

Appendix

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1. Sample Selection

Notes: The sample was pulled from Sound Physician records as of July 14, 2020. The composition of the initial sample through Week 24, and the basic sample used for analysis, is shown below.

Sample	Deletions	Explanations
1,152,429		Initial Sample
	-51,534	Critical Care Hospitals
1,100,895		
	-43,895	Incomplete Hosp. Coverage
1,057,000		
	-49	Hospitals with fewer than 50 admissions
1,056,951		= Total Admissions in 2019 & 2020 (505,060 in 2020 and 551,891 in 2019)

2. Sensitivity of results in supplemental exhibit 2 to missing zip code data

One concern with our analysis is the possibility of bias if patients without a zip code in their record are systematically different from those with zip codes. To address this problem, we limited our sample to one in which the zip code response at the hospital level was at least 90%. For example, if we consider the change in admissions among Black patients; for this restricted sample ($N = 4,519$ at baseline rather than 5,140 in the full sample) the decline for non-COVID-19 medical admissions was -45.7 (in contrast to -45.2 in supplemental exhibit 2) at the nadir in April, and -11.9 (the same as in the full sample) during the rebound. Including COVID-19 admissions the decline at the nadir was -30.6 (in contrast to -30.1 in the full sample) and -2.9 for the rebound (in contrast to -2.3). In other words, the estimates were virtually unchanged. For this reason, we do not think that this selection issue is biasing our results.

3. Estimation standard errors for comparing changes over time in admission rates

In this section, we show how we calculate confidence intervals for our analysis of proportional declines. Let y be the count for a given month k in 2020 and x the corresponding count in 2019. The proportional decline d is therefore

$$A.1 \quad d = (y - x) / x$$

Assuming independence for the admission “draws” across the two years, the variance of d can be approximated by

$$A.2 \quad \text{Var}(d) \cong \text{Var}(x)[E(y) / (E(x)^2)] + \text{Var}(y) / E(x)$$

We treat these as binary draws in the universe of admissions for month k in 2019 and 2020. We further multiply this ratio by a constant term to normalize (or propensity weight) so that the number of admissions during the baseline (February) in 2019 is equal to the number of admissions during the baseline in 2020.

Confidence intervals can then be calculated in the usual way. We are very grateful to James O’Malley for suggesting this approach; any errors are our own.

4: Change in COVID-19 and non-COVID-19 Admissions Relative to Equivalent Periods in 2019: Total and by Subgroup with confidence intervals (an expansion of supplemental exhibit 2)

Patient Subgroup (N of sample at 2020 Baseline)	<i>Non-COVID-19 admissions</i>		<i>All medical admissions</i>	
	Nadir (April) Change (%) [95% C.I.]	Rebound (June/July) Change (%) [95% C.I.]	Nadir (April) Change (%) [95% C.I.]	Rebound (June/July) Change (%) [95% C.I.]
Overall	-42.8	-15.9	-34.1	-8.3
(N = 105,688)	[-43.2, -42.4]	[-16.5, -15.4]	[-34.6, -33.6]	[-8.9, -7.7]
Race, Ethnicity and Poverty Status				
Zip > 50% Black	-45.2	-11.9	-30.1	-2.3
(N = 5,140)	[-47.2, -43.3]	[-14.7, -9.2]	[-32.3, -27.8]	[-5.3, 0.6]
Zip > 50% Hispanic	-44.2	-31.8	-34.8	-14.1
(N = 9,161)	[-45.7, -42.8]	[-33.4, -30.1]	[-36.4, -33.3]	[-16.0, -12.2]
Zip > 25% Poverty	-44.0	-16.7	-31.5	-2.7
(N = 6,761)	[-45.7, -42.4]	[-18.9, -14.5]	[-33.4, -29.6]	[-5.2, -0.2]
Insurance Status				
Medicaid	-41.4	-9.7	-31.2	-2.5
(N = 13,009)	[-42.6, -40.1]	[-11.4, -8.0]	[-32.6, -29.8]	[-4.3, -0.6]
Self-Pay	-37.7	-20.3	-27.3	-3.7
(N = 2,922)	[-40.4, -35.0]	[-23.4, -17.3]	[-30.3, -24.3]	[-7.2, -0.1]
Age				
Old (70+)	-45.4	-19.1	-37.5	-13.2
(N = 42,384)	[-46.1, -44.8]	[-20.0, -18.3]	[-38.2, -36.8]	[-14.1, -12.2]
Young (< 50)	-39.3	-13.4	-30.4	-3.4
(N = 23,636)	[-40.2, -38.3]	[-14.6, -12.2]	[-31.4, -29.4]	[-4.7, -2.1]
Hospital COVID-19 Volume				
Highest quintile	-50.0	-23.3	-31.2	-9.9
(N = 21,285)	[-50.9, -49.1]	[-24.4, -22.1]	[-32.3, -30.1]	[-11.2, -8.7]
Lowest quintile	-39.5	-6.8	-36.5	-5.5
(N = 21,231)	[-40.5, -38.5]	[-8.1, -5.5]	[-37.5, -35.5]	[-6.8, -4.1]

Notes: Source is Sound Physician Data. These estimates adjust for seasonality by use of the corresponding weeks for 2019 data. The sample size is for the initial (baseline) February 2020 admissions.

