

Online Supplement

Original Research

Hospitalization Outcomes of Patients with Asthma, COPD, and Asthma-COPD Overlap Syndrome

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Supplementary Materials

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Supplementary Table 1: ICD 9 codes used to define chronic bronchitis vs. emphysema

Chronic Bronchitis		Emphysema	
ICD 9 Code	Diagnosis	ICD 9 Code	Diagnosis
491	Chronic bronchitis	492	Emphysema
491.0	Simple chronic bronchitis	492.0	Emphysematous bleb
491.1	Mucopurulent chronic bronchitis	492.8	Emphysema not elsewhere classified (NEC)
491.20	Obstructive chronic bronchitis w/o exacerbations		
491.21	Obstructive chronic bronchitis with acute exacerbation		
491.22	Obstructive chronic bronchitis without acute exacerbation		
491.8	Chronic bronchitis not elsewhere classified (NEC)		
491.9	Chronic bronchitis not otherwise specified (NOS)		

Supplementary Table 2: Demographics and clinical characteristics of the study cohort during index admission stratified by COPD subsets: emphysema and chronic bronchitis

	Total	ACO	Chronic Bronchitis	Emphysema	Asthma	p
n (% of N)	2,522,013 (100)	120,200 (4.8)	1,561,520 (61.9)	171,425 (6.8)	668,867 (26.5)	
Demographics						
Age in years, median [IQR]	66 [75; 56]	63 [74; 54]	69 [77; 60]	68 [77; 59]	56 [68;45]	<0.001
Female sex, % (SE)	59.9 (0.1)	69.9 (0.2)	55.0 (0.1)	52.2 (0.2)	71.6 (0.1)	<0.001
NDX, median [IQR]	10 [14; 7]	12 [16; 9]	10 [14; 8]	13 [17; 9]	9 [13; 6]	<0.001
Current Smoker, % (SE)	32.2 (0.2)	27.2 (0.3)	38.2 (0.2)	31.9 (0.7)	24.3 (0.2)	<0.001
Past Smoker, % (SE)	22.8 (0.2)	21.5 (0.3)	26.3 (0.2)	36.4 (0.7)	17.7 (0.2)	<0.001
Primary Insurance Type,% (SE)						
Medicare	63.0 (0.2)	59.7 (0.3)	71.1 (0.1)	68.9 (0.3)	43.1 (0.2)	<0.001
Medicaid	13.6 (0.1)	16.0 (0.2)	10.6 (0.1)	10.9 (0.2)	20.8 (0.2)	<0.001
Private	14.8 (0.1)	15.5 (0.1)	11.5 (0.1)	13.0 (0.2)	22.9 (0.2)	<0.001
Other	8.6 (0.1)	8.8 (0.1)	6.8 (0.1)	7.2 (0.1)	12.6 (0.1)	<0.001
Median Household Income by Zip Code, % (SE)						
< \$41,999	37.9 (0.5)	38.3 (0.6)	37.9 (0.5)	37.3 (0.6)	38.1 (0.6)	<0.001
\$42,000 - 51,999	27.3 (0.3)	27.0 (0.4)	28.2 (0.3)	27.7 (0.4)	25.0 (0.3)	<0.001
\$52, 000 - 67,999	20.7 (0.3)	20.7 (0.4)	20.6 (0.3)	21.7 (0.4)	20.6(0.4)	<0.001
> \$68,000	14.1 (0.3)	14.0 (0.4)	13.3 (0.3)	13.3 (0.4)	16.3 (0.4)	<0.001
Comorbidities, % (SE)						
Obesity (BMI >30)	19 (0.1)	26.8 (0.03)	15.3 (0.1)	17.3 (0.2)	26.6 (0.2)	<0.001
Diabetes	30.3 (0.1)	34.3 (0.2)	30.0 (0.1)	31.3 (0.2)	29.9 (0.1)	<0.001
CHF	20.6 (0.1)	18.8 (0.2)	23.3 (0.1)	29.2 (0.2)	12.5 (0.1)	<0.001
Depression	16.1 (0.1)	18.7 (0.2)	16.4 (0.1)	14.8 (0.2)	15.2 (0.1)	<0.001
HTN	64.4 (0.1)	67.7 (0.3)	66.8 (0.1)	67.2 (0.3)	57.7 (0.2)	<0.001
High Severity [#]	36.2 (0.2)	36.6 (0.3)	38.9 (0.2)	51.3 (0.3)	26.1 (0.2)	<0.001
High risk of Mortality [#]	28.1 (0.1)	24.9 (0.3)	31.0 (0.2)	44.5 (0.3)	17.6 (0.2)	<0.001

Data expressed as weighted mean (SE) or weighted percent (SE).

