Author's response to reviews

**Title:** The leading methods of suicide in Taiwan, 2002-2008

**Authors:**

Jin-Jia Lin (jjl9110@ms34.hinet.net)
Shu-Sen Chang (shusen@ms25.hinet.net)
Tsung-Hsueh Lu (robertlu@mail.nckul.edu.tw)

**Version:** 2  **Date:** 25 June 2010

**Author's response to reviews:** see over
Dear editor and reviewers:

Thank you very much for your helpful comments. We have revised the manuscript according to your suggestions. We have changed the title into a simple one “The leading methods of suicide in Taiwan, 2002-2008”. Followings are our replies to each comment. We look forward to hearing from your further comments.

Sincerely,

Jin-Jia Lin, M.D.
Shu-Sen Chang, M.D.
Tsung-Hsueh Lu, M.D. Ph.D.

Replies to reviewer # 1 (Neil RM Jayasinghe)

1. Reviewer comment on Background:
   It was too brief, not balanced and not well written.
   **AUTHORS’ REPLY:** the revised manuscript has been lengthened (from two paragraphs with 237 words in original manuscript to five paragraphs with 623 words in revised manuscript) and more balanced. Please see the following replies for more detail accounts.

   “Research has also suggested the existence of gender differences in the most prevalence suicide method across European countries” Not clear.
   **AUTHORS’ REPLY:** we have deleted this sentence in the revised manuscript.

   There are several types of pesticide can be used to commit suicide and in this paper there is no enough information on Pesticide and we don’t know what types of pesticides are used in Taiwan.
   **AUTHORS’ REPLY:** this study did not specifically focus on suicide by pesticide poisoning in Taiwan. We don’t think it appropriate to describe types of pesticides used in Taiwan in this study which is not very relevant to the
arguments in this study.

Again needs more details on Charcoal burning in Taiwan.

AUTHORS' REPLY: we have added one paragraph in the revised manuscript to describe the epidemic of suicide by charcoal burning in Taiwan.

CHANGES TO TEXT: page 3 paragraph 2 now reads:

Ajdacic-Gross et al. further commented that the patterns of suicide methods typically change very slowly except charcoal burning suicide [7]. Suicide by charcoal burning has become epidemic in Hong Kong, Taiwan and Japan [8-12]. In Taiwan, only 32 people completed suicide by charcoal burning in 1998 and increased to 1346 in 2005 [10]. A recent spatial and temporal analysis suggested that the epidemic of charcoal burning suicide in Taiwan emerged more prominently in urban than rural areas, without a single point of origin, and rates remained highest in the metropolitan regions throughout the epidemic [11].

The Percentage of suicide methods were not given therefore we don't know what proportion in Asia or Latin America chooses pesticide to commit suicide.

AUTHORS' REPLY: we have provided the percentage of suicide method in the parenthesis for different regions in the revised manuscript.

CHANGES TO TEXT: page 3 paragraph 1 now reads:

… Ajdacic-Gross et al. used mortality data from the WHO to illustrate great variations of leading lethal suicide method across countries [7]. For example, poisoning by pesticides was a common suicide method in some Asian countries (e.g., 38% out of all suicides in Korea) and in Latin America (e.g., 86% in El Salvador, 61% in Nicaragua and 55% in Peru); poisoning by drugs was common in both Nordic countries (e.g., 18% in Finland and 14% in Demark) and the United Kingdom (15%); hanging was the preferred method of suicide in Eastern Europe (e.g., 92% in Lithuania, 85% in Latvia and 70% in Slovakia); as was firearm suicide in the United States (61%) and jumping from a high place in cities and urban societies such as Hong Kong (43%) [7].

There is no information on socio-cultural acceptability in Taiwan.

AUTHORS' REPLY: we provided some socioeconomic indicators of each city/county (table 1) in the revised manuscript. We hypothesize that the diverse industrial composition would result in diverse physical availability and socio-cultural acceptability of certain suicide method. We further cited one
previous study in Taiwan to support this argument. The discussion will focus on socio-cultural acceptability.

