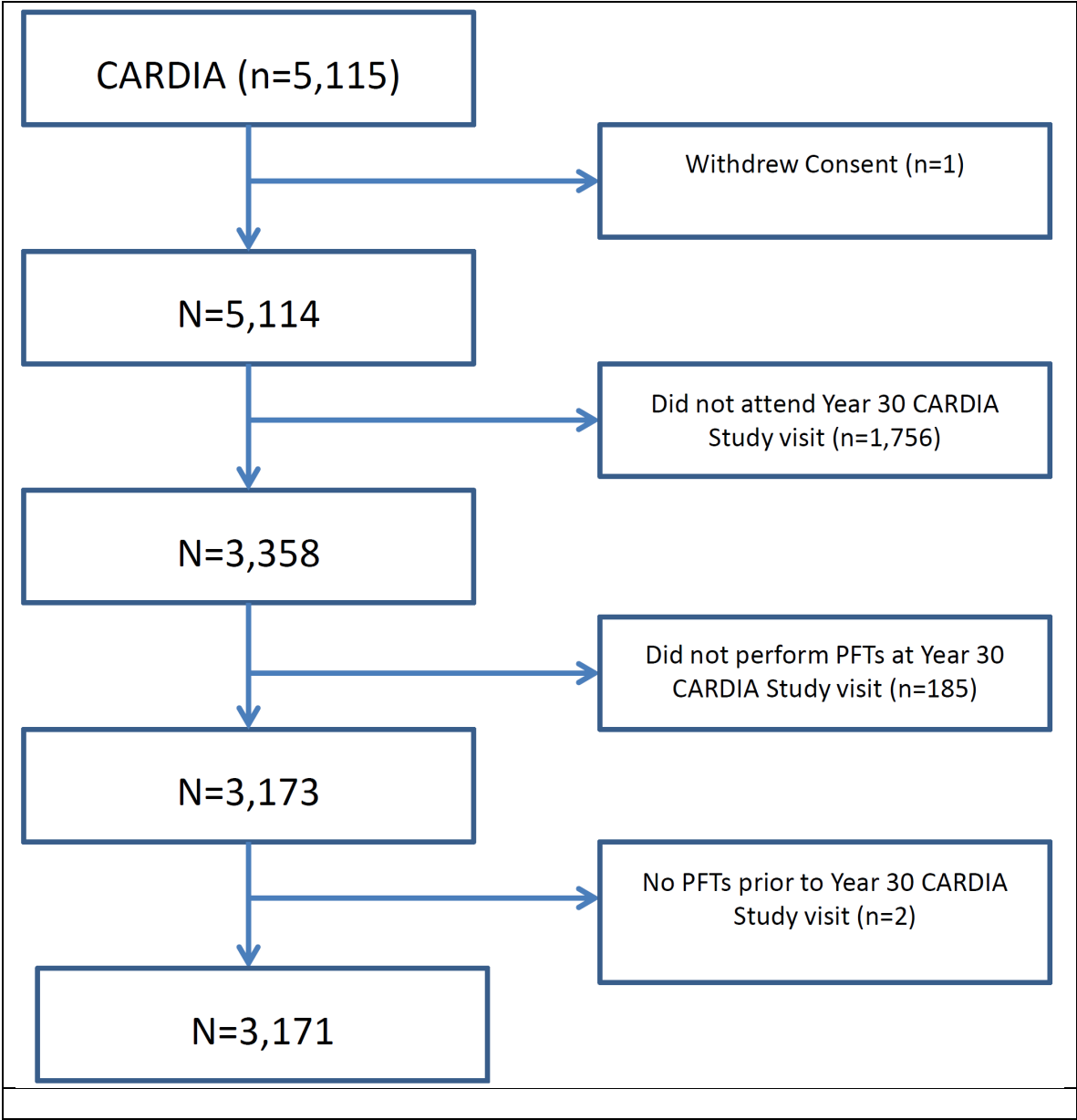
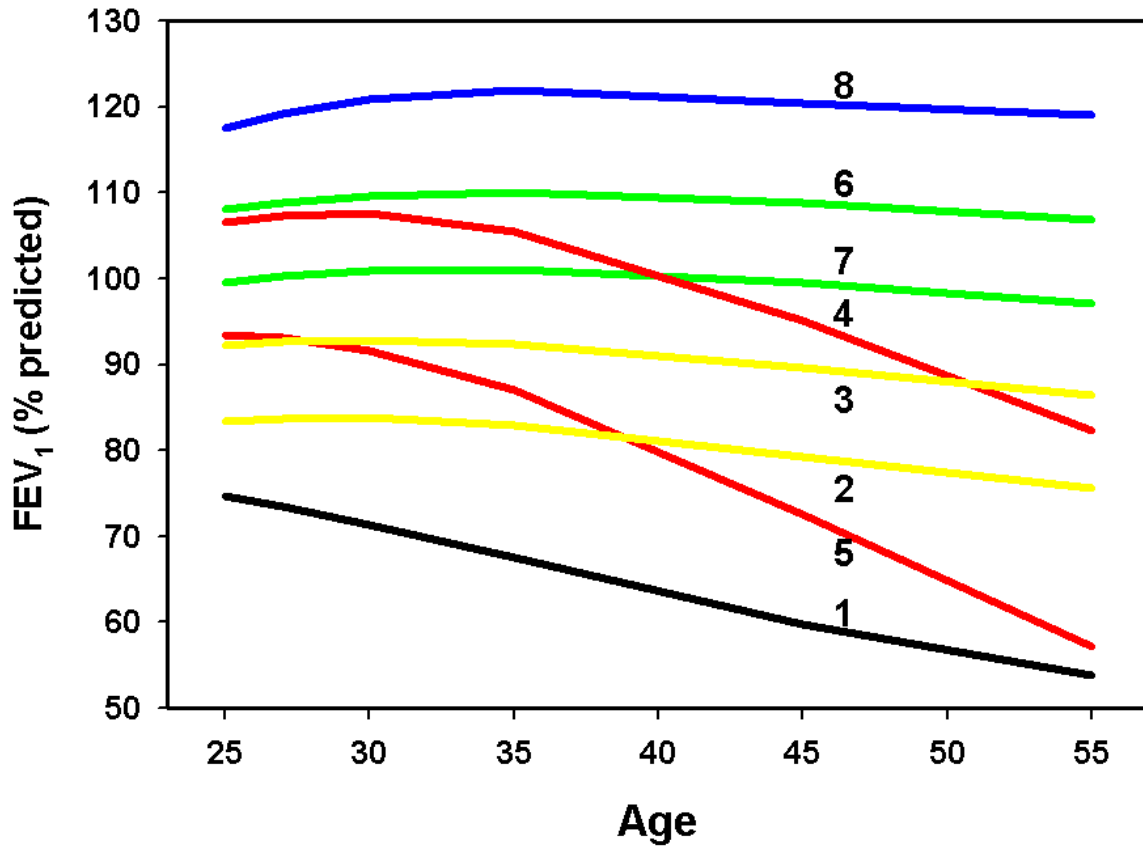


Appendix Figure 1: Flow diagram for CARDIA



**Appendix Figure 2:** Graphical depiction of the 8 initial spirometric trajectories in CARDIA defined by serial measures of the FEV<sub>1</sub> expressed as a percent of predicted.



