

Computed tomography measure of lung injury and future interstitial features: The CARDIA Lung Study

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ONLINE DATA SUPPLEMENT

Supplemental Methods:

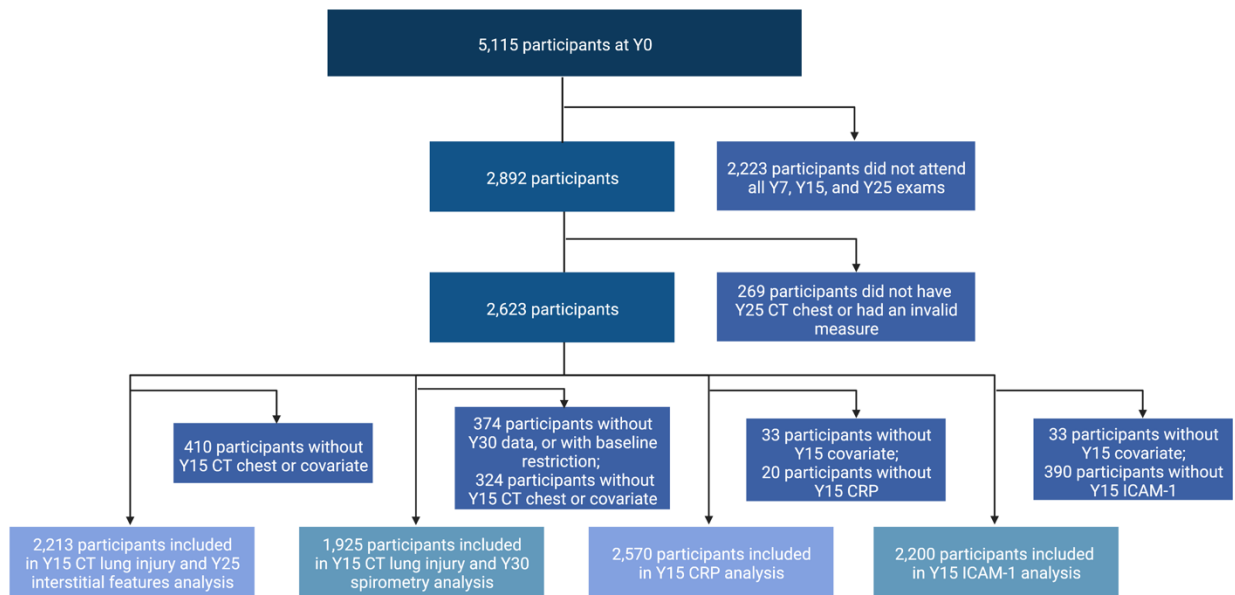
CT Acquisition

Year 15 (mean age 40): Computed tomography scans were obtained at the year 15 CARDIA examination using the following scanners at each field center: GE Lightspeed QX/I (Birmingham), Imatron C-150 (Chicago, Oakland), Siemens S4+Volume Zoom (Minneapolis). All scans were performed with a single breath hold with images taken at end-inspiration. The following image acquisition protocols were used: 130 kVp, 630 mA, 100 msec scan time, 3mm collimation, sharp reconstruction filter with 35 cm field of view and sharp reconstruction kernel (Imatron C-150); 120 kVp, 200 mA, 800 ms scan, 4x2.5mm collimation, sequential axial scans, segmented reconstruction, standard filter with a 35 cm field of view and standard kernel reconstruction (GE Lightspeed QX/I); 140 kVp, 100 mA, 500 ms scan, 4 x2.5mm collimation, sequential axial scans with 35 cm field of view and standard filter reconstruction (Siemens S4+ Volume Zoom).

Year 25 (mean age 50): Computed tomography scans were obtained at the year 25 CARDIA examination using the following scanners at each field center: GE Discovery CT750 (Birmingham), Siemens Sensation 64 (Chicago, Minneapolis), GE Lightspeed VCT 64 (Oakland). All were 64+ channel multi-detector computed tomography scanners. All scans utilized a single breath hold with images taken at end-inspiration with thorax scanned from

posterior lung recesses to the lung apex. The following image acquisition protocols were used: 100 kVp, 130 mAs, prospective ECG gating at 75%, 0.625 mm x 64 slices (64i mode GE, or equivalent on Siemens, Philips or Toshiba), 0.33 second gantry, CINE, snapshot pulse/prospective triggering. Standard reconstruction: 35 cm DFOV, 2.5-3 mm slice thickness. High Resolutions reconstruction: 25 cm DFOV, 0.5-0.6 mm slice thickness. Third reconstruction: 50 cm DFOV, 0.5-0.6 mm.

Supplemental Figures and Tables:



Supplementary Figure S1. Numbers of participants included in the primary analyses and Table 3 based on the availability of Year 7 (mean age 32), Year 15 (mean age 40), Year 25 (mean age 50), Year 30 (mean age 55) clinical data, laboratory data, CT scans, and spirometry. *Figure created with BioRender.com.*

Supplementary Table 1. Association between inflammatory markers at mean age 32 (year 7) and CT features at mean age 50 (year 25)

	Median (IQR) percentage of lung characterized as CT feature, by quartile of inflammatory marker*				Associated percent increase (95% CI) in lung characterized as each CT feature, per 10% increase in inflammatory marker†
	Quartile of Year 7 CRP				
	Q1	Q2	Q3	Q4	
CRP mean (SD) in µg/mL	0.29 (0.11)	0.75 (0.17)	1.88 (0.56)	8.04 (7.64)	
CT lung injury‡ (N=2484)	0.59% (0.10-3.55%)	0.95% (0.15-5.75%)	1.37% (0.26-7.27%)	2.33% (0.40-15.24%)	0.64% (-0.08 – 1.37%)
Interstitial features§ (N=2484)	0.50% (0.15-1.61%)	0.66% (0.23-2.34%)	0.80% (0.28-2.63%)	1.27% (0.37-4.06%)	0.51% (-0.08 – 1.11%)
	Quartile of Year 7 ICAM-1				
	Q1	Q2	Q3	Q4	
ICAM-1 mean (SD) in ng/L	105.9 (10.2)	127.6 (4.9)	144.8 (5.1)	179.1 (29.4)	
CT lung injury (N=1649)	0.52% (0.09-3.27%)	0.78% (0.15-5.35%)	1.37% (0.22-8.18%)	1.89% (0.35-12.02%)	5.30% (-0.20 – 11.1%)
Interstitial features (N=1649)	0.43% (0.14-1.55%)	0.67% (0.20-2.10%)	0.81% (0.25-2.58%)	1.09% (0.37-3.53%)	2.04% (-2.33 – 6.60%)

*Unadjusted

†Based on multivariable linear regression, after log-transformation of inflammatory marker and log-transformation of CT feature. Covariates: center, age, race, sex, educational attainment, BMI, smoking status, cigarettes smoked per day, smoking pack-years.

Models adjusted for year 0 field center, age, race, and sex, and year 7 years of education, smoking status, cigarettes smoked per day, BMI, year 25-year 7 BMI change, and year 25 smoking pack-years.

‡CT lung injury feature defined as visually normal-appearing regions with attenuation >90th percentile for normal lung tissue.

§Interstitial features defined as reticular, centrilobular nodule, linear scar, nodular, subpleural line, ground glass, and honeycombing

CT=computed tomography. IQR=interquartile range. CRP=C-reactive protein. ICAM=intercellular adhesion molecule. SD=standard deviation.