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Hospital workload and adaptation under climate change: Evidence from the People's Republic of China

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APPENDIX

Hospital Workload and Adaptation Under Climate Change: Evidence from the People's Republic of China

Wanrui Wu, Gordon Liu, and Yuhang Pan

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Appendix A: Computation of Weather Factors

Data on weather factors are obtained from the National Meteorological Information Center of the PRC, which provides hourly data at weather station level. The raw data contain temperature, precipitation, dew-point temperature, and wind speed from 400 land-based weather stations across the PRC. We compute the hospital-centered weather factors using the following methods.

Ambient temperature. For each hospital in our dataset, we derive geographical coordinates and calculate hospital-centered weather factors using the inverse distance weighting (IDW) approach (Fotheringham and O'Kelly 1989, Joseph 1991) on a daily basis. In most analyses conducted in this paper, we use the inverse distance-weighted average temperature from all weather stations in our dataset, applying a distance weight with a power of 2. For example, to compute daily mean temperature ($Temp_{i,t}$) of hospital i on date t , the equation is as follows:

$$Temp_{i,t} = \frac{\sum_k \frac{Temp_{k,t}}{d_{i,k}^2}}{\sum_k \frac{1}{d_{i,k}^2}}$$

Here, $Temp_{k,t}$ represents the daily average ambient temperature of weather station k on day t , calculated from hourly records accurate to 0.1°C. The term $d_{i,k}^2$ is the squared distance between hospital i and weather station k , calculated using the coordinates of hospitals and weather stations retrieved from Google Maps.

In addition to daily average ambient temperature, we compute the hospital-centered daily maximum and minimum temperatures using the same IDW approach, where $Temp_{k,t}$ alternatively represents the daily maximum or minimum ambient temperature recorded at weather station k on day t . We then derive the daily ambient temperature gap by calculating the difference between the hospital-centered daily maximum and minimum temperatures.

Apparent temperature. We estimate hospital-centered daily mean apparent temperature in two steps. First, hourly apparent temperature at each weather station is calculated using recorded hourly ambient temperature, humidity, and wind speed. Detailed calculations are presented below. Second, similar to the ambient temperature estimation, we apply the IDW approach to calculate the hospital-centered daily mean apparent temperature, using geographical distances between the hospital and weather stations.

In the first step, apparent temperature is calculated using the Temperature-Humidity-Wind (THW) index (Steadman 1984):

$$AT = 1.07T + 0.2P_w - 0.65V - 2.7$$

$$P_w = \frac{RH}{100} \times 6.105 \times e^{\frac{17.27T}{237.7+T}}$$

where AT is the apparent temperature ($^{\circ}\text{C}$) to be estimated, T is the temperature ($^{\circ}\text{C}$), P_w is the water vapor pressure (hPa), V is the wind speed (m/sec), and RH is the relative humidity (%). Hourly temperature and wind speed are taken directly from the weather dataset, while hourly relative humidity (RH) is calculated using the Magnus-Tetens approximation (Barenbrug 1974), as follows:

$$T_d = \frac{b\gamma(T, RH)}{a - \gamma(T, RH)}$$

$$\gamma(T, RH) = \frac{aT}{b + T} + \ln\left(\frac{RH}{100}\right)$$

where T_d is the dew-point temperature, and a and b are two constants ($a = 17.27$, $b = 237.7$). Integrating the approximated relative humidity into the THW index, we calculate hourly apparent temperatures and then average them to obtain daily apparent temperatures for each weather station.

Alternative computation methods. To test the robustness of our estimates, we generate alternative hospital-centered temperature measurements. First, we modify the IDW approach by replacing the power-2 distance weight with a power-1 distance weight, as shown below:

$$Temp_{i,t} = \sum_k \frac{\frac{Temp_{k,t}}{d_{i,k}}}{\sum_k \frac{1}{d_{i,k}}}$$

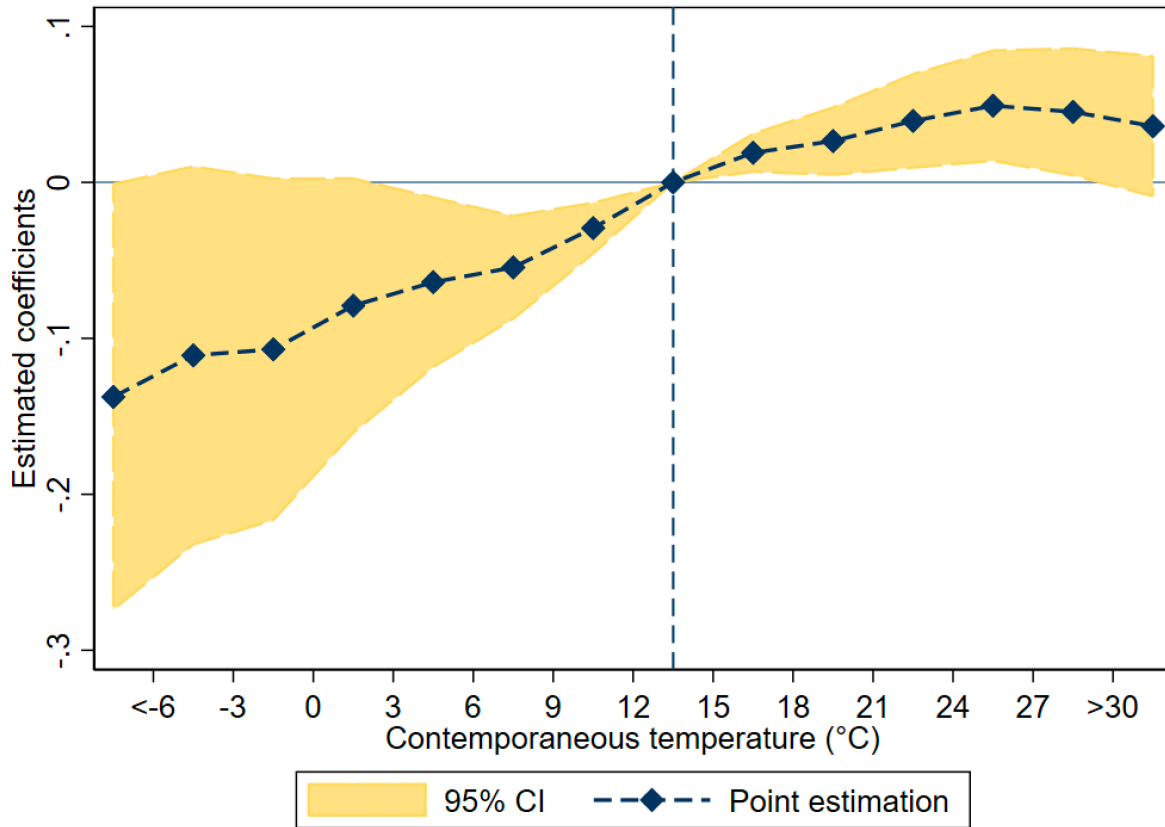
Additionally, we compute alternative temperature measurements by excluding weather stations located beyond specific distance thresholds from the hospital. Recognizing that weather stations far from a hospital may minimally influence temperature estimates, we restrict calculations to include only stations within 300 km, 200 km, 100 km, and 50 km of the hospital. Using these criteria, we derive a series of hospital-centered daily temperature metrics, including mean ambient temperature, mean apparent temperature, maximum temperature, minimum temperature, and the temperature gap.

References

- Barenbrug, A. W. T. 1974. *Psychrometry and Psychrometric Charts*. 3rd edition. Cape Town: Cape and Transvaal Printers Ltd.
- Fotheringham, A. Stewart, and Morton O'Kelly. 1989. *Spatial Interaction Models: Formulations and Applications*. Norwell, MA: Kluwer Academic Publishers.
- Joseph, A. 1991. "Comparison of Liver Histology with Ultrasonography in Assessing Diffuse Parenchymal Liver Disease." *Clinical Radiology* 43 (1): 26–31.
- Steadman, Robert. 1984. "A Universal Scale of Apparent Temperature." *Journal of Climate and Applied Meteorology* 23 (12): 1674–1687.

Appendix B: Figures and Tables

Appendix Figure 1: Contemporaneous Effects on Overall Hospital Admissions Through All Channels

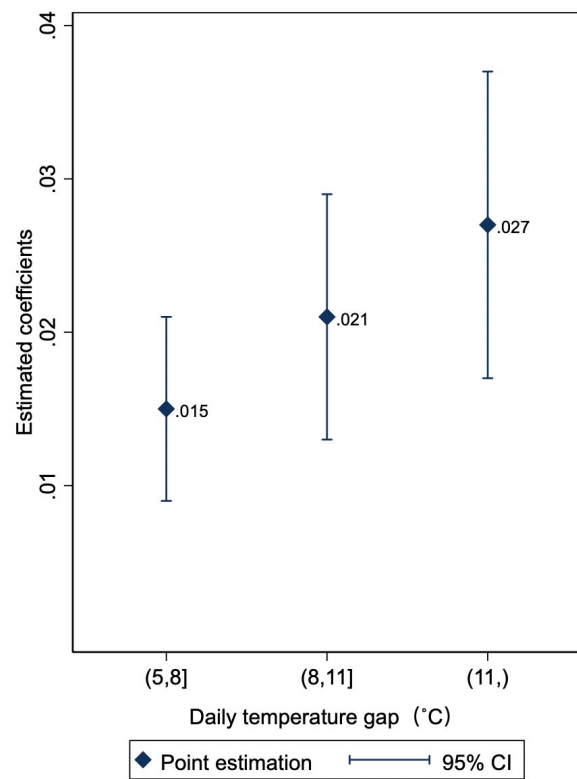


CI = confidence interval.

Notes: The figure presents contemporaneous effects on overall hospital admissions through all channels. Estimations of contemporaneous effects β_j are presented. Horizontal coordinates here show the median point of the corresponding temperature bin—for example, horizontal coordinates of β_1 are -7.5°C , and are the same throughout the remainder of the paper. Vertical dash line = benchmark temperature bin (12°C – 15°C).

Source: Authors' calculations.

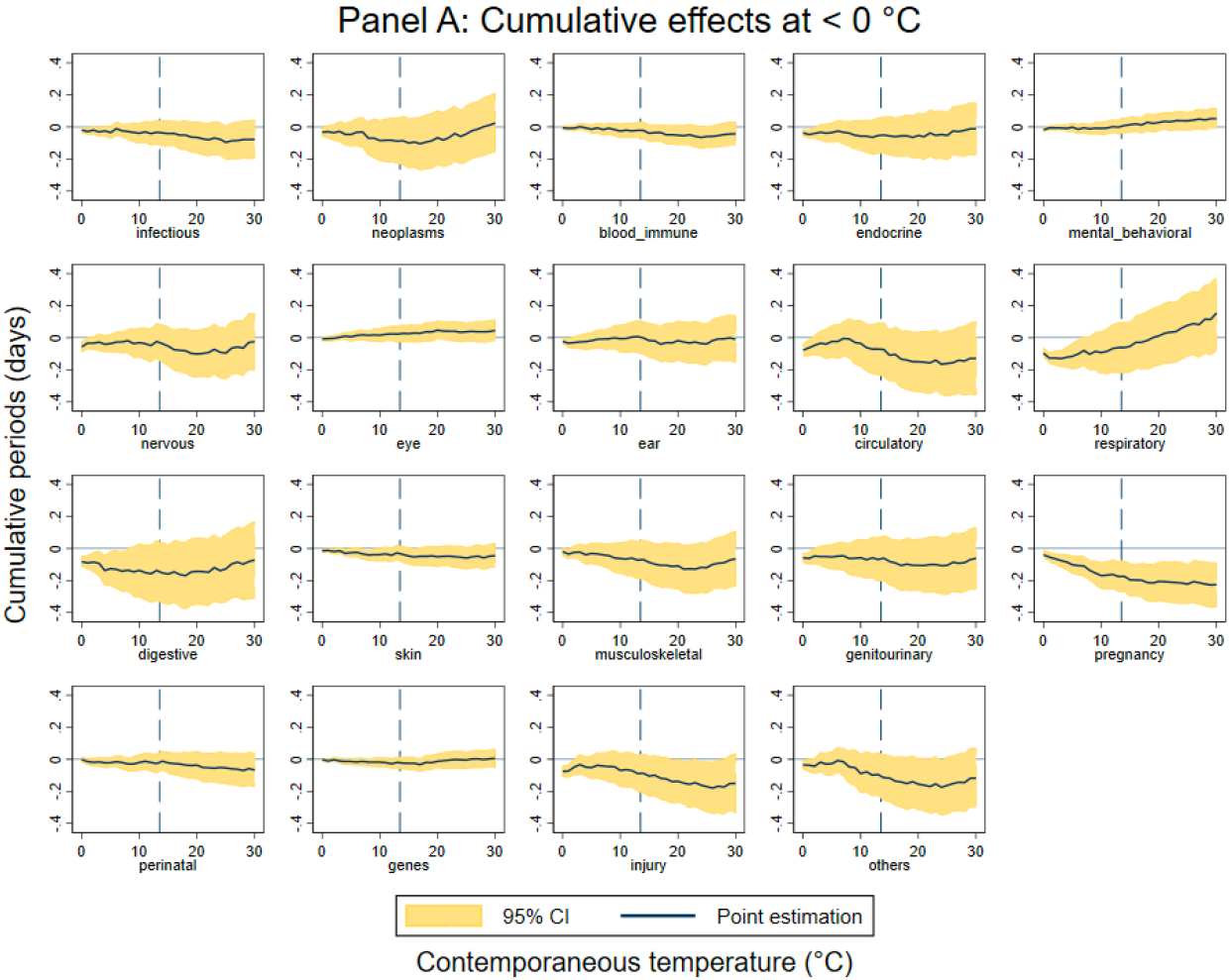
Appendix Figure 2: Contemporaneous Effects of Daily Temperature Variation on Hospital Daily Admission



