

When Labor Disputes Bring Cities to a Standstill:
The Impact of Public Transit Strikes on Traffic,
Accidents, Air Pollution, and Health

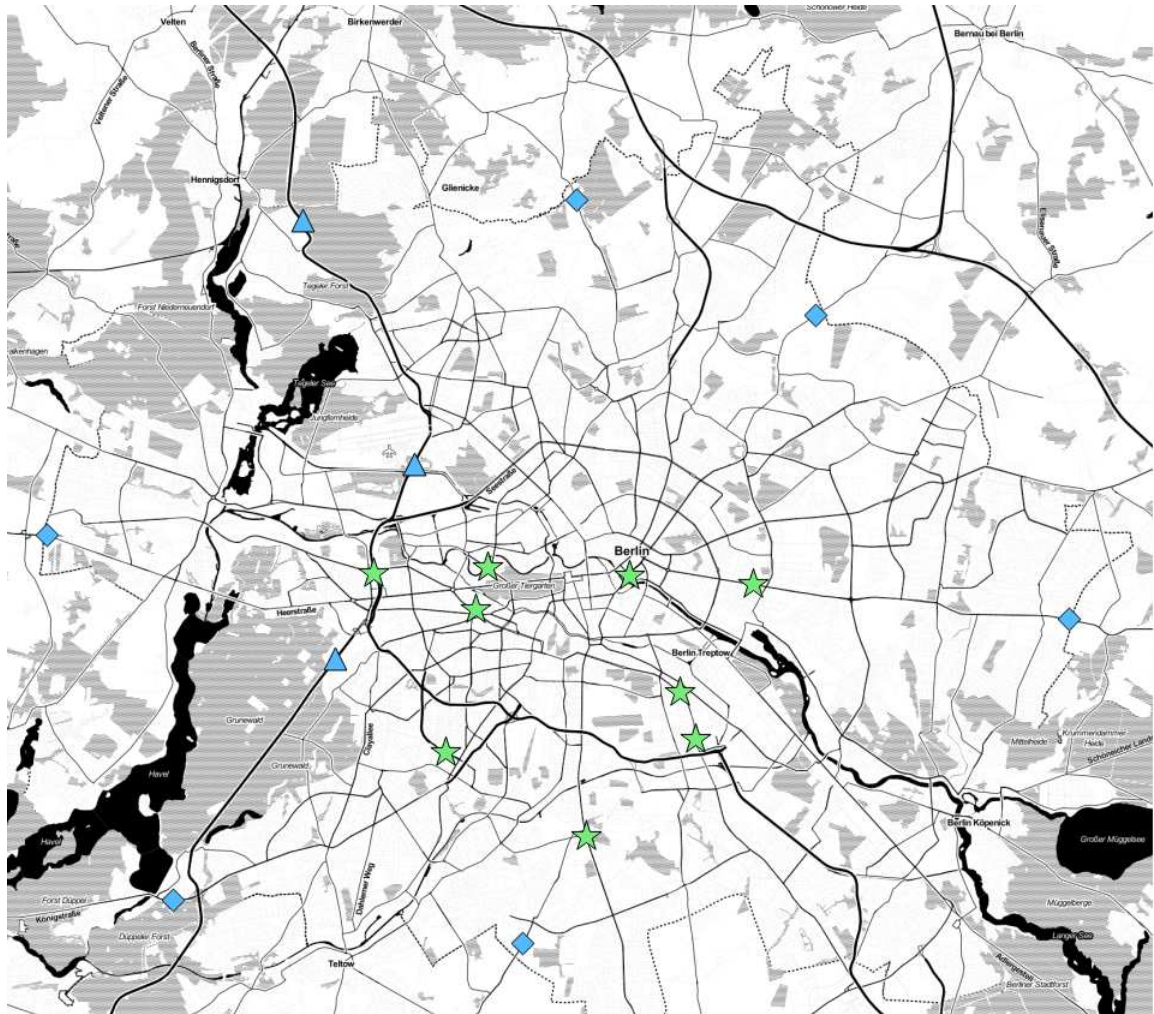
Stefan Bauernschuster

Timo Hener

Helmut Rainer

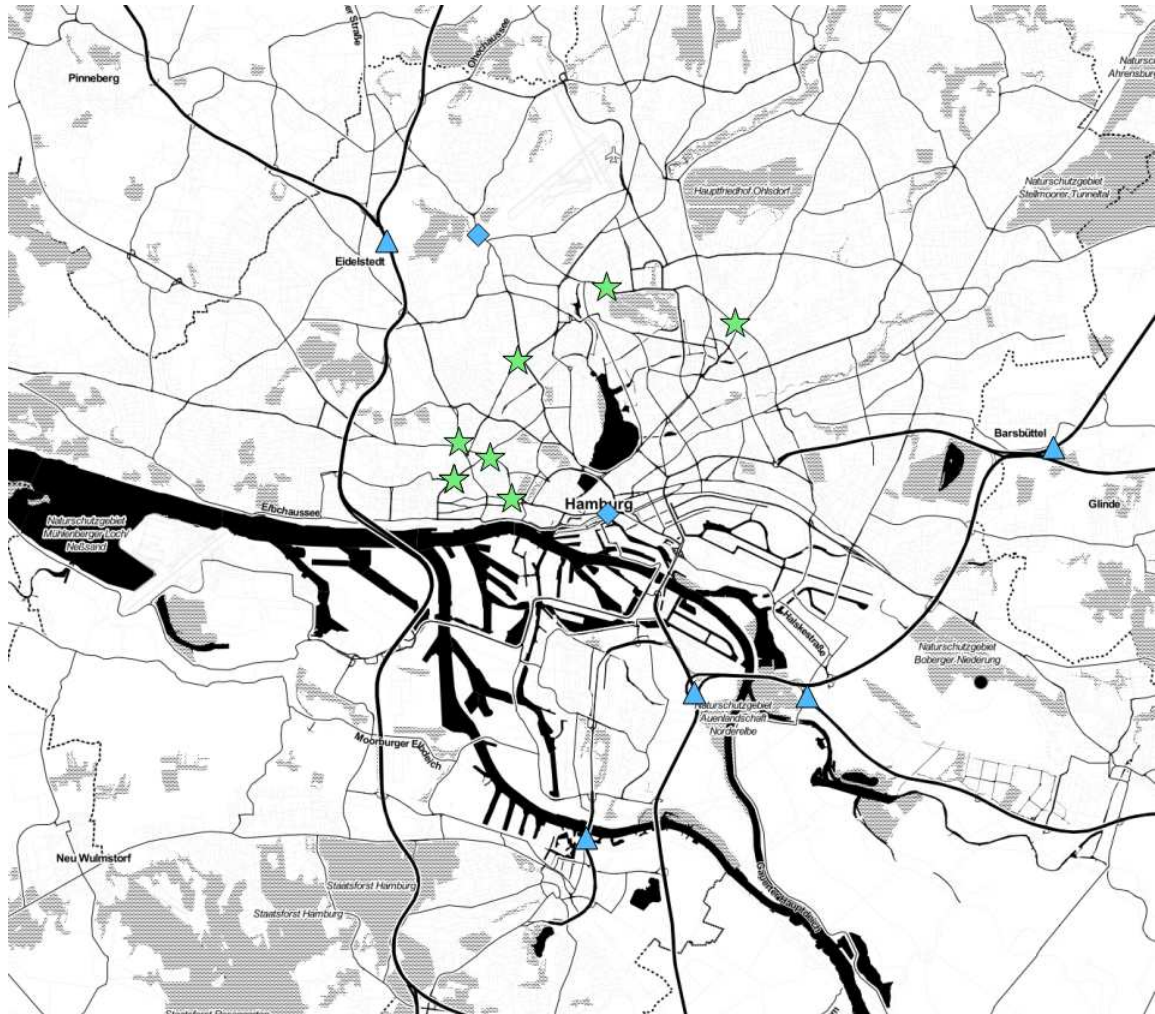
Online Appendix

FIGURE A1: *Location of Traffic and Air Monitors – Berlin*



NOTES: Triangles indicate traffic monitors on freeways, diamonds indicate traffic monitors on federal roads, stars indicate air monitors. Map tiles by Stamen Design, under CC BY 3.0. Data by OpenStreetMap, under CC BY SA. Scale 1:250,000.