- Preserved Ideal Lung Health
- Preserved Good Lung Health
- Preserved Good Lung Health
- Worsening Lung Health
- Worsening Lung Health
- Preserved Impaired Lung Health
- Preserved Impaired Lung Health
- Persistently Poor Lung Health

Appendix Figure 2 depicts the 8 initial trajectories of the FEV1% in the CARDIA cohort. Clinical, epidemiologic and spirometric characteristics of these trajectories are provided in Appendix Table 1. Visual inspection of both Appendix Figure 1 and the data presented in Appendix Table 1 led us to aggregate trajectories 2 and 3 into one group called Preserved Impaired Lung Health, trajectories 6 and 7 into Preserved Good Lung Health and trajectories 4 and 5 into Worsening Lung Health. Appendix Figures 2A-H on the following pages provides illustrations of the Spaghetti Plots for each of the subgroups. Appendix Figures 3A-C provides schematics for the combination of Spaghetti plots to form the Preserved Impaired Lung Health, Preserved Good Lung Health and Worsening Lung Health trajectories.

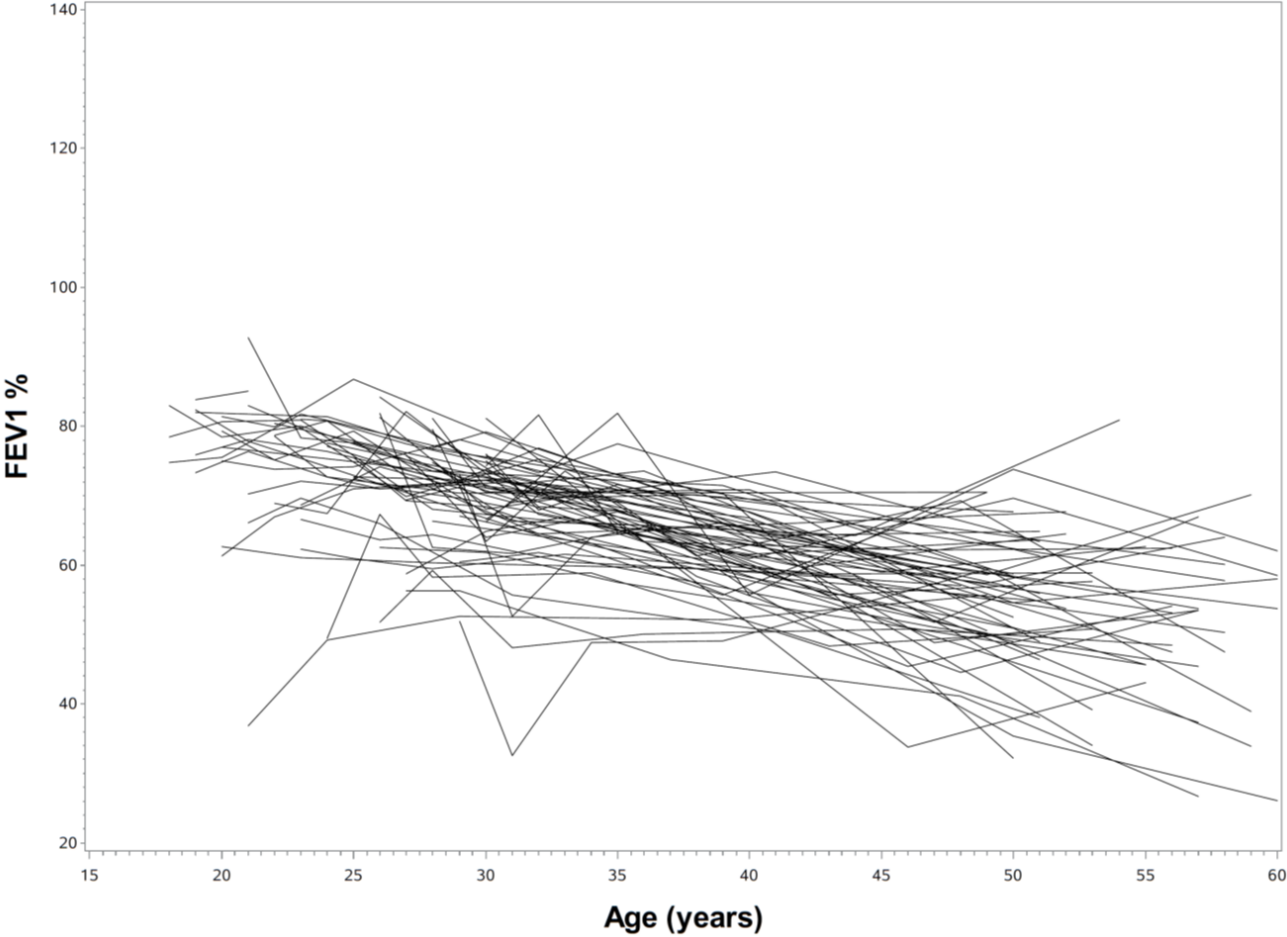
**Appendix Table 1:**

	Trajectories of FEV1% (n=3,171)							
	<b>PRESERVED IDEAL</b>	<b>PRESERVED GOOD</b>		<b>PRESERVED IMPAIRED</b>		<b>WORSENING</b>		<b>PERSISTENTLY POOR</b>
<b>Baseline</b>	<b>8</b>	<b>6</b>	<b>7</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>1</b>
N (year 30 lung function available)	187	577	901	358	906	117	63	62
Sex – Female, N (%)	121 (64.7)	347 (60.1)	533 (59.2)	183 (51.1)	486 (53.6)	79 (67.5)	36 (57.1)	33 (53.2)
Race- Black, N (%)	108 (57.8)	269 (46.6)	385 (42.7)	197 (55.0)	395 (43.6)	71 (60.7)	48 (76.2)	37 (59.7)
Age – years (SD) (Y0)	25.0 (3.7)	25.2 (3.4)	25.2 (3.6)	24.9 (3.6)	25.1 (3.5)	24.4 (3.8)	24.0 (4.1)	24.2 (3.9)
<i>Smoking (Y0)</i>								
Never, N (%)	121 (64.7)	345 (60.2)	571 (63.8)	210 (58.8)	548 (60.8)	63 (54.3)	26 (41.3)	34 (55.7)
Former, N (%)	29 (15.5)	105 (18.3)	134 (15.0)	31 (8.7)	104 (11.5)	19 (16.4)	6 (9.5)	6 (9.8)
Current, N (%)	37 (19.8)	123 (21.5)	190 (21.2)	116 (32.5)	249 (27.6)	34 (29.3)	31 (49.2)	21 (34.4)
<i>Smoking (Y30)</i>								
