**Supplemental Material**

**Short-term association between air pollution and infectious disease spectrum in Shanghai, China: a time-series study from 2013 to 2019**

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**Conflicts of Interest:** The authors declare no actual or potential conflicts of interest.

**Funding:** The authors declare that no funds, grants, or other support were received during the preparation of this manuscript.

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A graph of a number of seasons

Description automatically generated with medium confidenceA graph of a number of different colored lines

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A group of graphs showing different types of virus

Description automatically generated with medium confidence**Fig S2.** Time-series plots of different categories of infectious disease during 2013-2019.

A graph of different types of temperature

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A screenshot of a graph

Description automatically generated **Fig S4.** Spearman correlation matrix of air pollutants and weather variables during 2013-2019.

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| **Table S1.** Association between monthly air pollutants and specific infectious diseases in the double-pollutant DLM model. | | | | | | | | |
|  | **PM2.5** | | | | **Ozone** | | | |
|  | **Lag0** | **Lag1** | **Lag2** | **Net effect** | **Lag0** | **Lag1** | **Lag2** | **Net effect** |
| **Vaccine preventable diseases** | | | | | | | | |
| SI | 1.21 (0.29, 5.10) | 0.74 (0.07, 7.49) | 1.04 (0.30, 3.59) | 0.94 (0.01, 127.91) | 1.36 (0.71, 2.58) | **2.59 (1.03, 6.55)** | **1.68 (1.00, 2.80)** | 5.89 (0.77, 44.96) |
| Mumps | 0.90 (0.54, 1.48) | 0.85 (0.38, 1.93) | 0.91 (0.58, 1.43) | 0.70 (0.12, 3.92) | **1.28 (1.02, 1.62)** | **1.63 (1.19, 2.23)** | **1.39 (1.13, 1.70)** | **2.90 (1.39, 6.02)** |
| **Bacteria diseases** | | | | | | | | |
| TB | 0.77 (0.58, 1.02) | 0.67 (0.42, 1.05) | **0.77 (0.60, 0.99)** | 0.39 (0.15, 1.04) | 1.15 (0.94, 1.42) | 1.18 (0.89, 1.56) | 1.11 (0.92, 1.32) | 1.50 (0.78, 2.88) |
| SF | 0.81 (0.44, 1.51) | 0.65 (0.23, 1.81) | 0.69 (0.40, 1.20) | 0.37 (0.04, 3.15) | **1.59 (1.10, 2.31)** | **2.15 (1.27, 3.65)** | **1.68 (1.22, 2.33)** | **5.77 ( 1.75, 19.05)** |
| **Gastrointestinal and enterovirus diseases** | | | | | | | | |
| ID | 0.73 (0.50, 1.06) | 0.57 (0.31, 1.05) | 0.72 (0.52, 1.02) | 0.30 (0.08, 1.09) | 0.88 (0.68, 1.15) | 0.94 (0.66, 1.34) | 0.94 (0.75, 1.18) | 0.78 (0.34, 1.77) |
| HFMD | 0.78 (0.43, 1.43) | 0.52 (0.20, 1.33) | 0.71 (0.42, 1.19) | 0.29 (0.04, 2.16) | 1.15 (0.84, 1.58) | 1.38 (0.90, 2.11) | 1.23 (0.93, 1.63) | 1.95 (0.72, 5.27) |
| **Sexually transmitted and bloodborne diseases** | | | | | | | | |
| Syphilis | **0.81 (0.68, 0.96)** | **0.69 (0.52, 0.92)** | **0.79 (0.68, 0.92)** | **0.44 (0.24, 0.80)** | 1.08 (0.93, 1.24) | 1.13 (0.93, 1.37) | 1.08 (0.96, 1.23) | 1.32 (0.84, 2.07) |
| Gonorrhea | **0.80 (0.66, 0.96)** | **0.69 (0.51, 0.93)** | **0.76 (0.64, 0.89)** | **0.41 (0.22, 0.78)** | **1.20 (1.05, 1.38)** | **1.31 (1.09, 1.56)** | **1.20 (1.08, 1.34)** | **1.89 (1.25, 2.86)** |
| **Zoonotic diseases** | | | | | | | | |
| Hepatitis E | 0.89 (0.55, 1.43) | 0.80 (0.36, 1.78) | 0.86 (0.56, 1.32) | 0.61 (0.11, 3.25) | 1.06 (0.78, 1.43) | 1.15 (0.76, 1.76) | 1.09 (0.83, 1.42) | 1.32 (0.50, 3.47) |
| Notes: SI: Seasonal influenza; TB: Tuberculosis; SF: Scarlet fever; ID: Infectious diarrhea; HFMD: Hand, foot, and mouth disease. | | | | | | | | |

