# Appendix

**Supplementary material**

*Variable selection*

Based on previous research, we selected a total of eight demographic (population density, people under 18 years, people over 65 years, Hispanic American, Anglo American, African American, Asian American and other races) and five socioeconomic indicators (vehicle ownership, poverty, unemployment, education less than a high school diploma, English proficiency) as independent variables in the model. We retrieved all data from the U.S. Census Bureau ACS 2019 at the county level.

Multiple studies have highlighted the importance of demographic variables in the spread of COVID-19. Population density might be one of the most important factors since the virus is transmitted via human contact. Many papers reveal positive relationships between population density and COVID-19 infection and associated mortality in the U.S. (Sy et al., 2021), India (Bhadra et al., 2021), Algeria (Kadi and Khelfaoui 2020), Turkey (Coşkun et al., 2021) and Japan (Kodera et al., 2020). However, some researchers also found inverse relationships between population density, infection rates, and death rates (Carozzi et al., 2020; Hamidi et al., 2020). This relationship may be due to the quality of healthcare facilities (Hamidi et al., 2020), living environment (Bhadra et al., 2021) and public interventions (Sun et al., 2020) in low density areas.

Age is also an important variable impacting prevalence, severity and mortality of COVID-19. Ludvigsson (2020)'s review paper reported that children only accounted for 1~5% of all confirmed cases, had milder symptoms than adults, while deaths were extremely rare. On the other hand, patients older than 65 are responsible for 31% of COVID-19 infections, 45% of hospitalizations, 53% of intensive care unit admissions, and 80% of deaths related to COVID-19 (CDC COVID-19 Response Team 2020). This high susceptibility seems to be due to physiological changes of aging and multiple age-related comorbidities such as diabetes, heart and lung disease, dementia, hypertension and chronic kidney disease (Ejaz et al., 2020; Esme et al., 2021; Nikolich-Zugich et al., 2020). Age is also a major factor in deciding behavior or preventive actions. Younger individuals tend to be less likely to take prevention actions and are also less likely to take this threat as seriously as older adults (Barari et al., 2020; Utych and Fowler 2020).

Race and ethnicity may also have an additional impact on the COVID-19 infection rate and deaths. Based on a cohort of 505,992 patients receiving ambulatory care at the Bronx Montefiore Health System, Golestaneh et al. (2020) found higher COVID-19 mortality in Blacks after adjusting for age, multiple reported comorbidities and sociodemographic disparity. Baqui et al. (2020) also found increased mortality in Blacks. Evans and Lippman (2020) argue that Blacks' lower vitamin D levels could increase the risk of a worse respiratory syndrome by spurring a wounding response in the stellate cells of the lung. Others think this health disparity would be more related to socioeconomic status (Baqui et al., 2020; Gold et al., 2020; Lopez et al., 2021; Quan et al., 2021; Raifman and Raifman 2020).

Several critical socioeconomic factors could influence the rate of infection and death. Vehicle ownership might be one of the most important factors as this is highly associated with travel patterns and working/shopping behaviors (De Vos 2020; Kraemer et al., 2020; Parady et al., 2020). Poverty, unemployment rate, education level, and language proficiency are also significant factors (Abedi et al., 2021; Benfer et al., 2020; Fielding-Miller et al., 2020). Individuals with limited access to health services due to financial burden

or lack of health insurance could be more vulnerable than other individuals during times of crisis (Ahmed et al., 2020). Living environments are also highly associated with these factors (Pereira and Oliveira 2020).

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**Supplementary tables**

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**Supplementary Table 1. Summary of COVID-19 patients**

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| | | Mean | Max | Min | SD | r | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | NYT | USA fact | JHU |
| NYT | Confirmed cases | 9,300.2 | 1,218,879 | 1.0 | 34,213.4 | - | 0.9987 | 0.9998 |
| | Deaths | 163.6 | 23,103 | 0.0 | 620.0 | - | 0.9983 | 0.9998 |
| USAfact | Confirmed cases | 9,438.4 | 1,179,316 | 0.0 | 34,275.1 | - | - | 0.9985 |
| | Deaths | 171.5 | 23,101 | 0.0 | 669.9 | - | - | 0.9986 |
| JHU | Confirmed cases | 9,486.0 | 1,218,229 | 0.0 | 34,830.3 | - | - | - |
| | Deaths | 172.1 | 23,103 | 0.0 | 672.2 | - | - | - |

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**Supplementary Table 2. VIFs for each different model with different immigrant groups (TT: Total immigrants; Af: Africa; EAf: Eastern Africa; WAf: Western Africa;SAf: Southern Africa; NAf: Northern Africa; MAf: Middle Africa; NAm: Northern America; LAm: Latin America; EAs: Eastern Asia; WAs: Western Asia; SCAs: South-Central Asia; SEAs: South-Eastern Asia; NEu: Northern Europe; WEu: Western Europe; SEu: Southern Europe; EEu: Eastern Europe; Oc: Oceania)**

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| | TT | Af | EAf | WAf | SAf | NAf | MAf |
|---|---|---|---|---|---|---|---|
| Immigrant group | 4.61 | 1.57 | 1.22 | 1.10 | 1.27 | 1.09 | 1.01 |
| Demographic variables | | | | | | | |
| Population density | 2.29 | 2.31 | 2.27 | 2.22 | 2.24 | 2.23 | 2.22 |
| Under 18 years | 1.93 | 1.94 | 1.93 | 1.93 | 1.93 | 1.93 | 1.94 |
| Over 65 years | 1.93 | 1.97 | 1.95 | 1.94 | 1.93 | 1.93 | 1.93 |
| Hispanic | 3.89 | 4.39 | 4.39 | 4.39 | 4.39 | 4.39 | 4.39 |
| Anglo American | - | - | - | - | - | - | - |
| African American | 2.01 | 2.06 | 2.01 | 1.99 | 1.99 | 2.02 | 1.99 |
| Asian | 2.57 | 1.79 | 1.74 | 1.73 | 1.84 | 1.71 | 1.69 |
| Other races | 1.55 | 1.54 | 1.54 | 1.54 | 1.54 | 1.54 | 1.54 |
| Socioeconomic variables | | | | | | | |
| No vehicle | 2.98 | 2.98 | 3.00 | 2.98 | 2.97 | 2.97 | 2.97 |
| poverty | 3.06 | 3.02 | 3.02 | 3.02 | 3.02 | 3.02 | 3.02 |
| Unemployment | 1.91 | 1.92 | 1.92 | 1.92 | 1.92 | 1.92 | 1.92 |
| Education less than a high school diploma | 2.82 | 3.21 | 3.19 | 3.21 | 3.19 | 3.19 | 3.19 |
| English proficiency (not well and not at all) | - | 4.11 | 4.06 | 4.02 | 4.02 | 4.03 | 4.02 |
| Biophysical variables | | | | | | | |
| Mean temperature | 2.14 | 2.24 | 2.25 | 2.21 | 2.20 | 2.21 | 2.20 |
| Relative humidity | 3.12 | 3.13 | 3.13 | 3.13 | 3.12 | 3.12 | 3.13 |
| Diurnal temperature variation | 2.92 | 2.91 | 2.91 | 2.91 | 2.91 | 2.91 | 2.91 |

