Author's response to reviews

Title: Drowning deaths in Sweden with emphasis on the presence of alcohol and drugs - a retrospective study, 1992-2009

Authors:

Kristin Ahlm (kristin.ahlm@formed.umu.se)
Britt-Inger Saveman (britt-inger.saveman@nurs.umu.se)
Ulf Björnstig (ulf.bjornstig@surgery.umu.se)

Version: 5 Date: 9 February 2013

Author's response to reviews: see over
Dear Editor,

Thank you for handling our manuscript. We are grateful for the comments from the referees and have changed the manuscript according to their comments. The original manuscript was language edited by a professional language service. We have performed a new language editing by a native English speaking person.

Please, find below our responses point by point to the referees comments.

Best regards,

Kristin Ahlm, corresponding author.

**Reviewer's report nr 1**

**Title:** Drownings in Sweden with emphasis on the presence of alcohol and drugs - a retrospective study, 1992-2009

**Version:** 3  **Date:** 25 November 2012  

**Reviewer:** Keshia M. Pollack

**Reviewer's report:**
Thank you for the opportunity to review the manuscript by Ahlm and colleagues, “Drownings in Sweden with emphasis on the presence of alcohol and drugs – a retrospective study, 1992-2009”. The paper is interesting and with some modifications, it would be publishable.

**Major Compulsory Revisions**

Overall: The Results section was a little hard to follow. There were different denominators, especially when the authors looked only at alcohol, drugs, and then both. Consider adding denominators when appropriate to let the reader know what proportion of the total is being referred to by the data. Also, consider if there is a more logical order to present the results, which would help it flow better.

**Response:** Thank you for your comments. The result section has been rewritten to improve the section. We have added denominators when presenting the proportions of tested individuals and the presence of alcohol in the different groups to make it easier for the reader to follow. Furthermore, we have omitted some of the results and proportions from the text that are presented in Table 2 (see also answers to reviewer 2 and 3).

The challenge in reading it is that the focus shifts from deciding the cause of death (i.e., type of drowning), to the mechanism, with subcategories of type of drowning. I wonder if it is possible to organize the paper the other way, by cause of death with subcategories of alcohol, suicide, etc. I ask the authors to consider reorganizing the text. But I do strongly believe that the denominators should be clearer. This may not seem Major, however, the lack of clarity of this section is an issue for me, that can easily be fixed.

**Response:** To make it easier to compare drowning in different countries/regions, we have chosen to organize the data (all drowning deaths) according to the mechanism (manner of deaths, i.e. unintentional, intentional and those that were undetermined). It was done in such way because most studies of drowning deaths include only unintentional drowning (“accidental drowning”) and thereby it would be possible to compare our data with others.
We prefer to keep the present categorizations but have tried to improve clarity in several ways according to suggestions from the reviewer 1, 2 and 3.

Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)
- Page 2 Abstract: it would be helpful if you clarified the sentence in the Results that mentions the findings about suicide and women. The sentence would be clearer if it read “…females in the study...committed suicide by drowning, which…”

Response: We have changed the sentence according to the suggestions.
“Of all drowned females in the study, 55% (847/1,547) committed suicide, which was…” (abstract page 2, paragraph 3, line 4-5)

- Page 3 Introduction, 1st paragraph: the authors mention the decrease in the number of drowning deaths, from my knowledge of this issue, wasn’t that decline among children (in part due to Sweden’s Vision Zero)? If so, please add.

Response: The decline has occurred in all age groups but especially among children. We have changed the sentence “Although there has been a decrease in the number of drowning deaths (especially among children), it is unclear whether the incidence is still high in some groups.” (page 3, now in paragraph 3, line 2).

- Page 3 Introduction, 2nd paragraph: The sentence that begins with “Alcohol and drugs…” – there are 8 references listed. What do we know from these studies? All of them only support that “alcohol and drugs often contribute to drowning”? I suspect that some of other findings may be relevant to this study. Or, I suggest removing some of them.

Response: We have omitted the previous references, numbers 13,14,15,16.