Never, N (%)	125 (67.9)	361 (63.4)	598 (66.8)	219 (61.9)	573 (63.8)	58 (50.9)	20 (32.3)	32 (53.3)
Former, N (%)	39 (21.2)	139 (24.4)	201 (22.5)	83 (23.4)	209 (23.3)	22 (19.3)	15 (24.2)	14 (23.3)
Current, N (%)	20 (10.9)	69 (12.1)	96 (10.7)	52 (14.7)	116 (12.9)	34 (29.8)	27 (43.6)	14 (23.3)
BMI - kg/m <sup>2</sup> (Y0)	24.4 (4.3)	24.2 (4.6)	23.9 (4.5)	25.1 (5.5)	24.2 (4.6)	25.4 (4.9)	26.3 (5.7)	25.9 (6.8)
BMI - kg/m <sup>2</sup> (Y30)	29.3 (6.1)	29.5 (6.5)	29.5 (6.5)	32.2 (8.5)	30.6 (6.8)	35.2 (8.3)	35.0 (10.9)	32.1 (7.6)
Asthma, N % (Y0)	3 (1.6%)	7 (1.2%)	18 (2.0%)	34 (9.5%)	37 (4.1%)	1 (0.8%)	3 (4.8%)	13 (21.0%)
Baseline FVC - % predicted	118.0 (8.4)	109.4 (7.8)	101.7 (7.8)	89.5 (8.6)	95.3 (8.2)	108.9 (8.8)	99.1 (10.1)	84.5 (10.9)
Baseline FEV <sub>1</sub> - % predicted	118.8 (7.1)	108.9 (6.0)	100.1 (5.3)	83.0 (6.2)	92.3 (5.5)	106.8 (6.9)	91.0 (7.9)	73.4 (8.8)

Baseline FEV <sub>1</sub> /FVC %	86.1 (4.4)	84.9 (5.1)	83.9 (5.6)	79.3 (7.6)	82.5 (6.2)	84.3 (5.5)	79.0 (6.2)	75.2 (10.4)
Year 30 FVC - % predicted	118.7 (10.5)	106.7 (8.6)	97.4 (8.2)	79.6 (9.7)	87.7 (9.1)	83.7 (11.4)	68.1 (13.5)	65.8 (12.1)
Year 30 FEV <sub>1</sub> - % predicted	120.4 (9.3)	107.2 (7.4)	96.9 (6.9)	75.3 (7.6)	85.5 (7.3)	77.7 (9.5)	53.7 (10.8)	52.1 (12.0)
Year 30 FEV <sub>1</sub> /FVC	79.8 (4.4)	78.8 (5.3)	78.1 (5.4)	74.7 (7.5)	76.5 (6.1)	73.8 (8.7)	63.6 (13.1)	64.5 (14.7)
Decline FVC (baseline to year 30) – mL/y	-19 (15)	-21 (13)	-22 (13)	-27 (14)	-25 (14)	-46 (17)	-50 (16)	-36 (21)
Decline FEV <sub>1</sub> (baseline to year 30) – mL/y	-25 (11)	-26 (12)	-26 (11)	-26 (11)	-28 (11)	-50 (13)	-53 (13)	-36 (16)
<i>Emphysema (N year 25 CT scan available)</i>	160	476	738	298	786	98	55	49
Centrilobular N (%)	4 (2.5%)	16 (3.4%)	27 (3.7%)	18 (6.0%)	27 (3.4%)	7 (7.1%)	10 (18.2%)	7 (14.3%)
Paraseptal	4 (2.5%)	22 (4.6%)	29 (3.9%)	22 (7.4%)	36 (4.6%)	11 (11.2%)	14 (25.4%)	7 (14.3%)
Centrilobular or paraseptal	6 (3.8%)	26 (5.5%)	42 (5.7%)	31 (10.4%)	44 (5.6%)	13 (13.3%)	17 (30.9%)	10 (20.4%)

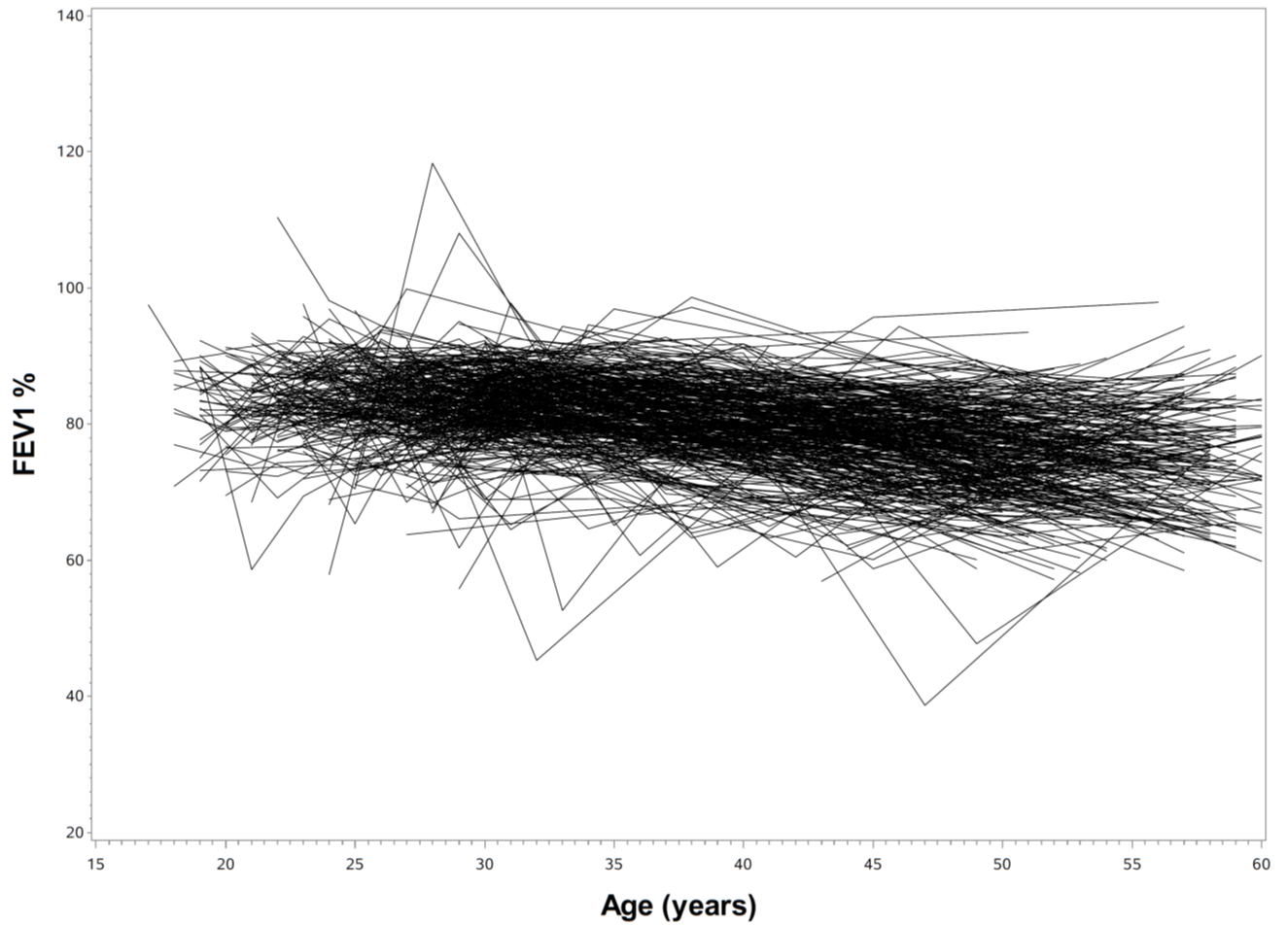
**Appendix Figure 2A)** Spaghetti plot for Trajectory 1 which is labeled as the “Persistently Poor Lung Health” trajectory in the 5-trajectory model.