**Supplementary Table 2. Cont.**

| | Am | NAm | LAm | As | EAs | WAs | SCAs | SEAs |
|---|---|---|---|---|---|---|---|---|
| Immigrant group | 3.41 | 1.14 | 3.48 | 1.77 | 4.45 | 1.45 | 3.31 | 2.96 |
| Demographic variables | | | | | | | | |
| Population density | 2.24 | 2.23 | 2.25 | 2.23 | 2.27 | 2.24 | 2.22 | 2.24 |
| Under 18 years | 1.93 | 1.95 | 1.93 | 1.94 | 1.99 | 1.95 | 1.93 | 1.94 |
| Over 65 years | 1.93 | 1.93 | 1.93 | 1.95 | 1.94 | 1.96 | 1.93 | 1.93 |
| Hispanic | 4.04 | 4.39 | 4.07 | 4.39 | 4.39 | 4.39 | 4.39 | 4.39 |
| Anglo American | | - | - | | - | - | - | - |
| African American | 2 | 1.99 | 2.00 | 1.99 | 2.00 | 1.99 | 2.00 | 1.99 |
| Asian | 1.59 | 1.70 | 1.59 | - | 4.56 | 1.85 | 3.97 | 3.67 |
| Other races | 1.55 | 1.55 | 1.55 | 1.54 | 1.54 | 1.55 | 1.54 | 1.55 |
| Socioeconomic variables | | | | | | | | |
| No vehicle | 2.99 | 2.97 | 2.99 | 2.97 | 2.98 | 2.97 | 2.97 | 2.98 |
| poverty | 3.05 | 3.02 | 3.05 | 3.01 | 3.04 | 3.03 | 3.02 | 3.02 |
| Unemployment | 1.91 | 1.92 | 1.91 | 1.92 | 1.93 | 1.92 | 1.92 | 1.92 |
| Education less than a high school diploma | 2.95 | 3.22 | 2.97 | 3.23 | 3.22 | 3.25 | 3.19 | 3.19 |
| English proficiency (not well and not at all) | - | 4.04 | - | 4.05 | 4.02 | 4.04 | 4.02 | 4.04 |
| Biophysical variables | | | | | | | | |
| Mean temperature | 2.14 | 2.21 | 2.14 | 2.20 | 2.20 | 2.20 | 2.20 | 2.20 |
| Relative humidity | 3.12 | 3.14 | 3.12 | 3.13 | 3.12 | 3.13 | 3.12 | 3.13 |
| Diurnal temperature variation | 2.9 | 2.92 | 2.90 | 2.91 | 2.91 | 2.92 | 2.91 | 2.91 |

**Supplementary Table 2. Cont.**

| | Eu | NEu | WEu | SEu | EEu | Oc |
|---|---|---|---|---|---|---|
| Immigrant group | 1.99 | 1.48 | 1.29 | 1.24 | 1.66 | 4.45 |
| Demographic variables | | | | | | |
| Population density | 2.25 | 2.23 | 2.23 | 2.22 | 2.26 | 2.27 |
| Under 18 years | 2.02 | 2.00 | 1.98 | 1.94 | 1.95 | 1.99 |
| Over 65 years | 1.93 | 1.93 | 1.93 | 1.93 | 1.93 | 1.94 |
| Hispanic | 4.39 | 4.39 | 4.39 | 4.39 | 4.39 | 4.39 |
| Anglo American | | - | - | - | - | - |
| African American | 1.99 | 1.99 | 1.99 | 1.99 | 1.99 | 2.00 |
| Asian | 1.89 | 1.77 | 1.72 | 1.72 | 1.87 | 4.56 |
| Other races | 1.55 | 1.55 | 1.54 | 1.55 | 1.54 | 1.54 |
| Socioeconomic variables | | | | | | |
| No vehicle | 2.99 | 2.97 | 2.97 | 3.01 | 2.98 | 2.98 |
| poverty | 3.08 | 3.04 | 3.03 | 3.06 | 3.04 | 3.04 |
| Unemployment | 1.93 | 1.93 | 1.92 | 1.92 | 1.92 | 1.93 |
| Education less than a high school diploma | 3.33 | 3.31 | 3.27 | 3.21 | 3.23 | 3.22 |
| English proficiency (not well and not at all) | 4.10 | 4.06 | 4.03 | 4.06 | 4.06 | 4.02 |
| Biophysical variables | | | | | | |
| Mean temperature | 2.22 | 2.25 | 2.22 | 2.21 | 2.20 | 2.20 |
| Relative humidity | 3.20 | 3.18 | 3.19 | 3.13 | 3.14 | 3.12 |
| Diurnal temperature variation | 3.00 | 2.95 | 2.93 | 2.94 | 2.95 | 2.91 |

**Supplementary Table 3. LR test p-values with SDM model.**

| | Confirmed cases | | | Deaths | | |
|---|---|---|---|---|---|---|
| | **SAM** | **SEM** | **OLS** | **SAM** | **SEM** | **OLS** |
| Total | < 2.2e-16 | < 2.2e-16 | < 2.2e-16 | 5.874e-11 | 5.44e-15 | < 2.2e-16 |
| Africa (%) | < 2.2e-16 | < 2.2e-16 | < 2.2e-16 | 2.091e-09 | 1.757e-13 | < 2.2e-16 |
| Eastern Africa (%) | < 2.2e-16 | < 2.2e-16 | < 2.2e-16 | 1.001e-09 | 1.396e-13 | < 2.2e-16 |
| Western Africa (%) | < 2.2e-16 | < 2.2e-16 | < 2.2e-16 | 1.062e-09 | 1.551e-13 | < 2.2e-16 |
| Southern Africa (%) | < 2.2e-16 | < 2.2e-16 | < 2.2e-16 | 6.567e-10 | 6.672e-14 | < 2.2e-16 |
| Northern Africa (%) | < 2.2e-16 | < 2.2e-16 | < 2.2e-16 | 9.908e-10 | 1.471e-13 | < 2.2e-16 |
| Middle Africa (%) | < 2.2e-16 | < 2.2e-16 | < 2.2e-16 | 9.704e-11 | 1.21e-14 | < 2.2e-16 |
| Americas (%) | < 2.2e-16 | < 2.2e-16 | < 2.2e-16 | 1.811e-12 | < 2.2e-16 | < 2.2e-16 |
| Northern America (%) | < 2.2e-16 | < 2.2e-16 | < 2.2e-16 | 4.503e-09 | 1.843e-14 | < 2.2e-16 |
| Latin America (%) | < 2.2e-16 | < 2.2e-16 | < 2.2e-16 | 3.82e-11 | 2.442e-15 | < 2.2e-16 |
| Asia (%) | < 2.2e-16 | < 2.2e-16 | < 2.2e-16 | 8.278e-11 | 8.549e-15 | < 2.2e-16 |
| Eastern Asia (%) | < 2.2e-16 | < 2.2e-16 | < 2.2e-16 | 3.103e-10 | 4.13e-14 | < 2.2e-16 |
| Western Asia (%) | < 2.2e-16 | < 2.2e-16 | < 2.2e-16 | 7.484e-10 | 9.082e-14 | < 2.2e-16 |
| South-Central Asia (%) | < 2.2e-16 | < 2.2e-16 | < 2.2e-16 | 7.256e-10 | 6.972e-14 | < 2.2e-16 |
| South-Eastern Asia (%) | < 2.2e-16 | < 2.2e-16 | < 2.2e-16 | 9.293e-10 | 1.388e-13 | < 2.2e-16 |
| Europe (%) | < 2.2e-16 | < 2.2e-16 | < 2.2e-16 | 1.737e-09 | 3.113e-13 | < 2.2e-16 |
| Northern Europe (%) | < 2.2e-16 | < 2.2e-16 | < 2.2e-16 | 2.592e-09 | 1.443e-14 | < 2.2e-16 |
| Western Europe (%) | < 2.2e-16 | < 2.2e-16 | < 2.2e-16 | 6.911e-10 | 5.107e-15 | < 2.2e-16 |
| Southern Europe (%) | < 2.2e-16 | < 2.2e-16 | < 2.2e-16 | 1.642e-09 | 7.86e-14 | < 2.2e-16 |
| Eastern Europe (%) | < 2.2e-16 | < 2.2e-16 | < 2.2e-16 | 6.877e-10 | 8.049e-14 | < 2.2e-16 |
| Oceania (%) | < 2.2e-16 | < 2.2e-16 | < 2.2e-16 | 6.109e-11 | 1.665e-15 | < 2.2e-16 |

