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SUPPLEMENT MATERIAL S2

	Primary analysis				
	(1) Inpatient stay (95% confidence interval)	(2) Inpatient stay with ICU/CCU (95% confidence interval)	(3) Inpatient stay with ARD dx (95% confidence interval)	(4) Inpatient stay with ARDS dx (95% confidence interval)	(5) Died same or following month (95% confidence interval)
Flu season / medication type					
2017-2018 flu season	ref.	ref.	ref.	ref.	ref.
2018-2019 flu season	-0.001 (-0.004,0.002)	0.008 (-0.002,0.018)	0.013*** (0.008,0.017)	-0.007*** (-0.010,-0.004)	0.000 (-0.002,0.002)
2019-2020 flu season	0.018*** (0.015,0.021)	0.035*** (0.026,0.044)	0.013*** (0.008,0.017)	0.013*** (0.009,0.016)	0.016*** (0.014,0.017)
Other medications only	ref.	ref.	ref.	ref.	ref.
ACEi or ARB plus/minus other medications	-0.019*** (-0.022,-0.016)	-0.009 (-0.019,0.001)	-0.007** (-0.011,-0.002)	-0.003 (-0.007,0.000)	-0.009*** (-0.011,-0.008)
ACEi or ARB monotherapy					
2018-2019 season: ACEi or ARB +- other	0.004* (0.001,0.008)	0.01 (-0.004,0.023)	0.004 (-0.003,0.010)	0 (-0.004,0.004)	0 (-0.002,0.002)
2018-2019 season: ACEi or ARB monotherapy					
2019-2020 season: ACEi or ARB +/- other	0.015*** (0.012,0.019)	0.015* (0.003,0.027)	0.007* (0.001,0.012)	0.009*** (0.004,0.013)	-0.002 (-0.004,0.001)
2019-2020 season: ACEi or ARB monotherapy					
Demographics					
Female	-0.016*** (-0.017,-0.014)	-0.023*** (-0.028,-0.018)	0 (-0.002,0.003)	-0.004*** (-0.006,-0.002)	-0.011*** (-0.012,-0.010)
Age categories					
<35	-0.006* (-0.011,-0.000)	-0.029 (-0.078,0.019)	0.02 (-0.006,0.045)	-0.01 (-0.028,0.008)	-0.001 (-0.003,0.001)
35-44	-0.008*** (-0.012,-0.005)	-0.028 (-0.056,0.000)	0.006 (-0.008,0.019)	-0.004 (-0.016,0.008)	0.001 (-0.000,0.002)
45-54	ref.	ref.	ref.	ref.	ref.
55-64	0.010*** (0.008,0.013)	0.005 (-0.009,0.020)	0.001 (-0.005,0.008)	0.001 (-0.005,0.007)	0.001* (0.000,0.002)
65-74	0.011*** (0.008,0.014)	-0.003 (-0.017,0.011)	0.001 (-0.006,0.008)	-0.001 (-0.007,0.004)	0.009*** (0.007,0.010)
75-84	0.029*** (0.025,0.032)	-0.026*** (-0.041,-0.012)	-0.002 (-0.009,0.004)	-0.005 (-0.011,0.001)	0.024*** (0.023,0.026)
85+	0.045*** (0.041,0.048)	-0.071*** (-0.086,-0.056)	-0.010** (-0.017,-0.003)	-0.014*** (-0.020,-0.008)	0.063*** (0.061,0.065)
Insurance coverage type					
Medicare Advantage	ref.	ref.	ref.	ref.	ref.
Commercial	-0.032*** (-0.034,-0.030)	0.01 (-0.001,0.020)	0.001 (-0.004,0.006)	0.003 (-0.002,0.007)	-0.001* (-0.002,-0.000)
Census region					
Unknown/other	-0.046** (-0.075,-0.016)	0.194* (0.014,0.373)	-0.011 (-0.086,0.064)	0.009 (-0.068,0.087)	-0.023* (-0.044,-0.002)
New England	ref.	ref.	ref.	ref.	ref.
Mid Atlantic	-0.008*** (-0.012,-0.003)	0.017* (0.003,0.031)	0.021*** (0.015,0.028)	0.021*** (0.016,0.026)	-0.005** (-0.008,-0.002)
South Atlantic	-0.001 (-0.005,0.003)	0.122*** (0.110,0.134)	0.016*** (0.011,0.021)	0.003 (-0.002,0.007)	-0.016*** (-0.018,-0.013)

