

PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (<http://bmjopen.bmj.com/site/about/resources/checklist.pdf>) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

This paper was submitted to a another journal from BMJ but declined for publication following peer review. The authors addressed the reviewers' comments and submitted the revised paper to BMJ Open. The paper was subsequently accepted for publication at BMJ Open.

ARTICLE DETAILS

TITLE (PROVISIONAL)	Exposure to traffic and lung function in adults: A general population cohort study
AUTHORS	Carlsen, Hanne Krage; Kim, Jeong-Lim; Levinsson, Anna; Modig, Lars; Torén, Kjell; Nyberg, Fredrik; Olin, Anna-Carin

VERSION 1 - REVIEW

This manuscript received two reviews from another journal from BMJ but the reviewers have declined to make their reviews public.

VERSION 2 – REVIEW

REVIEWER	Atkinson, Richard St George's, University of London England
REVIEW RETURNED	16-Mar-2015

GENERAL COMMENTS	<p>I remain unconvinced about the choice of regression model as the outcomes are very small percentage changes - are the assumptions for linear regression models satisfied or is a transformation required?</p> <p>I am less than confident about the statistical analyses because of basic errors in data reporting: i) numbers in text (para 2 of Results) do not match n in Table 1 for low and medium exposure groups; ii) the total number of subjects in Table 2a is 5496 not 5441 as stated in text (para 1 Results section).</p> <p>The estimated lung function decrements are small - are they clinically important?</p> <p>Smoking seems to differ substantially by exposure group. Although he models have adjusted for smoking I would still be cautious about the possibility of confounding by smoking. How confident are the authors in the validity of the smoking variable? What about excluding current smokers and re-analysing?</p> <p>What about adjustment for socio-economic status? How well does education deal with this?</p>
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VERSION 2 – AUTHOR RESPONSE

1. I remain unconvinced about the choice of regression model as the outcomes are very small percentage changes - are the assumptions for linear regression models satisfied or is a transformation required?

Answer: As our outcome is already a percentage a further transformation could leave us with more problems. We have checked the residuals which appear normal distributed, and autocorrelation functions are also ok for the models.

The distribution of the outcomes approach normal distribution. The skewness of the distribution of %predicted FVC is -0.123, rather symmetric. The skewness of %predicted FEV1 is -0.483, still within the range of approximately symmetric. We have added these numbers to the results section page 6 (revised text is highlighted with blue colour).

"The skewness of the distribution of %predicted FVC was -0.123, rather symmetric. The skewness of %predicted FEV1 was -0.483, within the range of approximately symmetric."

2. I am less than confident about the statistical analyses because of basic errors in data reporting: i) numbers in text (para 2 of Results) do not match n in Table 1 for low and medium exposure groups; ii) the total number of subjects in Table 2a is 5496 not 5441 as stated in text (para 1 Results section).

Answer: The numbers in paragraph 2 of the results had been mixed up during a rewriting in a previous revision of the manuscript. We thank the reviewer for pointing this out, and have corrected this in the text and tables.

3. The estimated lung function decrements are small - are they clinically important?

Answer: The clinical impact of few percentage point change in lung function is admittedly limited, but although small, we believe that in a public health perspective, the decrements are of importance. Especially considering the increased decrements found in the sub-populations of smokers and individuals with obstructive lung disease.

4. Smoking seems to differ substantially by exposure group. Although the models have adjusted for smoking I would still be cautious about the possibility of confounding by smoking. How confident are the authors in the validity of the smoking variable? What about excluding current smokers and re-analysing?

Answer: We understand the reviewer's concerns that smoking is somewhat unevenly distributed across exposure strata. We are confident in the validity of the smoking variable in the data. However, the lack of association in non-current smokers is illustrated in figure 1 and supplementary table 2. The combination of results in table 2a from the never and former smokers (combining result from figure 1) and stratified by gender, table 3 are in the table below.

Table A : Reanalysis of results in table 3 excluding current smokers, women (left) and men (right) adjusted for covariates

Women (n= 2346) Men (n=2186)

FVC FEV1 FVC FEV1

β p for trend β p for trend β p for trend β p for trend

>500 m - - - -

75-500 m -1.09 0.94 0.14 0.48

<75 m -1.17 0.04 0.67 0.16 0.07 0.83 0.44 0.44

(this table is better viewed in the word file)

These results further shows that while excluding non-smokers modify the effect of living close to

dense traffic, the association with FVC in high-exposed women is robust and remains significant.

5. What about adjustment for socio-economic status? How well does education deal with this?

Answer: Education alone is not a perfect marker of socio-economic status, but strong associations have been found between education level and prevalence of respiratory symptoms and poor lung function, (e.g. Bakke, et al., 1995), though the authors of that paper speculate that education is a better marker in men than in women, as the socio-economic level of women is dependent on the income of her husband. However, there is a correlation between education and income, and one advantage of education level is that it generally precedes occupational exposure and morbidities, which would affect income and labour market participation (Prescott and Vestbo, 1999).

Prescott et al, 1999 stratified by both income and education in analysing lung function and found results for both, but as we only had access to education, we are somewhat limited. We have added the following sentence and reference about this to the limitations section on page 10.

"Education was used as a measure of socio-economic status, but unfortunately no information about income or occupation were available, which could have improved the measure. Education is usually a better marker of socio-economic status in men than in women[Prescott & Vestby, 1999(31)]."

References:

Bakke, et al., 1995. Educational Level and Obstructive Lung Disease Given Smoking Habits and Occupational Airborne Exposure: A Norwegian Community Study. *Am. J. Epidemiol.* 141, 1080–1088.,

Prescott, E., Vestbo, J., 1999. Socioeconomic status and chronic obstructive pulmonary disease. *Thorax* 54, 737–741.

Prescott, E., Lange, P., Vestbo, J., Group, A.T.C.C.H.S., 1999. Socioeconomic status, lung function and admission to hospital for COPD: results from the Copenhagen City Heart Study. *European Respiratory Journal* 13, 1109–1114. doi:10.1034/j.1399-3003.1999.13e28.x