**Supplementary Table 4. The descriptive summary for the dependent and independent variables at the county level.**

| | Min | Mean | Max | SD |
|---|---|---|---|---|
| Total immigrants (#) | 0 | 13,982 | 3,430,507 | 91,828 |
| Africa (#) | 0 | 714 | 70,236 | 3,851 |
| Eastern Africa (#) | 0 | 213 | 34,164 | 1,373 |
| Western Africa (#) | 0 | 15 | 1,614 | 85 |
| Southern Africa (#) | 0 | 61 | 13,721 | 457 |
| Northern Africa (#) | 0 | 19 | 8,611 | 207 |
| Middle Africa (#) | 0 | 8 | 695 | 40 |
| Americas (#) | 0 | 7,334 | 1,961,011 | 54,726 |
| Northern America (#) | 0 | 259 | 29,438 | 1,216 |
| Latin America (#) | 0 | 7,075 | 1,931,573 | 53,865 |
| Asia(#) | 0 | 4,337 | 1,225,004 | 31,956 |
| Eastern Asia (#) | 0 | 1,329 | 472,314 | 11,856 |
| Western Asia (#) | 0 | 358 | 135,320 | 3,142 |
| South-Central Asia (#) | 0 | 1,278 | 203,280 | 7,983 |
| South-Eastern Asia (#) | 0 | 1,356 | 412,092 | 10,910 |
| Europe (#) | 0 | 1,511 | 245,100 | 8,397 |
| Northern Europe (#) | 0 | 300 | 41,644 | 1,412 |
| Western Europe (#) | 0 | 300 | 36,673 | 1,300 |
| Southern Europe (#) | 0 | 240 | 32,918 | 1,484 |
| Eastern Europe (#) | 0 | 669 | 188,404 | 5,073 |
| Oceania (#) | 0 | 86 | 19,330 | 641 |
| Demographic variables | | | | |
| Population density (people / km2) | 0.06 | 97.29 | 16,610.26 | 546.23 |
| Under 18 years (#) | 1 | 23,338.26 | 2,214,760.00 | 75,809.73 |
| Over 65 years (#) | 11 | 16,141.40 | 1,335,978 | 46,218.46 |
| Hispanic (#) | 0 | 18,593.82 | 4,888,434 | 126,310.70 |
| Anglo American (#) | 16 | 74,846.17 | 5,168,443 | 203,861.20 |
| African American (#) | 0 | 13,025.73 | 1,217,416 | 55,648.76 |
| Asian (#) | 0 | 5,697.74 | 1,473,221 | 41,438.78 |
| Other races (#) | 0 | 6,163.77 | 2,216,661 | 48,292.22 |
| Socioeconomic variables | | | | |
| No vehicle (#) | 0 | 3,277.21 | 584,710 | 19,611.60 |
| poverty (#) | 6 | 13,500.06 | 1,480,446 | 46,781.19 |
| Unemployment (#) | 0 | 2,697.43 | 311,956 | 9,856.68 |
| Education less than a high school diploma (#) | 4 | 8,413.69 | 1,437,059 | 36,627.09 |
| English proficiency (not well and not at all) (#) | 0 | 4,195.25 | 1,265,355 | 31,702.89 |
| Biophysical variables | | | | |
| Mean temperature (°C) | -0.01 | 11.25 | 24.81 | 4.78 |
| Relative humidity (%) | 21.94 | 67.43 | 84.59 | 9.86 |
| Diurnal temperature variation (°C) | 6.13 | 11.89 | 20.19 | 1.91 |
| COVID-19 (Johns Hopkins) | | | | |
| Confirmed cases (per 100,000) | 0 | 9,339.46 | 37,191.52 | 3086.00 |
| Death (per 100,000) | 0 | 185.65 | 792.86 | 110.29 |

**Supplementary Table 5. Model coefficients and 95% confidence intervals for immigrants from Africa.**

| | Confirmed cases | | Deaths | |
|---|---|---|---|---|
| | Total impact | CI (2.5~97.5%) | Total impact | CI (2.5~97.5%) |
| Africa immigrants | -171.1 | -482.9~88.0 | 3.1 | -7.7~14.1 |
| Demographic variables | | | | |
| Population density | 0.1 | -0.2~0.4 | 0.0 | 0.0~0.0 |
| Under 18 years | 210.3* | 157.2~265.8* | 10.7* | 9.3~12.4* |
| Over 65 years | 20.5 | -23.0~58.9 | 9.7* | 8.3~10.9* |
| Hispanic | -36.8* | -56.1~-18.1* | 0.5* | 0.0~1.0* |
| African American | 16.3* | 9.8~24.3* | 1.9* | 1.6~2.1* |
| Asian | -157.9* | -221.2~-74.3* | -0.5 | -2.2~2.0 |
| Other races | 99.8* | 77.5~117.2* | 1.6* | 1.1~2.0* |
| Socioeconomic variables | | | | |
| No vehicle | 149.5* | 85.7~211.0* | 13.0* | 10.8~14.9* |
| Poverty | -26.0 | -58.5~11.2 | -3.8* | -5.1~-2.6* |
| Unemployment | -488.7* | -567.9~-398.4* | -10.6* | -12.8~-8.8* |
| Education less than high school | 174.2* | 135.2~213.1* | 7.3* | 6.2~8.3* |
| English proficiency (not well and not at all) | 110.0 | -3.7~243.2 | -5.7* | -8.7~-3.3* |
| Biophysical variables | | | | |
| Mean temperature | 4.4 | -22.6~33.7 | 0.6 | -0.1~1.6 |
| Relative humidity | 127.7* | 108.4~146.2* | 3.1* | 2.6~3.6* |
| Diurnal temperature variation | 569.4* | 464.9~690.8* | 19.9* | 17.1~22.6* |

*Significant values at the *p*=0.05 level.

**Supplementary Table 6. Model coefficients and 95% confidence intervals for immigrants from Eastern Africa.**

| | Confirmed cases | | Deaths | |
|---|---|---|---|---|
| | Total impact | CI (2.5~97.5%) | Total impact | CI (2.5~97.5%) |
| Eastern Africa immigrants | -877.1* | -1568.1~-254.3* | -18.6* | -38.3~-2.9* |
| Demographic variables | | | | |
| Population density | 0.2 | -0.1~0.5 | 0.0 | 0.0~0.0 |
| Under 18 years | 212.2* | 157.2~259.2* | 10.5* | 9.2~12.2* |
| Over 65 years | 22.0 | -12.4~58.4 | 9.1* | 7.7~10.5* |
| Hispanic | -38.6* | -50.1~-25.7* | 0.4* | 0.0~0.8* |
| African American | 17.5* | 8.0~26.9* | 1.9* | 1.6~2.2* |
| Asian | -145.1* | -213.3~-83.0* | 0.1 | -1.9~2.1 |
| Other races | 94.8* | 75.9~113.8* | 1.5* | 0.9~2.0* |
| Socioeconomic variables | | | | |
| No vehicle | 121.6* | 50.7~185.7* | 12.7* | 10.7~14.8* |
| Poverty | -20.4 | -57.2~15.2 | -3.7* | -5.2~-2.3* |
| Unemployment | -489.6* | -559.0~-407.1* | -11.1* | -13.2~-8.7* |
| Education less than high school | 178.3* | 149.9~208.7* | 7.4* | 6.5~8.5* |
| English proficiency (not well and not at all) | 114.3* | 37.9~192.8* | -5.6* | -8.7~-2.7* |
| Biophysical variables | | | | |
| Mean temperature | -5.2 | -28.8~18.7 | 0.2 | -0.8~1.2 |
| Relative humidity | 129.2* | 112.1~145.4* | 3.2* | 2.8~3.6* |
| Diurnal temperature variation | 573.3* | 463.9~685.3* | 20.9* | 17.8~23.6* |

*Significant values at the *p*=0.05 level.

