

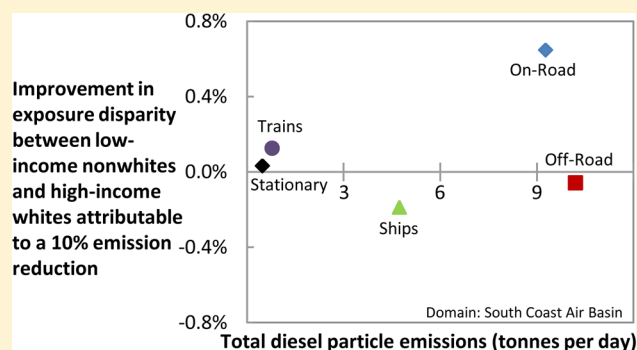
Prioritizing Environmental Justice and Equality: Diesel Emissions in Southern California

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S Supporting Information

ABSTRACT: Existing environmental policies aim to reduce emissions but lack standards for addressing environmental justice. Environmental justice research documents disparities in exposure to air pollution; however, little guidance currently exists on how to make improvements or on how specific emission-reduction scenarios would improve or deteriorate environmental justice conditions. Here, we quantify how emission reductions from specific sources would change various measures of environmental equality and justice. We evaluate potential emission reductions for fine diesel particulate matter (DPM) in Southern California for five sources: on-road mobile, off-road mobile, ships, trains, and stationary. Our approach employs state-of-the-science dispersion and exposure models. We compare four environmental goals: impact, efficiency, equality, and justice. Results indicate potential trade-offs among those goals. For example, reductions in train emissions produce the greatest improvements in terms of efficiency, equality, and justice, whereas off-road mobile source reductions can have the greatest total impact. Reductions in on-road emissions produce improvements in impact, equality, and justice, whereas emission reductions from ships would widen existing population inequalities. Results are similar for complex versus simplified exposure analyses. The approach employed here could usefully be applied elsewhere to evaluate opportunities for improving environmental equality and justice in other locations.



INTRODUCTION

Improving air pollution saves lives and improves public health. Among 51 U.S. metropolitan areas, average life expectancy between 1978 and 2001 increased more in communities with large improvements in air pollution than in communities with little or no improvement in air pollution: each $10 \mu\text{g m}^{-3}$ improvement in fine particle concentration was associated with ~ 7 months added to the average life expectancy.¹ Evaluating and prioritizing options for improving air pollution is an important scientific and policy goal. Here, we quantify distributional aspects of the issue—specifically, which populations would benefit from particular emission-reduction options.

A 1994 Executive Order mandated that environmental justice become a priority among federal agencies.² Similar to language in the Civil Rights legislation, the U.S. EPA’s definition of environmental justice emphasizes process, not outcomes—specifically, “the fair treatment and meaningful involvement of all people regardless of race, color, national origin or income.”³ In terms of performance (outcomes), standards exist for environmental quality (e.g., National Ambient Air Quality Standards) but not for environmental justice.

We found 307 peer-reviewed journal articles that match search criteria for [“air pollution” and “environmental justice”] or [“air pollution” and “environmental equity”] or [“air pollution” and “environmental equality”] in the Web of Science database (search date: August 29, 2013; this literature review is available in

the Supporting Information). Most articles (53%) focus on the United States; of those, nearly all ($\sim 88\%$) indicate higher-than-average risks or exposures for racial minorities or groups of low socioeconomic status (low-SES, e.g., poor, low education, or a combination therefore). Disparities may persist even as concentrations improve.⁴ Little research explores how to improve environmental justice outcomes.⁵ The absence of tools and guidance regarding how decisions can include environmental justice considerations is a major barrier to improvements. This article aims to help address this gap by developing and applying methods for comparing options in terms of their impacts to environmental justice and other goals.

We model the air pollution and exposure benefit that would be expected from reducing diesel-generated emissions of fine particulate matter in Southern California. Diesel-generated particles are almost exclusively $\text{PM}_{2.5}$ (also called fine particles), i.e., particles with aerodynamic diameter smaller than $2.5 \mu\text{m}$. $\text{PM}_{2.5}$ is one of the seven criteria pollutants regulated under the Clean Air Act. PM is commonly estimated to be the most important pollutant in terms of monetized impacts to public health in the U.S.³ and globally.⁶ The South Coast Air Quality

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Table 1. Air Pollution Goals and Metrics

goal	metric	equation ^a	base-case values ^b
impact	intake: the total amount inhaled by the population per day	$\text{intake} = \sum_{i=1}^n C_i Q_i$	380 g d ⁻¹
efficiency	intake fraction: the fraction of emissions that are inhaled by the population	$\text{iF} = \frac{1}{E} \sum_{i=1}^n C_i Q_i$	15 ppm ^c
equality	Atkinson Index: a value of 0 indicates perfect equality; 1 represents maximum inequality	$\text{Atk} = 1 - \left[\frac{1}{n} \sum_{i=1}^n \left[\frac{x_i}{\mu} \right]^{-1-\epsilon} \right]^{1/1-\epsilon}$	0.11
justice	RPD between mean intakes for HIW versus LIN	$\text{RPD} = \frac{ \mu_{\text{HIW}} - \mu_{\text{LIN}} }{\mu}$	44% ^d

^aVariables: C_i , concentration (g m⁻³) for person i ; Q_i , breathing rate (m³ d⁻¹) for person i ; E , total emissions (g d⁻¹); n , number of people; x_i , individual intake (g d⁻¹) for person i ; ϵ , inequality aversion factor (0.75); μ , population mean intake value (g d⁻¹); μ_{LIN} and μ_{HIW} , mean intake for low-income nonwhites (LIN) and high-income whites (HIW), respectively. ^bResults here are for all emissions (overall average); separate values for each emission source are in Figure 2 and Table S1. ^cAn intake fraction of 15 ppm would mean that 15 g of DPM are inhaled for every million grams emitted. ^dAn RPD of 44% means that the difference in average intake for Hispanic and for nonwhite householders with incomes in the bottom 25th percentile (LIN) versus that for white non-Hispanic householders with incomes in the top 25th percentile (HIW) is 44% of the population average (basis: year-2000 Census).

Management District in California reported that PM_{2.5} emitted from diesel engines (“DPM”) is responsible for most (84%) of the outdoor air pollution lung cancer risk in California’s South Coast Air Basin.⁷ For U.S. urban conditions, most (but not all^{8,9}) evidence suggests a linear dose–response for ambient PM_{2.5} in general¹⁰ and for DPM specifically,¹¹ which would indicate that health impacts are proportional to mass of pollution inhaled.

METHODS

We evaluate exposure estimates against four potential goals for emission reduction: impact, efficiency, equality, and justice. In general, decision-makers may wish to use multiple metrics when prioritizing among emission reduction options.

- (1) **Impact** (total population intake) is a surrogate measure of public health burden from a source, and therefore reflects the goal of targeting emission sources with a large total health impact.
- (2) **Efficiency** incorporates the relationship between the total intake and the amount of emissions, reflecting the goal of targeting sources with large health impacts per unit mass emission. Here, we employ intake fraction (i.e., the fraction of emissions that end up being inhaled).
- (3) For **equality**, we employ the Atkinson Index, a metric commonly used to quantify income inequality. For our study, the Atkinson Index calculation did not incorporate race or socioeconomic status; instead, it reflects the goal of having equal exposures among all people.⁵ For air pollution exposures, Atkinson may be preferred to alternative inequality metrics (e.g., Gini).¹²
- (4) For **justice**, we report the difference between average exposure for high-income whites (HIW; here, white non-Hispanics with income in the highest quartile) versus low-income nonwhites (LIN; here, Hispanics and nonwhites with income in the lowest quartile), based on the year-2000 Census. (Figure S1 in the Supporting Information provides a map of HIW and LIN prevalence.) This measure reflects the goal of equal exposures among economic and racial groups.

We employ a 3-D Eulerian photochemical air dispersion model (CAMx; www.camx.com) to simulate the spatial and temporal variability in pollutant concentrations.¹³ CAMx estimates

concentrations of DPM and other pollutants throughout the model domain (240 km × 150 km horizontal; 2 km vertical) based on meteorology, anthropogenic and biogenic emissions, and physicochemical transformations. We simulate the South Coast Air Basin in Southern California for year-2005. Grid resolution is 2 km × 2 km horizontal at ground level; temporal resolution is 1 hour. Using the selected model allows us to comprehensively study the entire air basin, which includes land in several counties (Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties) and extends into the ocean to incorporate emissions from nearby shipping lanes. The model provides no information on within-cell spatial variability in concentrations, such as the increase in concentrations on-roadway or within hundreds of meters of roads or other ground-level sources. The microenvironment model, described below, aims to address the first issue (time spent on-roadway) but not the second (being within hundreds of meters downwind of a road or other ground-level source).

A reactive tracer module¹⁴ separately tracks emissions from the five DPM sources: off-road mobile sources (e.g., construction equipment and heavy diesel equipment), on-road mobile sources (e.g., trucks), ships, trains, and stationary sources (e.g., generators). Our approach does not account for indoor emissions (most diesel engines are outdoors), emission changes relative to year-2005, or secondary PM attributable to, for example, NOx from diesel engines. Meteorological inputs, land use, cloud cover, albedo, ozone levels, and emission estimates are for local conditions.⁷ We employed six CAMx simulations: a base case (no change in emissions) and five sensitivity analyses wherein emissions from one of the five DPM sources are reduced by 10%.

We estimate exposure concentrations (μg m⁻³) and inhalation intake rates (units: μg person⁻¹ d⁻¹) based on four distinct exposure analyses.¹⁵ The reason for employing four distinct analyses is to explore whether conclusions are sensitive to exposure modeling assumptions.

- (1) Our main exposure analysis (“**Census**”) employs year-2000 U.S. Census block group data aggregated into individual 2 km × 2 km grid cells (see Figure S1); this straightforward approach reflects the at-home location for 100% of the Census population, is based on outdoor-only

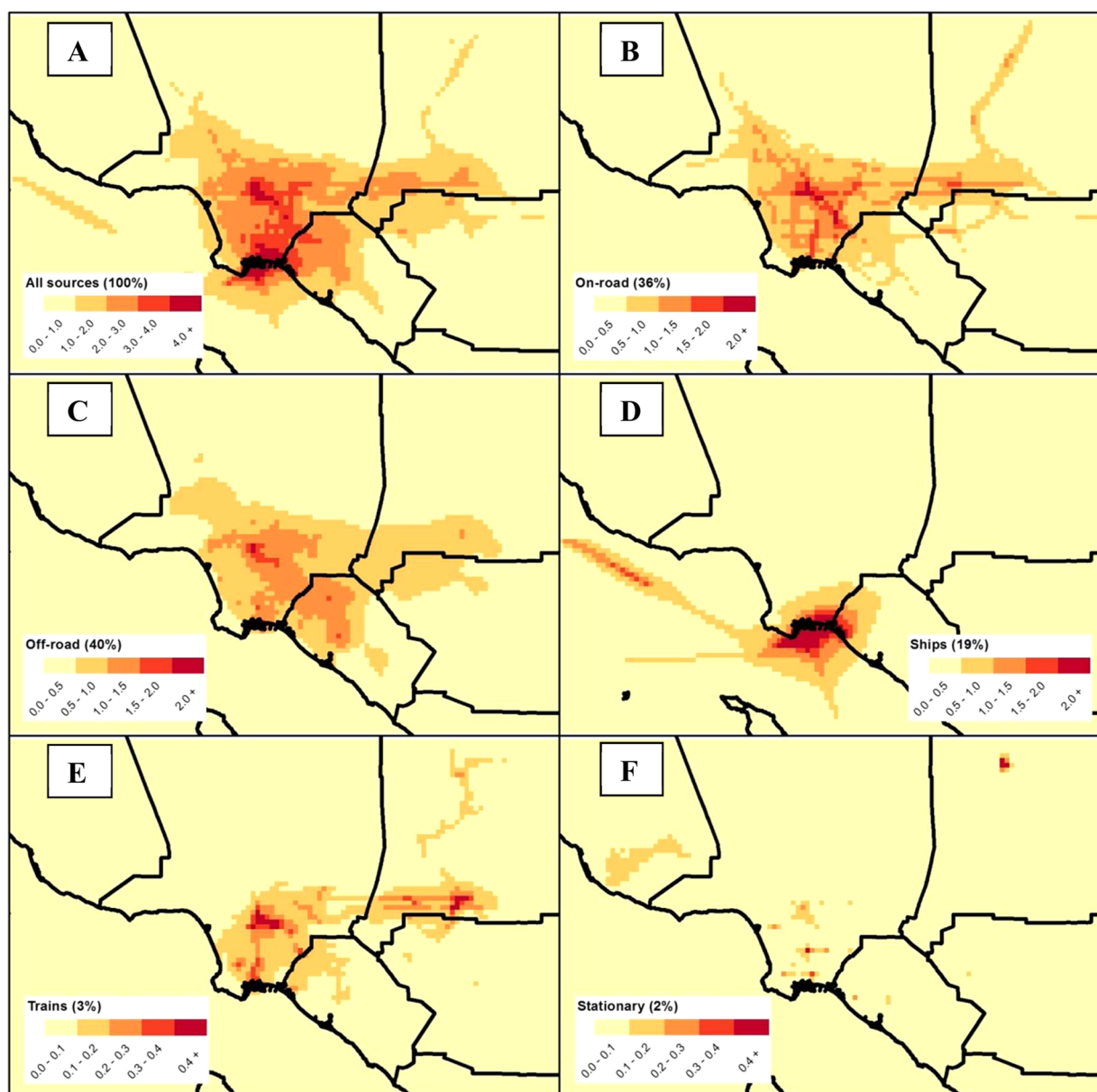


Figure 1. Estimated concentrations ($\mu\text{g m}^{-3}$; year-2005) of fine particles from diesel engines in the South Coast Air Basin for (A) all sources and five source categories: (B) on-road, (C) off-road, (D) ships, (E) trains, and (F) stationary. For visual display, panels (A), (E), and (F) employ different color scales than other panels. Percentages shown (e.g., 40% for off-road sources) indicate each source's proportion of total emissions (~ 28 tonne d^{-1}).

concentrations, and assumes a time-invariant breathing rate ($12 \text{ m}^3 \text{ person}^{-1} \text{ d}^{-1}$).¹⁶

The remaining three exposure analyses incorporate space-time travel patterns documented in the Southern California Association of Governments (SCAG) year-2000 transportation survey.¹⁷ The survey contains fewer people than the Census (15.9 million in the year-2000 Census versus 25 184 survey respondents [0.2% sample]), but with more information per person, including geocoded time–location–activity patterns, which capture travel for work, shopping, recreation, and other purposes.