FIGURE A2: Location of Traffic and Air Monitors – Hamburg



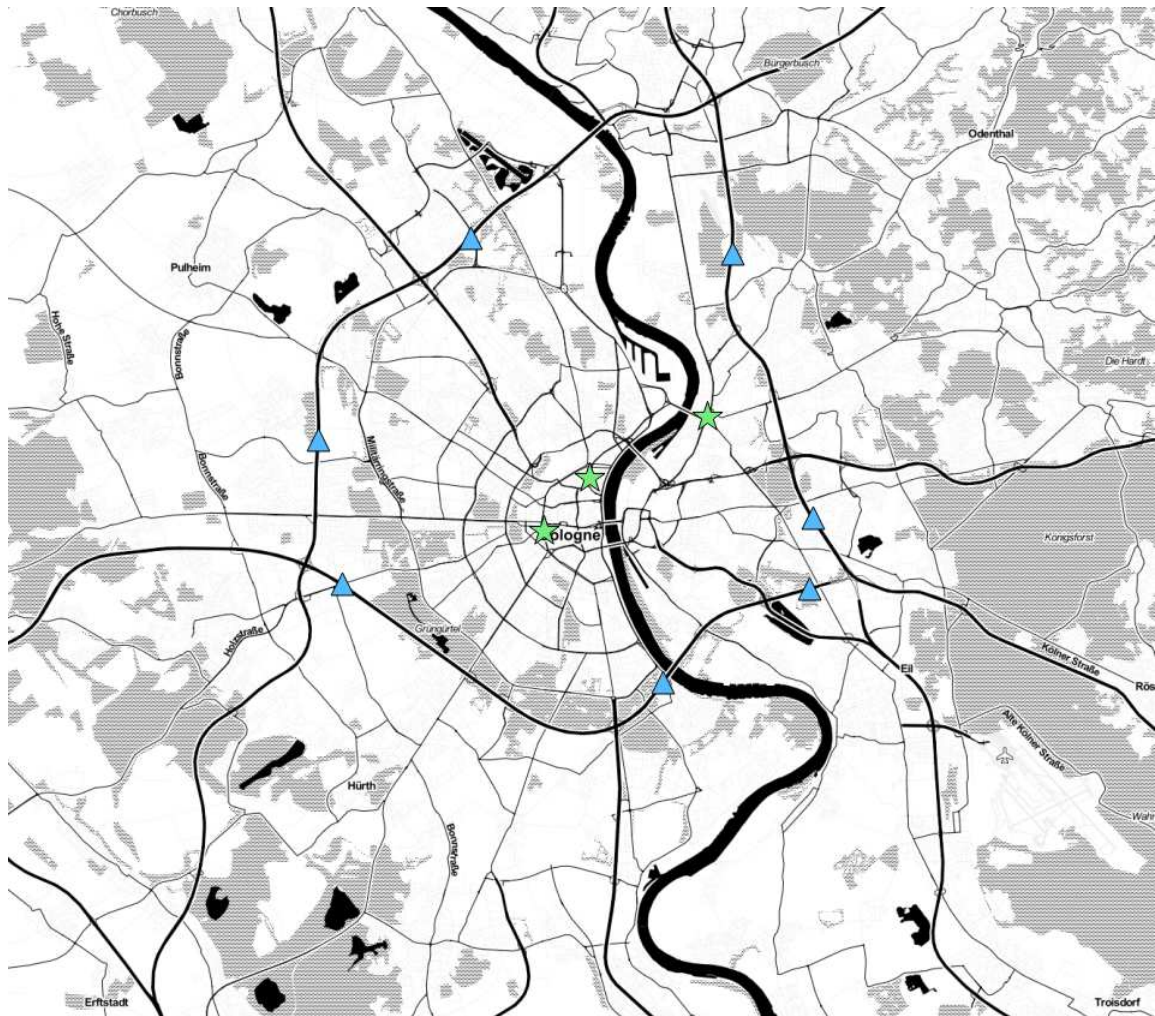
NOTES: Triangles indicate traffic monitors on freeways, diamonds indicate traffic monitors on federal roads, stars indicate air monitors. Map tiles by Stamen Design, under CC BY 3.0. Data by OpenStreetMap, under CC BY SA. Scale 1:200,000.