### Trajectory 1



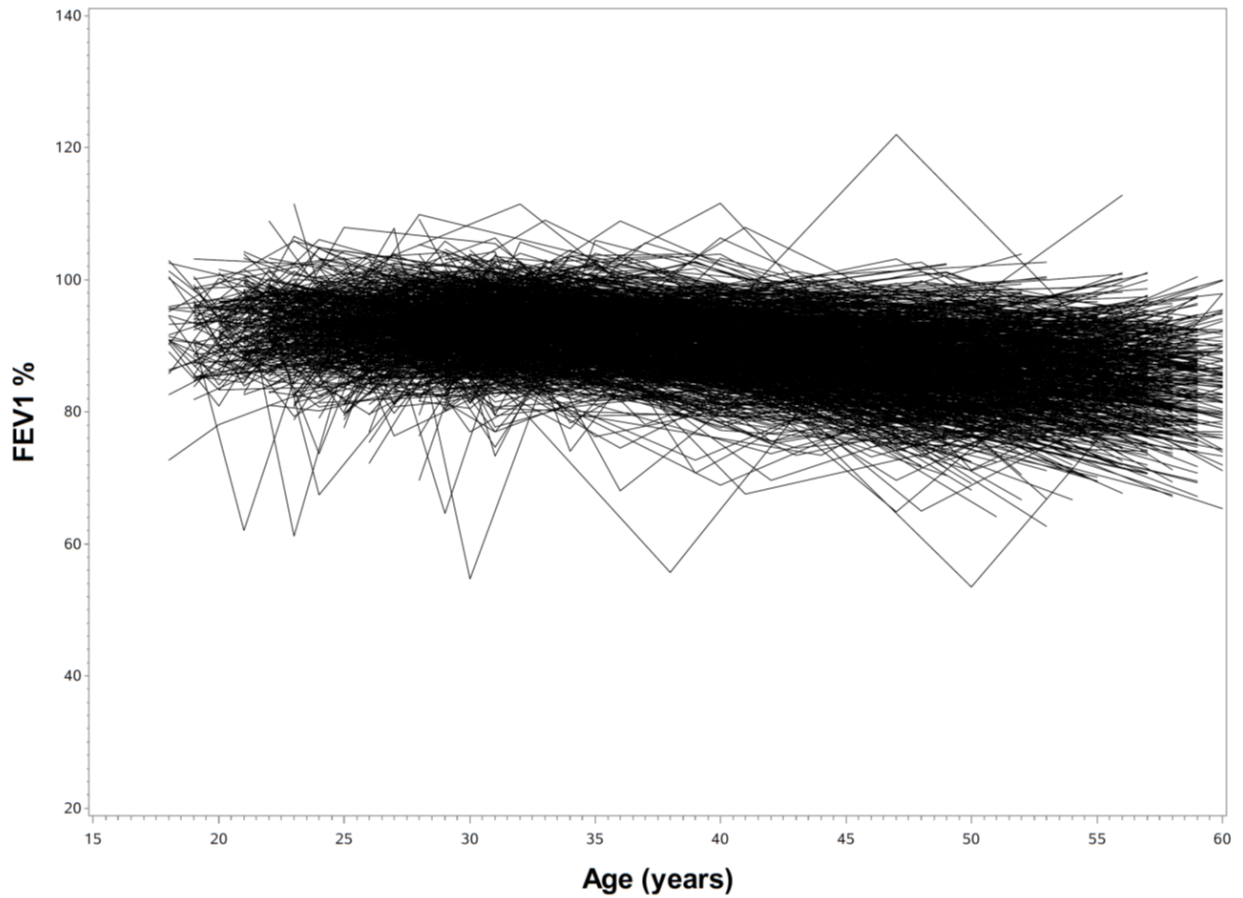
**Appendix Figure 2B)** Spaghetti plot for Trajectory 2 which is combined with Trajectory 3 on the following page to become the “Preserved Impaired Lung Health” trajectory in the 5-trajectory model.

## Trajectory 2



**Appendix Figure 2C)** Spaghetti plot for Trajectory 3 which is combined with Trajectory 2 on the previous page to become the “Preserved Impaired Lung Health” trajectory in the 5-trajectory model.

