

## Online Supplement

### Original Research

#### Census Tract Variability in COPD Emergency Department, Hospitalization, and Readmission Rates in Travis County, Texas

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**Supplemental Table 1. Descriptive Table of Census Tract ED Visits and Hospitalization PBIRs**

	<b>Median PBIR (IQR)</b>	<b>Min PBIR</b>	<b>Max PBIR</b>
<b>ED visits without a hospitalization</b>	168 (70.7-295.9)	0.0	2921.4
<b>Hospitalizations</b>	178.7 (89.6-296.9)	0.0	4066.6
<b>Total Acute Care Use Events</b>	354.6 (167.5-596.2)	0.0	6587.4

\*Per 100,000 person-year

PBIR = population-based incidence rate

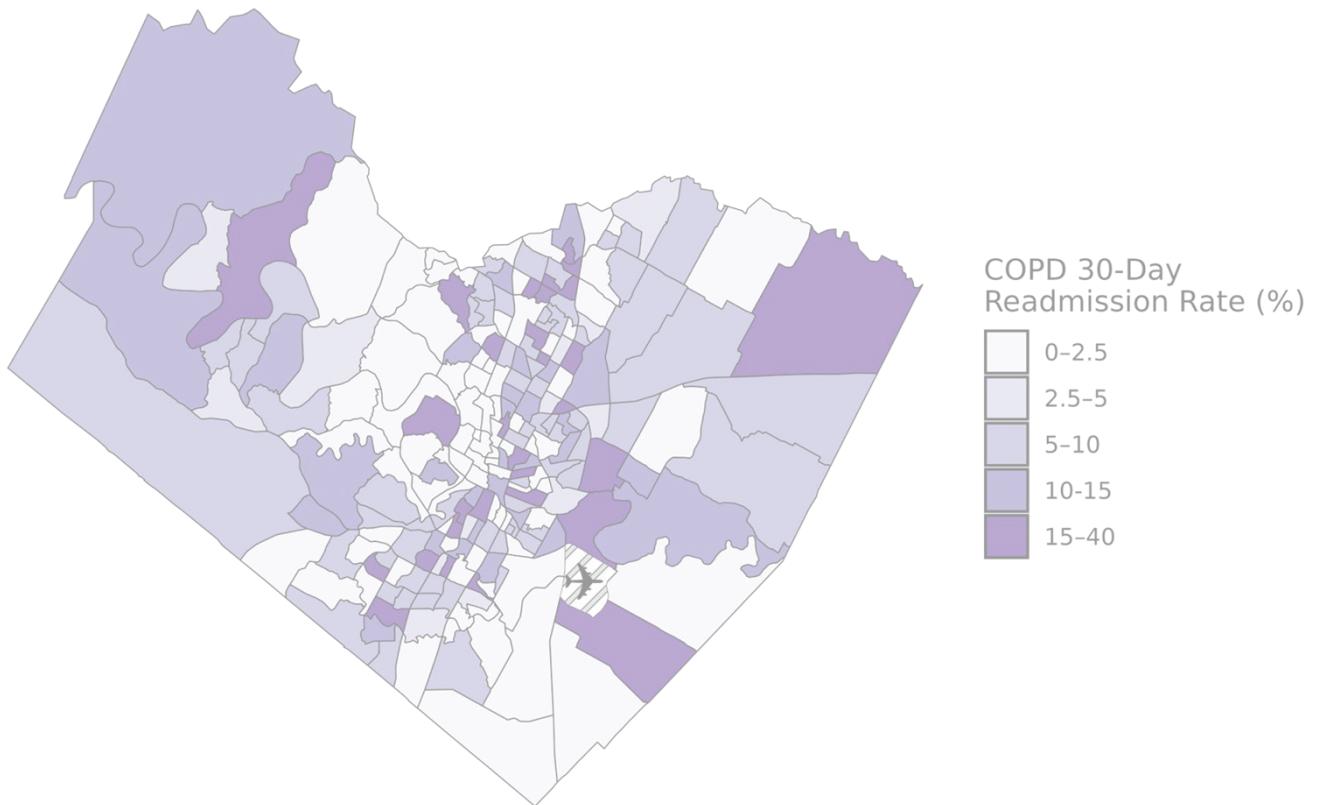
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### **Supplemental Figure 1.**

Maps of calculated acute exacerbation of COPD population-based incidence rates for emergency department visits without a hospitalization (A), hospitalizations (B), and total acute care use (C; emergency department visits + hospitalizations). In addition, this figure shows maps of percent non-white population (D), percent living under 200% federal poverty line (E), and median household income in dollars (F) derived from the 2019 American Community Survey census tract data.