- (2) To match the Census analysis, we first assume that respondents spend all of their time at home, outside, and at the time-invariant breathing rate ($12 \text{ m}^3 \text{ person}^{-1} \text{ d}^{-1}$); label: “SCAG-base”.
- (3) Next, we incorporate changes in people’s locations (“SCAG-mobile”): we match individuals’ time–location

travel patterns to the corresponding local and time-varying CAMx-predicted concentration. Here, we ignore microenvironments (i.e., assume people remain outdoors) and employ time-invariant breathing rates.

- (4) Finally, “SCAG-full” is the most realistic simulation: we include daily mobility, microenvironment factors, and a time-varying breathing rate (depending on activity, for example, exercising versus sleeping).¹⁴ Microenvironment factors account for whether the person was indoors, outdoors, or in transit (e.g., in-vehicle): buildings can provide protection against outdoor DPM, whereas concentrations may be higher in-vehicle¹⁸ than the CAMx grid cell average concentration.

RESULTS AND DISCUSSION

Results reflect modeled year-2005 exposure to DPM. Metrics for the four goals are summarized in Table 1. Dispersion model

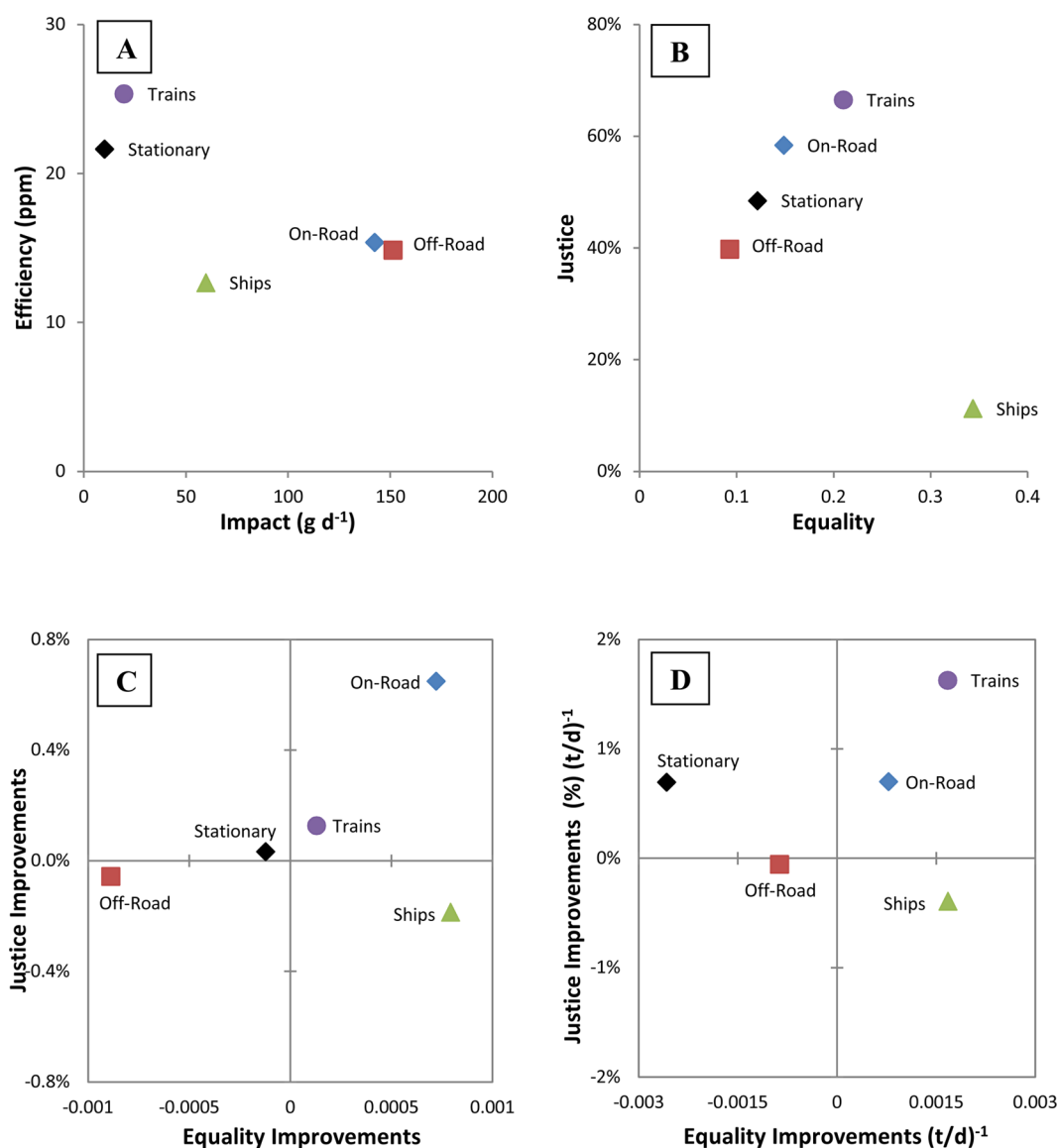


Figure 2. Upper plots show comparisons of (A) impact (intake) and efficiency (intake fraction), and (B) equality (Atkinson Index) and justice (RPD between the high-income non-Hispanic whites and low-income nonwhites), considering each source individually. For example, considering train emissions by themselves, the resulting exposures exhibit an Atkinson index of 0.21 and a RPD of 67%. Lower plots show changes in the equality and justice metrics for total exposures, for (C) a 10% change in emissions from a source and (D) a 1 tonne d^{-1} change in emissions from a source. Plots (C) and (D) account for exposure changes in the context of total exposures (i.e., emission reductions for each source, assuming other sources are held constant), whereas plots (A) and (B) examine emission reductions in isolation (i.e., emission reduction for each source, assuming other sources have zero emissions); as such, we argue that plots (C) and (D) are more relevant for policy than is plot (B). Panels (C) and (D) indicate that reducing train and on-road emissions would improve environmental justice and environmental equality. For example, reducing on-road emissions by 10% would improve the justice metric by 0.70% (from 44% to 43.3%); reducing train emissions by 1 tonne day^{-1} would improve the justice metric by 1.6% (from 44% to 42.4%).

results are in Figure 1. The largest sources of DPM are off-road and on-road, followed by ship emissions (the Los Angeles/Long Beach Ports are the busiest container complex in the U.S. and the sixth busiest in the world¹⁹), and then trains and stationary sources. With use of the Census exposure model, the base case DPM intake estimates are (arithmetic mean \pm SD) $24 \pm 12 \mu\text{g person}^{-1} \text{d}^{-1}$. Other results are intake fraction: 15 mg inhaled per kg emitted (i.e., 15 ppm), Atkinson Index 0.11, and relative percent difference (RPD) mean intake is 44% higher for LIN than it is for HIW relative to the population average. These findings are consistent with previous research for the South Coast documenting higher exposures for low-SES and nonwhites than for high-income whites.^{4,20–25}

Figure 2 and Table S1 show results for the four metrics, representing the four goals (Table 1), for each emission source. A point in the upper-right of any of the Figure 2 plots disproportionately worsens the metrics for the respective goals. Stated differently, a point in the upper-right of any of the Figure 2 plots is a good candidate for reduction because that source would provide the largest improvement toward the respective goals. Figure 2a,b characterizes each source based on current emissions. For example, Figure 2a shows that the population living in the South Coast cumulatively inhales $\sim 20 \text{ g d}^{-1}$ of DPM from trains and $\sim 140 \text{ g d}^{-1}$ of DPM from on-road sources. Figure 2c,d shows absolute and relative, respectively, changes in the equality and justice metrics resulting from

changes (here, a 10% reduction) in emissions. Figure 2b–d illustrates multiple ways of investigating emission reductions. Figure 2b identifies source-specific impacts, treating each source in isolation. Figure 2c,d shows each source in the context of all other sources. For example, as shown in Figure 2c, reducing on-road emissions by 10% would decrease the total relative percent difference between LIN and HIW exposures by 0.65% and would decrease the Atkinson Index by 0.0007. Figure 2c,d considers each emission source in the context of other existing sources, rather than in isolation (i.e., ignoring other emission sources) as in Figure 2b. We believe that Figure 2c,d is generally more relevant to policy decisions than Figure 2b is.

Trains have the highest value for intake fraction (Figure 2a) and for justice (Figure 2d): if reducing emissions by 1 tonne d^{-1} , then the total population exposure reduction would be greatest for trains relative to the other sources and the reduction in intake differential between HIW and LIN groups would be greatest for trains relative to the other sources. On-road and off-road mobile sources have the largest impact values because they have the largest emissions, intakes, and estimated health impacts. Stated differently, for maximum health benefit from DPM, if we could reduce one source's emissions by a relative amount (e.g., 10%), we should target on- or off-road mobile sources; if instead we could reduce one source's emissions by an absolute amount (e.g., 1 tonne d^{-1}), we should target trains. Consideration of environmental equality and environmental justice would suggest targeting on-road mobile sources if emissions were reduced by a relative amount (Figure 2c), and targeting trains if emissions reduced by an absolute amount (Figure 2d).

When considering each source independently (Figure 2a,b), none exhibit values near or below zero for the environmental justice metric. This finding reflects that each source delivers intakes that on average are larger for LIN than for HIW groups.

In Figure 2c,d, ship emission reductions yield a positive equality score yet a negative justice score. That observation reflects an important finding: while the terms “environmental equality” and “environmental justice” are often used interchangeably, they reflect distinct goals. Emission reductions from ships would result in a more equal distribution when considering all people (lower Atkinson Index), yet a slightly higher gap between HIW and LIN groups. The underlying reason is that in terms of justice, while there is a difference in exposures from ship emissions (e.g., higher for LIN than for HIW groups; see Figures 2b and S2), there is less of a difference than for other DPM sources; therefore, reducing only ship emissions would worsen the environmental justice metric. In terms of equality, exposures from ship emissions are comparatively localized (Figure 1d); reducing ship emissions would reduce exposures for a small population receiving relative large exposures, thereby reducing the Atkinson Index. Ship emissions occur in shipping lanes and in the port; the former impact the predominantly affluent populations along the coast and the latter, which constitute a majority of this source's emissions, impact the more economically and racially diverse populations near the port. Many of the results presented above are framed in terms of emission reductions, but would have equal relevance for emission increases.

Results given thus far reflect the Census exposure model. We conducted three sensitivity analyses using travel diaries, to explore varying assumptions regarding how exposures are calculated—for example, accounting for changes in exposure from changing locations (e.g., movement for work, school, and recreation) and from varying microenvironments (e.g., indoors,

outdoors, or in-vehicle). Results of the sensitivity analyses are in Figure S3. The magnitude and rank order of main results (metrics in Figure 2) are generally similar in the three sensitivity analyses as in the Census results, supporting the use of the Census exposure model, rather than more sophisticated exposure models, for investigations considered here. Impact, efficiency, and equality metrics appear more robust to the exposure method than the justice metric. A potential reason for this methodological sensitivity is that the travel diaries over-represent HIW individuals relative to the actual population (2000-census); relative to the other metrics (impact, efficiency, and equality), the justice metric may be more sensitive to the population sample being demographically representative.

Our results for DPM in the South Coast highlight the importance of train and on-road emissions. In terms of justice, equality, and exposure efficiency, increasing train emissions would worsen conditions; reducing train emissions would improve conditions. However, trains constitute only a small percentage (~3%) of total DPM emissions. So even reducing train emissions to zero would not have major impacts on air quality; having major impacts requires targeting on- and off-road mobile sources, which together constitute a majority of total emissions. Reducing on-road emissions would also improve environmental equality and justice. When prioritizing emission reductions based on the four environmental goals, strategies should focus on on-road mobile sources if reducing one source's emissions by a relative amount (e.g., 10%) and train emissions if reducing one source's emissions by an absolute amount (e.g., 1 tonne d^{-1}).

Results given here reflect spatial relations between people, emissions, and concentrations. Our approach could readily and usefully be applied to other urban areas to quantify and prioritize addressing environmental inequalities and environmental injustices. We see little reason why dispersion modeling required by the Clean Air Act could not be adopted or modified to investigate justice and equality concerns in polluted regions nationwide. Environmental equality and justice issues require attention in terms of not only process but also air quality.

■ ASSOCIATED CONTENT

⑤ Supporting Information

Demographic data, exposure reduction improvements analysis, complex exposure analysis, and literature review. This material is available free of charge via the Internet at <http://pubs.acs.org>.

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Notes

The authors declare no competing financial interest.

