

PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form ([see an example](#)) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below. Some articles will have been accepted based in part or entirely on reviews undertaken for other BMJ Group journals. These will be reproduced where possible.

ARTICLE DETAILS

TITLE (PROVISIONAL)	Health service use in adults 20-64 years with traumatic brain injury, spinal cord injury, or pelvic fracture. A cohort study with 9-year follow-up.
AUTHORS	Laursen, Bjarne; Helweg-Larsen, Karin

VERSION 1 - REVIEW

REVIEWER	Marcel Dijkers Ph.D. Mount Sinai School of Medicine, New York NY USA
REVIEW RETURNED	23-Jul-2012

GENERAL COMMENTS	<p>This paper aims to assess excess health services use by three groups of major injury survivors – those with TBI, SCI or PF. While this is an interesting subject, the report does not offer much worthwhile information, and is marred by statistical/methodological and language problems.</p> <p>=lack of worthwhile information:</p> <ul style="list-style-type: none"> • the actual rates of health services utilization (hospital admission, hospital outpatient services, GP services, physiotherapy treatments) are never reported, just their odds ratios for comparisons with a matched population group) and their confidence intervals. Which policy maker is helped by knowing that people with TBI or SCI use more health services than matched controls? • And what is statistically compared is an extreme simplification. Except for GP services (which are counted within and across visits), everything is simplified to yes/no use of the service during the follow-up year. My knowledge of the field shows that e.g. people with SCI often have multiple admissions in a year (especially in the first year after injury, after discharge from inpatient rehabilitation) and that all their admissions tend to be longer than those of the comparable population at large. Thus, a conclusion of “no difference” between the SCI group and the controls may hide enormous differences in the total days hospitalized. Again, policy makers and others need to know much more detail on the extent of health services use than what the authors offer. • And there is no direct comparison of TBI, SCI and PF, even though the authors “hypothesize that TBI and SCI cause more severe and lasting health problems than PF measured by health service use”. <p>=statistical/methodological issues</p> <ul style="list-style-type: none"> • It is not clear why inferential statistics are used – ALL incident cases with TBI, SCI and PF are used. Granted, the referent group constitutes a sample of matchable cases (we never know how big that total group from which matches were selected is), but that does not justify inferential statistics. Plus – the authors have access to information on ALL matches – what is the reason for just picking four
-------------------------	---

per case? Presumably the reason for that and for using inferential statistics is the usual one: the authors do not know when a difference makes a difference. Maybe they should talk with some policy makers to get an answer to that. Or to some researchers who are experts in the area of TBI, SCI and PF (Anne-Lise Christensen? Finn biering-sorenson?) – their input is sorely missed.

