

Review of Cost of Diabetes Complications in Four European Countries

Authors: Beaudet A¹, Grabbi E², Maurel F³, Ramos M⁴ and Lebioda A⁵

1 IMS Health, Basel, Switzerland; 2 IMS Health, London, United Kingdom; 3 IMS Health, Paris, France; 4 IMS Health, Barcelona, Spain; 5 IMS Health, Munich, Germany.

Introduction

Diabetes mellitus (T2DM) represents a major public health burden. To understand its economic consequences and assess the cost-effectiveness of different interventions, health economic modeling is commonly used. Diabetes complications are the main driver of the cost of the disease. Due to the large number and variability of diabetes complications, evaluating their medical cost is challenging.

Diabetes complication costs compiled in a systematic manner would help to determine and compare reliable estimates of the economic burden of the disease across countries.

Objective

To provide a comprehensive and coherent reference document of published diabetes complication costs in France, Germany, Italy and Spain for use in economic modeling.

Methods

- A search for published cost of diabetes complications data was performed on government websites, public databases and peer-reviewed journals. Costs were collected and reviewed by local cost experts.
- The national health care payer perspective was adopted. A consistent approach in the valuation of the different complications was applied whenever possible.
- For the costs of drugs, the cheapest and most frequently used product in the therapeutic class was selected.
- All costs were inflated to 2013 Euros (€).

Results

- Table 1 to 3 present a summary of the yearly costs associated with diabetes complications in four European countries for use in economic modeling.
- The costs of cardiovascular complications were similar in the four countries.
- The cost for dialysis appeared to be higher in France. This is because a comprehensive costing publication was used in France whereas in the three other countries the only information available was the DRG codes for the dialysis treatment.
- The cost of visual impairment and neuropathy complication varied widely due to the different valuation methods and the nature of the complications.

Limitations

This study presents several limitations due to the differences in health care system structures and in cost transparency. The cost estimation methodology varied among countries and was not always directly comparable. Diagnostic related group (DRG) tariffs were used to estimate several costs which may not accurately represent the burden of a specific complication nor take into account the full burden of follow-up after an acute event. The DRG costs do not reflect the fact that events in diabetic patients tend to be more costly than for the non-diabetic counterparts. There were also a limited number of published articles for several complications in all four countries. The published studies had disparate methodologies and were often conducted in a specific region or hospital which limits the applicability of the elicited cost to a national level.

Conclusion

This study provides a coherent set of costs identified through literature review for diabetes complications in four European countries. An effort was made to use consistent assumptions to facilitate the comparison. Nevertheless, most of the costs identified only accounted for the expenses of acute events such as myocardial infarction but not additional medical costs (i.e. additional follow-up costs, complication costs). Notwithstanding, this study is a useful source of cost data in the absence of more robust research. Future research would benefit from large-scale multi-country patient-level data collection which could reveal the true economic burden of diabetes.

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Table 1) Direct medical costs of macrovascular complications (€)

Macrovascular complications	France	Germany	Italy	Spain
Myocardial infarction: first year	3,041 - [1]	13,908 - [2,30]	3,698 - [3]	5'543 - [4]
Myocardial infarction: subsequent years	199 - [26]	3,911 - [31]	2,295 - [5]	316 - [9,21]
Angina: first year	1,384 - [1]	2,188 - [2,30]	1,870 - [3]	2'294 - [4]
Angina: subsequent years	145 - [26]	84 - [6]	1,870 - [3]	247 - [9,21]
Congestive heart failure: first year	3,104 - [1]	3,018 - [2,30]	4,000 - [3]	3'392 - [4]
Congestive heart failure: subsequent years	5,591 - [28]	58 - [2,30]	273 - [12,7]	329 - [9,21]
Stroke: first year	5,447 - [1]	20,185 - [2,30]	6,073 - [3]	8'457 - [4]
Stroke: subsequent years	2,704 - [29]	4,957 - [31]	765 - [8]	789 - [4]
Stroke death within 30 days	2,221 - [1]	4,254 - [2,30]	6,073 - [3]	3'731 - [4]
Peripheral vascular disease: first year	2,347 - [1]	2,536 - [2,30]	2,199 - [3]	2'909 - [4]
Peripheral vascular disease: subsequent years	326 - [26]	2,536 - [6]	2,199 - [3]	2'909 - [4]

Table 2) Direct medical costs of renal complications (€)

Renal complications	France	Germany	Italy	Spain
Haemodialysis: first year	71,683 - [10]	33,205 - [6,30]	21,552 - [3]	35,972 - [11]
Haemodialysis: year 2+	71,683 - [10]	28,026 - [6]	21,552 - [3]	35,972 - [11]
Peritoneal dialysis: first year	48,752 - [10]	32,984 - [6,30]	18,485 - [3]	21,255 - [12]
Peritoneal dialysis: year 2+	48,752 - [10]	28,026 - [6]	18,485 - [3]	21,255 - [12]
Renal transplant: first year	84,114 - [13]	34,653 - [6,30]	38,528 - [3]	26,618 - [4]
Renal transplant: year 2+	19,598 - [13]	8,346 - [6]	5,366 - [16]	2,957 - [17]

Table 3) Cost of other microvascular complications (€)

Other microvascular complications	France	Germany	Italy	Spain
Neuropathy	372 - [26]	885 - [15]	1,088 - [18]	575 - [9]
Amputation	9,578 - [1]	12,303 - [30]	6,056 - [3]	12,055 - [4]
Prosthesis following an amputation	1,485 - [26]	4,005 - [19]	465 - [3]	7,952 - [4]
Gangrene treatment	3,622 - [20]	18,328 - [6]	4,290 - [3]	11,045 - [14,21]
Infected ulcer	3,808 - [22]	18,328 - [6]	4,290 - [3]	5,302 - [4]
Uninfected ulcer	2,170 - [22]	18,328 - [6]	4,290 - [3]	5,302 - [4]
Laser treatment	138 - [26,27]	319 - [6]	95 - [23]	378 - [24]
Cataract operation	1,202 - [1]	611 - [6]	895 - [3]	3,785 - [4]
Blindness	13,905 - [25]	17,214 - [6,25]	1,868 - [3]	115 - [17]
Major hypoglycemia event	1,165 - [1]	2,561 - [30]	1,391 - [3]	3,741 - [4]
Minor hypoglycemia event	0 - [*]	0 - [*]	0 - [*]	0 - [*]
Ketoacidosis event	2,278 - [1]	3,063 - [30]	1,391 - [3]	3,741 - [4]

* Assumed to be associated with no medical cost

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