A Longitudinal Cohort Study of Aspirin Use and Progression of Emphysema-like Lung Characteristics on CT Imaging
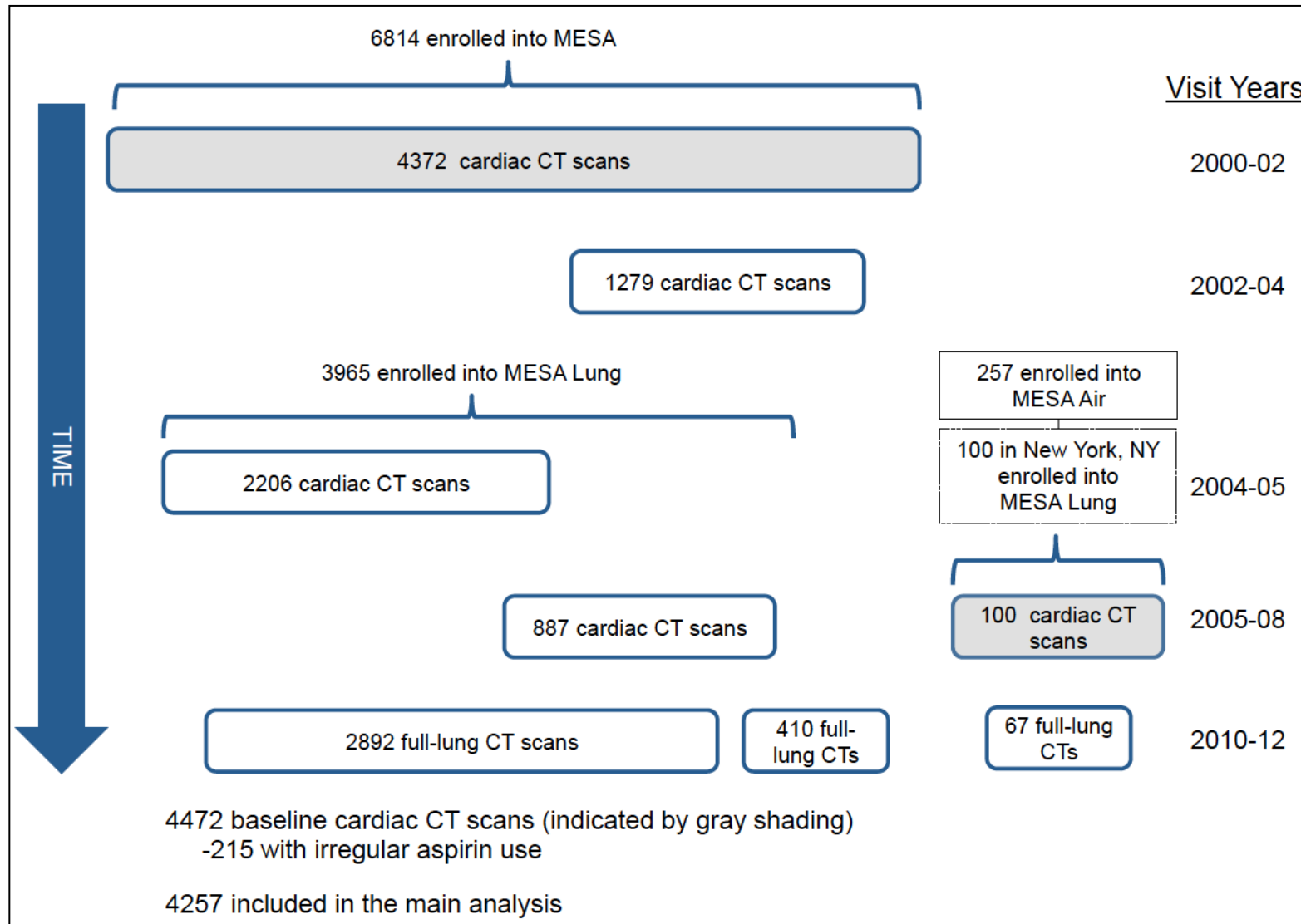
The MESA Lung Study

