Review of: "Crude Oil Spills and Respiratory Health of Clean-up Workers: A Systematic Review of Literature"

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Potential competing interests: No potential competing interests to declare.

I have reviewed the manuscript entitled the manuscript entitled *Crude Oil Spills and Respiratory Health of Clean-up Workers: A Systematic Review of Literature* by Pearl Abereton, et al. Briefly this is a systematic review of the pulmonary responses and ensuing respiratory health acutely and over the long-term (where available) to oil spills since the beginning of this century up until the end of June of this year. The authors have reviewed numerous databases and reported the results of 20 articles. The authors cite the subjective (respiratory symptoms) and objective (spirometry results measuring the FVC, FEV1 and the REV1/FVC ratio). The review concluded that there is a high level of exposure by clean up workers and adverse respiratory effect.

I offer the following comments and ask that they be considered in a constructive manner:

1. To begin let me show my appreciation for the work of this group of investigators. The work appears to be inclusive and to accurately reflect the data in the reports that are cited.
   I have not reviewed any of the manuscripts cited – except for the Manuscript describing the PRISMA-P 2015 statement (Moher, 2015). My comments reflect my understanding of the statements presented by the authors.
2. I am used to an introduction in the Results section stating that the “articles were reviewed by two authors (initials cited) and chosen for inclusion. If there was disagreement between the authors and third author (initials cited) was asked to determine whether the manuscript should be included in the work. The kappa coefficient of agreement between the first two authors was XXX.”
   Instead, there is a description of the role of each author at the end of the work.
   However, when I read the PRISMA-P format there was no such requirement. I ask the authors to determine whether this usual statement is appropriate for this work.
3. On page 4/24, the authors cite that *Studies with duplicates, studies not written in the English language, or with weak precision were excluded.* Please describe what a study of “weak precision” might be.
4. On page 4/24, the authors state *A meta-analysis was not done due to the diversity in the methodologies applied in the assessment of exposures and outcome variables*. Numerous meta-analyses have been performed on lung function outcomes. I agree that there is no practical way to address the subjective comments, but with four “data bases”, there may be a way to address lung acutely and serially. I ask that the authors address this.
5. On page 6/24, the authors state that *Twenty-two (20) studies discussed different…* Please review this.
6. On Table 1, the *Mexican Gulf* is more usually referred to as the *Gulf of Mexico*.

7. In this proposal, the main question is how oil spills affects the respiratory health of the exposed population compared to a non-exposed population.

    1. I appreciate the subjective information (i.e., symptoms) but consider the objective information on the effect of the population as a whole (not the sub-groups) more meaningful and reliable.
    2. It is reasonable to recognize that acute lung function decline can occur when workers are heavily exposed to irritants (as would occur in an oil spill; with or without burning oil fumes). It is my opinion that this objective effect (lung function test outcome) over the long term validates the symptoms and is of critical importance.
    3. In large population studies, it is not surprising that sub-groups will be affected in ways that may be different from the group as a whole. Please note that the effect of splitting the population into a number of groups increases the risk that outcomes may be affected by chance and the p value may need to be made smaller.

I have done my best to summarize each of the cited studies to address the long-term effect. I ask that the authors address the objective test results in their conclusions. It may also be reasonable to consider a chart (or as previously cited a meta-analysis of lung function outcomes) to help the reader understand the long-term effects. The text from the manuscript is in italics.

My interest is in documenting the long-term effects on lung function of such exposures. It appears that in many instances – particularly in the larger populations, there was no differences in the lung function outcomes, yet considerable persistence of symptoms. I ask that the authors address this important disparity.

Meo (2008) (n=31) showed an acute decline in lung function but return to baseline one year later.

Meo (2009b) (n=31) showed a decrease in FEV1, FVC and FEF25%-75%, and MVV in those with≥ 15 days of exposure compared to the comparison group. It is not clear when these tests were performed compared to the time of the spill.

D"Andrea and Reddy (2018) (n=44) results comparing baseline to seven years follow-up were reported in the text (9/24) as:

Pulmonary functions had progressively worsened as incidences rose from 0% in the initial study to also include severe pulmonary function abnormalities at 9%. 48%, 34% 16% were incidences of normal pulmonary function, mild pulmonary abnormality, and moderate pulmonary abnormality in the 7-year follow-up study as against 84%, 9%, and 6.8% in the initial study respectively.

Please review these sentences and also the calculation of individuals within the groups.

Gam (2018) (n=4806) showed that those *who smelled chemicals had elevated FEV1 and FVC values than unexposed workers (mean difference (MD): 30 mL; 95% CI: –3, 64 and 30 mL, 95% CI: –9, 70).*

In this summary it is not clear when the lung function tests were performed – note: the authors write that the study was conducted 1-3 years after the spill, btu it is not clear when the spirometry was performed. In addition, the above sentence may be written that there was no statistically significant difference between the exposed and non-exposed population.

Gam (2018b) (n=7780): *The lung function of these groups was assessed using spirometry. Their results showed no differences between workers and non-workers.*

Gam (2018c) (n=not stated): *There were no distinct differences observed in FEV1 or FVC between maximum THC levels and pulmonary function by ordinal THC level. Though there was a reduction in FEV1/FVC in workers with the greatest exposure to THC level than in workers with the lowest exposure, this reduction was not statistically significant (MD: -0.6%, 95% CI: -1.3 to 0.003%). There was therefore no relationship between exposure to THC and the pulmonary function of those who participated in the clean-up operations within 3years after the spill.*

Chen (2022) (n=518 burning exposed workers and 1798 in the referent group). Lung function measured 1-3 years post-exposure: *Workers involved in the combustion of the oil and gas had lower pulmonary function parameters FEV1 and FEV1/FVC when compared with workers who did not take part in the burning of the pollutants or were in close proximity to the burning site [–166.8 mL, 95% CI: –337.0, 4.0 and (–2.0, 95% CI: –4.0, 0.2)] respectively.*

Please note that these lung function differences are not statistically significant.

Rodrigo-Trigo (2010) (n=exposed 107, non-exposed 577). Two-year follow-up post-spill. *Pulmonary function, however, did not differ remarkably between the two groups (Rodriguez-Trigo et al., 2010) as seen in Table 2*

Zock (2014) (n=230 workers compared to 87 non-exposed) showed *that in the non-exposed, the pulmonary function, hyperresponsiveness of the bronchi and the growth factors and the respiratory biomarkers of oxidative stress levels had remarkably declined than in the exposed and also the parameters of the respiratory health were either the same or better in clean-up workers than in non-exposed, particularly, the FEV1/FVC and the FEF25–75% were remarkably elevated in the exposed after controlling for potential confounding variables, revealing that long-term RH consequences were not detected 6 years after the oil spill and the 4 years follow-up (Zock et al., 2014) as seen in Table 2.*