

Online Supplement**Structural Airway Imaging Metrics are Differentially Associated with Persistent Chronic Bronchitis**

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Supplemental Table 1: Bivariable and Multivariable Associations Between Airway Metrics and New and Persistent Chronic Bronchitis^Y at 5-year Follow-up

	New Chronic Bronchitis (n= 528)		Persistent Chronic Bronchitis (n= 399)	
	Bivariate	Multivariable	Bivariate	Multivariable
Parameter (Per SD change)	Odds Ratio (95%CI)	*Adjusted Odds Ratio (95%CI)	Odds Ratio (95%CI)	*Adjusted Odds Ratio (95%CI)
Wall Area % of segmental airways	1.74 (1.58-1.91)	1.65 (1.48-1.83)	1.97 (1.77-2.19)	1.75 (1.56-1.97)
Pi10 (mm)	1.64 (1.50-1.80)	1.63 (1.47-1.81)	1.78 (1.61-1.97)	1.66 (1.48-1.86)
Total Airway Count	0.78 (0.70-0.87)	0.74 (0.65-0.84)	0.70 (0.62-0.81)	0.69 (0.60-0.80)
Airway Fractal Dimension	0.80 (0.73-0.88)	0.77 (0.69-0.86)	0.79 (0.71-0.88)	0.76 (0.67-0.86)

^YChronic Bronchitis defined using classic definition.

*Adjusted for age, gender, race, smoking status (reference persistent no smoking), pack years of smoking, FEV₁ and CT scanner type.

Pi10 = Square root of the wall area of a hypothetic airway with 10 mm internal perimeter.

All p values <0.001.

Supplemental Table 2: Baseline characteristics of participants with and without chronic bronchitis[¥]

Parameters	Overall (n=8917)	No Chronic Bronchitis (n= 6174)	Chronic Bronchitis (n= 2741)
Age (years)	59.9 (9.1)	59.9 (9.2)	59.9 (8.9)
Female (%)	4064 (45.6%)	2918 (47.3%)	1146 (41.8%)
African American (%)	2838 (31.8%)	2097 (34.0%)	740 (27.0%)
Body-mass-index (kg/m ²)	28.4 (6.0)	28.4 (5.8)	28.4 (6.3)
Smoking Pack-years	44.5 (25.1)	42.0 (23.6)	49.9 (27.3)
Current Smokers (%)	4341 (48.7%)	3325 (53.9%)	1015 (37.0%)
FEV ₁ (L)	2.3 (1.0)	2.4 (1.0)	2.0 (1.0)
FEV ₁ % predicted	77.1 (27.0)	81.1 (25.8)	68.2 (27.4)
FVC (L)	3.4 (1.0)	3.4 (1.0)	3.3 (1.0)
FVC %predicted	89.1 (18.2)	91.0 (17.3)	84.8 (19.4)
FEV ₁ /FVC	0.65 (0.17)	0.68 (0.16)	0.60 (0.17)
GOLD Severity, n (%)			
0	4407 (49.8%)	3465 (56.1%)	941 (34.3%)
1	791 (8.9%)	577 (9.3%)	214 (7.8%)
2	1935 (21.7%)	1157 (18.7%)	777 (28.3%)
3	1175 (13.2%)	640 (10.4%)	535 (19.5%)
4	609 (6.8%)	335 (5.4%)	274 (10.0%)
CT Emphysema (%)*	7.0 (10.2)	6.4 (9.9)	8.2 (10.8)
Wall Area % of segmental airways*	50.7 (8.6)	49.2 (8.1)	54.1 (8.6)
Pi10 (mm) *	2.34 (0.62)	2.24 (0.57)	2.56 (0.66)
Total Airway Count*	172.5 (87.4)	180.7 (93.8)	157.9 (77.6)
Airway Fractal Dimension*	1.493 (0.093)	1.500 (0.093)	1.479 (0.090)

[¥]Chronic Bronchitis defined by responses to the cough-related questions on the St. George's Respiratory Questionnaire.

*CT data available in n= 8,322 for CT emphysema, 8,321 for Wall Area%, 8,322 for Pi10, 8,075 for Total airway count, and 8,322 for Airway fractal dimension.

Supplemental Table 3: Baseline characteristics of participants by chronic bronchitis^Y status at follow-up