- Page 3 Introduction, 2nd paragraph: Consider adding a citation to the sentence that begins with “Only a few studies…”

Response: Two references have been added after this sentence in the introduction (Lunetta et al., 2004 and Franklin et al., 2010).

Page 3, Materials and methods: typo is sentence that begins with “The autopsy rates…” I believe the sentence should read “…as the law recommends autopsies be performed…”

Response: This sentence has been rewritten and now reads “As the law recommends autopsies be performed for cases of unnatural deaths, a complete autopsy is the routine in these cases.” (page 4, paragraph 1, line 1).

- Page 4, Materials and methods, 2nd full paragraph: the authors note that “In each case, the forensic pathologist decides whether a sample should be obtained for such analysis.” How is this decision made? And this could introduce some bias.

Response: This decision is made individually by the forensic pathologist and the reason for the decision is not documented. The decision is based on information from police reports, medical records, and relatives. We have changed the sentence in material and methods to “In
each case, the forensic pathologist weights all available information and decides whether such a test should be done“. (page 4 paragraph 4, line 4).

We agree that there could be some bias, and have also added the following sentence in the strengths and limitations section of the discussion, “In the present study, most of the drowning deaths were not tested for illicit drugs, so there might be a selection bias.” (page 13, 1st paragraph).

Page 5, Results: The authors note in the 2nd full paragraph the seasonal variation in drowning. I suspect the mechanisms also varied. Consider adding a sentence here.

Response: There are more unintentional drowning deaths during the summer months which are related to boating, bathing and swimming. We have change the sentence in the result section to “Seasonal variation was noted in the unintentional drowning category with a peak during the summer months (June through August) and many of these drowning deaths were related to boating, bathing, or other outdoor water activities (Figure 2).” (page 5, Paragraph 2, line 6).  

- Page 5, Results: The authors note in the final paragraph that there were drowning associated with cars. It would be helpful to the reader if you can say more about that in parenthesis.

Response: The incidents with cars were only 3% of unintentional drowning deaths and were caused by the driver ending up in the water from a bridge, steep road, or quay respectively. The sentence now reads “bathing and other unspecified water activities (1807, 70%), boating incidents (521, 20%), cars driving into water (82, 3%), snowmobiles (78, 3%), diving (51, 2%), and airplanes, helicopters, and other vehicles (46, 2%). (page 5, paragraph 3, line 7).

- Discussion: I was looking for a little more of the “so what”. For example, the authors described the problem of suicide in bathtubs, especially for women. So what are the implications of this finding? What could be done about it? Or in discussing the finding on alcohol and boating, legislation was mentioned. So there is no current legislation in Sweden that restricts alcohol during boating? Or maybe there is a law and it should be better enforced? I encourage the authors to look at the entire Discussion section and determine how they are addressing the “so what” of these findings. Finally, while I appreciated a separation section on Prevention (page 11), I think this can be better integrated into the discussion of the findings.

Response: We have moved sentences from the prevention section to the paragraphs regarding suicide including suggested preventive measures against suicide. We believe that it’s not the bathtubs that is the main problem but the unrecognized or inefficiently treated individuals with depression that may lead to suicidal drowning. The issue of extended legislation is discussed in the paragraph concerning boating and alcohol. In Sweden, at present there is legislation for alcohol when driving a bigger boat than ten meters which can be extended to also include smaller recreational boats. Finally, we prefer to keep a separate section (page 11-12) with prevention now entitled “General prevention” including a general discussion about various preventive measures against drowning incidents and deaths.
- Page 12, Discussion: I thought that another limitation was the discretion of the pathologist in determining who went for drug testing. It does not seem that this decision was systematic, and thus, bias could be introduced.

Response: This limitation is mentioned in the manuscript “In the present study, most of the drowning deaths were not tested for illicit drugs, so there might be a selection bias.” (1st paragraph, page 13).

Page 5, Results: last sentence, paragraph that finishes at the top of the page: the authors state “The decrease affected all age groups”. I was wondering if the rate of decline was the same for all groups. Could be interesting to add this.

Response: We agree that this could be interesting and have changed the sentence from “The decrease has affected all age groups to “The decrease varied from 1-3% in the different age groups (page 5, paragraph 1, line 4).

