Author's response to reviews

Title: Sudden cardiac death in the young (5-39 years) in the canton of Vaud, Switzerland

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Cover Letter

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Title: “Sudden cardiac death in the young (5-39 years) in the canton of Vaud, Switzerland”

Type of the article: Research article

Authors: Fanny Hofer; Florence Fellmann; Jürg Schläpfer; Katarzyna Michaud

All of the corrections have been highlighted with yellow font colour in the manuscript and English corrections with grey font colour.

Referee 1:

The authors have responded well to my comments. Indeed, the manuscript reads better with "presumed SCD". Page 8, line 146 - please add "presumed"

Thank you very much for your comment. The correction was made.

Page 9, line 154-158 - I recommend deleting this - Most of your drownings were in fact drownings (autopsy results), and road vehicle accidents are very difficult if impossible to adhere to cardiac disease in this age group. Rather, driving under the influence of alcohol or other substances, or merely distraction would be cause of death. Including these deaths in a "high estimate" in my opinion is useless.

Thank you for this comment and we agree that it is unlikely that all drownings and road accidents were related to cardiac diseases. However, even if an autopsy shows clear signs of drowning, it is still possible that a sudden collapse for example related to an arrhythmia was responsible for the fatal event. In our experience, we observed in several cases of loss of car control leading to traffic accidents, a fresh coronary thrombosis. However, we agree with you, that in the
majority of these cases a non-cardiac origin is the leading cause of the fatal event (incapacity to drive, alcohol or drug abuse, inability to swim). We would like however to maintain this part of manuscript in order to be also coherent with other parts of our manuscript (tables, discussion). We think that by this calculation we leave open the possibility of cardiac origin in the chain of events resulting in drowning or traumatic lesions even if this is quite unlikely.

Considering also the remarks of the second reviewer, we propose to modify the suggested fragment as follow, hoping that you will adhere to this suggestion:

“If the transport accidents and the drownings/submersions that could have potentially been of cardiac origin are included, even if this appears very unlikely, the presumed incidence increases even further to 13.67/100'000 person/years. As already explained in the methodology section, it is difficult to ascertain whether the death was directly related to the vehicle’s driver or not when using ICD-10 codes with transport accidents. It is also impossible to distinguish all possible primary causes of drowning on the basis of codified data. The presumed incidence varies by a factor 8 depending on which categories are considered. It is certain that all these deaths in the three categories are not SCDs, but it is difficult to determine to what extent.”

Page 11, line 201: I agree, but consider expanding the perspective even further. Statistics are good, but what’s really important about the autopsy is the potential inherited trait that could affect family members. This, in my opinion, even further underscores the importance of the autopsy and the subsequent handling of the bereaved family. This should also be incorporated in the Conclusion.

We totally agree with this point of view. We added the following sentence in the Conclusion:

“Autopsy findings are important not only to correctly codify the cause of death but also to optimize the diagnostic procedures and the preventive measures for the family members, considering the frequency of genetic diseases associated with sudden cardiac death.”

Table 3: You need to clarify that there are a number of autopsies in which you do not have access to the conclusion of the autopsy. As an example (drownings) now, it reads 16 drownings, of which 11 were autopsied, and 4 confirmed the diagnosis. But this is misleading according to your rebuttal. What is right (as I understand it) there were 16 drowning, of which 11 were autopsied. Of these, conclusion of the autopsy was available in 4, and OF THESE 4 confirmed the diagnosis. This is rather important in my opinion... "No data concerning autopsy" could be changed to "unknown if autopsy was performed" to further clarify.