**Supplementary Table 7. Model coefficients and 95% confidence intervals for immigrants from Western Africa.**

| | Confirmed cases | | Deaths | |
|---|---|---|---|---|
| | Total impact | CI (2.5~97.5%) | Total impact | CI (2.5~97.5%) |
| Western Africa immigrants | 4,536.2 | -7535.9~15962.4 | -184.0 | -541.4~152.6 |
| Demographic variables | | | | |
| Population density | 0.1 | -0.3~0.5 | 0.0 | 0.0~0.0 |
| Under 18 years | 205.7* | 163.3~251.1* | 7.0* | 5.5~8.1* |
| Over 65 years | 26.7 | -7.6~66.7 | 3.9* | 2.6~5.0* |
| Hispanic | -35.6* | -51.7~-21.6* | -1.0* | -1.4~-0.7* |
| African American | 18.3* | 9.4~25.9* | 1.2* | 1.0~1.5* |
| Asian | -173.2* | -240.5~-117.5* | 1.7* | 0.3~3.6* |
| Other races | 106.7* | 87.8~126.3* | 0.6* | 0.0~1.2* |
| Socioeconomic variables | | | | |
| No vehicle | 129.9* | 60.4~190.2* | 9.5* | 8.0~11.4* |
| Poverty | -25.9 | -61.6~15.1 | -4.6* | -5.7~-3.6* |
| Unemployment | -497.3* | -574.0~-440.0* | -9.2* | -11.4~-7.1* |
| Education less than high school | 174.8* | 146.4~206.5* | 4.4* | 3.5~5.6* |
| English proficiency (not well and not at all) | 100.1* | 7.0~200.2* | -1.6 | -4.1~0.8 |
| Biophysical variables | | | | |
| Mean temperature | 1.5 | -18.8~21.7 | -5.5* | -7.3~-3.6* |
| Relative humidity | 132.0* | 117.8~146.8* | 2.0* | 1.2~2.8* |
| Diurnal temperature variation | 591.1* | 519.2~678.4* | 19.8* | 16.3~22.9* |

*Significant values at the $p$=0.05 level.

**Supplementary Table 8. Model coefficients and 95% confidence intervals for immigrants from Southern Africa.**

| | Confirmed cases | | Deaths | |
|---|---|---|---|---|
| | Total impact | CI (2.5~97.5%) | Total impact | CI (2.5~97.5%) |
| Southern Africa immigrants | 5008.4* | 1525.8~8569.5* | 167.0* | 77.3~269.5* |
| Demographic variables | | | | |
| Population density | 0.1 | -0.2~0.4 | 0.0 | 0.0~0.0 |
| Under 18 years | 215.3* | 162.9~268.0* | 10.6* | 9.1~11.7* |
| Over 65 years | 34.0 | -5.1~70.5 | 9.3* | 8.1~10.4* |
| Hispanic | -31.2* | -45.0~-18.9* | 0.5* | 0.1~0.9* |
| African American | 17.2* | 10.1~23.7* | 2.0* | 1.7~2.2* |
| Asian | -192.4* | -247.0~-146.7* | -1.2 | -3.0~0.7 |
| Other races | 99.8* | 78.9~121.1* | 1.6* | 1.1~2.1* |
| Socioeconomic variables | | | | |
| No vehicle | 124.5* | 57.1~183.2* | 13.0* | 10.8~15.1* |
| Poverty | -22.3 | -58.0~11.9 | -3.8* | -5.0~-2.5* |
| Unemployment | -503.5* | -587.2~-417.5* | -11.7* | -14.1~-9.7* |
| Education less than high school | 188.0* | 158.4~224.7* | 7.6* | 6.3~8.6* |
| English proficiency (not well and not at all) | 44.6 | -65.6~128.2 | -6.3* | -8.3~-3.9* |
| Biophysical variables | | | | |
| Mean temperature | -2.1 | -24.7~24.3 | 0.3 | -0.7~1.2 |
| Relative humidity | 130.1* | 117.2~144.7* | 3.2* | 2.8~3.7* |
| Diurnal temperature variation | 584.6* | 509.0~664.6* | 20.9* | 18.8~23.5* |

*Significant values at the $p$=0.05 level.

**Supplementary Table 9. Model coefficients and 95% confidence intervals for immigrants from Northern Africa.**

| | Confirmed cases | | Deaths | |
|---|---|---|---|---|
| | Total impact | CI (2.5~97.5%) | Total impact | CI (2.5~97.5%) |
| Northern Africa immigrants | -2656.0 | -7354.3~1535.1 | -146.5* | -285.5~-20.1* |
| Demographic variables | | | | |
|    Population density | 0.2 | -0.1~0.5 | 0.0 | 0.0~0.0 |
| Under 18 years | 207.9* | 161.0~253.0* | 10.9* | 9.1~12.5* |
|    Over 65 years | 24.0 | -23.3~64.0 | 9.3* | 8.4~10.5* |
|    Hispanic | -37.0* | -53.4~-17.9* | 0.4 | -0.1~1.0 |
|    African American | 17.9* | 9.2~27.5* | 1.9* | 1.7~2.2* |
|    Asian | -165.7* | -241.3~-89.9* | 0.2 | -2.6~2.3 |
|    Other races | 97.0* | 83.2~109.1* | 1.6* | 1.1~2.0* |
| Socioeconomic variables | | | | |
|    No vehicle | 121.9* | 54.7~188.0* | 13.4* | 11.6~14.8* |
|    Poverty | -24.6 | -66.3~14.5 | -4.3* | -5.3~-3.2* |
|    Unemployment | -489.8* | -578.1~-407.2* | -10.5* | -13.1~-8.1* |
|    Education less than high school | 179.0* | 148.1~212.9* | 7.6* | 6.7~8.6* |
| English proficiency (not well and not at all) | 91.7* | 10.7~185.8* | -5.8* | -8.5~-2.7* |
| Biophysical variables | | | | |
|    Mean temperature | 0.7 | -26.0~28.4 | 0.3 | -0.4~1.1 |
|    Relative humidity | 128.4* | 108.0~146.3* | 3.4* | 2.8~3.9* |
|    Diurnal temperature variation | 572.8* | 472.0~681.8* | 21.3* | 17.9~24.4* |

*Significant values at the $p$=0.05 level.