Carrie P. Aaron, MD; Joseph E. Schwartz, PhD; Eric A. Hoffman, PhD; Elsa Angelini, PhD; John H. M. Austin, MD; Mary Cushman, MD; David R. Jacobs Jr, PhD; Joel D. Kaufman, MD; Andrew Laine, DSc; Lewis J. Smith, MD; Jie Yang, MS; Karol E. Watson, MD, PhD; Russell P. Tracy, PhD; and R. Graham Barr, MD, DrPH
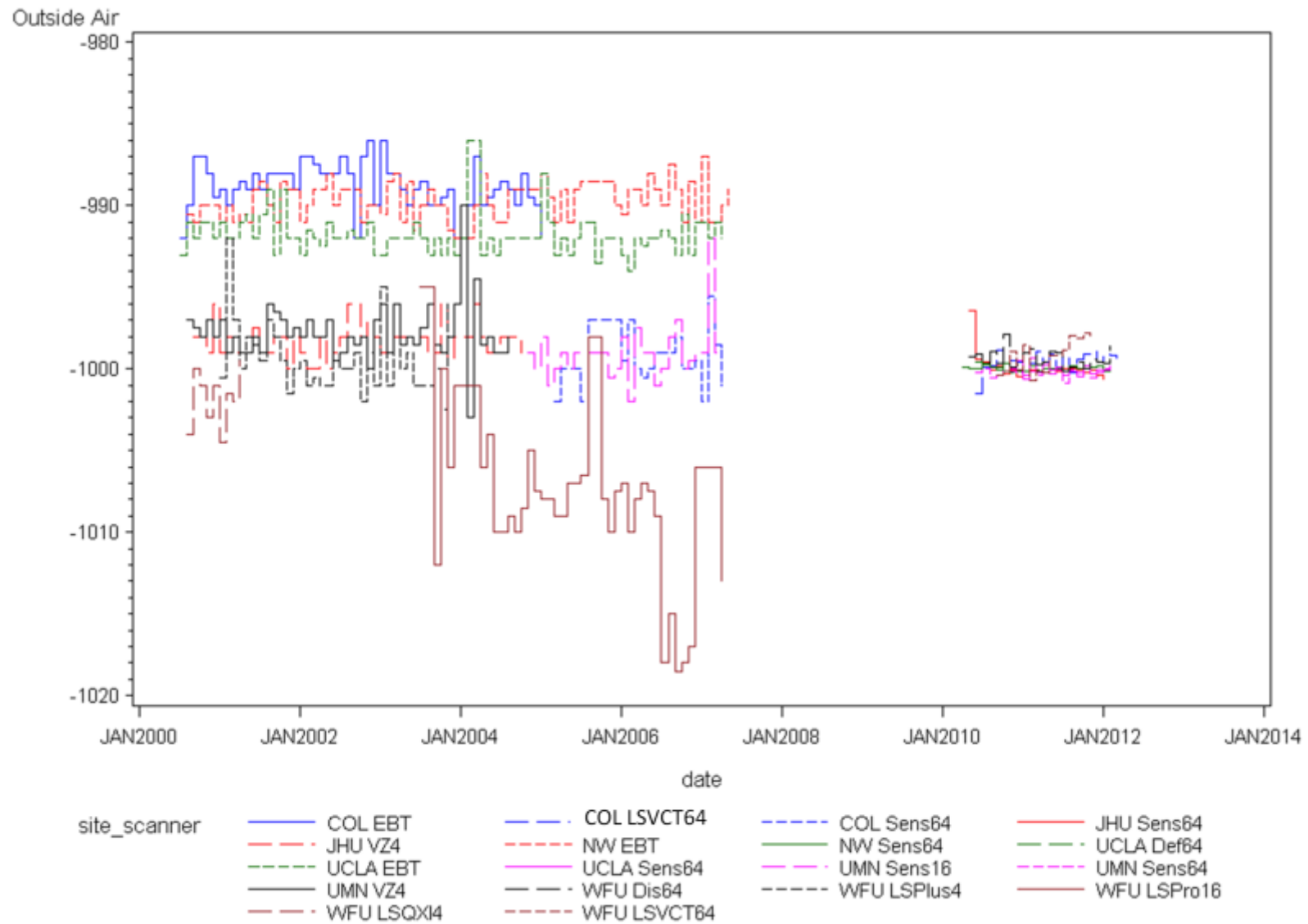
e-Figure 1. Description of the study sample