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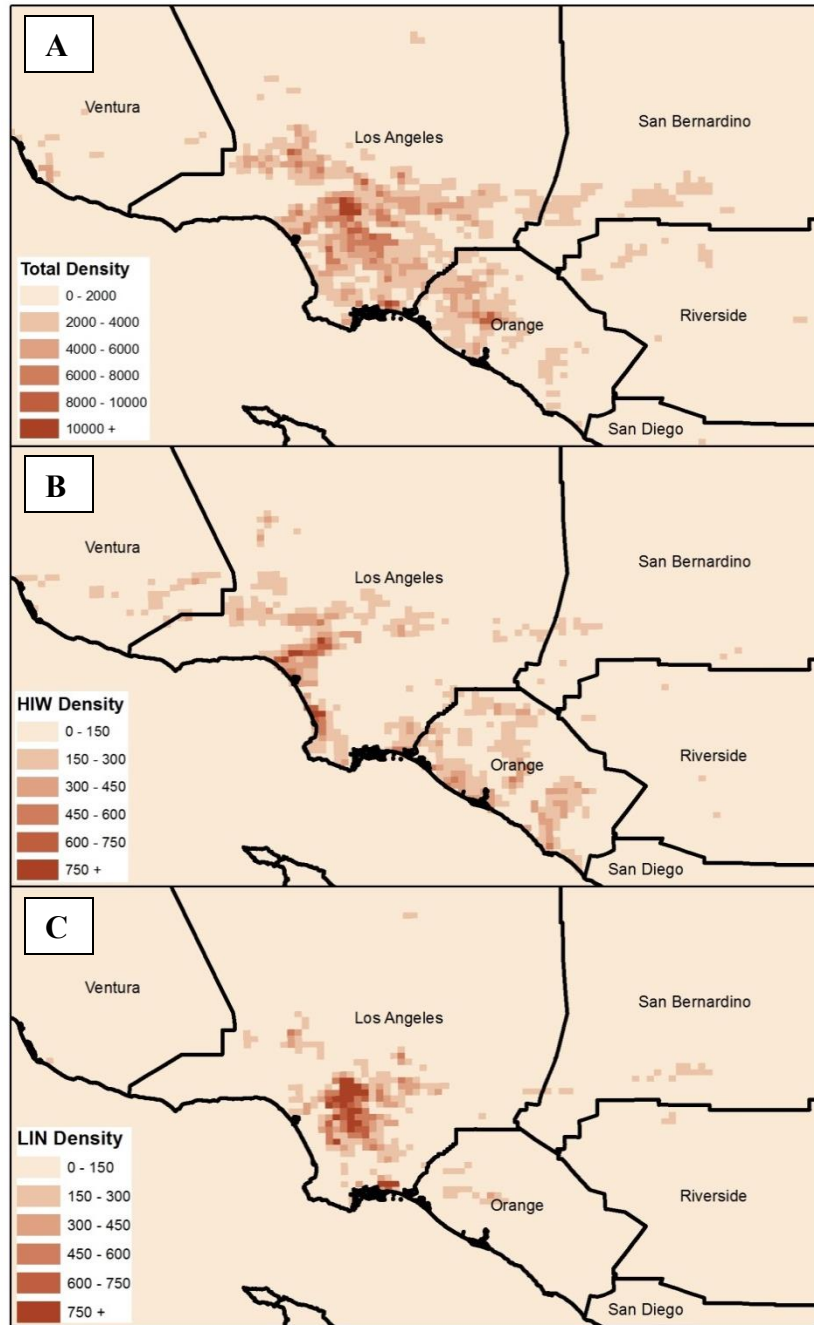
1 **Prioritizing environmental justice and equality:**
2 **diesel emissions in Southern California**

3 *AUTHOR NAMES. Julian D. Marshall*, Kathryn R. Swor, Nam P. Nguyen*

4 Number of SI Pages: 6

5 Number of SI Tables and Figures: 5

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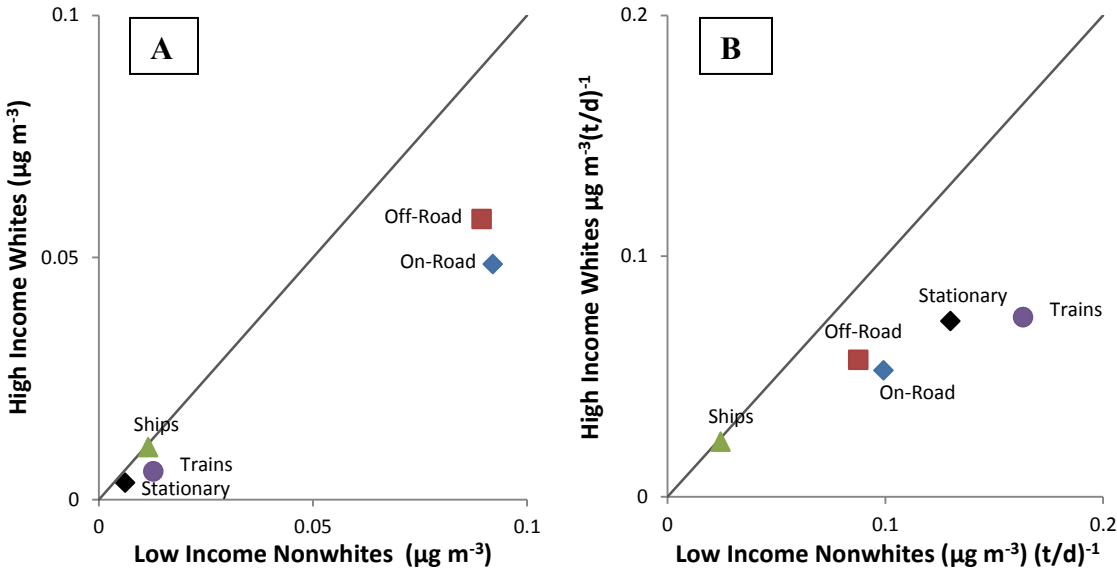
8 **Figure S1.** Population density (people km⁻²) for (A) total population, (B) white non-Hispanics
 9 with income in the highest quartile (HIW) and (C) nonwhites with income in the lowest quartile
 10 (LIN) for the South Coast Air Basin (basis: year-2000 Census).
 11

12

13

14 **Results.** Table S1 summarizes metrics by emission source. Figure S2 shows how exposure
 15 reductions from each source would impact white non-Hispanics with income in the highest
 16 quartile (HIW) and nonwhites with income in the lowest quartile (LIN); this figure further
 17 emphasizes that all five sources result in exposures that are disparate among economic and racial
 18 lines. (Exposures to ship emissions are only slightly larger for LIN than for HIW individuals.
 19 Reductions in ship emissions would increase the disparity between LIN and HIW [thereby
 20 worsening the environmental justice metric], because LIN/HIW exposure differences are smaller
 21 for ship DPM emissions than for the average of all DPM emissions.)

22



23

24 **Figure S2.** Concentration exposure improvement for high income non-Hispanic white and
 25 low income nonwhite populations based on reducing each of the five sources by (A) a relative
 26 amount (10% reduction) and (B) an absolute amount (1 t d⁻¹).

27

28

29 **Table S1:** Metric statistics by emission source

Source	Per Capital Intake ($\mu\text{g person}^{-1} \text{d}^{-1}$) *			Intake Fraction (ppm) †	Emissions (kg d^{-1}) ‡
	HIW <i>n=923,682</i>	LIN <i>n=568,428</i>	Total <i>n=15,904,050</i>		
On-road	6.3	11.6	9.0	15	9,270
Off-road	7.5	11.3	9.5	15	10,190
Ship	3.8	4.2	3.8	13	4,730
Train	0.8	1.6	1.2	25	780
Stationary	0.5	0.8	0.7	22	470
Total	18.9	29.5	24.2	15	25,440

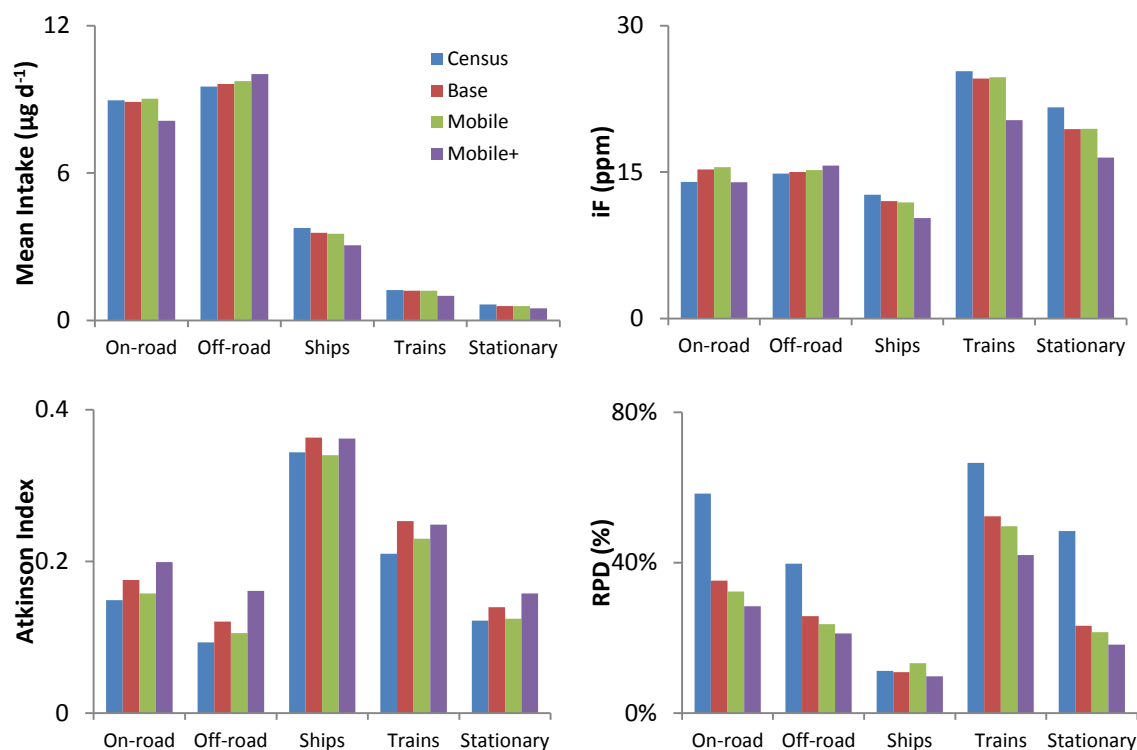
30 * Results represent average intake for non-white householders with incomes in the bottom 25th
 31 percentile (LIN), white non-Hispanic householders with incomes in the top 25th percentile
 32 (HIW) and total population of households in the South Coast Air Basin (basis: year-2000
 33 Census).

34 † Intake fraction (ppm) represents grams of fine DPM inhaled per million grams emitted.

35 ‡ Emissions are for year-2005, from (7).

36

37 Figure S3 presents results for the four exposure approaches given above (Methods and
 38 Materials). For most metrics, the magnitude and rank-order of results are generally similar
 39 among the four methods. Specifically, the impact, efficiency and equality metrics appear to be
 40 more robust to exposure method than the justice metric. A likely reason for greater
 41 methodological sensitivity for the justice metric relative to other metrics is that the survey over-
 42 represents HIW individuals (SCAG: 14% of total) relative to the population (year-2000 Census:
 43 6% of total).



44

45

46 **Figure S3.** Fine DPM results comparison based on four metrics for the entire domain population
 47 (“Census”), the SCAG population sample without accounting for breathing rate variations,
 48 mobility, or microenvironments (“Base”), the SCAG population sample including mobility
 49 (“Mobile”), and the SCAG population sample accounting for breathing rate variability, mobility,
 50 and microenvironments (“Mobile+”) for each of the five diesel sources.
 51

52 The calculated intake fraction value of 15 ppm for the South Coast Air Basin conforms with
 53 existing literature. Normal values of outdoor intake fraction from literature range from 1 to 100
 54 ppm. Evans et al. estimated urban exposure efficiencies of 3 – 18 ppm for primary fine particles
 55 from mobile sources using the CALPUFF air model,¹ and Marshall et al. estimated intake
 56 fraction values of 7 ppm and 4.4 ppm from benzene and diesel, respectively for U.S. urban
 57 counties.² For the South Coast Air Basin, Marshall et al. estimated intake fraction values of 46
 58 ppm and 47 ppm from benzene and carbon monoxide, respectively for motor vehicle emissions,³
 59 and Apte et al. estimated an intake fraction of 43 ppm for metropolitan Los Angeles.⁴ Lobscheid

60 et al. calculated an intake fraction of 19 ppm for the entire state of California, using a higher
61 breathing rate of $14 \text{ m}^3 \text{ person}^{-1} \text{ d}^{-1}$ (compared to $12 \text{ m}^3 \text{ person}^{-1} \text{ d}^{-1}$ in this study).⁵

62

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Table S2. Environment Justice Literature Review

Article Title	Author	Journal	Year	Vol	Iss	Page #	Country/ Region	Area	Metric	Type	LSES*	Minorities*
1 Skewed Riskscales and Gentrified Inequities: Environmental Exposure Disparities in Seattle, Washington	Abel and White	American Journal of Public Health	2011	101	-	S246-S254	USA	Seattle, Washington	EPA Risk-Screening Environmental Indicators	Study	Yes	Yes
2 Skewed riskscales and environmental injustice: A case study of metropolitan St. Louis	Abel	Environmental Management	2008	42	2	232-248	USA	St. Louis, Missouri	Toxic Release Inventory	Study	Yes	Yes
3 Mobile Air Monitoring: Measuring Change in Air Quality in the City of Hamilton, 2005-2010	Adams, DeLuca, Corr and Kanaroglou	Social Indicators Research	2012	108	2	351-364	Canada	Hamilton, Ontario	CO, PM2.5, SO2, NO, NO2, NOX	Study	-	-
4 The Collective Origins of Toxic Air Pollution: Implications for Greenhouse Gas Trading and Toxic Hotspots	Adelman	Indiana Law Journal	2013	88	1	273-337	USA	-	Toxic Release Inventory, National Emissions Inventory, National-Scale Air Toxics Assessment	Study	No	No
5 A Screening Method for Assessing Cumulative Impacts	Alexeeff et al.	International Journal of Environmental Research and Public Health	2012	9	2	648-659	USA	California	Exposures, public health and environmental effects, sensitive populations, socioeconomic factors	Study	Yes	Yes
6 Community-based participatory research: A vehicle to promote public engagement for environmental health in China	Ali, Olden, and Xu	Environmental Health Perspectives	2008	116	10	1281-1284	USA	-	-	Review	-	-
7 U.S. EPA Authority to Use Cumulative Risk Assessments in Environmental Decision-Making	Alves, Tilghman, Rosenbaum and Payne-Sturges	International Journal of Environmental Research and Public Health	2012	9	6	1997-2019	USA	-	-	Review	-	-
8 The dynamic nature of social disadvantage: implications for hazard exposure and vulnerability in Greater Vancouver	Andrey and Jones	Canadian Geographer	2008	52	2	146-168	Canada	Vancouver	Earthquake-induced liquefaction, wildfires, noise pollution	Study	No	No
9 Socioeconomic and racial disparities in cancer risk from air toxics in Maryland	Apelberg, Buckley and White	Environmental Health Perspectives	2005	113	6	693-699	USA	Maryland	National-scale Air Toxics Assessment	Study	Yes	Yes
10 Who lives on the wrong side of the environmental tracks? Evidence from the EPA's risk-screening environmental indicators model	Ash and Fetter	Social Science Quarterly	2004	85	2	441-462	USA	393 Urban Areas	EPA Risk-Screening Environmental Indicators	Study	Yes	Yes