FIGURE A3: Location of Traffic and Air Monitors – Munich



NOTES: Triangles indicate traffic monitors on freeways, diamonds indicate traffic monitors on federal roads, stars indicate air monitors. Map tiles by Stamen Design, under CC BY 3.0. Data by OpenStreetMap, under CC BY SA. Scale 1:200,000.

FIGURE A4: *Location of Traffic and Air Monitors – Cologne*



NOTES: Triangles indicate traffic monitors on freeways, diamonds indicate traffic monitors on federal roads, stars indicate air monitors. Map tiles by Stamen Design, under CC BY 3.0. Data by OpenStreetMap, under CC BY SA. Scale 1:200,000.

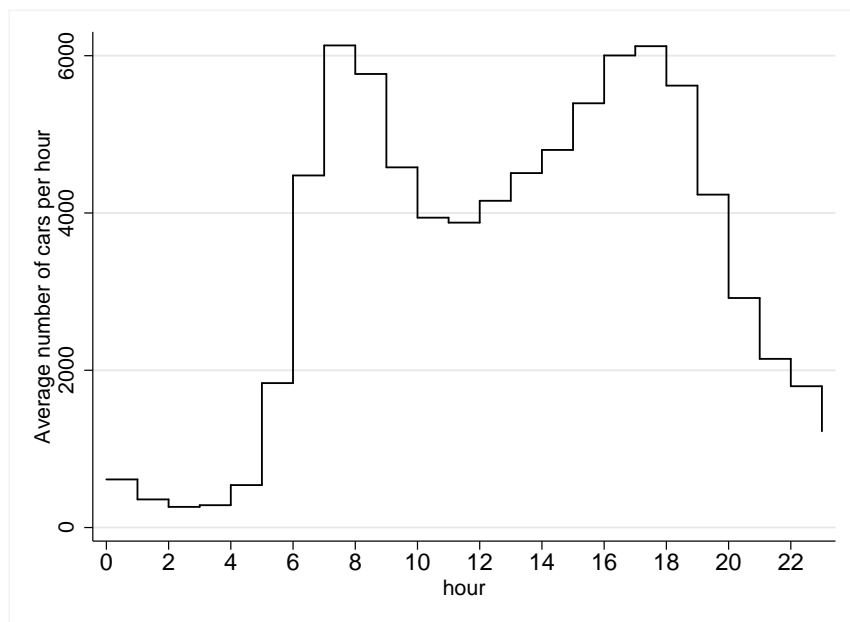
FIGURE A5: *Location of Traffic and Air Monitors – Frankfurt*



NOTES: Triangles indicate traffic monitors on freeways, diamonds indicate traffic monitors on federal roads, stars indicate air monitors. Map tiles by Stamen Design, under CC BY 3.0. Data by OpenStreetMap, under CC BY SA. Scale 1:200,000.