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	Primary analysis				
	(1)	(2)	(3)	(4)	(5)
	Inpatient stay (95% confidence interval)	Inpatient stay with ICU/CCU (95% confidence interval)	Inpatient stay with ARD dx (95% confidence interval)	Inpatient stay with ARDS dx (95% confidence interval)	Died same or following month (95% confidence interval)
E North Central	0.018***	0.073***	0.003	0	-0.009***
	(0.013,0.022)	(0.060,0.086)	(-0.002,0.009)	(-0.004,0.004)	(-0.012,-0.007)
E South Central	0.011***	0.071***	0.018***	-0.001	-0.009***
	(0.007,0.016)	(0.056,0.085)	(0.011,0.024)	(-0.006,0.005)	(-0.011,-0.006)
W North Central	0.027***	0.093***	0.004	0.006*	-0.007***
	(0.022,0.032)	(0.079,0.107)	(-0.002,0.010)	(0.001,0.011)	(-0.010,-0.004)
W South Central	0.014***	0.111***	0.017***	0.003	-0.011***
	(0.010,0.018)	(0.097,0.124)	(0.011,0.023)	(-0.002,0.007)	(-0.014,-0.009)
Mountain	-0.033***	0.122***	-0.007	0.008*	-0.019***
	(-0.037,-0.028)	(0.103,0.140)	(-0.015,0.000)	(0.001,0.016)	(-0.022,-0.016)
Pacific	-0.002	0.170***	0.008	0.001	-0.016***
Race/ethnicity	(-0.007,0.004)	(0.151,0.189)	(-0.000,0.017)	(-0.006,0.007)	(-0.019,-0.013)
Unknown/other	-0.007***	0.020***	0.004*	0.009***	-0.002**
	(-0.010,-0.005)	(0.013,0.028)	(0.001,0.008)	(0.006,0.012)	(-0.003,-0.001)
White	ref.	ref.	ref.	ref.	ref.
Black	0.011***	-0.010**	0.005**	0.008***	0.004***
	(0.009,0.013)	(-0.017,-0.003)	(0.002,0.008)	(0.006,0.011)	(0.002,0.005)
Hispanic	-0.016***	0.086***	0.011***	0.010***	-0.008***
	(-0.018,-0.013)	(0.077,0.095)	(0.006,0.015)	(0.007,0.014)	(-0.009,-0.006)
Asian	-0.011***	0.020*	0.002	0.007	-0.001
Comorbidities	(-0.016,-0.007)	(0.002,0.039)	(-0.007,0.010)	(-0.000,0.014)	(-0.004,0.002)
No diabetes	ref.	ref.	ref.	ref.	ref.
Diabetes without CC	0.011***	0.012**	0.005**	0.004**	0.005***
	(0.009,0.013)	(0.004,0.019)	(0.001,0.009)	(0.001,0.007)	(0.004,0.006)
Diabetes with CC	0.029***	0.008**	-0.002	0.002	0.008***
	(0.027,0.031)	(0.002,0.014)	(-0.005,0.001)	(-0.000,0.004)	(0.006,0.009)
Uncomp hypertension	ref.	ref.	ref.	ref.	ref.
Comp hypertension	0.023***	-0.012**	-0.003	-0.003*	-0.001
	(0.020,0.026)	(-0.018,-0.005)	(-0.006,0.000)	(-0.005,-0.000)	(-0.003,0.001)
Coronary artery disease	0.020***	0.028***	0.001	-0.002	0.007***
	(0.018,0.022)	(0.022,0.033)	(-0.001,0.004)	(-0.004,0.000)	(0.006,0.009)
Congestive heart failure	0.093***	0.077***	0.018***	0.002*	0.036***
	(0.090,0.095)	(0.072,0.083)	(0.015,0.020)	(0.000,0.004)	(0.034,0.037)
Chronic pulmonary diseases	0.061***	-0.010***	0.015***	-0.007***	-0.002***
	(0.059,0.063)	(-0.015,-0.005)	(0.013,0.018)	(-0.009,-0.006)	(-0.003,-0.001)
Renal failure	0.019***	0.012***	-0.001	0.001	0.023***
	(0.017,0.022)	(0.005,0.018)	(-0.004,0.003)	(-0.001,0.004)	(0.021,0.025)
Liver failure	0.046***	0.035***	-0.003	0	0.059***
	(0.042,0.051)	(0.025,0.045)	(-0.008,0.002)	(-0.004,0.004)	(0.056,0.063)
Metastatic cancer	0.122***	0.01	0.003	-0.010***	0.136***
	(0.115,0.130)	(-0.003,0.024)	(-0.004,0.009)	(-0.014,-0.006)	(0.130,0.142)
Lymphoma	0.064***	-0.008	-0.001	-0.010***	0.027***
	(0.056,0.073)	(-0.025,0.009)	(-0.009,0.007)	(-0.015,-0.004)	(0.021,0.033)
Non-metastatic solid tumor	0.036***	0.018***	0	-0.003*	0.028***
	(0.033,0.040)	(0.009,0.027)	(-0.004,0.005)	(-0.006,-0.000)	(0.026,0.030)
Peripheral vascular disorders	-0.008***	0.017***	0.004**	0.001	0.018***
	(-0.011,-0.006)	(0.010,0.023)	(0.001,0.008)	(-0.001,0.003)	(0.017,0.020)
Cardiac arrhythmias	0.062***	0.062***	0.005***	-0.002*	0.024***

	Primary analysis				
	(1)	(2)	(3)	(4)	(5)
	Inpatient stay	Inpatient stay with ICU/CCU	Inpatient stay with ARD dx	Inpatient stay with ARDS dx	Died same or following month
	(95% confidence interval)	(95% confidence interval)	(95% confidence interval)	(95% confidence interval)	(95% confidence interval)
	(0.060,0.064)	(0.057,0.067)	(0.002,0.007)	(-0.004,-0.000)	(0.023,0.025)
Rheumatoid arthritis/collagen vascular diseases	0.016***	-0.005	-0.007**	0	0.004***
	(0.013,0.020)	(-0.016,0.005)	(-0.012,-0.002)	(-0.004,0.004)	(0.002,0.006)
Coagulopathy	0.029***	0.032***	-0.004	0.002	0.035***
	(0.024,0.033)	(0.023,0.041)	(-0.008,0.000)	(-0.001,0.005)	(0.032,0.038)
Obesity	-0.002	0.013***	0.004	0.009***	-0.009***
	(-0.005,0.000)	(0.006,0.021)	(-0.000,0.007)	(0.006,0.012)	(-0.010,-0.007)
Chronic/acute deep vein thrombosis or pulmonary embolism	0.061***	0.050***	0.003	0.002	0.030***
	(0.056,0.067)	(0.039,0.061)	(-0.003,0.009)	(-0.003,0.006)	(0.026,0.034)
Hemorrhagic or ischemic stroke	0.016***	0.032***	0.002	-0.004**	0.043***
	(0.013,0.020)	(0.024,0.040)	(-0.001,0.006)	(-0.007,-0.001)	(0.040,0.045)
Valvular disease	-0.009***	0.045***	0.007***	-0.002	0.017***
	(-0.012,-0.006)	(0.038,0.052)	(0.003,0.010)	(-0.004,0.001)	(0.015,0.019)
Constant	0.058***	0.310***	0.020***	0.034***	0.012***
	(0.053,0.063)	(0.291,0.330)	(0.011,0.029)	(0.027,0.041)	(0.009,0.015)
N	1059474	167330	167330	167330	1057707
N_clust	728455	147846	147846	147846	727311
p	<0.001	<0.001	<0.001	<0.001	<0.001
R-squared	0.081	0.037	0.006	0.008	0.076