	Article Title	Author	Journal	Year	Vol	Iss	Page #	Country/ Region	Area	Metric	Type	LSES*	Minorities*
11	Measuring Corporate Environmental Justice Performance	Ash and Boyce	Corporate Social Responsibility and Environmental Management	2011	18	2	61-79	USA	-	EPA Risk-Screening Environmental Indicators	Study	Yes	Yes
12	PER pressure: New Jersey's "population emissions ratio" environmental equity screening model	Atlas	Risk Analysis	2003	23	1	69-79	USA	New Jersey	Population Emissions Ratios	Review	-	-
13	Methodological Considerations in Screening for Cumulative Environmental Health Impacts: Lessons Learned from a Pilot Study in California	August, Faust, Cushing, Zeise and Alexeeff	International Journal of Environmental Research and Public Health	2012	9	9	3069-3084	USA	California	Exposures, public health and environmental effects, sensitive populations, socioeconomic factors	Study	Yes	Yes
14	Scales of justice: Is there a geographic bias in environmental equity analysis?	Baden, Noonan and Turaga	Journal of Environmental Planning and Management	2007	50	2	163-185	USA	-	National Priorities List sites (Superfund)	Study	Yes	No
15	The exposure of disadvantaged populations in freeway air-pollution sheds: a case study of the Seattle and Portland regions	Bae, Sandlin, Bassok and Kim	Environment and planning. B, Planning design	2007	34	1	154-170	USA	Seattle/Portland	Freeway Air Pollution Shed	Study	Yes	Yes
16	Spaces of opposition: activism and deliberation in post-apartheid environmental politics	Barnett and Scott	Environment and planning A.	2007	39	11	2612-2631	South Africa	Durban	-	Study	-	-
17	Environmental Inequality in Exposures to Airborne Particulate Matter Components in the United States	Bell and Ebisu	Environmental Health Perspectives	2012	120	12	1699-1704	USA	-	PM2.5	Study	Yes	Yes
18	Health inequalities and place: A theoretical conception of neighbourhood	Benard et al.	Social Science and Medicine	2007	65	9	1839-1852	-	-	-	Theory	-	-
19	Quantitative estimation in Health Impact Assessment: Opportunities and challenges	Bhatia and Seto	Environmental Impact Assessment Review	2011	31	3	301-309	USA	-	Health Impact Assessments	Study	-	-
20	Risk perception research: socio-cultural perspectives on the public experience of air pollution	Bickerstaff	Environment International	2004	30	6	827-840	UK	-	Risk Perception	Review	-	-

	Article Title	Author	Journal	Year	Vol	Iss	Page #	Country/ Region	Area	Metric	Type	LSES*	Minorities*
21	Situating local experience of risk: Peripherality, marginality and place identity in the UK foot and mouth disease crisis	Bickerstaff, Simmons and Pidgeon	Geoforum	2006	37	5	844-858	UK	-	Local experiences	Study	-	-
22	From Endocrine Disruptors To Nanomaterials: Advancing Our Understanding Of Environmental Health To Protect Public Health	Birnbaum and Jung	Health Affairs	2011	30	5	814-822	-	-	-	Theory	-	-
23	Road traffic noise and socioeconomic status: Environmental inequalities at the small area level in Marseilles (France)	Bocquier et al.	Environnement Risques et Sante	2011	10	3	225-229	France	Marseilles	Road noise exposure	Study	No	No
24	Tourism in the Face of Environmental Risks: Sunbathing under the Ozone Hole, and Strolling through Polluted Air	Bohm and Pfister	Scandinavian Journal of Hospitality and Tourism	2011	11	3	250-267	Australia/ Thailand	Australia/Bangkok	Risk Perception	Study	-	-
25	Modelling environmental equity: access to air quality in Birmingham, England	Brainard, Jones, Bateman and Lovett	Environment and Planning A.	2002	34	4	695-716	UK	Birmingham	CO, NO2	Study	Yes	Yes
26	Changes in the distribution of air pollution exposure in the Los Angeles basin from 1990 to 1999	Brajer and Hall	Contemporary Economic Policy	2005	23	1	50-58	USA	South Coast Air Basin	Ozone, PM	Study	Yes	Yes
27	Adjusting Chinese income inequality for environmental equity	Brajer, Mead and Xiao	Environment and Development Economics	2010	15	-	341-362	China	-	SO2, NO2, PM	Study	Yes	-
28	Association between unemployment, income, education level, population size and air pollution in Czech cities: Evidence for environmental inequality? A pilot national scale analysis	Branis and Linhartova	Health and Place	2012	18	5	1110-1114	Czech Republic	39 cities	SO2, PM10, NO2	Study	No	-
29	Environmental Torts	Brennan	Vanderbilt Law Review	1993	46	1	1-73	USA	-	-	Review	-	-
30	Environmental pollution and the global burden of disease	Briggs	British Medical Bulletin	2003	68	-	1-24	World	-	Environmental pollution	Theory	Yes	Yes
31	Environmental inequity in England: Small area associations between socio-economic status and environmental pollution	Briggs, Abellan and Fecht	Social Science and Medicine	2008	67	10	1612-1629	UK	England	Air pollution, noise, EMF radiation	Study	Yes	-

Article Title	Author	Journal	Year	Vol	Iss	Page #	Country/ Region	Area	Metric	Type	LSES*	Minorities*
32 Clearing the air and breathing freely: The health politics of air pollution and asthma	Brown et al.	International Journal of Health Services	2004	34	1	39-63	USA	-	-	Review	-	-
33 The health politics of asthma: environmental justice and collective illness experience in the United States	Brown et al.	Social Science and Medicine	2003	57	3	453-464	USA	-	-	Review	-	-
34 Race, class, and environmental-health - A review and systematization of the literature	Brown	Environmental Research	1995	69	1	15-30	USA	-	-	Review	-	-
35 Racial gradients of ambient air pollution exposure in Hamilton, Canada	Buzzelli and Jerrett	Environment and planning A.	2004	36	10	1855-1876	Canada	Hamilton, Ontario	Total Suspended Solids	Study	Yes	Yes
36 Spatiotemporal perspectives on air pollution and environmental justice in Hamilton, Canada, 1985-1996	Buzzelli, Jerrett, Burnett and Finklestein	Annals of the Association of American Geographers	2003	93	3	557-573	Canada	Hamilton, Ontario	Total Suspended Solids	Study	Yes	Yes
37 Bourdieu does environmental justice? Probing the linkages between population health and air pollution epidemiology	Buzzelli	Health and Place	2007	13	1	3-13	USA/Canada	-	-	Review	-	-
38 Urban asthma	Byrd and Joad	Current Opinion in Pulmonary Medicine	2006	12	1	68-74	USA	-	Asthma	Review	-	-
39 Association of proximity to polluting industries, deprivation and mortality in small areas of the Basque Country (Spain)	Cambra et al.	European Journal of Public Health	2013	23	1	171-176	Spain	Basque County	Proximity to polluting industries	Study	Yes	-
40 Recycling norms	Carlson	California Law Review	2001	89	5	1231-1300	USA	-	-	Theory	-	-
41 Do perceptions of neighbourhood problems contribute to maternal health?: Findings from the Pacific Islands Families study	Carter, Williams, Paterson and Isuitini	Health and Place	2009	15	2	622-630	New Zealand	South Auckland	Noise, pollution, safety	Study	Yes	Yes
42 Socioeconomic status and exposure to disinfection by-products in drinking water in Spain	Castano-Vinyals et al.	Environmental Health	2011	10	18	doi: 10.1186/1476-069X-10-18	Spain	-	Disinfection by-products exposure	Study	Yes	-
43 Socioeconomic position and health status of people who live near busy roads: the Rome Longitudinal Study (RoLS)	Cesaroni et al.	Environmental Health	2010	9	41	doi: 10.1186/1476-069X-9-41	Italy	Rome	Traffic exposure	Study	No	-

Article Title	Author	Journal	Year	Vol	Iss	Page #	Country/ Region	Area	Metric	Type	LSES*	Minorities*
44 Children's exposure to nitrogen dioxide in Sweden: investigating environmental injustice in an egalitarian country	Chaix et al.	Journal of Epidemiology and Community Health	2006	60	3	234-241	Sweden	Malmö	NO2	Study	Yes	-
45 Cancer risk from exposure to hazardous air pollutants: spatial and social inequities in Tampa Bay, Florida	Chakraborty	International Journal of Environmental Health Research	2012	22	2	165-183	USA	Tampa Bay, Florida	National-scale Air Toxics Assessment	Study	Yes	Yes
46 Disproportionate Proximity to Environmental Health Hazards: Methods, Models, and Measurement	Chakraborty, Maantay and Brender	American Journal of Public Health	2011	101	-	S27-S36	USA	-	-	Review	-	-
47 Proximity Analysis for Exposure Assessment in Environmental Health Justice Research	Chakraborty and Maantay	Geospatial Analysis of Environmental Health	2011	4	-	111-138	USA	-	-	Review	-	-
48 Revisiting Tobler's First Law of Geography: Spatial Regression Models for Assessing Environmental Justice and Health Risk Disparities	Chakraborty	Geospatial Analysis of Environmental Health	2011	4	-	337-356	USA	Tampa Bay, Florida	National-scale Air Toxics Assessment	Study	Yes	Yes
49 Automobiles, Air Toxics, and Adverse Health Risks: Environmental Inequities in Tampa Bay, Florida	Chakraborty	Annals of the Association of American Geographers	2009	99	4	674-697	USA	Tampa Bay, Florida	National-scale Air Toxics Assessment	Study	Yes	Yes
50 Children at risk: measuring racial/ethnic disparities in potential exposure to air pollution at school and home	Chakraborty and Zandbergen	Journal of Epidemiology and Community Health	2007	61	12	1074-1079	USA	Orange County, Florida	Toxic Release Inventory	Study	-	Yes
51 Environmental health sciences education - A tool for achieving environmental equity and protecting children	Claudio, Torres, Sanjurjo, Sherman and Landrigan	Environmental Health Perspectives	1998	106	-	849-855	USA	South Bronx, New York	Asthma	Study	Yes	Yes
52 Synergistic effects of traffic-related air pollution and exposure to violence on urban asthma etiology	Clougherty et al.	Environmental Health Perspectives	2007	115	8	1140-1146	USA	East Boston, Massachusetts	Exposure to violence, NO2	Study	Yes	Yes
53 High-resolution pollutant transport in the San Pedro Bay of California	Cohan, Wu and Dabdub	Atmospheric Pollution Research	2011	2	3	237-246	USA	San Pedro, California	NOX, PM2.5	Study	-	-
54 Cap-and-trade policy challenges: A tale of three markets	Colby	Land Economics	2000	76	4	638-658	USA	-	-	Theory	-	-

Article Title	Author	Journal	Year	Vol	Iss	Page #	Country/ Region	Area	Metric	Type	LSES*	Minorities*
55 Risk-Based Targeting: Identifying Disproportionalities in the Sources and Effects of Industrial Pollution	Collins	American Journal of Public Health	2011	101	-	S231-S237	USA	Milwaukee, Wisconsin	Environmental Justice Strategic Enforcement Assessment Tool	Study	Yes	Yes
56 Understanding environmental health inequalities through comparative intercategory analysis: Racial/ethnic disparities in cancer risks from air toxics in El Paso County, Texas	Collins, Grineski, Chakraborty and McDonald	Health and Place	2011	17	1	335-344	USA	El Paso County, Texas	National-scale Air Toxics Assessment	Study	Yes	Yes
57 Estimation of exposure to toxic releases using spatial interaction modeling	Conley	International Journal of Health Geographics	2011	10	-	doi: 10.1186/1476-072X-10-20	USA	-	Toxic Release Inventory, Risk-Screening Environmental Indicators, Lung cancer mortality rates	Study	-	-
58 Emissions trading and environmental justice: distributive fairness and the USA's Acid Rain Programme	Corburn	Environmental Conservation	2001	28	4	323-332	USA	-	SO2	Study	No	No
59 Why Income Inequality Indexes Do Not Apply to Health Risks	Cox	Risk Analysis	2012	32	2	192-196	USA	-	-	Theory	-	-
60 Double burden of deprivation and high concentrations of ambient air pollution at the neighbourhood scale in Montreal, Canada	Crouse, Ross and Goldberg	Social Science and Medicine	2009	69	6	971-981	Canada	Montreal	NO2	Study	Yes	No
61 Geographies of health and climate change	Curtis and Oven	Progress in Human Geography	2012	36	5	654-666	World	-	Climate change	Review	-	-
62 Spatial inequality and the distribution of industrial toxic releases: Evidence from the 1990 TRI	Daniels and Friedman	Social Science Quarterly	1999	80	2	244-262	USA	-	Toxic Release Inventory	Study	Yes	Yes
63 The Effect of Power Plants on Local Housing Values and Rents	Davis	Review of Economics and Statistics	2011	93	4	1391-1402	USA	-	Proximity to power plants	Study	Yes	Yes
64 Place and the experience of air quality	Day	Health and Place	2007	13	1	249-260	UK	North London	Risk Perception	Study	-	-
65 Environmental justice and older age: consideration of a qualitative neighbourhood-based study	Day	Environment and Planning A.	2010	42	11	2658-2673	UK	Scotland	Distribution, procedural inclusion, recognition	Study	-	-
66 Social inequalities resulting from health risks related to ambient air quality-A European review	Deguen and Zmirou-Navier	European Journal of Public Health	2010	20	1	27-35	EU	-	-	Review	-	-

	Article Title	Author	Journal	Year	Vol	Iss	Page #	Country/ Region	Area	Metric	Type	LSES*	Minorities*
67	The Role of Environmental Economics in Recent Policy Making at the European Commission	Delbeke, Klaassen, van Ierland and Zapfel	Review of Environmental Economics and Policy	2010	4	1	24-43	EU	-	Greenhouse Gases	Study	-	-
68	Arsenic, cadmium, lead, and mercury in surface soils, Pueblo, Colorado: implications for population health risk	Diawara et al.	Environmental Geochemistry and Health	2006	28	4	297-315	USA	Pueblo, Colorado	As, Cd, Hg, Pb	Study	Yes	Yes
69	Parental altruism and the value of avoiding acute illness: are kids worth more than parents?	Dickie and Messman	Journal of Environmental Economics and Management	2004	48	3	1146-1174	USA	Hattiesburg, Mississippi	-	Study	-	-
70	Democratic smog? An empirical study on the correlation between social class and environmental pollution	Diekmann and Meyer	Kölner Zeitschrift Für Soziologie Und Sozialpsychologi	2010	62	3	437-457	EU	-	-	Review	-	-
71	The Equity-Efficiency Trade-off in Environmental Policy: Evidence from Stated Preferences	Dietz and Atkinson	Land Economics	2010	86	3	423-443	UK	Southwark, London	Surveyed perception of air quality	Study	-	-
72	Assessment of Environmental Health Children's Population Living in Environmental Injustice Scenarios	Dominguez-Cortinas, Cifuentes, Escobar and Martinez	Journal of Community Health	2012	37	6	1199-1207	Mexico	San Luis Potosi	Social, environment, health indicators	Study	Yes	-
73	Environmental inequality in metropolitan America	Downey, Dubois, Hawkins and Walker	Organization and Environment	2008	21	3	270-294	USA	329 Metro Areas	EPA Risk-Screening Environmental Indicators	Study	-	Yes
74	Single-mother families and air pollution: A national study	Downey and Hawkins	Social Science Quarterly	2008	89	2	523-536	USA	-	EPA Risk-Screening Environmental Indicators	Study	Yes	Yes
75	Participatory testing and reporting in an environmental-justice community of Worcester, Massachusetts: a pilot project	Downs et al.	Environmental Health	2010	9	-	doi: 10.1186/1476-069X-9-34	USA	Worchester, Massachusetts	Radon, mold, PM2.5	Study	Yes	Yes
76	Measuring environmental health risks: The negotiation of a public right-to-know law	Dunsby	Science, Technology and Human Values	2004	29	3	269-290	USA	California	-	Theory	-	-
77	'The air still wasn't good ... everywhere I went I was surrounded': Lay perceptions of air quality and health	Edgley, Pilnick and Clarke	Health Sociology Review	2011	20	1	97-108	UK	Nottingham, England	Surveyed perception of air quality	Study	Yes	-