FIGURE A6: *Passenger Vehicle Flows over the Course of an Average Weekday*

(a) Freeways



(b) Federal roads

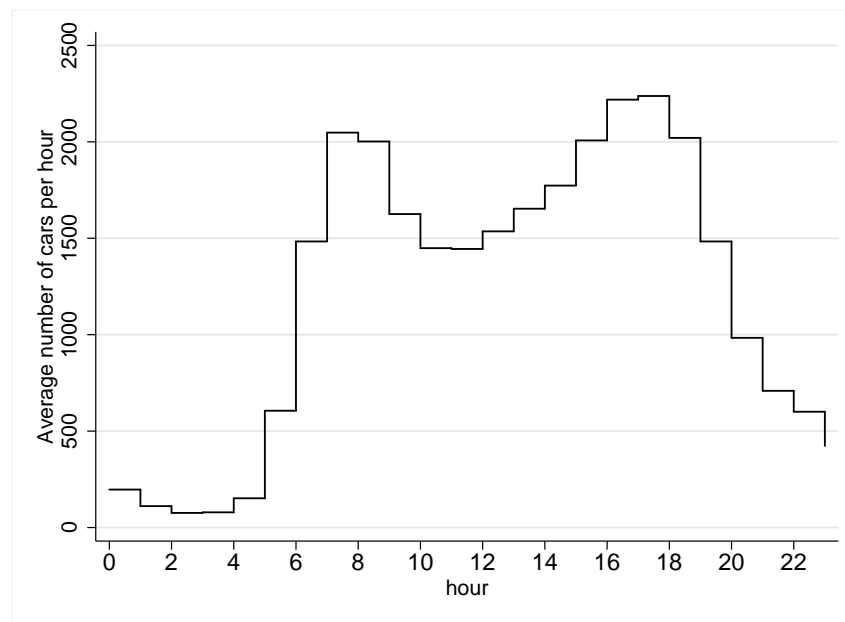
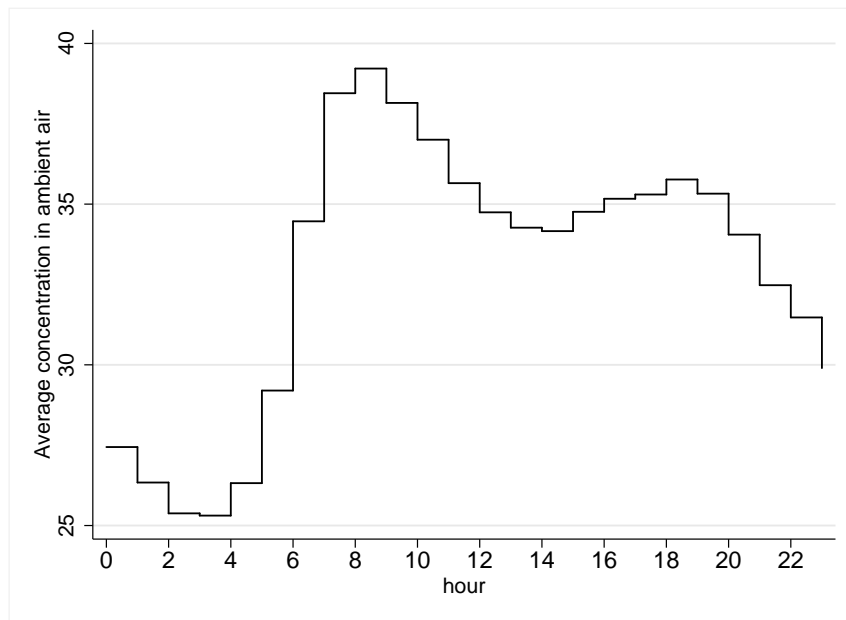