NDX stands for number of diagnoses at discharge. CHF = Congestive heart failure. HTN = hypertension. SE: standard error.

High severity and high-risk mortality are defined as patients belonging to All Patient Refined Diagnosis-Related Group (APR-DRG) severity class 3 or 4 and risk of mortality class 3 or 4, respectively.

Three-group comparisons were done using the Kruskal-Wallis rank test for continuous variables, and the chi-square test for categorical variables.

Supplemental Table 3: Outcomes of index admission and 30-day readmission stratified by COPD subsets: emphysema and chronic bronchitis

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Supplemental Table 4: Unadjusted and adjusted[#] analysis of outcome during hospitalization: chronic bronchitis vs. ACO, emphysema vs. ACO, asthma vs ACO

	Chronic Bronchitis (vs. ACO)		Emphysema (vs. ACO)		Asthma (vs. ACO)	
	Exponential of slope (95% CI)	Adjusted Exponential of slope (95% CI)	Exponential of slope (95% CI)	Adjusted Exponential of slope (95% CI)	Exponential of slope (95% CI)	Adjusted Exponential of slope (95% CI)
Index admission						
LOS	0.94 (0.93; 0.94)	0.92 (0.91; 0.93)	0.96 (0.95; 0.97)	0.91 (0.90; 0.92)	0.82 (0.82; 0.83)	0.88 (0.87; 0.88)
Cost	0.96 (0.95; 0.97)	0.94 (0.93; 0.94)	1.14 (1.12; 1.15)	1.06 (1.05; 1.07)	0.86 (0.85; 0.87)	0.91 (0.90; 0.91)
30-Day All-cause readmission						
LOS	1.06 (1.02; 1.09)	1.04 (1.01; 1.08)	1.04 (1.00; 1.08)	1.01 (0.97; 1.05)	0.90 (0.87; 0.94)	0.95 (0.92; 0.98)
Cost	1.04 (1.01; 1.06)	1.02 (1.00; 1.05)	1.11 (1.08; 1.14)	1.07 (1.04; 1.10)	0.92 (0.90; 0.94)	0.94 (0.92; 0.97)
30-Day Asthma-related readmission						
LOS	NA	NA	NA	NA	0.85 (0.80; 0.89)	0.97 (0.90; 1.06)
Cost	NA	NA	NA	NA	0.79 (0.75; 0.84)	0.97 (0.92; 1.02)
	Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)	Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)	Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
Index admission						
In-hospital Mortality	1.95 (1.71; 2.21)	1.43 (1.26; 1.64)	12.11 (10.60; 13.83)	7.63 (6.65; 8.75)	1.22 (1.06; 1.40)	1.59 (1.38; 1.83)
30-Day All-cause readmission						
In-hospital Mortality	1.70 (1.45; 2.00)	1.36 (1.16; 1.61)	2.17 (1.81; 2.61)	1.62 (1.34; 1.95)	0.76 (0.06; 0.90)	0.90 (0.76; 1.08)
30-Day Asthma-related readmission						
In-hospital Mortality	NA	NA	NA	NA	0.59 (0.30; 1.18)	0.73 (0.35; 1.51)

*Adjusted for demographic features, insurance and income status, and all known chronic comorbidities including obesity. LOS and Cost were analyzed using linear regression with a log transformation. Mortality was analyzed with logistic regression.
LOS = length of stay. CI: confidence interval.

Supplemental Table 5: Respiratory and non-respiratory complications during hospitalization stratified by COPD subsets: emphysema and chronic bronchitis

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