



GeoHealth

Supporting Information for

Public Health and Climate Benefits and Tradeoffs of U.S. Vehicle Electrification

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Introduction

The supporting information contains three figures, which expand on the main text figures by displaying health impact co-benefit results on a per-capita scale. Additionally, the supporting information includes five tables which contain the calculated state-level CO₂ emissions changes, the BenMAP-CE health impact function parameters, and the BenMAP-CE health impact function results aggregated nationally and by U.S. state and region.

State-Level Health Impacts

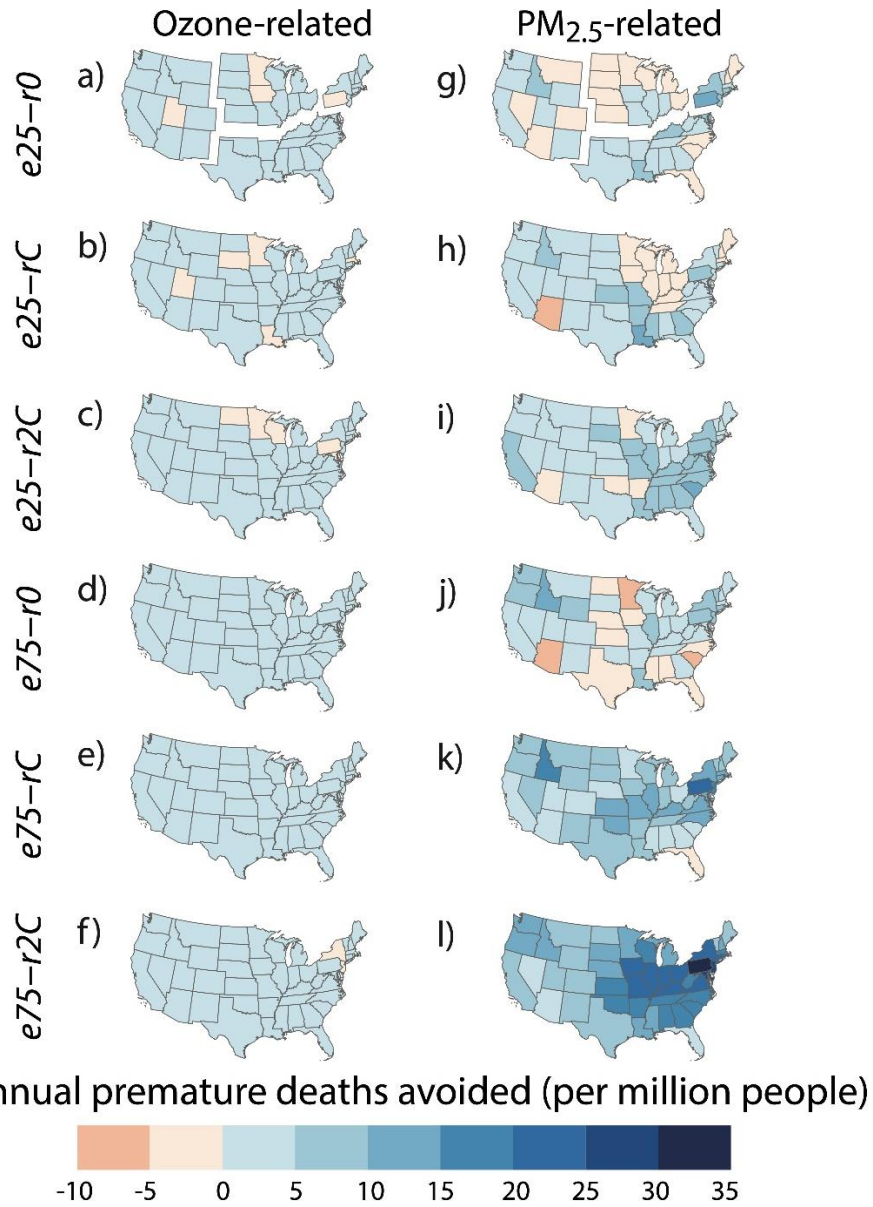


Figure S1. Population normalized annual premature deaths avoided by state. EV adoption scenario-driven changes in air pollutants – (a-f) O₃ (Bell et al., 2004) and (g-l) PM_{2.5}. (Krewski et al., 2009) – drive changes in annual premature mortality incidence. Data is normalized by state population. Negative numbers signify increases in premature mortality. Panels a and g are subdivided into U.S. Census regions; Midwest, West, Northeast, and South (U.S. Census Bureau, 2018).

