

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	End-stage renal disease: Financial costs and years of life lost in Panama. A cost-analysis study
AUTHORS	Moreno Velásquez, Ilais; Tribaldos Causadias, Maribel; Valdés, Régulo; Gómez, Beatriz; Motta, Jorge; Cuero, César; Herrera, Víctor

VERSION 1 - REVIEW

REVIEWER	Gillian Gorham Menzies School of Health Research Northern Territory Australia
REVIEW RETURNED	06-Nov-2018

GENERAL COMMENTS	<p>Background</p> <p>The paper is potentially a worthwhile addition to understanding cost of renal therapies across the world. It does require greater clarity around methods, inclusions and exclusions to make it more accessible.</p> <p>The paper would benefit from additional background information for readers unfamiliar with the burden of disease and the health system in Panama. The difference in patient criteria for those funded under MoH and those managed under CSS - both public health systems - would be helpful as it appears public health coverage is 100%. An explanation of why one data source was available but not the other.</p> <p>CKD and ESKD are used interchangeably and it is not clear in the discussion whether CKD in this paper is only referring to those people requiring RRT or the earlier disease state. Burden of CKD is described as elevated but incidence and prevalence rates of ESKD or how these have changed in recent years are not provided. The paper does not refer to a specific national data collection system for ESKD – the presence or lack of one would be useful background knowledge. (How is data from Panama captured in the Latin America Dialysis and Transplant registry? – voluntary, by hospital, nephrologist etc). Mortality rates for CKD – how are these defined, those with any diagnosis of kidney disease or only those receiving RRT.</p> <p>In the background, costs of PD are described as higher than HD. There is no discussion on why these might be different from</p>
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	<p>international studies or the outcomes of this analysis which has HD more expensive. Reference 10 on page 4 is unclear - are there three different data sets from this one reference?</p> <p>Methods A tighter description on the financial data provided is necessary (search strategy, determination and extraction of components eg recurrent, one off costs, infrastructure, only related to dialysis treatments or includes access creation, training education etc), the format data was provided to the researchers and analysis program used eg excel/stata should be stated clearly if it was for both YLL and service costs. A table identifying and comparing the variable and fixed cost components for each provider and each modality would be helpful. The rate of change in HD and PD modalities over a 5 year period is noted as decreasing for PD. There is no discussion on why this might be. The cost model is not clear on the overall prevalence rate used for the projection out to 2020. The statistical model used is not identified (Markov, Aria) and the graphs do not include historical data which might demonstrate appropriateness of projection. The graphs are difficult to read and markers on each line would help with differentiation. More detail on the sensitivity analysis and the influence of incidence and mortality rates on projections would be helpful as these are likely to be greater drivers of costs. While the USD YLL are impressive – some discussion on the significance of this to the focus on changing modalities is necessary or bring in the discussion on the burden of early CKD and preventive health earlier.</p> <p>Discussion 'Milder forms of CKD' are brought into the discussion for the first time – differentiation between ESKD/CKD requiring RRT and CKD not requiring RRT would be helpful. This clarification should also apply to the proposed 'CKD notification' legislation. The main cost drivers for HD appear to be different from most other studies (usually staff are the main drivers) which makes the inclusion of a table with components and costs per patient year more compelling.</p>
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REVIEWER	Nathalie THILLY University Hospital of Nancy France
REVIEW RETURNED	19-Nov-2018

GENERAL COMMENTS	<p>Dear authors, I find your manuscript is a well written manuscript. Background and methods used are clearly presented and results are consistent with methods. I recognize that your results may be of interest for the Panama health system by providing information on which the decision-making process on allocation of resources can be based. However, the interest seems to me minimal for countries other than Panama and the usefulness of data provided limited.</p>
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REVIEWER	Magdalena Walbaum University College London, UK
REVIEW RETURNED	28-Nov-2018