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: I declare that I have no competing
Reviewer's report nr 2
Title: Drownings in Sweden with emphasis on the presence of alcohol and drugs - a retrospective study, 1992-2009
Version: 3 Date: 25 November 2012
Reviewer: Richard Franklin
Reviewer's report:
Dear Authors
I commend you on undertaking this study exploring drowning in Sweden, the following comments are provided to strengthen the paper. The word drownings should be avoided where possible, you should talk about drowning deaths or drowning incidents if they do not die or drowning morbidity if they are left with a permanent disability following a drowning incident. You should also try not to use the word accident as this implies act of god and that it is not preventable, incident would be a better word to use. As you study talks about drowning deaths I would use drowning deaths at the beginning and then you can decide how to address it after this but do not use ‘drownings’. The paper also need to be read for grammar, I will try and address those instances where I find them however.

Response: Thank you for your comments. We agree and have changed the word “drownings” to “drowning deaths”...
(The manuscript has been edited by a professional language editing service and unfortunately, "drownings" was their recommendation.)
The word “accident” has been changed to “unintentional” throughout the revised version of the manuscript.

Title – change drowning to either drowning deaths or drowning

Response: The title is change to “Drowning deaths in Sweden …”

Abstract – remove the word ‘although’ from the start of the background. Unnatural deaths should be clarified.

Response: We agree and the word “although” has been omitted. Unnatural deaths can be explained by “a death caused by external causes”. Since we believe that this is an accepted definition we haven’t explained it.

Material and methods section change ‘were drowned and autopsied during’ to ‘died from drowning and an autopsy was undertaken’.

Response: We have changed the abstract and have chosen the wording “During an 18-years period, 5,125 drowning deaths were autopsied in Sweden.” in the revised version.

Results change ‘individuals and decreased on average by about 2% each year (p<0.001)’ to ‘people by an average of 2% per annum (p<0.001)’.

Response: We believe that the meaning of per annum and each year is the same and we leave it to an editorial discretion.

Need to add into the methods what proportion of deaths were tested.
Response: The information required about the number of tested individuals is already included in the Result section in the abstract.

In the sentence about drugs and suicide the high proportion should be moved to the beginning as this is a significant issue.

Response: We prefer to keep the present logical order of results in the abstract.

Conclusion should not start with ‘although’ please remove.

Response: We agree and have omitted “although”

I am not sure what you mean by ‘markedly elevated incidence risk’?

Response: The Conclusion section in the Abstract has been rewritten and this sentence has been changed in the revised manuscript.

The last 2 sentences need to be tightened, e.g. Alcohol and drugs are a significant contributor in drowning deaths in Sweden and should be considered as part of a comprehensive prevention program

Response: We agree and have changed the conclusion according to the suggestion (page 2, paragraph 4).

Introduction – Update the reference to the latest reference for figure on drowning deaths, reference 1.

Response: To our best knowledge the last official WHO statistics regarding the number of drowning deaths globally were from 2004 (388 000 individuals, presented in fact sheet in the website of WHO media center dated October 2012).

Explain what you mean by unnatural deaths.

Response: Unnatural deaths is an accepted definition and it means that deaths are caused by external causes (unintentional, intentional, undetermined whether purposely inflicted or not).

The sentence starting with ‘Although there has been a decrease ...’ is unclear.

Response: The sentence has now been changed according to suggestion from Reviewer 1 who also commented on this sentence and the sentence now reads “Although there has been a decrease in the number of drowning deaths (especially among children), it is unclear whether the incidence is still high in some groups” (page 3, paragraph 3, line 2).

Need more detail about why the drowning death figures may be an underestimation.

Response: According to the reference, Lunetta et al., 2004, the WHO data did not include boating- and traffic related drowning and natural disasters (e.g. floods). To clarify this, we have added a new sentence in the introduction “A population-based study from Finland (1970-2000) revealed that the WHO statistics underestimated the real number of drowning deaths by 40-50% [5]. The discrepancy could partly be explained by the fact that WHO did
not include drowning deaths associated with traffic accidents, boating accidents, or natural disasters (e.g., floods) [5]. (Page 3, paragraph 2, line 1)

2nd paragraph, how many deaths are related to psychiatric illness.