	(6) Inpatient stay (95% confidence interval)	(7) Inpatient stay with ICU/CCU (95% confidence interval)	(8) Inpatient stay with ARD dx (95% confidence interval)	(9) Inpatient stay with ARDS dx (95% confidence interval)	(10) Died same or following month (95% confidence interval)
Sensitivity analysis: ACEi/ARB monotherapy					
Flu season / medication type					
2017-2018 flu season	ref.	ref.	ref.	ref.	ref.
2018-2019 flu season	-0.001 (-0.004,0.002)	0.008 (-0.002,0.018)	0.013*** (0.008,0.017)	-0.007*** (-0.010,-0.004)	0 (-0.002,0.002)
2019-2020 flu season	0.018*** (0.015,0.021)	0.035*** (0.026,0.044)	0.013*** (0.008,0.017)	0.013*** (0.009,0.016)	0.016*** (0.014,0.017)
Other medications only	ref.	ref.	ref.	ref.	ref.
ACEi or ARB plus/minus other medications	-0.020*** (-0.023,-0.017)	-0.004 (-0.014,0.006)	-0.007** (-0.011,-0.002)	-0.002 (-0.006,0.001)	-0.010*** (-0.012,-0.009)
ACEi or ARB monotherapy	-0.016*** (-0.020,-0.012)	-0.039*** (-0.057,-0.020)	-0.007 (-0.015,0.001)	-0.009** (-0.015,-0.003)	-0.004*** (-0.006,-0.002)
2018-2019 season: ACEi or ARB +- other	0.004* (0.000,0.008)	0.004 (-0.009,0.018)	0.004 (-0.003,0.010)	-0.001 (-0.005,0.004)	-0.001 (-0.003,0.002)
2018-2019 season: ACEi or ARB monotherapy	0.005 (-0.001,0.010)	0.040** (0.015,0.065)	0.002 (-0.009,0.013)	0.002 (-0.006,0.009)	0.001 (-0.002,0.004)
2019-2020 season: ACEi or ARB +/- other	0.015*** (0.011,0.019)	0.011 (-0.001,0.024)	0.007* (0.002,0.013)	0.008*** (0.003,0.013)	-0.001 (-0.004,0.001)
2019-2020 season: ACEi or ARB monotherapy	0.017*** (0.012,0.022)	0.035** (0.013,0.057)	0.004 (-0.006,0.013)	0.012** (0.004,0.020)	-0.003* (-0.006,-0.000)
Demographics					
Female	-0.016*** (-0.017,-0.014)	-0.023*** (-0.028,-0.018)	0 (-0.002,0.003)	-0.004*** (-0.006,-0.002)	-0.011*** (-0.012,-0.010)
Age categories					
<35	-0.006* (-0.012,-0.000)	-0.029 (-0.078,0.020)	0.02 (-0.005,0.045)	-0.01 (-0.028,0.008)	-0.001 (-0.003,0.001)
35-44	-0.008*** (-0.012,-0.005)	-0.028 (-0.056,0.000)	0.006 (-0.008,0.019)	-0.004 (-0.016,0.008)	0.001 (-0.001,0.002)
45-54	ref.	ref.	ref.	ref.	ref.
55-64	0.010*** (0.008,0.013)	0.005 (-0.009,0.020)	0.001 (-0.005,0.008)	0.001 (-0.005,0.007)	0.001* (0.000,0.002)
65-74	0.011*** (0.008,0.014)	-0.003 (-0.017,0.011)	0.001 (-0.006,0.008)	-0.001 (-0.007,0.004)	0.009*** (0.007,0.010)
75-84	0.029*** (0.026,0.032)	-0.026*** (-0.041,-0.012)	-0.002 (-0.009,0.004)	-0.005 (-0.011,0.001)	0.024*** (0.023,0.026)
85+	0.045*** (0.041,0.049)	-0.072*** (-0.087,-0.057)	-0.010** (-0.017,-0.003)	-0.014*** (-0.020,-0.008)	0.063*** (0.061,0.065)
Insurance coverage type					
Medicare Advantage	ref.	ref.	ref.	ref.	ref.
Commercial	-0.032*** (-0.035,-0.030)	0.01 (-0.001,0.021)	0.001 (-0.004,0.006)	0.003 (-0.002,0.007)	-0.001** (-0.002,-0.000)
Unknown/other	-0.045** (-0.075,-0.016)	0.196* (0.016,0.375)	-0.011 (-0.086,0.064)	0.009 (-0.068,0.087)	-0.023* (-0.044,-0.002)
Census region					
New England	ref.	ref.	ref.	ref.	ref.
Mid Atlantic	-0.008*** (-0.012,-0.003)	0.017* (0.003,0.031)	0.021*** (0.015,0.028)	0.021*** (0.016,0.026)	-0.005** (-0.008,-0.002)
South Atlantic	-0.001 (-0.005,0.003)	0.122*** (0.110,0.134)	0.016*** (0.011,0.021)	0.003 (-0.002,0.007)	-0.016*** (-0.018,-0.013)