**Supplementary Table 10. Model coefficients and 95% confidence intervals for immigrants from Middle Africa.**

| | Confirmed cases | | Deaths | |
|---|---|---|---|---|
| | Total impact | CI (2.5~97.5%) | Total impact | CI (2.5~97.5%) |
| Middle Africa immigrants | 1657.1 | -4988.2~8587.6 | -622.6* | -801.4~-464.5* |
| Demographic variables | | | | |
|    Population density | 0.1 | -0.2~0.4 | 0.0 | 0.0~0.0 |
| Under 18 years | 206.5* | 163.8~258.2* | 9.9* | 8.5~11.0* |
|    Over 65 years | 20.1 | -16.4~55.1 | 9.0* | 7.9~9.9* |
|    Hispanic | -43.0* | -59.7~-25.2* | 0.5* | 0.1~0.9* |
|    African American | 18.2* | 12.0~23.9* | 2.0* | 1.8~2.2* |
|    Asian | -169.5* | -227.3~-118.7* | -0.1 | -2.0~1.7 |
|    Other races | 98.4* | 77.3~120.0* | 1.7* | 1.0~2.3* |
| Socioeconomic variables | | | | |
|    No vehicle | 128.1* | 53.1~185.7* | 12.4* | 10.5~13.9* |
|    Poverty | -31.0 | -61.9~11.3 | -4.0* | -4.9~-2.9* |
|    Unemployment | -467.1* | -550.9~-386.2* | -10.8* | -12.6~-8.6* |
|    Education less than high school | 176.4* | 144.0~207.8* | 7.6* | 6.7~8.5* |
| English proficiency (not well and not at all) | 131.3* | 27.7~242.6* | -5.4* | -8.3~-2.2* |
| Biophysical variables | | | | |
|    Mean temperature | 0.1 | -29.1~30.2 | 0.4 | -0.4~1.2 |
|    Relative humidity | 127.6* | 112.7~142.9* | 3.3* | 2.9~3.7* |
|    Diurnal temperature variation | 589.4* | 497.5~651.8* | 20.6* | 18.4~23.2* |

*Significant values at the $p$=0.05 level.

**Supplementary Table 11. Model coefficients and 95% confidence intervals for immigrants from Americas.**

| | Confirmed cases | | Deaths | |
|---|---|---|---|---|
| | Total impact | CI (2.5~97.5%) | Total impact | CI (2.5~97.5%) |
| Americas immigrants | -24.8 | -74.5~22.1 | -7.3* | -8.8~-5.7* |
| Demographic variables | | | | |
|    Population density | 0.3* | 0.0~0.7* | 0.0 | 0.0~0.0 |
| Under 18 years | 217.3* | 168.5~262.2* | 10.7* | 9.1~12.2* |
|    Over 65 years | 27.2 | -7.3~67.9 | 9.6* | 8.6~10.7* |
|    Hispanic | -20.1* | -34.5~-8.3* | 0.9* | 0.6~1.2* |
|    African American | 16.6* | 8.2~23.4* | 2.0* | 1.7~2.2* |
|    Asian | -150.3* | -202.1~-94.0* | 0.9 | -1.0~3.2 |
|    Other races | 105.5* | 83.7~125.4* | 1.8* | 1.2~2.3* |
| Socioeconomic variables | | | | |
|    No vehicle | 110.1* | 43.6~182.6* | 12.9* | 11.5~14.6* |
|    Poverty | -29.4 | -69.6~18.5 | -5.0* | -6.2~-3.8* |
|    Unemployment | -479.8* | -573.6~-398.5* | -11.1* | -14.0~-8.5* |
|    Education less than high school | 188.2* | 154.4~224.7* | 8.3* | 7.5~9.3* |
| English proficiency (not well and not at all) | - | - | - | - |
| Biophysical variables | | | | |
|    Mean temperature | 5.2 | -21.3~34.6 | 0.8* | 0.0~1.5* |
|    Relative humidity | 125.5* | 105.3~147.1* | 3.1* | 2.6~3.7* |
|    Diurnal temperature variation | 528.0* | 412.5~655.7* | 20.8* | 18.4~23.0* |

*Significant values at the $p$=0.05 level.


**Supplementary Table 12. Model coefficients and 95% confidence intervals for immigrants from Northern America.**

| | Confirmed cases | | Deaths | |
|---|---|---|---|---|
| | Total impact | CI (2.5~97.5%) | Total impact | CI (2.5~97.5%) |
| Northern America immigrants | -3809.0* | -4313.0~-3376.5* | -90.5* | -106.1~-73.8* |
| Demographic variables | | | | |
|    Population density | 0.1 | -0.3~0.4 | 0.0 | 0.0~0.0 |
| Under 18 years | 112.4* | 63.5~155.3* | 8.4* | 7.1~9.7* |
|    Over 65 years | 18.4 | -20.8~57.1 | 9.0* | 7.8~10.3* |
|    Hispanic | -46.3* | -60.7~-33.6* | 0.4* | 0.0~0.7* |
|    African American | 18.8* | 11.0~26.9* | 1.9* | 1.6~2.1* |
|    Asian | -157.9* | -206.8~-98.0* | -0.3 | -2.1~1.8 |
|    Other races | 118.0* | 99.3~136.3* | 1.9* | 1.4~2.4* |
| Socioeconomic variables | | | | |
|    No vehicle | 117.1* | 63.5~176.0* | 13.1* | 11.4~14.8* |
|    Poverty | -25.2 | -60.5~4.6 | -3.9* | -5.0~-2.7* |
|    Unemployment | -439.2* | -542.6~-330.9* | -9.4* | -11.7~-7.4* |
|    Education less than high school | 137.7* | 98.2~172.3* | 6.3* | 5.5~7.2* |
| English proficiency (not well and not at all) | 258.6* | 180.8~333.2* | -2.3 | -5.5~0.6 |
| Biophysical variables | | | | |
|    Mean temperature | -14.1 | -47.8~25.3 | -0.1 | -1.0~0.6 |
|    Relative humidity | 123.3* | 110.5~139.4* | 3.2* | 2.7~3.7* |
|    Diurnal temperature variation | 541.5* | 454.9~639.1* | 19.6* | 16.5~22.8* |

*Significant values at the $p$=0.05 level.

**Supplementary Table 13. Model coefficients and 95% confidence intervals for immigrants from Latin America.**

| | Confirmed cases | | Deaths | |
|---|---|---|---|---|
| | Total impact | CI (2.5~97.5%) | Total impact | CI (2.5~97.5%) |
| Latin America immigrants | -11.9 | -57.8~30.0 | -6.8* | -8.1~-5.2* |
| Demographic variables | | | | |
| Population density | 0.2 | -0.1~0.5 | 0.0 | 0.0~0.0 |
| Under 18 years | 231.9* | 188.6~269.9* | 11.0* | 9.5~12.5* |
| Over 65 years | 43.3* | 2.9~83.7* | 9.6* | 8.5~10.8* |
| Hispanic | -25.2* | -37.5~-14.2* | 0.8* | 0.5~1.2* |
| African American | 16.9* | 9.3~25.4* | 2.0* | 1.8~2.3* |
| Asian | -135.1* | -204.7~-74.9* | 0.5 | -1.4~2.1 |
| Other races | 104.3* | 81.6~127.7* | 1.8* | 1.2~2.4* |
| Socioeconomic variables | | | | |
| No vehicle | 128.5* | 69.2~199.1* | 12.7* | 10.3~14.2* |
| Poverty | -35.6 | -75.3~1.7 | -5.0* | -5.9~-3.6* |
| Unemployment | -492.8* | -561.1~-423.4* | -10.6* | -13.1~-8.2* |
| Education less than high school | 192.0* | 150.3~227.6* | 8.2* | 7.2~9.2* |
| English proficiency (not well and not at all) | - | - | - | - |
| Biophysical variables | | | | |
| Mean temperature | 8.1 | -18.4~37.9 | 0.9* | 0.1~1.7* |
| Relative humidity | 125.0* | 107.2~142.7* | 3.1* | 2.8~3.6* |
| Diurnal temperature variation | 544.4* | 466.0~641.3* | 20.9* | 18.5~23.4* |

*Significant values at the $p$=0.05 level.


