Author's response to reviews

Title: Diabetes: Cost of Illness in Norway

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Version: 5 Date: 12 August 2010

Author's response to reviews: see over
To Editor-in-chief

Nina Titmus
BMC-series Journals

Diabetes: Cost of Illness in Norway

We are grateful that we have been allowed to submit a revised version of the paper. In the following we will explain how we have responded to the comments

We have made various other small changes to improve the text, but without any change of substantial content.

We hope the manuscript now is acceptable for publication, but we are willing to perform further revision if the editor so wish.

Kind regards

Oddvar Solli
Reviewer Ken Redekop

MINOR ESSENTIAL REVISIONS

1) Inpatient hospital costs
The authors have provided more information about how hospital costs were calculated. Please add the answer found in the response to the reviewers to the paper.

Response: We agree with the reviewer

Action: We have added the following (information provided in the previous cover letter) to the methods section: “In Norway, patients receive a main diagnosis and possibly one or more secondary diagnoses at discharge from hospital. ICD10 has been used since 1999. On the basis of the diagnoses, age, sex and possibly procedures, patients are allocated to a diagnosis related group (DRG). The Directorate of Health performs annual cost studies of a representative sample of hospitals in order to estimate the mean hospital costs of patients in each DRG. Even though the cost estimate may be incorrect for the individual patient, on average they represent reasonable costs for the different types of patients”.

2) Comparisons with other COI studies
I actually think that comparisons can be made in different ways: one can compare results in the context of differences in diabetes care policies, but one would have to keep in mind any differences in methods (e.g., prevalence-based vs incidence-based approaches, human capital vs. friction method). One can also just compare methodologies. For example, I suggest that the authors take a look at what Bolin et al. (Diabetes, healthcare cost and loss of productivity in Sweden 1987 and 2005--a register-based approach. Diabet Med. 2009 Sep;26(9):928-34.) did for two different reasons. Firstly, Bolin et al discuss changes in total costs in Sweden, which is related to the comments by the authors about temporal trends in costs. Secondly, Bolin et al used attributable risks to estimate the contribution of diabetes to the costs of
diabetes-related disorders/complications (with multiple causes) such as cardiovascular disease. This approach should result in an estimate of COI that is between the COI based only on diabetes and the COI based on diabetes and diabetes complications. I don’t suggest new analyses, but rather a reference to this approach and study, which can go beyond what is stated on page 12 (“...many causal factors and no reliable data on the fraction...”). Note that Bolin et al. ignored certain cost components such as primary care costs and short-term illness costs.

Response: We appreciate this comment and agree with the reviewer.

Action: We have added the Bolin study to the reference list and added the following to the discussion section: “In a recent Swedish study [23] which report increasing costs of diabetes over time, another approach to COI analysis is used. Diabetes prevalence and attributable risks for diabetes complications were used to estimate the diabetes-related costs. This approach should result in an estimate of the COI that is between estimates based on diabetes as the primary diagnosis and estimates based on diabetes as the primary as well as the secondary diagnosis”.

3) Future research (see initial review and response to the reviewers)
Please add the comments found in the response to the reviewers to the paper.

Just to clarify what I meant in my initial review, I was interested in hearing what kinds of studies the authors think should be performed next, both in Norway and in general (e.g., methodological studies). I would like to see more reflection about new studies which can help to improve the lives of people with diabetes or ensure that good diabetes care is provided as efficiently as possible. I see that one of the authors is medical advisor to the Norwegian Diabetes Association. What kinds of questions raised by this study’s results can - or should - be addressed to improve the health of diabetes patients in Norway?

Response: We have added a paragraph on the need for guidelines and research

Action: The following text has been added to the discussion section:
“The wide variation in methodology makes comparison of the results difficult and calls for standardisation of methods. Patient organisations might play a role in developing guidelines for COI studies. Additionally, there is a need for more research into how choice of methods impact the results using data from the same country and the same time rather than comparing across countries. Even though COI represent a basis for allocating research resources, most research should be directed at studies of intervention effectiveness and how care can be provided in the most efficient way. The latter in practice means cost-effectiveness studies, and our COI study could be used as a toolbox for analysts in need of cost data. If later studies are performed in the same way, it may provide useful insight in how costs develop over time”.

4) Typographical/grammatical issues
By chance, I found upon another spot where “productions losses” is found (page 12).

Action: We have changed the text from “productions losses” to “productivity losses” on page 12.

DISCRETIONARY REVISIONS
1) Abstract: I would suggest adding a 1-2 sentences in methods section of the abstract which describe the calculation methods used to estimate total costs. For example, the abstract makes no mention of the prevalence-based method.

Response: We agree with the reviewer
Action: We have added the following to the methods section of the abstract: “The study was performed with a prevalence approach. Uncertainty was explored by means of bootstrapping”.
Reviewer Andrea Icks

Table 4 reports statistical uncertainty (CIs) of estimates for “other types of health care costs”. However, it remains unclear how this uncertainty was incorporated into the estimates of total costs. Furthermore, estimates of other cost categories are subject to many assumptions which constitute considerable methodological uncertainty. The impact of the methodological uncertainty on the results of the study should be examined by means of extensive sensitivity analyses.

*Response: The uncertainty in the estimates has been explored in bootstrap analyses.*

Data from the same reference year (that is 2005 or 2006) should be used to estimate costs.

*Response: Data were taken from 2005 with the exception of data on the costs of outpatient clinic visits. Here, no data for 2005 were available so data for 2006 were used.*