Reviewer's report

Title: Economic burden of stroke in a large county in Sweden

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Reviewer: Samantha Smith

Reviewer's report:

General comments
The focus of the paper is on an important and relevant issue, that of estimating the economic burden of stroke. The paper recognises that stroke is a chronic illness, posing long-term economic burdens (e.g., productivity loss) and appropriately includes both direct and indirect costs in the cost estimates. The paper could benefit in three main ways. Greater clarity is needed both in terms of the added value of the paper, and in terms of the data and methods used to estimate the cost burden. Third, sensitivity analysis is needed around the point estimates of the costs.

Major compulsory revisions

1. Added value
The added value of the paper, relative to existing estimates of the economic burden of stroke in Sweden, is not clear, particularly as this paper reports results from one county only.

The introductory paragraph to the paper makes reference to existing estimates of the direct and indirect costs of stroke in Sweden. The introduction also suggests that this paper makes use of ‘comprehensive statistics’ to look at societal costs in detail, and that differences between geographical regions can be examined. However, existing estimates of the costs of stroke in Sweden already include both direct and indirect costs. The methods and data sources in this paper are not outlined in enough detail to show how they improve on existing estimates. The third paragraph in the discussion compares the results from this paper with a previous study and finds similar results. There is no discussion of regional patterns in costs.

2. Data and methods
In general the data sources and methodology need to be outlined in more detail. The data sources are not described in sufficient detail to understand what information they provide. Top-down and bottom-up methodologies are mentioned although it is not clear how each are applied in the paper. The following points outline some specific areas where further information on data and methods are needed.

2.1 Paragraph: “Epidemiology”
Data source for the number of stroke events in the year 2008 is not outlined.
2.2 Paragraph “Data source”
Data sources are not clearly explained in this paragraph. The paragraph indicates that data were received from the county council but does not explain what these data include – e.g., total health care expenditure? E.g., Utilisation data?

2.3 Paragraph “Data source”
The description of the methodological approach is confusing. The paragraph indicates that the study mainly uses a ‘top-down’ approach, and that this is complemented by a ‘bottom-up’ approach. Without further information on the type of data collected, it is not easy to follow how these difference methods are applied and to which data. For example, Table 3 outlines unit costs which is consistent with a bottom-up approach but no data on utilisation are presented.

2.4 Paragraph “Direct costs in health care”
Explanation of the time period of analysis needs to be more careful. The first sentence in this paragraph indicates that the direct costs were estimated for the year 2008, for first-ever stroke patients in that year. The third sentence indicates that the costs are estimated for episodes that began in 2008 and a period of 12 months after the stroke.

2.5 Paragraph “Informal care volume”
Data sources are needed for the estimates of the number of hours of informal care provided.

2.6 Paragraph “Informal care volume”
What is the rationale for cutting the volume of informal care by half (as opposed to a quarter, a third etc.) for patients above 85?

2.7 Paragraph “Informal care costs”
Data source is needed for the estimated loss of income of 200 SEK per hour.

2.8 Paragraph “Cost for loss of productivity”
More details on the methods and data sources are needed for recalculating potential productivity loss to take into account absence from work due to unemployment and other sicknesses.

2.9 Paragraph “Cost for loss of productivity”
Were productivity losses estimated for all stroke cases or was this based on information on the employment status of the patients prior to, and following, stroke?

2.10 Paragraph “Lifetime costs”
The paragraph indicates that future costs are assumed to have the same costs each year as the first year. Unless the patient has a recurrent stroke, are the acute care costs expected to be as high in subsequent years?

2.11 Additional costs
Were other costs of stroke such as medications, home modifications/equipment,
voluntary input considered?

2.12 Paragraph “Objectives”

The paper indicates the intention to analyse ‘excess’ costs. It is not specified how this is achieved in the methods. Some proportion of health care utilisation (e.g., outpatient visits, doctor visits etc.) may have occurred in the absence of stroke and it is not clear how this is estimated in the methodology.

3. Sensitivity analysis

Sensitivity analysis is not undertaken in the paper. Costs are presented as point estimates with no indication of the possible margin of error around the estimates. Adjustment of unit costs (e.g., by +/- 10%) or adjustment of utilisation estimates would at least provide confidence intervals around the point estimates.

Minor Essential Revisions

1. Introduction & Objectives

The paper needs to distinguish between incidence-based and prevalence-based approaches early on. The introduction and objectives indicate that the focus is on the total societal burden of stroke in one county of Sweden. This would suggest a prevalence-based approach, whereby total stroke costs are estimated for all strokes occurring within a specified time period, plus costs associated with those who are living with the consequences of stroke (i.e., stroke survivors). It is not clear from the introduction and objectives that the paper is looking only at costs for first-ever incident cases in 2008.

2. Introduction: Second paragraph

The second paragraph of the introduction outlines the underlying goals and rights in health care in Sweden. Further information on the structures of the system, and of the county in which the study is based might be more relevant to the study. It is not clear if the county is representative of other areas in the country, and the county is not named.

3. Introduction: Second paragraph, last two sentences

The point made in these last two sentences is unclear “A health economic analysis of a disease implies that there is information available [......] This is the case in Sweden, and in this paper data were selected to a complete picture.”

4. Result: First paragraph “Excess total costs”

The discussion refers to loss of productivity due to absence of work as separate to informal care costs, although the latter refer to losses in productivity too.

5. Tables 1, 2, 3

The title of the tables should indicate which county/country the data refer to. Data sources are also needed for these tables.

6. Table 4, 5, Figure 2

The title of the tables and figure should indicate which county/country the data refer to.

7. Figure 1
Premature death seems to occur only following acute healthcare at hospital followed by no rehabilitation. Premature death could happen at any point in the chain?

Discretionary revisions:
1. Tables
Consider presenting total costs in terms of SEK000 and €000.

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**
I declare that I have no competing interests.