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| **Table S2**. Relative risk (and 95% CIs) of monthly number of infectious diseases per unit increase in ozone in single-pollutant model. | | | | | | | | | | | | |
|  | | **Total** | | **Vaccine preventable** | | **Bacteria** | | **Gastrointestinal and enterovirus** | **Sexually transmitted and bloodborne** | | **Zoonotic** | |
| **PM2.5** | ***Single Lag Model*** | | | | | | | | | | | | |
| Lag0 | **1.10 (1.02, 1.19)** | **1.29 (1.10, 1.52)** | | 1.04 (0.94, 1.14) | | 1.09 (0.98, 1.22) | | | 1.02 (0.97, 1.08) | | 1.00 (0.88, 1.15) | |
| Lag1 | 0.90 (0.81, 0.99) | 0.75 (0.61, 0.92) | | 0.94 (0.84, 1.06) | | 0.92 (0.81, 1.05) | | | 0.98 (0.91, 1.05) | | 1.01 (0.86, 1.19) | |
| Lag2 | 1.02 (0.93, 1.12) | 1.12 (0.92, 1.36) | | 0.99 (0.90, 1.10) | | 0.97 (0.86, 1.09) | | | 0.97 (0.91, 1.03) | | 0.94 (0.82, 1.07) | |
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| ***Distributed Lag Model*** | | | | | | | | | | | | |
| Lag0 | 0.91 (0.70, 1.19) | 1.49 (0.83, 2.67) | | 0.75 (0.56, 1.00) | | 0.79 (0.56, 1.11) | | | **0.82 (0.71, 0.94)** | | 0.72 (0.48, 1.09) | |
| Lag1 | 0.72 (0.47, 1.12) | 1.31 (0.49, 3.49) | | 0.57 (0.36, 0.92) | | 0.56 (0.32, 0.99) | | | **0.68 (0.54, 0.85)** | | 0.55 (0.28, 1.09) | |
| Lag2 | 0.85 (0.68, 1.08) | 1.23 (0.74, 2.04) | | 0.75 (0.59, 0.97) | | 0.71 (0.52, 0.97) | | | **0.80 (0.71, 0.90)** | | 0.71 (0.50, 1.00) | |
| Total1 | 0.56 (0.23, 1.40) | 2.40 (0.32, 18.23) | | 0.38 (0.13, 1.14) | | 0.31 (0.10, 1.03) | | | **0.44 (0.28, 0.71)** | | 0.28 (0.07, 1.14) | |
|  |  | | | | | | | | | | | |
| **O3** | ***Single Lag Model*** | | | | | | | | | | | |
| Lag0 | 0.97 (0.91, 1.03) | | 0.99 (0.84, 1.16) | | 0.99 (0.93, 1.07) | | 0.95 (0.89, 1.01) | 0.98 (0.95, 1.02) | | 0.94 (0.86, 1.03) | |
| Lag1 | 1.02 (0.97, 1.08) | | 1.04 (0.90, 1.21) | | 1.01 (0.95, 1.07) | | 1.04 (0.97, 1.10) | 1.02 (0.98, 1.05) | | 1.04 (0.96, 1.13) | |
| Lag2 | 1.02 (0.97, 1.07) | | 1.00 (0.88, 1.14) | | 1.01 (0.95, 1.07) | | 1.00 (0.94, 1.07) | 1.00 (0.97, 1.04) | | 0.98 (0.91, 1.06) | |
|  |  | |  | |  | |  |  | |  | |
| ***Distributed Lag Model*** | | | | | | | | | | | |
| Lag0 | **1.16 (1.02, 1.30)** | | **1.63 (1.08, 2.45)** | | 1.17 (0.97, 1.41) | | 1.06 (0.88, 1.28) | 1.08 (0.98, 1.20) | | 0.99 (0.78, 1.27) | |
| Lag1 | **1.37 (1.12, 1.69)** | | **2.21 (1.21, 4.05)** | | 1.31 (0.99, 1.72) | | 1.22 (0.90, 1.65) | **1.18 (1.01, 1.36)** | | 1.09 (0.75, 1.58) | |
| Lag2 | **1.24 (1.09, 1.42)** | | **1.56 (1.10, 2.23)** | | 1.19 (1.00, 1.41) | | 1.15 (0.94, 1.40) | **1.11 (1.01, 1.21)** | | 1.05 (0.83, 1.33) | |
| Total1 | **1.98 (1.26, 3.11)** | | **5.62 (1.49, 21.20)** | | 1.82 (0.98, 3.38) | | 1.49 (0.76, 2.91) | **1.41 (1.01, 1.96)** | | 1.13 (0.50, 2.60) | |
| Notes: 1 cumulative risk per 10 µg/m3 change in each air pollutant. Model adjusted for seasonality and long-term trend, mean temperature, and relative humidity. | | | | | | | | | | | | |