- It is never stated whether referent #3 for TBI case 13 may also have been picked as referent for PF or SCI 134 case #2 – statistical independence of observations!
- It is never explained what it means that patients with multiple injuries were excluded. Presumably it means that a case with SCI who also incurred a TBI was excluded, but it also could mean that anyone who incurred a single other injury (a broken finger, a lacerated spleen) was excluded.
- It is never explained what the age groups were within which matching was done.
- It is never explained what the 1995 health service groups were within which matching was done.
- The abstract (but not the paper!!!) states that observations were censored (well no – it says that “participants were censured”) when they left Denmark or died. The paper refers to people not being found in the register for years after the index year of matching. Does that mean that it was assumed they had zero health services use in that year? Had died? Had left the country? Or were otherwise “censured”?
- There is inconsistency in the language describing how cases were identified. For TBI it says “480 persons were registered with a diagnosis of TBI”, but for SCI it says “were registered with a hospital contact”. This is important, because TBI is the only injury which not necessarily requires hospitalization – I cannot imagine someone incurring a SCI or PF and NOT being hospitalized, but individuals with mild TBI are often seen in the emergency department and released. So –were all TBIs in this study hospitalized or not?
- The authors correctly note that using only the 1986-1995 period to identify earlier (i.e. pre-1995) cases receiving services again in 1995 and being taken for a new case is a weakness. They do not state whether this is avoidable (i.e.: are register data available from before 1986?), and misconstrue the effect of mistaken prevalent cases as incident ones: because health services use declines with time since injury (as their own data show) mistaken old cases for new ones UNDERestimates the excess health services use of what are presumed to be only newly diagnosed cases.
- It is unclear why for GP services a t-test was introduced, as the statistical test was done with the mann-whitney-wilcoxon (all three, no less) test. And this test certainly has no problem dealing with non-normal distributions; it is unclear why GP services are capped at 100.
- The estimated mortality rates seem awfully low – but maybe the more rational care of traumatic injuries in Denmark manages to keep people alive longer.
- However, the low mortality, assumed hospitalization rates of prevalent cases, and prevalent cases among the 1996 injuries makes for a problematic combination. Assume that there are 100 new cases of SCI in Denmark every year, and that 1% dies every year (more than double the authors' reported rate!). that means that just of the years 1976-1995, 1790 prevalent cases are alive in 1996. Of these people, $157-100=57$ were hospitalized in 1996 (the prevalent population admissions). $57/1790=3\%$, which is a suspiciously low hospitalization rate for this vulnerable a population. To the degree there still are survivors from before 1976 (aging

people with SCI), the $57/157=0.36$ “recapture rate” becomes even more unlikely. It certainly seems not to accord with the 29.5 mean % readmissions reported for the 1997-2005 period in table 1. (And while we are on the subject – the 10.7 mean % admission rate for referents seems awful high – if this means that over these 9 years each year on average 10.7% of the referent group was admitted to hospital, Danes must be a very sickly group.)

=English: While superficially the paper reads well, there are a number of issues that prevent the readers understanding or even may create misunderstandings.

- The major one is the “years”. A sentence like “more often treated as outpatients two years after the injury” generally would be understood to refer to “IN year two”. However, almost systematically the authors appear to mean “all years starting with year zero and ending in year two”. Just splicing in “during” in most places will be sufficient – e.g. “more often treated as outpatients DURING two years after the injury”
- “People first” language is disregarded – e.g. page 3 line 10-12
- about any time the word “measured” is used, it only makes sense if “as” is inserted just before it.
- “defining” is used where “identifying” is meant. I hope.
- “in mean” (e.g. page 8 line 8) presumably stands for “on average”. I suggest that the entire manuscript gets a careful review by someone who has a better grasp of the English language – preferably someone who also knows health services research.

Some odds and ends (page and approximate line number):

- There is no statement on an IRB approval, or an ethics body approving access to what must be identified or identifiable private health data.
- 1/4: during ten years: over a ten-year period? Over the first ten years after?
- 2/12: was used?
- 2/30: compared to referents?
- 3/6-9: survivors comprises?
- 3/21: secondary mortality: what is that?
- 3/30: victims?
- 3/52: inpatients: inpatient admissions?
- 3/55: 1995: 1995 forward?
- 6/34 and passim: persons cannot have percentage points; only a group can have a percentage, which may be higher or lower in successive years.
- 7/51 and passim: mean: is this mean per year?
- 10/38 and passim: contacts to: contacts with
- 10/44: enabled: enabled whom?
- 10/55: three times: yes – but only by the artifice of counting yesses/nos, not actual hospitalizations, inpatient days, visits.
- 11/15: here is where assistance from TBI, SCI or PF experts is needed – there is plenty prior research on health services use comparing traumatic injuries and the population at large for the 20-64 group – for instance Dryden DM, Saunders LD, Rowe BH, May LA, Yiannakoulias N, Svenson LW, Schopflocher DP, Voaklander DC. Utilization of health services following spinal cord injury: a 6-year follow-up study. Spinal Cord. 2004 Sep;42(9):513-25..
- 11/43: however depending on diagnosis?
- 11/45: this limited: what stops the authors to just use diagnostic codes that are “cleaner”?