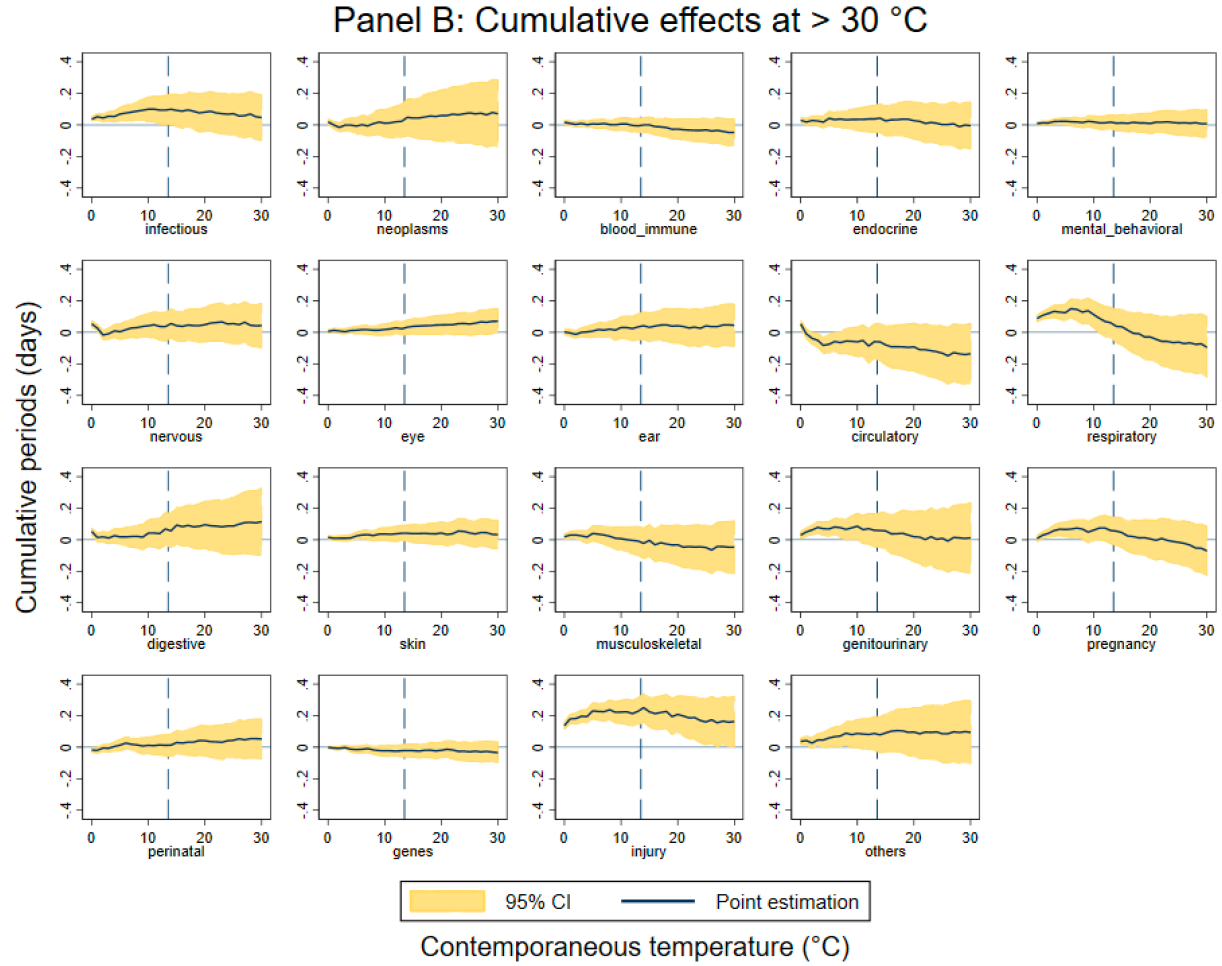
CI = confidence interval.

Source: Authors' calculations.

Appendix Figure 3: Cumulative Effects by Disease



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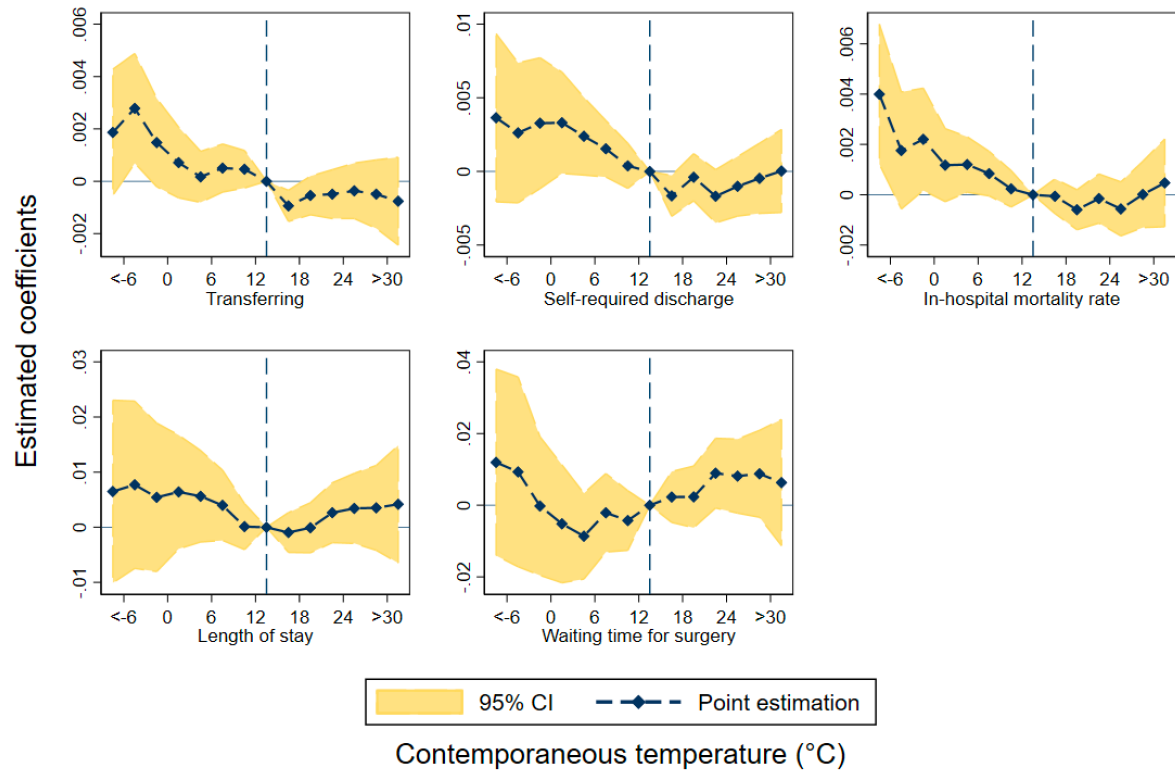


CI = confidence interval.

Notes: The figure presents cumulative effects on hospital admissions by disease. Panel A corresponds to joint estimations of $\beta_{1,t} \dots \beta_{1,t-\tau}$, $\beta_{2,t} \dots \beta_{2,t-\tau}$, $\beta_{3,t} \dots \beta_{3,t-\tau}$ with τ varying from 0 to 30, providing cumulative effects of various periods of the extreme cold temperature. Panel B corresponds to joint estimation of $\beta_{14,t} \dots \beta_{14,t-\tau}$ with τ varying from 0 to 30, providing cumulative effects of various periods of the extreme hot temperature.

Source: Authors' calculations.

Appendix Figure 4: Contemporaneous Effects on Quality and Efficiency of Healthcare



CI = confidence interval.

Note: Vertical dash line = benchmark temperature bin (12°C–15°C).

Source: Authors' calculations.

Appendix Table 1: Classification of Diagnosis

Disease Category	ICD-10-CM
Certain infectious and parasitic diseases	A00-B99
Neoplasms	C00-D48
Diseases of blood and blood-forming organs and certain disorders involving immune mechanism	D50-D89
Endocrine, nutritional, and metabolic diseases	E00-E90
Mental and behavioral disorders	F00-F99
Diseases of nervous system	G00-G99
Diseases of eye and adnexa	H00-H59
Diseases of ear and mastoid process	H60-H95
Diseases of circulatory system	I00-I99
Diseases of respiratory system	J00-J99
Diseases of digestive system	K00-K93
Diseases of skin and subcutaneous tissue	L00-L99
Diseases of musculoskeletal system and connective tissue	M00-M99
Diseases of genitourinary system	N00-N99
Pregnancy, childbirth, and puerperium	O00-O99
Certain conditions originating in perinatal period	P00-P96
Congenital malformations, deformations, and chromosomal abnormalities	Q00-Q99
Injury, poisoning, and certain other consequences of external causes	S00-T98
Other diseases not classified	R00-R99, U00-Z99

ICD = International Classification of Diseases, CM = Clinical Modification.

Source: Classifications based on alphabet level of WHO (World Health Organization). 2020. "Factors Influencing Health Status and Contact with Health Services." International Classification of Diseases, 10th Revision, Clinical Modification. Version for 2019. <https://icd.who.int/browse10/2019/en#/XXI>

Appendix Table 2: Robustness Check—Different Specifications

Y = Number of Patients	(1)	(2)	(3)	(4)	(5)
X = Mean Ambient Temperature	Model 1	Model 2	Model 3	Model 4	Model 5
(, -6°C)	-0.062** (0.025) [0.008]	-0.123*** (0.034) [0.008]	-0.062** (0.025) [0.014]	-0.123** (0.026) [0.008]	-0.128*** (0.028) [0.008]
[-6°C, -3°C)	-0.039** (0.017) [0.007]	-0.101*** (0.027) [0.007]	-0.039** (0.017) [0.012]	-0.098*** (0.022) [0.007]	-0.085*** (0.021) [0.007]
[-3°C, 0°C)	-0.020 (0.016) [0.006]	-0.085*** (0.023) [0.006]	-0.020 (0.016) [0.011]	-0.086*** (0.018) [0.005]	-0.068*** (0.022) [0.006]
[0°C, 3°C)	-0.019 (0.013) [0.005]	-0.072*** (0.018) [0.005]	-0.019 (0.013) [0.009]	-0.075*** (0.014) [0.004]	-0.059*** (0.016) [0.005]
[3°C, 6°C)	0.001 (0.011) [0.004]	-0.052*** (0.012) [0.004]	0.001 (0.011) [0.007]	-0.053*** (0.009) [0.004]	-0.041*** (0.012) [0.004]
[6°C, 9°C)	-0.007 (0.008) [0.003]	-0.041*** (0.009) [0.003]	-0.007 (0.008) [0.006]	-0.042*** (0.006) [0.003]	-0.030*** (0.009) [0.003]
[9°C, 12°C)	-0.009 (0.006) [0.002]	-0.021*** (0.006) [0.002]	-0.009 (0.006) [0.005]	-0.019*** (0.003) [0.002]	-0.017*** (0.004) [0.003]
[15°C, 18°C)	0.002 (0.005) [0.002]	0.023*** (0.004) [0.002]	0.002 (0.005) [0.004]	0.015*** (0.003) [0.002]	0.020*** (0.004) [0.002]
[18°C, 21°C)	0.022*** (0.007) [0.003]	0.039*** (0.008) [0.003]	0.022*** (0.007) [0.005]	0.032*** (0.004) [0.003]	0.034*** (0.006) [0.003]
[21°C, 24°C)	0.036*** (0.008) [0.003]	0.049*** (0.010) [0.003]	0.036*** (0.008) [0.006]	0.048*** (0.006) [0.003]	0.043*** (0.007) [0.003]
[24°C, 27°C)	0.056*** (0.010) [0.003]	0.066*** (0.011) [0.003]	0.056*** (0.010) [0.007]	0.064*** (0.007) [0.003]	0.059*** (0.010) [0.004]

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Y = Number of Patients	(1)	(2)	(3)	(4)	(5)
X = Mean Ambient Temperature	Model 1	Model 2	Model 3	Model 4	Model 5
[27°C,30°C)	0.068*** (0.013) [0.004]	0.078*** (0.013) [0.004]	0.068*** (0.013) [0.010]	0.074*** (0.008) [0.004]	0.067*** (0.012) [0.004]
[30°C,)	0.080*** (0.021) [0.006]	0.079*** (0.015) [0.006]	0.080*** (0.021) [0.016]	0.077*** (0.010) [0.006]	0.064*** (0.019) [0.006]
Precipitation	YES	YES	YES	YES	YES
Hospital*year-month FE	NO	NO	NO	NO	YES
Hospital*year-week FE	NO	YES	NO	YES	NO
Hospital FE	YES	NO	YES	NO	NO
Year-week FE	YES	NO	YES	NO	NO
Day-in-week FE	NO	NO	YES	YES	NO
N	817,344	815,490	817,344	815,490	817,340
R-square	0.719	0.893	0.719	0.898	0.876

FE = fixed effects.