**Supplementary Table 14. Model coefficients and 95% confidence intervals for immigrants from Asia.**

| | Confirmed cases | | Deaths | |
|---|---|---|---|---|
| | Total impact | CI (2.5~97.5%) | Total impact | CI (2.5~97.5%) |
| Asia immigrants | -260.4* | -355.3~-168.1* | 1.5 | -0.3~4.4 |
| Demographic variables | | | | |
| Population density | 0.2 | -0.1~0.6 | 0.0 | 0.0~0.0 |
| Under 18 years | 201.5* | 138.4~253.7* | 11.2* | 9.8~12.9* |
| Over 65 years | 11.2 | -24.4~45.9 | 9.8* | 8.8~10.8* |
| Hispanic | -39.4* | -52.5~-26.4* | 0.4 | -0.1~1.0 |
| African American | 15.7* | 6.2~25.7* | 1.9* | 1.7~2.2* |
| Asian | - | - | - | - |
| Other races | 100.9* | 85.9~117.4* | 1.5* | 1.0~1.9* |
| Socioeconomic variables | | | | |
| No vehicle | 131.7* | 57.6~199.2* | 12.6* | 10.7~14.5* |
| Poverty | -22.1 | -56.3~11.5 | -3.8* | -4.9~-2.7* |
| Unemployment | -515.3* | -596.4~-437.2* | -10.4* | -12.6~-8.4* |
| Education less than high school | 178.4* | 145.0~210.8* | 7.5* | 6.6~8.4* |
| English proficiency (not well and not at all) | 97.1* | 26.1~170.6* | -6.4* | -9.7~-4.0* |
| Biophysical variables | | | | |
| Mean temperature | 6.9 | -22.1~39.4 | 0.4 | -0.4~1.3 |
| Relative humidity | 124.1* | 105.8~146.5* | 3.2* | 2.8~3.5* |
| Diurnal temperature variation | 550.9* | 443.3~661.7* | 20.7* | 18.4~23.3* |

*Significant values at the $p$=0.05 level.

**Supplementary Table 15. Model coefficients and 95% confidence intervals for immigrants from Eastern Asia.**

| | Confirmed cases | | Deaths | |
|---|---|---|---|---|
| | Total impact | CI (2.5~97.5%) | Total impact | CI (2.5~97.5%) |
| Eastern Asia immigrants | -755.9* | -1212.0~-272.7* | 21.0* | 7.7~36.2* |
| Demographic variables | | | | |
| Population density | 0.3* | 0.0~0.7* | 0.0 | 0.0~0.0 |
| Under 18 years | 210.8* | 167.4~263.4* | 11.4* | 10.2~12.6* |
| Over 65 years | 38.4 | -18.6~94.0 | 9.8* | 8.9~10.7* |
| Hispanic | -33.6* | -47.9~-17.4* | 0.5 | -0.1~1.0 |
| African American | 16.3* | 6.6~23.6* | 1.9* | 1.7~2.1* |
| Asian | 38.3 | -77.0~151.8 | -3.9 | -7.6~0.1 |
| Other races | 102.4* | 85.1~119.1* | 1.5* | 1.1~2.0* |
| Socioeconomic variables | | | | |
| No vehicle | 129.2* | 62.0~188.9* | 12.8* | 10.8~14.7* |
| Poverty | -14.8 | -52.9~16.0 | -4.1* | -5.3~-3.1* |
| Unemployment | -504.4* | -593.7~-407.6* | -9.9* | -11.9~-7.8* |
| Education less than high school | 178.7* | 147.2~208.7* | 7.4* | 6.4~8.6* |
| English proficiency (not well and not at all) | 54.5 | -43.6~145.2 | -6.0* | -9.1~-2.5* |
| Biophysical variables | | | | |
| Mean temperature | -0.3 | -33.7~31.0 | 0.6 | -0.4~1.5 |
| Relative humidity | 128.3* | 112.0~144.6* | 3.1* | 2.7~3.6* |
| Diurnal temperature variation | 575.2* | 475.4~673.3* | 20.1* | 17.3~22.7* |

*Significant values at the $p$=0.05 level.

**Supplementary Table 16. Model coefficients and 95% confidence intervals for immigrants from Western Asia.**

| | Confirmed cases | | Deaths | |
|---|---|---|---|---|
| | Total impact | CI (2.5~97.5%) | Total impact | CI (2.5~97.5%) |
| Western Asia immigrants | -974.0 | -1904.3~30.2 | 42.5* | 16.9~68.8* |
| Demographic variables | | | | |
| Population density | 0.2 | -0.2~0.6 | 0.0 | 0.0~0.0 |
| Under 18 years | 219.1* | 160.0~269.5* | 10.8* | 8.8~12.3* |
| Over 65 years | 26.6 | -18.7~74.2 | 9.5* | 8.3~10.9* |
| Hispanic | -39.0* | -50.9~-25.5* | 0.6* | 0.1~0.9* |
| African American | 18.5* | 9.8~27.7* | 1.9* | 1.6~2.1* |
| Asian | -153.6* | -225.2~-86.7* | -1.0 | -2.8~0.9 |
| Other races | 99.3* | 81.0~118.6* | 1.5* | 0.8~2.0* |
| Socioeconomic variables | | | | |
| No vehicle | 126.5* | 63.5~190.5* | 12.6* | 10.6~14.1* |
| Poverty | -33.2 | -71.4~12.3 | -3.6* | -4.3~-3.0* |
| Unemployment | -466.8* | -543.9~-378.0* | -11.0* | -13.3~-9.1* |
| Education less than high school | 174.4* | 144.3~199.8* | 7.4* | 6.5~8.4* |
| English proficiency (not well and not at all) | 117.8* | 34.4~183.9* | -6.8* | -9.1~-4.2* |
| Biophysical variables | | | | |
| Mean temperature | 3.7 | -25.2~31.7 | 0.5 | -0.1~1.3 |
| Relative humidity | 121.9* | 104.1~141.2* | 3.3* | 2.8~3.8* |
| Diurnal temperature variation | 543.0* | 444.9~637.4* | 21.1* | 18.7~23.7* |

*Significant values at the $p$=0.05 level.

**Supplementary Table 17. Model coefficients and 95% confidence intervals for immigrants from South-Central Asia.**

| | Confirmed cases | | Deaths | |
|---|---|---|---|---|
| | Total impact | CI (2.5~97.5%) | Total impact | CI (2.5~97.5%) |
| South-Central Asia immigrants | -530.0* | -880.7~-192.6* | 26.6* | 15.5~36.9* |
| Demographic variables | | | | |
| Population density | 0.2 | -0.1~0.5 | 0.0 | 0.0~0.0 |
| Under 18 years | 220.4* | 162.8~277.9* | 10.4* | 8.6~11.7* |
| Over 65 years | 23.5 | -19.5~67.3 | 9.5* | 8.4~10.3* |
| Hispanic | -32.5* | -49.0~-19.6* | 0.4* | 0.0~0.9* |
| African American | 18.0* | 9.1~24.8* | 1.9* | 1.6~2.1* |
| Asian | -36.6 | -140.5~60.0 | -5.8* | -9.0~-2.4* |
| Other races | 98.3* | 81.0~117.8* | 1.7* | 1.0~2.3* |
| Socioeconomic variables | | | | |
| No vehicle | 124.5* | 58.4~173.7* | 13.2* | 11.2~15.3* |
| Poverty | -32.5 | -63.8~5.5 | -3.6* | -4.7~-2.4* |
| Unemployment | -468.1* | -548.1~-406.1* | -11.5* | -13.8~-8.8* |
| Education less than high school | 173.7* | 145.2~205.6* | 7.5* | 6.3~8.7* |
| English proficiency (not well and not at all) | 73.8* | 2.4~151.6* | -5.5* | -7.8~-3.1* |
| Biophysical variables | | | | |
| Mean temperature | 4.2 | -18.6~24.9 | 0.4 | -0.5~1.2 |
| Relative humidity | 129.7* | 113.0~145.5* | 3.2* | 2.6~3.7* |
| Diurnal temperature variation | 572.7* | 481.1~659.0* | 20.9* | 17.3~23.9* |

*Significant values at the $p$=0.05 level.

