

Syddansk Universitet

Respiratory, sensory and general health symptoms in populations exposed to air pollution from biodegradable wastes

Blanes-Vidal, Victoria ; Bælum, Jesper; Schwartz, Joel; S. Nadimi, Esmail; Løfstrøm, Per; Christensen, Lars Porskjær

Publication date:
2014

Document version
Final published version

Citation for published version (APA):

Blanes-Vidal, V., Bælum, J., Schwartz, J., S. Nadimi, E., Løfstrøm, P., & Christensen, L. P. (2014). Respiratory, sensory and general health symptoms in populations exposed to air pollution from biodegradable wastes. Abstract from 26th Conference of the International Society for Environmental Epidemiology, Seattle, United States.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal ?

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Respiratory, Sensory and General Health Symptoms among Populations Exposed to Air Pollution from Biodegradable Wastes

Victoria Blanes-Vidal¹, Jesper Bælum², Joel Schwartz³, Esmail S. Nadimi⁴, Per Løfstrøm⁵, Lars P. Christensen¹

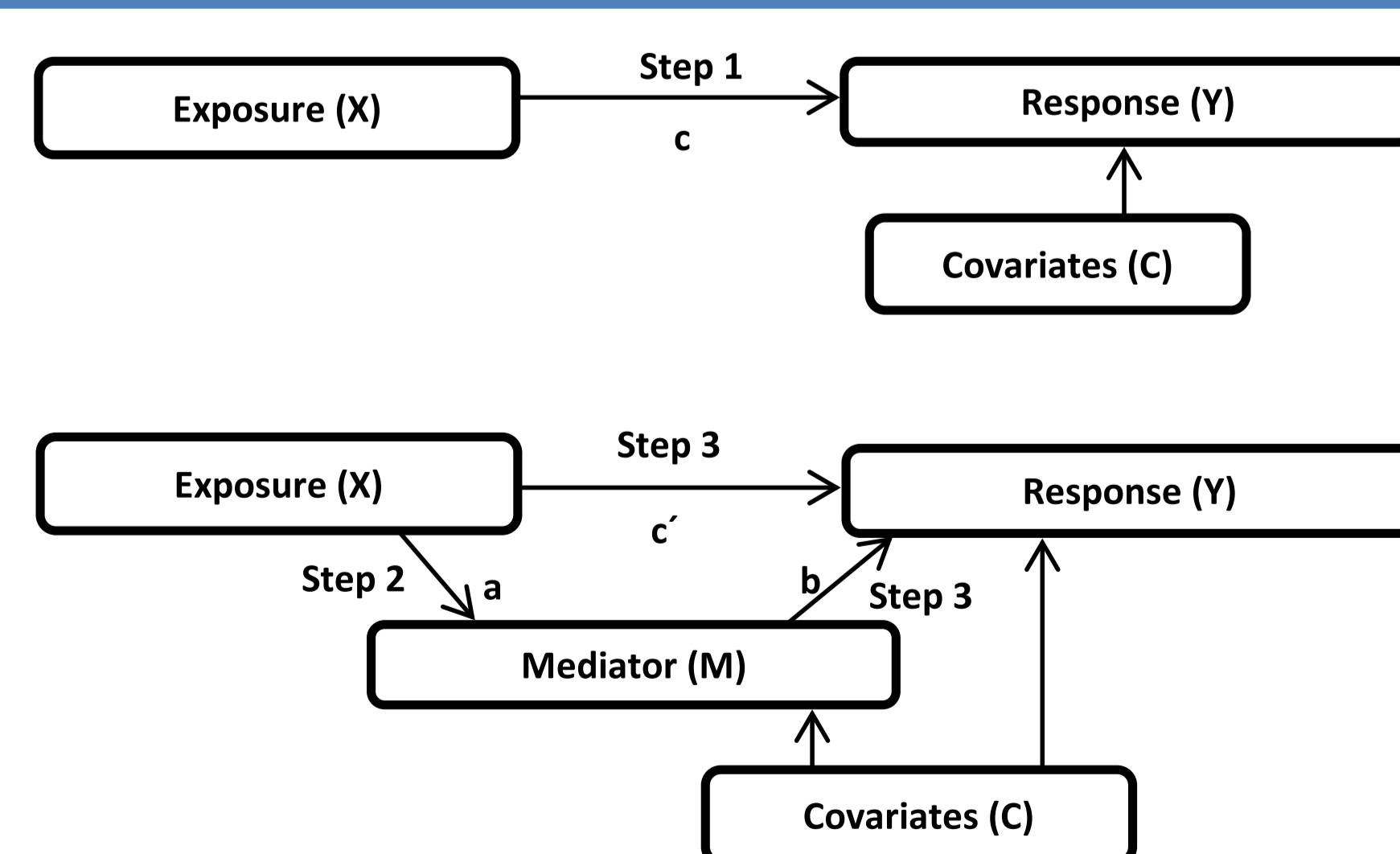
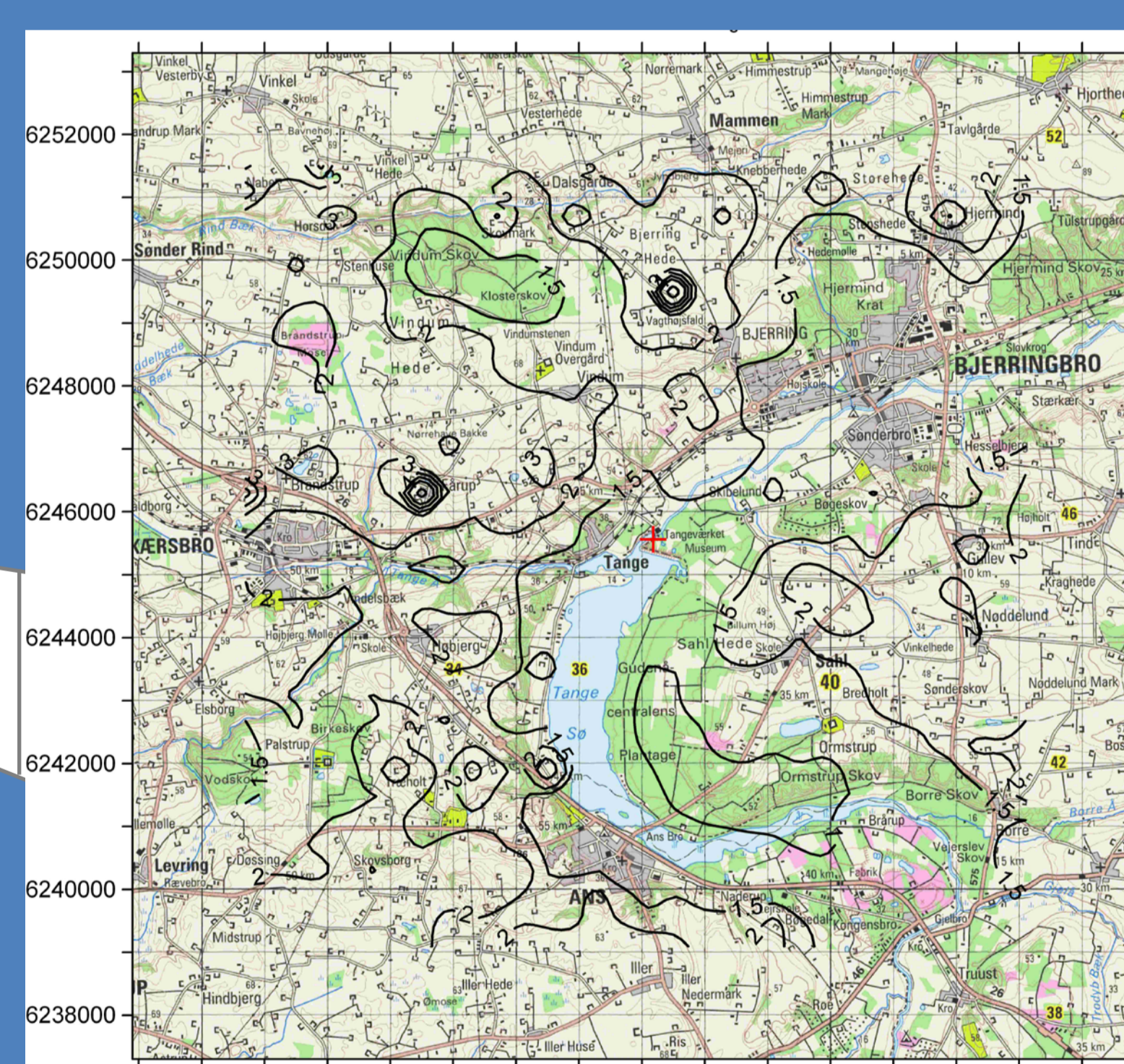
Correspondence to: V. Blanes-Vidal, Associate Prof., PhD, Department of Chemical Engineering, Biotechnology and Environmental Technology, Faculty of Engineering, University of Southern Denmark, Odense, Denmark E-mail: vbv@kbn.sdu.dk

