

Cost - consequence analysis of a remote patient monitoring program to improve clinical practice of automated peritoneal dialysis in Brazil

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Background

- The Automated Peritoneal Dialysis (APD) is recognized as an effective renal replacement therapy alternative (1)
- A patient monitoring (RPM) program in addition to APD, has demonstrated to improve adherence and health outcomes (2,3)
- There is a lack of economic evidence to demonstrate the association between the (RPM) and health care savings in APD patients

Objectives

To estimate from the payer perspective, the cost and clinical consequences of using (RPM), supported in *Sharesource* technology, to improve the clinical practice and control of incident patients in APD in Brazil.

Methods

A Markov type model was built for the cost consequence analysis using Excel (Excel 2016; Microsoft, Redmond WA) based on five health states (Figure 1). The model used monthly cycles to estimate the costs and outcomes of a hypothetical cohort of incident APD patients, with and without a RPM program over a one year time horizon. The model structure was based on the results of a focus group conducted with seven experts made up of nephrologists and nurses.

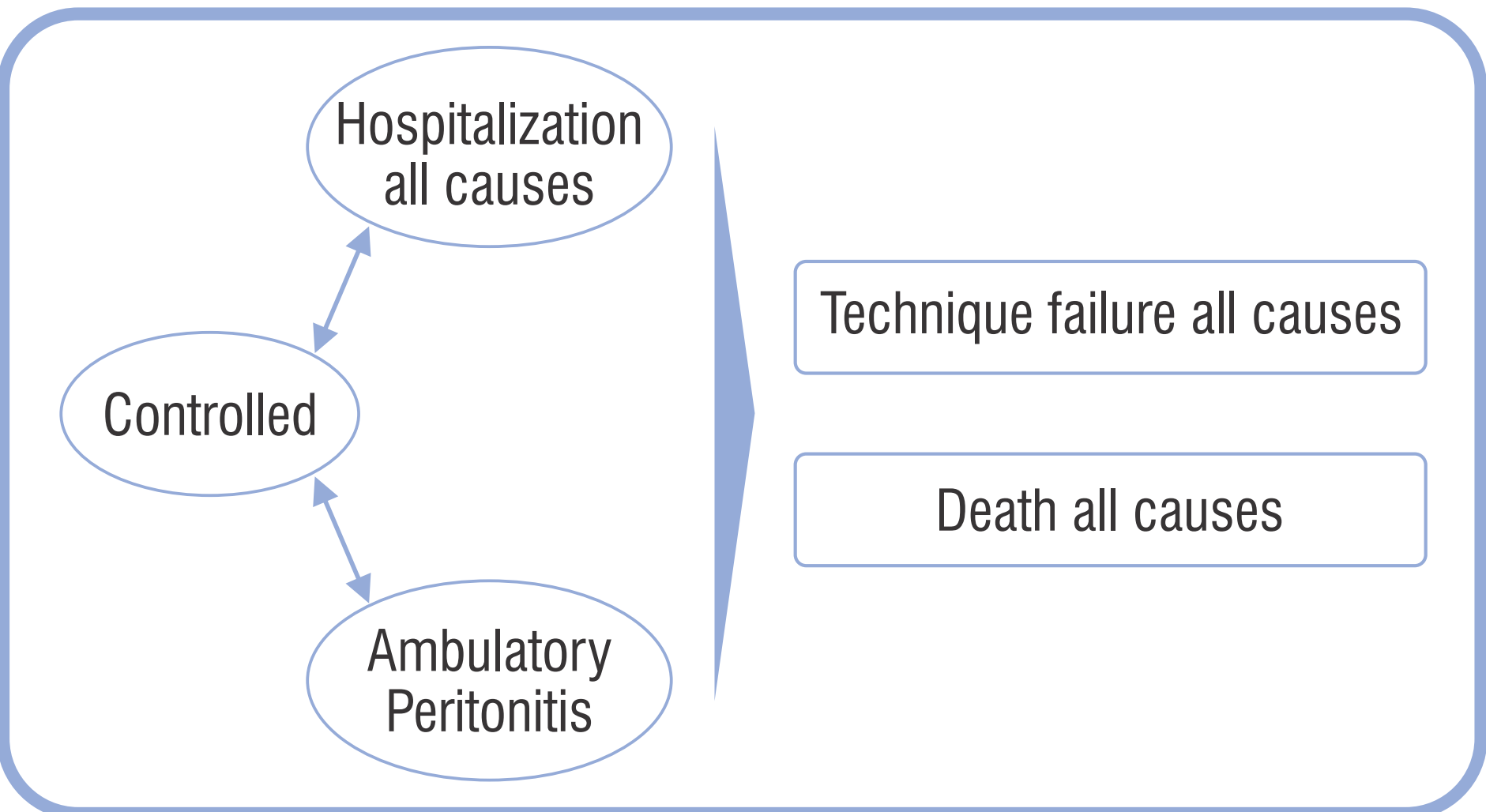


Figure 1: Markov model structure

The effectiveness of the interventions in reducing the risk of hospitalization and hospitalization days was based on a propensity score matched observational study (8). An internal analysis of the same matched sample were also used to inform the incidence of