GENERAL COMMENTS	<p>Good morning.</p> <ol style="list-style-type: none"> 1. For the cost analysis there was no discount rate included, but for the calculation of the YLL they did. I suggest including discounting for the cost analysis or justify why they did not include it. 2. The information of costs used for the cost analysis was not shown so is difficult to assess the results and to repeat the study. 3. Moreover, because for the private sector only information for HD was provided, is recommendable not to calculate the PD/HD ratio considering this sector, it bias the results. "The HD/PD costs ratio in the public sector was 1.19, whereas in the private and public sector combined was 1.20". 4. "Sensitivity analyses were conducted to explore model forecasts under varying assumptions about ESRD growth rates. In general, results of these analyses demonstrate that savings will be greater as the shift toward greater PD use is accomplished sooner." It would be more informative if the authors could provide some results from the sensitivity analyses. 5. Limitations about the data should be discussed more in depth. Also would be recommended to discuss the limitations of cost analysis compared to other forms of economic evaluations (such as cost-effectiveness).
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VERSION 1 – AUTHOR RESPONSE

Reviewer #1

The paper is potentially a worthwhile addition to understanding cost of renal therapies across the world. It does require greater clarity around methods, inclusions and exclusions to make it more accessible. The paper would benefit from additional background information for readers unfamiliar with the burden of disease and the health system in Panama. The difference in patient criteria for those funded under MoH and those managed under CSS - both public health systems - would be helpful as it appears public health coverage is 100%. An explanation of why one data source was available but not the other.

Author response: The Authors would like to thank the Reviewer for the careful revision of our work as well as for this highly constructive comment.

Panama has a fragmented health system with public and private health coverage schemes (1). In the public sector, CSS provide coverage for formally employed persons, whereas the MoH provide health coverage for the unemployed population without social security. CSS and MoH operate independently from one another; consequently, there is duplicity of activities and services which cause a high cost in terms of resources and infrastructure (1).

In some rural and indigenous areas, there is less coverage by the CSS and therefore, MoH provides health coverage to those areas. For reviewing purposes, please see below Table 1 describing the distribution of public health institutions of the CSS and MoH, according to provinces.

Under some special agreements, hospitals such as the National Oncology Institute, covers the population with both types of public insurance schemes, as this is one of the main hospitals of cancer reference in the country. All patients receive the same standards of care despite their insurance status; however those without social security are required to pay out-of-pocket fees. According to estimates from the MoH, in 2016, 74.2% of the population was under CSS coverage; yet 37% of the patients using the MoH health services are patients with CSS coverage (1).

In addition, there are private insurers with which affiliation is voluntary depending on the individual's affordability.

Over the past few years, the country has been working on electronic health information records at health facilities of the MoH and CSS; however, it is still in the implementation phase. Therefore, as of 2018, Panama did not have a unique CKD electronic registry. Recently and following the example of the National Cancer Registry, the legal framework for the CKD registration in Panama started through a resolution signed by the MoH, establishing notification of CKD (all the stages) as compulsory for private and health institutions at a national level.

Because the information (health and costs) is not systematized homogeneously, data was only possible to obtain from the CSS. In addition, cost-analysis research is a challenge due to bureaucratic procedures. In order to have access to the data from the MoH, several attempts via formal letter/correspondence were sent in 2016 without success. It is likely that the Health Economic department (recently incorporated to the MoH in 2018) might help to overcome these difficulties in the nearly future.

To address all this comments, information on health system in Panama as well as why data could not be obtained are now explained more in detail at the Introduction section (page 4 and 5, lines 149-155), Materials and Methods sections (page 6, line 193-194) and in the limitations (page 13, line 404-406).

Table 1. Number of Health Services (Primary, Secondary and Tertiary Care) per Province-Region in Panama. 2015

REGION DE SALUD	TOTAL	MNSA	CSS
TOTAL GENERAL	910	830	80
BOCAS DEL TORO	44	39	5
COCLE	91	86	5
COLON	74	69	5
CHIRIQUI	123	105	18
DARIEN	63	63	0
HERRERA	45	39	6
LOS SANTOS	44	39	5
PANAMA ESTE	64	62	2
PANAMA OESTE	78	69	9
PANAMA METRO	44	29	15
SAN MIGUELITO	20	14	6
VERAGUAS	93	89	4
KUNA YALA	20	20	0
NGABE BUGLE	107	107	0

Data source: Ministry of Health, 2014 (2)

CKD and ESKD are used interchangeably and it is not clear in the discussion whether CKD in this paper is only referring to those people requiring RRT or the earlier disease state.