Article Title	Author	Journal	Year	Vol	Iss	Page #	Country/ Region	Area	Metric	Type	LSES*	Minorities*
78 Cumulative Risk Assessment and Environmental Equity in Air Permitting: Interpretation, Methods, Community Participation and Implementation of a Unique Statute	Elickson et al.	International Journal of Environmental Research and Public Health	2011	8	11	4140-4159	USA	Minneapolis, Minnesota	Cumulative Levels, Effects Analysis	Study	-	-
79 Environmental justice: frequency and severity of US chemical industry accidents and the socioeconomic status of surrounding communities	Elliott, Wang, Lowe and Kleindorfer	Journal of Epidemiology and Community Health	2004	58	1	24-30	USA	2333 counties	Chemical releases	Study	Yes	Yes
80 The power of perception: Health risk attributed to air pollution in an urban industrial neighbourhood	Elliott, Cole, Krueger, Voorberg and Wakefield	Risk Analysis	1999	19	4	621-634	Canada	Hamilton, Ontario	Surveyed perception of air quality	Study	-	-
81 Global equity and sustainable earth resource consumption requires super-efficient extraction-conservation-recycling and ubiquitous, inexpensive energy	Ernst	International Geology Review	2002	44	12	1072-1091	World	-	-	Theory	-	-
82 Socioeconomic status and health: The potential role of environmental risk exposure	Evans and Kantrowitz	Annual Review of Public Health	2002	23	-	303-331	World	-	Environmental risk factors	Review	-	-
83 Differential exposure of the urban population to vehicular air pollution in Hong Kong	Fan, Lam and Yu	Science of the Total Environment	2012	426	-	211-219	China	Hong Kong	CO, NOX, SO2, PM10	Study	Yes	-
84 Maximizing Health Benefits and Minimizing Inequality: Incorporating Local-Scale Data in the Design and Evaluation of Air Quality Policies	Fann et al.	Risk Analysis	2011	31	6	908-922	USA	Detroit, Michigan	PM2.5	Study	Yes	Yes
85 Pollution Markets and Social Equity: Analyzing the Fairness of Cap and Trade	Farber	Ecology Law Quarterly	2012	39	1	1-56	USA	-	Cost of industrial pollution	Theory	No	No
86 Emission trading and public health	Farrell and Lave	Annual Review of Public Health	2004	25	-	119-138	USA	-	-	Theory	No	No
87 Relationship between area-level socioeconomic characteristics and outdoor NO2 concentrations in rural and urban areas of northern Spain	Fernandez-Somoano, Hoek and Tardon	BMC Public Health	2013	13	-	doi:10.1186/1471-2458-13-71	Spain	-	NO2	Study	No	-

Article Title	Author	Journal	Year	Vol	Iss	Page #	Country/ Region	Area	Metric	Type	LSES*	Minorities*
88 Scales of environmental justice: Combining GIS and spatial analysis for air toxics in West Oakland, California	Fisher, Kelly and Romm	Health and Place	2006	12	4	701-714	USA	West Oakland, California	Toxic Release Inventory	Study	Yes	Yes
89 Environmental justice in transportation planning	Forkenbrock and Schweitzer	Journal of the American Planning Association	1999	65	1	96-111	USA	Waterloo, Iowa	CO, noise	Study	Yes	Yes
90 Their Data, Our Cause: An Exploration of the Form, Function, and Deployment of Mapping Technologies among Community Environmental Justice Organizations	Fuller	Geospatial Analysis of Environmental Health	2011	4	-	139-149	USA	-	-	Study	-	-
91 Situating Urban Environmental Risk: Using GIScience to Understand Risk in a Midwestern City	Fuller and Gatrell	Planning and Socioeconomic Applications	2009	1	-	109-124	USA	Vigo County, Indiana	Toxic Release Inventory, Treatment, storage, and disposal facilities (TSDF), Superfund sites	Study	Yes	Yes
92 Urban transport, environmental justice and human daily activity patterns	Gaffron	Transport Policy	2012	20	-	116-129	UK/Germany	-	Traffic emissions, noise	Study	Yes	-
93 Environmental equity in funding decisions of the clean air school bus program: The case of New York State	Gao and Klein	Transportation Research Part D-Transport and Environment	2011	16	1	10-14	USA	New York	Funding for Clean Air School Bus program	Study	Yes	-
94 Environmental equity in participation of the Clean Air School Bus Program: The case of New York State	Gao and Klein	Transportation Research Part D-Transport and Environment	2010	15	4	220-227	USA	New York	Participation in Clean Air School Bus program	Study	Yes	-
95 Environmental health disparities: A framework integrating psychosocial and environmental concepts	Gee and Payne-Sturges	Environmental Health Perspectives	2004	112	17	1645-1653	USA	-	-	Theory	-	-
96 Using geographically weighted regression for environmental justice analysis: Cumulative cancer risks from air toxics in Florida	Gilbert and Chakraborty	Social Science Research	2011	40	1	273-286	USA	Florida	National-scale Air Toxics Assessment	Study	Yes	Yes
97 Particulate Matter Oxidative Potential from Waste Transfer Station Activity	Godri et al.	Environmental Health Perspectives	2010	118	4	493-498	UK	London, England	PM10	Study	-	-

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98	Energy for the new millennium	Goldemberg, Johansson, Reddy and Williams	AMBIO	2001	30	6	330-337	World	-	-	Theory	-	-
99	Community-Based Participatory Research and Policy Advocacy to Reduce Diesel Exposure in West Oakland, California	Gonzalez et al.	American Journal of Public Health	2011	101	-	S166-S175	USA	West Oakland, California	Diesel PM	Study	Yes	Yes
100	Characterising socio-economic inequalities in exposure to air pollution: A comparison of socio-economic markers and scales of measurement	Goodman, Wilkinson, Stafford and Tonne	Health and Place	2011	17	3	767-774	UK	London, England	Nox	Study	Yes	-
101	Bringing the Polluters Back In: Environmental Inequality and the Organization of Chemical Production	Grant, Trautner, Downey and Thiebaud	American Sociological Review	2010	75	4	479-504	USA	-	EPA Risk-Screening Environmental Indicators	Study	Yes	Yes
102	'Optimal' pollution abatement - whose benefits matter, and how much?	Gray and Shadbeigian	Journal of Environmental Economics and Management	2004	47	3	510-534	USA	-	Reported and modeled pollution from paper and pulp mills	Study	Yes	No
103	Proximity of California public schools to busy roads	Green, Smorodinsky, Kim, McLaughlin and Ostro	Environmental Health Perspectives	2004	112	1	61-66	USA	California	Traffic Exposure, traffic related pollution	Study	Yes	Yes
104	Criteria air pollution and marginalized populations: Environmental inequity in metropolitan Phoenix, Arizona	Grinseki, Bolin and Boone	Social Science Quarterly	2007	88	2	535-554	USA	Phoenix	Modeled criteria air pollutants	Study	Yes	Yes
105	Environmental Health Injustice: Exposure to Air Toxics and Children's Respiratory Hospital Admissions in El Paso, Texas	Grinseki, Collins, Chakraborty and McDonald	Professional Geography	2013	65	1	31-46	USA	El Paso County, Texas	National-scale Air Toxics Assessment	Study	Yes	Yes
106	Climate change and environmental injustice in a bi-national context	Grineski et al.	Applied Geography	2012	33	1	25-35	USA/Mexico	El Paso, Texas, Ciudad Juárez, Chihuahua	Hazards related to climate change	Study	Yes	Yes
107	Mapping the uninsured using secondary data: an environmental justice application in Dallas	Grineski and McDonald	Population and Environment	2011	32	4	376-387	USA	Dallas, Texas	National-scale Air Toxics Assessment	Study	Yes	-

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108 No Safe Place: Environmental Hazards & Injustice along Mexico's Northern Border	Grineski, Collins, Aguilar and Aldouri	Social Forces	2010	88	5	2241-2265	Mexico	Ciudad Juárez	Industrial plants, brick kilns, pork feed lots, rail hazards	Study	Yes	Yes
109 Environmental injustices in transnational context: urbanization and industrial hazards in El Paso/Ciudad Juarez	Grineski and Collins	Environment and Planning	2010	42	6	1308-1327	USA/Mexico	El Paso, Texas, Ciudad Juárez, Chihuahua	Toxics Release Inventory, location of Industrial plants	Study	Yes (El Paso)/No (Ciudad)	Yes (El Paso)/No (Ciudad)
110 Human-Environment Interactions and Environmental Justice: How Do Diverse Parents of Asthmatic Children Minimize Hazards?	Grineski	Society and Natural Resources	2009	22	8	727-743	USA	Phoenix, Arizona	Asthma	Study	-	-
111 Exploring patterns of environmental injustice in the Global South: Maquiladoras in Ciudad Juarez, Mexico	Grineski and Collins	Population and Environment	2008	29	6	247-270	Mexico	Ciudad Juárez	Location of Industrial Plants	Study	No	No
112 Hispanic heterogeneity and environmental injustice: intra-ethnic patterns of exposure to cancer risks from traffic-related air pollution in Miami	Grineski, Collins and Chakraborty	Population and Environment	2013	35	1	26-44	USA	Miami, Florida	National-scale Air Toxics Assessment	Study	Yes	Yes
113 Traffic density in California: Socioeconomic and ethnic differences among potentially exposed children	Gunier, Hertz, Von Behren and Reynolds	Journal of Exposure Analysis and Environmental Epidemiology	2003	13	3	240-246	USA	California	Traffic Exposure	Study	Yes	Yes
114 Geographic variability in childhood asthma prevalence in Chicago	Gupta, Zhang, Sharp, Shannon and Weiss	Journal of Allergy and Clinical Immunology	2008	121	3	639-645	USA	Chicago, Illinois	Asthma	Study	Yes	Yes
115 Environmental Justice: an ecosocial health approach	Habermann and Gouveia	Revista De Saude Publica	2008	42	6	1105-1111	-	-	-	Theory	-	-
116 Racial and ethnic disparities in hospital care resulting from air pollution in excess of federal standards	Hackbarth, Romley and Goldman	Social Science and Medicine	2011	73	8	1163-1168	USA	California	PM, ozone	Study	Yes	-
117 Asthma, Air Quality and Environmental Justice in Louisville, Kentucky	Hanchette, Lee and Aldrich	Geospatial Analysis of Environmental Health	2011	4	-	223-242	USA	Louisville, Kentucky	Criteria pollutants, VOCs from air monitors	Study	Yes	Yes

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118 Climate change and health in cities: impacts of heat and air pollution and potential co-benefits from mitigation and adaptation	Harlan and Ruddell	Current Opinion in Environmental Sustainability	2011	3	3	126-134	-	-	Climate change	Theory	-	-
119 Social inequalities in residential exposure to road traffic noise: An environmental justice analysis based on the RECORD Cohort Study	Havard, Reich, Bean and Chaix	Occupational and Environmental Medicine	2011	68	5	366-374	France	Paris	Traffic noise	Study	No	No
120 Traffic-Related Air Pollution and Socioeconomic Status A Spatial Autocorrelation Study to Assess Environmental Equity on a Small-Area Scale	Havard, Deguen, Zmirou-Navier, Schillinger and Bard	Epidemiology	2009	20	2	223-230	France	Strasbourg	NO2	Study	No	No
121 Relation between malodor, ambient hydrogen sulfide, and health in a community bordering a landfill	Heaney et al.	Environmental Research	2011	111	6	847-852	USA	Orange County, North Carolina	Hydrogen sulfide	Study	Yes	Yes
122 Air pollution: Costs and paths to a solution in Hong Kong - Understanding the connections among visibility, air pollution, and health costs in pursuit of accountability, environmental justice, and health protection	Hedley et al.	Journal of Toxicology and Environmental Health-Part A-Current Issues	2008	71	9-10	544-554	China	Hong Kong	NO2, SO2, ozone, PM10	Study	-	-
123 Economics and Ecosystems: Efficiency, Sustainability and Equity in Ecosystem Management	Hein	Economics and Ecosystems: Efficiency, Sustainability and Equity in Ecosystem Management	2010	-	-	1-203	-	-	-	Theory	-	-
124 Environmental injustice and air pollution in coal affected communities, Hunter Valley, Australia	Higginbotham, Freeman, Connor and Albrecht	Health and Place	2010	16	2	259-266	Australia	Upper Hunter Region, New South Wales	PM (mining- and coal-related pollution)	Study	-	-
125 GIScience, environmental justice, & estimating populations at risk: The case of landfills in Wales	Higgs and Langford	Applied Geography	2009	29	1	63-76	UK	Wales	Landfill Sites	Study	Yes	-