**CHANGES TO TEXT: page 5 paragraph 3 now reads:**

Cities/counties in Taiwan differ greatly in sociodemographic characteristics, ethnic composition, dialects used, economic structure and income level (Table 1). Taiwan experienced a rapid economic growth during the 1970s and 1980s which also resulted in diverse developments between cities/counties. For example, many high technology industries were located in northern Taiwan (such as Taipei County, Taoyuan County and Hsinchu County); and many counties (e.g., Nantou County, Yunlin County, Chiayi County, Pingtung County, and Taitung County) are predominantly rely on traditional industries with high percentage of agricultural population and have lower disposable household income (Table 1).

**CHANGES TO TEXT: page 6 paragraph 2 now reads:**

The diverse industrial composition cross cities/counties would certainly result in diverse physical availability and sociocultural acceptability of certain suicide method. Previous study in Taiwan already indicated that cities/counties with higher percentage of agricultural population were more likely to have suicide rates from pesticides and cities/counties with higher percentage of high buildings were more likely to have suicide rates from jumping [13]. We thus hypothesize that the leading lethal suicide method used would be different across cities/counties and changed promptly after suicide by charcoal burning become epidemic.

Unfortunately, the questions posed by the authors were not well defined either. **AUTHORS' REPLY: our specific hypothesis is that the leading lethal suicide method used would be different across cities/counties and changed promptly after epidemic of suicide by charcoal burning.**

**CHANGES TO TEXT: page 6 paragraph 2 now reads:**

The diverse industrial composition cross cities/counties would certainly result in diverse physical availability and socio-cultural acceptability of certain suicide method. Previous study in Taiwan already indicated that cities/counties with higher percentage of agricultural population were more likely to have suicide rates from pesticides and cities/counties with higher percentage of high buildings were more likely to have suicide rates from jumping [13]. We thus hypothesize that the leading lethal suicide method used would be different
across cities/counties and changed promptly after epidemic of suicide by charcoal burning.

**AUTHORS' REPLY:** furthermore, we added one paragraph to justify the importance of using city/county as unit of analysis.

**CHANGES TO TEXT:** page 5 paragraph 2 now reads:

However, little is known the differences in suicide rates from charcoal burning by geographic regions and cities/counties. There are different implications for suicide prevention between differences in suicide rates by urbanization level and by geographic regions and cities/counties. For example, Taipei City and Kaohsiung City are the only two metropolitans in Taiwan and are classified in the same urbanization level; however, Taipei City is in northern Taiwan and Kaohsiung City in southern Taiwan and the city government was run by different political party with many different local policy formations. City/county is the most important political administrative unit in Taiwan with her own budget and autonomy in designing locally relevant suicide prevention programs.

2. **Reviewer comment in Method:**

It is not clear to me if methods were well described. There are no information on population and we don’t know what the population in 7 cities and the 15 counties and how it various according the regions. We don’t know which cities or counties are belongs to urban, rural or mixed.

**AUTHORS' REPLY:** Following the reviewer's suggestions, we added one table (Table 1) in the revised manuscript which provides some socioeconomic indicators of each city/county. We also added one paragraph to account whether the cities and counties belong to urban, rural or mixed in the background section.

**CHANGES TO TEXT:** page 5 paragraph 3 now reads:

Cities/counties in Taiwan differ greatly in sociodemographic characteristics, ethnic composition, dialects used, economic structure and income level (Table 1). Taiwan experienced a rapid economic growth during the 1970s and 1980s which also resulted in diverse developments between cities/counties. For example, many high technology industries were located in northern Taiwan (such as Taipei County, Taoyuan County and Hsinchu County); and many counties (e.g., Nantou County, Yunlin County, Chiayi County, Pintung County,
and Taitung County) are predominantly rely on traditional industries with high percentage of agricultural population and have lower disposable household income (Table 1). All seven cities are in urban areas with high population density. Most counties include some urban townships with high population density and some rural townships with low population density. General speaking, counties in south and east compose more rural townships and are poorer.