peritonitis. APD technique failure and mortality were assumed to be equal with and without RPM. Inpatient care costs were obtained from SIMPRO, CMED, CBHPM and UNIDAS; Dialysis ambulatory costs were estimated from referent national tariffs CBHPM. Complication costs were obtained from medical literature. Costs reported in BRL (1 USD = 3.89)

The model outcomes were net annual direct costs as well as changes in key clinical consequences including time free of complications, hospitalization episodes, days of hospitalization and other APD complications (peritonitis, technique failure and death).

Both deterministic and probabilistic sensitivity analyses were performed to analyze the effect of parameter estimation uncertainty in the model.

Results

Base case results are presented in the scenario of 100 hypothetical APD patients (with and without RPM) followed for one year and assuming an incremental cost for RPM of 14% over the APD reimbursement fee (table 1 and 2). Model results were robust and sensitive to the change in the hospitalization rate, length of stay and daily hospitalization cost (Figure 2). In 93% of one thousand Montecarlo simulations, the APD with RPM was a cost-saving intervention (Figure 3).

Table 1: Base case costs results (BRL R\$)

Alternatives	Overall cost	Dialysis monitoring cost	Hospitalization cost	APD Complication costs
APD without RPM	\$ 7,427,117	\$ 2,755,529	\$ 4,000,590	\$ 670,999
APD with RPM	\$ 5,792,249	\$ 3,228,449	\$ 1,949,504	\$ 614,296
Net cost	(\$ 1,634,869)	\$ 472,920	(\$ 2,051,086)	(\$ 56,703)

Figure 2: Deterministic sensitivity analysis (DSA)