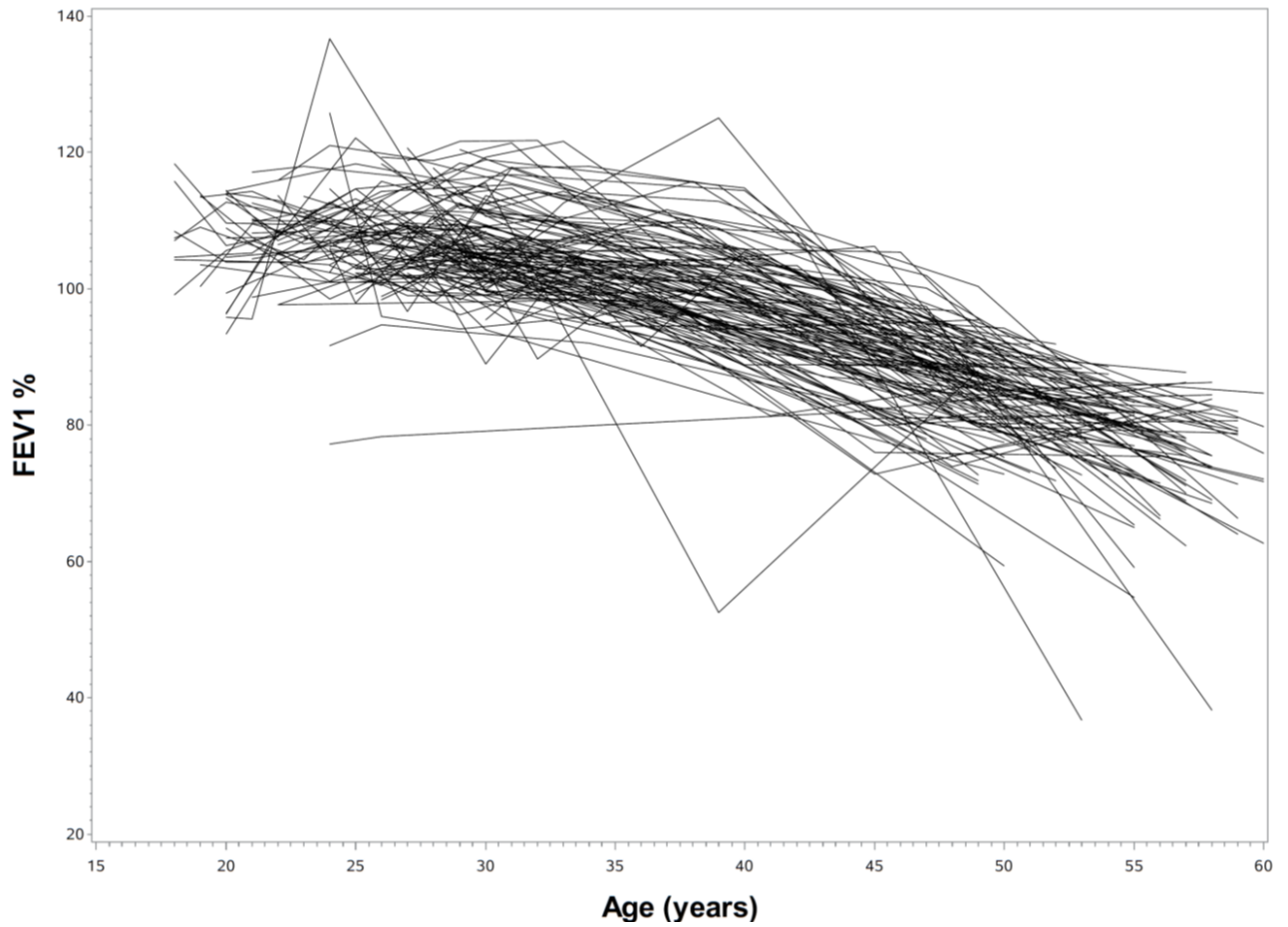
### Trajectory 3





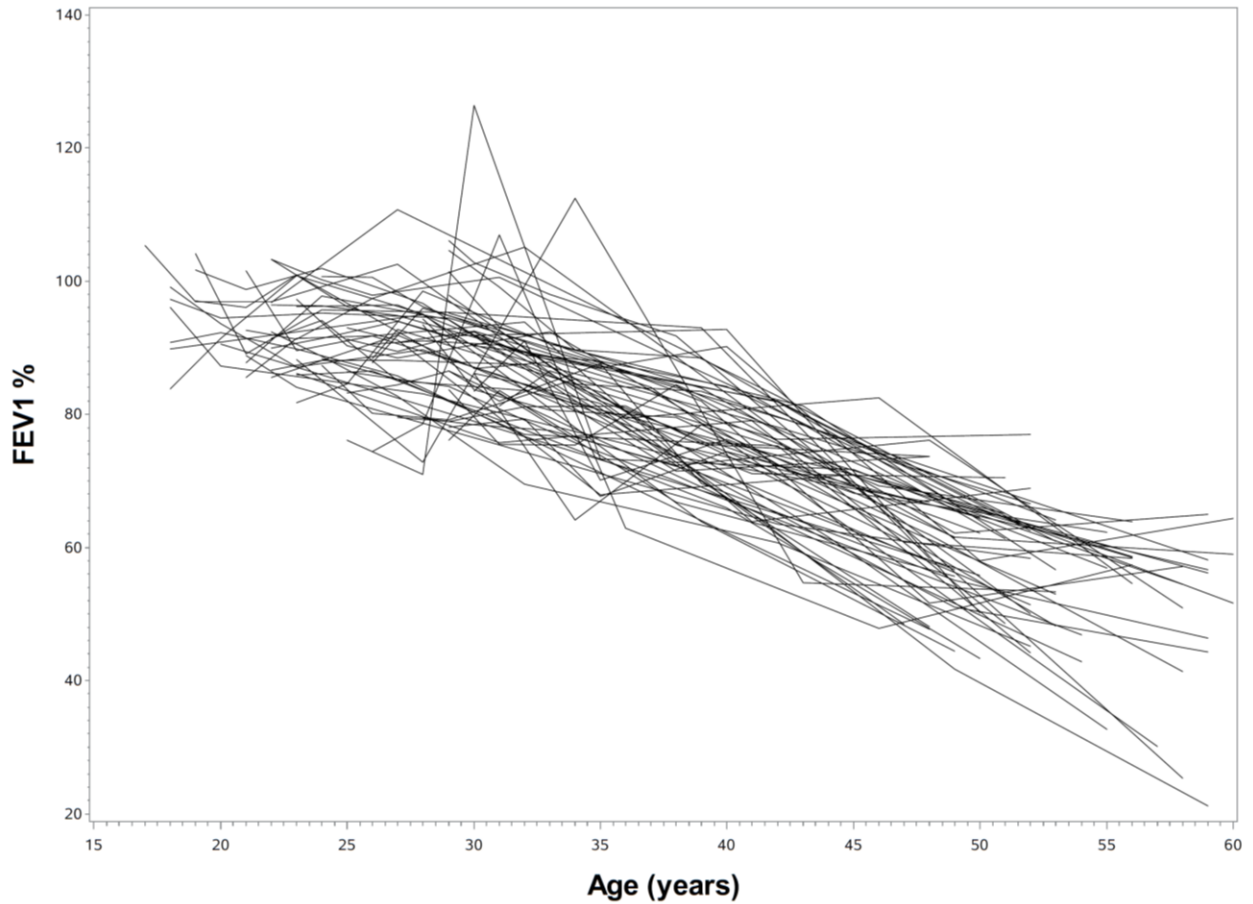
**Appendix Figure 2D)** Spaghetti plot for Trajectory 4 which is combined with Trajectory 5 on the next page to become the “Worsening Lung Health” trajectory in the 5-trajectory model.