3. Reviewer comment on Result:
The findings are not clearly presented and not sure if the results were convincing. Table 1- It would be interesting to see the break down of suicide methods according the population and city/county. Table 2 & 3 – It would be interesting to see if these two tables were merged together against the population and present as a Chart then we will be able to see a clear gender differences according to the age and methods. I will also apply some statistical test to check the differences. Then we wouldn’t need Table 4

AUTHORS’ REPLY: following the suggestions of reviewers we added Table 1 to provide population and socioeconomic characteristics of each city and county. In Table 2 we present the results by geographic regions and city/county and by suicide methods. We merged the original Table 2 & 3 into Table 3 in the revised manuscript as reviewer suggested.

4. Reviewer comment on Discussion and Conclusion:
Not so sure the discussion and conclusion were balanced and adequately supported by the data. This is because it is not well presented, and obviously not convincing. This section needs major revisions. “Our findings again support the hypothesis that the choice of suicide method depends on the socio-cultural acceptability of the method and its availability” Where?

AUTHORS’ REPLY: we have totally rewritten the discussion section and provide evidence to suggest the important role of socio-cultural acceptability in choice of certain suicide method.

CHANGES TO TEXT: page 11-12 now reads:
The above mentioned two studies, however, did not further examine whether there were differences in leading lethal suicide method by age group. The findings of this study suggest that within the counties with high percentage of agricultural population (i.e., equal physical availability of pesticide to all age groups); we still found large differences in using pesticides as suicide method by age groups. Only the elderly were more like to choose pesticide as suicide
method in these counties and this might be due to differences in socio-cultural acceptability of certain suicide method between age groups.

The findings of this study also reveal age groups differences and time changes in socio-cultural acceptability of charcoal burning. Charcoal burning (an equal physical available suicide method to different age group and across years) is more acceptable by people aged 15-44 years old group than their counterparts aged 45 years old and above. In 2002-04, charcoal burning was not the leading suicide method in any of the city/county and increased to 10 out of 22 in 2006-08. Of 9 cities/counties of which jumping was the leading lethal suicide method among female deceased aged 15-24 years old in 2002-04, 8 of them changed into charcoal burning in 2006-08. These findings suggest the increasing of socio-cultural acceptance of using charcoal burning as suicide method by younger people across years.

The third evidence supporting the importance of socio-cultural acceptability was the huge differences in percentage of using hanging as the suicide method across countries, ranged from 8.4% in El Salvador to 91.7% in Kuwait [7]. This study further revealed that percentage of using hanging as suicide method varied across cities/counties and by age groups. As rope is a universally-available tool for hanging suicide in every country for all age groups; therefore the differences in percentage of choosing hanging as a suicide method were mainly due to differences in socio-cultural acceptability by geographic regions and age groups.

No recommendation, No preventive methods were given.

**AUTHORS’ REPLY:** we have added three paragraphs discussing the implications for suicide prevention according to our findings and provided some recommendations.

**CHANGES TO TEXT:** page 14-16 now reads:

**Implications for suicide prevention**

Restricting lethal suicide methods has been proposed as one of the most effective suicide prevention strategies [1-5]. Nevertheless, most discussions focused on restriction of physical availability and relatively few attentions were paid to the alteration of socio-cultural acceptability of certain suicide methods. Socio-cultural acceptability as indicated by Cantor and Baume is a measure of the extent to which a person’s choice of method is shaped and circumscribed by the norms, tradition, and moral attitudes of their culture [6]. The findings of
This study suggests that socio-cultural acceptability still play a very important role in determination of choice of lethal suicide method (i.e., charcoal burning).

Similar to socio-cultural acceptability, Florentine and Crane proposed concept of ‘cognitive availability’, i.e., how accessible something is in one’s mind, can also play a role in suicide method choice [5]. They emphasized that the media can increase cognitive availability of a particular suicide method by distributing technical information about how to enact the method, sensationalizing it and by giving inaccurate portrayals that may encourage using this method. They used charcoal burning as an example to illustrate how ‘cognitive availability’ might be differently shaped by news reports in Hong Kong. Despite of very physically available of charcoal in western counties, pointed by Florentine and Crane, there are currently very few suicides by this method in western countries because charcoal is not culturally associated with suicide [5].