Author response: In the first aim of our study, we estimated the direct costs associated with ESRD (people requiring RRT). Unfortunately, Panama does not collect data systematically on milder forms of CKD in an electronic format at the public and private levels.

However, for the third aim-calculate the years of life lost due to CKD in the country-, we used mortality data from the National Mortality Registry with deaths recorded as N18 (chronic kidney disease, n=221) and N19 (unspecified kidney failures, n=18), according to the international classification of disease -10th Revision (ICD-10). Yet, we acknowledge that the reliance on diagnostic code data alone to define CKD as a cause of death might have resulted in underestimation of people with early stages of CKD.

According to the Reviewer's suggestion, we have now specified in the manuscript that cost analysis results are in relation to the population receiving RRT, whereas the YLL were in relation to CKD coded by the National Mortality Register.

Changes are highlighted in yellow at the Introduction (page 4 line 127-128, page 5 line 170,172, Page 6 line 186 and Page 7 line 234)

Burden of CKD is described as elevated but incidence and prevalence rates of ESKD or how these have changed in recent years are not provided. The paper does not refer to a specific national data collection system for ESKD – the presence or lack of one would be useful background knowledge. (How is data from Panama captured in the Latin America Dialysis and Transplant registry? – voluntary, by hospital, nephrologist etc).

Author response: As explained previously, at present, Panama lacks a National Registry of all stages of CKD and the health system is fragmented. In order to have an approximation of national estimates of patients undergoing RRT, data has been actively collected through the years by the Panamanian Society of Nephrology and Hypertension (3) and the Panamanian Transplant Organization (PTO) (4). The PTO reports cases (dialysis and transplant) to the Latin America Dialysis and Transplant registry.

This information has now been included in the manuscript, at the Discussion section, page 13, line 410-412 and in the lines 159-160 .

Mortality rates for CKD – how are these defined, those with any diagnosis of kidney disease or only those receiving RRT.

Author response: We thank the Reviewer for this relevant point. We used mortality data from the National Mortality Registry with deaths recorded in the year 2015 as N18 (chronic kidney disease, n=221) and N19 (unspecified kidney failures, n=18), according to the international classification of disease -10th Revision (ICD-10). We did not calculate mortality rates, as this has been reported previously (5). We calculated the years of life lost only in the population aged 20-77 years old, as we wanted to have an estimate of the years of life lost in the economic active population and based on the average life expectancy of the country.

We have now specified this information in the Methods section, Page 7, lines 237-239.

In the background, costs of PD are described as higher than HD. There is no discussion on why these might be different from international studies or the outcomes of this analysis which has HD more expensive.

Author response: We thank the Reviewer for raising this point. Indeed, we observed a low utilization of PD modalities in the country, an important result of our study. Other neighboring countries such as Colombia and Nicaragua have also reported a decrease in the use of PD from the year 2000 to 2010, contrasted with the continued expansion of HD (6). Potential explanations of negative PD annual growth might be related to the purchase modalities used in the public sector, favoring indirectly the use of HD as well as the lack of health policies for the implementation of PD utilization.

We have included these potential explanations in the discussion section, page12, lines 356-365.

Reference 10 on page 4 is unclear - are there three different data sets from this one reference?

Author response: Thanks for this observation. There was an error with the Endnote program and it has now been corrected.

A tighter description on the financial data provided is necessary (search strategy, determination and extraction of components eg recurrent, one off costs, infrastructure, only related to dialysis treatments or includes access creation, training education etc), the format data was provided to the researchers and analysis program used eg excel/stata should be stated clearly if it was for both YLL and service costs. A table identifying and comparing the variable and fixed cost components for each provider and each modality would be helpful.