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Sensitivity analysis: ACEi/ARB monotherapy

	(6) Inpatient stay (95% confidence interval)	(7) Inpatient stay with ICU/CCU (95% confidence interval)	(8) Inpatient stay with ARD dx (95% confidence interval)	(9) Inpatient stay with ARDS dx (95% confidence interval)	(10) Died same or following month (95% confidence interval)
E North Central	0.018***	0.073***	0.003	0	-0.009***
	(0.013,0.022)	(0.060,0.086)	(-0.002,0.009)	(-0.004,0.004)	(-0.012,-0.007)
E South Central	0.011***	0.070***	0.018***	-0.001	-0.008***
	(0.007,0.016)	(0.056,0.085)	(0.011,0.024)	(-0.006,0.004)	(-0.011,-0.006)
W North Central	0.027***	0.093***	0.004	0.006*	-0.007***
	(0.022,0.032)	(0.079,0.107)	(-0.002,0.010)	(0.001,0.011)	(-0.010,-0.004)
W South Central	0.014***	0.111***	0.017***	0.003	-0.011***
	(0.010,0.018)	(0.097,0.124)	(0.011,0.023)	(-0.002,0.007)	(-0.014,-0.009)
Mountain	-0.033***	0.122***	-0.007	0.008*	-0.019***
	(-0.037,-0.028)	(0.103,0.141)	(-0.015,0.000)	(0.001,0.016)	(-0.022,-0.016)
Pacific	-0.002	0.170***	0.008	0.001	-0.016***
Race/ethnicity	(-0.007,0.004)	(0.151,0.189)	(-0.000,0.017)	(-0.006,0.007)	(-0.019,-0.013)
Unknown/other	-0.007***	0.020***	0.004*	0.009***	-0.002**
	(-0.010,-0.005)	(0.013,0.028)	(0.001,0.008)	(0.006,0.012)	(-0.003,-0.001)
White	ref.	ref.	ref.	ref.	ref.
Black	0.011***	-0.010**	0.005**	0.008***	0.004***
	(0.009,0.013)	(-0.017,-0.003)	(0.002,0.008)	(0.006,0.011)	(0.003,0.005)
Hispanic	-0.016***	0.086***	0.011***	0.010***	-0.008***
	(-0.018,-0.013)	(0.077,0.095)	(0.006,0.015)	(0.007,0.014)	(-0.009,-0.006)
Asian	-0.012***	0.020*	0.002	0.007	-0.001
Comorbidities	(-0.016,-0.007)	(0.002,0.039)	(-0.007,0.010)	(-0.000,0.014)	(-0.004,0.001)
No diabetes	ref.	ref.	ref.	ref.	ref.
Diabetes without CC	0.011***	0.012**	0.005**	0.004**	0.005***
	(0.009,0.013)	(0.004,0.019)	(0.001,0.009)	(0.001,0.007)	(0.004,0.006)
Diabetes with CC	0.029***	0.008**	-0.002	0.002	0.008***
	(0.027,0.031)	(0.002,0.014)	(-0.005,0.001)	(-0.000,0.004)	(0.006,0.009)
Uncomp hypertension	ref.	ref.	ref.	ref.	ref.
Comp hypertension	0.023***	-0.012**	-0.003	-0.003*	-0.001
	(0.020,0.026)	(-0.019,-0.005)	(-0.006,0.000)	(-0.005,-0.000)	(-0.003,0.001)
Coronary artery disease	0.020***	0.027***	0.001	-0.002	0.008***
	(0.018,0.022)	(0.022,0.033)	(-0.001,0.004)	(-0.004,0.000)	(0.006,0.009)
Congestive heart failure	0.093***	0.077***	0.017***	0.002	0.036***
	(0.091,0.096)	(0.071,0.082)	(0.015,0.020)	(-0.000,0.004)	(0.035,0.038)
Chronic pulmonary diseases	0.061***	-0.010***	0.015***	-0.007***	-0.002***
	(0.059,0.063)	(-0.015,-0.005)	(0.013,0.018)	(-0.009,-0.006)	(-0.003,-0.001)
Renal failure	0.019***	0.012***	-0.001	0.001	0.023***
	(0.017,0.022)	(0.005,0.018)	(-0.004,0.003)	(-0.001,0.003)	(0.021,0.025)
Liver failure	0.046***	0.035***	-0.003	0	0.059***
	(0.042,0.051)	(0.025,0.045)	(-0.008,0.002)	(-0.004,0.004)	(0.056,0.063)
Metastatic cancer	0.122***	0.01	0.003	-0.010***	0.136***
	(0.115,0.130)	(-0.003,0.024)	(-0.004,0.009)	(-0.014,-0.006)	(0.130,0.142)
Lymphoma	0.064***	-0.008	-0.001	-0.010***	0.027***
	(0.056,0.073)	(-0.025,0.009)	(-0.009,0.007)	(-0.015,-0.004)	(0.021,0.033)
Non-metastatic solid tumor	0.036***	0.018***	0	-0.003*	0.028***
	(0.033,0.040)	(0.009,0.027)	(-0.004,0.005)	(-0.006,-0.000)	(0.026,0.030)
Peripheral vascular disorders	-0.008***	0.017***	0.004**	0.001	0.018***
	(-0.011,-0.006)	(0.010,0.023)	(0.001,0.008)	(-0.001,0.003)	(0.017,0.020)
Cardiac arrhythmias	0.062***	0.062***	0.005***	-0.002*	0.024***