5. Non-COVID-19 Change in Admissions by Diagnosis (with Confidence Intervals)

Diagnosis	N (2020 baseline)	Non-Covid-19 (April)	Lower 95% C.I. (April)	Upper 95% C.I. (April)	Non-Covid-19 (June/July)	Lower 95% C.I. (June/July)	Upper 95% C.I. (June/July)
Abdominal Pain	4893	-48.5	-50.3	-46.6	-14.4	-17.0	-11.8
Acute Myocardial Infarction (Non-ST-Elevation)	1568	-42.2	-45.7	-38.6	-16.1	-20.8	-11.4
Acute Myocardial Infarction (ST-Elevated)	416	-34.9	-42.4	-27.5	-22.2	-30.7	-13.8
Alcohol-Related	1042	-32.6	-37.3	-27.9	4.3	-2.0	10.6
Altered Mental Status	2251	-27.1	-30.5	-23.6	-15.5	-19.3	-11.7
Arrythmia	3626	-47.2	-49.5	-45.0	-14.7	-17.7	-11.6
Chest Pain (Excluding Acute Myocardial Infarction)	7383	-46.0	-47.6	-44.4	-14.6	-16.7	-12.5
Chronic Obstructive Pulmonary Disease / Asthma	3192	-68.6	-70.4	-66.7	-40.1	-42.8	-37.4
Congestive Heart Failure	3878	-47.5	-49.7	-45.3	-20.1	-23.0	-17.2
Dehydration	4446	-33.7	-36.0	-31.4	-12.5	-15.2	-9.8
Diabetes	2283	-38.5	-41.5	-35.5	0.8	-3.2	4.9
Gastrointestinal Bleeding	4042	-38.8	-41.1	-36.6	-11.9	-14.9	-8.9
Pancreatitis	1151	-23.7	-28.6	-18.8	-4.5	-10.2	1.2
Pneumonia	3953	-53.6	-55.6	-51.6	-44.1	-46.4	-41.8
Respiratory Failure	5986	-44.8	-46.6	-43.0	-21.0	-23.4	-18.6
Sepsis and Sepsis Shock	6712	-40.1	-41.9	-38.3	-25.1	-27.1	-23.1
Skin and Soft Tissue Infection	2806	-44.0	-46.6	-41.4	-19.0	-22.2	-15.7
Stroke	2350	-24.7	-28.2	-21.1	-16.9	-20.6	-13.3
Transient Ischemic Attack	1082	-50.9	-54.8	-47.0	-11.4	-17.2	-5.7
Urinary Tract Infection	2296	-48.5	-51.2	-45.7	-24.3	-27.7	-20.9

6. Total Change in Medical Admissions by Diagnosis (with Confidence Intervals)

Diagnosis	N (2020 baseline)	Non-Covid-19 (April)	Lower 95% C.I. (April)	Upper 95% C.I. (April)	Non-Covid-19 (June/July)	Lower 95% C.I. (June/July)	Upper 95% C.I. (June/July)
Abdominal Pain	4893	-46.1	-48.0	-44.2	-11.9	-14.5	-9.2
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Alcohol-Related	1042	-30.5	-35.3	-25.7	5.8	-0.6	12.1
Altered Mental Status	2251	-18.9	-22.6	-15.2	-11.2	-15.1	-7.3
Arrhythmia	3626	-44.2	-46.5	-41.9	-12.3	-15.4	-9.2
Chest Pain (Excluding Acute Myocardial Infarction)	7383	-44.0	-45.6	-42.4	-13.0	-15.2	-10.8
Chronic Obstructive Pulmonary Disease / Asthma	3192	-61.6	-63.6	-59.6	-35.5	-38.4	-32.7
Congestive Heart Failure	3878	-43.8	-46.1	-41.6	-17.8	-20.7	-14.8
Dehydration	4446	-29.4	-31.7	-27.0	-9.7	-12.4	-7.0
Diabetes	2283	-35.8	-38.9	-32.8	3.5	-0.6	7.6
Gastrointestinal Bleeding	4042	-36.9	-39.2	-34.6	-9.7	-12.7	-6.7
Pancreatitis	1151	-22.4	-27.3	-17.4	-2.9	-8.7	2.8
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Respiratory Failure	5986	-11.8	-14.3	-9.4	11.1	7.9	14.2
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Transient Ischemic Attack	1082	-50.0	-54.0	-46.1	-10.8	-16.6	-5.0
Urinary Tract Infection	2296	-46.2	-49.0	-43.4	-22.0	-25.5	-18.5

7. In-Hospital Mortality Logistic Regression Model Output

```

Logistic regression          Number of obs   =   483,246
                             Wald chi2(46)       =   6844.43
                             Prob > chi2        =   0.0000
Log pseudolikelihood = -42302.104   Pseudo R2      =   0.0921
  
```

(Std. Err. adjusted for 158 clusters in hosp_id)

		Robust				
	mortality	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]
-----+-----						
Age (<= 20 Excluded)						
21-40	2.204523	.746307	2.34	0.020	1.135412	4.280314
41-50	3.423283	1.14867	3.67	0.000	1.773476	6.607851
51-60	4.376513	1.431846	4.51	0.000	2.304857	8.310218
61-70	5.812435	1.905556	5.37	0.000	3.057026	11.05139
71-80	7.434346	2.412555	6.18	0.000	3.93564	14.04333
81+	11.00684	3.615182	7.30	0.000	5.782113	20.95264
Sex (Male excluded)						
Female	.8332931	.0199447	-7.62	0.000	.795105	.8733155
Unknown	.6398786	.1541209	-1.85	0.064	.3990961	1.02593
Diagnosis						
Altered Mental Status	3.268721	.2523323	15.34	0.000	2.809755	3.802658
Acute Myocardial Infarction (ST-Elevated)	5.970948	.6990818	15.26	0.000	4.746617	7.511081
Arrythmia	5.101967	.4492339	18.51	0.000	4.293272	6.062991