Author response: We thank The Reviewer for this comment. To select the participant institutions, a discussion was held with the nephrologist's co-authors of this manuscript (Panamanian Society of Nephrology and Hypertension and PTO. The selection criterion was based on the mayor providers

of HD/DP in the country. Three institutions were initially invited to participate in the study. CETRERSA, the biggest hemodialysis private center in Panama, CSS (comprising all HD and PD at the national level) and Hospital Santo Tomás (MoH). We send formal institutional invitation letters to each of the institutions, explaining the aims of the study.

For the cost components, the costs were provided to the researchers in different formats (due to the lack of standardize registries) and we allocated the items according to a cost matrix using Excel. For the private sector, data on HD costs was grouped according to categories given by the data provider using the format in Table 2. For the CSS, data on HD and PD costs was given in several PDF files and the researchers allocated the costs according to the categories stipulated, previously (Table 3).

For the YLL, raw data was obtained from the National Mortality Registry (year of death (2015), province, sex, age and cause of death, according to the ICD-10 codes).

To address this issue we have now:

1. Included these tables as supplementary information
2. Expanded the methods section (Page 6, lines 188-194)

Table 2. Cost of HD (USD) in CETRERSA, year 2015

HD (PRIVATE)			
	Monthly cost 2015	Yearly Cost	Cost/HD
Human resources	Private		
Personal (Neprologists, General Practicioners, Nurses, etc.)	123757.00	1485084.00	147.86
Sub total Human Resources	123757.00	1,485,084.00	147.86
Basic Services	Private		
Water	400.00	4,800.00	0.48
Electricity	3,886.00	46,632.00	4.64
Sub total Basic Services	4,286.00	51,432.00	5.12
Travel expenses	Private		
Food/Travel expenses companions	57.00	684.00	0.07
Travel expenses patients	1605.00	19260.00	1.92
Sub total Travel expenses	1,662.00	19,944.00	1.99
Infrastructure	Private		
Maintenance and buildings	1,235.00	14,820.00	1.48
Maintenace of equipment	7,018.00	84,216.00	8.38
Estimation of the use of buildings	29,151.00	349,812.00	34.83
Equipment utilization	4,184.00	50,208.00	5.00
Sub total Infrastructure	41,588.00	499,056.00	49.69
Materials and supplies	Private		
Food-patients and human resources	2572.00	30864.00	3.07
Cost of clothing: sheets, patient gowns, disposable bed cover,	3048.00	36576.00	3.64
Diesel	1026.00	12312.00	1.23

Medicines	10091.00	121092.00	12.06
Pharmaceuticals supplies	38224.00	458688.00	45.67
Cleaning articles	639.00	7668.00	0.76
Laboratories	1125.00	13500.00	1.34
Office materials	773.00	9276.00	0.92
Surgical Medical Instruments	4324.00	51888.00	5.17
Sub total Materials and Supplies	61,822.00	741,864.00	73.86
Machinery and equipment	Private		
Number of HD			10044
Number of patients			64
	Monthly cost 2015	Yearly Cost	Cost/HD
Total	233,115.00	2,797,380.00	278.51

