6	0.4
Infection	0.1	0.0	0.1	0.1
Anemia	0.0	0.2	0.4	0.3
Total cost in euros for 1 mo at risk <sup>b</sup>				
Total	310	420	690	363
Nephrological or urological domain <sup>a</sup>	39	60	193	44.5
Other	138	177	225	144
Nontumoral chemotherapy	21	20	22	3
Cancer	18	22	45	30
Cardiovascular domain	46	66	86	76
Peritonitis	0	0	70	0
Vascular access	26	22	16	32
Infection	23	50	30	32
Anemia	0	2	2	2

APD, automated peritoneal dialysis; HD, hemodialysis; IQR, interquartile range.

<sup>a</sup>Includes systematic peritoneal assessment for patients treated by PD.

<sup>b</sup>For each modality of treatment, the sum of the costs for all hospital stay for a given cause was divided by the number of months at risk. Therefore, months without expenses are included in the cost per month.

Caution: these results are not adjusted for age or comorbidities.

which is paid at the same level as standard day treatment of 4 hours. Second, a cost-benefit analysis would be more relevant to estimate the best strategy, that is, the one producing the best effects (quality of life, social integration) at the lowest cost. Third, we cannot exclude some errors because of indirect linkage. Finally, our study did not include indirect costs linked to the environmental impact of the different treatment strategies, including but not limited to waste disposal, energy use, and water resource depletion, which could be higher for more intensive strategies.

In conclusion, our study shows that different strategies of care can be proposed to French dialysis

patients. Some underused techniques, such as nocturnal extended facility-based HD, might usefully be promoted because they do not involve any excess cost, at least in comparison to dhHD. Real cost analyses are however needed because some reimbursements are not adapted and deserve to be revised upward.

## APPENDIX

### Participants of the REIN registry are all the French Nephrologists

Abbade Mohamed Adnan, Abbassi Abdelhamid, Abboud Imad, Abd El Fatah Mohamed Abo Bakr, Abdulrahman Zhyiar, Abokasem Ayman, Aboubekr Habib, Abtahi Mahdi, Acamer Sophie, Achard Jean Michel, Achard Hottelart Carine, Achiche Jeddiga, Adda Hassen, Adelaide Jessica, Afiani Aida, Agasse Feriale, Agbonon Ekoue, Agha Mir Soraya, Aglae Cedric, Aguilera Didier, Ahonienne Marie Laure, Aizel Ali, Akposso Kodso, Al Cheikh Hassan Zarih, Al Morabiti Mustapha, Al Moussalla Loay, Aladib Mohamed, Alamartine Eric, Alaradi Achour, Albadawy Mahen, Albaret Julie, Albeiriss Nudar, Albert Catherine, Aldigier Jean, Alenabi Farideh, Aliagas Christine, Alla Asma, Allal Asma, Allal Radia, Allard Julien, Allard Catherine, Allot Vincent, Allouache Mahmoud, Almeras Cyrielle, Almoubarak Imad, Alos Laure Anne, Alphonse Jean Claude, Alrifai Assem, Althaus Alexandra, Amaouche Amar, Amara Brahim, Amaria Rachid, Amirou Mustapha, Ammar Naji, Ammor Mounia, Amrandi Mokhtar, Andrianomearisoa Zanamiadana, Antia Catherine, Antri Bouzar Lilia, Aoun Bilal, Araujo Caroline, Ardeleanu Serban, Argiles Angel, Arguel Aurelie, Arnautou Jean, Assogba Dominique, Assogba Gbindoun Ubald, Atchia Hafsabhai, Atidi Ae, Atsama Ondoa Roseline, Attias Julie, Attroun Arsene, Aubertin Perrine, Audry Marie Helene, Audry Severine, Augusto Jean Francois, Aulagnon Florence, Aussant Solveig, Avramescu Marina, Azar Raymond, Azymah Yamina, Azzaoui Mohamed, Azzouz Lynda, Baadj Anissa, Babici Daniela, Babin Philippine, Babinet Francois, Bacchetta Justine, Bachelet Rousseau Cecile, Badid Cherif, Badulescu Viorica, Badulescu Mihaela, Baili Nesrine, Baillet Anabelle, Bailliet Thierry, Bakarrou Naima, Bakoto Sol Eugenie, Balan Karine, Balde Mamadou, Baleynaud Juliette, Balgobin Sanjeet, Ball Beatrice, Balland Valerie, Bally Stephane, Balourdet Jocelyne, Baluta Simona, Bamoulid Jamal, Barange Emmanuel, Baranger Thierry, Barbier Stephane, Barbier Loic, Barbot Patrice, Baret Jocelyne, Baricheff Jeanne, Baron Emmanuel, Barre Audrey, Barsumau Joseph, Barthelemy Aurore, Basel Avriola Olivia, Basse Gregoire, Basse Francois, Bassilios Nader, Bataille Stanislas, Batho Jean Marie, Baudeau Christophe, Baudin Catherine, Baudoin Delphine, Baudouin Veronique, Bauwens Marc, Bazin Dorothee, Beaubrun Diant Marlene, Beauchamp Christine, Beaudreuil Severine, Beauvais