Normalized Grid Cell Health Impacts

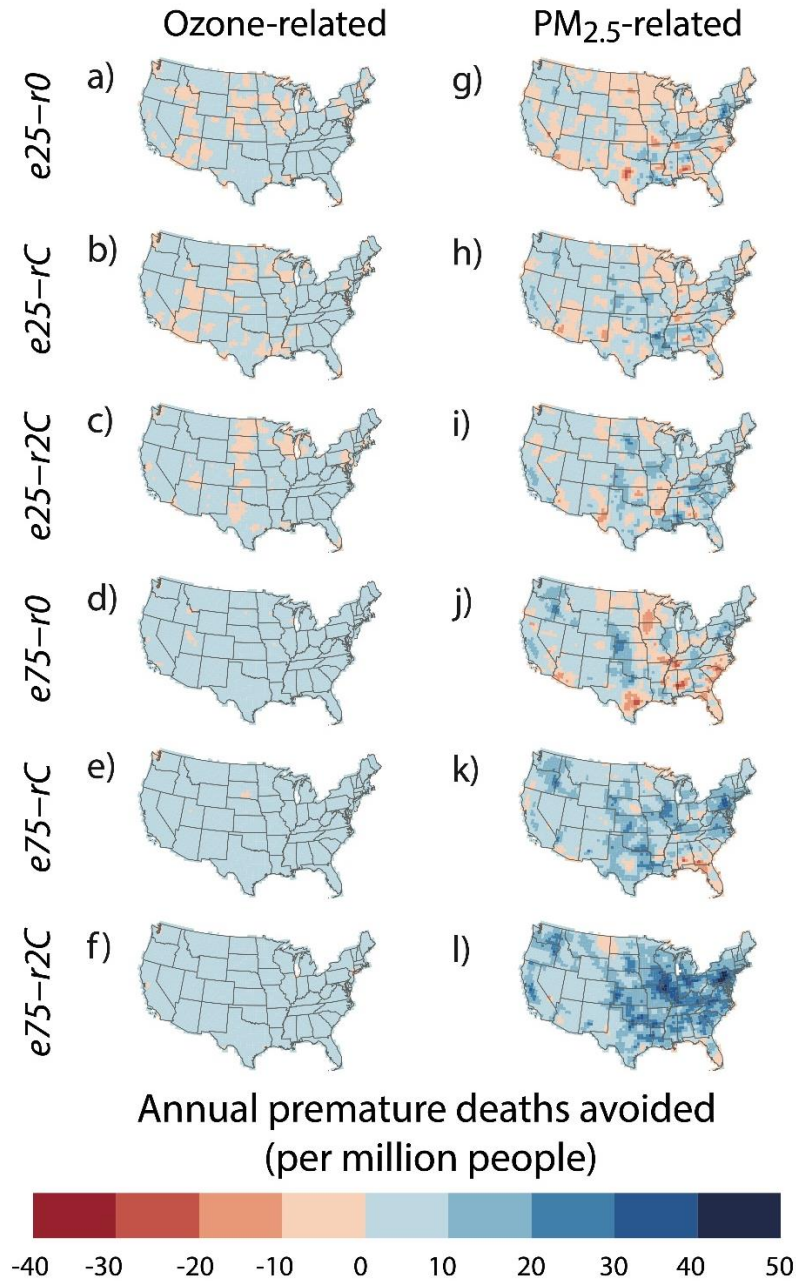


Figure S2. Population normalized annual premature deaths avoided by model grid cell. EV adoption scenario-driven changes in air pollutants – (a-f) O₃ (Bell et al., 2004) and (g-l) PM_{2.5}. (Krewski et al., 2009) – drive changes in annual premature mortality incidence. Data is normalized by grid cell population. Negative numbers signify increases in premature mortality.