### Trajectory 4



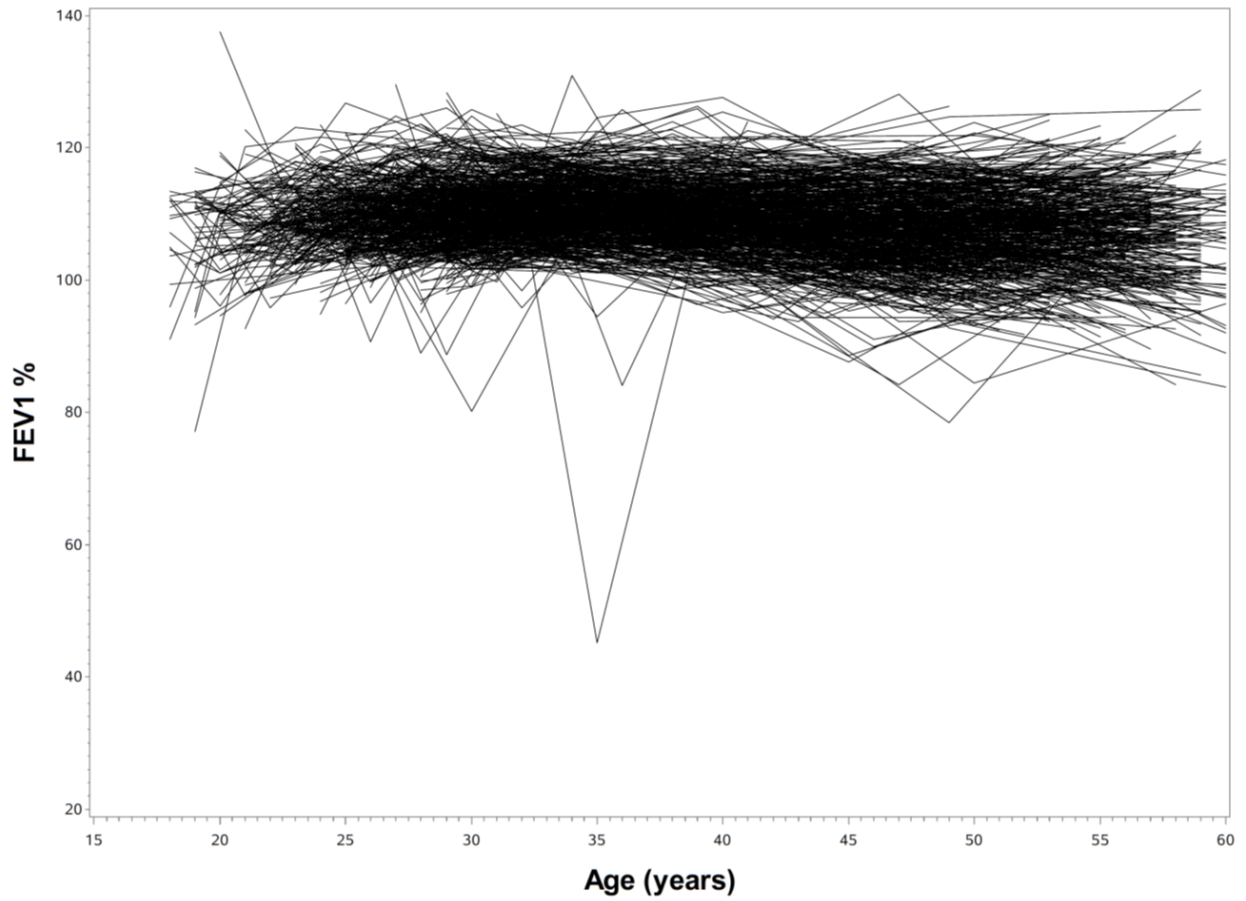
**Appendix Figure 2E)** Spaghetti plot for Trajectory 5 which is combined with Trajectory 4 on the previous page to become the “Worsening Lung Health” trajectory in the 5-trajectory model.