**Supplementary Table 18. Model coefficients and 95% confidence intervals for immigrants from South-Eastern Asia.**

| | Confirmed cases | | Deaths | |
|---|---|---|---|---|
| | Total impact | CI (2.5~97.5%) | Total impact | CI (2.5~97.5%) |
| South-Eastern Asia immigrants | 761.1* | 345.8~1089.6* | -14.8* | -29.2~-0.2* |
| Demographic variables | | | | |
| Population density | 0.3* | 0.0~0.5* | 0.0 | 0.0~0.0 |
| Under 18 years | 196.5* | 135.3~256.3* | 10.6* | 8.9~12.4* |
| Over 65 years | 8.3 | -41.3~52.7 | 9.5* | 8.4~10.5* |
| Hispanic | -31.8* | -45.5~-17.4* | 0.4 | -0.1~0.8 |
| African American | 18.9* | 8.5~29.1* | 1.8* | 1.5~2.2* |
| Asian | -350.7* | -463.7~-245.2* | 3.6 | -0.8~8.0 |
| Other races | 98.2* | 77.6~119.6* | 1.6* | 0.9~2.2* |
| Socioeconomic variables | | | | |
| No vehicle | 140.9* | 67.6~209.6* | 12.3* | 10.6~13.7* |
| Poverty | -17.2 | -57.6~30.9 | -3.8* | -5.0~-2.5* |
| Unemployment | -506.5* | -575.9~-440.2* | -10.6* | -12.8~-8.2* |
| Education less than high school | 171.0* | 136.9~200.5* | 7.6* | 6.4~8.5* |
| English proficiency (not well and not at all) | 88.1* | 1.2~183.5* | -5.5* | -7.5~-3.1* |
| Biophysical variables | | | | |
| Mean temperature | -6.1 | -38.1~26.6 | 0.4 | -0.5~1.2 |
| Relative humidity | 128.5* | 109.3~149.5* | 3.2* | 2.6~3.7* |
| Diurnal temperature variation | 556.7* | 475.4~660.0* | 20.6* | 17.5~23.7* |

*Significant values at the $p$=0.05 level.

**Supplementary Table 19. Model coefficients and 95% confidence intervals for immigrants from Europe.**

| | Confirmed cases | | Deaths | |
|---|---|---|---|---|
| | Total impact | CI (2.5~97.5%) | Total impact | CI (2.5~97.5%) |
| Europe immigrants | -731.0* | -978.1~-457.3* | -7.3* | -13.2~-0.3* |
| Demographic variables | | | | |
| Population density | 0.2 | -0.3~0.5 | 0.0 | 0.0~0.0 |
| Under 18 years | 149.6* | 90.5~182.0* | 10.1* | 8.8~11.7* |
| Over 65 years | 9.2 | -29.1~43.3 | 9.2* | 8.0~10.3* |
| Hispanic | -40.9* | -53.4~-28.7* | 0.3 | -0.1~0.8 |
| African American | 17.8* | 9.6~26.4* | 1.9* | 1.6~2.1* |
| Asian | -126.3* | -195.0~-54.0* | 0.2 | -1.7~2.0 |
| Other races | 104.6* | 80.8~122.3* | 1.6* | 1.2~1.9* |
| Socioeconomic variables | | | | |
| No vehicle | 172.7* | 119.2~235.3* | 13.2* | 11.4~14.9* |
| Poverty | -56.2* | -93.0~-21.5* | -4.0* | -5.3~-3.0* |
| Unemployment | -447.9* | -507.7~-364.7* | -10.5* | -12.7~-8.3* |
| Education less than high school | 158.2* | 117.3~196.5* | 7.0* | 6.0~8.0* |
| English proficiency (not well and not at all) | 180.5* | 92.1~271.9* | -4.5* | -7.0~-1.9* |
| Biophysical variables | | | | |
| Mean temperature | 10.5 | -16.1~35.2 | 0.7 | -0.1~1.6 |
| Relative humidity | 117.2* | 101.2~133.3* | 3.1* | 2.4~3.8* |
| Diurnal temperature variation | 532.5 | 422.8~621.9 | 19.9* | 16.5~22.9* |

*Significant values at the $p$=0.05 level.


**Supplementary Table 20. Model coefficients and 95% confidence intervals for immigrants from Northern Europe.**

| | Confirmed cases | | Deaths | |
|---|---|---|---|---|
| | Total impact | CI (2.5~97.5%) | Total impact | CI (2.5~97.5%) |
| Northern Europe immigrants | -6741.5* | -7682.0~-6040.9* | -176.5* | -202.6~-147.6* |
| Demographic variables | | | | |
| Population density | 0.3* | 0.0~0.6* | 0.0 | 0.0~0.0 |
| Under 18 years | 54.1 | -12.6~129.1 | 6.4* | 4.6~8.1* |
| Over 65 years | -1.2 | -49.1~43.4 | 8.6* | 7.6~9.8* |
| Hispanic | -43.6* | -58.1~-31.0* | 0.2 | -0.2~0.7 |
| African American | 14.9* | 8.5~22.3* | 1.8* | 1.6~2.0* |
| Asian | -54.9 | -122.1~1.1 | 2.5* | 0.9~4.3* |
| Other races | 114.2* | 102.0~132.6* | 2.0* | 1.4~2.8* |
| Socioeconomic variables | | | | |
| No vehicle | 105.5* | 30.8~165.1* | 12.0* | 10.4~13.8* |
| Poverty | -44.8* | -87.4~-6.6* | -4.2* | -5.2~-3.1* |
| Unemployment | -415.7* | -479.2~-344.4* | -8.4* | -10.8~-6.1* |
| Education less than high school | 108.6* | 79.3~144.8* | 5.8* | 4.7~6.8* |
| English proficiency (not well and not at all) | 260.6* | 183.6~342.2* | -1.4 | -4.1~1.6 |
| Biophysical variables | | | | |
| Mean temperature | 44.0* | 17.7~70.5* | 1.3* | 0.4~2.0* |
| Relative humidity | 103.3* | 88.5~120.1* | 2.5* | 2.0~2.9* |
| Diurnal temperature variation | 461.4* | 374.5~534.7* | 17.4* | 14.5~20.3* |

*Significant values at the $p$=0.05 level.