Response: A psychiatric history was present in 53 of 123 (43%) of suicidal drowning deaths according to Byard et al 2001. We have changed the sentence in the revised manuscript to "Another common circumstance is suicide; often related to a previously known psychiatric illness [9]."

Material and methods – What is an N-code?

Response: The ICD9 N-code is the nature of the injury, a code from 800 to 999. We have omitted the word “n-code” from the first paragraph in Material and method and to clarify we have changed the sentence and included the code “ICD9 994.1” (drowning, according to international classification of disease version 9, ICD9).

What is the actual number of cases which are autopsied?

Response: In the present study all autopsied cases of drowning in Sweden during 1998-2009 are included (n=5,125). The Forensic Medicine database contains all forensic autopsies in Sweden. We believe that these cases are all drowning deaths during this period.

How are you defining death accident?

Response: We have changed the word “accident” to “unintentional” throughout the manuscript so there should be no misunderstanding.

Please define a ‘not permanent resident’.

Response: The definition of “not permanent resident” is a person who has not acquired Swedish citizenship or is a visitor. These individuals were not included in the calculation of incidence of drowning deaths in Sweden.

Any reason why age was missing in 7 cases.

Response: These 7 persons were not identified and consequently the age was unknown. The data on sex (males, females) was available (since these cases were autopsied).

How many cases were tox screening undertaken?

Response: There were 4,181 individuals who were tested for pharmaceutical drugs, 854 individuals for illicit drugs, and 4,377 individuals for alcohol. The numbers are presented in the result section under the subtitles “Alcohol” and “Pharmaceutical and illicit drugs”.

If testing for drugs is not routine then how is the decision made to test?

Response: The decision to test for pharmaceutical and illicit drugs is made individually by the forensic pathologist and the reason for the decision is however not documented in the
forensic database. The decision is based on information which is gathered from police reports, medical records, and relatives.

The sentence describing this in Material and Methods section has been changed in the revised version to “Testing for illicit drugs, unlike testing for alcohol, is not a routine practice at autopsy in Sweden. In each case, the forensic pathologist weights all available information and decides whether such a test should be” (page 4, paragraph 4, line 3).

A flow chart for the inclusion of the information would also be useful.

**Response:** We believe that a flow chart is not necessary. The study comprises all cases of drowning deaths in Sweden registered in the database during the study period.

Was ethical approval provided for this study?

**Response:** According to Swedish regulations ethical approval is not required for register studies of deceased persons. Approval from the Swedish National Board of Forensic Medicine was obtained for the study. This information is included in the submitted manuscript “Permission to use the autopsy and toxicological data for this study was obtained from the National Board of Forensic Medicine” (Material and methods section, page 4).

Results – 1st Paragraph, change ‘The decrease affected all age groups’. Was the rates by region standardised? If not this may explain some of the differences in rates.

**Response:** In the first paragraph in page 5, the national incidence rates were calculated for each age group. The denominators were the mean number of inhabitants in each age group in Sweden during the study period. We have changed the sentence from “The decrease has affected all age groups to “The decrease varied from 1-3% in the different age groups”. The incidence rates by region presented in the first paragraph and in Table 1 are crude incidence rates and were not age-adjusted.

2nd paragraph – Sentence being with ‘Unintentional drowning ...’ needs to be made clearer, also change ‘this’ before northern to ‘the

**Response:** To avoid confusion and to make it clearer this sentence in page 5 has been changed to “Drowning deaths defined as unintentional were more common in the northern district (incidence 2.7/100,000) compared with the other districts (1.3-1.9/100,000), and there was a higher proportion of drowning associated with thin ice (16% compared to 1-6%), boat incidents (22% compared to 9-10%), and presence of alcohol (46% compared to 30-41%). (page 5, paragraph 1)”.

‘I am also surprised that there were so few people under the age of 18 years (5%) who drowned, this goes against the international trends, this is worth a mention in the discussion.

**Response:** We agree and have mentioned this finding in the discussion in the submitted version “From an international perspective, the incidence of drowning deaths among children was very low in the present study.” (page 9, paragraph 3).

