Author's response to reviews

Title: Measuring the impact of health policies using Internet search patterns: the case of abortion

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

We are grateful for the insightful and comprehensive reviews provided by the reviewers.

We have carefully read and addressed each of the reviewers’ comments in detail, and have made the appropriate changes to the manuscript, as described below.

We feel that the paper is significantly improved as a result of the review process.

Sincerely,

Ben Reis
John Brownstein

Reviewer 1: Judith Dwyer

This paper proposes a novel potential method of assessing the impact of health policies, by extending the use of online search statistics from epidemiological surveillance of infectious illness to factors affecting health service utilisation, using abortion as a case study. The paper documents an inverse relationship between the volume of internet searches for abortion and local legal abortion rates (and a direct relationship between volume of searches and legal restrictions on abortions). This is a potentially useful finding. However, the paper needs further work in relation to the following concerns:

We thank the reviewer for the insightful review and comments.

MAJOR COMPULSORY REVISIONS
1. The policy questions and implications are overstated in this paper. In the background, the authors state that they are focusing on the relationship between abortion policies and abortion rates, and suggest that the potential to measure that relationship in real time is of value for public health. They suggest that internet search patterns could provide a ‘real-time’ method of tracking ‘overall’ abortion rates in specific regions. These claims overstate both the significance of the results and the potential usefulness of the method for surveillance.

Firstly, this is not an adequate study of the relationship between local restrictions and local rates. It does analyse existing data about the relationship between some measures of restriction and measures of local legal abortion rates. Since legal status and abortion rates are the main policy and service utilisation variables under study, the potential impact of illegal/informal abortion practice is important. In some of the countries included, illegal abortion is a significant health problem, as evidenced in maternal mortality rates, inter alia. However, the connection
between search volume and policy settings, and between search volume and local legal abortion rates is of interest, particularly for the US where the data and legal settings between states are more clearly comparable. In relation to the usefulness of the results, assuming that the data and definitional problems raised above could be addressed, the main application would seem to be to confirm that policies that restrict or extend access to services are having an impact on the targeted population; or to compare the impact of alternative restrictive or liberalising access measures across jurisdictions; or to confirm that reduced or improved supply of services is affecting access to care. These results have policy relevance. However, as the authors acknowledge, the search measure is not robust enough to provide real time information about actual abortion rates. It may be that the search measure could provide real time information about policies or services that affect access, but even this may be subject to confounding by transitional effects during ‘real time’. That is, increased searching during a transitional period could not reliably be interpreted in the same way as annual average searching behaviour for comparison across jurisdictions, which is what this study reports.

We have revised the text in accordance with the reviewer’s comments. We have toned down the policy questions and implications throughout the manuscript to specify that this paper covers only certain measures of local abortion policies and restrictions that were available for study. We have also revised the text to make clear that that the statistics refer only to legal abortions that have been reported, and do not include the potential impact of illegal abortions. We state that considering statistics on illegal abortion is an important next step.

Also, in accordance with the reviewer’s comments, we have removed mention of “real-time” or “near-real-time” throughout the manuscript. We agree that the data provided cannot be used to accurately assess abortion rates in populations. As a result, we have toned down the claims and now simply state that due to their electronic nature, the collection of search data can be accomplished in a more efficient fashion than more traditional surveillance techniques. We have also discussed the potential benefits of analyses based on long-term data collection over short term ones.

2. As indicated above, limitations of the data need to be discussed. To the extent that I could identify the specific sources for all countries, the data relate to legal abortion only. The data used to represent 'local abortion rates' in relation to USA populations is regarded as reliable for legal abortion; and the sources do allow for differentiation of legal abortions by place of occurrence and by residence of the patient. However, the authors do not address the potential impact of illegal abortions, in states with restrictions, or where the availability of services is inadequate. The extent of the variation in rates by state of residence raises this question.

We have revised the text in accordance with the reviewer’s comments. The text now makes clear that the statistics refer only to legal abortions that have been reported, and do not include the potential impact of illegal abortions.
MINOR ESSENTIAL REVISIONS

3. At the end of the results section, the authors suggest that differences in rate and search volume patterns found in Central and South American data as compared to Eastern European data ‘may be the result of inherent cultural/religious differences in attitudes to abortion between these countries’. The authors have no evidence for this suggestion; and I am not aware of evidence that indicates that religion (as distinct from legal, regulatory and service access settings) has an independent impact on abortion rates. (Religious influence does of course affect those legal and service settings). There is some evidence that depth of religious feeling has an impact; but this is independent of religious denomination.

In accordance with the reviewer’s comments we have revised and clarified the text. It now reads: “These differences may be the result of differences in underlying attitudes towards abortion, which may be associated with cultural norms and/or with the pervasiveness and depth of religious adherence in these countries. Such potential associations would need to be studied in greater detail before any conclusions about them could be drawn.”

4. Further detail on the non-USA data sources used is needed.

The data for international abortion statistics were obtained from the World Health Organization – we have clarified that the data is available at unstats.un.org.

Reviewer 2: Robin Gauld

This is a very well put together study. The article is well constructed, easy to read and reports on some fascinating findings as outlined in the abstract. I particularly like the fact that the article is straight to the point and digestible for a general audience, the method is novel, and findings with implications for further research outlined.

We thank the reviewer for the kind comments.

I think the article should be accepted pretty much as is, although I would suggest the authors tighten up the writing in places. As stated, this is generally fine but there are occasional lapses as on the 'background' page, 2nd para "implications on planning” should be 'implications for...".

We have made this change as recommended by the reviewer.
Last sentence, para before "results' should be "save a woman's life".

We have made this change as recommended by the reviewer.

More reference to the figures would be useful. I can't seem to find where Figs 3-4 are referred to in the text. Other Figs don't seem to line up with the text either. Check that labels on Figs and refs to these are aligned.

We have corrected the figure references, as recommended by the reviewer.

It could be useful to think about putting in a table that shows numbers of overall searches and those for abortion in each of the countries and US states, and also include the overall abortion rates, but I'll leave that open. Another thought is the title: should this have "the case of abortion" added to it?

We have added changed the title to reflect the reviewer’s comments. The title is now “Measuring the impact of health policies using Internet search patterns: the case of abortion”.