Notes:

1. Dependent variables are logarithms of hospital-level daily number of admissions through emergency department.
2. Bin "[12°C,15°C)" is omitted, as it is the reference bin.
3. All specifications estimate equation (1) by Ordinary Least Squares, controlling for precipitation. Different sets of fixed effects are controlled in each column.
4. Robust standard errors clustered at hospital level and year-week level are in "()" and robust standard errors clustered at hospital level are in "[]".
5. * Significant at 10% level, ** significant at 5% level, *** significant at 1% level. Significance of coefficient based on two-way clustered standard errors.

Source: Authors' calculations.

Appendix Table 3: Robustness Check—Adding Control Variables

Y = Number of Patients X = Mean Ambient Temperature	(1)	(2)	(3)	(4)	(5)	(6)
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
(,-6°C)	-0.123*** (0.026)	-0.124*** (0.026)	-0.048* (0.024)	-0.055** (0.026)	-0.060** (0.025)	-0.053*** (0.020)
[-6°C,-3°C)	-0.098*** (0.022)	-0.099*** (0.022)	-0.024 (0.018)	-0.025 (0.018)	-0.025 (0.018)	-0.009 (0.017)
[-3°C,0°C)	-0.086*** (0.018)	-0.087*** (0.018)	-0.003 (0.016)	-0.008 (0.017)	-0.009 (0.017)	-0.007 (0.019)
[0°C,3°C)	-0.075*** (0.014)	-0.076*** (0.014)	-0.005 (0.013)	-0.01 (0.014)	-0.01 (0.014)	-0.009 (0.014)
[3°C,6°C)	-0.053*** (0.009)	-0.054*** (0.009)	0.009 (0.010)	0.008 (0.011)	0.008 (0.011)	0.004 (0.011)
[6°C,9°C)	-0.042*** (0.006)	-0.043*** (0.007)	0.006 (0.008)	0.005 (0.008)	0.005 (0.008)	-0.004 (0.008)
[9°C,12°C)	-0.019*** (0.003)	-0.020*** (0.004)	0.000 (0.006)	0.001 (0.006)	0.001 (0.006)	-0.003 (0.006)
[15°C,18°C)	0.015*** (0.003)	0.015*** (0.003)	0.003 (0.005)	0.005 (0.005)	0.005 (0.005)	0.005 (0.005)
[18°C,21°C)	0.032*** (0.004)	0.034*** (0.004)	0.020*** (0.007)	0.021*** (0.007)	0.021*** (0.007)	0.018*** (0.007)
[21°C,24°C)	0.048*** (0.006)	0.052*** (0.006)	0.031*** (0.008)	0.034*** (0.008)	0.036*** (0.008)	0.038*** (0.008)
[24°C,27°C)	0.064*** (0.007)	0.070*** (0.007)	0.051*** (0.010)	0.056*** (0.010)	0.058*** (0.010)	0.058*** (0.010)
[27°C,30°C)	0.074*** (0.008)	0.084*** (0.008)	0.064*** (0.012)	0.070*** (0.013)	0.073*** (0.013)	0.074*** (0.013)
[30°C,)	0.077*** (0.010)	0.091*** (0.010)	0.060*** (0.017)	0.064*** (0.018)	0.068*** (0.018)	0.080*** (0.018)
Precipitation	NO	YES	YES	YES	YES	YES
GDP per capita	NO	NO	YES	YES	YES	YES
Economic structure	NO	NO	NO	YES	YES	YES
Healthcare infrastructure	NO	NO	NO	NO	YES	YES
Electricity usage	NO	NO	NO	NO	NO	YES

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Y = Number of Patients	(1)	(2)	(3)	(4)	(5)	(6)
X = Mean Ambient Temperature	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Hospital *year-week FE	YES	YES	YES	YES	YES	YES
Day-in-week FE	YES	YES	YES	YES	YES	YES
N	815,490	815,490	694,974	623,140	601,350	366,653
R-square	0.898	0.898	0.744	0.747	0.745	0.805

FE = fixed effects, GDP = gross domestic product.

Notes:

1. Dependent variables are logarithms of hospital-level daily number of admissions through emergency department.
2. All columns present an estimation of equation (4) controlling for different control variables. Economic structure includes share of agriculture sector in GDP and share of industrial sector in GDP. Healthcare infrastructure includes number of hospitals, beds, and physicians in city where hospital is located. Electricity usage includes mean light index in county where hospital is located, and total amount of electricity usage in city where hospital is located.
3. Bin "[12°C,15°C]" is omitted, as it is the reference bin.
4. All specifications estimate equation (1) by Ordinary Least Squares, controlling for precipitation, hospital-year-week fixed effects, and day-of-week fixed effects. Standard errors are two-way clustered at hospital level and year-week level.
5. Significant at 10% level, ** significant at 5% level, *** significant at 1% level. Robust standard errors in parentheses.

Source: Authors' calculations.

Appendix Table 4: Robustness Check—Different Measurements of Temperature

Y = Number of Patients X = Mean Ambient Temperature	(1) Weight 1/d	(2) Nearest	(3) Within 300 km	(4) Within 200 km	(5) Within 100 km	(6) Within 50 km	(7) Placebo
(,-6°C)	-0.144*** (0.036)	-0.115*** (0.022)	-0.124*** (0.024)	-0.124*** (0.024)	-0.123*** (0.023)	-0.119*** (0.024)	-0.004 (0.003)
[-6°C,-3°C)	-0.127*** (0.028)	-0.094*** (0.018)	-0.097*** (0.021)	-0.098*** (0.020)	-0.095*** (0.019)	-0.089*** (0.021)	0.004 (0.003)
[-3°C,0°C)	-0.101*** (0.023)	-0.073*** (0.015)	-0.085*** (0.017)	-0.084*** (0.016)	-0.082*** (0.016)	-0.072*** (0.017)	-0.003 (0.003)
[0°C,3°C)	-0.079*** (0.016)	-0.066*** (0.011)	-0.073*** (0.012)	-0.071*** (0.012)	-0.069*** (0.011)	-0.069*** (0.012)	0.001 (0.002)
[3°C,6°C)	-0.060*** (0.012)	-0.050*** (0.008)	-0.050*** (0.009)	-0.051*** (0.009)	-0.051*** (0.008)	-0.048*** (0.009)	-0.002 (0.002)
[6°C,9°C)	-0.037*** (0.007)	-0.034*** (0.005)	-0.038*** (0.006)	-0.037*** (0.005)	-0.035*** (0.005)	-0.033*** (0.006)	-0.002 (0.002)
[9°C,12°C)	-0.015*** (0.005)	-0.017*** (0.003)	-0.018*** (0.003)	-0.018*** (0.003)	-0.017*** (0.003)	-0.016*** (0.004)	-0.002 (0.002)
[15°C,18°C)	0.019*** (0.004)	0.014*** (0.003)	0.015*** (0.003)	0.015*** (0.003)	0.015*** (0.003)	0.015*** (0.004)	0.001 (0.002)
[18°C,21°C)	0.044*** (0.007)	0.029*** (0.004)	0.031*** (0.004)	0.031*** (0.004)	0.031*** (0.004)	0.029*** (0.005)	-0.001 (0.002)
[21°C,24°C)	0.056*** (0.010)	0.046*** (0.005)	0.047*** (0.005)	0.046*** (0.005)	0.047*** (0.005)	0.047*** (0.005)	-0.002 (0.002)
[24°C,27°C)	0.060*** (0.011)	0.061*** (0.005)	0.062*** (0.006)	0.062*** (0.006)	0.063*** (0.006)	0.061*** (0.006)	-0.002 (0.002)
[27°C,30°C)	0.064*** (0.013)	0.072*** (0.006)	0.073*** (0.007)	0.072*** (0.007)	0.072*** (0.006)	0.072*** (0.007)	-0.000 (0.002)
[30°C,)	-0.037 (0.039)	0.073*** (0.007)	0.070*** (0.008)	0.070*** (0.008)	0.073*** (0.008)	0.073*** (0.008)	-0.000 (0.002)
Precipitation	YES	YES	YES	YES	YES	YES	YES
Hospital*year-week FE	YES	YES	YES	YES	YES	YES	YES
Day-in-week FE	YES	YES	YES	YES	YES	YES	YES
N	815,490	815,213	814,698	814,356	787,007	502,401	815,490
R-square	0.898	0.898	0.898	0.898	0.897	0.896	0.897

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FE = fixed effects.

Notes:

1. Dependent variables are logarithms of hospital-level daily number of admissions through emergency department.
2. Column (1) presents estimations using 1/d weighted temperature as independent variables. Column (2) presents estimations using nearest temperature as independent variable. Columns (3) to (6) use temperature measured via similar methods to those used in our baseline results, albeit with restricted sample of weather stations. The last column presents results for placebo test.
3. Bin "[12°C,15°C)" is omitted, as it is the reference bin.
4. All specifications estimate equation (1) by Ordinary Least Squares, controlling for precipitation, hospital-year-week fixed effects, and day-of-week fixed effects. Standard errors are two-way clustered at hospital level and year-week level.
5. Significant at 10% level, ** significant at 5% level, *** significant at 1% level. Robust standard errors in parentheses.

Source: Authors' calculations.

Appendix Table 5: Contemporaneous Effects on Healthcare Expenditure

Y = Number of Patients X = Mean Ambient Temperature	(1) Daily Expenditure per Patient	(2) Expenditure per Patient	(3) Total Expenditure of All patients	(4) OOP per Patient	(5) OOP of All Patients	(6) Insured Payment per Patient	(7) Insured Payment of All Patients
(,-6°C)	0.037*** (0.008)	0.033*** (0.010)	-0.104*** (0.033)	0.007 (0.018)	-0.081** (0.034)	0.003 (0.024)	-0.117** (0.046)
[-6°C,-3°C)	0.030*** (0.007)	0.028*** (0.008)	-0.080*** (0.028)	0.002 (0.016)	-0.064** (0.028)	0.016 (0.018)	-0.082** (0.036)
[-3°C,0°C)	0.022*** (0.006)	0.018** (0.008)	-0.079*** (0.023)	0.008 (0.012)	-0.053** (0.023)	0.000 (0.017)	-0.091*** (0.030)
[0°C,3°C)	0.018*** (0.005)	0.017*** (0.006)	-0.065*** (0.018)	0.000 (0.010)	-0.055*** (0.018)	0.007 (0.014)	-0.071*** (0.024)
[3°C,6°C)	0.013*** (0.004)	0.013*** (0.005)	-0.044*** (0.012)	0.000 (0.009)	-0.041*** (0.014)	0.004 (0.010)	-0.048*** (0.016)
[6°C,9°C)	0.007** (0.003)	0.007* (0.004)	-0.039*** (0.009)	-0.003 (0.008)	-0.035*** (0.011)	0.002 (0.009)	-0.040*** (0.013)
[9°C,12°C)	0.004* (0.002)	0.001 (0.003)	-0.020*** (0.005)	0.005 (0.006)	-0.009 (0.008)	-0.005 (0.007)	-0.022** (0.009)
[15°C,18°C)	-0.007*** (0.002)	-0.006** (0.003)	0.010** (0.004)	-0.007 (0.005)	0.001 (0.006)	-0.007 (0.006)	0.009 (0.008)
[18°C,21°C)	-0.007*** (0.003)	-0.008** (0.003)	0.027*** (0.006)	-0.007 (0.005)	0.014* (0.008)	-0.009 (0.006)	0.024*** (0.008)
[21°C,24°C)	-0.012*** (0.003)	-0.007* (0.004)	0.047*** (0.008)	-0.006 (0.006)	0.028*** (0.009)	-0.006 (0.007)	0.043*** (0.010)
[24°C,27°C)	-0.013*** (0.003)	-0.010** (0.005)	0.061*** (0.009)	0.001 (0.008)	0.046*** (0.011)	-0.008 (0.009)	0.058*** (0.012)
[27°C,30°C)	-0.016*** (0.004)	-0.013** (0.005)	0.070*** (0.010)	-0.002 (0.009)	0.050*** (0.014)	-0.001 (0.010)	0.076*** (0.014)
[30°C,)	-0.016*** (0.005)	-0.016** (0.008)	0.071*** (0.014)	-0.001 (0.014)	0.062*** (0.019)	-0.004 (0.016)	0.077*** (0.021)
Precipitation	YES	YES	YES	YES	YES	YES	YES
Hospital*year-week FE	YES	YES	YES	YES	YES	YES	YES
Day-in-week FE	YES	YES	YES	YES	YES	YES	YES
N	812,562	812,748	812,748	812,748	812,748	810,201	810,130
R-square	0.679	0.656	0.973	0.969	0.922	0.905	0.906

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FE = fixed effects, OOP = out-of-pocket.