**Supplementary Table 21. Model coefficients and 95% confidence intervals for immigrants from Western Europe.**

| | Confirmed cases | | Deaths | |
|---|---|---|---|---|
| | Total impact | CI (2.5~97.5%) | Total impact | CI (2.5~97.5%) |
| Western Europe immigrants | -4684.5* | -5427.5~-3851.9* | -159.7* | -187.3~-136.2* |
| Demographic variables | | | | |
|   Population density | 0.2 | -0.1~0.6 | 0.0 | 0.0~0.0 |
| Under 18 years | 112.5* | 60.2~166.7* | 7.4* | 5.7~8.9* |
|   Over 65 years | 11.0 | -33.5~54.3 | 8.7* | 7.4~9.9* |
|   Hispanic | -41.4* | -60.5~-26.2* | 0.2 | -0.2~0.8 |
|   African American | 18.8* | 10.9~25.9* | 1.8* | 1.6~2.1* |
|   Asian | -110.0* | -160.7~-60.4* | 1.9* | 0.2~3.6* |
|   Other races | 111.9* | 92.1~132.7* | 1.7* | 1.2~2.2* |
| Socioeconomic variables | | | | |
|   No vehicle | 107.8* | 49.0~174.0* | 12.1* | 10.5~13.9* |
|   Poverty | -24.5 | -59.1~11.6 | -3.8* | -4.9~-2.6* |
|   Unemployment | -468.8* | -523.3~-396.8* | -9.0* | -10.9~-6.5* |
|   Education less than high school | 135.8* | 91.7~180.9* | 5.8* | 4.9~6.7* |
| English proficiency (not well and not at all) | 176.4* | 68.2~264.2* | -2.4 | -5.4~0.6 |
| Biophysical variables | | | | |
|   Mean temperature | 21.8 | -3.6~48.3 | 1.1* | 0.4~1.8* |
|   Relative humidity | 100.5* | 85.0~115.9* | 2.4* | 2.0~2.9* |
|   Diurnal temperature variation | 473.9* | 410.3~559.7* | 18.3* | 15.3~21.0* |

*Significant values at the $p$=0.05 level.

**Supplementary Table 22. Model coefficients and 95% confidence intervals for immigrants from Southern Europe.**

| | Confirmed cases | | Deaths | |
|---|---|---|---|---|
| | Total impact | CI (2.5~97.5%) | Total impact | CI (2.5~97.5%) |
| Southern Europe immigrants | 455.8* | 30.6~907.8* | 34.0* | 20.1~46.1* |
| Demographic variables | | | | |
|   Population density | 0.1 | -0.2~0.5 | 0.0 | 0.0~0.0 |
| Under 18 years | 220.0* | 174.5~265.3* | 10.6* | 8.7~12.4* |
|   Over 65 years | 18.5 | -7.9~53.6 | 9.3* | 8.2~10.5* |
|   Hispanic | -36.3* | -52.0~-24.0* | 0.6* | 0.1~1.0* |
|   African American | 18.1* | 9.7~26.0* | 1.9* | 1.7~2.2* |
|   Asian | -192.9* | -254.8~-141.1* | -0.4 | -2.2~1.4 |
|   Other races | 97.5* | 78.8~117.2* | 1.5* | 0.9~2.0* |
| Socioeconomic variables | | | | |
|   No vehicle | 123.8* | 55.3~186.2* | 12.2* | 10.1~13.9* |
|   Poverty | -20.0 | -60.2~15.3 | -3.5* | -4.8~-2.5* |
|   Unemployment | -498.9* | -579.3~-421.5* | -10.8* | -13.0~-8.9* |
|   Education less than high school | 173.9* | 136.0~210.8* | 7.7* | 6.7~8.7* |
| English proficiency (not well and not at all) | 101.8* | 8.4~191.6* | -7.3* | -10.0~-3.8* |
| Biophysical variables | | | | |
|   Mean temperature | 3.9 | -23.9~31.7 | 0.1 | -0.6~0.9 |
|   Relative humidity | 129.5* | 109.1~149.0* | 3.2* | 2.7~3.8* |
|   Diurnal temperature variation | 581.0* | 473.2~690.3* | 20.9* | 17.7~23.5* |

*Significant values at the $p$=0.05 level.

**Supplementary Table 23. Model coefficients and 95% confidence intervals for immigrants from Eastern Europe.**

| | Confirmed cases | | Deaths | |
|---|---|---|---|---|
| | Total impact | CI (2.5~97.5%) | Total impact | CI (2.5~97.5%) |
| Eastern Europe immigrants | -411.7 | -819.8~123.8 | 34.5* | 19.8~49.8* |
| Demographic variables | | | | |
|   Population density | 0.1 | -0.2~0.4 | 0.0 | 0.0~0.0 |
| Under 18 years | 200.8* | 141.8~260.5* | 11.7* | 10.3~13.1* |
|   Over 65 years | 22.2 | -16.1~59.3 | 9.7* | 8.5~11.0* |
|   Hispanic | -34.8* | -49.4~-19.9* | 0.5* | 0.0~0.9* |
|   African American | 16.5* | 10.2~22.5* | 1.9* | 1.7~2.1* |
|   Asian | -138.0* | -197.8~-68.6* | -1.0 | -3.0~0.8 |
|   Other races | 102.8* | 85.5~125.2* | 1.5* | 1.0~2.1* |
| Socioeconomic variables | | | | |
|   No vehicle | 138.1* | 68.9~195.9* | 12.3* | 10.2~13.9* |
|   Poverty | -26.4 | -70.9~19.3 | -3.5* | -4.8~-2.1* |
|   Unemployment | -496.1* | -565.8~-427.6* | -11.5* | -14.0~-9.6* |
|   Education less than high school | 180.0* | 140.2~214.6* | 7.9* | 6.9~8.9* |
| English proficiency (not well and not at all) | 82.6* | 5.3~174.5* | -7.4* | -10.3~-4.6* |
| Biophysical variables | | | | |
|   Mean temperature | 0.4 | -29.9~30.7 | 0.4 | -0.5~1.2 |
|   Relative humidity | 123.5* | 110.6~140.1* | 3.2* | 2.7~3.6* |
|   Diurnal temperature variation | 537.3* | 437.0~640.7* | 21.2* | 18.5~23.4* |

*Significant values at the $p$=0.05 level.

**Supplementary Table 24. Model coefficients and 95% confidence intervals for immigrants from Oceania.**

| | Confirmed cases | | Deaths | |
|---|---|---|---|---|
| | Total impact | CI (2.5~97.5%) | Total impact | CI (2.5~97.5%) |
| Oceania immigrants | 1303.1* | 211.4~2454.9* | -223.3* | -270.1~-185.1* |
| Demographic variables | | | | |
|   Population density | 0.2 | -0.2~0.5 | 0.0 | 0.0~0.0 |
| Under 18 years | 203.1* | 156.6~255.9* | 10.6* | 8.9~12.1* |
|   Over 65 years | 15.4 | -29.9~64.0 | 9.3* | 8.2~10.7* |
|   Hispanic | -35.4* | -51.1~-22.4* | 0.3 | -0.1~0.7 |
|   African American | 18.8* | 10.6~27.9* | 1.7* | 1.5~1.9* |
|   Asian | -187.0* | -250.2~-135.2* | 2.8* | 0.5~4.8* |
|   Other races | 100.9* | 81.2~119.5* | 1.6* | 1.1~2.1* |
| Socioeconomic variables | | | | |
|   No vehicle | 133.1* | 68.9~191.6* | 12.2* | 10.2~14.4* |
|   Poverty | -22.4 | -66.8~12.8 | -3.1* | -4.2~-2.0* |
|   Unemployment | -499.9* | -576.9~-434.1* | -10.4* | -12.2~-8.2* |
|   Education less than high school | 177.8* | 138.7~214.5* | 6.8* | 5.7~8.0* |
| English proficiency (not well and not at all) | 98.3 | -5.9~199.8 | -4.9* | -7.5~-1.9* |
| Biophysical variables | | | | |
|   Mean temperature | -1.2 | -31.1~27.7 | 0.7 | -0.2~1.6 |
|   Relative humidity | 129.2* | 108.2~149.0* | 3.0* | 2.5~3.5* |
|   Diurnal temperature variation | 577.1* | 466.8~679.7* | 20.4* | 17.5~23.8* |

*Significant values at the $p$=0.05 level.