Title: Dataset of filtration efficiency associated with "Quantifying the health benefits of face masks and respirators to mitigate exposure to severe air pollution"

Abstract:

Familiarity with the use of face coverings to reduce the risk of respiratory disease has increased during the coronavirus pandemic; however, recommendations for their use outside of the pandemic remains limited. Here, we develop a modeling framework to quantify the potential health benefits of wearing a face covering or respirator to mitigate exposure to severe air pollution. This framework accounts for the wide range of available face coverings and respirators, fit factors and efficacy, air pollution characteristics, and exposure-response data. Our modeling shows that N95 respirators offer robust protection against different sources of air pollution, reducing exposure by more than a factor of 14 when worn with a leak rate of 5%. Synthetic-fiber masks offer less protection with a strong dependence on aerosol size distribution (protection factors ranging from 4.4 to 2.2.), while natural-fiber and surgical masks offer reductions in exposure of 1.9 and 1.7, respectively. To assess the ability of face coverings to provide population-level health benefits to wildfire smoke, we perform a case study for the 2012 Washington state fire season. Our models suggest that although natural-fiber masks offer minor reductions in respiratory hospitalizations attributable to smoke (2-11%) due to limited filtration efficiency, N95 respirators and to a lesser extent surgical and synthetic-fiber masks may lead to notable reductions in smoke-attributable hospitalizations (22-39%, 9-24%, and 7-18%, respectively). The filtration efficiency, bypass rate, compliance rate (fraction of time and population wearing the device) are the key factors governing exposure reduction potential and health benefits during severe air pollution events.

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Format of data files – .csv

File Information – Table_S1.csv includes the average ("mask_efficiency_mean") and standard deviation ("mask_efficiency_sd") of measured filtration efficiency for natural-fiber masks, synthetic-fiber mask, surgical mask, and N95 respirator as a function of particle diameter ("diameter_um").

Variable Information:

- *diameter_um* - Particle diameter [microns]
- *natural_efficiency_mean* - Average collection efficiency of the natural-fiber masks [expressed as a fraction]
- *natural_efficiency_sd* - Standard deviation of measured collection efficiency for the natural-fiber masks
- *synthetic_efficiency_mean* - Average collection efficiency for the synthetic-fiber masks
- *synthetic_efficiency_sd* - Standard deviation of measured collection efficiency for the synthetic-fiber masks
- *surgical_efficiency_mean* - Average collection efficiency for the surgical masks

- *surgical_efficiency_sd* - Standard deviation of measured collection efficiency for surgical masks
- *N95_efficiency_mean* - Average collection efficiency for the N95/KN95 respirators
- *N95_efficiency_sd* - Standard deviation of the measured collection efficiency for the N95/KN95 respirators