Notes:

1. The table provides estimations of contemporaneous effects on healthcare expenditure.
2. Bin “[12°C,15°C)” is omitted, as it is the reference bin.
3. All specifications estimate equation (1) by Ordinary Least Squares, controlling for precipitation, hospital-year-week fixed effects, and day-of-week fixed effects. Standard errors are two-way clustered at hospital level and year-week level.
4. Significant at 10% level, ** significant at 5% level, *** significant at 1% level. Robust standard errors in parentheses.

Source: Authors' calculations.

Appendix Table 6: Contemporaneous Effects by Tier and Grade

Y = Number of Patients	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
X = Mean Ambient Temperature	Tier 3 (A)	Tier 3 (B)	Tier 3 (unrated)	Tier 2 (A)	Tier 2 (B)	Tier 2 (unrated)	Tier 3 (B & unrated)	Tier 2 (B & unrated)
(, -6°C)	-0.110*** (0.028)	-0.117*** (0.032)	-0.141*** (0.035)	-0.138*** (0.026)	-0.353** (0.057)	-0.117** (0.052)	-0.133*** (0.030)	-0.133** (0.050)
[-6°C, -3°C)	-0.087*** (0.024)	-0.097*** (0.028)	-0.088*** (0.027)	-0.124*** (0.024)	-0.147* (0.049)	-0.093 (0.104)	-0.093*** (0.024)	-0.085 (0.079)
[-3°C, 0°C)	-0.071*** (0.020)	-0.088*** (0.022)	-0.088*** (0.024)	-0.112*** (0.018)	-0.210* (0.068)	-0.060 (0.040)	-0.088*** (0.020)	-0.071** (0.033)
[0°C, 3°C)	-0.064*** (0.015)	-0.060*** (0.016)	-0.086*** (0.017)	-0.089*** (0.016)	-0.296** (0.058)	-0.088*** (0.026)	-0.079*** (0.015)	-0.111*** (0.027)
[3°C, 6°C)	-0.051*** (0.010)	-0.056*** (0.013)	-0.053*** (0.011)	-0.056*** (0.012)	-0.162 (0.078)	-0.068*** (0.023)	-0.054*** (0.010)	-0.076*** (0.024)
[6°C, 9°C)	-0.038*** (0.008)	-0.025** (0.011)	-0.051*** (0.007)	-0.047*** (0.009)	-0.150 (0.064)	-0.065*** (0.019)	-0.043*** (0.006)	-0.074*** (0.021)
[9°C, 12°C)	-0.017*** (0.005)	-0.023** (0.011)	-0.026*** (0.006)	-0.019*** (0.005)	-0.027 (0.030)	-0.022 (0.015)	-0.025*** (0.006)	-0.023* (0.013)
[15°C, 18°C)	0.012*** (0.004)	0.010 (0.008)	0.014** (0.005)	0.021*** (0.005)	-0.070 (0.040)	0.027 (0.026)	0.012*** (0.005)	0.016 (0.024)
[18°C, 21°C)	0.024*** (0.006)	0.030*** (0.010)	0.035*** (0.008)	0.046*** (0.005)	0.038* (0.012)	0.008 (0.026)	0.033*** (0.006)	0.013 (0.022)
[21°C, 24°C)	0.039*** (0.007)	0.051*** (0.012)	0.053*** (0.009)	0.062*** (0.007)	0.036 (0.013)	0.017 (0.024)	0.053*** (0.008)	0.020 (0.021)
[24°C, 27°C)	0.052*** (0.008)	0.057*** (0.013)	0.072*** (0.010)	0.081*** (0.008)	0.080 (0.032)	0.044 (0.031)	0.068*** (0.009)	0.050* (0.027)
[27°C, 30°C)	0.064*** (0.010)	0.074*** (0.015)	0.077*** (0.012)	0.088*** (0.009)	0.104 (0.045)	0.035 (0.038)	0.076*** (0.010)	0.049 (0.035)

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Y = Number of Patients	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
X = Mean Ambient Temperature	Tier 3 (A)	Tier 3 (B)	Tier 3 (unrated)	Tier 2 (A)	Tier 2 (B)	Tier 2 (unrated)	Tier 3 (B & unrated)	Tier 2 (B & unrated)
[30°C,)	0.064*** (0.013)	0.071*** (0.019)	0.089*** (0.013)	0.095*** (0.016)	0.018 (0.030)	0.016 (0.050)	0.085*** (0.012)	0.014 (0.040)
Precipitation	YES	YES	YES	YES	YES	YES	YES	YES
Hospital*year-week FE	YES	YES	YES	YES	YES	YES	YES	YES
Day-in-week FE	YES	YES	YES	YES	YES	YES	YES	YES
N	368,279	56,914	135,783	237,423	2,119	13,197	192,697	15,316
R-square	0.902	0.893	0.892	0.881	0.824	0.9	0.893	0.897

FE = fixed effects.

Notes:

1. Dependent variables are logarithms of hospital-level daily number of admissions through emergency departments. In each column, we include hospitals with specific tiers and grades, as shown at the top of the table. Grades are shown in parentheses.
2. Bin "[12°C,15°C]" is omitted, as it is the reference bin.
3. All specifications estimate equation (1) by Ordinary Least Squares, controlling for precipitation, hospital-year-week fixed effects, and day-of-week fixed effects. Standard errors are two-way clustered at hospital level and year-week level.
4. Significant at 10% level, ** significant at 5% level, *** significant at 1% level. Robust standard errors in parentheses.

Source: Authors' calculations.

Appendix Table 7: Contemporaneous Effects by Department

Y = Number of Patients X = Mean Ambient Temperature	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Internal	Surgery	Obstetrics/ Gynecology	Pediatrics	Ophthalmology	Otolaryngology	Stomatology	Dermatology
(, -6°C)	-0.129*** (0.020)	-0.041* (0.021)	-0.045*** (0.011)	-0.042*** (0.011)	-0.024*** (0.007)	-0.012 (0.008)	-0.004 (0.003)	-0.001 (0.002)
[-6°C, -3°C)	-0.109*** (0.016)	-0.038** (0.018)	-0.041*** (0.010)	-0.038*** (0.009)	-0.017*** (0.006)	-0.012* (0.006)	0.001 (0.003)	-0.000 (0.002)
[-3°C, 0°C)	-0.096*** (0.012)	-0.038** (0.015)	-0.030*** (0.008)	-0.030*** (0.007)	-0.013*** (0.005)	-0.011** (0.005)	-0.001 (0.003)	-0.000 (0.002)
[0°C, 3°C)	-0.075*** (0.011)	-0.045*** (0.012)	-0.020*** (0.007)	-0.027*** (0.006)	-0.012*** (0.004)	-0.008* (0.005)	-0.004* (0.002)	-0.000 (0.001)
[3°C, 6°C)	-0.054*** (0.007)	-0.035*** (0.009)	-0.014*** (0.005)	-0.014*** (0.005)	-0.010*** (0.003)	-0.005 (0.003)	-0.001 (0.001)	-0.001 (0.001)
[6°C, 9°C)	-0.038*** (0.005)	-0.029*** (0.006)	-0.014*** (0.004)	-0.009*** (0.004)	-0.005** (0.002)	-0.003 (0.002)	-0.003** (0.001)	0.000 (0.001)
[9°C, 12°C)	-0.022*** (0.003)	-0.013*** (0.004)	-0.007** (0.003)	-0.002 (0.003)	-0.003 (0.002)	-0.002 (0.002)	-0.002 (0.001)	0.001 (0.001)
[15°C, 18°C)	0.008*** (0.003)	0.009*** (0.003)	-0.001 (0.003)	0.010*** (0.003)	-0.000 (0.002)	0.002 (0.002)	0.000 (0.001)	0.002** (0.001)
[18°C, 21°C)	0.022*** (0.004)	0.022*** (0.004)	0.004 (0.004)	0.018*** (0.003)	-0.000 (0.002)	0.005* (0.003)	0.001 (0.001)	0.002** (0.001)
[21°C, 24°C)	0.036*** (0.005)	0.034*** (0.005)	0.005 (0.004)	0.025*** (0.004)	0.001 (0.003)	0.007** (0.003)	0.001 (0.001)	0.002* (0.001)
[24°C, 27°C)	0.049*** (0.006)	0.042*** (0.006)	0.008 (0.005)	0.034*** (0.004)	0.003 (0.003)	0.007* (0.004)	0.002 (0.002)	0.003*** (0.001)
[27°C, 30°C)	0.052*** (0.007)	0.053*** (0.006)	0.010* (0.006)	0.036*** (0.005)	0.001 (0.003)	0.004 (0.004)	0.000 (0.002)	0.002** (0.001)

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Y = Number of Patients	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
X = Mean Ambient Temperature	Internal	Surgery	Obstetrics/ Gynecology	Pediatrics	Ophthalmology	Otolaryngology	Stomatology	Dermatology
[30°C,)	0.056*** (0.009)	0.047*** (0.008)	0.004 (0.007)	0.033*** (0.006)	0.001 (0.005)	0.002 (0.005)	-0.003 (0.002)	0.002 (0.001)
Precipitation	YES	YES	YES	YES	YES	YES	YES	YES
Hospital*year-week FE	YES	YES	YES	YES	YES	YES	YES	YES
Day-in-week FE	YES	YES	YES	YES	YES	YES	YES	YES
N	815490	815,490	815,490	815,490	815,490	815,490	815,490	815,490
R-square	0.891	0.854	0.772	0.814	0.664	0.594	0.505	0.684

Y = Number of Patients	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
X = Mean Ambient Temperature	Psychiatry	Epidemiology	Oncology	Emergency	Rehabilitation	Intensive Care	Traditional Chinese Medicine	Others
(,-6°C)	-0.001 (0.001)	-0.008* (0.005)	-0.005 (0.006)	-0.026*** (0.009)	-0.002 (0.004)	-0.016** (0.008)	-0.030*** (0.008)	-0.027*** (0.008)
[-6°C,-3°C)	-0.001 (0.002)	-0.007* (0.004)	-0.012** (0.005)	-0.021*** (0.008)	-0.003 (0.003)	-0.009 (0.006)	-0.026*** (0.008)	-0.015** (0.007)
[-3°C,0°C)	-0.001 (0.002)	-0.009** (0.004)	-0.012*** (0.004)	-0.019*** (0.007)	-0.001 (0.003)	-0.003 (0.005)	-0.021*** (0.007)	-0.014*** (0.005)
[0°C,3°C)	-0.002* (0.001)	-0.007** (0.003)	-0.011*** (0.004)	-0.018*** (0.006)	-0.002 (0.003)	0.001 (0.005)	-0.018*** (0.006)	-0.012** (0.005)
[3°C,6°C)	-0.002** (0.001)	-0.005* (0.003)	-0.008*** (0.003)	-0.013** (0.004)	-0.001 (0.002)	0.004 (0.003)	-0.013*** (0.004)	-0.008** (0.004)
[6°C,9°C)	-0.001 (0.001)	-0.008*** (0.002)	-0.006** (0.003)	-0.008*** (0.003)	-0.002 (0.001)	0.001 (0.003)	-0.010*** (0.003)	-0.005* (0.003)

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Y = Number of Patients	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
X = Mean Ambient Temperature	Psychiatry	Epidemiology	Oncology	Emergency	Rehabilitation	Intensive Care	Traditional Chinese Medicine	Others
[9°C,12°C)	-0.001 (0.001)	-0.002 (0.002)	-0.001 (0.002)	-0.005** (0.002)	0.000 (0.001)	0.004* (0.002)	-0.004 (0.002)	-0.002 (0.002)
[15°C,18°C)	0.000 (0.001)	-0.001 (0.002)	0.004** (0.002)	0.002 (0.002)	0.001 (0.001)	0.002 (0.002)	0.003* (0.002)	0.003* (0.002)
[18°C,21°C)	0.001 (0.001)	0.003 (0.002)	0.004* (0.002)	0.005** (0.002)	0.000 (0.001)	0.005 (0.003)	0.007*** (0.002)	0.008*** (0.002)
[21°C,24°C)	-0.000 (0.001)	0.004* (0.002)	0.007** (0.003)	0.008*** (0.003)	-0.001 (0.001)	0.005 (0.003)	0.010*** (0.003)	0.009*** (0.003)
[24°C,27°C)	-0.000 (0.001)	0.007*** (0.002)	0.010*** (0.003)	0.015*** (0.003)	-0.002 (0.002)	0.005 (0.004)	0.015*** (0.003)	0.016*** (0.004)
[27°C,30°C)	0.000 (0.001)	0.009*** (0.003)	0.010** (0.004)	0.018*** (0.003)	-0.002 (0.002)	0.009** (0.004)	0.015*** (0.004)	0.017*** (0.004)
[30°C,)	0.001 (0.001)	0.006 (0.005)	0.002 (0.005)	0.024*** (0.004)	0.000 (0.003)	0.022*** (0.006)	0.019*** (0.006)	0.018*** (0.005)
Precipitation	YES	YES	YES	YES	YES	YES	YES	YES
Hospital*year-week FE	YES	YES	YES	YES	YES	YES	YES	YES
Day-in-week FE	YES	YES	YES	YES	YES	YES	YES	YES
N	815,490	815,490	815,490	815,490	815,490	815,490	815,490	815,490
R-square	0.549	0.640	0.661	0.848	0.576	0.567	0.880	0.858

FE = fixed effects.