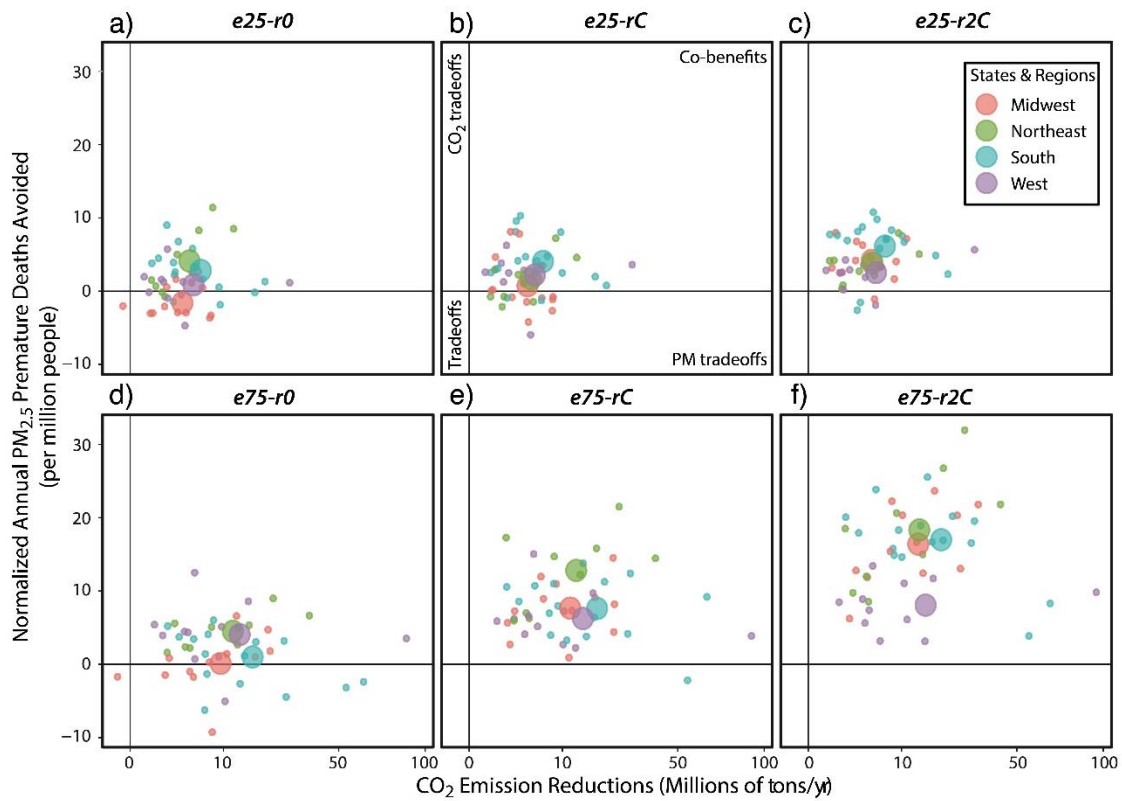


Figure S3. Population normalized national, regional, and state co-benefits. Avoided premature mortality and CO₂ reduction co-benefits under six vehicle electrification scenarios. Climate and PM_{2.5} health co-benefits (Krewski et al., 2009) for individual states (smaller circles) and regional averages (larger circles) normalized by population.

Health Impact Function (HIF)	Pollutant	Location	Age Group	Health Endpoint	Concentration-response coefficient (β)	β Standard Error	Form
<i>Krewski et al.</i>	PM _{2.5} (Annual)	116 U.S. Cities	30-99	All-Cause Mortality (Long-Term)	0.005827	0.000963	Log-linear
<i>Laden et al.</i>	PM _{2.5} (Annual)	6 Cities	25-99	All-Cause Mortality (Long-Term)	0.014842	0.004170	Log-linear
<i>Bell et al.</i>	Ozone (MDA8)	95 U.S. Cities	0-99	Non-Accidental Mortality (Short-Term)	0.0002613	0.000089	Log-linear
<i>Ito et al.</i>	Ozone (MDA8)	7 U.S. Cities	0-99	Non-Accidental Mortality (Short-Term)	0.000532	0.000088	Log-linear
<i>Jerrett et al.</i>	Ozone (Annual)	86 U.S. Urban Areas	30-99	Respiratory Mortality (Long-Term)	0.004471	0.001510	Log-linear

Table S1. Source of health impact functions (HIFs) and underlying characteristics (US EPA, 2019b).

Tables S2 – S5 are provided as .csv files.

Table S2. State-level changes in CO₂ emissions (10⁶ tons per year) for EV adoption-energy generation scenarios.

Table S3. National health impact data. Column 1: scenario (1 = *e25r0*; 2 = *e25rC*; 3 = *e25r2C*; 4 = *e75r0*; 5 = *e75rC*; 6 = *e75r2C*). Column 2: O₃ or PM_{2.5} pollutant. Column 3: HIF Author (see supplemental Table 1 for more details). Column 4, 5, & 6: 50P, 2.5P, and 97.5P estimates of avoided mortality, respectively.

Table S4. Regional health impacts data. Column 1: scenario (1 = *e25r0*; 2 = *e25rC*; 3 = *e25r2C*; 4 = *e75r0*; 5 = *e75rC*; 6 = *e75r2C*). Column 2: O₃ or PM_{2.5} pollutant. Column 3: HIF Author (see supplemental Table 1 for more details). Columns 4, 5, & 6: 50P, 2.5P, and 97.5P estimates of avoided mortality, respectively.

Table S5. State health impact data. Column 1: state. Column 2: scenario (1 = *e25r0*; 2 = *e25rC*; 3 = *e25r2C*; 4 = *e75r0*; 5 = *e75rC*; 6 = *e75r2C*). Column 3: HIF Author (see supplemental Table 1 for more details). Column 4: state population. Columns 5, 6, & 7: 50P, 2.5P, and 97.5P estimates of avoided mortality, respectively. Column 8: percent of baseline; HIF 50P estimate of annual avoided mortality normalized by baseline (*BASE*) incidence rates. Column 9: region of U.S. based on Census Bureau Classification (2018). Column 10: O₃ or PM_{2.5} pollutant.