3rd paragraph what does a less pronounced seasonal variation mean was it statistically significant?
Response: We agree that this sentence was misleading and we have omitted the word “pronounced”. The numbers of drowning deaths in different months are not tested statistically.

Unintentional drowning – 1st paragraph what does ‘this is was cited as an issue’ mean?

Response: We don’t fully understand this comment.-The sentence in the original submitted version of the manuscript was “Thin ice was cited as an issue for drowning... “. In the revised manuscript, this sentence has been changed to “Thin ice was associated with 262 (13%) drowning incidents that occurred in lakes, seas, streams, and rivers.” (last paragraph, page 5).

Please add ‘were’ into the sentence starting with ‘boating incidents association’ before ‘association’.

Response: The sentence has been changed to “Unintentional drowning deaths were associated with bathing and other unspecified water activities (1807, 70%), boating incidents (521, 20%), cars driving into water (82, 3%), snowmobiles (78, 3%), diving (51, 2%), and airplanes, helicopters, and other vehicles (46, 2%).” (last paragraph, page 5).

Also a deaths and remove ‘s’ from ‘drownings’ at the end of the sentence, same with the next sentence,

Response: We have changed the sentence.

Intentional drowning – I would change in the 1st sentence ‘were caused by suicide’ to ‘as a result of a suicide attempt’ 2nd sentence starting with ‘Of all the drowned ...’ needs to be rewritten.

Response: We prefer not to use the word “suicide attempt”.
We have changed the first 2 sentences to “During the study period, there were 1,610/5,125 (31%) suicides by drowning (47% males and 53% females); the mean age for males was 59 years (range 16-97 year, SD 18) and 61 years for females (range 14-96 year, SD 18). Of all female drowning deaths, 55% (847/1,547) committed suicide, which was significantly higher compared to males (22%, 763/3,578, p<0.001). “ (second paragraph, page 6).

Is there any more information which could be provided about the homicides, particularly who was the perpetrator.

Response: This is a register study and there is no more information about the perpetrator in homicides.

Undetermined drowning – 1st sentence need to be rewritten, I would suggest ‘Intent was unable to be established in 909 cases (18%).’
Response: The first reviewer suggested including denominators. Therefore, we have changed the sentence to “In 909/5,125 cases (18%), intent was unable to be established (page 6, last paragraph).

Alcohol – what proportion does 4,377 represent of all cases where alcohol testing was undertaken?

Response: The proportion were 91% (4,377 tested of 4,812) of the cases. This proportion is now included in the revised version in the results section.

The 3rd paragraph does not read well and needs to be rewritten.

Response: We agree and have rewritten this paragraph. It now reads “Alcohol was detected in 256 (54%) of 471 tested individuals who fell from a boat. Of the diving incidents, all 44 individuals tested negative. Fifty (68%) of 73 snowmobile riders who drowned after breaking through thin ice were alcohol positive. In drowning incidents with other motor vehicles, 35 (30%) of 115 occupants had alcohol in their blood.” (page 7, paragraph 4).

It is interesting to note how much alcohol was involved in people jumping from bridges. Was there any statistical difference in the different proportions by location for the presence of alcohol?

Response: Unfortunately, there has been a mistake regarding the number of people jumping from bridges that were tested positive for alcohol. We have noted this mistake and now the correct number has been included. It should be 16 (37%) instead of 36 (83%). We have once again checked the numbers throughout manuscript.

We have tested the different proportions of alcohol in relation to location and there was a significant difference between location and presence of alcohol for both the unintentional drowning deaths and the suicide groups. This has now been added in page 9.

Pharmaceutical and illicit drugs – How many people had multiple drugs in their system? In the combination of the alcohol and drugs you cannot use 4492 as the denominator as only 4181 people were tested for drugs, therefore the denominator needs to be less than 4181 or 4181 if all of them were tested for alcohol as well.