REVIEWER	Johan Lund Researcher PhD, Institute of Health and Society, University of Oslo, Norway No competing interests
REVIEW RETURNED	30-Jul-2012

THE STUDY	<p>The reference groups are told to be matched by agegroup, sex and servicehealth service used during the year 1995. I understand that for each incident casse there are randomly found four persons with same sax, in same agegroup (not defined) and same score (yes/no) in hospital treatment (in- and/or out-patient) and use of physiotherapy. It is not clear to me if yes can mean one and more treatments during 1995.</p> <p>This is the baseline treatment, also called "normal" (see in abstract and in conclusion). But what is "normal" treatment? would be better to consequently call it baseline treatment.</p> <p>In outcome measures are listed the distribution of various accident and injury types within each of the three injury groups. Falls is mentioned to be most of the remaining groups. However, falls might occur in occupational and sport accidents. Why cant you give a complete overview of the accident groups, where the falls are divided into home, occupational, sport, home and other accident groups? would be very valuable to divide these severe injury types in accident groups.</p> <p>I am no native Englisch speaking person. however, I am not used to the word "referent" and "censured" I wopuld have used the "reference" and "deleted" or something similar.</p>
------------------	---

VERSION 1 – AUTHOR RESPONSE

Reviewer: Marcel Dijkers Ph.D.
Mount Sinai School of Medicine, New York NY USA

This paper aims to assess excess health services use by three groups of major injury survivors – those with TBI, SCI or PF. While this is an interesting subject, the report does not offer much worthwhile information, and is marred by statistical/methodological and language problems.

=lack of worthwhile information:

- the actual rates of health services utilization (hospital admission, hospital outpatient services, GP services, physiotherapy treatments) are never reported, just their odds ratios for comparisons with a matched population group) and their confidence intervals. Which policy maker is helped by knowing that people with TBI or SCI use more health services than matched controls?

Response: The actual rates are now reported in all the tables for both cases and controls.

- And what is statistically compared is an extreme simplification. Except for GP services (which are counted within and across visits), everything is simplified to yes/no use of the service during the follow-up year. My knowledge of the field shows that e.g. people with SCI often have multiple admissions in a year (especially in the first year after injury, after discharge from inpatient rehabilitation) and that all their admissions tend to be longer than those of the comparable population at large. Thus, a conclusion of "no difference" between the SCI group and the controls may hide

enormous differences in the total days hospitalized. Again, policy makers and others need to know much more detail on the extent of health services use than what the authors offer.

Response: Now the actual numbers of services or visits are compared, so the differences are visible whether they are significant or not.

- And there is no direct comparison of TBI, SCI and PF, even though the authors “hypothesize that TBI and SCI cause more severe and lasting health problems than PF measured by health service use”.

Response: Now a direct comparison between the three types of injuries is now made in a separate paragraph. However, the sentence is now removed.

- It is not clear why inferential statistics are used – ALL incident cases with TBI, SCI and PF are used. Granted, the referent group constitutes a sample of matchable cases (we never know how big that total group from which matches were selected is), but that does not justify inferential statistics. Plus – the authors have access to information on ALL matches – what is the reason for just picking four per case? Presumably the reason for that and for using inferential statistics is the usual one: the authors do not know when a difference makes a difference. Maybe they should talk with some policy makers to get an answer to that. Or to some researchers who are experts in the area of TBI, SCI and PF (Anne-Lise Christensen? Finn biering-sorenson?) – their input is sorely missed.

Response: We agree that the actual difference is of great importance and therefore it is now presented in the tables. However we think that statistical inference is still needed if the results should be generalised. The purpose of the use of the control groups instead of the remaining population was to reduce the confounding – our initial results showed a marked difference to the general population even for superficial injuries.

The question on how large a difference that make sense is of great importance. By presenting the actual levels of health service use now helps the readers to make their assessments.