Notes:

1. Dependent variables are logarithms of hospital-level daily number of admissions through emergency departments of different departments.
2. Bin "[12°C,15°C)" is omitted, as it is the reference bin.

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3. All specifications estimate equation (1) by Ordinary Least Squares, controlling for precipitation, hospital-year-week fixed effects, and day-of-week fixed effects. Standard errors are two-way clustered at hospital level and year-week level.
4. Significant at 10% level, ** significant at 5% level, *** significant at 1% level. Robust standard errors in parentheses.

Source: Authors' calculations.

Appendix Table 8: Contemporaneous Effects by City—Average Income

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Y = Number of Patients	All	Ages 0–5			Ages 6–64			Ages 65+				
X = Mean Ambient Temperature	Low	Middle	High	Low	Middle	High	Low	Middle	High	Low	Middle	High
(, -6°C)	-0.139*** (0.030)	-0.130*** (0.030)	-0.110*** (0.026)	-0.060** (0.026)	-0.048** (0.019)	-0.029* (0.016)	-0.145*** (0.031)	-0.102*** (0.030)	-0.094*** (0.027)	-0.115*** (0.031)	-0.145*** (0.027)	-0.117*** (0.024)
[-6°C, -3°C)	-0.117*** (0.024)	-0.093*** (0.025)	-0.097*** (0.022)	-0.062*** (0.023)	-0.037*** (0.012)	-0.043*** (0.015)	-0.133*** (0.027)	-0.076*** (0.027)	-0.084*** (0.022)	-0.088*** (0.027)	-0.104*** (0.023)	-0.098*** (0.022)
[-3°C, 0°C)	-0.106*** (0.020)	-0.091*** (0.019)	-0.071*** (0.019)	-0.066*** (0.020)	-0.040*** (0.011)	-0.028** (0.013)	-0.093*** (0.022)	-0.075*** (0.021)	-0.062*** (0.019)	-0.110*** (0.022)	-0.098*** (0.018)	-0.080*** (0.018)
[0°C, 3°C)	-0.077*** (0.016)	-0.081*** (0.015)	-0.062*** (0.014)	-0.052*** (0.015)	-0.038*** (0.010)	-0.022** (0.010)	-0.077*** (0.019)	-0.066*** (0.016)	-0.058*** (0.015)	-0.069*** (0.019)	-0.086*** (0.015)	-0.066*** (0.013)
[3°C, 6°C)	-0.057*** (0.012)	-0.056*** (0.011)	-0.043*** (0.009)	-0.038*** (0.012)	-0.025*** (0.008)	-0.010 (0.007)	-0.056*** (0.013)	-0.044*** (0.012)	-0.046*** (0.010)	-0.053*** (0.015)	-0.064*** (0.011)	-0.044*** (0.010)
[6°C, 9°C)	-0.048*** (0.008)	-0.047*** (0.008)	-0.030*** (0.007)	0.017** (0.008)	-0.022*** (0.007)	-0.010 (0.006)	-0.045*** (0.009)	-0.039*** (0.009)	-0.031*** (0.008)	-0.045*** (0.011)	-0.051*** (0.009)	-0.032*** (0.008)
[9°C, 12°C)	-0.025*** (0.005)	-0.020*** (0.005)	-0.014*** (0.005)	-0.010 (0.007)	-0.005 (0.006)	-0.003 (0.005)	-0.024*** (0.006)	-0.017*** (0.005)	-0.012** (0.006)	-0.018*** (0.007)	-0.023*** (0.006)	-0.017** (0.007)
[15°C, 18°C)	0.015*** (0.005)	0.014*** (0.004)	0.016*** (0.005)	0.010* (0.005)	0.017*** (0.005)	0.004 (0.005)	0.013** (0.006)	0.014*** (0.005)	0.014** (0.006)	0.015** (0.007)	0.012*** (0.005)	0.017*** (0.006)
[18°C, 21°C)	0.035*** (0.006)	0.029*** (0.006)	0.036*** (0.006)	0.027*** (0.008)	0.024*** (0.006)	0.018*** (0.006)	0.036*** (0.007)	0.027*** (0.006)	0.031*** (0.007)	0.027*** (0.009)	0.022*** (0.006)	0.036*** (0.008)
[21°C, 24°C)	0.051*** (0.008)	0.046*** (0.008)	0.050*** (0.007)	0.036*** (0.009)	0.036*** (0.006)	0.024*** (0.007)	0.053*** (0.009)	0.042*** (0.008)	0.041*** (0.007)	0.038*** (0.010)	0.036*** (0.008)	0.051*** (0.009)
[24°C, 27°C)	0.067*** (0.009)	0.065*** (0.009)	0.062*** (0.008)	0.045*** (0.010)	0.051*** (0.007)	0.036*** (0.008)	0.073*** (0.010)	0.059*** (0.010)	0.054*** (0.008)	0.047*** (0.011)	0.051*** (0.009)	0.059*** (0.010)

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Y = Number of Patients	All			Ages 0–5			Ages 6–64			Ages 65+		
X = Mean Ambient Temperature	Low	Middle	High	Low	Middle	High	Low	Middle	High	Low	Middle	High
[27°C,30°C)	0.078*** (0.011)	0.075*** (0.010)	0.068*** (0.009)	0.051*** (0.012)	0.058*** (0.008)	0.033*** (0.009)	0.085*** (0.011)	0.077*** (0.011)	0.060*** (0.010)	0.049*** (0.012)	0.044*** (0.009)	0.068*** (0.012)
(30°C)	0.084*** (0.015)	0.081*** (0.014)	0.070*** (0.012)	0.062*** (0.016)	0.057*** (0.011)	0.014 (0.012)	0.090*** (0.015)	0.077*** (0.015)	0.072*** (0.013)	0.044** (0.018)	0.055*** (0.014)	0.065*** (0.013)
Precipitation	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Hospital*year-week FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Day-in-week FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	167,771	397,483	250,236	167,771	397,483	250,236	167,771	397,483	250,236	167,771	397,483	250,236
R-square	0.911	0.898	0.887	0.763	0.781	0.794	0.857	0.851	0.840	0.817	0.828	0.839

FE = fixed effects.

Notes:

1. Dependent variables are logarithms of hospital-level daily number of admissions through emergency departments.
2. Columns (1) to (3) present the estimations for number of all patients, and columns (4) to (6), (7) to (9), and (10) to (12) present estimations for number of patients of different ages, respectively. Columns (1), (4), (7), and (10); (2), (5), (8), and (11); and (3), (6), (9), and (12) present estimations for hospitals in low-income, mid-income, and high-income cities, respectively.
3. Bin “[12°C,15°C)” is omitted, as it is the reference bin.
4. All specifications estimate equation (1) by Ordinary Least Squares, controlling for precipitation, hospital-year-week fixed effects, and day-of-week fixed effects. Standard errors are two-way clustered at hospital level and year-week level.
5. Significant at 10% level, ** significant at 5% level, *** significant at 1% level. Robust standard errors in parentheses.

Source: Authors' calculations.

Appendix Table 9: Contemporaneous Effect by City—Centralized Winter Heating

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Y = Number of Patients	All		Ages 0–5		Ages 6–64		Ages 65+	
X = Mean Ambient Temperature	Heating	Non-heating	Heating	Non-heating	Heating	Non-heating	Heating	Non-heating
(,–6°C)	–0.106*** (0.023)	–0.164*** (0.040)	–0.030** (0.013)	–0.058** (0.025)	–0.088*** (0.024)	–0.157*** (0.038)	–0.118*** (0.023)	–0.139*** (0.034)
[–6°C,–3°C)	–0.080*** (0.020)	–0.125*** (0.036)	–0.030*** (0.010)	–0.053** (0.021)	–0.070*** (0.021)	–0.129*** (0.036)	–0.087*** (0.019)	–0.101*** (0.029)
[–3°C,0°C)	–0.068*** (0.016)	–0.119*** (0.031)	–0.023** (0.009)	–0.067*** (0.017)	–0.060*** (0.017)	–0.102*** (0.031)	–0.076*** (0.016)	–0.120*** (0.024)
[0°C,3°C)	–0.058*** (0.015)	–0.093*** (0.019)	–0.022** (0.009)	–0.048*** (0.010)	–0.052*** (0.015)	–0.081*** (0.021)	–0.060*** (0.014)	–0.095*** (0.017)
[3°C,6°C)	–0.045*** (0.012)	–0.057*** (0.011)	–0.013* (0.007)	–0.031*** (0.008)	–0.045*** (0.013)	–0.047*** (0.012)	–0.046*** (0.012)	–0.062*** (0.011)
[6°C,9°C)	–0.029*** (0.009)	–0.049*** (0.007)	–0.007 (0.006)	–0.024*** (0.006)	–0.027** (0.010)	–0.043*** (0.008)	–0.032*** (0.009)	–0.051*** (0.008)
[9°C,12°C)	–0.012** (0.006)	–0.023*** (0.004)	0.000 (0.005)	–0.010** (0.004)	–0.010 (0.006)	–0.020*** (0.005)	–0.015** (0.007)	–0.022*** (0.004)
[15°C,18°C)	0.014** (0.005)	0.016*** (0.003)	0.010** (0.005)	0.014*** (0.003)	0.012** (0.006)	0.015*** (0.004)	0.013** (0.006)	0.016*** (0.004)
[18°C,21°C)	0.020** (0.008)	0.041*** (0.004)	0.017*** (0.006)	0.027*** (0.004)	0.018** (0.009)	0.039*** (0.005)	0.014 (0.009)	0.036*** (0.005)
[21°C,24°C)	0.032*** (0.010)	0.058*** (0.006)	0.029*** (0.006)	0.034*** (0.005)	0.029*** (0.011)	0.052*** (0.006)	0.027*** (0.010)	0.049*** (0.007)
[24°C,27°C)	0.049*** (0.011)	0.074*** (0.007)	0.045*** (0.007)	0.045*** (0.006)	0.046*** (0.012)	0.070*** (0.007)	0.041*** (0.011)	0.060*** (0.007)

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Y = Number of Patients	All		Ages 0–5		Ages 6–64		Ages 65+	
X = Mean Ambient Temperature	Heating	Non-heating	Heating	Non-heating	Heating	Non-heating	Heating	Non-heating
[27°C,30°C)	0.063*** (0.012)	0.082*** (0.008)	0.049*** (0.008)	0.048*** (0.007)	0.055*** (0.013)	0.086*** (0.008)	0.055*** (0.013)	0.055*** (0.008)
(30°C)	0.078*** (0.018)	0.083*** (0.010)	0.049*** (0.012)	0.040*** (0.009)	0.071*** (0.018)	0.088*** (0.011)	0.069*** (0.020)	0.053*** (0.011)
Precipitation	YES	YES	YES	YES	YES	YES	YES	YES
Hospital*year-week FE	YES	YES	YES	YES	YES	YES	YES	YES
Day-in-week FE	YES	YES	YES	YES	YES	YES	YES	YES
N	325021	490469	325021	490469	325021	490469	325021	490469
R-square	0.894	0.9	0.774	0.787	0.851	0.847	0.836	0.822

FE = fixed effects.