Catherine, Beauval Beatrice, Becu Emilie, Beier Stefanie, Belanger Juliette, Belgrine Malika, Belguesmia Zineb, Bellenfant X, Bellhasene Farid, Belliard Guillaume, Belloi Amelie, Bellou Moufida, Belmouaz Mohamed, Bemmerzouk Mohammed, Ben Amor Said, Ben Henda Amaury, Benabed Anais, Benabid Zaid, Benalia Hadjira, Benarbia Seddick, Bencheikh Larbi, Bendini Jean Christophe, Benhabib Tassadit, Benmoussa Abdelatif, Bennour Ania, Benoit Laurent, Benoit Michele, Bensalem Tayeb, Bensman Albert, Bentaarit Boutheina, Benyaghla Sidi Ali, Benzakour Mountassir, Beonel Jeanine, Berge Franck, Berinque Marie Helene, Bernadet Monrozies Pauline, Bernard Alexandra, Bernard Anna, Bertaux Martine, Berthelot Anne Lise, Bertholet Thomas Aurelia, Bertrand Dominique, Besnier Dominique, Besse Sandrine, Besselievre Thibault, Bessenay Lucie, Besson Frederic, Besson Virginie, Beuscart Thibaut, Bidault Caroline, Bijak Krzysztof, Billion Stephane, Binaut Reynald, Bindi Pascal, Birot Josette, Bisaccia Vincent, Bitan Valerie, Bittar Haiat, Blacher Laurene, Blainvillain Jean Baptiste, Blanchard Capucine, Blanche Maryse, Blanchier Dominique, Blancho Gilles, Blevin Stephanie, Bloch Julie, Blondeau Anne, Bobrie Guillaume, Boccabella Sandrine, Bocquentin Frederique, Bocquet Clemence, Boffa Jean Jacques, Bois Guercy, Boissinot Lucie, Bonarek Herve, Boncila Simona, Bonnard Guillaume, Bonne Jean Francois, Bonnet Michele, Bonnet Marie, Bonniol Claude, Bonnot Pierre Henri, Bono Monique, Borde Jean Sebastien, Bordessoules Sandrine, Boriceanu Ciprian, Borni Duval Claire, Bosc Jean Yves, Bossard Claire, Bossert Magalie, Botte Noel Alexandra, Bouaka Christophe, Boubenider Samir, Boubia Toufik, Boubia Veronique, Bouchoule Isabelle, Boudhabhay Idris, Boudi Wael, Boudjeltia Samir, Boudray Catherine, Bouet Julien, Bouffandeau Giorgita Ancuta, Bougrida Hammouche, Bouguereau Sabrina, Bouiller Marc, Boukadida Amine, Boukelmoune Maklouf, Boukerroucha Zacharia, Boukhalifa Zohra, Boula Aime Remy, Boulahia Ghada, Boulahrouz Rehouni, Boulanger Henri, Boulay Hugoline, Boulechfar Hacene, Boulet Anne Valerie, Boullenger Fanny, Boumendjel Nourredine, Bourcelet Odile, Bourckholzer Fanny, Bourdenx Jean Philippe, Bourdon Franck, Bourgeon Bruno, Bourges Anne, Bouriez Emmanuelle, Bourouma Rachid, Boury Edouard, Bouvier Nicolas, Bouvier Muriele, Bouyssou Marie France, Bouzernidj Mouloud, Bouzoubia Linda, Boyer Annabel, Boyer Olivia, Bozman Dogan Firat, Brahemscha Laurent, Brahim Mohamed, Brahim Mabrouk, Branchu Corinne, Brasseur Jose, Braun Parvez Laura, Brazier Francois, Bresson Cyrielle, Bresson Vautrin Catherine, Brial Camille, Bridoux Franck, Brifault Cecile, Briffa Dominique, Briffaut Yamina, Brillat Georges, Brocard Jean, Brodin Sartorius Albane, Brossard Severine, Broux Francoise, Bruandet Amelie, Brucker Marie, Bruckmann Niels, Bruel Tessoulin Alexandra, Brunak Yvan, Brunelle Charlotte, Brunet Carine, Brunet Maryse, Brunet