- It is never stated whether referent #3 for TBI case 13 may also have been picked as referent for PF or SCI 134 case #2 – statistical independence of observations!

Response: Because the referents were drawn from the same population, overlaps between the three control groups were possible. Of the total of 3237 controls, 2 were controls for both TBI and SCI, 8 were controls for both TBI and PF, and one was control for both SCI and PF. This is now presented in the paper. However we consider this to be a minor problem.

Although possible, no case served as control for any other injury group.

- It is never explained what it means that patients with multiple injuries were excluded. Presumably it means that a case with SCI who also incurred a TBI was excluded, but it also could mean that anyone who incurred a single other injury (a broken finger, a lacerated spleen) was excluded.

Response: Some of the patient had other, less severe injuries. Patients were excluded if they had a hospital contact (admission or as an outpatient) during 1996 with another main diagnosis than that of interest, included in the EUROCOST injury groups with non-zero lifelong disability weight according to Haagsma et al, 2012 (this is now explained in the methods section, and the publication is added to the reference list)

- It is never explained what the age groups were within which matching was done.

Response: This is now explained (Age groups were 10-years: 20-29, 30-39, 40-49, 50-59, 60-64).

- It is never explained what the 1995 health service groups were within which matching was done.

Response: The health service groups for matching were hospital admission (yes/no); hospital treatment as outpatient (yes/no); Number of GP services (0-1, 2-4, 5-9, 10-19, 20-); treatment by physiotherapist (yes/no). This is now explained in the methods section.

- The abstract (but not the paper!!!) states that observations were censored (well no – it says that “participants were censored”) when they left Denmark or died. The paper refers to people not being found in the register for years after the index year of matching. Does that mean that it was assumed they had zero health services use in that year? Had died? Had left the country? Or were otherwise “censored”?

Response: Only whole observation years were included in the analysis. The denominator for the calculation of health service use was reduced correspondingly from 1997-2005. This is now described in the methods section.

- There is inconsistency in the language describing how cases were identified. For TBI it says “480 persons were registered with a diagnosis of TBI”, but for SCI it says “were registered with a hospital contact”. This is important, because TBI is the only injury which not necessarily requires hospitalization – I cannot imagine someone incurring a SCI or PF and NOT being hospitalized, but individuals with mild TBI are often seen in the emergency department and released. So –were all TBIs in this study hospitalized or not?

Response: Patients were included as cases if they were treated at a hospital with the specific primary diagnosis, either at an emergency department or during a hospital admission, and if they were registered as new cases. This is now described more precisely.

- The authors correctly note that using only the 1986-1995 period to identify earlier (i.e. pre-1995) cases receiving services again in 1995 and being taken for a new case is a weakness. They do not state whether this is avoidable (i.e.: are register data available from before 1986?), and misconstrue the effect of mistaken prevalent cases as incident ones: because health services use declines with time since injury (as their own data show) mistaken old cases for new ones UNDERestimates the excess health services use of what are presumed to be only newly diagnosed cases.

Response: Only cases recorded as new cases during 1996 were included. However, due to the possibility of registration errors cases recorded as hospital treated with a similar diagnosis during the period 1978-1995 were excluded. (1986 was an error). We expect that the number of persons injured before 1978 and treated at a Danish hospital with the same injury diagnosis during 1996 but not during 1978-1995 is small although they might exist.

- It is unclear why for GP services a t-test was introduced, as the statistical test was done with the

mann-whitney-wilcoxon (all three, no less) test. And this test certainly has no problem dealing with non-normal distributions; it is unclear why GP services are capped at 100.

Response: The SAS PROC TTEST was used only for calculating the difference between the groups, not for significance testing – here the WILCOXON test was used. This is now changed in the Methods section to avoid confusion.

- The estimated mortality rates seem awfully low – but maybe the more rational care of traumatic injuries in Denmark manages to keep people alive longer.

