amputation, angina, cataracts, congestive heart failure, hypoglycaemia, infarct, ketoacidosis, peripheral vascular disease and stroke. Further, because of the lack of experimental data, the evolution of all complications has been assumed to be independent, except for some clinical dependences as, for example, nephropathy after micro albuminuria and amputation after diabetic foot.

Our model and estimations rely on several clinical and patient-based assumptions, such as similar efficacy among considered pharmacologic treatment options and regimes, perfect adherence and compliance to drugs by patients, no a priori (pre-diagnosis) treatment and no patient- nor group-based education programs, among others. We were not able to establish a differentiated effectiveness of each of the former for the considered SMBG regimes over a long-run time frame as there is no available information. However, because of how the model was built and structured, any treatment additions (such as telemetry, education programs or new drugs) could be easily incorporated by knowing its individual impact on HbA1c levels for different SMBG regimes.

Our study adds valuable information to the available economic literature on the long term costs associated to T2D treatment. To the best of our knowledge, no such study is available for the Mexican context. Our results lie between the cost estimates shown by Rodriguez Bolaños [26] and Arredondo and De Icaza [27]; and the cost trend seems exponential between years 1 and 10 of simulation. After the tenth year, our cost estimations might be volatile due to the loss of patients during simulation, either because of T2D-related complications, or of natural death.

4 Concluding Remarks

We report the development and application of a simulation model that was designed to imitate the individual experience of a patient with type-2 diabetes at a Mexican public health institution, and performed simulation runs to estimate the expected annual costs incurred by patients with type-2 diabetes under four different scenarios related to the frequency of self-monitoring of blood glucose: no self-monitoring, once a day, twice a day, and three times a day. Although there is some controversy on the impact of SMBG on the evolution of patients with T2D (for a report on a non-significant impact see, e.g., [28]), our simulation experiments are in agreement with the literature that report a positive impact of SMBG and, in particular, with reports (e.g., [7]) on a significant reduction in HbA1c for patients using SMBG (once a day), with no significant further reduction with more intensive SMBG (in our case, twice or three times a day). Our simulation runs show that, compared to the non-SMBG scenario, the expected cumulative cost incurred by patients with T2D break evens at year 3 for all three scenarios of SMBG (one, twice and three times a day). In addition, the expected (present value) cumulative cost for patients with T2D and no SMBG is around US $60,443 over a 10-year span, and the use of SMBG will reduce this expected cost in 6.5%, 7.5% and 7.8% for 1, 2 and 3 times daily regimes of SMBG, respectively.

The simulation model reported in this paper incorporates input data in 4 categories: demographic data, risk factors data, clinical data and epidemiologic data, and the main drivers for cost computation are the evolution of glycosylated hemoglobin, and the incidence (or not) of the main comorbidities, complications and acute events associated with T2D. For the application reported in this paper, economic evaluation of four different scenarios of SMBG has been performed. However, simple modifications on the appropriate transition probabilities for the evolution of HbA1c and the corresponding complications' relative risks can be implemented to perform economic analysis of other therapies for T2D.

The main limitations of the results reported in this paper are associated to the lack of experimental data to support the estimation of the main parameters for the probability distributions that drive the simulations, and in particular, we are aware that data (from individual diabetic patients) on the evolution of HbA1c may allow us to apply appropriate input analysis techniques to drive our simulations. We expect that this application may help Latin-American healthcare decision makers to understand the importance of recording the appropriate information to support important healthcare policy-decisions. For instance, if implementation of SMBG may provide a 7% reduction in the cumulative per-patient cost over a 10-year period, the expected total savings from this policy on a population of 6.5 million patients with T2D in Mexico (see [8]) will be around 27 billion US dollars over a 10-year period.

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