Philippe, Bruno Danielle, Bruno Julie Lisa, Buffard Salima, Buffet Anne, Bugnon Denis, Buhl Alexandra, Bulte Francoise, Burbach Maren, Burban Laure Anne, Burda Guillaume, Bussac Sandrine, Caboche Marie Helene, Caceres Catherine, Caillard Pauline, Caillette Beaudoin Agnes, Cailliau Christine, Cambou Patricia, Canciani Colette, Canet Sebastien, Caniot Elisabeth, Canivet Eric, Cantarovich Diego, Cantin Jean Francois, Capdeville Arthur, Carceles Odette, Cardeau Isabelle, Cardineau Eric, Cardon Gerard, Cardozo Carlos, Caria Sophie, Cariou Sylvain, Carpentier Josette, Carraut Charlotte, Carrey Francoise, Carrillo Julien, Cartery Claire, Cartier Jean Charles, Cassaigne Nancy, Cassin Aurelie, Castaing Maguy, Castilejos Pascale, Castin Nelly, Castrale Cindy, Catoliquot Marie Noelle, Caudwell Valerie, Caux Dominique, Caytan Christelle, Cazajous Geraldine, Cazin Marie Cecile, Cellot Etienne, Cemon Christelle, Chabannier Marie Helene, Chaghouri Baher, Chaigne Virginie, Chaintreuil Deborah, Chalabi Lotfi, Chamard Boudet Coralie, Chamley Paul, Champion Laure, Champion Gerard, Chanliou Jacques, Chantrel Francois, Chapal Marion, Chapelet Arielle, Chapelet Debout Agnes, Charasse Christophe, Chargui Soumaya, Charlin Emmanuelle, Charpy Vianney, Chartier Dantec Allyriane, Charuau Sylvie, Chatelet Valerie, Chaussard Sandrine, Chauveau Philippe, Chauvet Cecile, Chazot Guillaume, Chenine Leila, Chevallier Sylvie, Chichery Elodie, Chlih Bouchra, Choukroun Gabriel, Chouraqui Martine, Ciobotaru Monica, Cioldi Bellanger Magali, Cisterne Jean Marc, Citarda Salvatore, Cittone Sandrine, Clabault Karine, Clair Francois, Claire Jean Claude, Claudeon Joelle, Claustres Sylvie, Cledes Jacques, Clement Guillaume, Clement Cathy, Cloarec Sylvie, Clouet Virginie, Cluzel Pascal, Coindet Emmanuelle, Coindre Philippe, Coldefy Olivier, Coliche Vincent, Colle Marilyne, Colombo Alexandra, Colonnelle Angele, Combarrous F, Combe Christian, Corchia Anthony, Cordonnier Christophe, Cormier Nadia, Correia Geraldine, Correia Rosa Virginie, Corsy Myriam, Corthier Alice, Coste Didier, Couderc Anne, Coudert Krier Marie Jeanne, Coulibaly Jean Marie, Coulibaly Moussa, Coulomb Francois, Coupel Stephanie, Couraud Corinne, Courivaud Cecile, Courtellemont Claire, Cousin Maud, Couturier Aymeric, Couvrat Desvergnies Gregoire, Crepin Thomas, Creput Caroline, Cretal Deborah, Creyssac Sandrine, Cridlig Joelle, Crochette Romain, Croze Laure Emmanuelle, Cudennec Marianne, Cuny Melodie, Dabot Christian, Dachy Angelique, Dahan Philippe, Dahan Karine, Dahmane Djamel, Dahmani Omar, Dahmoune Said, Dahri Souad, Danel Peggy, Daniere Carine, Daniliuc Ioana, Danna Marine, Dantal Jacques, Dao Emmanuel, Dargelos Mathilde, Darie Ioana, Daroux Maite, Daubresse Daniel, Dauchy Sylvie, Daugas Eric, Dauvergne Pierre, David Daniela, Davin Manuela, Davodoun Timote, Davourie Salandre Aurelie, De Castro Francoise, De Kerautem Claire, De Lachaux Arlette, De Marion Gaja Catherine, De Martin Alfio, De Monti Francoise, De Precigout Valerie,