Response: The mortality rates have been rechecked. However, the immediate mortality is in general not included because patients who die during the initial treatment are usually not registered with an injury diagnosis, but typically with R99.9 (Dead without specification). The mortality reported should therefore not be interpreted as the mortality related to the specific injury. The Cause of Death register would provide more useful information on this.

- However, the low mortality, assumed hospitalization rates of prevalent cases, and prevalent cases among the 1996 injuries makes for a problematic combination. Assume that there are 100 new cases of SCI in Denmark every year, and that 1% dies every year (more than double the authors' reported rate!). that means that just of the years 1976-1995, 1790 prevalent cases are alive in 1996. Of these people, $157-100=57$ were hospitalized in 1996 (the prevalent population admissions). $57/1790=3\%$, which is a suspiciously low hospitalization rate for this vulnerable a population. To the degree there still are survivors from before 1976 (aging people with SCI), the $57/157=0.36$ "recapture rate" becomes even more unlikely. It certainly seems not to accord with the 29.5 mean % readmissions reported for the 1997-2005 period in table 1. (And while we are on the subject – the 10.7 mean % admission rate for referents seems awful high – if this means that over these 9 years each year on average 10.7% of the referent group was admitted to hospital, Danes must be a very sickly group.)

Response: We agree, probably more than 157 SCI patients were admitted during 1996. However, the 157 patient only included patients recorded as new patients with a primary diagnosis of SCI. Many SCI patients may have other diagnoses, and if SCI was the primary diagnosis they should not be registered as new patients, but as patients with late complications. Therefore the 57 excluded patients may be patients registered erroneous as new, or – unlikely – be patient with a new SCI. This was the reason not to just rely on the hospital registration of the patient being new.

The mean rate of hospital admission in the Danish population is about 0.2 (approximate 1 million admissions annually in a population of about 5 millions), however dependent on age and sex. Most hospital admissions have a short duration, typically one or two days.

=English: While superficially the paper reads well, there are a number of issues that prevent he readers understanding or even may create misunderstandings.

- He major one is the "years". A sentence like "more often treated as outpatients two years after the injury" generally would be understood to refer to "IN year two". However, almost systematically the authors appear to mean "all years starting with year zero and ending in year two". Just splicing in "during" in most places will be sufficient – e.g. "more often treated as outpatients DURING two years after the injury"

Response: We agree, the terms about years should be used more precise. This is now corrected.

- “People first” language is disregarded – e.g. page 3 line 10-12

Response: This is now corrected throughout the manuscript.

- about any time the word “measured” is used, it only makes sense if “as” is inserted just before it.

Response: This is now corrected.

- “defining” is used where “identifying” is meant. I hope.

Response: The sentence is now rewritten.

- “in mean” (e.g. page 8 line 8) presumably stands for “on average”.

I suggest that the entire manuscript gets a careful review by someone who has a better grasp of the English language – preferably someone who also knows health services research.

Response: The language is now corrected.

Some odds and ends (page and approximate line number):

- There is no statement on an IRB approval, or an ethics body approving access to what must be identified or identifiable private health data.

Response: According to the Danish legislation, approvals from the local ethics committee and from the Danish Data Protection Agency were not needed for research based on existing register data and when the data processing was performed within Statistics Denmark. Statistics Denmark has approved the project and the access to the requested data. A statement about this is now included.

- 1/4: during ten years: over a ten-year period? Over the first ten years after?

Response: The ten years includes the injury year. The description of the period is now made more precise, and the title is changed accordingly.

- 2/12: was used?

Response: The language is now corrected.

- 2/30: compared to referents?

Response: The paragraph is rewritten due to the other changes.

- 3/6-9: survivors comprises?

Response: The language is now corrected.

- 3/21: secondary mortality: what is that?

Response: The word “secondary” is now removed.

- 3/30: victims?

Response: This is now corrected to non-injured.