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126 Childhood social position and associations between environmental exposures and health outcomes	Hoffman et al.	International Journal of Hygiene and Environmental Health	2009	212	2	146-156	Germany	Ruhr Area	Total Suspended Solids	Study	Yes	Yes
127 Structural disparities of urban traffic in Southern California: Implications for vehicle-related air pollution exposure in minority and high-poverty neighborhoods	Houston, Wu, Ong and Winer	Journal of Urban Affairs	2004	26	5	565-592	USA	Southern California	Traffic density	Study	Yes	Yes
128 Diesel Truck Traffic in Low-income and Minority Communities Adjacent to Ports Environmental Justice Implications of Near-Roadway Land Use Conflicts	Houston, Krudysz and Winer	Transportation Research Record	2008	-	2067	38-46	USA	Southern California	Traffic density	Study	Yes	Yes
129 Proximity of licensed child care facilities to near-roadway vehicle pollution	Houston, Ong, Wu and Winer	American Journal of Public Health	2006	96	9	1611-1617	USA	California	Traffic exposure, proximity to roads	Study	Yes	Yes
130 Mapping Cumulative Environmental Effects, Social Vulnerability, and Health in the San Joaquin Valley, California	Huang and London	American Journal of Public Health	2012	102	5	830-832	USA	San Joaquin Valley, California	Cumulative Environmental Hazards Index	Study	Yes	Yes
131 The value relevance of nonfinancial measures of air pollution in the electric utility industry	Hughes	Accounting Review	2000	75	2	209-228	USA	-	SO2	Theory	-	-
132 A method of assessing air toxics concentrations in urban areas using mobile platform measurements	Isakov, Touma and Khlystov	Journal of the Air and Waste Management Association	2007	57	11	1286-1295	USA	Wilmington, Delaware	VOC, PM, toxic metals	Study	-	-
133 Uneven Magnitude of Disparities in Cancer Risks from Air Toxics	James, Jia and Kedia	International Journal of Environmental Research and Public Health	2012	9	12	4365-4385	USA	"Cancer Alley", Louisiana	National-scale Air Toxics Assessment	Study	Yes	Yes
134 Ecosystem services and urban heat riskscape moderation: water, green spaces, and social inequality in Phoenix, USA	Jenerette, Harlan, Stefanov and Martin	Ecological Applications	2011	21	7	2637-2651	USA	Phoenix, Arizona	Vegetative cover	Study	Yes	-
135 Geospatial analysis of naturally occurring boundaries in road-transport emissions and children's respiratory health across a demographically diverse cityscape	Jephcote and Chen	Social Science and Medicine	2013	82	-	87-99	UK	Leicester, England	PM10	Study	Yes	Yes

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136 Environmental injustices of children's exposure to air pollution from road-transport within the model British multicultural city of Leicester: 2000-09	Jephcote and Chen	Science of the Total Environment	2012	414	-	140-151	UK	Leicester, England	PM10	Study	Yes	Yes
137 Particulate air pollution, social confounders, and mortality in small areas of an industrial city	Jerrett, Buzzelli, Burnett and DeLuca	Social Science and Medicine	2005	60	12	2845-2863	Canada	Hamilton, Ontario	Total Suspended Solids	Study	Yes	-
138 A GIS - environmental justice analysis of particulate air pollution in Hamilton, Canada	Jerrett et al.	Environment and Planning A.	2001	33	6	955-973	Canada	Hamilton, Ontario	Total Suspended Solids	Study	Yes	No
139 Spatial Modeling in Environmental and Public Health Research	Jerrett, Gale and Kontgis	International Journal of Environmental Research and Public Health	2010	7	4	1302-1329	-	-	-	Review	-	-
140 Global Geographies of Injustice in Traffic-Related Air Pollution Exposure	Jerrett	Epidemiology	2009	20	2	231-233	World	-	-	Theory	-	-
141 Electric Vehicles in China: Emissions and Health Impacts	Ji, Cherry, Bechle, Wu and Marshall	Environmental Science and Technology	2012	46	4	2018-2024	China	-	PM2.5	Study	-	-
142 Mitigating Diesel Truck Impacts in Environmental Justice Communities Transportation Planning and Air Quality in Barrio Logan, San Diego, California	Karner, Eisinger, Bai and Niemeier	Transportation Research Record	2009	-	2125	1-8	USA	San Diego, California	Diesel PM	Study	Yes	Yes
143 Environmental health promotion interventions: Considerations for preparation and practice	Kegler and Miner	Health Education and Behavior	2004	31	4	510-525	USA	-	-	Theory	-	-
144 Asthma Mitigation Strategies Professional, Charitable, and Community Coalitions	Keirns	American Journal of Preventative Medicine	2009	37	6	S244-S250	USA	-	-	Study	-	-
145 Individual and neighborhood characteristics associated with environmental exposure	Keller-Olaman et al.	Environment and Behavior	2005	37	4	441-464	Canada	Hamilton, Ontario	Pollution exposure perception	Study	No	-
146 The role of differences in individual and community attributes in perceived air quality	Kim, Yi and Kim	Science of the Total Environment	2012	425	-	20-26	Korea	Seoul	PM10, CO, SO2, NO2, ozone	Study	Yes	-

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147 Driven to injustice? Environmental justice and vehicle pollution in Christchurch, New Zealand	Kingham, Pearce and Zavar-Reza	Transportation Research Part D-Transport and Environment	2007	12	4	254-263	New Zealand	Christchurch	PM10	Study	Yes	Yes
148 Social inequality in perceived environmental exposures in relation to housing conditions in Germany	Kohlhuber, Mielck, Weiland and Bolte	Environmental Research	2006	101	2	246-255	Germany	-	Noise, pollution exposure perception	Study	Yes	Yes
149 Children's environmental health: Why should social disparities be considered?	Kohlhuber et al.	Acta Paediatrica	2006	95	-	26-30	EU	-	-	Review	-	-
150 Inequities in Enforcement? Environmental Justice and Government Performance	Konisky	Journal of Policy Analysis and Management	2009	28	1	102-121	USA	-	State regulatory enforcement of pollution control laws	Study	Yes	No
151 The Limited Effects of Federal Environmental Justice Policy on State Enforcement	Konisky	Policy Studies Journal	2009	37	3	475-496	USA	-	Federal effects of EJ policy	Study	Yes	Yes
152 An integrated framework for risk management and population health	Krewski et al.	Human and Ecological Risk Assessment	2007	13	6	1288-1312	-	-	-	Theory	-	-
153 Environmental equity and the role of public policy: Experiences in the rijnmond region	Kruize, Driessen, Glasbergen and van Egmond	Environmental Management	2007	40	4	578-595	Netherlands	Rijnmond	Traffic noise, NO2, external safety, availability of green space	Study	Yes	-
154 Environmental equity in the vicinity of Amsterdam Airport: The interplay between market forces and government policy	Kruize, Driessen, Glasbergen, van Egmond and Dassen	Journal of Environmental Planning and Management	2007	50	6	699-726	Netherlands	Amsterdam Airport	Traffic noise, NO2, external safety, availability of green space	Study	Yes	-
155 Environmental Justice and the Health of Children	Landrigan, Rauh and Galvez	Mount Sinai Journal of Medicine	2010	77	2	178-187	USA	-	Asthma, lead poisoning, obesity	Study	Yes	Yes
156 Street trees and equity: evaluating the spatial distribution of an urban amenity	Landry and Chakraborty	Environment and Planning A.	2009	41	11	2651-2670	USA	Tampa Bay, Florida	Street tree distribution	Study	Yes	Yes
157 Effect of socioeconomic status on the relationship between atmospheric pollution and mortality	Laurent, Brad, Filleul and Segala	Journal of Epidemiology and Community Health	2007	61	8	665-675	-	-	-	Review	-	-
158 The Distribution of Environmental Risks: Analytical Methods and French Data	Laurian	Population	2008	63	4	711-729	France	-	-	Review	-	-

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159	Environmental injustice in France	Laurian	Journal of Environmental Planning and Management	2008	51	1	55-79	France	-	Hazardous sites	Study	Yes	Yes
160	Environmental Impacts of a Major Freight Corridor: A Study of I-710 in California	Lee et al.	Transportation Research Record	2009	-	2123	119-128	USA	Los Angeles, California	CO, HC, NOx, PM	Study	-	-
161	Social Welfare Needs of Residents in Polluted Areas: A Case of Dioxin Pollution in Southern Taiwan	Lee, Yang and Tung	Public Administration and Development	2009	29	3	239-249	Taiwan	Southern Taiwan	Dioxin Polluted areas around Chemical Plants	Study	Yes	-
162	Uncertainty in impact and externality assessments - Implications for decision-making	Lenzen	International Journal of Life Cycle Assessment	2006	11	3	189-199	-	-	-	Theory	-	-
163	Between Choice and Sacrifice - Constructions of Community Consent in Reactive Air Pollution Regulation	Levine	Law and Society Review	1994	28	5	1035-1077	USA	-	Odor	Theory	-	-
164	Evaluating Efficiency-Equality Tradeoffs for Mobile Source Control Strategies in an Urban Area	Levy, Greco, Melly and Mukhi	Risk Analysis	2009	29	1	34-47	USA	Boston, Massachusetts	PM2.5	Study	-	-
165	Quantifying the efficiency and equity implications of power plant air pollution control strategies in the United States	Levy, Wilson and Zwack	Environmental Health Perspectives	2007	115	5	743-750	USA	-	PM, SO2, NOx	Study	-	-
166	Beyond tort: Compensating victims of environmental toxic injury	Lin	Southern California Law Review	2005	78	6	1439-1528	USA	-	-	Theory	-	-
167	Cumulative cancer risk from air pollution in Houston: Disparities in risk burden and social disadvantage	Linder, Marko and Sexton	Environmental Science and Technology	2008	42	12	4312-4322	USA	Houston, Texas	National-scale Air Toxics Assessment	Study	Yes	Yes
168	Environmental justice - Who will be protected by EPA's new ozone and particulate matter standards?	Liu	Environmental Science and Technology	1998	32	1	32A-39A	USA	-	Ozone and PM nonattainment areas	Study	Yes	Yes
169	Urban ozone plumes and population distribution by income and race: A case study of New York and Philadelphia	Liu	Journal of the Air and Waste Management Association	1996	46	3	207-215	USA	New York, Philadelphia, Pennsylvania	Ozone	Study	No	No

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170	Children's Environmental Health: Intergenerational Equity in Action-A Civil Society Perspective	Lloyd-Smith and Sheffield-Brotherton	Environmental Challenges in the Pacific Basin	2008	1140	-	190-200	-	-	Toxic chemicals	Review	-	-
171	Data Sources for an Environmental Quality Index: Availability, Quality, and Utility	Lobdell, Jagai, Rappazzo and Messer	American Journal of Public Health	2011	101	-	S277-S285	USA	-	Environmental quality index	Study	-	-
172	From asthma to AirBeat: Community-driven monitoring of fine particles and black carbon in Roxbury, Massachusetts	Loh, Sugerman-Brozan, Wiggins, Noiles and Archibald	Environmental Health Perspectives	2002	110	-	297-301	USA	Roxbury, Boston, Massachusetts	PM2.5, Black Carbon, ozone	Study	-	-
173	Segregation and Black/White differences in exposure to air toxics in 1990	Lopez	Environmental Health Perspectives	2002	110	-	289-295	USA	-	Air Toxics	Study	No	Yes
174	Out of sight, out of mind: Distancing and the geographic relationship between electricity consumption and production in Massachusetts	Luna	Social Science Quarterly	2008	89	5	1277-1292	USA	Massachusetts	Distance from power plant	Study	-	-
175	Who bears the environmental burden in China-An analysis of the distribution of industrial pollution sources?	Ma	Ecological Economics	2010	69	9	1869-1876	China	Henan Province	Industrial pollution sources	Study	No	No
176	Mapping urban risk: Flood hazards, race, & environmental justice in New York	Maantay and Maroko	Applied Geography	2009	29	1	111-124	USA	New York	Flood hazards	Study	-	No
177	Asthma and air pollution in the Bronx: Methodological and data considerations in using GIS for environmental justice and health research	Maantay	Health and Place	2007	13	1	32-56	USA	Bronx, New York	Toxics Release Inventory	Study	Yes	Yes
178	Mapping health on the Internet: A new tool for environmental justice and public health research	Maclachlan, Jerrett, Abernathy, Sears and Bunch	Health and Place	2007	13	1	72-86	Canada	Hamilton, Ontario	-	Study	-	-
179	Vehicle restrictions in four Latin American cities: Is congestion pricing possible?	Mahendra	Transport Reviews	2008	28	1	105-133	South America	Santiago de Chile, Mexico City, São Paulo, Bogotá	-	Study	-	-

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180 Using Geovisualization and Geospatial Analysis to Explore Respiratory Disease and Environmental Health Justice in New York City	Maroko, Maantay and Grady	Geospatial Analysis of Environmental Health	2011	4	-	39-66	USA	New York	Hospitalizations from respiratory disease	Study	Yes	Yes
181 Using air dispersion modeling and proximity analysis to assess chronic exposure to fine particulate matter and environmental justice in New York City	Maroko	Applied Geography	2012	34	-	533-547	USA	New York City	PM2.5	Study	Yes	Yes
182 Environmental inequality: Air pollution exposures in California's South Coast Air Basin	Marshall	Atmospheric Environment	2008	42	21	5499-5503	USA	Southern California	Benzene, butadiene, chromium particles, diesel PM	Study	Yes	Yes
183 Inhalation intake of ambient air pollution in California's South Coast Air Basin	Marshall et al.	Atmospheric Environment	2006	40	23	4381-4392	USA	Southern California	Benzene, diesel PM, 1,3-butadiene, chromium particles, ozone	Study	Yes	Yes
184 Reaching for environmental health justice: Canadian experiences for a comprehensive research, policy and advocacy agenda in health promotion	Masuda, Poland and Baxter	Health Promotion International	2010	25	4	453-463	Canada	-	-	Theory	-	-
185 Environmental justice in the therapeutic inner city	Masuda and Crabtree	Health and Place	2010	16	4	656-665	Canada	Vancouver	-	Study	-	-
186 Disparities in access to residential plumbing: a binational comparison of environmental injustice in El Paso and Ciudad Juarez	McDonald and Grineski	Population and Environment	2012	34	2	194-216	USA/Mexico	El Paso, Texas, Ciudad Juárez, Chihuahua	Plumbing	Study	Yes	-
187 Diesel particulate matter, lung cancer, and asthma incidences along major traffic corridors in MA, USA: A GIS analysis	McEntee and Ogneva-Himmelberger	Health and Place	2008	14	4	817-828	USA	Massachusetts	Diesel PM	Study	Yes	Yes
188 The relationship between socio-economic indicators and air pollution in England and Wales: implications for Environmental justice	McLeod et al.	Regional Environmental Change	2000	1	2	78-85	UK	England, Wales	SO2, PM10, NO2	Study	-	-
189 The role of environmental epidemiology in its disciplinary development	Mendez Paz	Colombia Medica	2011	42	3	278-285	-	-	-	Theory	-	-