	Sensitivity analysis: ACEi/ARB monotherapy				
	(6)	(7)	(8)	(9)	(10)
	Inpatient stay (95% confidence interval)	Inpatient stay with ICU/CCU (95% confidence interval)	Inpatient stay with ARD dx (95% confidence interval)	Inpatient stay with ARDS dx (95% confidence interval)	Died same or following month (95% confidence interval)
	(0.060,0.064)	(0.057,0.067)	(0.002,0.007)	(-0.004,-0.000)	(0.023,0.026)
Rheumatoid arthritis/collagen vascular diseases	0.016***	-0.005	-0.007**	0	0.004***
	(0.013,0.020)	(-0.016,0.006)	(-0.012,-0.002)	(-0.004,0.004)	(0.002,0.006)
Coagulopathy	0.029***	0.032***	-0.004	0.002	0.035***
	(0.024,0.033)	(0.023,0.041)	(-0.008,0.000)	(-0.001,0.005)	(0.032,0.038)
Obesity	-0.002	0.013***	0.004	0.009***	-0.008***
	(-0.004,0.000)	(0.006,0.021)	(-0.000,0.007)	(0.006,0.012)	(-0.010,-0.007)
Chronic/acute deep vein thrombosis or pulmonary embolism	0.061***	0.050***	0.003	0.002	0.030***
	(0.055,0.067)	(0.039,0.061)	(-0.003,0.009)	(-0.002,0.006)	(0.026,0.034)
Hemorrhagic or ischemic stroke	0.016***	0.032***	0.002	-0.004**	0.043***
	(0.013,0.019)	(0.024,0.040)	(-0.001,0.006)	(-0.007,-0.001)	(0.040,0.045)
Valvular disease	-0.009***	0.045***	0.007***	-0.002	0.017***
	(-0.012,-0.006)	(0.038,0.052)	(0.003,0.010)	(-0.004,0.001)	(0.015,0.019)
Constant	0.058***	0.312***	0.020***	0.034***	0.012***
	(0.053,0.063)	(0.292,0.332)	(0.011,0.029)	(0.027,0.042)	(0.009,0.015)
N	1059474	167330	167330	167330	1057707
N_clust	728455	147846	147846	147846	727311
p	<0.001	<0.001	<0.001	<0.001	<0.001
R-squared	0.081	0.037	0.006	0.008	0.076

	Sensitivity analysis: Dropping people with comorbidities (other than hypertension)				
	(11) Inpatient stay (95% confidence interval)	(12) Inpatient stay with ICU/CCU (95% confidence interval)	(13) Inpatient stay with ARD dx (95% confidence interval)	(14) Inpatient stay with ARDS dx (95% confidence interval)	(15) Died same or following month (95% confidence interval)
Flu season / medication type					
2017-2018 flu season	ref.	ref.	ref.	ref.	ref.
2018-2019 flu season	0.002 (-0.001,0.006)	0.02 (-0.032,0.072)	0.030** (0.009,0.051)	0.006 (-0.005,0.017)	0 (-0.002,0.002)
2019-2020 flu season	0.032*** (0.028,0.035)	0.068** (0.024,0.111)	0.029*** (0.014,0.045)	0.052*** (0.039,0.065)	0.007*** (0.005,0.009)
Other medications only	ref.	ref.	ref.	ref.	ref.
ACEi or ARB plus/minus other medications	-0.006*** (-0.009,-0.003)	-0.001 (-0.049,0.046)	0.009 (-0.008,0.026)	0.003 (-0.007,0.013)	-0.003*** (-0.004,-0.001)
ACEi or ARB monotherapy					
2018-2019 season: ACEi or ARB +- other	-0.003 (-0.007,0.001)	0.004 (-0.062,0.071)	-0.013 (-0.041,0.014)	0.001 (-0.015,0.017)	0.001 (-0.001,0.003)
2018-2019 season: ACEi or ARB monotherapy					
2019-2020 season: ACEi or ARB +/- other	-0.001 (-0.006,0.003)	0.05 (-0.006,0.106)	-0.022* (-0.043,-0.001)	-0.001 (-0.019,0.016)	-0.001 (-0.003,0.001)
2019-2020 season: ACEi or ARB monotherapy					
Demographics					
Female	-0.010*** (-0.012,-0.008)	-0.025* (-0.048,-0.003)	-0.01 (-0.019,0.000)	-0.008 (-0.018,0.002)	-0.003*** (-0.004,-0.002)
Age categories					
<35	-0.013*** (-0.017,-0.010)	-0.125 (-0.286,0.037)	0.089 (-0.025,0.202)	-0.017 (-0.074,0.040)	-0.001** (-0.002,-0.000)
35-44	-0.007*** (-0.009,-0.004)	-0.151*** (-0.229,-0.074)	0.014 (-0.026,0.055)	-0.022 (-0.053,0.009)	-0.001 (-0.001,0.000)
45-54	ref.	ref.	ref.	ref.	ref.
55-64	0.003** (0.001,0.006)	-0.041 (-0.091,0.009)	-0.004 (-0.027,0.018)	0.006 (-0.018,0.029)	0.001*** (0.001,0.002)
65-74	0.006*** (0.003,0.009)	-0.056* (-0.109,-0.003)	-0.017 (-0.041,0.008)	0.009 (-0.015,0.032)	0.001* (0.000,0.002)
75-84	0.028*** (0.024,0.032)	-0.077** (-0.132,-0.022)	-0.011 (-0.037,0.014)	0.005 (-0.019,0.029)	0.008*** (0.007,0.010)
85+	0.074*** (0.068,0.079)	-0.139*** (-0.196,-0.083)	-0.022 (-0.048,0.004)	-0.007 (-0.032,0.017)	0.036*** (0.032,0.039)
Insurance coverage type					
Medicare Advantage	ref.	ref.	ref.	ref.	ref.
Commercial	-0.013*** (-0.015,-0.010)	-0.043* (-0.083,-0.002)	-0.01 (-0.028,0.009)	0.006 (-0.011,0.024)	-0.004*** (-0.005,-0.003)
Census region					
Unknown/other	-0.034*** (-0.053,-0.014)	0.755*** (0.693,0.816)	-0.025* (-0.050,-0.000)	-0.062*** (-0.089,-0.035)	0.008 (-0.018,0.034)
New England	ref.	ref.	ref.	ref.	ref.
Mid Atlantic	-0.002 (-0.007,0.004)	0.065* (0.008,0.123)	0.015 (-0.008,0.038)	0.025 (-0.003,0.053)	0.002 (-0.001,0.005)
South Atlantic	-0.004 (-0.009,0.001)	0.164*** (0.113,0.214)	0.012 (-0.007,0.032)	-0.009 (-0.032,0.014)	-0.001 (-0.004,0.001)

