Author’s response to reviews

Title: Estimating the regional distribution of men who have sex with men (MSM) based on Internet surveys and calculation of MSM population-specific incidence of sexually transmitted infections

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Responses to comments and suggestions from the four reviewers

Reviewer: Francoise Dubois-Arber

"The article is very long, with many subchapters that would deserve a better organisation. One may suggest to split this article in two different articles. It seems to me that the exploration of the validity of using internet-based surveys to calculate sizes of MSM regional population – with the comparison of estimated HIV prevalences by two methods - is the main subject of this article. The use of the results of this exploration may be the subject of another article."

Response:

We have splitted the manuscript in two. “Estimating the regional distribution …” deals with the validity of using internet-based surveys to calculate sizes of regional MSM populations and compares survey-derived estimates with the geographical distribution of user profiles of the largest MSM website in Germany with currently ~ 300,000 user profiles. “The denominator problem …” demonstrates the use of these results for incidence and prevalence estimation in MSM populations and compares the new approach with other methods of incidence and prevalence measurement.

"Overall, in spite of the great interest of this exercise, there are many assumptions, estimations, adjustments which are not clearly detailed and the consequences of which are not appreciated. In this situation, it is difficult to completely appreciate the validity of the data presented. Some tables are also not easy to read with imprecise headings (see below).

1. The methods should include, at the beginning, a definition of the steps that
have been undertaken to attain the objectives. A figure with a summary of these steps, together with the assumptions made during the process may be useful.

Response:
By splitting the manuscript the structure of the articles became clearer. We explicitly explain our assumptions, and eliminate adjustments as much as possible.

"2. The methods should be exposed more in depth, by defining, at each step, the rationale for the comparisons undertaken (for example the rationale for and the consequences of the comparison of the three samples), the precise assumptions made, the detailed account of adjustments made, the detailed calculation of estimates, including confidence intervals where it is relevant (for example, in the estimation of the total MSM population in Germany, and consequently, on the regional prevalence estimates)."

Response:
We revised the methods section of both manuscripts accordingly.

"3. The diverse internet sites included in the studies should be mentioned with their characteristics, as well as the contribution of the diverse sites to the surveys."

Response:
Data included in Table 1 of the first manuscript ("Estimating the regional distribution...")

"4. The results should be presented more clearly, step by step."

Response:
The results sections of both manuscripts have been thoroughly revised accordingly.

"A table with the main characteristics of the three survey samples should be provided."

Response:
There are only two survey samples that can be described. Table 1 in the first manuscript has been revised to include more information on sample characteristics.

"5. As the main outcome of the comparison seems to be the relevance of using online KaBasTi as a reasonably representative sample of German MSM this choice should be validated."

Response:
The main outcome of the comparison is that the two survey samples are reasonably representative for German MSM in terms of regional distribution. We validate this by comparing the regional distribution with the largest available dataset (GayRomeo user profiles) and by comparing the subset of HIV positive survey participants with HIV surveillance data. The differences between the two surveys are small, but to increase the validity of regional distribution especially for areas with small numbers of participants we use in the manuscript “The denominator problem …” a combined dataset of both surveys.

"6. The headings in tables 2 and 3 are not precise, as well as methods of calculations. These two tables should be revised"
Response:
All tables have been revised accordingly.

"7. The similarities declared for the figures 2 and 3 should be analysed more in depth."
Response:
Former figure 3 has been removed and figure 2 has been revised and analysed more in depth in the manuscript “Estimation of regional distribution …”

"8. Where it is appropriate (in relation to survey data), confidence intervals should be mentioned."
Response:
We included confidence intervals for the general population survey estimate of the MSM proportion in the general population.

"9. Sensitivity analysis on the estimates should be performed. In summary, we should get an evaluation of the cumulated effect of the different assumptions, adjustments, etc., on the precision of the numbers of MSM in the regions, and on the prevalence and incidence estimates. Current differences between regions may change."
Response:
We reduced the number of assumptions and adjustments to a minimum and discuss the effects of remaining assumptions and estimates on prevalence and incidence estimates.

"10. The discussion should take into account these changes, and this may lead to substantial modifications."
Response:
The discussion sections of both manuscripts have been thoroughly revised.
"Minor revisions needed
1. The objectives are not clearly described and should be more explicit (in the abstract, they appear more clearly).
2. In the introduction, some statements such as the last sentence in the last paragraph, should be sustained with references to literature"
Response:
The objectives sections of both manuscripts have been re-written and more references to literature have been included.
Reviewer: John de Wit
"Authors present a highly interesting, timely and innovative study to estimate the regional distribution of MSM and STI incidence in Germany. The only issues I have with the paper are that it is rather lengthy and it could refer somewhat more to the literature. Regarding the length, my suggestion would be that authors focus their methods, results and discussion more explicitly on the main aim of the paper, which is to estimate the regional distribution of MSM and the incidence/prevalence of STI in this group. Other analyses seem to be more requisite to make the authors major case and could potentially be dealt with in a more succinct way. The discussion is particularly lengthy, and sometimes explanations are given for less central problems and at times it is unclear how these explanations actually explain findings. In my view a stronger focus on the main aims and taking out lengthy treatments of less central issues would strengthen the paper. Similariy, the number of tables and, in particular, figures could be substantially reduced."
Response:
We have splitted the manuscript in two, individually shorter manuscripts. This splitting allowed us an improved focus on the respective aims in the two new papers. Objective, methods, results and discussion sections have been thoroughly revised.
Reviewer: Sarah Dougan
"1. Length of manuscript
I thought that the manuscript was too long, and as there was so much information about different surveys etc. included within it, I found it difficult to follow and to assess what had been done. I wondered whether it would be better to split the paper into two: one on estimating the MSM denominator and the other on estimating regional-specific incidence of STIs using the regional
denominators. Either way, I think it needs to be shortened and some of the arguments and the specific research question tightened up. Once this had been done, I would find it easier to assess it.”