**Supplemental Figure 2. Map of Calculated Travis County Census Tract 30-Day Hospital Readmissions for AECOPD**



**Supplemental Table 2. Descriptive Characteristics of Socioeconomic and Built Environment Variables**

Variable*	Median (IQR)	Min	Max
<b>Demographic Characteristics</b>			
%Black population	5.1 (2.0, 11.2)	0	45.5
%LatinX white population	27.2 (15.3, 46.6)	3.9	83.7
% Population 18+ speaking no English	0.63 (0, 2.8)	0	15.1
% households with 1+ person with a disability	16.1 (11.4, 21.2)	3.1	36.4
<b>Socioeconomic Characteristics</b>			
% of Residents Living under Federal poverty level	9.7 (4.9, 16.7)	0.4	80.3
% of Residents Uninsured	11.6 (5.6, 19.3)	0.4	39.2
% of Residents with < High School Level Education	5.9 (2.2, 16.0)	0	47.9
% Population 18+ with no computer	2.9 (1.1, 6.3)	0	21.6
% Households with no internet access	7.4 (3.9, 15.2)	0	47.6
% Households receiving food stamps/SNAP	4.6 (1.7, 11.1)	0	43.1
% Households with gross rent >30% household income	47.8 (37.0, 56.2)	0	93.2
% Households with no vehicles	4.4 (1.8, 8.5)	0	29.1
<b>Built Characteristics</b>			
% housing units using natural gas	41.4 (27.0, 55.5)	1.0	82.5
% Units with ten or more attached units	13.7 (3.0, 24.3)	0	93.7
% Total Vacant housing units	7.6 (4.7, 11.2)	0	24.0
% Housing units built before 1980	28.0 (10.2, 58.6)	0	93.9

\*N=215 census tracts unless otherwise noted

Supplemental Table 3. Variance and Spatial Parameters for ED visit, Hospitalizations, and 30-day Readmissions

Variable	ED Visits without Hospitalization*			Hospitalization*			30-Day Readmissions**		
	IRR (95% Credible Interval)	Tau^2	Rho	IRR (95% Credible Interval)	Tau^2	Rho	IRR (95% Credible Interval)	Tau^2	Rho
Null models		2.57 (1.82-3.42)	0.76 (0.45-0.96)		1.98 (1.27-2.87)	0.53 (0.25-0.85)		0.14 (0.004-0.41)	0.23 (0.004-0.80)
<b>Demographic Characteristics</b>									
% Black population	1.42 (1.19, 1.68)	1.46 (0.86, 2.34)	0.35 (0.11, 0.70)	1.35 (1.16, 1.58)	0.92 (0.55-1.55)	0.15 (0.02, 0.40)	1.00 (0.87, 1.15)	0.16 (0.00, 0.46)	0.24 (0.00-0.82)
% LatinX white population	1.17 (1.08, 1.26)			1.15 (1.08, 1.23)			1.02 (0.97, 1.08)		
% Population 18+ speaking no English	1.66 (1.07, 2.55)	2.30 (1.49-3.23)	0.63 (0.32-0.93)	1.92 (1.26, 2.85)	1.51 (0.88-2.34)	0.36 (0.11-0.70)	1.14 (0.87, 1.53)	0.14 (0.004-0.41)	0.23 (0.004-0.78)
% households with 1+ person with a disability	1.15 (0.92, 1.43)	2.48 (1.72-3.37)	0.69 (0.40-0.95)	1.35 (1.11, 1.65)	1.66 (1.00-2.57)	0.42 (0.15-0.76)	0.99 (0.84, 1.17)	0.14 (0.004-0.42)	0.23 (0.004-0.79)
<b>Socioeconomic Characteristics</b>									
% of Residents Living under Federal poverty level	1.46 (1.28-1.64)	1.57 (0.92-2.40)	0.44 (0.17-0.80)	1.37 (1.22, 1.54)	1.25 (0.72-2.06)	0.30 (0.08-0.63)	1.03 (0.91, 1.16)	0.14 (0.004-0.43)	0.23 (0.004-0.80)
% of Residents Uninsured	1.52 (1.26, 1.82)	1.62 (0.92-2.61)	0.39 (0.12-0.77)	1.54 (1.34, 1.77)	0.85 (0.52-1.46)	0.12 (0.007-0.35)	1.07 (0.94, 1.21)	0.16 (0.004-0.43)	0.21 (0.004-0.77)
% of Residents with < High School Level Education	1.33 (1.14, 1.54)	1.96 (1.21-2.92)	0.52 (0.22-0.86)	1.32 (1.15, 1.49)	1.29 (0.75-2.10)	0.28 (0.07-0.60)	1.02 (0.93, 1.13)	0.15 (0.00-0.43)	0.23 (0.00-0.79)
% Population 18+ with no computer	1.40 (1.02, 1.91)	2.24 (1.42-3.18)	0.60 (0.28-0.92)	1.47 (1.08, 1.98)	1.47 (0.80-2.45)	0.33 (0.07-0.70)	1.10 (0.89, 1.38)	0.15 (0.00-0.43)	0.22 (0.00-0.78)
% Households with no internet access	1.23 (1.07, 1.41)	2.03 (1.23-2.99)	0.54 (0.22-0.88)	1.28 (1.12, 1.46)	1.20 (0.65-2.06)	0.24 (0.03-0.57)	1.04 (0.95, 1.15)	0.15 (0.05-0.43)	0.21 (0.00-0.77)
% Households receiving food stamps/SNAP	1.56 (1.25, 1.91)	1.66 (0.93-2.64)	0.40 (0.12-0.78)	1.50 (1.26, 1.77)	1.12 (0.64-1.92)	0.22 (0.04-0.53)	1.03 (0.90, 1.19)	0.15 (0.00-0.42)	0.21 (0.00-0.77)
% Households with gross rent	1.13 (1.03, 1.23)	2.31 (1.56-3.21)	0.64 (0.35-0.93)	1.16 (1.06, 1.28)	1.56 (0.91-2.44)	0.39 (0.13-0.74)	0.99 (0.91, 1.08)	0.14 (0.00-0.42)	0.24 (0.00-0.82)

