Reviewer’s report

Title: Particulate matter and emergency visits for asthma: a time-series study of their association in the presence and absence of wildfire smoke in Reno, Nevada, 2013-2018

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Reviewer: Wayne Cascio

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Comments:
L. 69-106. The introduction concisely describes the foundation and background of the study and provides a rationale for the study design.
L. 81-85. The justification for the study and its relevance to public health in Reno, Nevada specifically is explained based on annual impacts by wildfire smoke and climate change and projections of much more smoke in the future. While these are important justifications for the study, there is another which is important to note. It is critically important to have accurate effect estimates of wildland fire smoke on the health of the public so that forest management policies and practice can reasonably reflect the effect of smoke on the population impacted.
L. 107-228. The methods are appropriate.
L. 140-143. There is limited data in the literature that links sub-24-hour exposures to health effects of wildland fire smoke, and virtually no published data on one-hour exposures which in some cases in this study were used to define a "wildfire day". Using your definition of a "wildfire day" is it possible to show a histogram plot the distribution of wildfire days over the course of the study period based on the number of hours of smoke within the 24-hours.
L. 139-141. While at the present time your decision to combine the two major categories of wildland fire smoke, wildfire and prescribed fire into one exposure metric is appropriate, going forward it is definitely important to consider that the health effects might be different between smoke originating from a wildfire versus a prescribed fire given the differences in combustion conditions and fuels. The US Department of the Interior, USDA US Forest Service, and state forestry agencies recognize the need for more prescribed fire in the western US to manage fuel loads. As such, an important goal in future research will be to better define whether health effects differ between wildland fire smoke versus prescribed fire smoke on a µg/m³ to µg/m³ basis. Your present manuscript is a good foundation for such a study because your methodological approach would allow for a comparison of prescribed fire versus wildfire at comparable concentrations.
L. 302. The discussion is well written and places the finding into the broader context of the current literature. The discussion is an appropriate place to provide a general paragraph that describes from where the wildfire smoke originates that impacts the region around Reno, and what type of fuel is burning. For example, emissions originating the forests west of Reno are probably largely from the combustion of pine, fir and grasslands. Consequently, the findings of the study are most relevant to Reno and perhaps populations in the vicinity of the eastern slopes of the Sierra Nevada mountains. It's not clear how these results would relate to the Southeastern US where the predominate forest tree type is pine, or the Appalachian Mountains where hardwoods dominate, or
eastern NC with its pine and peat bogs. A comment should therefore be made about the generalizability of the data and conclusions.

L. 254. The clinical endpoints of interest were emergency department and urgent care center visits for asthma. Two recent publications (Lipner EM, O'Dell K, Brey SJ, Ford B, Pierce JR, Fischer EV, Crooks JL. The Associations Between Clinical Respiratory Outcomes and Ambient Wildfire Smoke Exposure Among Pediatric Asthma Patients at National Jewish Health, 2012-2015. Geohealth. 2019 Jun 3;3(6):146-159. doi: 10.1029/2018GH000142; Gan RW, Liu J, Ford B, O'Dell K, Vaidyanathan A, Wilson A, Volckens J, Pfister G, Fischer EV, Pierce JR, Magzamen S. The association between wildfire smoke exposure and asthma-specific medical care utilization in Oregon during the 2013 wildfire season. J Expo Sci Environ Epidemiol. 2020 Feb 12. doi: 10.1038/s41370-020-0210-x) bring up another issue for the authors to note and that is that the findings of the study could be affected by the behaviors of the individuals with asthma and how they use their bronchodilator medication. Also the current paper refers only the emergency department and urgent care center visits rather than effects on well-being or lung function, and as such doesn't fully reflect the full spectrum of the adverse impacts of air particle pollution. Behavioral influences are recognized in the form of possibly being modified by outdoor temperature, however, rates health care utilization and the appearance of a patient in the ED or UC Center could also be influenced by their knowledge of their disease and the application of their asthma management plan. It is probably more likely that a patient with asthma will activate their asthma management plan with a forecast of impending smoke rather than with non-wildfire PM because the former is more likely to be advertised in the media. Consequently, the differences between wildfire smoke related PM$_{2.5}$ and non-wildfire PM$_{2.5}$ reported in this study are probably attenuated to some degree by use of inhaled medications in advance of and during wildfire smoke exposure. This is obviously speculator but a reasonable consideration.

L. 411-421. The conclusion summarizes the key points presented in the paper are well done, however it is recommended that the authors include a statement that reflects a very important aspect of the study, i.e. the findings represent differences at comparable concentrations of PM associated with wildfires smoke and non-wildfire sources and at relatively low concentrations.

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None.

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