- 3/52: inpatients: inpatient admissions?

Response: The language is now corrected.

- 3/55: 1995: 1995 forward?

Response: The language is now corrected.

- 6/34 and passim: persons cannot have percentage points; only a group can have a percentage, which may be higher or lower in successive years.

Response: Due to the other changes this term is removed everywhere.

- 7/51 and passim: mean: is this mean per year?

Response: Yes, this is now corrected.

- 10/38 and passim: contacts to: contacts with

Response: This is now corrected.

- 10/44: enabled: enabled whom?

Response: The language is now corrected

- 10/55: three times: yes – but only by the artifice of counting yesses/nos, not actual hospitalizations, inpatient days, visits.

Response: This is now changed due to the presentation of the actual number of services provided.

- 11/15: here is where assistance from TBI, SCI or PF experts is needed – there is plenty prior research on health services use comparing traumatic injuries and the population at large for the 20-64 group – for instance Dryden DM, Saunders LD, Rowe BH, May LA, Yiannakoulias N, Svenson LW, Schopflocher DP, Voaklander DC. Utilization of health services following spinal cord injury: a 6-year follow-up study. Spinal Cord. 2004 Sep;42(9):513-25..

Response: We agree that there are several other studies in this age group, and the study by Dryden et al is actually referred as a comparable study. Consequently the phrasing is changed to “Several previous studies..”.

- 11/43: however depending on diagnosis?

Response: The validity is now described in more detail.

- 11/45: this limited: what stops the authors to just use diagnostic codes that are "cleaner"?

Response: We could have done so, but the result would be a reduced power due to the lower number of cases. The idea behind the study was to determine the health effects based on injury groups corresponding to the the EUROCOST injury groups.

Reviewer: Johan Lund, Researcher PhD, Institute of Health and Society, University of Oslo, Norway

No competing interests

The reference groups are told to be matched by agegroup, sex and servicehealth service used during the year 1995. I understand that for each incident casse there are randomly found four persons with same sax, in same agegroup (not defined) and same score (yes/no) in hospital treatment (in- and/or out-patient) and use of physioterapy. It is not clear to me if yes can mean one and more treatments during 1995.

This is the baseline treatment, also called "normal" (see in abstract and in conclusion). But what is "normal" treatment? would be better to consequently call it baseline treatment.

Response: The matching process is now described in more detail. Further, the word "normal" is now replaced be "baseline"

In outcome measures are listed the distribution of varoius accident and injury types within each of the three injury groups. Falls is mentioned to be most of the remaining groups. However, falls might occur in occupational and sport accidents. Why cant you give a complete overview of the accident groups, where the falls are divided into home, occupational, sport, home and other accident groups? would be very valuable to divide these severe injury types in accident groups.

Response: The accidents leading to the injuries are now described in more detail, in particular for the falls.

I am no native Englisch speaking person. however, I am not used to the word "referent" and "censured" I wopuld have used the "reference" and "deleted" or something similar.

Response: The language is now corrected and should now be more readable.

VERSION 2 – REVIEW

REVIEWER	Marcel Dijkers Ph.D., Professor, Dept. of Rehabilitation Medicine, Mount Sinai School of Medicine Mount Sinai School of Medicine Department of Rehabilitation Medicine, Box 1240 One Gustave Levy Place New York, NY 10029-6574 United States of America I have no conflicts of interest
REVIEW RETURNED	04-Sep-2012

THE STUDY	The authors have been responsive to the comments of this reviewer, and have improved the laguage and the contents of this paper, even throwing in information (on outpatient hospital services) that (to my
------------------	---

