Author's response to reviews

Title: The gap in injury mortality rates between urban and rural residents of Hubei Province, China

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Author's response to reviews: see over
Dear Dr. Dizon,

Thank you very much for your letter and advice. We have revised the manuscript, and would like to re-submit it for your consideration. We have addressed the comments raised by the reviewers, and the amendments are highlighted in red in the revised manuscript. Point by point responses to the reviewers’ comments are listed below this letter.

I apologize for misspelling of the second author’s name. Could you please correct the name of the second author from “Qunlin Li” to “Junlin Li”.

We hope that the revised version of the manuscript is now acceptable for publication in your journal.

I look forward to hearing from you soon.

With best wishes,

Yours sincerely,

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We would like to express our sincere thanks to the reviewers for the constructive and positive comments.

Responses to comments:

**Reviewer #1 (Remarks for the Author):**

This paper is a well written paper examining injury rates in Hubei Province in China. Understanding patterns of injury mortality is, as the authors explain, crucial to inform development of appropriate prevention programs.

Abstract: second sentence – does this sentence refer to China or injury in general?

**Answer:** This sentence refers to injury in general.

**Major compulsory revisions**

Methods: In general there is insufficient information given about the methods used to collect mortality data and its likely validity.

1. Detail is required for the population sampling – how it was determined, sample size, what proportion of population covered in both rural and urban areas.

**Answer:** A detailed description of the population sampling is provided in “Methods” (see page 5).

2. Detail needed on the classification of urban versus rural areas – how was health and economic data used for such classification, and what was the reference point.

**Answer:** Detail of the Classification of urban versus rural areas is provided in the Methods (see page 4-5).

3. More detail about the non-hospital deaths is required – what proportion of households are sampled, how often, and how is cause of death ascertained (via verbal autopsy? Code collects and codes the data? How accurate is it? Detail is also required about what proportion of deaths are captured using this method.

**Answer:** Detail about the non-hospital deaths is provided in the Method (see pages 5).
About 50% and 80% of adult deaths occur at home in urban areas and in rural areas respectively. Even for those deaths that occur at home, there is often clinical evidence available from recent consultations with medical staff at community or other hospitals. The standardised verbal autopsy procedure for the cause-of-death ascertainment and collecting and coding the data in DSP system was described by Yang. Description is as follows:

- For deaths occurring at home, a village health worker reports the event to the Prevention Unit at the township hospital. A staff member from the Unit visits the household, and completes a death certificate based on a description of symptoms from family members, and available documents from recent contact with health services.
- For deaths occurring in the township hospital, the DSP staff members collect the death certificate from the hospital, completed by the physician who attended the death.
- For deaths occurring in other hospital, relatives of the deceased submit physician-certified death certificates to the Prevention Unit at the township hospital.
- In the event of a childhood death, or deaths in women of maternal age, the Maternal and Child Health Unit at the township hospital undertakes the investigation of the cause of death, and screens death certificates for such deaths from other hospitals for accuracy.
- Data cleaning and compilation are done at the county or provincial level, and following computerization, an electronic data-file is transferred to the Chinese Academy of Preventive Medicine.
- ICD coding of the underlying cause of death and subsequent tabulation and publication of results is done by Hubei Province Centers for Disease Control and Prevention (CDC).

Diagnoses based on the verbal autopsy were found to be valid and reliable for most cause of disease both in urban and rural.

4. There is no detail on the population denominator – what has been used and how current is it?

Answer: Detail on the population denominator is provided in Methods (see page 6)

Population estimates from the 2000 Chinese Census were used to compute the denominators for injury mortality rates. The year 2000 was chosen because it was the most recent year with census.
The authors should also comment on the possibility of differential reporting, particularly by urban/rural areas (and what impact might the different sampling structure have on this?), by external cause of injury (they have commented on that for suicide and drowning deaths, but what about misclassification of other deaths eg falls in the elderly – often misclassified as other causes due to co-morbidities), and also by deaths recorded in hospital and at home. It is not clear what proportion of deaths would be expected in hospital, whether this differs by urban/rural areas and what impact that may have on findings.

Answer: The possibility of differential reporting was provided in Method (see page 5) and also be commented in “Discussion” under “limitation” (see page 12).

The percentage under-reporting of deaths was 15% and 13% in urban and rural areas respectively. Wang and Hu evaluated the quality of cause of death using verbal autopsies in urban and in rural respectively. Most misclassification was found within chronic disease. Most injury-related deaths have a defined sequence of events that is less likely to be misclassified. In rural areas, although most deaths occur at home, there is often clinical evidence available from recent consultation with medical staff members at township or other hospital. Usually falls in the elderly were misclassified as other causes due to co-morbidities, but compensating patterns of misclassification would appear to suggest that the method yields population-level cause-specific estimates that are reasonably reliable.