Chest Pain (Excluding Acute Myocardial Infarction)		.2861345	.0299629	-11.95	0.000	.2330429	.3513215
Congestive Heart Failure		1.992648	.1598087	8.60	0.000	1.702805	2.331826
Chronic Obstructive Pulmonary Disease / Asthma		1.148187	.1186509	1.34	0.181	.937673	1.405962
Dehydration		1.997709	.1482296	9.33	0.000	1.727322	2.310422
Diabetes		1.089967	.1095888	0.86	0.392	.8950164	1.327383
Gastrointestinal Bleeding		1.709683	.1243315	7.37	0.000	1.482568	1.97159
Pancreatitis		.7565213	.1177853	-1.79	0.073	.557564	1.026473
Pneumonia		2.886934	.2007386	15.25	0.000	2.519126	3.308445
Sepsis and Sepsis Shock		6.061807	.4004572	27.28	0.000	5.325614	6.899767
Skin and Soft Tissue Infection		.6629163	.0766232	-3.56	0.000	.5285336	.8314667
Stroke		4.582324	.4307566	16.19	0.000	3.811267	5.509372
Transient Ischemic Attack		.1964328	.05624	-5.68	0.000	.1120752	.3442855
Urinary Tract Infection		.7215911	.0748321	-3.15	0.002	.588868	.8842282
Alcohol-Related		.9206229	.1596569	-0.48	0.633	.6553361	1.2933
Respiratory Failure		6.373872	.4164225	28.35	0.000	5.607794	7.244604
Acute Myocardial Infarction (Non-ST-Elevation)		2.315979	.2023599	9.61	0.000	1.951464	2.748583
disad#xweek#year							
Low Minority/Poverty ZIP#February#2020		.9836002	.0599268	-0.27	0.786	.8728875	1.108355
Low Minority/Poverty ZIP#March#2019		.9349855	.0556924	-1.13	0.259	.8319612	1.050768
Low Minority/Poverty ZIP#March#2020		1.03099	.0595713	0.53	0.597	.920601	1.154615
Low Minority/Poverty ZIP#April#2019		.9082435	.0490327	-1.78	0.075	.8170509	1.009614
Low Minority/Poverty ZIP#April#2020		1.108438	.0754999	1.51	0.131	.9699132	1.266747
Low Minority/Poverty ZIP#May#2019		.8400889	.0448532	-3.26	0.001	.7566217	.9327639
Low Minority/Poverty ZIP#May#2020		.983758	.0645222	-0.25	0.803	.8650878	1.118707
Low Minority/Poverty ZIP#June#2019		.825338	.0451739	-3.51	0.000	.7413825	.9188006
Low Minority/Poverty ZIP#June#2020		.8777937	.051412	-2.23	0.026	.7825966	.9845708
High Minority/Poverty ZIP#February#2019		.9182197	.0903388	-0.87	0.386	.7571839	1.113504

```

High Minority/Poverty ZIP#February#2020 | 1.026139 .0883779 0.30 0.764 .866752 1.214835
High Minority/Poverty ZIP#March#2019 | 1.060943 .1060318 0.59 0.554 .8722117 1.290512
High Minority/Poverty ZIP#March#2020 | 1.064488 .1041688 0.64 0.523 .8787063 1.289549
High Minority/Poverty ZIP#April#2019 | .8979502 .0999325 -0.97 0.333 .7219754 1.116817
High Minority/Poverty ZIP#April#2020 | 1.387924 .1592424 2.86 0.004 1.108418 1.737911
High Minority/Poverty ZIP#May#2019 | .8859858 .0796272 -1.35 0.178 .7428922 1.056642
High Minority/Poverty ZIP#May#2020 | 1.036867 .1232831 0.30 0.761 .8213259 1.308973
High Minority/Poverty ZIP#June#2019 | .8532207 .0827773 -1.64 0.102 .7054724 1.031912
High Minority/Poverty ZIP#June#2020 | .8876334 .087441 -1.21 0.226 .7317816 1.076678
|
_cons | .0014751 .0004817 -19.97 0.000 .0007779 .0027975

```

Note: _cons estimates baseline odds.

```
. margins xweek#disad if year == 2020
```

```
Predictive margins      Number of obs      =      215,970
```

```
Model VCE      : Robust
```

```
Expression      : Pr(mortality), predict()
```

```
-----+-----
```

	Margin	Std. Err.	z	P> z	[95% Conf. Interval]
xweek#disad					
February#Low Minority/Poverty ZIP	.0203984	.0011584	17.61	0.000	.018128 .0226689
February#High Minority/Poverty ZIP	.0212438	.0016588	12.81	0.000	.0179927 .0244949

March#Low Minority/Poverty ZIP		.02134	.0012059	17.70	0.000	.0189765	.0237036
March#High Minority/Poverty ZIP		.0220035	.0018746	11.74	0.000	.0183294	.0256776
April#Low Minority/Poverty ZIP		.0228712	.0013208	17.32	0.000	.0202824	.02546
April#High Minority/Poverty ZIP		.0283193	.0027508	10.29	0.000	.0229278	.0337108
May#Low Minority/Poverty ZIP		.0204016	.0012414	16.43	0.000	.0179685	.0228347
May#High Minority/Poverty ZIP		.0214566	.0024826	8.64	0.000	.0165909	.0263223
June#Low Minority/Poverty ZIP		.0182832	.0009811	18.64	0.000	.0163603	.020206
June#High Minority/Poverty ZIP		.0184806	.001666	11.09	0.000	.0152154	.0217459

8. ICD-10 codes used to categorize medical admissions by primary diagnosis.

Notes: We relied on the primary diagnosis supplied by the admitting physician and recorded on the corresponding professional claim. The 20 medical conditions on which this analysis was based represent the most common diagnoses among patients admitted to hospital medicine, based on a previous analysis of discharge DRGs by Sound Physicians. ICD-10 codes comprising each of the 20 conditions were selected by consensus of clinicians serving on Sound's clinical quality committee.