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190 The distribution and enforcement of air polluting facilities in New Jersey	Mennis	Professional Geography	2005	57	3	411-422	USA	New Jersey	Proximity to air polluting facilities, regulatory enforcement	Study	-	Yes
191 Environmental-Health and Hispanic Children	Metzger, Delgado and Herrell	Environmental Health Perspectives	1995	103	-	25-32	USA	-	-	Review	-	-
192 Race, poverty, and potential exposure of middle-school students to air emissions from confined swine feeding operations	Mirabelli, Wing, Marshall and Wilcosky	Environmental Health Perspectives	2006	114	4	591-596	USA	North Carolina	Proximity to swine confined animal feeding operations	Study	Yes	Yes
193 Making the Environmental Justice Grade: The Relative Burden of Air Pollution Exposure in the United States	Miranda, Edwards, Keating and Paul	International Journal of Environmental Research and Public Health	2011	8	6	1755-1771	USA	-	Ozone, PM2.5	Study	Yes	Yes
194 The air quality impact of cordon and distance based road user charging: An empirical study of Leeds, UK	Mitchell, Namdeo and Milne	Atmospheric Environment	2005	39	33	6231-6242	UK	Leeds, England	NO2, PM10, CO, SO2, CO2, 103, butadiene, NOx	Study	No	No
195 An environmental justice analysis of British air quality	Mitchell and Dorling	Environment and Planning A.	2003	35	5	909-929	UK	-	NO2	Study	Yes	-
196 Air Pollution Around Schools Is Linked To Poorer Student Health And Academic Performance	Mohai, Kweon, Lee and Ard	Health Affairs	2011	30	5	852-862	USA	Michigan	EPA Risk-Screening Environmental Indicators	Study	Yes	Yes
197 Identifying Vulnerable Populations through an Examination of the Association Between Multipollutant Profiles and Poverty	Molitor et al.	Environmental Science and Technology	2011	45	18	7754-7760	USA	Los Angeles County, California	NO2, PM2.5, diesel PM	Study	Yes	-
198 Integrating environmental justice and the precautionary principle in research and policy making: The case of ambient air toxics exposures and health risks among schoolchildren in Los Angeles	Morello-Frosch, Pastor and Sadd	Annals of the American Academy of Political and Social Science	2002	584	-	47-68	USA	Los Angeles, California	Cancer and Respiratory Risk from air toxics	Study	No	Yes
199 Environmental justice and regional inequality in southern California: Implications for future research	Morello-Frosch, Pastor, Porras and Sadd	Environmental Health Perspectives	2002	110	-	149-154	USA	Southern California	Proximity to treatment, storage, and disposal facilities and Toxic Release Inventory facilities	Study	Yes	Yes

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200 Environmental justice and Southern California's "riskscape" - The distribution of air toxics exposures and health risks among diverse communities	Morello-Frosch, Pastor and Sadd	Urban Affairs Review	2001	36	4	551-578	USA	Southern California	Estimated lifetime cancer risks	Study	Yes	Yes
201 Discrimination and the political economy of environmental inequality	Morello-Frosch	Environment and Planning C- Government and Policy	2002	20	4	477-496	-	-	-	Theory	-	-
202 The riskscape and the color line: Examining the role of segregation in environmental health disparities	Morello-Frosch and Lopez	Environmental Research	2006	102	2	181-196	-	-	-	Theory	-	-
203 Social distribution of internal exposure to environmental pollution in Flemish adolescents	Morrens et al.	International Journal of Hygiene and Environmental Health	2012	215	4	474-481	Belgium	Flanders	PCBs, HCB, DDE, Pb, cadmium, benzene, PAHs	Study	No	-
204 Investigating the relationship between air pollution, health and social deprivation in Leeds, UK	Namdeo and Stringer	Environment International	2008	34	5	585-591	UK	Leeds, England	NO2	Study	Yes	-
205 Markets and geography: Designing marketable permit schemes to control local and regional pollutants	Nash and Revesz	Ecology Law Quarterly	2001	28	3	569-661	-	-	-	Theory	-	-
206 Too much market? Conflict between tradable pollution allowances and the "polluter pays" principle	Nash	Harvard Environmental Law Review	2000	24	2	465-535	-	-	-	Theory	-	-
207 Traffic Noise and Inequality in the Twin Cities, Minnesota	Nega, Chihara, Smith and Jayaraman	Human and Ecological Risk Assessment	2013	19	3	601-619	USA	Twin Cities, Minnesota	Noise	Study	Yes	Yes
208 Market solutions for sustainable cities	Nijkamp and Ursem	International Journal of Environment and Pollution	1998	10	1	46-64	-	-	-	Theory	-	-
209 Environmental equity and health: Understanding complexity and moving forward	Northridge, Stover, Rosenthal and Sherard	American Journal of Public Health	2003	93	2	209-214	USA	-	-	Theory	-	-
210 Spatiality of risk	November	Environment and Planning A.	2008	40	7	1523-1527	-	-	Risk	Review	-	-

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211 A Framework for Integrating Environmental Justice in Regulatory Analysis	Nweke	International Journal of Environment Research and Public Health	2011	8	6	2366-2385	USA	-	-	Theory	-	-
212 Symposium on Integrating the Science of Environmental Justice into Decision-Making at the Environmental Protection Agency: An Overview	Nweke et al.	American Journal of Public Health	2011	101	-	S19-S26	USA	-	-	Review	-	-
213 Environmental equity in air quality management: Local and international implications for human health and climate change	O'Neill, Kinney and Cohen	Journal of Toxicology and Environmental Health-Part A-Current Issues	2008	71	9-10	570-577	-	-	-	Theory	-	-
214 Poverty, Environment, and Health: The Role of Environmental Epidemiology and Environmental Epidemiologists	O'Neill, McMichael, Schwartz and Wartenberg	Epidemiology	2007	18	6	664-668	-	-	-	Theory	-	-
215 Health, wealth, and air pollution: Advancing theory and methods	O'Neill et al.	Environmental Health Perspectives	2003	111	16	1861-1870	World	-	-	Review	-	-
216 Helping schoolchildren with asthma breathe easier: Partnerships in community-based environmental health education	O'Neill	Environmental Health Perspectives	1996	104	5	464-466	-	-	-	Theory	-	-
217 Denial and the process of moral exclusion in environmental conflict	Opotow and Weiss	Journal of Social Issues	2000	56	3	475-490	-	-	-	Theory	-	-
218 The role of spatial representation in the development of a LUR model for Ottawa, Canada	Parenteau and Sawada	Air Quality Atmosphere and Health	2012	5	3	311-323	Canada	Ottawa	NO2	Study	-	-
219 The air is always cleaner on the other side: Race, space, and ambient air toxics exposures in California	Pastor, Morello-Frosch and Sadd	Journal of Urban Affairs	2005	27	2	127-148	USA	Southern California	National-scale Air Toxics Assessment	Study	No	Yes
220 Waiting to inhale: The demographics of toxic air release facilities in 21st-century California	Pastor, Sadd and Morello-Frosch	Social Science Quarterly	2004	85	2	420-440	USA	Southern California	Toxic Release Inventories	Study	Yes	Yes
221 Reading, writing, and toxics: children's health, academic performance, and environmental justice in Los Angeles	Pastor, Sadd and Morello-Frosch	Environment and Planning C-Government and Policy	2004	22	2	271-290	USA	Los Angeles, California	Toxic Release Inventories, estimated respiratory risk from air toxics	Study	-	Yes

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222 Who's minding the kids? Pollution, public schools, and environmental justice in Los Angeles	Pastor, Sadd and Morello-Frosch	Social Science Quarterly	2002	83	1	263-280	USA	Los Angeles, California	Toxic Release Inventories, Treatment, Storage, Disposal facilities, Cancer and Respiratory Risk from air toxics	Study	-	Yes
223 Breathless: Schools, air toxics, and environmental justice in California	Pastor, Morello-Frosch and Sadd	Policy Studies Journal	2006	34	3	337-362	USA	Los Angeles, California	National-scale Air Toxics Assessment	Study	Yes	Yes
224 Closing the research loop: A risk-based approach for communicating results of air pollution exposure studies	Payne-Sturges, Schwab and Buckley	Environmental Health Perspectives	2004	112	1	28-34	USA	Baltimore, Maryland	VOCs, estimated cancer risk from air toxics	Study	-	-
225 National environmental health measures for minority and low-income populations: Tracking social disparities in environmental health	Payne-Sturges and Gee	Environmental Research	2006	102	2	154-171	-	-	Measures based on social processes, physical environmental hazards/exposures, bodyburdens, health outcomes.	Theory	-	-
226 Every breath you take? Environmental justice and air pollution in Christchurch, New Zealand	Pearce, Kingham and Zavar-Reza	Environment and Planning A.	2006	38	5	919-938	New Zealand	Christchurch	PM10	Study	Yes	Yes
227 Environmental inequalities in New Zealand: A national study of air pollution and environmental justice	Pearce and Kingham	Geoforum	2008	39	2	980-993	New Zealand	-	PM10	Study	Yes	No
228 Environmental justice and health: A study of multiple environmental deprivation and geographical inequalities in health in New Zealand	Pearce, Richardson, Mitchell and Shortt	Social Science and Medicine	2011	73	3	410-420	New Zealand	-	New Zealand Multiple Environmental Deprivation Index	Study	-	-
229 Environmental justice and health: the implications of the socio-spatial distribution of multiple environmental deprivation for health inequalities in the United Kingdom	Pearce, Richardson, Mitchell and Shortt	Transactions of the Institute of British Geographers	2010	35	4	522-539	New Zealand	-	New Zealand Multiple Environmental Deprivation Index	Study	Yes	-

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230 Residential proximity to industrial sources of air pollution: Interrelationships among race, poverty, and age	Perlin, Wong and Sexton	Journal of the Air and Waste Management Association	2001	51	3	406-421	USA	Kanawha Valley, West Virginia, Baton Rouge-New Orleans Corridor, Louisiana, Baltimore, Maryland	Toxic Release Inventory	Study	Yes	Yes
231 An examination of race and poverty for populations living near industrial sources of air pollution	Perlin, Sexton and Wong	Journal of Exposure Analysis and Environmental Epidemiology	1999	9	1	29-48	USA	Kanawha Valley, West Virginia, Baton Rouge-New Orleans Corridor, Louisiana, Baltimore, Maryland	Toxic Release Inventory	Study	Yes	Yes
232 Distributional Benefit Analysis of a National Air Quality Rule	Post, Belova and Huang	International Journal of Environmental Research and Public Health	2011	8	6	1872-1892	USA	-	PM2.5	Study	-	Yes
233 Socio-economic correlates of municipal-level pollution emissions on Montreal Island	Premji, Bertrand, Smargiassi and Daniel	Canadian Journal of Public Health-Revue Canadienne de Sante Publique	2007	98	2	138-142	Canada	Montreal	National Pollutant Release Inventory	Study	Yes	No
234 An archaeology of environmental racism in Los Angeles	Pulido, Sidawi and Vos	Urban Geography	1996	17	5	419-439	USA	Torrance and East Los Angeles, California	-	Theory	-	-
235 Housing and health - Intersection of poverty and environmental exposures	Rauh, Landrigan and Claudio	Reducing the Impact of Poverty on Health and Human Development: Scientific Approaches	2008	1136	-	276-288	-	-	-	Theory	-	-

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236	Health, justice, and the environment	Resnik and Roman	Bioethics	2007	21	4	230-241	-	-	-	Theory	-	-
237	Particulate air pollution and health inequalities: a Europe-wide ecological analysis	Richardson, Pearce, Tunstall, Mitchell and Shortt	International Journal of Health Geographics	2013	12	-	doi: 10.1186/1476-072X-12-34	EU	-	PM10	Study	Yes for Eastern Europe/ No for Western Europe	-
238	Is particulate air pollution associated with health and health inequalities in New Zealand?	Richardson, Pearce and Kingham	Health and Place	2011	17	5	1137-1143	New Zealand	-	PM10	Study	No	-
239	The mechanism behind environmental inequality in Scotland: which came first, the deprivation or the landfill?	Richardson, Shortt and Mitchell	Environment and Planning A.	2010	42	1	223-340	UK	Scotland	Landfill Air pollution	Study	Yes	-
240	Intake Fraction of Urban Wood Smoke	Ries, Marshall and Brauer	Environmental Science and Technology	2009	43	13	4701-4706	Canada	Vancouver	Wood Smoke emissions	Study	Yes	-
241	A question of justice: Equity in environmental litigation, 1974-1991	Ringquist	Journal of Politics	1998	60	4	1148-1165	USA	-	Penalties for violating environmental regulations	Study	No	-
242	Trading Equity for Efficiency in Environmental Protection? Environmental Justice Effects from the SO2 Allowance Trading Program	Ringquist	Social Science Quarterly	2011	92	2	297-323	USA	-	SO2	Study	Yes	No
243	Air pollution and very low birth weight infants: A target population?	Rogers and Dunlop	Pediatrics	2006	118	1	156-164	USA	Georgia	PM10	Study	-	-
244	Protecting children from chemical exposure: Social work and US social welfare policy	Rogge and Combs-Orme	Social Work	2003	48	4	439-450	-	-	-	Study	-	-
245	Political ecology of natural hazards and environmental pollution in Santiago de Chile: The need for environmental justice	Romero, Fuentes and Smith	Scripta Nova-Revista Electronica de Geografia Y Ciencias Sociales	2010	14	331	-	Chile	Santiago	Natural hazards and air pollution	Study	Yes	-

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246 Exploration of health risks related to air pollution and temperature in three Latin American cities	Romero-Lankao, Qin and Borbor-Cordova	Social Science and Medicine	2013	83	-	110-118	South America	Bogota, Colombia, Mexico City, Mexico, Santiago, Chile	Temperatures, PM2.5, PM10, NO2, ozone	Study	No	-
247 ADAPTE: A tale of diverse teams coming together to do issue-driven interdisciplinary research	Romero-Lankao et al.	Environmental Science and Policy	2013	26	-	29-39	South America	Bogota, Colombia, Mexico City, Mexico, Santiago, Chile	-	Theory	-	-
248 Environmental movements, waste and waste infrastructure: an introduction	Rootes	Environmental Politics	2009	18	6	817-834	-	-	-	Theory	-	-
249 Environmental health disparities: Environmental and social impact of industrial pollution in a community-the model of Annison, AL	Rubin et al.	Pediatric Clinics of North America	2007	54	2	375	USA	Annison, Alabama	PCBs	Study	Yes	Yes
250 Playing It Safe: Assessing Cumulative Impact and Social Vulnerability through an Environmental Justice Screening Method in the South Coast Air Basin, California	Sadd, Pastor, Morello-Frosch, Scoggins and Jesdale	International Journal of Environmental Research and Public Health	2011	8	5	1441-1459	USA	Los Angeles, California	Environmental Justice Screening Method	Study	-	-
251 Under-mining health: Environmental justice and mining in India	Saha, Pattanayak, Sills and Singha	Health and Place	2011	17	1	140-148	India	-	Proximity to mining area	Study	-	-
252 Spatial analysis of air pollution and childhood asthma in Hamilton, Canada: comparing exposure methods in sensitive subgroups	Sahsuaroglu et al.	Environmental Health	2009	-	-	doi: 10.1186/1476-069X-8-1	Canada	Hamilton, Ontario	Ozone, PM10, NO2, NOx, SO2	Study	-	-