Parameters	Overall (n= 5122)	Persistent No CB (n= 3187)	Resolved CB (n= 632)	New CB (n= 538)	Persistent CB (n= 765)
Age (years)	60.1 (8.7)	60.3 (8.8)	59.2 (8.1)	60.4 (9.0)	60.2 (8.4)
Female (%)	2500 (48.8%)	1630 (51.1%)	295 (46.7%)	250 (46.5%)	325 (42.5%)
African American (%)	1469 (28.7%)	928 (29.1%)	194 (30.7%)	169 (31.4%)	178 (23.3%)
Body-mass-index (kg/m ²)	28.7 (5.8)	28.6 (5.8)	29.5 (6.2)	28.5 (5.8)	28.5 (5.8)
Smoking Pack-years	42.9 (23.7)	40.0 (22.3)	44.9 (23.7)	45.9 (25.4)	50.9 (26.0)
Smoking Status (%)					
Persistent active	1788 (34.9%)	896 (28.1%)	242 (38.3%)	230 (42.8%)	420 (55.0%)
Interval Quit	613 (12.0%)	357 (11.2%)	134 (21.2%)	45 (8.4%)	77 (10.1%)
Interval New	120 (2.3%)	75 (2.4%)	13 (2.1%)	21 (3.9%)	11 (1.4%)
Persistent Former	2600 (50.8%)	1859 (58.3%)	243 (38.4%)	242 (45.0%)	256 (33.5%)
FEV ₁ (L)	2.4 (0.9)	2.5 (0.9)	2.2 (0.9)	2.2 (0.9)	2.0 (0.8)
FEV ₁ %predicted	80.8 (24.1)	85.4 (22.4)	75.8 (25.8)	76.8 (24.6)	68.4 (24.0)
FVC (L)	3.4 (1.0)	3.5 (1.0)	3.4 (1.0)	3.4 (1.0)	3.4 (1.0)
FVC %predicted	91.1 (16.4)	93.0 (15.5)	88.1 (17.8)	90.4 (17.2)	86.1 (17.1)
FEV ₁ /FVC	0.67 (0.15)	0.70 (0.14)	0.65 (0.16)	0.65 (0.15)	0.60 (0.15)
GOLD Severity, n (%)					
0	2715 (53.0%)	1961 (61.5%)	292 (46.2%)	233 (43.3%)	229 (29.9%)
1	511 (10.0%)	335 (10.5%)	56 (8.9%)	62 (11.5%)	58 (7.6%)
2	1149 (22.4%)	577 (18.1%)	154 (24.4%)	142 (26.4%)	276 (36.1%)
3	595 (11.6%)	241 (7.6%)	103 (16.3%)	84 (15.6%)	167 (21.8%)
4	152 (3.0%)	73 (2.3%)	27 (4.3%)	17 (3.2%)	35 (4.6%)
CT Emphysema (%)*	6.0 (8.7)	5.4 (8.3)	5.7 (8.1)	7.5 (9.9)	7.8 (9.3)
Wall Area % of segmental airways*	49.6 (8.4)	47.9 (7.7)	51.8 (8.4)	50.4 (8.1)	54.5 (8.7)
Pi10 (mm) *	2.25 (0.59)	2.13 (0.53)	2.39 (0.63)	2.31 (0.56)	2.57 (0.67)
Total Airway Count*	181.8 (96.2)	191.2 (103.5)	172.0 (88.3)	172.0 (80.6)	157.7 (72.9)
Airway Fractal Dimension*	1.500 (0.094)	1.509 (0.094)	1.488 (0.091)	1.492 (0.092)	1.481 (0.092)
Change in FEV ₁ (ml)¥	39.8 (53.2)	37.0 (49.6)	33.7 (64.5)	50.2 (57.6)	48.9 (52.4)

^YChronic Bronchitis defined by responses to the cough-related questions on the St. George's Respiratory Questionnaire.

*CT data available in n= 4,850 for CT emphysema, 4,849 for Wall Area%, 4,850 for Pi10, 4,680 for Total airway count, and 4,850 for Airway fractal dimension.

¥Change in FEV₁ data available in 4,952.

Supplemental Table 4: Bivariable and Multivariable Associations Between Airway Metrics and Chronic Bronchitis^Y at Baseline

Parameter (Per SD change)	Bivariate		Multivariable	
	Odds Ratio (95%CI)	P value	*Adjusted Odds Ratio (95%CI)	P value
Wall Area % of segmental airways	1.81 (1.72-1.90)	<0.001	1.40 (1.32-1.49)	<0.001
Pi10 (mm)	1.67 (1.59-1.75)	<0.001	1.28 (1.20-1.36)	<0.001
Total Airway Count	0.72 (0.68-0.77)	<0.001	0.95 (0.89-1.01)	0.092
Airway Fractal Dimension	0.79 (0.76-0.83)	<0.001	0.93 (0.87-0.98)	0.010

^YChronic Bronchitis defined by responses to the cough-related questions on the St. George's Respiratory Questionnaire.

*Adjusted for age, gender, race, smoking status, pack years of smoking, FEV₁ and CT scanner type.

Supplemental Table 5: Bivariable and Multivariable Associations Between Airway Metrics and Persistent Chronic Bronchitis^Y at 5-year Follow-up

	New Chronic Bronchitis (n= 538)		Persistent Chronic Bronchitis (n= 765)	
	Bivariate	Multivariable	Bivariate	Multivariable
Parameter (Per SD change)	Odds Ratio (95%CI)	*Adjusted Odds Ratio (95%CI)	Odds Ratio (95%CI)	*Adjusted Odds Ratio (95%CI)
Wall Area % of segmental airways	1.68 (1.53-1.85)	1.53 (1.39-1.69)	2.31 (2.11-2.53)	2.11 (1.92-2.33)
Pi10 (mm)	1.62 (1.48-1.78)	1.51 (1.37-1.66)	2.09 (1.92-2.27)	1.99 (1.81-2.19)
Total Airway Count	0.79 (0.72-0.88)	0.81 (0.73-0.90)	0.62 (0.55-0.69)	0.59 (0.53-0.67)
Airway Fractal Dimension	0.80 (0.73-0.87)	0.80 (0.73-0.88)	0.74 (0.68-0.80)	0.67 (0.61-0.74)

^YChronic Bronchitis defined by responses to the cough-related questions on the St. George's Respiratory Questionnaire.

*Adjusted for age, gender, race, smoking status (reference persistent no smoking), pack years of smoking, FEV₁ and CT scanner type.

Pi10 = Square root of the wall area of a hypothetical airway with 10 mm internal perimeter.

All p values <0.001.