Reviewer's report

Title: Trends in incidence and costs of injuries to the shoulder, arm and wrist in The Netherlands between 1986 and 2008

Version: 3 Date: 17 November 2012

Reviewer: William D. Leslie

Reviewer's report:

Major Compulsory Revisions:
None

Minor Essential Revisions:

1. Previous comment: On page 6 the authors used a direct standardization method in order to calculate age-adjusted incidence rates. The reference year and population should be stated.

Previous comment: On page 9 (Discussion, first paragraph) the authors state that “the aging population” contributes to the increase in incidence of upper extremity injuries. I do not understand this statement since analyses were age-adjusted. Please explain.

Response: The reference years were 1986-2010, and the study population was the overall Dutch population. To our opinion this is mentioned clear enough in the text (page 6, lines 113-115): The age- and sex-specific incidence rates per 100,000 person years were calculated based upon the Dutch midyear standard population for each year. The mid-year population sizes for all age-groups were obtained from Statistics Netherlands [26].” No changes were made.

Response: This statement relates to the overall incidence of injuries to the upper extremity. During the study period, the relative number of elderly consistently increased due to aging. With the highest incidence in this age group, their relative contribution to the overall incidence increased over time. The text has been slightly changed (page 9, line 193).

New comment: The direct standardization method requires that a SINGLE reference (standard) population and year be selected. One cannot perform direct standardization to “the Dutch midyear standard population for each year.” Please consult one of the many references on the direct standardization method. The direct standardization method is intended to adjust for an aging population structure therefore the following statement is inconsistent with the methods as described (lines 194-196): “The increase in incidence of upper extremity injuries is presumably due to the constant relative increase in the number of elderly during these two decades and is most evident in patients aged 60 years and above.”

2. Previous comment: On page 9 (third paragraph) the authors compare their
results with several other studies. This may be problematic unless exactly the same approach is used in terms of age standardization. Could this account for the observed differences?

Response: Age-standardization is also used in the referred studies. Although the population used for standardization differs, age-standardization is accepted as a method that allows for a valid comparison of findings between studies. With all referred studies being performed in Western societies, similar trends in population and injury demographics are to be expected.

New comment: Age-standardization allows for a valid comparison of rates between the standardized populations, but not between studies that are based upon different reference (standard) populations. The direct standardization method does not provide absolute rates that can be directly compared between different studies with different population structures.

3. Previous Minor Essential Revisions from Reinhard Schnettler: Page 3:
Punctuation marks are missing after paragraphs Background and Results.
Response: We searched for the missing punctuation marks, but were not able to find them.

New comment: The punctuation marks (periods) were and still are missing from Page 3.

Discretionary Revisions:
None.

Minor issues not for publication:

1. Previous comment: The authors indicate on page 4 (Background, first paragraph, and Table 1) that distal radius and ulna fractures are included with carpal bone fractures as “Fracture wrist”, separate from other ulna and radius fractures grouped as “Fracture forearm”. Distal radius/ulna fractures (e.g., Colles fracture) are really a distal forearm fracture, even if they are casually but incorrectly referred to as “wrist” fractures. Indeed, the ICD-10 code for fractures of the forearm and Colles fractures all fall within ICD-10 S52. In contrast, wrist joint and carpal injuries all fall within ICD-10 S60-S63. It is quite likely that many (and probably the majority) of the “Wrist fractures” as defined in Table 1 are actually distal forearm (Colles) fractures. The authors need to justify their grouping of S52.5-S52.6 fractures with S62.0-S62.1 carpal fractures.

Response: In the text we now specified in more detail which anatomic locations are included in the “shoulder”, “arm”, and “wrist” area. The ICD-9 codes and corresponding ICD10 codes are shown in Table 1. We wanted the wrist joint to appear as a separate entity. Combined injuries involving both carpal bones and distal radius or ulna can be encoded in ICD-9 either as distal forearm or wrist injury. Since we did not want to miss any patients with distal radius/ulna fractures in case of combined injuries (as that would underscore the extent of the problem), we decided to combine distal radius/ulna with the carpal bones.

New comment: The response misses the point. Whether distal radius/ulna
fractures are counted with arm fractures or wrist fractures, neither approach would “underscore the extent of the problem” as long as all fractures are counted. Nonetheless, since the assignment of distal radius/ulna fractures is inherently arbitrary, I will accept the proposed grouping.

2. Previous comment: The coding presented by the authors is ICD-10 (Table 1), but this would not have been available in 1986. The authors should briefly indicate what coding(s) were used in earlier years, how coding equivalence was established across the 22 years of data, and whether coding changes could affect results. I note a large jump in incidence rates for males age 15-64 years between 1996 and 1997 (Figure 1) – did coding practices change coincident with this jump? Could coding changes (e.g., ICD-9-CM to ICD-10) be contributing to the reported increase in wrist fractures (page 8, first paragraph)?

Response: Throughout the study, injuries were encoded using the ICD-9CM, which was implemented in 1979. This is changed in the Methods section (page 5, lines 87-92) and in Table 1. Since in future data will be recoded into ICD-10 for extraction from the database and since many readers may be more familiar with the ICD-10, we also added the corresponding ICD-10 codes to Table 1. Since during the entire period the same coding was used, jumps in incidence cannot be explained by changes in coding practice. Had there been a change in coding (which was not the case), an effect in only a particular age group would be unlikely. In that case, the entire population for that year would have changed in incidence. We looked for explanations but were unable to find any.

New comment: Including ICD-10 codes in Table 1 may be confusing to readers since this coding was not used in the analysis. My preference would be to remove the ICD-10 codes completely. If they are retained then it is important to clearly flag to the reader why these are being provided.

3. Previous comment: The final sentence of the same paragraph notes “wrist fractures occurred more frequently in females than in males (290 versus 206 per 100,000)”. Are these incidence rates age-adjusted? Is the difference statistically significant?

Previous comment: Was the reported increase in wrist fractures for males (24%) and females (10%) during the study period (page 8, first paragraph) statistically significant?

Response: These numbers represent the entire age range. The age-standardized differences are indeed statistically significant, but as the study is descriptive, we decided not to include statistical testing on single items. No changes were made in the text.

Response: As the study is descriptive in nature, we did not perform statistical testing for individual items. No changes were made.

New comment: I do not understand why the authors do not indicate statistical significance where applicable, as is routinely reported for descriptive studies.

4. Previous comment: The figures are difficult to visualize in grey scale, and the stacked bars series in the opposite order from the legend. The authors may wish
to consider changes that will allow these to be more easily read, especially when printed in black and white.

Response: We have tested a multitude of color and background designs to achieve the clearest visualization of our data and concluded that grey scale bars with different shadings and patterns worked best. When printed in pure black and white, the differences remained better than with colored bars. In order to improve readability of the figures, the legends have been reversed in Figures 2-4, so they are now in parallel with the stacked bars. In Figure 3 the scaling has been inflated a bit, and in Figure 2 the groups have been reversed so that in all Figures wrist is at the bottom and shoulder is on top.

New comment: The reordered captions are better but the shadings remain virtually illegible when printed in grey scale. Alternating solid and non-solid patterns may be more successful. Figure 3E also has a Y-axis break between “Superficial injury/contusion” and “Open wound”.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

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

Declaration of competing interests:

No relevant conflicts,

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