Response. We have changed this section and have provided the number of drowning deaths that had multiple psychoactive drugs. To avoid confusion, the number and proportion of individuals that were tested positive for several pharmaceutical drugs has been removed from the text and is now only given in Table 3. We believe that the most interesting drugs here are the psychoactive ones. The paragraph now reads “In all, 4,181 out of 4,812 (87%) individuals were tested for pharmaceutical substances in their blood (Table 3). In 1688 (40%) individuals, one or several psychoactive substances were detected. Multiple psychoactive drugs were found in 1,070 (26%) individuals” (page 8, paragraph 2).

You are right regarding the combination of alcohol and drugs. The numbers of individuals tested for the combination of alcohol and pharmaceuticals are not correct. The correct
number is n=4,083 and this has been changed in the revised manuscript (page 8, paragraph 3).

I would also be interested to know how many were prescribed drugs and how many were not.

**Response:** We know what substances that are present in the blood samples. Unfortunately, it is not known whether the substances are legally prescribed or maybe ordered from “internet” since medical records are not available in the present study.

Discussion – 1st paragraph change ‘each year’ to ‘per annum’.

**Response:** We believe that the meaning of per annum and each year is the same and we leave it to an editorial discretion.

In the last sentence of the 1st paragraph you talk about exposure but do not link it to your study.

**Response:** This sentence was included to inform the reader that even if drowning deaths are less frequent than road traffic fatalities, the risk is higher when calculating the exposure time to water hazards. Our point is that drowning is as important to prevent as road traffic deaths and merits more attention.

We couldn’t perform similar estimations in our study design. The last two sentences in this paragraph are changed to “In Sweden, the average annual number of drowning deaths during the study period was half of traffic deaths [19]. Notably, Australian researchers estimate that compared to traffic deaths the risk of drowning is 200 times higher when calculating the person-time exposures, indicating that drowning may merit interest from a prevention perspective [20].” (last sentence, page 8 and first lines, page 9)

In the 2nd paragraph you speculate about the difference in the rates for drowning being due to geographical difference but provide no evidence to back this up. You also need to clarify why difference is collection methods may lead to difference in numbers of drowning deaths.

**Response:** Undoubtedly, there are differences between countries regarding the incidence of drowning deaths. In the Discussion section, 2nd paragraph we speculate about the possible explanations for this fact. In this paragraph were mentioned both demographic factors and “geography (e.g., presence of coast, lakes, and other water sources), and the implementation of preventive measures.”

To our knowledge, there are very few comparative studies regarding drowning deaths in different countries. We believe that it is possible to speculate about the differences in incidence of drowning deaths. The suggested variables could be used when performing future comparative studies.

Regarding your question about the differences in collection methods and coding practices, in the previous answer about WHO statistics above we have referred to the explanations by Lunetta et al. 2004 (reference 5). We have included a reference for different coding practices in the Nordic countries (Melinder et al., 1998, reference 24).

In the 3rd paragraph you need to talk about difference in rates of drowning deaths for children and some critical thought about why this might be the case would be appreciated.
Response: In the discussion there is a paragraph about the low incidence of drowning deaths in children in the present study and the higher incidence in older age groups including references.

“From an international perspective, the incidence of drowning deaths among children was very low in the present study. However, older age groups still have a markedly high incidence of drowning, a finding also reported in previous studies from other countries [5,13]. This finding may be explained by more effective prevention for younger groups than for older age groups [13]. Especially in high-income countries several preventive measures have successfully been implemented for children and have led to a decrease in drowning deaths and hospitalization after drowning incidents [25].” (page 9, paragraph 3, line 6).

In the 4th paragraph what does ‘striking male predominance’; mean? Do you have any evidence for male participation in more aquatic activities?

Response: In this study of drowning deaths it was a male predominance (70%) and we have omitted the word “striking”. We don’t have any evidence that males participate more in water activities.

In the 5th paragraph remove the word ‘relatively’ unless you are comparing it to something else. Need a reference for why this is an important public health problem.

Response: We agree and have omitted the word “relatively’. We have added a new reference from WHO, World Suicide Prevention Day, 2004 (http://www.who.int/mediacentre/news/releases/2004/pr61/en/)

In the 6th paragraph change ‘unusual’ to ‘uncommon’.

Response: We agree and have omitted the word unusual and added the word uncommon instead.