De Preneuf Helene, Debris Myriam, Debure Alain, Decambren Melanie, Decesse Isabelle, Decourt Alexandre, Decroix Therese, Deglise Favre Anne, Deguine Amelie, Dehais Melanie, Dehaut Jeanne, Dehay Julien, Dehiri Jamila, Dehue Marie Laure, Dejarnac Astrid, Del Pilar Cascon M, Delarche Antoine, Delattre Vincent, Delautre Arnaud, Delaval Ronan, Delavaud Guy, Delbes Sebastien, Delbet Jean Daniel, Delclaux Caroline, Delcourt Sophie, Deleaval Patrik, Deleuze Sebastien, Delezire Arnaud, Delhoume Nellie, Delmarle Aurelie, Delmas Sylvie, Delmas Yahsou, Delpierre Alexia, Deltombe Clement, Delvallez Luc, Demontis Renato, Demortier Emilie, Denhez Celine, Deoliveire Anita, Depraetre Pascale, Deprele Carole, Deroure Benjamin, Derriche Mohammed, Dervaux Thomas, Desbuissons Geoffroy, Descamps Martine, Desert Eleonore, Deshays Julien, Desport Estelle, Dessaix Kathleen, Dessassis Jean Francois, Deteix Patrice, Devaux Jean Philippe, Devillard Nadege, Devriendt Isabelle, Dhib Malek, Di ascia Ludovic, Diab Raji, Diab Nabil, Diaconita Mirella, Diallo Mamadou, Diarra Julie, Diarrassouba Assetou, Dickson Zara, Diddaoui Ali, Diet Carine, Dimitrov Yves, Dimulescu Radu, Dimulescu Theodora, Diolez Jeremie, Dion Jean Jacques, Dione Jean Pierre, Diouani Mohamed, Djefal Rachid, Djelaleddine Benyakoub, Djema Assia, Djennaoui Mehdi, Djiconkpodere Irene, Dolley Hitze Thibault, Dombry Dominique, Domelier Carine, Dorr Gaele, Dossier Claire, Doussy Yves, Drieu Martine, Drouet Camille, Drouillat Valerie, Drouineau Olivier, Druenes R, Du Besset Anne Claire, Du Halgouet Caroline, Dubart Camille, Dubau Malina, Dubief Sandrine, Dubois C, Dubois Audrey, Dubosq Pascale, Dubot Philippe, Dubreucq Stephanie, Ducloux Didier, Ducret Maize, Ducroc Gaele, Ducros Jacques, Dufay Alexandre, Dufлот Laurent, Dufour Lea, Dufresne Roger, Dufresne Richard, Duhem Alexandra, Dujardin Amaury, Dumazer Philippe, Dumazet Cedric, Dumea Raluca, Dumont Audrey, Dumont Genevieve, Dumoulin Alexandre, Dunand Olivier, Duneau Gabrielle, Duperrey Palmyre, Dupeyrat Tristan, Dupin Muriel, Dupuis Emmanuel, Duquennoy Simon, Duquesne Alyette, Durand Pierre Yves, Durault Sandrine, Durez Joel, Duthoit Elodie, Duval Roselyne, Duveau Agnes, Duverger Karine, Duvic Christian, Duvic Jacques, D'ythurbide Geraldine, Easy Firas, Ebikili Bertin, Ecotiere Laure, Ekhlal Ragab EID Amr, El Ali Hamid, El Boumaoui Nisrine, El Esper Najeh, El Haggan Wael, El Karoui Khalil, El Nasser Khuzama, El Ouafi Zhour, El Salhy Magdy, Elhamel Chahrazed, Elsakawi Karim, Emal Violaine, Enache Ioana, Enoch Carole, Eprincharde Laure, Epron Mourey Catherine, Erbilgin Dilaver, Erdociain Elisabeth, Essig Marie, Etouaria Colette, Eugene Marc, Fagniard Florine, Falala Martine, Faller Anne Laure, Fani Dimitra, Faucher Justine, Faucon Jean Paul, Faure Magali, Fedorca Ana, Felgueiras Ado Ado, Fen Chong Michel, Ferey Colette, Ferhat Carre Assia, Fermigier Florence, Ferrandiz Ines, Ferrier Marie Laure, Fessi Hafedh,