Medical Condition	ICD-10 Code	Description
Abdominal pain, nausea, vomiting, diarrhea	A04.5	Campylobacter enteritis
	A04.7	Enterocolitis due to Clostridium difficile
	A08.4	Viral intestinal infection, unspecified
	A09	Infectious gastroenteritis and colitis, unspecified
	G43.A0	Cyclical vomiting, not intractable
	K20.9	Esophagitis, unspecified
	K21.9	Gastro-esophageal reflux disease without esophagitis
	K22.10	Ulcer of esophagus without bleeding
	K22.2	Esophageal obstruction
	K25.9	Gastric ulcer, unspecified as acute or chronic, without hemorrhage or perforation
	K26.9	Duodenal ulcer, unspecified as acute or chronic, without hemorrhage or perforation
	K27.9	Peptic ulcer, site unspecified, unspecified as acute or chronic, without hemorrhage or perforation
	K29.00	Acute gastritis without bleeding
	K29.20	Alcoholic gastritis without bleeding
	K29.70	Gastritis, unspecified, without bleeding
	K29.80	Duodenitis without bleeding
	K31.84	Gastroparesis
	K52.9	Noninfective gastroenteritis and colitis, unspecified
	K57.20	Diverticulitis of large intestine with perforation and abscess without bleeding
	K57.31	Diverticulosis of large intestine without perforation or abscess with bleeding
K57.32	Diverticulitis of large intestine without perforation or abscess without bleeding	
K57.80	Diverticulitis of intestine, part unspecified, with perforation and abscess without bleeding	
K57.92	Diverticulitis of intestine, part unspecified, without perforation or abscess without bleeding	
K59.00	Constipation, unspecified	
R10.11	Right upper quadrant pain	
R10.13	Epigastric pain	
R10.30	Lower abdominal pain, unspecified	
R10.31	Right lower quadrant pain	
R10.32	Left lower quadrant pain	
R10.84	Generalized abdominal pain	
	R10.9	Unspecified abdominal pain
	R11.0	Nausea
	R11.10	Vomiting, unspecified

	R11.2	Nausea with vomiting, unspecified
	R19.7	Diarrhea, unspecified
Acute myocardial infarction	I21.09	ST elevation (STEMI) myocardial infarction involving other coronary artery of anterior wall
	I21.11	ST elevation (STEMI) myocardial infarction involving right coronary artery
	I21.19	ST elevation (STEMI) myocardial infarction involving other coronary artery of inferior wall
	I21.3	ST elevation (STEMI) myocardial infarction of unspecified site
	I21.4	Non-ST elevation (NSTEMI) myocardial infarction
Alcohol related	F10.129	Alcohol abuse with intoxication, unspecified
	F10.20	Alcohol dependence, uncomplicated
	F10.230	Alcohol dependence with withdrawal, uncomplicated
	F10.231	Alcohol dependence with withdrawal delirium
	F10.239	Alcohol dependence with withdrawal, unspecified
	F10.929	Alcohol use, unspecified with intoxication, unspecified
	K70.10	Alcoholic hepatitis without ascites
	K70.30	Alcoholic cirrhosis of liver without ascites
	K70.31	Alcoholic cirrhosis of liver with ascites
	J96.00	Acute respiratory failure, unspecified whether with hypoxia or hypercapnia
Altered mental status/weakness	F03.90	Unspecified dementia without behavioral disturbance
	F03.91	Unspecified dementia with behavioral disturbance
	F05	Delirium due to known physiological condition
	G92	Toxic encephalopathy
	G93.40	Encephalopathy, unspecified
	G93.41	Metabolic encephalopathy
	G93.9	Disorder of brain, unspecified
	I67.4	Hypertensive encephalopathy
Arrhythmia	I44.1	Atrioventricular block, second degree
	I44.2	Atrioventricular block, complete
	I45.5	Other specified heart block
	I45.9	Conduction disorder, unspecified
	I46.9	Cardiac arrest, cause unspecified
	I47.1	Supraventricular tachycardia
	I47.2	Ventricular tachycardia
	I48.0	Paroxysmal atrial fibrillation
	I48.1	Persistent atrial fibrillation
	I48.2	Chronic atrial fibrillation
		I48.91
	I48.92	Unspecified atrial flutter
	I49.01	Ventricular fibrillation
	I49.5	Sick sinus syndrome
	I49.8	Other specified cardiac arrhythmias
	I49.9	Cardiac arrhythmia, unspecified
	R00.1	Bradycardia, unspecified

Chest pain excluding AMI	I20.0	Unstable angina
	I20.8	Other forms of angina pectoris
	I20.9	Angina pectoris, unspecified
	I24.8	Other forms of acute ischemic heart disease
	I24.9	Acute ischemic heart disease, unspecified
	R07.89	Other chest pain
	R07.9	Chest pain, unspecified
Congestive heart failure (CHF) exacerbation	E87.70	Fluid overload, unspecified
	I50.1	Left ventricular failure
	I50.20	Unspecified systolic (congestive) heart failure
	I50.21	Acute systolic (congestive) heart failure
	I50.23	Acute on chronic systolic (congestive) heart failure
	I50.30	Unspecified diastolic (congestive) heart failure
	I50.31	Acute diastolic (congestive) heart failure
	I50.33	Acute on chronic diastolic (congestive) heart failure
	I50.41	Acute combined systolic (congestive) and diastolic (congestive) heart failure
	I50.43	Acute on chronic combined systolic (congestive) and diastolic (congestive) heart failure
	I50.9	Heart failure, unspecified
	I51.81	Takotsubo syndrome
J81.0	Acute pulmonary edema	
Chronic obstructive pulmonary disease (COPD)/Asthma exacerbation	J44.0	Chronic obstructive pulmonary disease with acute lower respiratory infection
	J44.1	Chronic obstructive pulmonary disease with (acute) exacerbation
	J44.9	Chronic obstructive pulmonary disease, unspecified
	J45.901	Unspecified asthma with (acute) exacerbation
	J45.902	Unspecified asthma with status asthmaticus
	J45.909	Unspecified asthma, uncomplicated
	J47.1	Bronchiectasis with (acute) exacerbation
Dehydration, electrolyte abnormalities, acute and/or chronic kidney injury/disease	E83.42	Hypomagnesemia
	E83.51	Hypocalcemia
	E83.52	Hypercalcemia
	86.0	Dehydration
	E86.1	Hypovolemia
	E86.9	Volume depletion, unspecified
	E87.0	Hyperosmolality and hypernatremia
	E87.1	Hypo-osmolality and hyponatremia
	E87.3	Alkalosis
	E87.6	Hypokalemia
	N10	Acute tubulo-interstitial nephritis
	N12	Tubulo-interstitial nephritis, not specified as acute or chronic
	N17.0	Acute kidney failure with tubular necrosis
	N17.9	Acute kidney failure, unspecified
	N18.3	Chronic kidney disease, stage 3 (moderate)