	Sensitivity analysis: Dropping people with comorbidities (other than hypertension)				
	(11) Inpatient stay (95% confidence interval)	(12) Inpatient stay with ICU/CCU (95% confidence interval)	(13) Inpatient stay with ARD dx (95% confidence interval)	(14) Inpatient stay with ARDS dx (95% confidence interval)	(15) Died same or following month (95% confidence interval)
E North Central	0.007** (0.002,0.013)	0.111*** (0.058,0.165)	0.018 (-0.003,0.039)	0 (-0.024,0.024)	0 (-0.003,0.002)
E South Central	0.001 (-0.005,0.007)	0.116*** (0.055,0.176)	0.01 (-0.014,0.034)	-0.004 (-0.030,0.023)	-0.001 (-0.003,0.002)
W North Central	0.009** (0.003,0.015)	0.124*** (0.063,0.184)	0.021 (-0.004,0.046)	-0.002 (-0.028,0.025)	0.002 (-0.001,0.004)
W South Central	0.001 (-0.004,0.007)	0.142*** (0.086,0.199)	0.025* (0.002,0.049)	0.007 (-0.019,0.034)	0 (-0.002,0.003)
Mountain	-0.005 (-0.011,0.001)	0.161*** (0.087,0.235)	-0.005 (-0.031,0.020)	0.019 (-0.017,0.055)	-0.002 (-0.005,0.001)
Pacific	0 (-0.007,0.006)	0.173*** (0.093,0.253)	-0.004 (-0.032,0.024)	-0.008 (-0.041,0.025)	-0.003 (-0.005,0.000)
Race/ethnicity					
Unknown/other	0.001 (-0.002,0.004)	0.056** (0.022,0.089)	0.002 (-0.012,0.016)	0.009 (-0.006,0.023)	0 (-0.001,0.001)
White	ref.	ref.	ref.	ref.	ref.
Black	0.008*** (0.006,0.011)	0 (-0.031,0.032)	0.003 (-0.010,0.016)	0.01 (-0.003,0.023)	0.001 (-0.000,0.002)
Hispanic	-0.001 (-0.004,0.001)	0.092*** (0.054,0.130)	0.016 (-0.001,0.034)	0.035*** (0.015,0.055)	-0.001* (-0.003,-0.000)
Asian	-0.007** (-0.011,-0.002)	0.029 (-0.045,0.103)	-0.018 (-0.042,0.007)	0.018 (-0.018,0.055)	-0.002 (-0.004,0.000)
Comorbidities					
No diabetes					
Diabetes without CC					
Diabetes with CC					
Uncomp hypertension	ref.	ref.	ref.	ref.	ref.
Comp hypertension	0.014*** (0.007,0.021)	-0.009 (-0.068,0.050)	-0.009 (-0.032,0.013)	-0.017 (-0.036,0.003)	0.006** (0.002,0.010)
Coronary artery disease					
Congestive heart failure					
Chronic pulmonary diseases					
Renal failure					
Liver failure					
Metastatic cancer					
Lymphoma					
Non-metastatic solid tumor					
Peripheral vascular disorders					
Cardiac arrhythmias					

Supplemental material

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BMJ Open

	Sensitivity analysis: Dropping people with comorbidities (other than hypertension)				
	(11) Inpatient stay (95% confidence interval)	(12) Inpatient stay with ICU/CCU (95% confidence interval)	(13) Inpatient stay with ARD dx (95% confidence interval)	(14) Inpatient stay with ARDS dx (95% confidence interval)	(15) Died same or following month (95% confidence interval)
Rheumatoid arthritis/collagen vascular diseases					
Coagulopathy					
Obesity					
Chronic/acute deep vein thrombosis or pulmonary embolism					
Hemorrhagic or ischemic stroke					
Valvular disease					
Constant	0.027*** (0.020,0.033)	0.268*** (0.190,0.347)	0.027 (-0.003,0.058)	0.006 (-0.026,0.038)	0.006*** (0.003,0.009)
N	200778	7696	7696	7696	200508
N_clust	175494	7647	7647	7647	175251
p	<0.001				<0.001
R-squared	0.022	0.033	0.007	0.023	0.015