Fichet Catherine, Ficheux Maxence, Fickl Rocsana, Fikri Benbrahim Oussamah, Fila Marc, Filancia Anna, Filipozzi Pierre, Finielz Paul, Flahaut Gauthier, Flechon Meibody Fleuria, Fleury Dominique, Florea Adelina, Florin Veronique, Fodil Cherif Mohamed, Fohrer Patrick, Fois Antioco, Fontaine Valerie, Fontenier Stephanie, Forget Vincent, Formet Cedric, Fort Magalie, Fortune Tanguy, Fouillaud Eliane, Fouque Denis, Fourcade Jacques, Fourdinier Ophelie, Fournieret Sylvie, Fournie Coralie, Fournier Philippe, Fournier Agnes, Fournier Thomas, Fournier Veronique, Fousilla Condamine, Fraioli Nathalie, Fraisse Helene, Francois Patrick, Francois Martine, Francois Alexis, Francois Maud, Francois Clair, Frangie Carlos, Franko Benoit, Fraoui Rabah, Frassin Christelle, Frechin Frederique, Freguin Caroline, Freist Marine, Frejate Fares, Frimat Luc, Frimat Marie, Fritz Olivier, Fromentin Luc, Fuhrer Valerie, Fumeron Christine, Gaboriau Elke, Gabriel Jean Marc, Gail Leslie, Gajic Gordana, Galantine Valerie, Gallen Labbe Florence, Gamberoni Joel, Ganea Alexandru, Gansey Renaud, Garandeau Claire, Garcia Claudine, Garnier Fabrice, Garnier Emilie, Garo Florian, Garrigue Valerie, Garrouste Cyril, Garstka Antoine, Gauchon Rousseau Celia, Gaude Emmanuelle, Gaultier Jacques, Gauthier Marion, Gauthier Eric, Gautier Nicolas, Gavard Marie Sophie, Gavet Lucille, Geisen Muriel, Geldreich Marie Anne, Gendrot Lurlinys, Genestier Sandrine, Genevriere Nathalie, Genin Robert, Genin Aude, Georgieva Lora, Gerard Fabien, Ghali Nasredine, Ghattas Labaky, Ghazali Abderrahmane, Gheerbrandt J. Dominique, Ghemmour Amel, Ghiciuc dita Camelia, Ghouti terki Lila, Gibergues Sandrine, Gilbert Olivia, Giles Valerie, Gillis Florence, Gilson Brigitte, Girardot Emilie, Giraud David, Girerd Sophie, Giroud Sylvie, Glasman Brigitte, Glowacki Francois, Godart Chloe, Godart Catherine, Godron Dubrasquet Astrid, Golea Gabriella, Gosset Brigitte, Goubet Marlene, Gouin Jean Baptiste, Goupy Christophe, Gourraud Vercel Caroline, Govindin Loriane, Granveau Hugot Valerie, Gregoire Carol, Gregoire Adelaide, Grellier Jimmy, Griuncelli Mireille, Grondin Karine, Gruget Gabriel, Guenifi Ismahane, Guepin Henri, Guerard Arnaud, Gueret Claudine, Guergour Mounir, Guerraoui Abdallah, Guerrot Dominique, Guerry Mary Jane, Guery Bruno, Gueutin Victor, Gueuttin Victor, Gueye Serigne, Guiard Elsa, Guibergia Corinne, Guibert Fanny, Guichard Isabelle, Guigonis Vincent, Guihot Jean Pierre, Guilbert Marion, Guillodo Marie Paule, Guinault Damien, Guinault Ghaanine Celine, Guincestre Thomas, Guiraud Cecile, Guiserix Jose, Guitton Virginie, Guyot Laetitia, Hachemi Fatima, Hachicha Mourad, Hachim Gilberte, Hacini Sabria, Haddad Imad, Haddad Fouad, Haddj Elmrabet Atman, Hadj Abdelkader, Haeck Marie, Hafi Ali, Halin Pascale, Hallonet Patrick, Hamani Abdelaziz, Hamard Claire, Hamdini Nasser, Hamel Didier, Hammadi Mohamed, Hamed Hedia, Hammelin Jean Philippe, Hamroun Aghiles, Hanafi Latifa, Hanf William, Hannedouche Thierry, Hannoun Jacques, Hanoy Melanie, Happe Laurence,

Harambat Jerome, Hardier Beatrice, Hardy Olivier, Hardy Yverneau Paule, Harrami Elarbi, Harry Martine, Hazgui Faical, Hazzan Marc, Hebibi Hadia, Hebmman Delphine, Hebral Anne Laure, Hecht Michel, Hecquet Emmanuelle, Hedna Anissa, Heibel Françoise, Helmer Lea, Henaoui Bachir, Heng Anne Elisabeth, Hennino Marie Flore, Henri Patrick, Henry Virginie, Henry Nicolas, Herbez Claire, Herbez Rea Claire, Herbin Laure, Hermes Tina, Herrera Flores Yeliz, Hestin Dominique, Heyani Alim, Hiernaux Philippe, Ho Sang Fouk Catia, Hoarau Clarisse, Hodemon Corne Benedicte, Hoffmann Maxime, Hogan Julien, Housset Pierre, Houze Lucie, Hristea Dan, Hue Patricia, Hue Fabienne, Hue Kheira, Huet Mathilde, Hufnagel Gilles, Huitelec Suzelle, Hummel Aurelie, Hurot Jean Marc, Hutteau Corinne, Iamandi Laurentiu, Iavorenciuc Mihaela, Ichana Isabelle, Ichay Lydia, Ikonga Donatien, Ilinca Toma, Imhoff Olivier, Imiela Jean Paul, Indrieis Monica, Ingwiller Maxime, Ismail Khalil, Ismer Manfred, Isnard Myriam, Issad Belkassem, Issautier Roland, Izzedine Hassane, Jaber Waddah, Jablonski Mathieu, Jacquet Antoine, Jamali Mohamed, Jannot Martin, Jarraya Faical, Jaubert Dominique, Jauffrineau Brigitte, Jaulin Jean Paul, Jaureguy Maite, Javauge Vincent, Jean Guillaume, Jeannot Dominique, Jeanson Alain, Jegado Audrey, Jego Dominique, Jolimoy Cyrille, Jolivot Anne, Jolly Damien, Joly Melanie, Jomaa Z, Jonon Benoit, Joris Aurelia, Joseph Maan, Josse Anne Gaelle, Joubel Florence, Jouette Josiane, Joule Josiane, Jourdain Pierre, Journet Julien, Jousset Philippe, Jouveau Catherine, Jouzel Charlotte, Jublin Marie Odile, Jugant Sebastien, Juillard Laurent, Jullien Yvette, Jullien Perrine, Kachko Abdo, Kalbacher Emilie, Karaaslan Huseyin, Karame Alexandre, Karatekin Ayfer, Kareche Mimi, Kassiss Samuel, Kaysi Saleh, Kazes Isabelle, Keller Nicolas, Kerkeni Nadia, Kervella Delphine, Kesraoui Dalila, Khalfallah Mejdi, Khayat Rateb, Khellaf Karim, Khuzaie Usama, Kihal Lilia, Kintega Roland, Klein Alexandre, Klisnick Arnaud, Knefati Yannick, Kofman Thomas, Kohler Emmanuelle, Kohn Wladimir, Kolb Isabelle, Kolko Labadens Anne, Konate Bambou, Koochaki Pour Zoe, Koppe Laetitia, Kormann Raphael, Kossari Niloufar, Kourilsky Olivier, Kourouma Lamine, Krencker Corinne, Kriaa Faycal, Kribs Marc, Krummel Thierry, Kunz Kristian, Kwon Theresa, Labat Anne Marie, Labatide Alanor Agnes, Labatut Delphine, Laclaustra Annie, Lacombe JI, Lacoste Marion, Lacraz Adeline, Ladriere Marc, Laforge Florence, Lahoche Manucci Annie, Laichour Corinne, Laleu Muriel, Lamagnere Laura, Lambertini Valerie, Lamotte Christian, Lamriben Larbie, Lamy Thomas, Lamy Gaspard, Lan Yue Wah Philippe, Lanau Jean Marc, Lancon Jenny, Lando Mathilde, Lang Philippe, Langlois Etienne, Langlois Anne Lyse, Langs Virginie, Lanoiselee Stephanie, Lanot Antoine, Laporte Pascale, Lariviere Benedicte, Larmet Burgeot David, Larue Jean Rene, Laruelle Eric, Lasserre Valerie, Lasseur Catherine, Lataste Anne, Lateb Mael, Latif Rezkallah,