In the 7th paragraph please add a reference for your explanation of why regional differences may be seen.

Response: To our best knowledge, this is the first study that compare drowning incidence in different regions of Sweden. In this paragraph in the Discussion we have provided our interpretation of our results. The sentence has now been changed from “The regional differences in Sweden regarding incidence of drowning could also be explained by differences in leisure activities in rural and urban areas, alcohol consumption, and a longer winter period with ice coverage lasting up to five months in northern Sweden” to “The regional differences in Sweden especially regarding the incidence of unintentional drowning deaths could partly be explained by differences in access to water sources, leisure activities, and the length of ice coverage during winter, which in northern Sweden could last up to five months” (page 9, end of paragraph 4).

Alcohol – deleted ‘i.e. 44% of the unintentional drownings’. An examination of the statistical difference of the proportion of alcohol in different circumstance would be valuable.

Response: In the discussion part, the proportion of alcohol (44%) is provided for unintentional drowning deaths to be able to compare our finding with other previous studies.
This paragraph now reads “A substantial proportion (44%) of unintentional drowning deaths tested positive for alcohol in the blood. This finding could be compared with 51% in Finland [5], 35%-55% in the USA [40], 50% in New Zealand [41], 62% in Ireland [32], and 22% in Australia [13]. The proportion of alcohol in drowning deaths may reflect the differences in alcohol policy and consumption in these countries.” (page 10, paragraph 3)

In the result section (page 7) the proportions in relation to different circumstances are presented, statistical differences are added for the differences between unintentional vs. suicidal drowning deaths and differences between locations in these groups.

2nd paragraph change the 1st sentence particularly the ‘one may speculate ..’ statement.

**Response:** It’s a good point. We agree and have omitted “one may speculate” and the sentence now reads “In the present study, alcohol was found in 24% of suicidal drowning and alcohol may also have facilitated suicide.” (page 11, second paragraph).

Prevention – change ‘dangerous’ to ‘danger’. What does ‘should be spread’ mean?

**Response:** We agree and we have change the sentence to “The information about the danger of combining alcohol and drugs with water activities should be given to groups at high risk, i.e., males and the middle/older age groups.”. (page 12, line 1-3)

What do you mean by a ‘safety systems’?

**Response:** Thank you for this question. ”Safety systems” could be misleading in this sentence since the term is used for electronic systems and devices. We have omitted this term to make the sentence clearer.

Limitations – how might the system miss cases?
Change ‘judged’ to ‘used’.

**Response:** In drowning deaths or when person is missing the police will always be involved. If the police don’t request a forensic autopsy of the body the case might be missed. However, this is very unlikely. A few drowning victims that die after a longer hospitalization period could be missed.
We have changed the wording ‘judged’ to ‘used’. The sentence now reads “The data on alcohol in drowning deaths should be used with caution”. (page 12, paragraph 4).

Could you also provide a definition of ‘decomposed bodies’ as all bodies start to decompose upon death.

**Response:** Yes, it is true that the process starts upon death, and it can vary in different circumstances and climates. In the autopsy report, the forensic pathologist grade the decomposed bodies in three groups “mild”, “moderate”, and “severe”.
However, in the present register based study we have no access to the autopsy reports and therefore the notification in the register will only be “decomposed”.

References – please ensure you have a date accessed after any web references.
Regard
**Response:** We have given the date of access after the web references.
Reviewer's report nr 3

Title: Drownings in Sweden with emphasis on the presence of alcohol and drugs - a retrospective study, 1992-2009
Version: 3 Date: 8 December 2012
Reviewer: Tim Driscoll

Reviewer's report:
I apologise to the authors for the delay in providing this review. This manuscript presents the results of a largely descriptive epidemiological study of drownings in Sweden over an 18-year period, with a focus on the presence of alcohol and drugs. The dataset is essentially a census of drowning deaths that occurred over the study period. The analysis seems to have been performed competently and comprehensively and the language in the manuscript is clear, although there are some minor errors. People interested in the burden and prevention of drowning should find the manuscript useful.
I have a few major compulsory revisions to suggest and some comments that I hope will be of use to the readers.