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BMJ Open

	Sensitivity analysis: limiting analysis to strict flu season (dropping summer months)				
	(16) Inpatient stay (95% confidence interval)	(17) Inpatient stay with ICU/CCU (95% confidence interval)	(18) Inpatient stay with ARD dx (95% confidence interval)	(19) Inpatient stay with ARDS dx (95% confidence interval)	(20) Died same or following month (95% confidence interval)
Flu season / medication type					
2017-2018 flu season	ref.	ref.	ref.	ref.	ref.
2018-2019 flu season	0 (-0.004,0.003)	0.009 (-0.002,0.019)	0.017*** (0.012,0.022)	-0.007*** (-0.010,-0.003)	0 (-0.002,0.002)
2019-2020 flu season	0.003* (0.000,0.007)	0.030*** (0.020,0.041)	0.017*** (0.011,0.022)	0.010*** (0.006,0.014)	0.017*** (0.015,0.020)
Other medications only	ref.	ref.	ref.	ref.	ref.
ACEi or ARB plus/minus other medications	-0.016*** (-0.019,-0.013)	-0.01 (-0.021,0.000)	-0.007** (-0.011,-0.002)	-0.003 (-0.006,0.001)	-0.009*** (-0.010,-0.007)
ACEi or ARB monotherapy					
2018-2019 season: ACEi or ARB +- other	0.002 (-0.002,0.006)	0.01 (-0.004,0.025)	0.001 (-0.006,0.008)	0 (-0.005,0.004)	0 (-0.003,0.002)
2018-2019 season: ACEi or ARB monotherapy					
2019-2020 season: ACEi or ARB +/- other	0.008*** (0.004,0.012)	0.012 (-0.003,0.026)	0.008* (0.001,0.014)	0.008** (0.002,0.013)	-0.005*** (-0.008,-0.002)
2019-2020 season: ACEi or ARB monotherapy					
Demographics					
Female	-0.011*** (-0.012,-0.009)	-0.024*** (-0.030,-0.017)	0.001 (-0.002,0.004)	-0.001 (-0.003,0.001)	-0.009*** (-0.010,-0.008)
Age categories					
<35	0 (-0.006,0.006)	-0.051 (-0.111,0.009)	0.012 (-0.020,0.044)	-0.014 (-0.035,0.006)	-0.001 (-0.003,0.001)
35-44	-0.005** (-0.009,-0.002)	-0.027 (-0.063,0.009)	0.005 (-0.013,0.023)	-0.008 (-0.022,0.006)	0.001 (-0.000,0.002)
45-54	ref.	ref.	ref.	ref.	ref.
55-64	0.009*** (0.006,0.012)	0.005 (-0.014,0.023)	0 (-0.009,0.009)	-0.002 (-0.009,0.005)	0 (-0.001,0.001)
65-74	0.009*** (0.006,0.012)	-0.009 (-0.027,0.009)	-0.002 (-0.011,0.007)	-0.003 (-0.010,0.004)	0.006*** (0.005,0.008)
75-84	0.027*** (0.023,0.030)	-0.033*** (-0.051,-0.015)	-0.005 (-0.013,0.004)	-0.007 (-0.014,0.000)	0.022*** (0.020,0.023)
85+	0.049*** (0.045,0.053)	-0.078*** (-0.097,-0.059)	-0.012* (-0.021,-0.003)	-0.015*** (-0.022,-0.008)	0.062*** (0.060,0.065)
Insurance coverage type					
Medicare Advantage	ref.	ref.	ref.	ref.	ref.
Commercial	-0.028*** (-0.030,-0.025)	0.006 (-0.007,0.019)	0.002 (-0.005,0.008)	0.004 (-0.001,0.009)	0.001 (-0.000,0.002)
Census region					
Unknown/other	-0.035 (-0.071,0.000)	0.219* (0.012,0.426)	-0.003 (-0.099,0.094)	0.016 (-0.085,0.117)	-0.024* (-0.048,-0.000)
New England	ref.	ref.	ref.	ref.	ref.
Mid Atlantic	0 (-0.005,0.005)	0.018* (0.002,0.035)	0.021*** (0.014,0.029)	0.022*** (0.015,0.028)	0.002 (-0.001,0.006)
South Atlantic	-0.012*** (-0.017,-0.008)	0.121*** (0.107,0.135)	0.014*** (0.007,0.020)	-0.004 (-0.009,0.001)	-0.019*** (-0.022,-0.016)