	N18.4	Chronic kidney disease, stage 4 (severe)
	N18.5	Chronic kidney disease, stage 5
	N18.6	End stage renal disease
	N18.9	Chronic kidney disease, unspecified
	N19	Unspecified kidney failure
Diabetes related	E10.10	Type 1 diabetes mellitus with ketoacidosis without coma
	E10.65	Type 1 diabetes mellitus with hyperglycemia
	E10.9	Type 1 diabetes mellitus without complications
	E11.00	Type 2 diabetes mellitus with hyperosmolarity without nonketotic hyperglycemic-hyperosmolar coma
	E11.01	Type 2 diabetes mellitus with hyperosmolarity with coma
	E11.22	Type 2 diabetes mellitus with diabetic chronic kidney disease
	E11.29	Type 2 diabetes mellitus with other diabetic kidney complication
	E11.40	Type 2 diabetes mellitus with diabetic neuropathy, unspecified
	E11.43	Type 2 diabetes mellitus with diabetic autonomic (poly)neuropathy
	E11.52	Type 2 diabetes mellitus with diabetic peripheral angiopathy with gangrene
	E11.621	Type 2 diabetes mellitus with foot ulcer
	E11.649	Type 2 diabetes mellitus with hypoglycemia without coma
	E11.65	Type 2 diabetes mellitus with hyperglycemia
	E11.69	Type 2 diabetes mellitus with other specified complication
	E11.8	Type 2 diabetes mellitus with unspecified complications
	E11.9	Type 2 diabetes mellitus without complications
	E13.10	Other specified diabetes mellitus with ketoacidosis without coma
	E16.2	Hypoglycemia, unspecified
	R73.9	Hyperglycemia, unspecified
Gastrointestinal bleeding	K26.4	Chronic or unspecified duodenal ulcer with hemorrhage
	K62.5	Hemorrhage of anus and rectum
	K92.0	Hematemesis
	K92.1	Melena
	K92.2	Gastrointestinal hemorrhage, unspecified
	K83.8	Other specified diseases of biliary tract
Hip Fracture	S72.002A	Fracture of unspecified part of neck of left femur, initial encounter for closed fracture
	S72.009A	Fracture of unspecified part of neck of unspecified femur, initial encounter for closed fracture
	S72.141A	Displaced intertrochanteric fracture of right femur, initial encounter for closed fracture
	S72.142A	Displaced intertrochanteric fracture of left femur, initial encounter for closed fracture
	S72.143A	Displaced intertrochanteric fracture of unspecified femur, initial encounter for closed fracture
	S72.302A	Unspecified fracture of shaft of left femur, initial encounter for closed fracture
	S72.409A	Unspecified fracture of lower end of unspecified femur, initial encounter for closed fracture
	S72.90XA	Unspecified fracture of unspecified femur, initial encounter for closed fracture
	S72.91XA	Unspecified fracture of right femur, initial encounter for closed fracture
	S72.92XA	Unspecified fracture of left femur, initial encounter for closed fracture
Pancreatitis	K85.1	Biliary acute pancreatitis
	K85.10	Biliary acute pancreatitis without necrosis or infection

	K85.2	Alcohol induced acute pancreatitis
	K85.20	Alcohol induced acute pancreatitis without necrosis or infection
	K85.9	Acute pancreatitis, unspecified
	K85.90	Acute pancreatitis without necrosis or infection, unspecified
	K85.91	Acute pancreatitis with uninfected necrosis, unspecified
	K86.0	Alcohol-induced chronic pancreatitis
	K86.1	Other chronic pancreatitis
	J11.00	Influenza due to unidentified influenza virus with unspecified type of pneumonia
Pneumonia	J13	Pneumonia due to Streptococcus pneumoniae
	J15.1	Pneumonia due to Pseudomonas
	J15.212	Pneumonia due to Methicillin resistant Staphylococcus aureus
	J15.6	Pneumonia due to other aerobic Gram-negative bacteria
	J15.9	Unspecified bacterial pneumonia
	J18.1	Lobar pneumonia, unspecified organism
	J18.9	Pneumonia, unspecified organism
	J69.0	Pneumonitis due to inhalation of food and vomit
	G40.409	Other generalized epilepsy and epileptic syndromes, not intractable, without status epilepticus
Respiratory failure	J96.01	Acute respiratory failure with hypoxia
	J96.02	Acute respiratory failure with hypercapnia
	J96.20	Acute and chronic respiratory failure, unspecified whether with hypoxia or hypercapnia
	J96.21	Acute and chronic respiratory failure with hypoxia
	J96.22	Acute and chronic respiratory failure with hypercapnia
	J96.90	Respiratory failure, unspecified, unspecified whether with hypoxia or hypercapnia
	J96.91	Respiratory failure, unspecified with hypoxia
	J96.92	Respiratory failure, unspecified with hypercapnia
	S72.001A	Fracture of unspecified part of neck of right femur, initial encounter for closed fracture
Seizure / seizure disorder	G40.901	Epilepsy, unspecified, not intractable, with status epilepticus
	G40.909	Epilepsy, unspecified, not intractable, without status epilepticus
	G40.919	Epilepsy, unspecified, intractable, without status epilepticus
	R56.9	Unspecified convulsions
	A41.01	Sepsis due to Methicillin susceptible Staphylococcus aureus
Sepsis & septic shock	A41.02	Sepsis due to Methicillin resistant Staphylococcus aureus
	A41.4	Sepsis due to anaerobes
	A41.50	Gram-negative sepsis, unspecified
	A41.51	Sepsis due to Escherichia coli [E. coli]
	A41.9	Sepsis, unspecified organism
	I95.9	Hypotension, unspecified
	R57.0	Cardiogenic shock
	R57.1	Hypovolemic shock
	R57.9	Shock, unspecified
	R65.10	Systemic inflammatory response syndrome (SIRS) of non-infectious origin without acute organ dysfunction