Latour Veronique, Latour Sophie, Launay Ludovic, Laurain Emmanuelle, Laurence Manon, Laurent Guillaume, Lauze Iman, Lavainne Frederic, Lavaud Sylvie, Lavelle Olivier, Lavidiere Florence, Lazzarano Virginie, Le Berre Nicolas, Le Bot Bouras Sabine, Le Cacheux Philippe, Le Cam Jocelyne, Le Chapois Didier, Le Coz Sylvie, Le Fur Awena, Le Goas Françoise, Le Guen Eric, Le Guillaume Audrey, Le Guillou Aurelie, Le Gurun Christine, Le Lan Delphine, Le Large Maryse, Le Maner Ophelie, Le Mee Marin, Le Moigne Claire, Le Mouellic Lionel, Le Quellenech Christine, Le Quintrec Donnette Moglie, Le Roy Frank, Le Sann Valerie, Lebas Celine, Lebour Fouad, Lebleu Jacques, Lebot Marc, Lebourg Ludivine, Lebreton Marine, Lebrun Gaetan, Lecaque Caroline, Leclerc Anne Laure, Leclercq Jessica, Lecomte Anne Sophie, Lecomte Marie, Lecouf Angelique, Ledon Christine, Leduc Vincent, Lefebvre Sarah, Lefevre Jean Jacques, Lefevre Lucie, Leflecher Arnaud, Lefort Ludivine, Lefrancois Nicole, Lefrancois Gaelle, Legall Maryvonne, Legault Marie Marthe, Legendre Bruno, Legrand Eric, Lekhal Saliha, Lemaire Chantal, Lemoine Mathilde, Lemoine Corinne, Lemoine Cecile, Lenain Remi, Leocardi Catherine, Leon Emilie, Leou Sylvie, Lepaslier Sylvie, Lepeytre Fanny, Lerat Anne, Leray Helene, Lerda Denis, Leriche Anne, Leroux Anne Charlotte, Leroy Christine, Leroy Valerie, Leroy Fanny, Lesclauze Brigitte, Lessore De Ste Foy Celia, Leteif Denis, Leteur Karen, Levannier Martial, Levy Corinne, Levy Benedicte, Lherbier Sabrina, Linca Solen, Lionet Arnaud, Litscher Catherine, Llanas Brigitte, Lmimouni Nadia, Lobbedez Thierry, Loche Virginie, Lokmane Hassan, Longlune Nathalie, Lorcy Nolwenn, Loridon Christelle, Lorriaux Christie, Lorthioir Aurelien, Louillet Ferialle, Louis Marion, Louis Magali, Louvet Daniel, Lowe Yolande, Loyher Jeanne, Lucas Karine, Lucas Gisele, Lucats Florence, Luce Ludivine, Luchianov Andre, Lucret Jean Marc, Lumbroso Catherine, M ban Constant, Maakaroun Ghassan, Maanaoui Mehdi, Maaz Mehadji, Mac Namara Evelyne, Mackaya Leandre, Macombe Anouk, Macou Margot, Macron Estelle, Madi Lailati, Maghlaoua Mohamed, Magnavacca Marie, Magnol Roger, Maheas Catherine, Mahelelaine Ismail, Maheut Herve, Mahi Amar, Mahieddine Mohamed, Maillard Jean Charles, Maillier Tuduri Aurelie, Mailliez Sebastien, Maisin Anne, Maisonneuve Nathalie, Maiza Hakim, Majbri Nabil, Makdassi Raifat, Maksour Edouard, Mallia Sylvia, Mandart Lise, Mane Maryline, Manescu Maria, Mangelot Gerard, Mann Youssef, Mansour Janette, Marchand Pascale, Marcu Elena, Margiotta Melanie, Mariot Agnes, Maroun Nadine, Martin Alexandre, Martin Stephane Jean, Martin Severine, Martin Laure, Martin Dupont Philippe, Martine Catherine, Martinez Casado Edouard, Marveaux Virginie, Masoumi Afshin, Massad Michel, Masset Christophe, Masson Elisabeth, Masson Beatrice, Maugard Elodie, Maurand Audrey, Maurel Stephane, May Delia, Maynard Claire, Mayor Brice, Mazouz Hakim, Mazouz Omar, Mdoye Maguette, Mechaour Saadeddine, Meddeb Mohamed, Medjahdi

