Review of: "Human health effects of volcanic eruptions – a systematic review"

Jakob H. Bonlokke

Potential competing interests: No potential competing interests to declare.

The paper gives a nice overview of what health effects have been associated with volcanic eruptions but unfortunately provide little information apart from that and provides too little informations of scientific relevance for publication of its current content. I find the topic important and a systematic review relevant, but I think it requires major changes before a final publication. I will discuss the paper from a public and environmental health perspective, but as volcano experts have pointed out in their review, there might be an important lack of literature including such effects, limiting the value of the review. There are several language and minor error issues.

Abstract. The information that " 81% (n = 21) of the short-term and 74% (n=23) of the long-term studies consider that there is an affectation due to volcanic eruptions, compared to 11% (n=3) and 13% (n=4), respectively, that did not find this relationship" is not very informative because it does not say anything about the severity of the affectations or whether studies not finding relationships were of a design that was unlikely to identify such affectations.

The statement that "Heterogeneous results among studies reinforce the need to continue developing new studies" is not supported by results in the abstract because the abstract does not give any results about this heterogeneity. Rather it gives the impression that the majority of studies observed health effects and very, thus, not very heterogenous. Further the conclusion that "most of the scientific community and international organizations agree that volcanic eruptions impact human health" is of little interest because there is no question whether such eruptions impact human health if exposure is sufficiently high. The questions of interest re rather which diseases, at what distance, to what extent, for how long time such impacts occur.

Materials: The search strategy is simple and appears to be somewhat random in its selection of words and likely missed studies because of that. It could be improved by the use of MESH terms. On the other hand it included some broad terms and several languages which is certainly a strength.

The quality assessment appears sound although the PRISMA statement is lacking. Figure 1 shows 62 studies excluded because of wrong design. But design is not mentioned as an exclusion criteria in the list in table 1, so this is strange.

Results: The studies and their findings are simply listed and does not give any information about severity of the diseases or whether e.g., asthma is examined for exacerbations only or for incidence. Thus the results serve mostly to give an overview of how many studies have been performed. This could have been better presented in a table. There is no information about whether impacts were likely due volcanic eruptions or could be due to derived effects such as

displacement or social unrest.

The review does not provide information about whether impacts were statistically significantly increased in all studies reporting such increases. I also miss information about whether differences in study size and designs or differences in eruption severity and duration could explain why some studies found no evidence for health effects.

Discussion:

The review does not contain information that warrant stating “These pathologies occurred mainly because of exposure to ash and volcanic gases” – it can only conclude that these were the exposures studied for which associations were given. The statement is common sense, but cannot see from the review if other exposures were considered and investigated. It would be more correct to say that the majority of studies associated the health effects with ash and volcanic gases.

I agree with the authors that “Following a natural disease, infectious disease outbreaks are common due to the displacement of evacuees and environmental changes” (disease should be replaced by disaster here?) and find it relevant to write it, rather than just focusing on ash and gases. However, I think there is ample evidence in the literature that air pollutants rich in metals can affect the airways and immune system and lead to increased risk of infections too.

Asbestos is mentioned as a cause of thyroid cancer. This is not correct, such a link is not given in the reference #72, nor in the reference #72 refers to and it is not commonly considered a cause of thyroid cancer but of other types of cancers, in particular malignant mesothelioma and lung cancer.

Conclusion: Like in the abstract I do not agree that there is sufficient contradictory results in the review to state “Although most studies observed effects on human health, some contradictory results were observed”. Rather I find it warranted to state that respiratory effects, in particular asthma, has been studied and found to increase in a large number of studies whereas for a number of other health outcomes the number of studies is too limited for firm conclusions to be drawn on a relationship.

If the authors can find the ressources to put into the paper, I support the idea of the review and wish good luck.