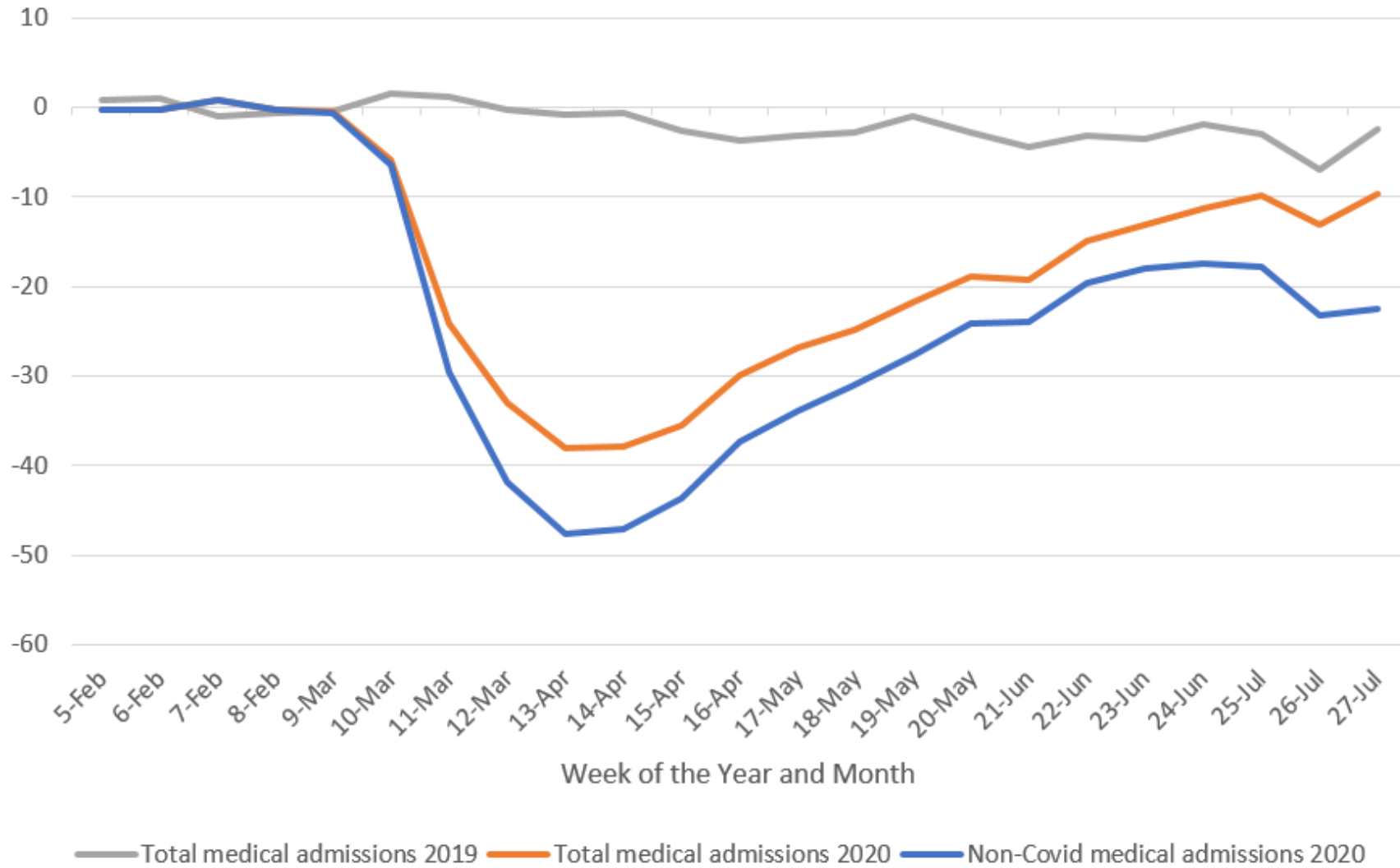
	R78.81	Bacteremia
	A49.01	Methicillin susceptible <i>Staphylococcus aureus</i> infection, unspecified site
Skin and soft tissue infections	A49.02	Methicillin resistant <i>Staphylococcus aureus</i> infection, unspecified site
	E08.621	Diabetes mellitus due to underlying condition with foot ulcer
	I96	Gangrene, not elsewhere classified
	K12.2	Cellulitis and abscess of mouth
	L02.01	Cutaneous abscess of face
	L02.11	Cutaneous abscess of neck
	L02.211	Cutaneous abscess of abdominal wall
	L02.214	Cutaneous abscess of groin
	L02.215	Cutaneous abscess of perineum
	L02.31	Cutaneous abscess of buttock
	L02.413	Cutaneous abscess of right upper limb
	L02.414	Cutaneous abscess of left upper limb
	L02.415	Cutaneous abscess of right lower limb
	L02.416	Cutaneous abscess of left lower limb
	L02.419	Cutaneous abscess of limb, unspecified
	L02.511	Cutaneous abscess of right hand
	L02.512	Cutaneous abscess of left hand
L02.519	Cutaneous abscess of unspecified hand	
	L02.611	Cutaneous abscess of right foot
	L02.612	Cutaneous abscess of left foot
	L02.91	Cutaneous abscess, unspecified
	L03.011	Cellulitis of right finger
	L03.012	Cellulitis of left finger
	L03.019	Cellulitis of unspecified finger
	L03.031	Cellulitis of right toe
	L03.032	Cellulitis of left toe
	L03.113	Cellulitis of right upper limb
	L03.114	Cellulitis of left upper limb
	L03.115	Cellulitis of right lower limb
	L03.116	Cellulitis of left lower limb
	L03.119	Cellulitis of unspecified part of limb
	L03.211	Cellulitis of face
	L03.221	Cellulitis of neck
	L03.311	Cellulitis of abdominal wall
	L03.313	Cellulitis of chest wall
	L03.314	Cellulitis of groin
	L03.317	Cellulitis of buttock
	L03.319	Cellulitis of trunk, unspecified
L03.818	Cellulitis of other sites	
L03.90	Cellulitis, unspecified	

