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**Thesis title:** Development of advocacy tools for the fight against type 2 diabetes in sub-Saharan Africa from the estimation of costs of inaction and action.

**Abstract:** This thesis is organized in three different parts with three objectives: i) To estimate the direct medical costs of treatment of T2D in four sub-Saharan African countries and in the case of Mali, compare the direct medical costs estimated from prices used in the health system to the real expenditures of diabetic patients, ii) To evaluate the perceptions of health professionals on advocacy tools for T2D including the cost calculator used to estimate medical costs and a narrative argument developed under the Double Burden Nutritional project, iii) To examine the cost effectiveness of economic evaluation of lifestyle interventions for primary prevention of T2D.

In the first part of the study, we estimated the costs of T2D and its complications in Benin, Burkina - Faso, Guinea and Mali. The care components for T2D and its complications were defined by a team of specialists, based on their clinical experience and current guidelines. Prices were collected from two public healthcare facilities and two private facilities. The costs were estimated on an annual basis for T2D with or without chronic complications and per episode for acute complications. The estimated annual costs in Mali were compared to diabetic patients' expenditures based on data from a cross-sectional survey conducted earlier in that country. The survey covered 500 diabetic subjects randomly selected from the registry of known diabetics. Data on expenditures for care in the last three months were collected. Determinants of expenditures were examined. The results showed cost disparities within countries, within and between the private and the public sector. The minimum cost of treatment of T2D without complications in the public sector amounted to 21% - 34% of the country's Gross National Income per capita; 26% - 47% in the presence of retinopathy - the cheapest complication -, and above 70 % for nephropathy, the most costly complication. According to Mali survey, diabetic subjects' expenditures were below the estimated minimum cost, except for diabetes without complications or only with retinopathy. Insulin

therapy, the number of complications and residing in the capital were significantly associated with higher expenditures.

The second part of the thesis consists of the systematic review of economic evaluation studies of T2D prevention interventions in high-risk groups through diet and physical activity. Interventions to control obesity as a major risk factor for T2D were also considered. The studies were extracted from scientific databases using keywords and predefined criteria. Original studies published between January 2009 and December 2014 and conducted in French, English or Spanish were potentially eligible. The "British Medical Journal" checklist was used to assess the quality of studies. Of the 21 studies included, 15 reported that the interventions were cost-effective as per the acceptability limits considered. Six studies were inconclusive, including four for T2D prevention and two for obesity control.

In the third second part, the perceptions of potential users of the cost calculator and another advocacy tool, namely, the narrative set of arguments explaining the need to address T2D in Africa, were evaluated in an exploratory qualitative study. Data were collected through individual interviews of 16 health professionals from four sub-Saharan countries and a focus group with 10 Master's students in nutrition during a training workshop on advocacy using these tools, in Benin. The questions pertained to the two tools and to factors involved in the prioritization of health policy, with a focus on T2D. Interviews were recorded, transcribed and coded using the QDA Miner software. Participants underlined the relevance of the tools for advocacy. They considered the cost calculator as user – friendly. It remains that the political context characterized by competing priorities, lack of cohesion between policy makers, and lack of data, especially the cost - effectiveness of interventions, are challenges for positioning T2D as a priority in public policies in sub-Saharan African countries.

The studies confirmed that treatment of T2D is unaffordable for many patients. It highlighted the fact that expenses of patients were below the estimated costs for minimal treatment with some exceptions. Prevention of T2D based on lifestyle modification appears cost-effective but studies should be conducted in Africa. We hope that the tools, which were found relevant by health actors of the four countries, will be helpful in stimulating preventive interventions in order to reduce the trend of T2D and its economic burden in sub-Saharan Africa.