Cost/patient

43,447.96 USD

Table 3. Estimated cost of HD and PD (USD) in CSS, year 2015

	Monthly cost	Yearly cost/patient	Patients (factor)	Total Cost (USD)
PD		18,766.00	265	4,972,990.00
HD	1,739.66	20,875.92	1746	36,449,356.32
Eritropoyetin	507.00	6,084.00	2011	12,234,924.00
Paricalcitol	299.00	3,588.00	1423	5,105,724.00
Sevelamer	207.00	2,484.00	1751	4,349,484.00
Peritoneal Dialysis		18,766.00	265	4,972,990.00
Total				63,112,478.32
National Coordination		26,500.00	1	26,500.00
National Coordination (teaching)		11,000.00	1	11,000.00
National coordination (personnel)	5,982.84	71,794.08	1	71,794.08
National Coordination (physicians)	10,248.42	122,981.04	1	122,981.04
Sub total				232,275.12
Nephrologist (salary)	62,682.52	752,190.24	0.87*	654,405.51
Nephrologist (shifts)	41,600.00	499,200.00	0.87*	434,304.00
Nephrologists (productivity)	2,142.00	25,704.00	1	25,704.00
Sub total				1,114,413.51
General practitioners (salary)	71,029.00	852,348.00	1	852,348.00
General practitioners (shifts)	19,960.00	239,520.00	1	239,520.00
Sub total				1,091,868.00
Nurses (salary)	129,680.19	1,556,162.28	1	1,556,162.28
Nurses (shifts)	37,227.00	446,724.00	1	446,724.00
Sub total				2,002,886.28
TOTAL (HD+PD)				67,553,921.23
Yearly cost / patient (HD+PD)				38,580.19 USD

*Shifts are calculated only for HD (Prevalence of HD =0.87).

The rate of change in HD and PD modalities over a 5 year period is noted as decreasing for PD. There is no discussion on why this might be. The cost model is not clear on the overall prevalence rate used for the projection out to 2020. The statistical model used is not identified (Markov, Aria) and the graphs do not include historical data which might demonstrate appropriateness of projection.

Author response: Thanks for raising these points.

Indeed, we observed a decrease in the utilization of PD modalities in the country. Other neighboring countries such as Colombia and Nicaragua have also reported a decrease in the use of PD from the year 2000 to 2010, contrasted with the continued expansion of HD (6). Potential explanations of negative PD annual growth might be related to the purchase modalities used in the public sector, favoring indirectly the use of HD as well as the lack of health policies for the implementation of PD utilization.

For the cost model, we have used as baseline the prevalence of HD and PD for 2010 in Panama reported by the Latin American Dialysis and Renal Transplantation Registry (6). This registry gathers information on incidence and prevalence of patients undergoing various modalities of RRT based on annual surveys. With the prevalence data (2015) on HD and PD obtained for our manuscript, we calculated the annual growth rate for these modalities in a 5 year period (2010-2015). Our projection model was based in trends over different assumptions under fixed parameters and we did not apply statistical tests- Markov, Aria

To address this issue, the Discussion section of the new version of the manuscript includes explanation for negative growth rates of HD utilization (Page 12, lines 355-364). In addition, we have expanded the methods and discussion in relation to the baseline utilized to calculate the annual growth (Page 67-, lines 212-215).

The graphs are difficult to read and markers on each line would help with differentiation.

Author response: Unfortunately, markers could not be added to the figure using the software, yet we have improved the quality of the picture (300dpi). For reviewing purposes, please see Table 4 with the data displayed.

Table 4. Estimated cost (US Dollars) of the dialysis program according to different scenarios in the public sector and in the combined public and private sector .

	2015	2016	2017	2018	2019	2020
Public (CSS)						
Reference	67,553,921 .23	75,193,334 .13	80,727,539 .34	86,669,060 .28	93,047,875 .25	99,896,168. 95
2.5% anual increase in PD	67,553,921 .23	74,885,787 .62	80,067,175 .68	85,605,610 .96	91,525,583 .45	97,853,253. 96
5% anual increase in PD	67,553,921 .23	74,578,241 .11	79,406,812 .02	84,542,161 .63	90,003,291 .64	95,810,338. 97
7.5% anual increase in PD	67,553,921 .23	74,270,694 .60	78,746,448 .35	83,478,712 .31	88,480,999 .84	93,767,423. 98
1% anual decrease in PD	67,553,921 .23	75,316,352 .73	80,991,684 .81	87,094,440 .01	93,656,791 .97	100,713,334 .94
Public and Private (CSS+CETRERSA)						
Reference	70,351,301 .23	78,143,954 .63	83,312,129 .88	89,443,875 .85	96,026,916 .35	103,094,466 .52