Previous study already indicated that the charcoal burning has been portrayed as an easy, painless and nice-looking way of death. Furthermore, charcoal burning, compared with hanging and jumping, is more compatible to traditional Chinese belief emphasizes preservation of the complete corpse for burial, which ensures a good beginning for the next incarnation [17]. Further qualitative studies are needed to better understanding the different socio-cultural acceptability of choosing charcoal burning as a suicide method between different age groups. The information is essential in designing countermeasure social marketing strategies to discourage the acceptability of using charcoal burning as suicide method.

Conclusion
Large variations in distribution of leading lethal suicide across geographic regions and cities/counties in Taiwan were partially due to different physical availability to particular suicide methods such as pesticides and high buildings. However, great differences in leading lethal suicide method between age groups and across times within a given city/county (equal physical availability) were mainly owing to differences and changes in socio-cultural acceptability of certain suicide method (especially charcoal burning and pesticide). Suicide prevention program at city/county level should not only consider restricting the locally relevant high physical available suicide method, but should also consider alerting some false socio-cultural acceptability of certain suicide method by age groups.
Replies to reviewer # 2 (Vladeta Ajdacic-Gross)

1. Reviewer comment 1:
Major issue:
The authors should comment on the choice of the period 2002-8 for their analysis. It is not clear why it starts in 2002 and not before.

AUTHORS’ REPLY: the main reason of the choice of the period 2002-08 was that the ICD-10 codes were available since 2002 and 2008 was the year the latest available data. Only 3-digit ICD-9 codes were used in tabulating cause-of-death statistics in Taiwan before 2002 we could not specify suicide by pesticides poisoning (ICD-9 code E950.6) from suicide by solid and liquid poisoning (ICD-9 code E950). We have added this account in the revised manuscript.

CHANGES TO TEXT: page 6 paragraph 1 now reads:
All deaths classified as suicide or undetermined intent from 2002 to 2008 was extracted from the database of the Department of Health of the Executive Yuan of Taiwan for analysis. Why we confined to years 2002-2008 only? Because the International Classification of Diseases, Tenth Revision (ICD-10) was used since 2002 which could provide better classification of lethal suicide method (especially pesticide poisoning) in mortality data. The national coders in Taiwan used only 3-digit ICD-9 codes in tabulating national cause-of-death statistics before 2002. We could not identify suicide by pesticide poisoning (ICD-9 code E950.6) from suicide by solid or liquid poisoning (ICD-9 code E950).

It is also not self-evident why the analysis relies on congruent 3-year periods in order to demonstrate the change of the leading suicide method. The choice of the time windows appears to be somewhat arbitrary.

AUTHORS’ REPLY: the reason why we combined three years of data for analysis because some cities or counties have relatively small population. For example, there were only 44 suicide deaths in 2008 in Taitung county. The number of death would be zero if we analyzed the data by sex, age and method. We therefore combined three years of data to increase the stability of the statistical analysis. We agree that the choice of the time windows was somewhat arbitrary. This was due to availability of only 7 years data, we thus could only examine the changes within such short time windows.

CHANGES TO TEXT: page 7 paragraph 2 now reads:
To increase the stability in number of deaths for cities or counties with relatively small populations, we combined three years of data for analysis. As we only had 7 years data and the largest time windows to examine the changes would be from 2002-04 to 2006-08. We first computed the number of deaths and proportion (%) of suicides committed by the four most commonly used suicide method for each city/county in 2002–2004 and 2006–2008, then calculated the proportion of suicides committed by the leading suicide method among all suicides and undetermined intent deaths in each city/county by sex and age (15–24, 25–44, 45–64, and 65 years and older). We used ArcGIS Version 9.3 to illustrate graphically the regional variations in leading suicide method across years and by age group.

2. Reviewer comment 2:
Minor issues:
Some readers might appreciate more detailed comments and interpretations about the differences between younger and older age groups with respect to the change of the leading suicide method. Why were the charcoal burning suicides not contagious for the older age groups? Is that a question of availability or acceptability?

AUTHORS' REPLY: we highly appreciate your comments, the age differences in leading lethal suicide method and possible role of socio-cultural acceptability have become the main focus of analysis and discussion in the revised manuscript. Please see our replies to the 4th comment raised by the first reviewer.

The last sentence of paragraph one from page 11 ("In conclusion ...") includes too many "different" words

AUTHORS' REPLY: we have deleted that sentence in revised manuscript.