e-Figure 2. Monthly median attenuation (Hounsfield units) of air outside the body by site and scanner over time

Monthly median attenuation (Hounsfield units) of air outside the body assessed on each scan over 10 years of follow-up. The median value for each month is plotted against time. Multi-detector scanners have an average attenuation of air of -1,000 HU whereas electron beam scanners maintain a stable difference with an average attenuation of -990 HU. The outlier values between 2003 to 2007 were acquired on a GE LightSpeed Pro 16 scanner (solid brown line departing from average). Exclusion of scans acquired on these scanners increased the precision of results. The monthly median attenuation of outside air on full-lung scans acquired in 2010-12 were very stable; these were all acquired on 64-slice MDCT scanners. Labels above include the site followed by scanner type.

Site: COL=Columbia, JHU=Johns Hopkins University, NW=Northwestern, UCLA=University of California Los Angeles, UMN=University of Minnesota, WFU=Wake Forest University
Scanner type: EBT=Electron beam tomography, LSVCT64=LightSpeed VCT 64 (GE), Sens64=Sensation 64 (Siemens), VZ4=Volume zoom 4 (Siemens), Def64=Definition 64 (Siemens), Sens16=Sensation 16 (Siemens), Dis64=Discovery 64 (GE), LSPlus4=LightSpeed Plus 4 (GE), LSPro16=LightSpeed Pro 16 (GE), LSQXI4=LightSpeed QX/i 4 (GE).

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e-Table 1. Selected baseline characteristics of participants included and not included in the analysis

	Included in analysis (N=4257)	Not included in analysis (N=2814)
Age, years	61.3 ± 9.9	63.5 ± 10.5
Male	48.7	44.7
Race		
White, non-Hispanic	36.8	43.2
African-American	27.3	27.4
Hispanic	20.9	23.3
Chinese-American	14.9	6.0
Education		
Incomplete high school	15.9	20.7
Completed high school	18.2	17.6
Some college	28.0	29.9
Completed college	18.7	15.0
Graduate degree	19.1	16.1
Height, cm	166.7 ± 10.0	165.9 ± 10.0
Weight, kg	78.5 ± 17.1	79.6 ± 17.8
BMI, kg/m2	28.1 ± 5.3	28.8 ± 5.8
Smoking status		
Never	46.5	39.5
Former	39.7	42.3
Current	13.8	14.0
Pack-years[a]	25.0 ± 24.9	24.4 ± 24.9
Cigarettes per day[b]	12.5 ± 9.6	13.9 ± 10.5
Hypertension	42.6	47.9
Systolic blood pressure, mmHg	124.7 ± 20.1	129.0 ± 23.1
Total cholesterol, mg/dL	193.4 ± 35.2	195.2 ± 36.9
Diabetes	11.2	15.4
Medication use		
Aspirin, 3 or more days per week	21.8	18.2
ACE-inhibitor or ARB	12.1	13.4
NSAID	16.0	19.5
COX-2 inhibitor	6.4	7.1
ADP-receptor inhibitor	0.3	0.2
Statin	14.9	15.7
Diuretic	16.0	18.5
Framingham 10 year CHD risk[c] ≥ 10%	38.9	44.1
FEV_1, mL[d]	2389 ± 731	2384 ± 758
FEV_1/FVC ratio[e]	0.75 ± 0.08	0.73 ± 0.10
Airflow limitation on spirometry[f]	24.6	27.5
Asthma by self-report of physician diagnosis	9.5	10.4
Percent emphysema$_{-950}$, median (IQR)	2.97 (1.23, 5.83)	2.86 (1.23, 5.59)
Emphysema on CT[g]	7.7	8.5
C-reactive protein, mg/dL	3.5 ± 5.3	4.2 ± 6.5
Sphingomyelin, mg/dL	47.8 ± 15.5	48.3 ± 16.5

Data are presented as mean ± SD or %, except where noted.