	Sensitivity analysis: limiting analysis to strict flu season (dropping summer months)				
	(16)	(17)	(18)	(19)	(20)
	Inpatient stay (95% confidence interval)	Inpatient stay with ICU/CCU (95% confidence interval)	Inpatient stay with ARD dx (95% confidence interval)	Inpatient stay with ARDS dx (95% confidence interval)	Died same or following month (95% confidence interval)
E North Central	0.008***	0.073***	0.004	-0.008**	-0.012***
	(0.003,0.013)	(0.058,0.089)	(-0.003,0.011)	(-0.013,-0.002)	(-0.015,-0.009)
E South Central	-0.006*	0.069***	0.015***	-0.010**	-0.014***
	(-0.011,-0.001)	(0.051,0.087)	(0.007,0.023)	(-0.016,-0.004)	(-0.017,-0.010)
W North Central	0.013***	0.091***	0.003	-0.004	-0.012***
	(0.008,0.018)	(0.074,0.109)	(-0.005,0.011)	(-0.010,0.002)	(-0.015,-0.009)
W South Central	-0.002	0.100***	0.016***	-0.008**	-0.017***
	(-0.007,0.002)	(0.083,0.116)	(0.008,0.024)	(-0.014,-0.003)	(-0.020,-0.014)
Mountain	-0.040***	0.115***	-0.009	-0.006	-0.020***
	(-0.046,-0.035)	(0.091,0.138)	(-0.019,0.001)	(-0.014,0.002)	(-0.024,-0.017)
Pacific	-0.008*	0.180***	0.005	-0.006	-0.017***
Race/ethnicity	(-0.014,-0.001)	(0.158,0.203)	(-0.006,0.015)	(-0.014,0.002)	(-0.021,-0.013)
Unknown/other	-0.007***	0.013*	0.003	0.005**	0
	(-0.010,-0.005)	(0.003,0.023)	(-0.002,0.009)	(0.001,0.009)	(-0.001,0.002)
White	ref.	ref.	ref.	ref.	ref.
Black	0.011***	-0.012**	0.005*	0.010***	0.004***
	(0.009,0.014)	(-0.021,-0.004)	(0.000,0.009)	(0.007,0.014)	(0.002,0.005)
Hispanic	-0.015***	0.079***	0.010***	0.007***	-0.008***
	(-0.018,-0.013)	(0.068,0.090)	(0.004,0.015)	(0.003,0.011)	(-0.010,-0.007)
Asian	-0.011***	0.005	0.002	0.006	-0.002
Comorbidities	(-0.016,-0.005)	(-0.017,0.027)	(-0.009,0.012)	(-0.002,0.015)	(-0.005,0.001)
No diabetes	ref.	ref.	ref.	ref.	ref.
Diabetes without CC	0.006***	0.012*	0.004	0.003	0.004***
	(0.004,0.009)	(0.003,0.022)	(-0.000,0.009)	(-0.001,0.006)	(0.003,0.005)
Diabetes with CC	0.026***	0.006	-0.003	0	0.007***
	(0.024,0.028)	(-0.001,0.013)	(-0.006,0.001)	(-0.002,0.003)	(0.006,0.008)
Uncomp hypertension	ref.	ref.	ref.	ref.	ref.
Comp hypertension	0.023***	-0.009*	-0.004	0	-0.001
	(0.020,0.026)	(-0.018,-0.000)	(-0.008,0.000)	(-0.003,0.003)	(-0.003,0.001)
Coronary artery disease	0.018***	0.031***	0	-0.001	0.006***
	(0.016,0.020)	(0.025,0.038)	(-0.003,0.004)	(-0.003,0.001)	(0.004,0.007)
Congestive heart failure	0.101***	0.078***	0.018***	0.004***	0.038***
	(0.098,0.104)	(0.072,0.085)	(0.015,0.022)	(0.002,0.007)	(0.037,0.040)
Chronic pulmonary diseases	0.074***	-0.010**	0.015***	-0.005***	0
	(0.072,0.076)	(-0.016,-0.004)	(0.012,0.018)	(-0.007,-0.002)	(-0.001,0.001)
Renal failure	0.019***	0.012**	0	0.001	0.023***
	(0.016,0.022)	(0.004,0.020)	(-0.004,0.004)	(-0.002,0.004)	(0.021,0.025)
Liver failure	0.041***	0.037***	0	0.004	0.057***
	(0.036,0.047)	(0.024,0.050)	(-0.006,0.007)	(-0.001,0.009)	(0.053,0.062)
Metastatic cancer	0.118***	0.007	0.001	-0.008**	0.138***
	(0.109,0.127)	(-0.010,0.023)	(-0.007,0.010)	(-0.013,-0.003)	(0.131,0.146)
Lymphoma	0.064***	-0.009	-0.001	-0.009**	0.023***
	(0.054,0.073)	(-0.030,0.012)	(-0.011,0.009)	(-0.015,-0.002)	(0.016,0.029)
Non-metastatic solid tumor	0.038***	0.021***	0.002	-0.004*	0.030***
	(0.034,0.042)	(0.010,0.032)	(-0.003,0.008)	(-0.007,-0.000)	(0.027,0.033)
Peripheral vascular disorders	-0.001	0.016***	0.005*	0.004**	0.023***
	(-0.004,0.002)	(0.008,0.024)	(0.001,0.009)	(0.001,0.007)	(0.021,0.025)
Cardiac arrhythmias	0.063***	0.065***	0.005**	-0.001	0.023***

	Sensitivity analysis: limiting analysis to strict flu season (dropping summer months)				
	(16)	(17)	(18)	(19)	(20)
	Inpatient stay	Inpatient stay with ICU/CCU	Inpatient stay with ARD dx	Inpatient stay with ARDS dx	Died same or following month
	(95% confidence interval)	(95% confidence interval)	(95% confidence interval)	(95% confidence interval)	(95% confidence interval)
	(0.061,0.066)	(0.058,0.071)	(0.002,0.008)	(-0.003,0.002)	(0.021,0.025)
Rheumatoid arthritis/collagen vascular diseases	0.015***	-0.013	-0.008*	-0.001	0.002
	(0.010,0.019)	(-0.026,0.001)	(-0.014,-0.002)	(-0.005,0.004)	(-0.000,0.005)
Coagulopathy	0.035***	0.032***	-0.002	0.001	0.039***
	(0.030,0.041)	(0.021,0.043)	(-0.008,0.003)	(-0.004,0.005)	(0.035,0.043)
Obesity	-0.002	0.016***	0.004	0.008***	-0.008***
	(-0.005,0.000)	(0.007,0.026)	(-0.001,0.009)	(0.005,0.012)	(-0.010,-0.006)
Chronic/acute deep vein thrombosis or pulmonary embolism	0.053***	0.052***	0.005	0.002	0.026***
	(0.046,0.061)	(0.038,0.066)	(-0.003,0.012)	(-0.004,0.007)	(0.021,0.031)
Hemorrhagic or ischemic stroke	0.018***	0.030***	0.005	-0.003	0.044***
	(0.014,0.022)	(0.020,0.040)	(-0.000,0.010)	(-0.007,0.000)	(0.041,0.047)
Valvular disease	-0.008***	0.053***	0.008***	-0.001	0.016***
	(-0.012,-0.005)	(0.044,0.061)	(0.003,0.012)	(-0.004,0.003)	(0.014,0.019)
Constant	0.057***	0.314***	0.022***	0.037***	0.013***
	(0.051,0.063)	(0.290,0.338)	(0.010,0.033)	(0.028,0.046)	(0.010,0.017)
N	738240	106917	106917	106917	737059
N_clust	556579	97383	97383	97383	555729
p	<0.001	<0.001	<0.001	<0.001	<0.001
R-squared	0.094	0.039	0.007	0.008	0.082