Sabrina, Meeus Frederique, Meftah Aimele, Megri Karim, Mehama Hocine, Mehdi Manolie, Meier Pascal, Meklati Louiza, Melander Catherine, Melin Marylene, Mellaza Chloe, Melliti Hedia, Menouer Soraya, Menoyo Calonge Victorio, Merault Henri, Meret Nadine, Mesbah Rafik, Mesguen Caroline, Mesquida Aurelie, Messeant Sarah, Messier Gilles, Metivier Fabien, Meulders Quentin, Meurette Aurelie, Meyer Lara, Mezerai Dounia, Mezghani Mahmoud, Michaut Patrick, Michel Pierre Antoine, Michel Philippe, Mignot Benedicte, Mihout Fabrice, Milic Ivona, Milioto Olivier, Millet Sophie, Milongo David, Mingat Nadege, Mirgaine Philippe, Mocanu Alina, Mohajer Mederick, Mohey Hesham, Mojaat Rachid, Molin Annick, Molina Virginia, Mondain Jean Rene, Monera Beatrix, Monge Matthieu, Monjot Luc, Monkam Regine, Monnier Magali, Monnier Nicole, Montoriol Jean, Montseny Jean Jacques, Moranne Olivier, Moreau Karine, Moriere Baume Julie, Morin Denis, Mortelette Romain, Mortier Marie, Motte Gerard, Mottola Clement, Mouche Antoine, Moumas Eric, Mouneimne Alexandre, Mouniama Joxiane, Mourad Georges, Mouri Kenza, Moussion Schott Francoise, Muller Sandrine, Muller Carole, Muller Clotilde, Muresan Carmina, Musialowski Alexandra, Mustel Jihad, Mzoughi Sonia, Najim Rachid, Nakhla Magued, Nankeu Nestor, Naufary Denise, Ncolet Laurent, Ndoeye Maguette, Nefti Abdelhamid, Negri Guy, Nemmar Fazia, Neugebauer Yann, Neuville Sylvie, Ngango Nga Messi Liliane, N'gopa Francois, Nguyen Viet, Nguyen Khoa Man, Nicolas Antoine, Nielsen Louise, Nistor Claudia, Nobili Francois, Noc Valerie, Noel Natacha, Nogier Marie Beatrice, Noguera Gonzalez Maria Eugenia, Nollet Barbara, Nony Sébastien, Noordally Reschad, Noraz Salome, Normand Michel, Normand Gabrielle, Noury Armelle, Novel Catin Etienne, Novo Robert, Nsembani Emerson, Nussbaumer Timothee, Nzeyimana Hilaire, Nziamboudi Gladys, Oger Nelly, Okamba Achille, Oliver Priscilla, Ollier Jacques, Ollivon Marie Claire, Oltra Emma, Onesta Tania, Onno Celine, Ortiz Jean Paul, Ott Julien, Oudin Christine, Oudot Sergine, Ourouda Eleonore, Ouziala M, Ozenne Sophie, Paget Amandine, Pain Christian, Pajot Aurelie, Palacin Pedro, Palcoux Jean Bernard, Pambrun Emilie, Panaye Marine, Panepinto Nicolo, Panescu Victor, Panici Laure, Panzini Sabine, Parahy Sophie, Parasote Jennifer, Parazols Fabien, Pardon Agathe, Parent Pierrot, Pargoire Karima, Paris Eric, Paris Bruno, Paris Anne, Paris Sophie, Parisotto Maricel, Parmentier Cyrielle, Parmentier Peggy, Passeron Corinne, Pastural Myriam, Pateau Celine, Pater Miretta, Patrier Laure, Paty Stephanie, Paugam Elise, Paullier Roxanne, Pauly Patrick, Payet Julie, Payet Jessica, Pech Messaoudene Fadila, Pelisse Christelle, Pelissier Carole, Pelle Gaele, Pelle Brigitte, Pelletier Solenne, Pelletier Caroline, Peltier Therese, Peltier Julie, Perez Lydie, Permanne Lydie, Pernin Vincent, Perrin Marie, Pertue Alrick, Pery Christelle, Peters Nicolas, Petit Laetitia, Petit Martine, Petitjean