Response:
We have splitted the paper in two according to the recommendation and focused the respective research questions.

"2. Definition of "MSM"
My understanding of the "MSM" population is that these are men whose sexual behaviour is to have sex with other men, and that this is different to sexual identity/desire. In the methods, it wasn't clear what definition of MSM was being used and that this may have changed depending on the data source. Presumably this did vary by survey/study and this would result in differences in estimates of MSM population and also the validity of applying these to HIV/STI estimates. Work looking at the differences between sexual behaviours, sexual desire and/or sexual identity shows that there can be quite large differences (see for example, Australian Sexual Health Survey / Natsal from UK). I think the (likely) definitions of MSM/gay men need to be more clearly articulated and there should be discussion about this in introduction/discussion.”

Response:
We have the same understanding of the MSM population: MSM are men whose sexual behaviour is to have sex with other men. For our surveys and for the comparison with Website user profiles there should not be a difference, since all data sources include men who decide to use websites who provide opportunities to get in social and sexual contact with other men, independent of their sexual identity. A difference certainly exists for transmission group information from surveillance data. Since HIV and syphilis reporting in Germany are anonymous, reluctance of health care providers to reveal sensitive data on their patients is minimized. However, information on sexual behaviour on infectious disease surveillance reports are given by health care providers, who may or may not communicate with their clients about their sexual behaviour, and clients may or may not decide to disclose sexual preferences to their health care providers. Surveillance data almost certainly underestimate MSM-related transmission risk, and they will do so even more in regions where MSM have fewer options to choose MSM-friendly health care providers. For syphilis surveillance data, in which transmission risk is essentially dichotomised in heterosexual and homosexual we account for this problem by assuming that all infection reports from male clients unless heterosexual transmission is explicitly reported is due to MSM behaviour (i.e. all unknown risk in men is assumed to be MSM risk). On HIV reports there are essentially four risk categories in Germany: MSM, IDU, Heterosexual and origin from a high prevalence region. Unknown risk factors are
redistributed only proportionally. The proportion of MSM is thus likely to be underestimated. We have added some discussion on this topic in the introduction and discussion section of the manuscript “Estimating distribution ….” And the discussion section of the Manuscript “The denominator problem …”.

"3. Estimates of the proportion of MSM in the adult male population in Germany
Given that the 3.3% came from a sample of 3,600 adults, I think that all of the estimates of the MSM population should have 95% confidence intervals to show uncertainty around this estimate."
Response:
We have included confidence intervals for this estimate.

Reviewer: Onno de Zwart
"There are, however, some issues the authors need to address in more detail:
- p.4. There is only one reference to studies into the size of populations of MSM. It would be helpful to refer to more articles so to put the German results (3.3%) in perspective."
Response:
We have included more references on this topic.

"- p. 4. The authors state that ‘asking people about their sexual preferences is becoming more and more acceptable’. It is not clear on which research or published articles the authors base this statement."
Response:
We refer to two articles here: the one demonstrates a higher proportion of reported MSM behaviour in the late 1990s compared to the late 1980s, the other reports a higher proportion of reported MSM behaviour in younger compared to older survey participants (age cohort effect).

"- P. 5. The authors state that ‘MSM who are reluctant to report sexual experiences with other men, usually are also less sexually active’. It is not clear on which research or published articles the authors base this statement."
Response:
We have rephrased this statement.

"- P. 8. The authors do not discuss the possibility when discussing the GayRomeo User Data the possibility that users may have more profiles which may influence the regional distribution."
Response:
Indeed we are well aware that MSM internet users may have more than one
profile. However, mostly these profiles are on different websites. Also we see no obvious reason why MSM in one region should have more or less multiple profiles on the same website like in other regions. Considering the very large number of user profiles on Gay Romeo (~300,000 profiles of users in Germany) the effect of double/multiple profiles on the regional distribution is in our opinion likely to be negligible.

"- P. 12. Including a table with the main socio-demographic results of the different surveys would help the reader to get a good overview of the differences."
Response:
We have included more data on basic characteristics of survey participants in Table 1 of the manuscript "Estimating regional distribution ...".

"- P. 13. The offline survey of the KABaSTI study was mostly done in Berlin which could also explain some of the differences between online and offline."
Response:
The offline sample of the KABaSTI study was a national sample and not mostly from Berlin, but we have excluded the offline sample of KABaSTI from our analysis for other reasons.

"- P. 15. It is not clear whether the differences in ranges of estimates of MSM in the states were statistically significant or not."
Response:
We decided to not test differences in the estimate ranges for statistical significance, because this would suggest an –inappropriate- accuracy of the estimates.

"- P. 36. Table 3, remark 2. The authors here assume ‘no systematic change due to change of residence after HIV diagnosis’. However, in the discussion op p. 23 and 24 the authors claim that a move of MSM with HIV to larger cities is probable. How to explain these two contrasting remarks?"
Response:
We have clarified in the manuscript “The denominator problem” that the surveillance data based model does not take post-HIV diagnosis migration into account, while a survey based model has the potential to detect such migration.

"In general it would be interesting in the discussion to put the results more in an international perspective."
Response:
By splitting the manuscript and an improved focus on the research questions we hope that the generalizability of our findings becomes clearer. We also have included more references to previous work on these topics in other countries.