The rates of injury are surprising too. The rates for RTI are relatively low by international comparisons, and the rapid increase in old age very unusual – would expect to see the rates for RTI peak in middle age. Likewise, more of a peak in childhood drowning and falls would be expected. These results require explanation.

Answer: Explanation about this had been added to the discussion (see page 11, paragraph 1 and paragraph 2).

The database on RTI from WHO Global Burden of Disease Study 2002 report indicated that in high-income countries, people aged 15-29 years had the highest death rates of road traffic injury, but in low-income and middle-income countries people 60 years and older had the highest rates. When involved in a motor vehicle crash, elderly people are more likely to be killed or seriously disabled than younger people because they are generally less resilient.
Similar to other developed and developing countries, the fall-related mortality rate increase exponentially with age, with the greatest increase after age 75. This is because most falls are associated with age-related conditions such as physical frailty, immobility and reduced functional capacity.

According to WHO reports, drowning is a leading cause of death for children less than 15 years of age and most of these occur in developing countries, but mortality rates for drowning among elderly people aged 65 years and over were the highest in South-East Asia countries. For few countries (especially developing countries) provide mortality rates for drowning segregated by urban versus rural residence, there is less opportunity for international comparisons. The reasons for the higher drowning death rates in the rural elderly population are unclear. We assume that one potential explanation may be the misclassification of suicides.

There is also no comparison of actual rates against those reported in similar settings internationally (rather than just highlighting the relative difference between urban and rural areas) – this would go some way to strengthening the case for validity of these data.

Answer: The international comparison of actual rates was added in “discussion” (see page 8, paragraph 2, page 11, paragraph 2 and page 12, paragraph 1). Few countries (especially developing countries) provide mortality rates segregated by urban versus rural residence, so there is less data for international comparisons.

Figures – these should be adjusted in some way so that the scale is appropriate to show peaks at younger ages – perhaps show with external causes of injury in young ages, then another for elder ages.

Answer: The figure 1, figure2 and figure4 have been adjusted and showed with external causes of injury in 0-54 year age group and \( \geq 55 \) year age group.

In general, the paper is well written with a thoughtful explanation of the findings – but the lack of information on the methods leads me to wonder how much bias is inherent in the data collection system, and whether that explains the findings.
Reviewer #2 (Remarks for the Author):

The study is well organized and presented.

Major Compulsory Revisions:

There is a surprisingly high mortality rate of suicide in rural population that exceeds Road Traffic Injury mortality and is reported as high as 279.8 per 100,000 in the #65 age group in rural areas. This needs more explanation. Probable errors should be discussed too.

Answer: More explanation is provided in Discussion (see page 9, paragraph 3 and page 10, paragraph1).

Our data are drawn from Disease Surveillance Points (DSP) system which has been approved to be representative. We analyzed the injury death rate from 2006 to 2008, the result is close each year. So we think the results are reliable.

We think the major reason for higher suicide death rates in rural elderly may be the difference in taking care of elderly people. Despite the Chinese cultural tradition of respecting elders and loving children (zun lao ai you ), the traditional ideal of family organization-three generations living to together has disintegrated in most parts of the country. Other cultural changes are also challenging classical Confucian filial obligation. Most young couples leave their parents and form their own households after they marry and have a child, creating a situation in which no one remains in the home to assist elderly parents when they become ill or lose their ability to care for themselves. In urban areas most elders can live adequately by themselves with the aid of retirement wages, occasional additional financial assistance from the family for medical care and other expenses, and sometimes the help of the local government’s Aged Houses, in which some elderly persons reside. Moreover, any adult children living in the same city can assist them fairly easily by dropping in, bringing groceries, or helping with meals. Unfortunately, elderly individuals in rural areas lack these supports and have far more difficulty caring for themselves. Many rural peasants are still poor and engaged in subsistence farming. This may be an important risk factor contributing to the high suicide rate among the elderly in rural areas.

In addition, there are no strong religious or legal prohibitions against suicide in Chin, so people with serious mental disorders or chronic life stressors (such as incurable illness) might consider
suicide an acceptable method of relieving their misery or of reducing the financial and emotional burden they cause their family. This belief is more popular in rural areas in central China.

The 95% confidence intervals (by using Poisson distribution assumptions) should be presented for mortality rate of every single cause of death, including Suicide.

Answer: Yes, we have revised it and presented the 95% confidence intervals for mortality rate of every single cause of death.

Discretionary Revisions:

Please include 95% confidence intervals in figures 1-4.

Answer: Following referee’s suggestion, 95% confidence interval was included in Figure3. The 95% confidence intervals were not added in Figure1, Figure2, and Figure4 because the curves were more or very close and these curves will be less visible or unclear with the inclusion of 95% confidence intervals.

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