	L08.9	Local infection of the skin and subcutaneous tissue, unspecified
	L73.2	Hidradenitis suppurativa
	L89.154	Pressure ulcer of sacral region, stage 4
	L89.159	Pressure ulcer of sacral region, unspecified stage
	L89.90	Pressure ulcer of unspecified site, unspecified stage
	L89.94	Pressure ulcer of unspecified site, stage 4
	I60.9	Nontraumatic subarachnoid hemorrhage, unspecified
Stroke	I61.9	Nontraumatic intracerebral hemorrhage, unspecified
	I62.9	Nontraumatic intracranial hemorrhage, unspecified
	I63.50	Cerebral infarction due to unspecified occlusion or stenosis of unspecified cerebral artery
	I63.511	Cerebral infarction due to unspecified occlusion or stenosis of right middle cerebral artery
	I63.512	Cerebral infarction due to unspecified occlusion or stenosis of left middle cerebral artery
	I63.9	Cerebral infarction, unspecified
	R55	Syncope and collapse
Syncope	G45.4	Transient global amnesia
TIA	G45.9	Transient cerebral ischemic attack, unspecified
	N13.2	Hydronephrosis with renal and ureteral calculous obstruction
Urinary tract infection (upper and lower tract)	N13.30	Unspecified hydronephrosis
	N20.0	Calculus of kidney
	N20.1	Calculus of ureter
	N20.9	Urinary calculus, unspecified
	N30.00	Acute cystitis without hematuria
	N30.01	Acute cystitis with hematuria
	N30.90	Cystitis, unspecified without hematuria
	N39.0	Urinary tract infection, site not specified
	F10.10	Alcohol abuse, uncomplicated

9. Supplemental exhibits

Supplemental Exhibit 1

Total medical admissions and non-COVID-19 medical admissions by week: 2019 & 2020



SOURCE Data from Sound Physician Hospital Admissions. NOTES N = 1,056,951. Non-Covid-19 admissions exclude all suspected or confirmed Covid-19 admissions based on physician response to a specific prompt in the electronic medical record at admission starting in Week 10, which

corresponds to the beginning of the pandemic. The percentage decline is relative to the average weekly admissions during February (Week 5-8). Week 5 corresponds to February 2-8, and Week 27 to July 5-11, 2020.

Supplemental Exhibit 2

Changes in all medical admissions and non-COVID-19 medical admissions relative to baseline: Total and by subgroup, 2020

Patient Subgroup (N of sample at 2020 Baseline)	Sample Size at Baseline	<i>Non-COVID-19 admissions</i>		<i>All medical admissions</i>	
		Nadir (April) Change (%)	Rebound (June/July) Change (%)	Nadir (April) Change (%)	Rebound (June/July) Change (%)
Overall	105,688	-42.8	-15.9	-34.1	-8.3
Race, Ethnicity and Poverty Status					
Zip > 50% Black	5,140	-45.2	-11.9	-30.1	-2.3 ^a
Zip > 50% Hispanic	9,161	-44.2	-31.8	-34.8	-14.1
Zip > 25% Poverty	6,761	-44.0	-16.7	-31.5	-2.7
Insurance Status					
Medicaid	13,009	-41.4	-9.7	-31.2	-2.5
Self-Pay	2,922	-37.7	-20.3	-27.3	-3.7
Age					
Old (70+)	42,384	-45.4	-19.1	-37.5	-13.2
Young (< 50)	23,636	-39.3	-13.4	-30.4	-3.4
Hospital COVID-19 Volume					
Highest quintile	21,285	-50.0	-23.3	-31.2	-9.9
Lowest quintile	21,231	-39.5	-6.8	-36.5	-5.5

Source: Data from Sound Physician Hospital Admissions.

Notes: These estimates adjust for seasonality by use of the corresponding weeks for 2019 data. The sample size is for the initial (baseline) February 2020 admissions. All differences in utilization, relative to the seasonally adjusted baseline, are significant at the 0.05 level except for one coefficient marked with an (a). See Appendix for details regarding estimates of confidence intervals.

Supplemental Exhibit 3

Changes in all medical admissions and non-COVID-19 medical admissions by diagnosis, 2020 relative to equivalent periods in 2019