Unfortunately, and as explained in our paper, we were not able to compare the anonymous data from the official statistics and conclusions of post-mortem examination (not systematically an autopsy) performed mostly by the forensic medicine institute.
It is possible that the diagnosis of drowning was confirmed by an autopsy for all 11 cases; in this hypothesis, the autopsy conclusions were not considered or not available during the process of codification. It is also possible that the number of autopsies was lower than 11 if the codified information was based on the information obtained from the first practitioner who certified the death and who was not informed that finally the prosecutor did not order an autopsy. It is also possible that the number of autopsies was 12 as information of whether or not an autopsy was performed was unavailable for one case. This is unfortunately related to our system and to underestimation of the autopsy value as explained in the section “General considerations” of our paper.

In consequence modified:
• the title of the corresponding column in the Table 3.
• the legend of column “autopsy performed” and “no autopsy” to “autopsy act codified as performed” and “autopsy act codified as not performed” respectively.

We added also in the legend of Table 3: It is possible that the percentage of autopsies with a confirmed cause of death could be higher if the autopsy results were neither not available nor considered during the codification process.

Referee 2:

Major Compulsory Revisions
1. Although the authors acknowledged the comments of the other reviewer and myself that the quality of the data is insufficient to provide an accurate estimate of the incidence of SCD as well as autopsy rates, I still think that the current presentation of the data is not yet completely in line with these limitations. An incidence of SCD or “presumed” SCD is provided and compared to the incidence rates in other countries, while the true incidence may be much lower (autopsy might have identified a non-cardiac cause of death) or higher (some drowning and traffic accidents may be due to SCD). Similarly, the low autopsy rates are compared with international autopsy rates, while it was unknown if autopsy was performed in a significant number of cases. I understand that the authors cannot improve the quality of the data, but feel that the statements and conclusions throughout the paper should be softened. For example, the abstract should, in my opinion, conclude that the quality of data is insufficient to provide an accurate incidence estimate and call for measures to improve the registration of SCD cases. Similarly, the discussion should start with and focus more on this issue.

Thank you for your comments and understanding of this limitation related to the legal system and official data. We modified the abstract as follow:
• However, the quality of the officially available data was insufficient to provide an accurate incidence of SCD as well as autopsy rates.
• The presumed autopsy rate of sudden deaths classified as diseases of the
circulatory system is 47.5 %. For deaths of unknown cause (11.1 % of the deaths), the autopsy was conducted in 13.7 % of the cases according to codified data.

- Increasing the autopsy rate of SCD in the young, better management of information obtained from autopsies as well developing of structured registry could improve the reliability of the statistical data, optimize the diagnostic procedures, and the preventive measures for the family members.

We moved the following sentence from the second to first paragraph of the section Discussion “The reliability of the incidence depends on the available statistical data, which is based on the information given by the physicians who declare the deaths. “

We added also “We noted that the quality of the officially given data was insufficient to provide an accurate incidence of SCD as well as autopsy rates. Therefore we use the term of “presumed” considering this limitation inherent to the current system of codification and to the retrospective nature of the study.

Minor Essential Revisions
1. P5: It is unnecessary to detail how the institutions were contacted or provide e-mail addresses.

The modifications were made as suggested.

2. Text and Table 3: I still do not understand what “cause of death confirmed after an autopsy” means. Are these the number of cases in which the autopsy results were available? Or was autopsy also performed in the other cases and did it show a different cause of death than expected? Please change this formulation throughout the text and in Table 3.

We modified the legends of column in the Table 3 considering that all were received as codified anonymous from the official statistical institutions. As discussed above, it is impossible to verify the accuracy of codified anonymous information concerning the number of autopsies and their results.

3. Methods: I would change the subheading “Data” to “Methods”, and then restructure the paragraphs, starting with “General considerations”, followed by the two paragraphs that describe the methods of this study.

The modifications were made as suggested

4. Table 3: As already commented on by the other reviewer, the number of cases with missing autopsy data is high. This should be clearly mentioned in the limitations section, because the low autopsy rates may actually be underestimated significantly.

We added to the limitation section:

“....the autopsy rate may be underestimated considering that the information
concerning to whether an autopsy was performed or not, was unavailable in 23.4 % of cases."

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