Author's response to reviews

Title: Comparison of hip fracture incidence and trends between Germany and Austria 1995-2004: An epidemiological study

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Author's response to reviews: see over
Point by point response to the points made by the reviewers

We greatly appreciate the opportunity to submit the revised version of our manuscript.

Response to Jaroslava Wendlova

We thank for the careful review and the useful remarks.

1. Describe correctly the Poisson regression model:
1.1 Which is the dependent variable (categorial)?

Comment
The dependent variable is the incidence of hip fractures, which is the number of events per person year (log-person years as offset in the model specification).

1.2 Which are the independent variables?

Comment
The independent variables are country (Austria versus Germany), calendar year (ordinal), age (classes) and sex.

1.3 Age and sex are not confounders as you claim, but independent variables (page 5, row 4 bottom up).

Comment
The independent variables are specified above. Using age and sex as independent variables the results of the regression model are adjusted for age and sex, which we consider as confounders, since these variables are not the target influencing variables.

Page 5, line 20 we corrected the sentences “To analyse the hip fracture incidence and the incidence trend from 1995 to 2004 in Austria and Germany and its difference, we used the pooled data from both countries and multiple Poisson regression models including the incidence of hip fractures (log-persons years as offset in the model specification) as the dependent variable and country (Austria versus Germany), calender year (ordinal), age (same classes as above) and sex as independent variables. The results of the regression model are adjusted for age and sex”.

2. The level of significance was # = 0.5 % (page 6, row 3 from the top)

Comment
We assume that this was a misunderstanding. The level of significance was – as usual – $\alpha = 5\%$, which is the same as 0.05.
3. Use in the whole article the same expressions: male and female, because for age 9-10 years you cannot use denomination men or women (page 7, row 5-6 from the top).

Comment
We changed “men” to “male” and “women” to “female” throughout the article.

4. Drugs affecting bone health divide in two groups: (page 8, row 13 from the top).

Comment
We thank the reviewer for her request to differentiate between osteoporosis-inducing drugs and drugs for treatment of osteoporosis. Changes are included below.

4.1. Drugs associated with an increased risk of osteoporosis (for example glucocorticosteroids).

Comment
Page 8, line 9, we corrected the sentence “Different national drug policies affecting prescription of drugs inducing osteoporosis as well as treating osteoporosis may contribute to the difference between the two countries”.

4.2. Drugs used in the treatment of osteoporosis.

- bisphosphonates (not only bisphosphonates, as you declare in your article!)
- SERM (selective modulators of estrogenic receptors)
- strontium ranelat
- HRT (hormone replacement therapy)

Have you evaluated the prescription of all these antiosteoporotic drugs or only the prescription of bisphosphonates? HRT was and is very often prescribed drug.

Comment
We thank the reviewer for her valuable request for additional information about the impact of antiosteoporotic drug prescription on the results of our study. Raloxifene was introduced in the EU market in 1998 and it was not until 2004 that strontium ranelat was released. As our study covers the period from 1995 to 2004 and the 30 percent higher incidence rate in Austria is consistent all over the study period, we suggest that the impact of these two drugs might be of minor importance. Prescription analysis of hormone replacement therapy could have been of interest. However, drug sales data are not available in Austria. Unlike Germany, Austria has no national registration on drug sales.
Page 8, line14, we added the following sentence and corrected the subsequent:

“Concerning raloxifene and hormone replacement therapy the lack of a national drug registration in Austria prohibits comparison. However, individual-linked data for a longer time period are required to draw any conclusion on the possible effect of these drugs”. We followed the reviewers’ recommendation and now discuss the impact of drugs on hip fracture incidence and trend more intensively.

We added the sentences (page 8, line 16):

“Two recently published studies about hip fracture long-term trends in the US and Canada point out that the impact of antiosteoporotic drug treatment on trends might be overestimated as the decline of hip fracture incidence rates since 1985 in Canada prevailed the market release of bisphosphonates and the decreasing trend after 1995 in the US is only partially attributable to antiosteoporotic drugs. Both authors speculate other causes like life style factors including increased body weight, better awareness of falls and osteoporosis or a birth cohort effect to exceed the influence of drugs”.

Response to Elisabeth Preisinger

We greatly appreciate the reviewers’ comments as they are linked to the problem associated to the use of hospital discharge diagnosis registers. We agree that different numbers of readmissions and transfers could contribute to the 30 percent higher incidence rate in Austria compared to Germany. We tried to reflect the magnitude of a possible influence on our results in more detail.

In Germany, a correction factor was evaluated twice. The number of readmissions and transfers was estimated to be 30 percent in 2001 and 11 percent in 2006, respectively (Wildner 2001, Hoffmann 2006). Unfortunately, such a correction factor has not been analysed in Austria up to now.

We inserted the following statement at page 10, lines 1 to 5:

“The Austrian association of insurance companies made preliminary data accessible, which allowed estimation of hip fracture related readmission rate (personal communication, data available on request). According to these data there were 30,418 hospital admissions due to hip fracture in 24,856 patients in the years 2006 and 2007, yielding 19% transfers and readmissions.”