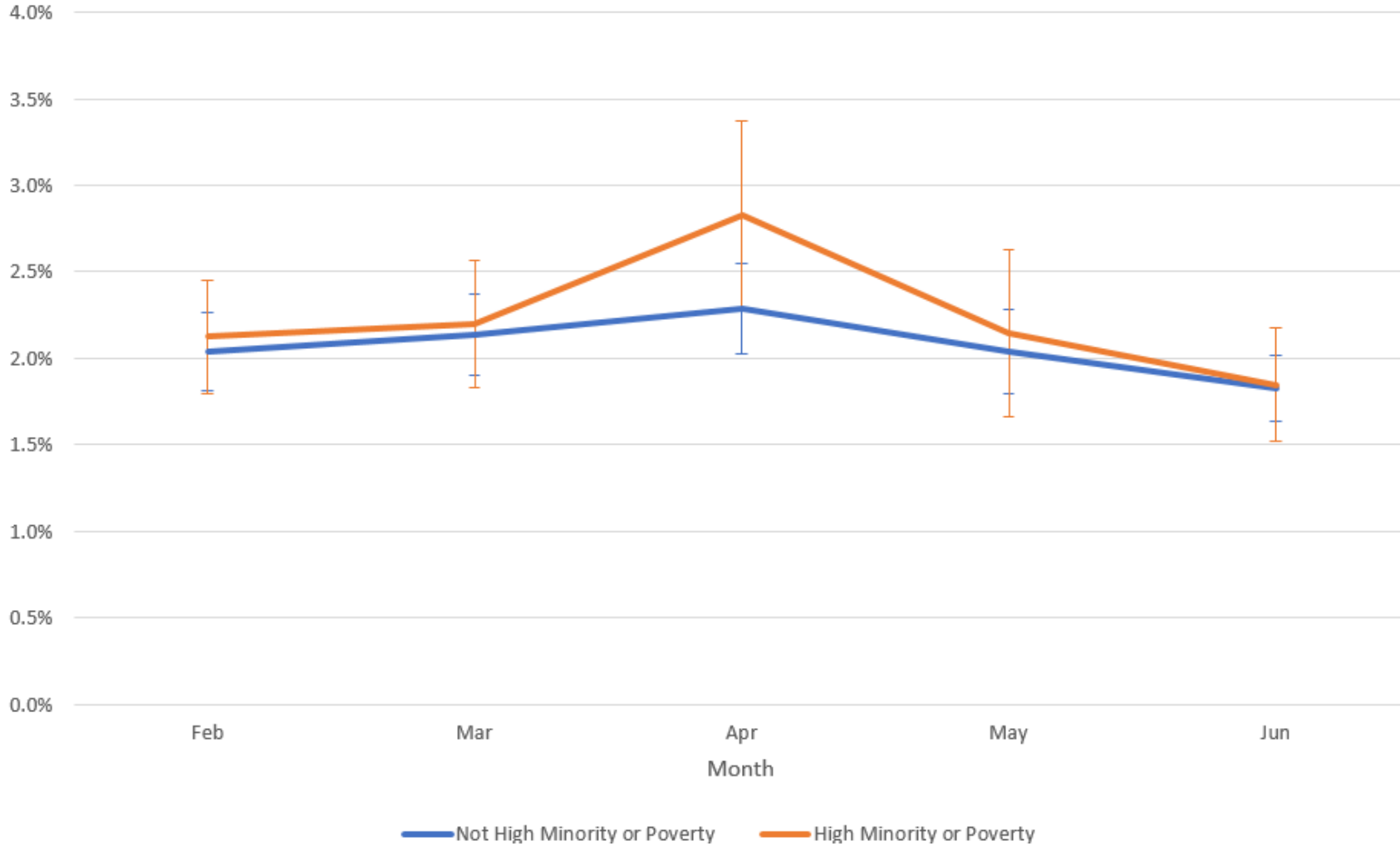
Disease Subgroup	<i>Non-COVID-19 admissions</i>			<i>All medical admissions</i>	
	Sample Size at Baseline	Nadir (April) Change (%)	Rebound (June/July) Change (%)	Nadir (April) Change (%)	Rebound (June/July) Change (%)
Pancreatitis	1,151	-23.7	-4.5 ^a	-22.4	-2.9 ^a
Stroke	2,350	-24.7	-16.9	-23.1	-15.8
Altered Mental Status	2,251	-27.1	-15.5	-18.9	-11.2
Alcohol-Related	1,042	-32.6	4.3 ^a	-30.5	5.8 ^a
Dehydration	4,446	-33.7	-12.5	-29.4	-9.7
Acute ST Elevation Myocardial Infarction	416	-34.9	-22.2	-33.1	-21.1
Diabetes	2,283	-38.5	0.8 ^a	-35.8	3.5 ^a
Gastrointestinal Bleeding	4,042	-38.8	-11.9	-36.9	-9.7
Sepsis and Sepsis Shock	6,712	-40.1	-25.1	-24.8	-14.4
Acute Myocardial Infarction (Non-ST-Elevation)	1,568	-42.2	-16.1	-39.4	-14.4
Skin and Soft Tissue Infection	2,806	-44.0	-19.0	-42.5	-18.1
Respiratory Failure	5,986	-44.8	-21.0	-11.8	11.1
Chest Pain (Excluding Acute Myocardial Infarction)	7,383	-46.0	-14.6	-44.0	-13.0
Arrhythmia	3,626	-47.2	-14.7	-44.2	-12.3
Congestive Heart Failure	3,878	-47.5	-20.1	-43.8	-17.8
Abdominal Pain	4,893	-48.5	-14.4	-46.1	-11.9
Urinary Tract Infection	2,296	-48.5	-24.3	-46.2	-22.0
Transient Ischemic Attack	1,082	-50.9	-11.4	-50.0	-10.8
Pneumonia	3,953	-53.6	-44.1	-16.0	-19.6
Chronic Obstructive Pulmonary Disease / Asthma	3,192	-68.6	-40.1	-61.6	-35.5

Source: Data from Sound Physician Hospital Admissions.

Notes: Diagnostic category based on initial diagnosis code at admission. All results are statistically significant at the .05 level unless noted with an (a). All confidence intervals (and sample size) reported in the Appendix.

Supplemental Exhibit 4

Adjusted in-hospital mortality for non-COVID-19 medical admissions: By minority or poverty status in the patient's zip code (February-June, 2020)



SOURCE Data from Sound Physician Hospital Admissions. NOTES The orange line corresponds to estimates for patients living in zip codes with either majority-Black or majority-Hispanic populations, or those with poverty rates over 25%; the blue line denotes all other patients. Estimates are from a logistic regression that adjusts for diagnosis, age, sex, and month-by-year-by-high minority/poverty zip code categorical variables. The weeks correspond to months as follows: February (Weeks 5-8), March (Weeks 9-12), April (Weeks 13-17), May (Weeks 18-21) and June (Weeks 22-26). See the Appendix for the full regression analysis.