Abbreviations: BMI=body mass index, ACE=angiotensin converting enzyme, ARB=angiotensin II receptor blocker, NSAID=non-steroidal anti-inflammatory drug (not including aspirin), ADP=adenosine diphosphate, CHD=coronary heart disease, FEV_1=forced expiratory volume in 1 second, FVC=forced vital capacity, IQR=interquartile range

[a]among ever-smokers reporting pack-years (2016 included in analysis, 1438 not included in analysis)

[b]among current smokers reporting cigarettes per day (556 included in analysis, 382 not included in analysis)

[c]Framingham Risk Score as per Wilson PW et al, Circulation 1998

[d]among those with valid FEV_1 measured (3770 included in analysis, 119 not included in analysis)

[e]among those with valid FEV_1/FVC measured (3697 included in analysis, 116 not included in analysis)

[f]airflow limitation defined as pre-bronchodilator FEV_1/FVC <0.7, among those with FEV_1/FVC without a restrictive ventilatory defect (3431 included in the analysis, 178 not included in the analysis)

[g]Emphysema on CT defined as above the upper limit of normal, among those reporting cigarettes per day and smoking status (4224 included in analysis, and 2794 not included in analysis)

e-Table 2. Predicted change in lung density at the lower 15th percentile (PD15) over 10 years for participants taking aspirin regularly compared to those not taking aspirin

	Change in PD15 over 10 years, in HU (95% CI)	P-value
Unweighted		
Unadjusted	2.89 (0.75, 5.04)	0.008
Model 1	3.30 (1.22, 5.38)	0.002
Model 2	3.26 (1.18, 5.34)	0.002
Model 3	3.07 (0.98, 5.15)	0.004
Weighted by propensity score		
Unadjusted	2.53 (0.56, 4.50)	0.012
Model 1	3.13 (1.22, 5.05)	0.001
Model 2	3.11 (1.20, 5.02)	0.001
Model 3	2.98 (1.06, 4.89)	0.002

Model 1: adjusted for baseline age, sex, race/ethnicity, sex*time and race/ethnicity*time interactions, education, time-varying height, weight, CT scanner model, mAs and voxel size

Model 2: additionally adjusted for baseline pack-years, pack-years*time interaction and time-varying cigarettes per day for current smokers

Model 3: additionally adjusted for baseline hypertension, C-reactive protein, sphingomyelin, ACE-inhibitor or ARB use and ACE-inhibitor or ARB use*time interaction

e-Table 3. Predicted change in lung function per year for participants taking aspirin regularly compared to those not taking aspirin regularly

	Predicted change in lung function per year (95% CI)	P-value
FEV$_1$, mL (n=3770)		
Unadjusted	-1.87 (-5.43, 1.69)	0.30
Model 1	0.01 (-3.48, 3.49)	0.99
Model 2	0.20 (-3.33, 3.73)	0.91
FEV$_1$/FVC ratio,% (n=3697)		
Unadjusted	-0.04 (-0.12, 0.03)	0.24
Model 1	-0.04 (-0.11, 0.04)	0.35
Model 2	-0.03 (-0.11, 0.04)	0.38

Model 1: adjusted for baseline age, sex, race/ethnicity, sex*time and race/ethnicity*time interaction, education, time-varying height and weight, as well as height^2 for FEV$_1$

Model 2: additionally adjusted for baseline pack-years, C-reactive protein and time-varying smoking status

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