### Trajectory 5

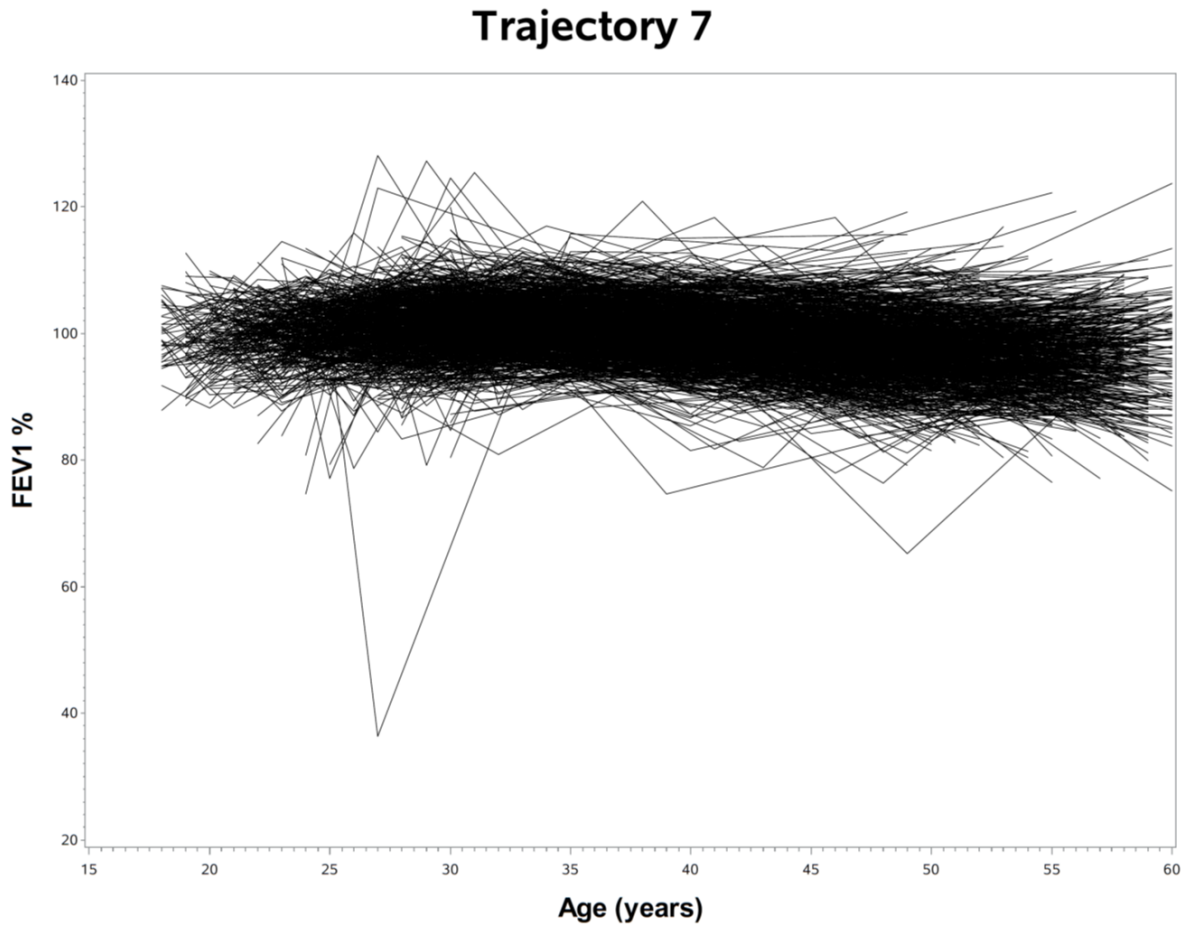


**Appendix Figure 2F)** Spaghetti plot for Trajectory 6 which is combined with Trajectory 7 on the following page to become the “Preserved Good Lung Health” trajectory in the 5-trajectory model.