>30% household income									
% Households with no vehicles	<b>1.75 (1.33, 2.30)</b>	1.97 (1.23-2.90)	0.54 (0.24-0.88)	<b>1.58 (1.23, 2.04)</b>	1.56 (0.92-2.42)	0.40 (0.14-0.75)	1.06 (0.84, 1.30)	0.13 (0.00-0.40)	0.23 (0.00-0.80)
<b>Built Characteristics</b> <sup>c</sup>									
% housing units using natural gas	<b>0.88 (0.83, 0.94)</b>	2.39 (1.75-3.13)	0.77 (0.51-0.97)	<b>0.92 (0.86, 0.98)</b>	1.97 (1.29-2.82)	0.58 (0.29-0.89)	0.96 (0.91, 1.02)	0.13 (0.00-0.40)	0.26 (0.00-0.84)
% Units with ten or more attached units	<b>1.14 (1.07, 1.23)</b>	2.34 (1.68-3.10)	0.74 (0.48-0.96)	<b>1.12 (1.04, 1.20)</b>	1.95 (1.27-2.77)	0.58 (0.29-0.89)	1.04 (0.98, 1.10)	0.09 (0.00-0.35)	0.29 (0.00-0.86)
% Total Vacant housing units	<b>1.68 (1.27, 2.21)</b>	2.26 (1.69-3.13)	0.74 (0.47-0.96)	<b>1.47 (1.13, 1.92)</b>	1.98 (1.29-2.83)	0.58 (0.29-0.89)	<b>1.32 (1.09, 1.60)</b>	0.06 (0.00-0.29)	0.33 (0.00-0.88)
% Housing units built before 1980	0.99 (0.93, 1.05)	2.60 (1.84-3.46)	0.74 (0.46-0.96)	1.03 (0.96, 1.09)	1.90 (1.18-2.83)	0.50 (0.22-0.84)	1.03 (0.99-1.07)	0.11 (0.00-0.38)	0.24 (0.00-0.82)

IRR = incidence rate ratio; PRIB = population-based incidence rate

\*Per PBIR (100,000 person-year)

\*\*per readmission rate (%)

⟨per 10 percentage point increments

## **Appendix A.**

**ICD-10 Codes for acute exacerbations of COPD:** J41, J41.8, J42, J43, J43.1, J43.2, J43.8, J43.9, J44.0, J44.1, or J44.9) or a principal diagnosis of acute respiratory failure ICD-10-CM (J96.00, J96.01, J96.02, J96.11, J96.12, J96.20, J96.21, J96.22, J96.90, J96.92, or R06.03) with a secondary COPD diagnosis code