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Renee, Schnunt Emilie, Schohn Dominique, Schortgen Gerard, Schweitzer Camoin Marie Christine, Sebahoun Pascale, Sebire Fabienne, Sechet Anne, Sedrati Nadia, Seffert Aline, Segalen Isabelle, Seidowsky Alexandre, Seifi Scha Esta, Seigneuric Bruno, Sekhri Hacene, Semjen Elisabeth, Seniuta Piotr, Seret Guillaume, Seris Pascal, Serato Tomas, Serre Jean Emmanuel, Serre Sylvie, Servel Marie France, Severini Karine, Seydou Toure Elmoctar, Shahapuni Irina, Shahbazkia Katayoune, Shenouda Milad, Shweke Nassim, Si ahmed Celia, Sigogne Mickael, Simon Amelie, Simon Arnaud, Simonini Fanny, Simphal Philippine, Siohan Pascale, Sirajedine Khaled, Sissoko Henriette, Skalli Amina, Smadi Malika, Smati Mustafa, Smith Anna, Soetens Patricia, Soltani Nadia, Soltani Zaara, Souares Beatrice, Souid Marc, Soula Beatrice, Soulis Fabien, Souweine Jean Sebastien, Sow Hadiya, Spataru Luciana, Spitaels Pascal, Sporer Philippe, Stamatakis Georges, Stancu Alexandra, Stanescu Corina, Stolz Arnaud, Strauss Sabrina, Stroumza Paul, Strullu Bernard, Stuit Luc, Suru Florina, Svilarich Martine, Szelag Jean Christophe, Szwarc Ilan, Tabbi Aneni Wided, Taddei Catherine, Tafelin Cecile, Taflin Cecile, Taghipour Tamiji Lili, Taghzouti Fouad, Taieb Valerie, Takla Zafer, Tamain Mathilde, Tanguy Veronique, Taque Sophie, Target Natalia, Tassery Marion, Tchiangotwetchu Angele, Tebouille Dan, Teissier Delphine, Tellier Stephanie, Temperville Bernard, Tenefo Roby, Tenenbaum Julie, Terki Nazim, Terki Ferial, Ternat Sylvie, Terrasse Marianne, Terzic Joelle, Testa Angelo, Testevuide Pascale, Testou Didier, Tetaz Rachel, Thibaudin Damien, Thierry Antoine, Thomas Kedna, Thomas Patrick, Thorel Philippe, Thouret Marie Christine, Tiburce Claire, Tiercelin Sandrine, Tifoura Adam, Tiple Aurelien, Tirdea Alina Elena, Tirolien Yannick, Titeca Beauport Dimitri, Tivollier Jean Michel, Tolani Michel, Toledano Daniel, Tollis Frederic, Tomeh Monzer, Tomkiewicz Elisabeth, Tonson Christiane, Torner Stephane, Torreggiani Massimo, Tostivint Isabelle, Touam Malik, Touin Elodie, Toure Fatouma, Toussaint Stephanie, Touzot Maxime, Traore Hawa, Tremolieres Pierre, Tritz Celine, Trivin Claire, Tsimaratos Michel, Tubail Zead, Tuil Diane, Turc Baron Cecile, U Martine, Ulinski Tim, Ulrich Marc, Urena Torres Pablo Antonio, Vacarme Helene, Vacarme Daisy, Vacher Coponat Henri, Vairon Codaccioni Marie Xaviere, Van der Straaten Menno, Van Triempont Marine, Vandenbussche Cyrille, Vandenbussche Christian, Vandooren Ann Karolien, Vanhille Pauline, Vanhille Philippe, Vanlaeys Sarah, Vannoye Celestine, Vasbeck Camille, Vasseur Anne Sophie, Vasseur Manon, Vautrin Pierre, Vecina Frederique, Veillon Sebastien, Vela Carlos, Vende Florence, Vendrely Benoit, Venot Marion, Verdier Jean Francois, Vergaud Dominique, Verhelst David, Vernadal Chantal, Vernier Isabelle, Vernier Louis Marie, Vernin Guillaume, Verove Cathy, Verrier Christelle, Vetromile Fernando, Vial Philippe, Viallet Nicolas, Viaud Christel, Vido Sandor Alex, Vigerat Philippe, Vignalou Odile, Vilaine

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## DISCLOSURES

All the authors declared no competing interests.

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## SUPPLEMENTARY MATERIAL

Supplementary File (PDF)

### Population and Method.

**Figure S1.** Flowchart.

**Table S1.** Characteristics of patients and their places of residence by modality of treatment.

**Table S2.** Distribution of the monthly cost by cost subcategories in the entire cohort.

**Table S3.** Various financial allowances by modality of treatment.

**Table S4.** Public dialysis tariff in France (2020 tariff campaign)

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