FIGURE A7: *Air Pollution over the Course of an Average Weekday*

(a) PM10



(b) NO2

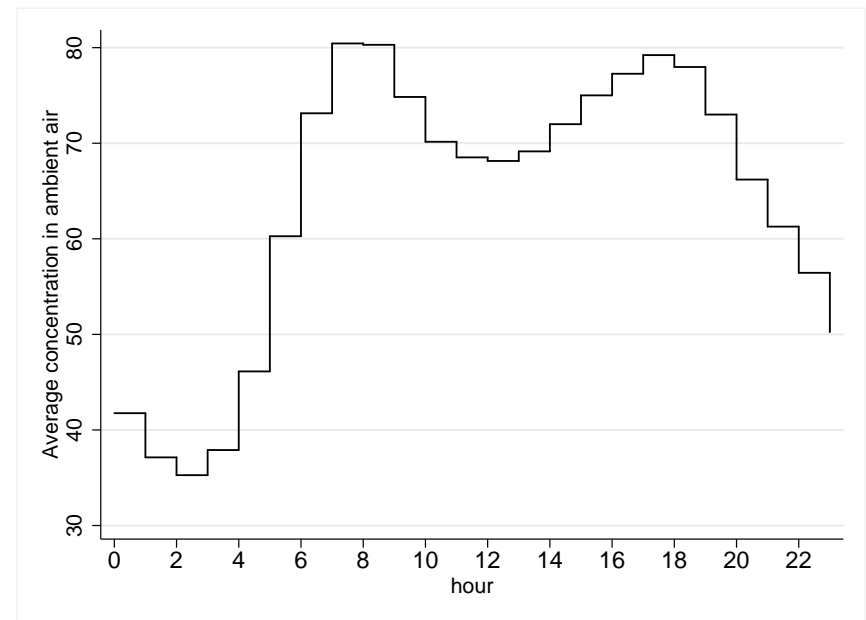


TABLE A1: *Public Transit Strikes of One Day or Less (2002-2011)*

Year	Berlin	Cologne	Frankfurt	Hamburg	Munich
2002		05/27/2002 (4:00-8:00)			05/27/2002 (4:00- 8:00)
		12/17/2002 (4:00-7:30)			12/16/2002 (all day)
2003		03/06/2003 (6:00-6:45)	03/06/2003 (6:00-6:45)	03/06/2003 (6:00-6:45)	03/06/2003 (6:00-6:45)
2004	04/21/2004 (7:00-8:00)				
	04/23/2004 (18:00-20:00)				
2005	05/24/2005 (3:30-10:00)				09/15/2005 (all day)
2006		09/29/2006 (4:00-6:00)			
2007	07/03/2007 (5:00-9:00)	07/03/2007 (5:00- 9:00)	07/03/2007 (5:00-9:00)	07/03/2007 (5:00-9:00)	07/03/2007 (5:00- 9:00)
	07/10/2007 (8:00-10:15)	07/10/2007 (8:00-10:15)		07/10/2007 (8:00-10:15)	07/10/2007 (8:00-10:15)
	08/09/2007 (8:00-10:00)			08/09/2007 (8:00-10:00)	
	10/05/2007 (8:00-11:00)	10/05/2007 (8:00- 11:00)	10/05/2007 (8:00-11:00)	10/05/2007 (8:00-11:00)	10/05/2007 (8:00-11:00)
	10/12/2007 (all day)	10/12/2007 (all day)	10/12/2007 (all day)	10/12/2007 (all day)	10/12/2007 (all day)
	10/18/2007 (2:00-11:00)	10/18/2007 (2:00-11:00)	10/18/2007 (2:00-11:00)	10/18/2007 (2:00-11:00)	10/18/2007 (2:00-11:00)
2008		02/22/2008 (4:00-12:00)	02/22/2008 (3:00-7:30)		
2009		01/29/2009 (6:30-9:00)	02/25/2009 (all day)		02/03/2009 (3:30-15:30)
					02/27/2009 (all day)
2010	02/09/2010 (3:00-14:00)	02/04/2010 (3:00-6:30)	02/01/2010 (all day)	01/20/2010 (all day)	09/10/2010 (4:00-10:00)
		10/26/2010 (4:00-9:00)	02/05/2010 (all day)	01/29/2010 (all day)	09/15/2010 (all day)
			10/26/2010 (5:00-8:30)	02/18/2010 (3:00-15:00)	10/26/2010 (4:00-19:00)
2011	02/22/2011 (6:00-8:00)	02/22/2011 (6:00-8:00)	02/22/2011 (6:00-8:00)	02/22/2011 (6:00-8:00)	02/22/2011 (6:00-8:00)
	03/10/2011 (4:00-10:00)	02/25/2011 (8:30-11:30)	02/25/2011 (8:30-11:30)	02/25/2011 (8:30-11:30)	02/25/2011 (8:30-11:30)
		03/10/2011 (4:00-10:00)	03/10/2011 (4:00-10:00)	03/10/2011 (4:00-10:00)	03/10/2011 (4:00-10:00)

NOTES: Table lists dates and duration of one-day strikes in public transportation during the period 2002-2011. One-day strikes labeled "all day" affected the entire operating hours of the services in question.

