

CDR Contextual Data Resource
for Aging Surveys

Documentation for

Nitrogen Dioxide LUR Model Estimates

Version 1.0, released December 2018

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Requested Acknowledgment

If you used the HRS Contextual Data Resource data in a written analysis, please include the following acknowledgement:

This analysis uses data or information from the Contextual Data Resource (CDR): Nitrogen Dioxide LUR Model Estimates, 2000-2010, Version 1.0 as of December 2018, developed by Jennifer Ailshire and Hyewon Kang at the USC/UCLA Center on Biodemography and Population Health. The development of the CDR was funded by the National Institute on Aging (R21 AG045625, P30 AG017625).

Suggested Citation

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Data Sources

Empirical Model Database, http://spatialmodel.com/concentrations/Bechle_LUR.html

The data were obtained from Bechle et al (2016) whose work was supported by the National Science Foundation under Grant No. 1236800 and by the Minnesota Supercomputing Institute.

Version Note

We are not aware of plans to update this data in the future.

Linking CDR Data with Survey Respondent Data

The Contextual Data Resource is designed to be linked with geocoded survey data.

All geographic identifiers are in string format and match the US Census Bureau Geographies for census tracts. The census tract level data has been harmonized to the 2010 census tract boundaries.

- To link census tract level data, merge using the 11-digit LINKCEN2010 geographic identifier, which is the 2-digit state + 3-digit county + 6-digit census tract FIPS code.

Data Overview

The Nitrogen Dioxide (NO₂) Land Use Regression (LUR) Model Estimates data include estimates of ambient NO₂ air pollution concentrations (ppb) using land-use regression models for the entire United States. Fixed-site regulatory monitor data, satellite-derived NO₂ estimates, and GIS-derived land-use data were used to model national-scale continuous surface estimates of NO₂ over time. Data are available at the census tract level in monthly, quarterly, and annual estimates from 2000-2010. See the variable codebook for details.

Data Summary

Dataset Name: NO₂ Land-Use Regression (LUR) Model Estimate Data

Data Source: Empirical Model Database

Data Source URL: http://spatialmodel.com/concentrations/Bechle_LUR.html

Data Collection Method: EPA fixed-site monitoring, satellite-derived estimates, and GIS-derived land-use data.

Years Collected: The data range from 2000 to 2010 and are made available as monthly, quarterly, and annual estimates.

Geographic Level of Collection: Data are collected at XY coordinates and made available at the census tract level.

Dataset Notes

This data contains modeled monthly average NO₂ concentration in years between 2000 and 2010 using a land use regression analysis for 64,886 census tracts.

The data were obtained from Bechle et al (2016), whose work was supported by the National Science Foundation under Grant No. 1236800 and by the Minnesota Supercomputing Institute.

The Land-use regression (LUR) is an empirical-statistical technique that uses in situ concentration measurements and information about surrounding land-uses to estimate concentrations for nonmeasurement locations. The regression analysis incorporates six land-use characteristics (impervious surface, tree canopy, population, and major/minor/total road length) and three point-based values (elevation, distance to coast, and satellite NO₂). NO₂ estimates at census tracts are calculated as the mean of all block centroid (based on 2000 census block) predictions within tract.

All of the Census data is year 2000, and were obtained from <https://www.nhgis.org/>

For further information on the NO₂ Land-use regression model, please see following published journal papers:

Bechle, M. J., Millet, D. B., & Marshall, J. D. (2015). National spatiotemporal exposure surface for NO₂: monthly scaling of a satellite-derived land-use regression, 2000–2010. *Environmental Science & Technology*, 49(20), 12297-12305.

Clark, L. P., Millet, D. B., & Marshall, J. D. (2014). National patterns in environmental injustice and inequality: outdoor NO₂ air pollution in the United States. *PloS one*, 9(4), e94431.

Clark, L. P., Millet, D. B., & Marshall, J. D. (2017). Changes in Transportation-Related Air Pollution Exposures by Race-Ethnicity and Socioeconomic Status: Outdoor Nitrogen Dioxide in the United States in 2000 and 2010. *Environmental Health Perspectives*, 125(9), 097012-097012.

Novotny, E. V., Bechle, M. J., Millet, D. B., & Marshall, J. D. (2011). National satellite-based land-use regression: NO₂ in the United States. *Environmental science & technology*, 45(10), 4407-4414.

Variable List

Name	Definition	Geography	Years
<u>Geographic Identifiers</u>			
p101	Tract ID (2000 FIPS)	Tract	All years
<u>NO₂ Annual Average Estimates</u>			
p105	Mean NO ₂ Annual	Tract	2000-2010
<u>NO₂ Quarterly Average Estimates</u>			
p106	Mean NO ₂ (Q1: Jan-Mar)	Tract	2000-2010
p107	Mean NO ₂ (Q2: Apr-Jun)	Tract	2000-2010
p108	Mean NO ₂ (Q3: Jul-Sep)	Tract	2000-2010
p109	Mean NO ₂ (Q4: Oct-Dec)	Tract	2000-2010
<u>NO₂ Monthly Average Estimates</u>			
p110	Mean NO ₂ (Jan)	Tract	2000-2010
p111	Mean NO ₂ (Feb)	Tract	2000-2010
p112	Mean NO ₂ (Mar)	Tract	2000-2010
p113	Mean NO ₂ (Apr)	Tract	2000-2010
p114	Mean NO ₂ (May)	Tract	2000-2010
p115	Mean NO ₂ (Jun)	Tract	2000-2010
p116	Mean NO ₂ (Jul)	Tract	2000-2010
p117	Mean NO ₂ (Aug)	Tract	2000-2010
p118	Mean NO ₂ (Sep)	Tract	2000-2010
p119	Mean NO ₂ (Oct)	Tract	2000-2010
p120	Mean NO ₂ (Nov)	Tract	2000-2010
p121	Mean NO ₂ (Dec)	Tract	2000-2010