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253 Predicting Personal Nitrogen Dioxide Exposure in an Elderly Population: Integrating Residential Indoor and Outdoor Measurements, Fixed-Site Ambient Pollution Concentrations, Modeled Pollutant Levels, and Time-Activity Patterns	Sahsuvaroglu et al.	Journal of Toxicology and Environmental Health-Part A-Current Issues	2009	72	23	1520-1533	Canada	Hamilton, Ontario	NO2	Study	-	-
254 A land use regression model for predicting ambient concentrations of nitrogen dioxide in Hamilton, Ontario, Canada	Sahsuvaroglu et al.	Journal of the Air and Waste Management Association	2006	56	8	1059-1069	Canada	Hamilton, Ontario	NO2	Study	-	-
255 Urban air pollution and health inequities: A workshop report	Samet et al.	Environmental Health Perspectives	2001	109	-	357-374	-	-	-	Review	-	-
256 Environmental Justice at School: Understanding Research, Policy, and Practice to Improve Our Children's Health	Sampson	Journal of School Health	2012	82	5	246-252	-	-	-	Review	-	-
257 Matching heterogeneous traders in quantity-regulated markets	Sasaki and Caplan	Computational Economics	2008	31	4	341-362	-	-	-	Theory	-	-
258 Tangible evidence, trust and power: Public perceptions of community environmental health studies	Scammell, Senier, Darrah-Okike, Brown and Santos	Social Science and Medicine	2009	68	1	143-153	USA	Boston, Massachusetts	Surveyed perception of air quality	Study	-	-
259 Migration, class and environmental inequality: Exposure to pollution in China's Jiangsu Province	Schoolman and Ma	Ecological Economics	2012	75	-	140-151	China	Jiangsu	Number of pollution sources, smog, COD, SO2, NH3-N	Study	Yes	-
260 Expanding the Scope of Environmental Risk Assessment to Better Include Differential Vulnerability and Susceptibility	Schwartz, Bellinger and Glass	American Journal of Public Health	2011	101	-	S88-S93	-	-	-	Theory	-	-
261 Environmental injustice and transportation: The claims and the evidence	Schweitzer and Valenzuela	Journal of Planning Literature	2004	18	4	383-398	-	-	-	Review	-	-
262 Neighborhood Air Quality, Respiratory Health, and Vulnerable Populations in Compact and Sprawled Regions	Schweitzer and Zhou	Journal of the American Planning Association	2010	76	3	363-371	USA	80 Metropolitan Areas	Ozone, PM2.5	Study	Yes	Yes

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263	Something in the Air: Civic science and contentious environmental politics in post-apartheid South Africa	Scott and Barnett	Geoforum	2009	40	3	373-382	South Africa	Durham	-	Theory	-	-
264	Air-Pollution Health Risk - Do Class and Race Matter	Sexton et al.	Toxicology and Industrial Health	1993	9	5	843-879	USA	-	-	Review	-	-
265	Racism and health inequity among Americans	Shavers	Journal of the National Medical Association	2006	98	3	386-396	USA	-	-	Review	-	-
266	Global Climate Change and Children's Health: Threats and Strategies for Prevention	Sheffield and Landrigan	Environmental Health Perspectives	2011	119	3	291-298	Global	-	-	Review	-	-
267	The outdoor air quality flag program in central california: A school-based educational intervention to potentially help reduce children's exposure to environmental asthma triggers	Shendell et al.	Journal of Environmental Health	2007	70	3	28-31	-	-	-	Review	-	-
268	Environmental justice in the Israeli context	Shmueli	Environment and Planning A.	2008	40	10	2384-2401	Israel	Sachnin	Distribution, recognition, participation, compensatory justice	Study	-	-
269	Bivariate spatial process modeling for constructing indicator or intensity weighted spatial CDFs	Short, Carlin and Gelfand	Journal of Agricultural, Biological and Environmental Statistics	2005	10	3	259-275	USA	Central and Southern California, Atlanta, Georgia	NO2, NO, ozone	Study	-	Yes
270	Mortality inequalities by environment type in New Zealand	Shortt, Richardson, Pearce and Mitchell	Health and Place	2012	18	5	1132-1136	New Zealand	-	PM10, UV Index, temperature, greenspace coverage	Study	-	-
271	Whose risk in Philadelphia? Proximity to unequally hazardous industrial facilities	Sicotte and Swanson	Social Science Quarterly	2007	88	2	515-534	USA	Philadelphia, Pennsylvania	EPA Risk-Screening Environmental Indicators	Study	Yes	Yes
272	Educating Reflective Practitioners: Learning to Embrace the Unexpected through Service Learning	Sletto	Journal of Planning Education and Research	2010	29	4	403-415	USA	-	-	Theory	-	-
273	Levels of analysis for the study of environmental health disparities	Soobader, Cubbin, Gee, Rosenbaum and Laurenson	Environmental Research	2006	102	2	172-180	USA	-	-	Theory	-	-

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274 The effects of 3 environmental risks on mortality disparities across Mexican communities	Steven, Dias and Ezzati	Proceedings of the National Academy of Sciences of the United States of America	2008	105	44	16860-16865	Mexico	-	Indoor air pollution from solid fuel use, PM, unsafe water, sanitation	Study	Yes	-
275 Neighbourhoods and health: A review of the New Zealand literature	Stevenson, Pearce, Blakely, Ivory and Witten	New Zealand Geographer	2009	65	3	211-221	-	-	-	Review	-	-
276 Blueprint for Communicating Risk and Preventing Environmental Injustice	Stokes, Hood, Zokovitch and Close	Journal of Health Care for the Poor and Underserved	2010	21	1	35-52	USA	Taylor County, Florida	-	Theory	-	-
277 The relationship between lead and crime	Stretesky and Lynch	Journal of Health and Social Behavior	2004	45	2	214-229	USA	-	Pb	Study	Yes	Yes
278 An inequality study of ambient nitrogen dioxide and traffic levels near elementary schools in the Tampa area	Stuart and Zeager	Journal of Environmental Management	2011	92	8	1923-1930	USA	Tampa Bay, Florida	NO2	Study	Yes	Yes
279 The Social Distribution of Neighborhood-Scale Air Pollution and Monitoring Protection	Stuart, Mudhasakul and Sriwatanapongse	Journal of the Air and Waste Management Association	2009	59	5	591-602	USA	Tampa Bay, Florida	CO, NO2, SO2, PM10, PM2.5, Toxics Release Inventory, traffic counts, proximity to power plants	Study	Yes	Yes
280 Inequalities in cumulative environmental burdens among three urbanized counties in California	Su, Jerrett, Morello-Frosch, Jesdale and Kyle	Environment International	2012	40	-	79-87	USA	Alameda, San Diego and Los Angeles Counties	NO2, PM2.5, diesel PM	Study	Yes	Yes
281 Does exposure to air pollution in urban parks have socioeconomic, racial or ethnic gradients?	Su, Jerrett, de Nazelle and Wolch	Environmental Research	2011	111	3	319-328	USA	Los Angeles, California	NO2, PM2.5, ozone	Study	Yes	Yes
282 An Index for Assessing Demographic Inequalities in Cumulative Environmental Hazards with Application to Los Angeles, California	Su et al.	Environmental Science and Technology	2009	43	20	7626-7634	USA	Los Angeles County, California	NO2, PM2.5, diesel PM	Study	Yes	Yes
283 Evaluating socioeconomic and racial differences in traffic-related metrics in the United States using a GIS approach	Tian, Xue and Barzyk	Journal of Exposure Analysis and Environmental Epidemiology	2013	23	2	215-222	USA	-	Road and traffic densities	Study	Yes	Yes

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284	Transport and land-use policies in Delhi	Tiwari	Bulletin of the World Health Organization	2003	81	6	444-450	India	Delhi	Evaluation of Transportation policies	Study	Yes	-
285	Energy production, consumption, policies and recent developments in Turkey	Toklu, Guney, Isik, Comakli and Kaygusuz	Renewable and Sustainable Energy Reviews	2010	14	4	1172-1186	Turkey	-	-	Theory	-	-
286	Hot spots regulation and environmental justice	Turaga, Noonan and Bostrom	Ecological Economics	2011	70	7	1395-1405	USA	Escambia and Santa Rosa Counties, Florida	Benzene, acetaldehyde, formaldehyde, acrylonitrile, nickel, arsenic	Study	-	-
287	What is social sustainability? A clarification of concepts	Vallance, Perkins and Dixon	Geoforum	2011	42	3	342-348	-	-	-	Theory	-	-
288	Comparing objective and subjective status: Gender and space (and environmental justice?)	Veenstra and Kelly	Health and Place	2007	13	1	57-71	Canada	British Columbia	Surveyed perception of status	Study	-	-
289	Taking environmental action: The role of local composition, context, and collective	Wakefield, Elliott, Eyles and Cole	Environmental Management	2006	37	1	40-53	Canada	British Columbia	Environmental Action	Study	No	-
290	Beyond Distribution and Proximity: Exploring the Multiple Spatialities of Environmental Justice	Walker	Antipode	2009	41	4	614-636	-	-	-	Theory	-	-
291	The urban in fragile, uncertain, neoliberal times: towards new geographies of social justice ?	Walks	Canadian Geographer	2009	53	3	345-356	Canada	-	-	Theory	-	-
292	Interpollutant emission trading of ozone precursors in southeast Texas	Wang, Allen and McDonald-Buller	Clean Technologies and Environmental Policy	2009	11	2	189-200	USA	Houston, Texas	NOx, VOCs, ozone	Study	-	-
293	Environmental justice: A contrary finding for the case of high-voltage electric power transmission lines	Wartenberg, Greenberg and Harris	Journal of Exposure Science and Environmental Epidemiology	2010	20	3	237-244	-	-	Proximity to high voltage electric power transmission lines	Study	No	No
294	Environmental equity, air quality, socioeconomic status, and respiratory health: a linkage analysis of routine data from the Health Survey for England	Wheeler and Ben-Shlomo	Journal of Epidemiology and Community Health	2005	59	11	948-954	UK	England	NO2, SO2, benzene, PM10	Study	Yes (urban)/ No (rural)	-

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295 Health-related environmental indices and environmental equity in England and Wales	Wheeler	Environment and Planning A.	2004	36	5	803-822	UK	England, Wales	Air quality, chemical releases from industrial processes, landfills and sites registered under the Control of Major Accident regulations	Study	Yes (urban)/ No (rural)	-
296 Modeling the effects of water usage and co-behavior on inhalation exposures to contaminants volatilized from household water	Wilkes, Small, Davidson and Andelman	Journal of Exposure Analysis and Environmental Epidemiology	1996	6	4	393-412	-	-	Indoor air pollution from VOCs	Study	-	-
297 Air pollution and restricted activity days among New Zealand school children and staff	Wilson, Kingham and Pearce	International Journal of Environment and Pollution	2010	41	1-2	140-154	New Zealand	Christchurch	PM10	Study	-	-
298 Air pollution and odor in communities near industrial swine operations	Wing et al.	Environmental Health Perspectives	2008	116	10	1362-1368	USA	North Carolina	PM10, hydrogen sulfide, swine odor	Study	-	-
299 Energy and health 3 - Energy and transport	Woodcock, Banister, Edwards, Prentice and Roberts	Lancet	2007	370	9592	1078-1088	-	-	Transportation Costs	Study	Yes	-
300 Disparities in exposure to air pollution during pregnancy	Woodruff, Parker, Kyle and Schoendorf	Environmental Health Perspectives	2003	111	7	942	USA	-	PM10, ozone, NO2, SO2, CO	Study	No	Yes
301 Advancing a multilevel framework for epidemiologic research on asthma disparities	Wright and Subramanian	Chest	2007	132	5	757S-769S	-	-	-	Theory	-	-
302 Exposures to volatile organic compounds (VOCs) and associated health risks of socio-economically disadvantaged population in a "hot spot" in Camden, New Jersey	Wu et al.	Atmospheric Environment	2012	57	-	72-79	USA	Camden, New Jersey	VOCs	Study	-	-
303 Proximity of schools in Detroit, Michigan to automobile and truck traffic	Wu and Batterman	Journal of Exposure Science and Environmental Epidemiology	2006	16	5	457-470	USA	Wayne County, Michigan	Proximity to high traffic roads	Study	Yes	Yes

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304 Assessment of the Relationship between Air Quality and Socio-Economic Factors in Sheffield, UK using GIS	Xie and Hou	Fresenius Environmental Bulletin	2010	19	9B	2040-2046	UK	Sheffield, England	Air quality index	Study	Yes	-
305 Differential Exposure to Hazardous Air Pollution in the United States: A Multilevel Analysis of Urbanization and Neighborhood Socioeconomic Deprivation	Young et al.	International Journal of Environmental Research and Public Health	2012	9	6	2204-2225	USA	-	National-scale Air Toxics Assessment	Study	Yes	-
306 Race, gender, and social status as modifiers of the effects of PM10 on Mortality	Zanobetti and Schwartz	Journal of Occupational and Environmental Medicine	2000	42	5	469-474	USA	Chicago, Illinois, Detroit, Michigan, Minneapolis-St. Paul, Minnesota, Pittsburgh, Pennsylvania	PM10	Study	No	No
307 Performance of Kriging and EWPM for Relative Air Pollution Exposure Risk Assessment	Zou, Zhan, Zeng, Yorke and Liu	International Journal of Environmental Research	2011	5	3	769-778	USA	Dallas, Texas	SO2	Study	-	-

*Journal article that provides new evidence about the distribution of environmental hazards: Yes denotes a greater burden to either individuals of low socioeconomic status (LSES) (e.g. low income, education, home ownership) or minorities within a country (e.g. nonwhite in the USA, immigrant status in Germany).