2.5% anual increase in PD	70,351,301 .23	77,810,952 .04	83,180,301 .62	88,918,520 .87	95,050,821 .87	101,604,129 .78
5% anual increase in PD	70,351,301 .23	77,477,949 .45	82,465,278 .67	87,767,048 .26	93,402,527 .71	99,392,119. 68
7.5% anual increase in PD	70,351,301 .23	77,144,946 .86	81,750,255 .72	86,615,575 .65	91,754,233 .55	97,180,109. 57
1% anual decrease in PD	70,351,301 .23	78,277,155 .66	84,181,333 .74	90,530,582 .52	97,358,433 .70	104,700,943 .92

More detail on the sensitivity analysis and the influence of incidence and mortality rates on projections would be helpful as these are likely to be greater drivers of costs.

Author response: We thank the Reviewer for this comment. With the exception of the 1% annual decrease in PD scenario, all of the different scenarios presented in Figure 1 were based on the ratio of sensibility (Annual increase rate of HD/annual increase rate of PD) = 10.65/-4.23 = 2.5. In addition, we have estimated in our Excel template, different arbitrary scenarios, based on achieving higher increases in PD utilization, such as 10% annual increase in PD, but also reducing PD utilization by 2.5 yearly. Results are shown in Table 5. Overall, lower cost estimates were obtained with increase annual utilization of PD (10%).

Panama, as other countries in the region, does not have validated incidence data (6), and therefore the influence of incidence on the projections might not be reliable. In general, national mortality rates have been decreasing in the country, however there are geographical disparities (5). The methods section has now been expanded regarding these relevant points (Page 7, lines 228-231).

Table 5. Estimated cost (US Dollars) of the dialysis program according to other different scenarios in the public sector and in the combined public and private sector .

	2015	2016	2017	2018	2019	2020
Public (CSS)						
Referenc e	67,553,921. 23	75,193,334. 13	80,727,539. 34	86,669,060. 28	93,047,875. 25	99,896,168.9 5
10% anual increase in PD	67,553,921. 23	73,963,148. 10	78,086,084. 69	82,415,262. 98	86,958,708. 04	91,724,509.0 0
2.5% anual decrease in PD	67,553,921. 23	75,500,880. 63	81,387,903. 00	87,732,509. 60	94,570,167. 05	101,939,083. 94
Public and Private (CSS+CETRERSA)						
Referenc e	70,351,301. 23	78,143,954. 63	83,312,129. 88	89,443,875. 85	96,026,916. 35	103,094,466. 52
10% anual	70,351,301. 23	76,811,944. 27	81,035,232. 78	85,464,103. 05	90,105,939. 39	94,968,099.4 7

increase in PD						
2.5% annual decrease in PD	70,351,301. 23	78,476,957. 22	84,610,347. 51	91,221,466. 08	98,347,410. 20	106,028,149. 98

While the USD YLL are impressive – some discussion on the significance of this to the focus on changing modalities is necessary or bring in the discussion on the burden of early CKD and preventive health earlier.

Author response: Following the Reviewer suggestion, we have added a sentence in the Discussion section (Page 13, lines 393-395).

'Milder forms of CKD' are brought into the discussion for the first time – differentiation between ESKD/CKD requiring RRT and CKD not requiring RRT would be helpful. This clarification should also apply to the proposed 'CKD notification' legislation.

Author response: Following the Reviewer suggestion, we have now defined "milder form of CKD" vs ESRD in the introduction section (lines 127-128, line 146, line 170-172)

Regarding the CKD notification legislation, it will include all stages of CKD that are recorded in the health system, at private and public institutions (lines 396-397-Discussion section).

The main cost drivers for HD appear to be different from most other studies (usually staff are the main drivers which makes the inclusion of a table with components and costs per patient year more compelling.