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| **Table S3.** Relative risk (and 95% CIs) of monthly number of infectious diseases per unit increase in air pollutants in the double-pollutant model. | | | | | | | |
|  |  | **Total** | **Vaccine preventable** | **Bacteria** | **Gastrointestinal and enterovirus** | **Sexually transmitted and bloodborne** | **Zoonotic** |
| **PM2.5** | ***Single Lag Model*** | | | | | | |
| Lag0 | **1.13 (1.04, 1.22)** | 1.14 (0.93, 1.39) | 1.09 (0.95, 1.24) | **1.12 (1.01, 1.25)** | 1.04 (0.98, 1.10) | 1.10 (0.96, 1.25) |
| Lag1 | 0.90 (0.82, 0.99) | 0.96 (0.78, 1.18) | 0.93 (0.81, 1.06) | **0.88 (0.79, 0.99**) | 0.97 (0.91, 1.03) | 0.95 (0.82, 1.09) |
| Lag2 | 1.02 (0.93, 1.11) | 0.96 (0.82, 1.12) | 0.99 (0.88, 1.11) | 1.04 (0.94, 1.16) | 0.99 (0.94, 1.04) | 0.98 (0.87, 1.09) |
| Lag3 | 1.04 (0.96, 1.12) | 1.06 (0.92, 1.20) | 1.06 (0.96, 1.18) | 1.03 (0.93, 1.14) | **1.05 (1.00, 1.09)** | 1.07 (0.98, 1.18) |
| ***Distributed Lag Model*** | | | | | | |
| Lag0 | 1.06 (0.74, 1.50) | 0.89 (0.39, 2.07) | 0.70 (0.41, 1.17) | 1.04 (0.66, 1.65) | 0.92 (0.77, 1.09) | 1.05 (0.63, 1.74) |
| Lag1 | 0.99 (0.46, 2.15) | 0.57 (0.10, 3.40) | 0.44 (0.14, 1.36) | 1.08 (0.39, 2.98) | 0.85 (0.58, 1.25) | 1.09 (0.37, 3.28) |
| Lag2 | 1.16 (0.54, 2.48) | 0.55 (0.09, 3.22) | 0.55 (0.18, 1.68) | 1.41 (0.52, 3.80) | 0.98 (0.67, 1.43) | 1.32 (0.44, 3.90) |
| Lag3 | 1.16 (0.81, 1.66) | 0.78 (0.34, 1.81) | 0.88 (0.52, 1.51) | 1.33 (0.83, 2.11) | 1.09 (0.92, 1.30) | 1.29 (0.77, 2.16) |
| Total1 | 1.41 (0.16, 12.43) | 0.22 (0.00, 34.56) | 0.15 (0.01, 3.62) | 2.09 (0.12, 36.02) | 0.84 (0.29, 2.46) | 1.94 (0.09, 43.27) |
|  |  | | | | | | |
| **O3** | ***Single Lag Model*** | | | | | | |
| Lag0 | 0.99 (0.92, 1.06) | 0.99 (0.85, 1.15) | 1.02 (0.92, 1.14) | 0.98 (0.90, 1.06) | 1.00 (0.95, 1.05) | 0.97 (0.88, 1.07) |
| Lag1 | 0.97 (0.92, 1.03) | 0.98 (0.86, 1.12) | 0.98 (0.89, 1.07) | 0.98 (0.91, 1.04) | 1.00 (0.96, 1.05) | 1.01 (0.93, 1.09) |
| Lag2 | **1.05 (1.00, 1.10)** | 1.04 (0.93, 1.16) | 1.01 (0.94, 1.09) | 1.05 (0.99, 1.12) | 1.00 (0.96, 1.03) | 1.00 (0.93, 1.08) |
| Lag3 | **0.93 (0.88, 0.99)** | 0.93 (0.83, 1.03) | 0.97 (0.89, 1.06) | 0.95 (0.88, 1.03) | 1.00 (0.96, 1.04) | 0.99 (0.91, 1.07) |
| ***Distributed Lag Model*** | | | | | | |
| Lag0 | 1.01 (0.79, 1.29) | 0.90 (0.55, 1.48) | 0.76 (0.54, 1.07) | 0.76 (0.54, 1.07) | 1.00 (0.82, 1.22) | 0.82 (0.59, 1.15) |
| Lag1 | 1.09 (0.71, 1.69) | 0.66 (0.27, 1.65) | **0.50 (0.26, 0.95)** | **0.50 (0.26, 0.95)** | 0.96 (0.66, 1.39) | 0.72 (0.39, 1.35) |
| Lag2 | 1.10 (0.76, 1.59) | 0.58 (0.26, 1.29) | **0.50 (0.28, 0.89)** | **0.50 (0.28, 0.89)** | 0.93 (0.67, 1.28) | 0.77 (0.43, 1.36) |
| Lag3 | 0.97 (0.81, 1.16) | 0.69 (0.47, 1.01) | **0.72 (0.54, 0.95)** | **0.72 (0.54, 0.95)** | 0.94 (0.81, 1.10) | 0.91 (0.68, 1.20) |
| Total1 | 1.19 (0.39, 3.66) | 0.24 (0.02, 2.56) | **0.14 (0.02, 0.76)** | **0.14 (0.02, 0.76)** | 0.84 (0.32, 2.22) | 0.41 (0.08, 2.18) |
| Notes: 1 cumulative risk per 10 µg/m3 change in each air pollutant. Model adjusted for seasonality and long-term trend, mean temperature, relative humidity, and O3 or PM2.5. | | | | | | | |