Note:

- Columns (1) to (2) present the estimations for number of all patients, and columns (3) to (4), (5) to (6), and (7) to (8) present estimations for number of patients of different ages, respectively. The first column in each subgroup presents estimations for hospitals in cities with centralized heating in winter, and the second column presents estimations for hospitals in cities without centralized heating.
- Bin “[12°C,15°C)” is omitted, as it is the reference bin.
- All specifications estimate equation (1) by Ordinary Least Squares, controlling for precipitation, hospital-year-week fixed effects, and day-of-week fixed effects. Standard errors are two-way clustered at hospital level and year-week level.
- * Significant at 10% level, ** significant at 5% level, *** significant at 1% level. Robust standard errors in parentheses.

Source: Authors' calculations.

Appendix Table 10: Contemporaneous Effects by Diagnosed Disease

Y = Number of Patients	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
X = Mean Ambient Temperature	Infectious	Neoplasms	Blood Immune	Endocrine	Mental	Nervous	Eye	Ear	Circulatory	Respiratory
(, -6°C)	-0.030*** (0.008)	-0.026 (0.017)	-0.002 (0.006)	-0.038*** (0.012)	-0.011** (0.004)	-0.047*** (0.015)	-0.008 (0.006)	-0.034** (0.013)	-0.087*** (0.020)	-0.101*** (0.015)
[-6°C, -3°C)	-0.022*** (0.007)	-0.026* (0.014)	-0.007 (0.005)	-0.036*** (0.011)	-0.008** (0.004)	-0.039*** (0.013)	-0.007 (0.005)	-0.021* (0.011)	-0.068*** (0.018)	-0.091*** (0.013)
[-3°C, 0°C)	-0.022*** (0.006)	-0.019 (0.012)	-0.010** (0.004)	-0.029*** (0.010)	-0.007** (0.004)	-0.034*** (0.010)	-0.006 (0.004)	-0.022*** (0.008)	-0.058*** (0.014)	-0.077*** (0.011)
[0°C, 3°C)	-0.021*** (0.005)	-0.025** (0.010)	-0.010*** (0.004)	-0.033*** (0.008)	-0.011*** (0.003)	-0.025*** (0.007)	-0.003 (0.004)	-0.019*** (0.007)	-0.037*** (0.012)	-0.065*** (0.009)
[3°C, 6°C)	-0.018*** (0.004)	-0.016** (0.007)	-0.006** (0.003)	-0.025*** (0.006)	-0.009*** (0.002)	-0.025*** (0.005)	-0.004 (0.003)	-0.020*** (0.006)	-0.027*** (0.008)	-0.044*** (0.007)
[6°C, 9°C)	-0.011*** (0.003)	-0.013** (0.005)	-0.004* (0.002)	-0.020*** (0.005)	-0.008*** (0.002)	-0.017*** (0.004)	-0.001 (0.002)	-0.014*** (0.004)	-0.023*** (0.006)	-0.028*** (0.005)
[9°C, 12°C)	-0.006** (0.002)	-0.006 (0.003)	-0.003 (0.002)	-0.009*** (0.003)	-0.005*** (0.002)	-0.008** (0.003)	-0.001 (0.002)	-0.004 (0.003)	-0.009** (0.004)	-0.011*** (0.004)
[15°C, 18°C)	0.005** (0.002)	0.000 (0.003)	0.004** (0.002)	0.003 (0.003)	0.004** (0.002)	0.008*** (0.003)	0.000 (0.001)	-0.001 (0.003)	0.002 (0.003)	0.017*** (0.003)
[18°C, 21°C)	0.011*** (0.003)	0.002 (0.004)	0.007*** (0.002)	0.011*** (0.004)	0.004** (0.002)	0.010*** (0.003)	0.001 (0.002)	0.000 (0.003)	0.009* (0.005)	0.034*** (0.004)
[21°C, 24°C)	0.014*** (0.003)	0.008 (0.005)	0.009*** (0.002)	0.013*** (0.004)	0.005** (0.002)	0.013*** (0.004)	0.002 (0.002)	0.001 (0.004)	0.011* (0.006)	0.048*** (0.005)
[24°C, 27°C)	0.024*** (0.004)	0.012** (0.006)	0.010*** (0.003)	0.019*** (0.005)	0.008*** (0.002)	0.018*** (0.005)	0.001 (0.002)	0.004 (0.005)	0.016** (0.007)	0.060*** (0.006)
[27°C, 30°C)	0.030*** (0.005)	0.014** (0.006)	0.009*** (0.003)	0.027*** (0.006)	0.009*** (0.003)	0.014*** (0.005)	0.002 (0.003)	0.000 (0.006)	0.013* (0.008)	0.066*** (0.007)

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Y = Number of Patients	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
X = Mean Ambient Temperature	Infectious	Neoplasms	Blood Immune	Endocrine	Mental	Nervous	Eye	Ear	Circulatory	Respiratory
[30°C,)	0.025*** (0.007)	0.006 (0.008)	0.015*** (0.005)	0.022*** (0.008)	0.007** (0.004)	0.024*** (0.007)	0.005 (0.004)	-0.006 (0.007)	0.009 (0.009)	0.075*** (0.009)
Precipitation	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Hospital*year-week FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Day-in-week FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	815,490	815,490	815,490	815,490	815,490	815,490	815,490	815,490	815,490	815,490
R-square	0.56	0.603	0.322	0.507	0.262	0.535	0.261	0.488	0.804	0.739

Y = Number of Patients	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
X = Mean Ambient Temperature	Digestive	Skin	Musculoskeletal	Genitourinary	Pregnancy	Perinatal	Genes	Injury	Others
(,-6°C)	-0.072*** (0.018)	-0.009** (0.005)	-0.019 (0.013)	-0.054*** (0.015)	-0.031** (0.012)	-0.001 (0.008)	-0.002 (0.005)	-0.092*** (0.018)	-0.034** (0.017)
[-6°C,-3°C)	-0.061*** (0.016)	-0.012*** (0.004)	-0.020 (0.013)	-0.046*** (0.014)	-0.031*** (0.010)	-0.002 (0.006)	-0.004 (0.004)	-0.071*** (0.015)	-0.034** (0.014)
[-3°C,0°C)	-0.056*** (0.013)	-0.008** (0.004)	-0.019* (0.011)	-0.035*** (0.011)	-0.022*** (0.008)	0.000 (0.005)	-0.001 (0.004)	-0.067*** (0.014)	-0.034*** (0.012)
[0°C,3°C)	-0.049*** (0.009)	-0.006 (0.004)	-0.016* (0.009)	-0.024** (0.010)	-0.016** (0.006)	0.000 (0.004)	-0.003 (0.003)	-0.079*** (0.012)	-0.030*** (0.009)
[3°C,6°C)	-0.032*** (0.007)	-0.006** (0.003)	-0.016** (0.007)	-0.024*** (0.007)	-0.011** (0.005)	0.002 (0.003)	-0.003 (0.002)	-0.053*** (0.008)	-0.022*** (0.007)
[6°C,9°C)	-0.024*** (0.005)	-0.003 (0.002)	-0.013*** (0.005)	-0.018*** (0.005)	-0.010** (0.004)	0.003 (0.003)	-0.002 (0.002)	-0.042*** (0.006)	-0.019*** (0.006)

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Y = Number of Patients	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
X = Mean Ambient Temperature	Digestive	Skin	Musculoskeletal	Genitourinary	Pregnancy	Perinatal	Genes	Injury	Others
[9°C,12°C)	-0.008** (0.003)	0.001 (0.002)	-0.006** (0.003)	-0.006* (0.004)	-0.005 (0.003)	0.003 (0.002)	-0.001 (0.001)	-0.025*** (0.004)	-0.008** (0.004)
[15°C,18°C)	0.013*** (0.003)	0.002* (0.001)	0.002 (0.003)	0.003 (0.003)	-0.001 (0.003)	0.002 (0.002)	0.000 (0.001)	0.018*** (0.003)	0.007** (0.003)
[18°C,21°C)	0.020*** (0.005)	0.003 (0.002)	0.005 (0.004)	0.012*** (0.004)	0.003 (0.004)	-0.001 (0.003)	-0.002 (0.001)	0.045*** (0.004)	0.013*** (0.004)
[21°C,24°C)	0.027*** (0.005)	0.003 (0.002)	0.007 (0.005)	0.018*** (0.005)	0.004 (0.004)	-0.005 (0.003)	0.000 (0.002)	0.070*** (0.006)	0.018*** (0.005)
[24°C,27°C)	0.032*** (0.006)	0.005** (0.003)	0.011** (0.005)	0.021*** (0.006)	0.006 (0.004)	-0.006* (0.003)	0.002 (0.002)	0.087*** (0.007)	0.028*** (0.006)
(27°C,30°C)	0.032*** (0.007)	0.006** (0.003)	0.010* (0.006)	0.030*** (0.007)	0.007 (0.005)	-0.010** (0.004)	0.000 (0.002)	0.107*** (0.008)	0.025*** (0.007)
[30°C,)	0.024*** (0.009)	0.009** (0.004)	0.015* (0.008)	0.029*** (0.009)	0.009 (0.007)	-0.016*** (0.006)	-0.001 (0.003)	0.119*** (0.011)	0.022** (0.009)
Precipitation	YES	YES	YES	YES	YES	YES	YES	YES	YES
Hospital*year-week FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Day-in-Week FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	815,490	815,490	815,490	815,490	815,490	815,490	815,490	815,490	815,490
R-square	0.693	0.31	0.586	0.599	0.74	0.61	0.383	0.725	0.639

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FE = fixed effects.

Notes:

1. Dependent variables are logarithms of hospital-level daily number of admissions through emergency departments of 1 disease category among the 19.
2. Bin “[12°C,15°C)” is omitted, as it is the reference bin.
3. All specifications estimate equation (1) by Ordinary Least Squares, controlling for precipitation, hospital-year-week fixed effects, and day-of-week fixed effects. Standard errors are two-way clustered at hospital level and year-week level.
4. Significant at 10% level, ** significant at 5% level, *** significant at 1% level. Robust standard errors in parentheses.

Source: Authors' calculations.

Appendix Table 11: Contemporaneous Effects by Age and Sex

Y = Number of Patients	(1)	(2)	(3)	(4)	(5)
X = Mean Ambient Temperature	Age 0–5	Age 6–64	Age 65+	Male	Female
(,–6°C)	–0.044*** (0.013)	–0.104*** (0.027)	–0.130*** (0.023)	–0.117*** (0.025)	–0.114*** (0.026)
[–6°C,–3°C)	–0.043*** (0.010)	–0.087*** (0.023)	–0.100*** (0.019)	–0.096*** (0.020)	–0.088*** (0.023)
[–3°C,0°C)	–0.040*** (0.009)	–0.073*** (0.019)	–0.093*** (0.016)	–0.084*** (0.016)	–0.078*** (0.018)
[0°C,3°C)	–0.035*** (0.007)	–0.066*** (0.014)	–0.077*** (0.013)	–0.069*** (0.013)	–0.072*** (0.014)
[3°C,6°C)	–0.023*** (0.006)	–0.048*** (0.010)	–0.056*** (0.009)	–0.050*** (0.009)	–0.051*** (0.009)
[6°C,9°C)	–0.017*** (0.004)	–0.038*** (0.007)	–0.044*** (0.007)	–0.038*** (0.007)	–0.043*** (0.006)
[9°C,12 °C)	–0.006* (0.003)	–0.017*** (0.004)	–0.020*** (0.004)	–0.017*** (0.004)	–0.019*** (0.004)
[15°C,18°C)	0.012*** (0.003)	0.013*** (0.004)	0.014*** (0.003)	0.018*** (0.003)	0.009** (0.004)
[18°C,21 °C)	0.023*** (0.004)	0.030*** (0.005)	0.027*** (0.005)	0.036*** (0.005)	0.024*** (0.005)
[21°C,24 °C)	0.032*** (0.004)	0.044*** (0.006)	0.041*** (0.006)	0.056*** (0.006)	0.034*** (0.006)
[24°C,27 °C)	0.045*** (0.005)	0.061*** (0.007)	0.053*** (0.007)	0.074*** (0.007)	0.046*** (0.007)
[27°C,30 °C)	0.048*** (0.006)	0.073*** (0.008)	0.053*** (0.008)	0.083*** (0.008)	0.053*** (0.008)

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Y = Number of Patients	(1)	(2)	(3)	(4)	(5)
X = Mean Ambient Temperature	Age 0–5	Age 6–64	Age 65+	Male	Female
[30°C,)	0.042*** (0.008)	0.078*** (0.010)	0.055*** (0.010)	0.092*** (0.010)	0.049*** (0.011)
Precipitation	YES	YES	YES	YES	YES
Hospital*year-week FE	YES	YES	YES	YES	YES
Day-in-week FE	YES	YES	YES	YES	YES
N	815,490	815,490	815,490	815,490	815,490
R-square	0.782	0.85	0.829	0.848	0.839

FE = fixed effects.