Background

- A large number of potentially hazardous pollutants are emitted during handling, storage, treatment and disposal of agricultural, animal and municipal biodegradable wastes.
- However, few investigations have examined the adverse effects that chronic exposures to low-to-moderate air pollution from biodegradable wastes, may have on the health of local residents.
- Besides, most studies have relied on distances to waste sites to assign exposure status, and have not investigated whether these potential exposure-health associations were direct or indirect (stress-mediated).

Methods:

- Individual-specific exposures to a proxy indicator of biodegradable waste pollution (ammonia, NH₃) in non-urban residences (6 regions of 12x12 km, n=454) during 2005-2010 were calculated by the Danish Eulerian long range transport model (DEHM) and the local-scale transport deposition model (OML-DEP).
- Logistic regression and mediating analyses were used to examine associations between exposures and questionnaire-based cross-sectional data on odor annoyance and symptoms, after adjusting by person-specific covariates.



Results

- Individual NH₃ exposures were associated with odor annoyance, increased frequency of “eyes itching, dryness or irritation” and “cough” (OR_{adj} = 3.72; 95%CI: 2.41–5.75; OR_{adj} = 1.69; 95%CI: 1.09-2.61 and OR_{adj} = 1.75; 95%CI: 1.12-2.74, respectively, for each unit increase in Log_e(NH₃ exposure)). Significant associations were also found between individual NH₃ exposures and “chest wheezing or whistling” and “runny nose”.
- Associations between exposures and some health symptoms (“nose itching, dryness or irritation” and “runny nose”, nausea, headache, dizziness, difficulty concentrating and unnatural fatigue) were indirect (annoyance-mediated).
- Partial mediation (involving both direct and indirect effects) was found for “eyes itching, dryness or irritation” and “cough”.

Conclusions

- Environmental exposures play an important role in the genesis of respiratory, sensory and general health symptoms among residents exposed to low-to-moderate air pollution from biodegradable wastes.
- People exposed air pollution from these wastes experienced an increased frequency of respiratory and sensory irritation symptoms, and those increases showed a dose-response.
- In some cases, the health effects of air pollution seem to be indirect, relayed through stress-related mechanisms. However, we found evidence of direct effects for some of the symptoms as well.

References and more information:

- Blanes-Vidal V, Bælum J, Schwartz J, Løfstrøm P, Christensen LP. 2014. Respiratory and sensory irritation symptoms among residents exposed to low-to-moderate air pollution from biodegradable wastes. *Journal of Exposure Science and Environmental Epidemiology*. In press. <http://www.nature.com/jes/journal/vaop/ncurrent/full/jes201420a.html>
- Blanes-Vidal V. 2014. Air pollution from biodegradable wastes and non-specific health symptoms among residents: Direct or annoyance-mediated associations?. *Chemosphere*. In press.
- Blanes-Vidal V, Bælum J, Nadimi ES, Løfstrøm P, Christensen LP. 2014. Chronic exposure to odorous chemicals in residential areas and effects of human psychosocial health: Dose-response relationships. *Science of the Total Environment*. 490:545-554.

¹Department of Chemical Engineering, Biotechnology and Environmental Technology, University of Southern Denmark

²Institute of Public Health, Research Unit of General Practice, University of Southern Denmark

³Harvard Center for Risk Analysis, Harvard School of Public Health, Harvard University, Boston, Massachusetts, USA

⁴Maersk Mc-Kinney Moller Institute, Faculty of Engineering, University of Southern Denmark

⁵Department of Environmental Science, Aarhus University, Denmark