Author response: Following the Reviewer suggestion, we have now included the tables, as supplementary material, with estimated costs per category. As observed, in the CSS Eritropoyetin was the main driver, followed by staff salaries. In the private sector (CETRERSA), staff wages were the main drives. This has now been specified in the discussion section and these differences might be, in part, due to the different laws regulating free supply and demands (Discussion, lines 340-342).

Reviewer #2

I find your manuscript is a well written manuscript. Background and methods used are clearly presented and results are consistent with methods.

I recognize that your results may be of interest for the Panama health system by providing information on which the decision-making process on allocation of resources can be based. However, the interest seems to me minimal for countries other than Panama and the usefulness of data provided limited.

Author response: The Authors would like to thank the Reviewer for the careful revision of our work as well as for the constructive comment.

We agree with the Reviewer that our results are of interest for the Panamanian health system, however PD is still an underutilized modality for RRT in most countries of Latin America (6); this fact particularly contrasts with the continued expansion of HD. The causes are presumably multifactorial, the shortage of trained nephrologists and nurses on the one hand, and the lack of financial support and health policies on the other. Therefore, we do believe that our results contribute to the worldwide scientific evidence in understanding the cost of renal therapies across Latin-America.

Reviewer #3

For the cost analysis there was no discount rate included, but for the calculation of the YLL they did. I suggest including discounting for the cost analysis or justify why they did not include it.

Author response: The Authors would like to thank the Reviewer for the careful revision of our work as well as for these highly constructive comments. All changes are highlighted in yellow color.

The cost analysis was performed in present value, whereas the YLL were adapted to the present value so that both datas could be comparable for the year 2015. This explanation has now been added to the Methods section (Page 7, lines 217-218)

The information of costs used for the cost analysis was not shown so is difficult to assess the results and to repeat the study.

Author response: Thanks for raising this point. Following the Reviewer suggestion, we have now included two tables with information on costs from the Public and Private sector, as part of the Supplementary Information.

Moreover, because for the private sector only information for HD was provided, is recommendable not to calculate the PD/HD ratio considering this sector, it bias the results. "The HD/PD costs ratio in the public sector was 1.19, whereas in the private and public sector combined was 1.20".

Author response: We reflected on the Reviewers comment and agree that HP/PD cost ratio from the private sector is a biased estimate. We have now excluded this result from the manuscript.

"Sensitivity analyses were conducted to explore model forecasts under varying assumptions about ESRD growth rates. In general, results of these analyses demonstrate that savings will be greater as the shift toward greater PD use is accomplished sooner." It would be more informative if the authors could provide some results from the sensitivity analyses.

Author response: We thank the Reviewer for this comment. With the exception of the 1% annual decrease in PD scenario, all of the different scenarios presented in Figure 1 were based on the ratio of sensibility (Annual increase rate of HD/annual increase rate of PD) = $10.65/-4.23 = 2.5$. In addition, we have estimated in our Excel platform, different scenarios, such as 10% annual increase in PD and 2.5 decrease in PD utilization. Results are shown in Table 5. Overall, lower cost estimates were obtained with increase annual utilization of PD (10%). The methods section has now been expanded regarding these relevant points (Page 7, lines 228-231).

Limitations about the data should be discussed more in depth. Also would be recommended to discuss the limitations of cost analysis compared to other forms of economic evaluations (such as cost-effectiveness).

Author response: We thank the Reviewer for this comment. Unfortunately, currently we do not have the possibility to collect data to perform a cost-effectiveness study; however, future studies can be planned as the country improves the data collection system. Limitations are now clearly addressed at page 13 and 14, lines 409-416.

References

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VERSION 2 – REVIEW

REVIEWER	Gillian Gorham Head Renal Health Program Menzies School of Health Research Australia
REVIEW RETURNED	18-Jan-2019

GENERAL COMMENTS	Thank you for revising your manuscript and adding the additional information and clarification requested. I note there are a few grammatical errors and expect these will be addressed by the editor prior to acceptance.
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REVIEWER	Magdalena Walbaum University College London, UK
REVIEW RETURNED	14-Jan-2019

GENERAL COMMENTS	Changes made.
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