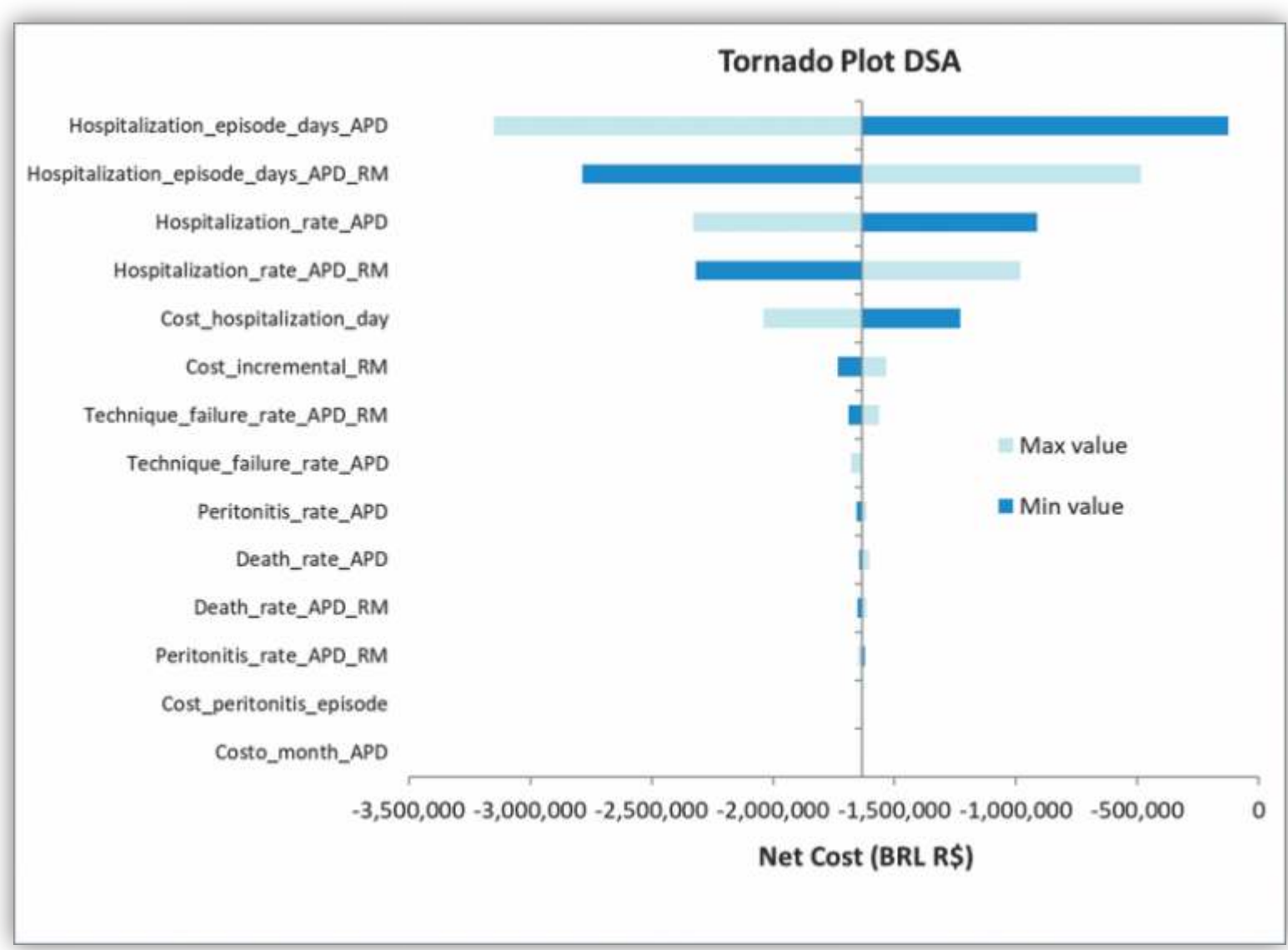
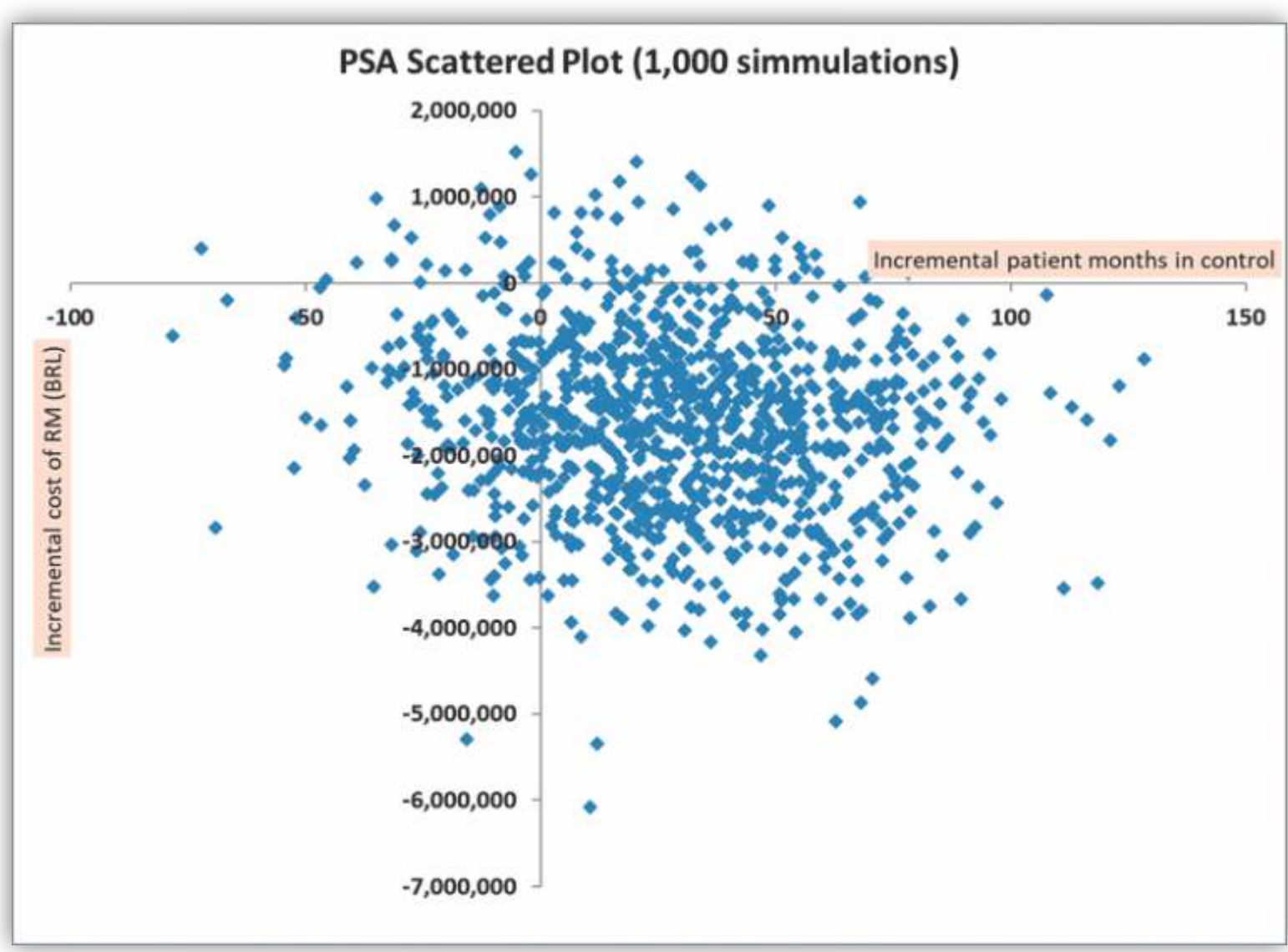


Table 2: Base case clinical results

Alternatives	Months free of complications	Episodes of hospitalizations	Days of hospitalizations	Episodes of APD complications
APD without RPM	1,097	75	995	22
APD with RPM	1,128	48	478	16
Net cost	31	-27	-517	-6

Figure 3: Probabilistic sensitivity analysis (PSA)



Conclusions

From a payer perspective and with a time horizon of one year, the available evidence suggests that the RPM program implemented in Brazil would likely be a cost saving intervention with the potential for enhancing time without complications. This conclusion proved to be robust under different scenarios of the sensitivity analysis. Further, the economic benefit of a RPM program could be even higher in environments with clinical indicators clearly in need of attention and where there are higher hospitalization costs. However, the external validity of these findings should be interpreted carefully and it will very much depend on how renal centers implement RPM similar to the one examined here.

References

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