TABLE A2: *Summary Statistics*

	N	Mean	Std dev	Min	Max
Panel A: Car Traffic					
# Freeway cars per hour (morning peak)	212,896	5,241	2,291	113	12,911
# Freeway cars per hour (evening peak)	212,896	5,787	2,253	0	13,142
# Federal road cars per hour (morning peak)	102,540	1,789	979	61	5,039
# Federal road cars per hour (evening peak)	102,540	2,120	1,070	307	5,463
Panel B: Congestion					
Congestion Index (morning peak)	2,454	1.47	0.20	1.04	3.03
Congestion Index (evening peak)	2,454	1.49	0.20	1.13	3.36
Congestion Index (all peaks)	2,454	1.48	0.16	1.09	2.63
Congestion Index (all day)	2,454	1.31	0.09	1.09	2.04
Congestion Index (city streets - all day)	2,454	1.36	0.07	1.18	2.01
Congestion Index (highways - all day)	2,454	1.25	0.11	1.04	2.11
Panel C: Accidents					
# Vehicle crashes (morning peak)	12,238	4.28	3.28	0	27
# Vehicle crashes (evening peak)	12,238	6.96	4.82	0	39
# Slightly injured (morning peak)	12,238	3.94	3.47	0	26
# Slightly injured (evening peak)	12,238	6.78	5.27	0	41
# Seriously or fatally injured (morning peak)	12,238	0.35	0.66	0	6
# Seriously or fatally injured (evening peak)	12,238	0.65	0.96	0	8
Panel D: Pollution					
Mean PM10 in $\mu\text{g}/\text{m}^3$ (morning peak)	33,007	37.67	21.27	1.99	463
Mean PM10 $\mu\text{g}/\text{m}^3$ (evening peak)	33,737	35.30	20.26	0.58	273
Mean NO2 in $\mu\text{g}/\text{m}^3$ (morning peak)	38,525	76.84	29.71	2.38	257
Mean NO2 in $\mu\text{g}/\text{m}^3$ (evening peak)	39,468	77.20	31.78	5.00	350
Mean SO2 in $\mu\text{g}/\text{m}^3$ (morning peak)	14,038	6.46	6.41	0.00	101
Mean SO2 in $\mu\text{g}/\text{m}^3$ (evening peak)	14,349	5.02	4.57	0.00	70
Panel E: Hospitalizations					
# Respiratory (all patients)	11,000	61.08	36.03	3	250
# Respiratory (ages below 5)	11,000	7.83	5.77	0	45
# Respiratory (ages 65 and above)	11,000	22.08	15.05	0	112
# Breathing (all patients)	11,000	1.27	1.23	0	8
# Breathing (ages below 5)	11,000	0.22	0.49	0	5
# Breathing (ages 65 and above)	11,000	0.39	0.65	0	4
Panel F: Control Variables					
Mean Temperature ($^{\circ}\text{C}$)	12,238	10.42	7.58	-14.9	30.2
Precipitation (mm)	12,238	1.96	4.61	0.0	130.0
Wind speed (m/s)	12,238	3.41	1.58	0.4	13.9
Snow cover	12,238	0.07	0.25	0	1
School vacations	12,238	0.26	0.44	0	1

NOTES: Table lists descriptive statistics (number of observations, mean, standard deviation, minimum, and maximum) of all variables in the data set. The data summarized in Panel A are based on monitor-hour observations. The data summarized in Panel B are based on monitor-day observations. The data summarized in Panels B, C, E, F are based on city-day observations.