My main concern (which is not a big deal) is in regards to the last paragraph on page 5, under the heading "Unintentional drowning". This paragraph presents results in terms of two separate concepts - place of occurrence (e.g. lake) and circumstance of occurrence (e.g. boating). There are so many percentages here, and percentages of sub-groups, that it is very hard for the reader to gain a comprehensive understanding of what the results really were or showed. I think the authors should give strong consideration to presenting the results separately - where did the people drown and what were the circumstances of the drownings? As a specific example, 20% of the drownings involved boats and a small percentage involved other vehicles of various sorts. What were the circumstances of all the rest?

Response: Thanks for your comments. We agree, and we have removed percentages in several sentences in the results. The percentages are now only presented in tables 2, 3, 4 and 5.
The information about the percentage of each location is removed from the text and now presented in table 2 but the circumstances/activities as boating is still only presented in text.

We agree that information about circumstance could be misleading. We have not complete information about the remaining cases but we know that these individuals were found in water after water related activities. However, we don't have the specific information about the type of activity (bathing, swimming etc.). In the revised version, we have included some information regarding the remaining cases. It now reads “Unintentional drowning deaths were associated with bathing and other unspecified water activities (1807, 70%), boating incidents (521, 20%), cars driving into water (82, 3%), snowmobiles (78, 3%), diving (51,
As an extension of this, it is helpful to consider why the presence of alcohol or drugs might be relevant. The authors mention some reasons but it seems to me that for unintentional deaths at least this is of most interest and relevance if this is looked at in terms of circumstance. Is it a big issue in drowning associated with boating? Recreational swimming? Snowmobiles? Fishing? Etc. I notice at the end of the manuscript the authors mention that they didn’t have much information on factors leading up to the drowning and following the drowning. However, they do appear to have had some information (e.g. boating, various types of vehicles) and it would be helpful to use whatever information they had to undertake the sort of analysis I have just suggested. If the necessary information is not available, I guess it won’t be able to be done.

**Response:** We have added some new result in the paragraph about presence of alcohol in relation to driving vehicles and diving. The paragraph now reads: “Alcohol was detected in 256 (54%) of 471 tested individuals who fell from a boat. Of the diving incidents, all 44 individuals tested negative. Fifty (68%) of 73 snowmobile riders who drowned after breaking through thin ice were alcohol positive. In drowning incidents with other motor vehicles, 35 (30%) of 115 occupants had alcohol in their blood” (page 7, paragraph 4).

The final significant suggestion I have is to consider what the manuscript is like for the naïve reader. There are a LOT of percentages presented, sometimes of all drownings, sometimes of specific subsets, sometimes of subsets of subsets. This can be very difficult to understand after a while. The manuscript would benefit by a review to ensure that just the key results, general findings and patterns are presented in the text, with the reader otherwise free to look for the detail in the tables (and the figures). This would make the text shorter, and perhaps might result in longer or additional tables (or might not).

**Response:** We have reduced the presentations of percentages in the text in the result section and refer instead to Table 2. Presence of alcohol in males and females are now included in Table 4. Thereby, this detailed information has been reduced in the text. We have not more detailed results regarding activities for those who drowned so we preferred to keep this information in the text and have not added a new table. According to the request from reviewer 1, a few denominators were added in the result section.

A few minor comments:
- page 4 para 3: interchangeably, not interchangeable;
- page 9, para 2, line 7: missing the word ‘and’ after the comma;
- page 10, para 2, line 2: missing the word ‘of’ before ‘children’;
- page 11 line 2: the section on level of impairment should be “…and increasing levels of impairment are associated with…”.

**Response:** Page 4, We have omitted this sentence and will not use the word “accident” according to the comments from reviewer 2. Page 9, this sentence has been rewritten. We had added the word ‘of’ before ‘children’; in page 10, para 2, line 2: We agree and have changed the sentence accordingly (page 11 line 2).

All the tables should have decimal tabs when there are columns of numbers. Currently the numbers are all left-aligned.
Response: In the revised version, we have used decimal tabs in Table 2, 3, 4 and 5.
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:
I declare that I have no competing interests