Notes:

1. Dependent variables are logarithms of hospital-level daily number of admissions through emergency departments of different age groups and sex groups.
2. Bin “[12°C,15°C)” is omitted, as it is the reference bin.
3. All specifications estimate equation (1) by Ordinary Least Squares, controlling for precipitation, hospital-year-week fixed effects, and day-of-week fixed effects. Standard errors are two-way clustered at hospital level and year-week level.
 - a. Significant at 10% level, ** significant at 5% level, *** significant at 1% level. Robust standard errors in parentheses.

Source: Authors' calculations.

Appendix Table 12: Contemporaneous Effects by Age (groups of 5 years)

Y = Number of Patients	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
X = Mean Ambient Temperature	Age 0–5	Age 5–10	Age 10–15	Age 15–20	Age 20–25	Age 25–30	Age 30–35	Age 35–40	Age 40–45
(,–6°C)	–0.044*** (0.013)	–0.055*** (0.008)	–0.041*** (0.009)	–0.019** (0.009)	–0.025** (0.010)	–0.032** (0.012)	–0.036*** (0.014)	–0.054*** (0.015)	–0.037** (0.016)
[–6°C,–3°C)	–0.043*** (0.010)	–0.046*** (0.007)	–0.036*** (0.007)	–0.013* (0.007)	–0.019** (0.009)	–0.025** (0.012)	–0.036*** (0.013)	–0.044*** (0.013)	–0.030** (0.014)
[–3°C,0°C)	–0.040*** (0.009)	–0.040*** (0.006)	–0.026*** (0.006)	–0.015** (0.006)	–0.009 (0.008)	–0.019* (0.010)	–0.038*** (0.010)	–0.027** (0.011)	–0.029** (0.011)
[0°C,3°C)	–0.035*** (0.007)	–0.028*** (0.005)	–0.024*** (0.005)	–0.012** (0.006)	–0.007 (0.007)	–0.023*** (0.007)	–0.026*** (0.008)	–0.030*** (0.008)	–0.028*** (0.009)
[3°C,6°C)	–0.023*** (0.006)	–0.020*** (0.004)	–0.020*** (0.005)	–0.009** (0.004)	–0.008 (0.005)	–0.014*** (0.005)	–0.024*** (0.006)	–0.022*** (0.007)	–0.019*** (0.007)
[6°C,9°C)	–0.017*** (0.004)	–0.013*** (0.003)	–0.015*** (0.003)	–0.010*** (0.003)	–0.008* (0.004)	–0.014*** (0.005)	–0.018*** (0.005)	–0.019*** (0.005)	–0.015*** (0.005)
[9°C,12 °C)	–0.006* (0.003)	–0.007*** (0.003)	–0.005** (0.003)	–0.004 (0.003)	–0.005 (0.003)	–0.009** (0.004)	–0.012*** (0.003)	–0.007* (0.004)	–0.008** (0.004)
[15°C,18°C)	0.012*** (0.003)	0.012*** (0.003)	0.003 (0.003)	0.003 (0.002)	0.006** (0.003)	0.007** (0.003)	0.001 (0.003)	0.000 (0.003)	0.004 (0.004)
[18°C,21 °C)	0.023*** (0.004)	0.019*** (0.003)	0.010*** (0.003)	0.013*** (0.003)	0.014*** (0.003)	0.010*** (0.004)	0.008** (0.004)	0.012*** (0.004)	0.010** (0.004)
[21°C,24 °C)	0.032*** (0.004)	0.031*** (0.004)	0.019*** (0.003)	0.020*** (0.003)	0.021*** (0.004)	0.018*** (0.004)	0.010** (0.004)	0.013*** (0.004)	0.015*** (0.005)
[24°C,27 °C)	0.045*** (0.005)	0.032*** (0.005)	0.025*** (0.004)	0.024*** (0.004)	0.024*** (0.004)	0.026*** (0.005)	0.017*** (0.005)	0.020*** (0.005)	0.024*** (0.006)
[27°C,30 °C)	0.048*** (0.006)	0.038*** (0.006)	0.026*** (0.005)	0.034*** (0.005)	0.027*** (0.005)	0.036*** (0.006)	0.021*** (0.007)	0.024*** (0.006)	0.028*** (0.007)

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Y = Number of Patients	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
X = Mean Ambient Temperature	Age 0–5	Age 5–10	Age 10–15	Age 15–20	Age 20–25	Age 25–30	Age 30–35	Age 35–40	Age 40–45
[30°C,)	0.042*** (0.008)	0.030*** (0.008)	0.031*** (0.007)	0.036*** (0.005)	0.033*** (0.007)	0.035*** (0.009)	0.022** (0.010)	0.032*** (0.008)	0.024*** (0.009)
Precipitation	YES	YES	YES	YES	YES	YES	YES	YES	YES
Hospital*year-week FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Day-in-week FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	815,490	815,490	815,490	815,490	815,490	815,490	815,490	815,490	815,490
R-square	0.782	0.499	0.331	0.324	0.455	0.569	0.529	0.47	0.501

Y = Number of Patients	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
X = Mean Ambient Temperature	Age 45–50	Age 50–55	Age 55–60	Age 60–65	Age 65–70	Age 70–75	Age 75–80	Age 80–85	Age 85+
(,–6°C)	–0.055*** (0.019)	–0.051*** (0.019)	–0.075*** (0.019)	–0.061*** (0.021)	–0.086*** (0.021)	–0.078*** (0.017)	–0.101*** (0.015)	–0.082*** (0.015)	–0.053*** (0.012)
[–6°C,–3°C)	–0.030* (0.016)	–0.040** (0.017)	–0.060*** (0.016)	–0.040** (0.019)	–0.068*** (0.018)	–0.063*** (0.016)	–0.070*** (0.012)	–0.077*** (0.013)	–0.053*** (0.010)
[–3°C,0°C)	–0.035** (0.015)	–0.031** (0.015)	–0.053*** (0.013)	–0.044*** (0.015)	–0.056*** (0.015)	–0.051*** (0.012)	–0.067*** (0.011)	–0.067*** (0.009)	–0.050*** (0.009)
[0°C,3°C)	–0.037*** (0.012)	–0.033*** (0.012)	–0.050*** (0.011)	–0.042*** (0.012)	–0.053*** (0.012)	–0.043*** (0.010)	–0.054*** (0.009)	–0.055*** (0.007)	–0.043*** (0.007)
[3°C,6°C)	–0.026*** (0.008)	–0.023*** (0.009)	–0.037*** (0.008)	–0.040*** (0.009)	–0.039*** (0.008)	–0.034*** (0.007)	–0.035*** (0.006)	–0.038*** (0.005)	–0.031*** (0.005)
[6°C,9°C)	–0.019*** (0.006)	–0.019*** (0.006)	–0.026*** (0.006)	–0.029*** (0.007)	–0.032*** (0.006)	–0.030*** (0.006)	–0.029*** (0.005)	–0.026*** (0.004)	–0.019*** (0.005)
[9°C,12°C)	–0.010*** (0.004)	–0.010** (0.005)	–0.008** (0.004)	–0.012*** (0.004)	–0.009** (0.003)	–0.011*** (0.003)	–0.013*** (0.004)	–0.013*** (0.003)	–0.013*** (0.003)

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Y = Number of Patients	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
X = Mean Ambient Temperature	Age 45–50	Age 50–55	Age 55–60	Age 60–65	Age 65–70	Age 70–75	Age 75–80	Age 80–85	Age 85+
[15°C,18°C)	0.007** (0.003)	0.009** (0.004)	0.011** (0.004)	0.007** (0.003)	0.010** (0.004)	0.010*** (0.003)	0.003 (0.003)	0.014*** (0.003)	0.002 (0.003)
[18°C,21°C)	0.015*** (0.005)	0.017*** (0.005)	0.021*** (0.005)	0.016*** (0.005)	0.017*** (0.005)	0.022*** (0.004)	0.014*** (0.004)	0.022*** (0.004)	0.009** (0.004)
[21°C,24°C)	0.021*** (0.006)	0.021*** (0.006)	0.030*** (0.006)	0.021*** (0.006)	0.025*** (0.006)	0.027*** (0.006)	0.020*** (0.006)	0.032*** (0.005)	0.016*** (0.004)
[24°C,27°C)	0.035*** (0.007)	0.029*** (0.007)	0.038*** (0.008)	0.033*** (0.006)	0.032*** (0.007)	0.030*** (0.006)	0.029*** (0.006)	0.041*** (0.005)	0.025*** (0.005)
[27°C,30°C)	0.045*** (0.008)	0.036*** (0.008)	0.039*** (0.009)	0.031*** (0.008)	0.032*** (0.008)	0.029*** (0.007)	0.034*** (0.007)	0.041*** (0.007)	0.025*** (0.006)
[30°C,)	0.037*** (0.011)	0.032*** (0.011)	0.044*** (0.012)	0.026*** (0.010)	0.026*** (0.010)	0.027*** (0.008)	0.035*** (0.011)	0.035*** (0.009)	0.029*** (0.008)
Precipitation	YES	YES	YES	YES	YES	YES	YES	YES	YES
Hospital*year-week FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Day-in-week FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	815,490	815,490	815,490	815,490	815,490	815,490	815,490	815,490	815,490
R-Square	0.579	0.623	0.634	0.649	0.663	0.626	0.583	0.522	0.453

FE = fixed effects.

Notes:

1. Dependent variables are logarithms of hospital-level daily number of admissions through emergency departments of different specific age groups.
2. Bin “[12°C,15°C)” is omitted, as it is the reference bin.
3. All specifications estimate equation (1) by Ordinary Least Squares, controlling for precipitation, hospital-year-week fixed effects, and day-of-week fixed effects. Standard errors are two-way clustered at hospital level and year-week level.
4. Significant at 10% level, ** significant at 5% level, *** significant at 1% level. Robust standard errors in parentheses.

Source: Authors' calculations.

Appendix Table 13: Contemporaneous Effects by Type of Insurance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Y = Number/Proportion of Patients	UEBMI		URBMI		NMCS		Other Insurance		Entirely OOP	
X = Mean Ambient Temperature	# of Patients	Proportion	# of Patients	Proportion	# of Patients	Proportion	# of Patients	Proportion	# of Patients	Proportion
(,-6°C)	-0.089*** (0.022)	-0.539* (0.327)	-0.063*** (0.017)	0.084 (0.243)	-0.051*** (0.015)	0.016 (0.186)	-0.056*** (0.016)	-0.068 (0.181)	-0.080*** (0.013)	0.508 (0.337)
[-6°C,-3°C)	-0.073*** (0.018)	-0.554** (0.266)	-0.054*** (0.015)	0.048 (0.209)	-0.043*** (0.013)	0.228 (0.177)	-0.045*** (0.013)	-0.069 (0.156)	-0.064*** (0.011)	0.348 (0.271)
[-3°C,0°C)	-0.064*** (0.015)	-0.545*** (0.211)	-0.045*** (0.011)	0.070 (0.170)	-0.043*** (0.011)	-0.045 (0.158)	-0.039*** (0.011)	-0.054 (0.120)	-0.045*** (0.010)	0.575** (0.271)
[0°C,3°C)	-0.062*** (0.011)	-0.534*** (0.166)	-0.037*** (0.008)	0.042 (0.150)	-0.034*** (0.008)	0.125 (0.122)	-0.035*** (0.008)	0.039 (0.089)	-0.045*** (0.009)	0.328* (0.186)
[3°C,6°C)	-0.048*** (0.008)	-0.528*** (0.139)	-0.027*** (0.006)	0.138 (0.129)	-0.024*** (0.006)	-0.001 (0.110)	-0.027*** (0.006)	-0.026 (0.077)	-0.028*** (0.007)	0.417*** (0.161)
[6°C,9°C)	-0.032*** (0.006)	-0.224* (0.119)	-0.021*** (0.005)	0.070 (0.095)	-0.019*** (0.005)	-0.078 (0.092)	-0.018*** (0.005)	0.000 (0.077)	-0.026*** (0.004)	0.232* (0.120)
[9°C,12°C)	-0.014*** (0.004)	-0.066 (0.092)	-0.011*** (0.003)	-0.073 (0.088)	-0.012*** (0.003)	-0.104 (0.071)	-0.013*** (0.003)	0.006 (0.061)	-0.011*** (0.003)	0.237** (0.096)
[15°C,18°C)	0.010*** (0.003)	-0.010 (0.089)	0.012*** (0.003)	0.012 (0.076)	0.003 (0.003)	-0.106* (0.060)	0.006** (0.003)	0.055 (0.060)	0.012*** (0.003)	0.049 (0.088)
[18°C,21°C)	0.021*** (0.005)	0.018 (0.099)	0.023*** (0.004)	0.051 (0.097)	0.007* (0.003)	-0.252*** (0.077)	0.017*** (0.004)	0.062 (0.068)	0.028*** (0.004)	0.223** (0.099)
[21°C,24°C)	0.035*** (0.006)	0.104 (0.103)	0.033*** (0.005)	-0.045 (0.106)	0.010*** (0.004)	-0.298*** (0.086)	0.022*** (0.004)	0.036 (0.083)	0.041*** (0.005)	0.203* (0.116)
[24°C,27°C)	0.044*** (0.007)	0.067 (0.127)	0.040*** (0.005)	-0.165 (0.123)	0.017*** (0.004)	-0.193** (0.096)	0.032*** (0.005)	0.041 (0.005)	0.053*** (0.006)	0.250* (0.134)

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Y = Number/Proportion of Patients	UEBMI		URBMI		NMCS		Other Insurance		Entirely OOP	
X = Mean Ambient Temperature	# of Patients	Proportion	# of Patients	Proportion	# of Patients	Proportion	# of Patients	Proportion	# of Patients	Proportion
[27°C,30°C)	0.047*** (0.008)	0.058 (0.143)	0.045*** (0.006)	0.267* (0.146)	0.017*** (0.005)	-0.319*** (0.120)	0.038*** (0.006)	0.200* (0.103)	0.068*** (0.007)	0.328** (0.159)
[30°C,)	0.049*** (0.010)	0.165 (0.217)	0.041*** (0.009)	-0.487** (0.227)	0.019** (0.008)	-0.333* (0.172)	0.036*** (0.008)	0.128 (0.164)	0.077*** (0.010)	0.528** (0.239)
Precipitation	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Hospital*year-week FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Day in week FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	815,490	815,491	815,492	815,493	815,494	815,495	815,496	815,497	815,498	815,499
R-square	0.862	0.738	0.888	0.779	0.914	0.839	0.893	0.911	0.820	0.612

FE = fixed effects, NCMS = New Cooperative Medical Scheme, OOP = out-of-pocket, UEBMI = Urban Employee Basic Medical Insurance, URBMI = Urban Resident Basic Medical Insurance.