	<p>recollection) was not present in the prior version.</p> <p>I still have a few issues, which are relatively minor: Language: there are a few remains of the problematic designation of the study period. For instance, in the abstract (line 7) it should be "over nine years", or preferably: over a period of nine years". Ditto page/line 2/37, 2/43,</p> <p>Some other lines that deserve linguistic attention: 3/19-22, 3/43-46, 4/25 ("by"), 7/21; 8/8 (pelvic); 10/36; 10/41; 11/10; the whole sentence on page 11 lines 31-34; 11/52-55 (tenses)</p> <p>More substantive:</p> <ul style="list-style-type: none"> • Is PT a primary health care service? Maybe in Denmark. In fact, all health services use by the control groups seem very high compared to my US experience, and the authors may comment on that (not necessarily USA, but e.g. other western Europe), and on the fact that against a background of high use, TBI, SCI and PF were not statistically higher in use for some years. • Talking about statistics – the use of inferential statistics still is not being justified. The PF, TBI and SCI groups are not a sample, but the population (of new injuries), so what is the justification for using statistical testing? My guess is that without statistical tests the authors cannot tell whether a difference makes a difference. • We still are not told about the severity of the TBIs. As there is an enormous difference between mild, moderate and severe TBIs, that is an important issue. If the ICD coding does not allow differentiation, we need to get it from other sources. For instance, we still don't know whether these cases were included as ED users or as admits to the hospital (4/10-13; 5/46), or either (4/4). If the latter, it is more likely that they were at least moderate, but it would be useful being told whether in 1996 physicians admitted mild TBI injuries to the hospital for at least a one-day observation. This LOS may need to be reported to convince this reviewer that these were not mild TBIs. • We still do not get explained what the 1995 health service usage groups were within which matching was done. • How clean is the "treated for other injuries" on page 4, line 10-13? If someone admitted for an SCI was readmitted to repair XYZ that had been broken in the same injury, was he excluded from the study (because it looked like he incurred another injury), or included? If excluded, what remains apparently is a subgroup with minimum associated injuries, who would have lower than average (for TBI, SCI and PF cases) health care utilization in the next 9 years. • 4/53 and 5/4: is this the MEAN number of hospitalizations? If not, what is it? Ditto for all other tables • Possible rechecks for transcription errors: table 1 recheck the numbers for PF controls years 3 and 8; table 2 for SCI year 0 (very suspicious values!) and 5; table 4 SCI year -1 • In tables 1 and 2, all values (means?) are given in two decimals, but that ends with the first double column in table 3. Did someone get tired? • Page 11/44: larger use at baseline: by whom? Why? • For all diagnoses and controls, years 8 and 9 show a significant dip in outpatient services; this is well commenting on: what was going on in the Danish healthcare system at the time?
--	--

VERSION 2 – AUTHOR RESPONSE

Reviewer: Marcel Dijkers Ph.D., Professor, Dept. of Rehabilitation Medicine, Mount Sinai School of Medicine Mount Sinai School of Medicine Department of Rehabilitation Medicine, Box 1240 United States of America

I have no conflicts of interest

The authors have been responsive to the comments of this reviewer, and have improved the language and the contents of this paper, even throwing in information (on outpatient hospital services) that (to my recollection) was not present in the prior version.

I still have a few issues, which are relatively minor:

Language: there are a few remains of the problematic designation of the study period. For instance, in the abstract (line 7) it should be "over nine years", or preferably: over a period of nine years". Ditto page/line 2/37, 2/43,

These errors are now corrected.

Some other lines that deserve linguistic attention: 3/19-22, 3/43-46, 4/25 ("by"), 7/21; 8/8 (pelvic); 10/36; 10/41; 11/10; the whole sentence on page 11 lines 31-34; 11/52-55 (tenses)

These errors are now corrected.

More substantive:

• Is PT a primary health care service? Maybe in Denmark. In fact, all health services used by the control groups seem very high compared to my US experience, and the authors may comment on that (not necessarily USA, but e.g. other western Europe), and on the fact that against a background of high use, TBI, SCI and PF were not statistically higher in use for some years.