Notes:

1. This table provides estimations of contemporaneous effects on hospital admission by type of insurance. The odd columns show estimated effects on numbers of admissions enrolled in each type of insurance. The even columns show estimations on the proportion of admissions in total.
2. Bin "[12°C,15°C)" is omitted, as it is the reference bin.
3. All specifications estimate equation (1) by Ordinary Least Squares, controlling for precipitation, hospital-year-week fixed effects, and day-of-week fixed effects. Standard errors are two-way clustered at hospital level and year-week level.
4. * Significant at 10% level, ** significant at 5% level, *** significant at 1% level. Robust standard errors in parentheses.

Source: Authors' calculations.

Appendix Table 14: Contemporaneous Effects by Severity Of Sickness (number of patients)

Y = Number of Patients	(1)	(2)	(3)	(4)	(5)	(6)
X = Mean Ambient Temperature	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
(,-6°C)	-0.023** (0.010)	-0.114*** (0.015)	-0.115*** (0.027)	-0.084*** (0.020)	-0.002 (0.014)	-0.011 (0.009)
[-6°C,-3°C)	-0.017* (0.010)	-0.094*** (0.013)	-0.097*** (0.023)	-0.068*** (0.019)	0.000 (0.011)	-0.001 (0.007)
[-3°C,0°C)	-0.017* (0.010)	-0.072*** (0.013)	-0.084*** (0.023)	-0.061*** (0.019)	0.004 (0.011)	0.003 (0.007)
[0°C,3°C)	-0.015* (0.007)	-0.059* (0.008)	-0.074* (0.014)	-0.055* (0.011)	-0.013 (0.008)	-0.001 (0.004)
[3°C,6°C)	-0.009* (0.005)	-0.039* (0.007)	-0.056* (0.010)	-0.038* (0.008)	-0.009 (0.006)	0.004 (0.004)
[6°C,9°C)	-0.005 (0.004)	-0.029* (0.005)	-0.042* (0.007)	-0.029* (0.006)	-0.015* (0.005)	-0.002 (0.003)
[9°C,12°C)	-0.002 (0.003)	-0.014* (0.004)	-0.018* (0.004)	-0.011* (0.004)	-0.006* (0.003)	-0.001 (0.002)
[15°C,18°C)	0.005* (0.003)	0.017* (0.003)	0.013* (0.003)	0.016* (0.003)	0.000 (0.003)	-0.009* (0.003)
[18°C,21°C)	0.006* (0.003)	0.032* (0.004)	0.028* (0.005)	0.023* (0.004)	0.008* (0.004)	-0.009* (0.003)
[21°C,24°C)	0.011* (0.004)	0.045* (0.005)	0.044* (0.007)	0.030* (0.005)	0.014* (0.004)	-0.010* (0.003)
[24°C,27°C)	0.016* (0.004)	0.067* (0.006)	0.056* (0.008)	0.043* (0.006)	0.015* (0.005)	-0.010* (0.004)
[27°C,30°C)	0.015* (0.005)	0.080* (0.007)	0.064* (0.009)	0.043* (0.007)	0.023* (0.006)	-0.013* (0.004)

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Y = Number of Patients	(1)	(2)	(3)	(4)	(5)	(6)
X = Mean Ambient Temperature	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
[30°C,)	0.015*	0.088*	0.072*	0.042*	0.014*	-0.009
	(0.006)	(0.010)	(0.010)	(0.007)	(0.006)	(0.004)
Precipitation	YES	YES	YES	YES	YES	YES
Hospital*year-week FE	YES	YES	YES	YES	YES	YES
Day-in-week FE	YES	YES	YES	YES	YES	YES
N	798,258	798,258	798,258	798,258	798,258	798,258
R-square	0.669	0.761	0.869	0.783	0.654	0.518

DRG = diagnosis-related group, FE = fixed effects.

Notes:

1. Dependent variables are logarithms of hospital-level daily number of admissions of different sickness severity groups. Level 1 represents patients categorized in a DRG with a point between 0 and 0.25. Levels 2–6 represent DRG points within the range of [0.25,0.5), [0.5,1), [1,2), [2,4), [4,8), respectively.
2. Bin “[12°C,15°C)” is omitted, as it is the reference bin.
3. All specifications estimate equation (1) by Ordinary Least Squares, controlling for precipitation, hospital-year-week fixed effects, and day-of-week fixed effects. Standard errors are two-way clustered at hospital level and year-week level.
4. Significant at 10% level, ** significant at 5% level, *** significant at 1% level. Robust standard errors in parentheses.

Source: Authors' calculations.

Appendix Table 15: Contemporaneous Effects by Severity of Sickness (proportion of patients)

Y = Proportion of Patients	(1)	(2)	(3)	(4)	(5)	(6)
X = Mean Ambient Temperature	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
(,-6°C)	0.001 (0.001)	-0.009*** (0.002)	-0.006* (0.003)	0.001 (0.002)	0.008*** (0.002)	0.002* (0.001)
[-6°C,-3°C)	0.002 (0.001)	-0.007*** (0.002)	-0.007*** (0.003)	0.002 (0.002)	0.006*** (0.001)	0.003*** (0.001)
[-3°C,0°C)	0.001 (0.001)	-0.004* (0.002)	-0.006* (0.003)	0.000 (0.002)	0.006*** (0.001)	0.002* (0.001)
[0°C,3°C)	0.000 (0.001)	-0.006* (0.002)	-0.006* (0.003)	0.001 (0.001)	0.004* (0.001)	0.002* (0.001)
[3°C,6°C)	0.001 (0.001)	-0.001 (0.002)	-0.005* (0.001)	0.001 (0.001)	0.003* (0.001)	0.002* (0.001)
[6°C,9°C)	0.001 (0.001)	-0.000 (0.002)	-0.003* (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.000)
[9°C,12°C)	0.000 (0.000)	-0.001 (0.001)	-0.001 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.000)
[15°C,18°C)	-0.001 (0.001)	0.001* (0.001)	0.001 (0.001)	0.001 (0.001)	-0.001* (0.001)	-0.001* (0.001)
[18°C,21°C)	-0.000 (0.001)	0.002* (0.001)	0.001 (0.001)	0.000 (0.001)	-0.002* (0.001)	-0.001* (0.001)
[21°C,24°C)	-0.000 (0.001)	0.004* (0.001)	0.002* (0.001)	0.000 (0.001)	-0.002* (0.001)	-0.002* (0.001)
[24°C,27°C)	0.000 (0.001)	0.006* (0.001)	0.001 (0.001)	0.000 (0.001)	-0.004* (0.001)	-0.002* (0.001)
[27°C,30°C)	-0.001 (0.001)	0.008* (0.001)	0.002 (0.001)	-0.001 (0.001)	-0.003* (0.001)	-0.003* (0.001)

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Y = Proportion of Patients	(1)	(2)	(3)	(4)	(5)	(6)
X = Mean Ambient Temperature	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
[30°C,)	-0.001 (0.001)	0.010* (0.001)	0.002 (0.001)	-0.001 (0.001)	-0.005* (0.001)	-0.003* (0.001)
Precipitation	YES	YES	YES	YES	YES	YES
Hospital*year-week FE	YES	YES	YES	YES	YES	YES
Day-in-week FE	YES	YES	YES	YES	YES	YES
N	798,258	798,258	798,258	798,258	798,258	798,258
R-square	0.669	0.761	0.869	0.783	0.654	0.518

DRG = diagnosis-related group, FE = fixed effects.

Notes:

1. Dependent variables are logarithms of hospital-level daily proportion of admissions of different sickness severity groups. Level 1 represents patients categorized in a DRG with a point between 0 and 0.25. Levels 2–6 represent DRG points within the range of [0.25,0.5), [0.5,1), [1,2), [2,4), [4,8), respectively.
2. Bin “[12°C,15°C)” is omitted, as it is the reference bin.
3. All specifications estimate equation (1) by Ordinary Least Squares, controlling for precipitation, hospital-year-week fixed effects, and day-of-week fixed effects. Standard errors are two-way clustered at hospital level and year-week level.
4. Significant at 10% level, ** significant at 5% level, *** significant at 1% level. Robust standard errors in parentheses.

Source: Authors' calculations.

Appendix Table 16: Contemporaneous Effects on Number of Physicians

Y = Number of Physicians	(1)	(2)	(3)	(4)
X = Mean Ambient Temperature	Total	Chief	Attending	Resident
(,-6°C)	-0.080*	-0.056*	-0.075*	-0.088**
	(0.041)	(0.033)	(0.039)	(0.044)
[-6°C,-3°C)	-0.062*	-0.043	-0.056*	-0.068*
	(0.037)	(0.029)	(0.034)	(0.039)
[-3°C,0°C)	-0.055*	-0.039	-0.050*	-0.062*
	(0.032)	(0.025)	(0.030)	(0.035)
[0°C,3°C)	-0.042*	-0.028	-0.038*	-0.049*
	(0.024)	(0.018)	(0.022)	(0.026)
[3°C,6°C)	-0.033**	-0.023*	-0.030**	-0.038**
	(0.016)	(0.012)	(0.014)	(0.018)
[6°C,9°C)	-0.028***	-0.020**	-0.026***	-0.032***
	(0.009)	(0.007)	(0.009)	(0.011)
[9°C,12°C)	-0.014***	-0.009***	-0.013***	-0.016***
	(0.004)	(0.003)	(0.004)	(0.005)
[15°C,18°C)	0.007*	0.004	0.007**	0.009**
	(0.004)	(0.003)	(0.003)	(0.004)
[18°C,21°C)	0.013**	0.008*	0.011**	0.016**
	(0.006)	(0.004)	(0.006)	(0.007)
[21°C,24°C)	0.017**	0.011*	0.016**	0.022**
	(0.008)	(0.006)	(0.007)	(0.009)
[24°C,27°C)	0.024**	0.015**	0.022**	0.029***
	(0.010)	(0.007)	(0.009)	(0.011)
[27°C,30°C)	0.025**	0.015*	0.023**	0.030**
	(0.011)	(0.008)	(0.010)	(0.012)
[30°C,)	0.023*	0.013	0.020*	0.029**
	(0.012)	(0.009)	(0.011)	(0.014)
Precipitation	YES	YES	YES	YES
Hospital*year-week FE	YES	YES	YES	YES
Day-of-week FE	YES	YES	YES	YES
N	815,490	815,490	815,490	815,490
R-square	0.974	0.974	0.969	0.962

Continued on the next page

FE = fixed effects.

Notes:

1. Dependent variables are logarithms of hospital-level daily number of physicians in charge of emergency department hospitalization patients. Column (1) presents the estimations for numbers of all physicians, and columns (2) to (4) present the estimations for numbers of physicians with different seniorities.
2. Bin "[12°C,15°C]" is omitted, as it is the reference bin.
3. All specifications estimate equation (1) by Ordinary Least Squares, controlling for precipitation, hospital-year-week fixed effects, and day-of-week fixed effects. Standard errors are two-way clustered at hospital level and year-week level.
4. Significant at 10% level, ** significant at 5% level, *** significant at 1% level. Robust standard errors in parentheses.

Source: Authors' calculations.