In Denmark PT is a partly public health care service with limited self-payment. An initial referral from GP is needed. The length of the period of treatments varies individually, and it may cover several treatments over a long timeperiod. PT covers a range of services, both individual treatments and training in a group. This may be the explanation for the relatively large number of services. This is now described in the discussion.

• Talking about statistics – the use of inferential statistics still is not being justified. The PF, TBI and SCI groups are not a sample, but the population (of new injuries), so what is the justification for using statistical testing? My guess is that without statistical tests the authors cannot tell whether a difference makes a difference.

We understand your point quite well, as there is no sampling involved in the study. Consequently, the description of confidence interval calculation is now removed from the methods section (it was actually not used).

However, we hope that the conclusions can be generalised to similar settings and it is therefore important to know whether the observed differences could be due to chance. Therefore the statistical inference is used. The reason for this is now described in the Methods section.

The discussion is now primarily based on the actual difference to baseline and to a less degree on whether the difference to the control group is significant or not.

• We still are not told about the severity of the TBIs. As there is an enormous difference between mild, moderate and severe TBIs, that is an important issue. If the ICD coding does not allow differentiation, we need to get it from other sources. For instance, we still don't know whether these cases were

included as ED users or as admits to the hospital (4/10-13; 5/46), or either (4/4). If the latter, it is more likely that they were at least moderate, but it would be useful being told whether in 1996 physicians admitted mild TBI injuries to the hospital for at least a one-day observation. This LOS may need to be reported to convince this reviewer that these were not mild TBIs.

More information on the TBI cases has been included. For the TBI patients, 83% were admitted to hospital, and 72% were admitted for at least 2 days. However, referring to Haagsma et al life, long lasting consequences of TBI may also occur for TBI patients who are not admitted to hospitals.

- We still do not get explained what the 1995 health service usage groups were within which matching was done.

The explained is now improved: "... and health service use during the year 1995 (hospital admission, yes or no; outpatient treatment at a hospital, yes or no; use of general practitioner (0-1, 2-4, 5-9, 10-19, 20+ services); use of physiotherapy, yes or no)"

- How clean is the "treated for other injuries" on page 4, line 10-13? If someone admitted for an SCI was readmitted to repair XYZ that had been broken in the same injury, was he excluded from the study (because it looked like he incurred another injury), or included? If excluded, what remains apparently is a subgroup with minimum associated injuries, who would have lower than average (for TBI, SCI and PF cases) health care utilization in the next 9 years.

We agree, the exclusion of patients with other severe injuries may lead to underestimation of the health service use. This fact is now dealt with in the discussion.

- 4/53 and 5/4: is this the MEAN number of hospitalizations? If not, what is it? Ditto for all other tables
- Possible rechecks for transcription errors: table 1 recheck the numbers for PF controls years 3 and 8; table 2 for SCI year 0 (very suspicious values!) and 5; table 4 SCI year -1 • In tables 1 and 2, all values (means?) are given in two decimals, but that ends with the first double column in table 3. Did someone get tired?

The presented number are means, this is now corrected in all the table headings. The figures in the tables were re-checked. We agree that some of them seem dubious. The data presented in Table 2 were wrong due to a programming error – which has been corrected. However, some of the "suspicious" results are explained by the large variation in number of treatment days between patients, e.g. some patients had more than 100 treatment days. This variance is now mentioned in the discussion. In Table 3 and 4 data are now presented with two decimals.

- Page 11/44: larger use at baseline: by whom? Why?

There may be a larger health service use in the patient group at baseline (1995), if some of the patients were injured before 1978 and therefore not excluded. Because of the matching by health service use in 1995, the health service use in the control group may also be higher in 1995. This is now described in the discussion.

- For all diagnoses and controls, years 8 and 9 show a significant dip in outpatient services; this is well commenting on: what was going on in the Danish healthcare system at the time?

A programming error caused erroneous results that have been corrected (Tabel 2). Changes in

reporting of health care services occurred during the period. We have included this factor in the discussion.