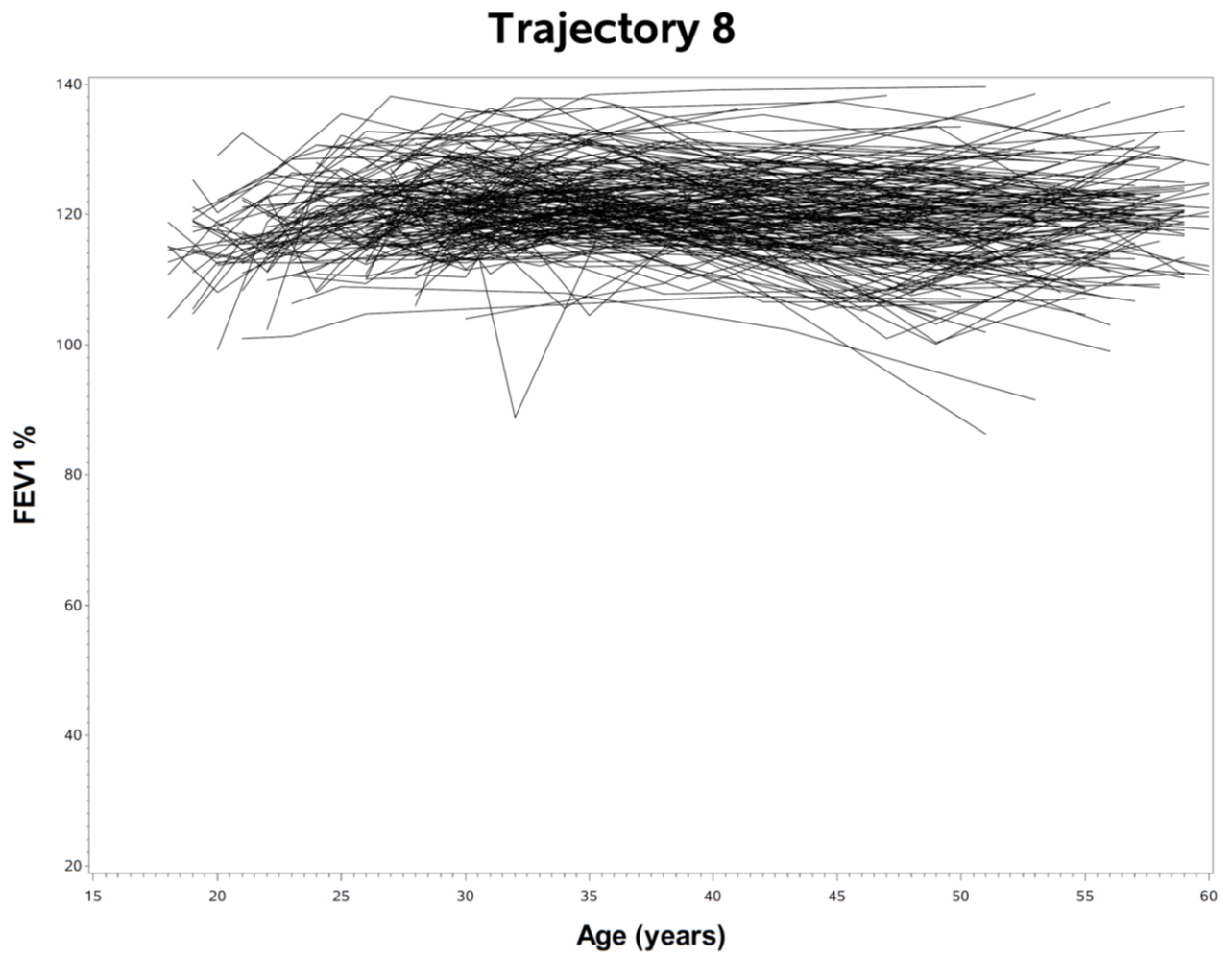
### Trajectory 6



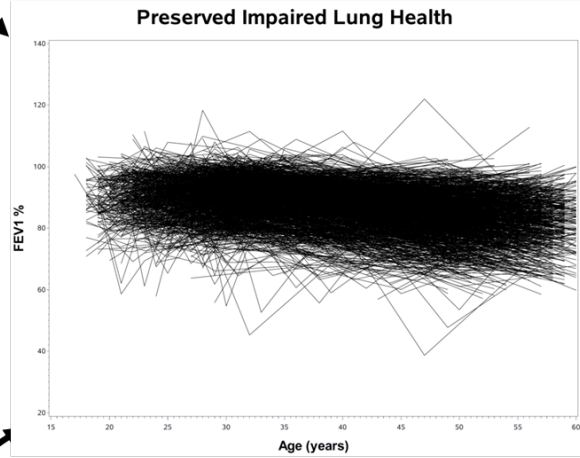
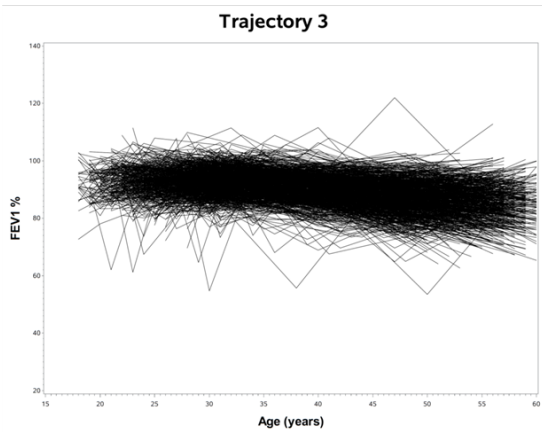
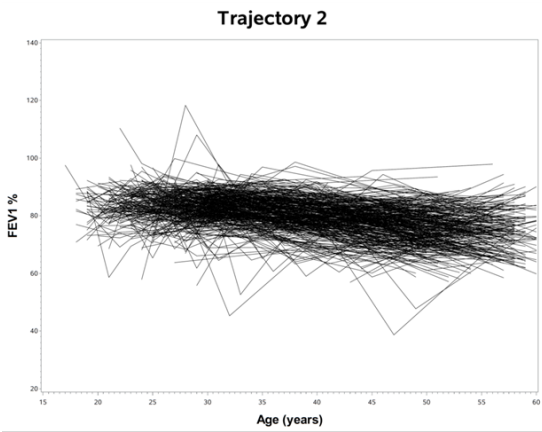
**Appendix Figure 2G)** Spaghetti plot for Trajectory 7 which is combined with Trajectory 6 on the previous page to become the “Preserved Good Lung Health” trajectory in the 5-trajectory model.



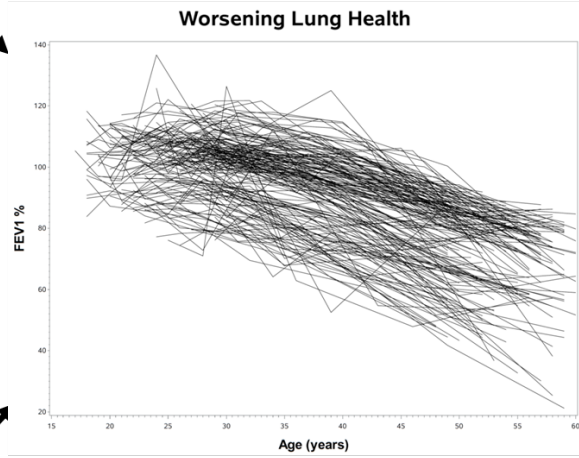
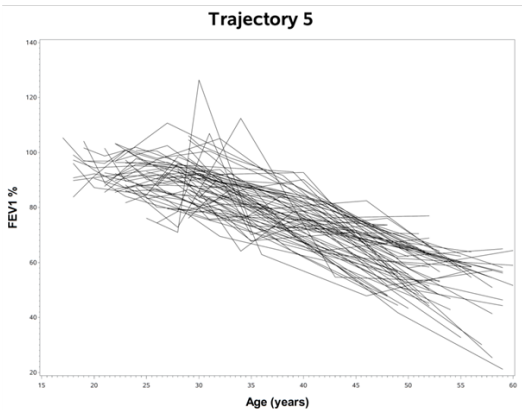
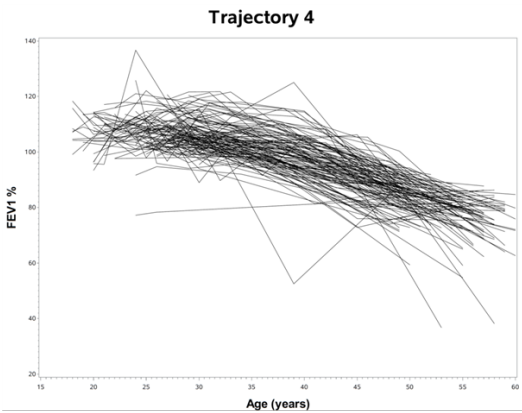
**Appendix Figure 2H)** Spaghetti plot for Trajectory 8 which is the “Preserved Ideal Lung Health” trajectory in the 5-trajectory model.



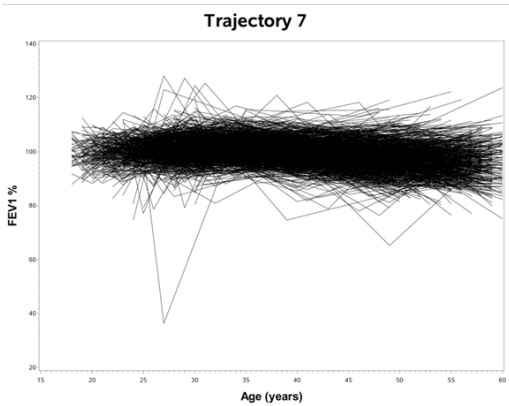
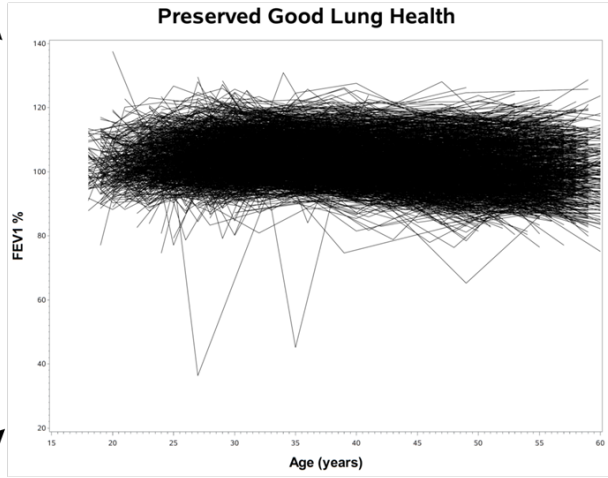
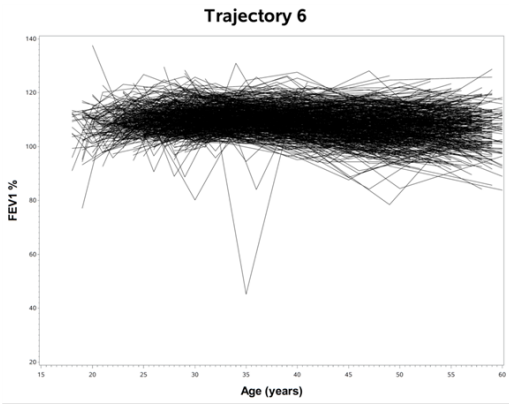
**Appendix Figure 3A)** Schematic for the combination of trajectories 2 and 3 to become “Preserved Impaired Lung Health”.



**Appendix Figure 3B)** Schematic for the combination of trajectories 4 and 5 to become “Worsening Lung Health”.



**Appendix Figure 3C)** Schematic for the combination of trajectories 6 and 7 to become “Preserved Good Lung Health”.



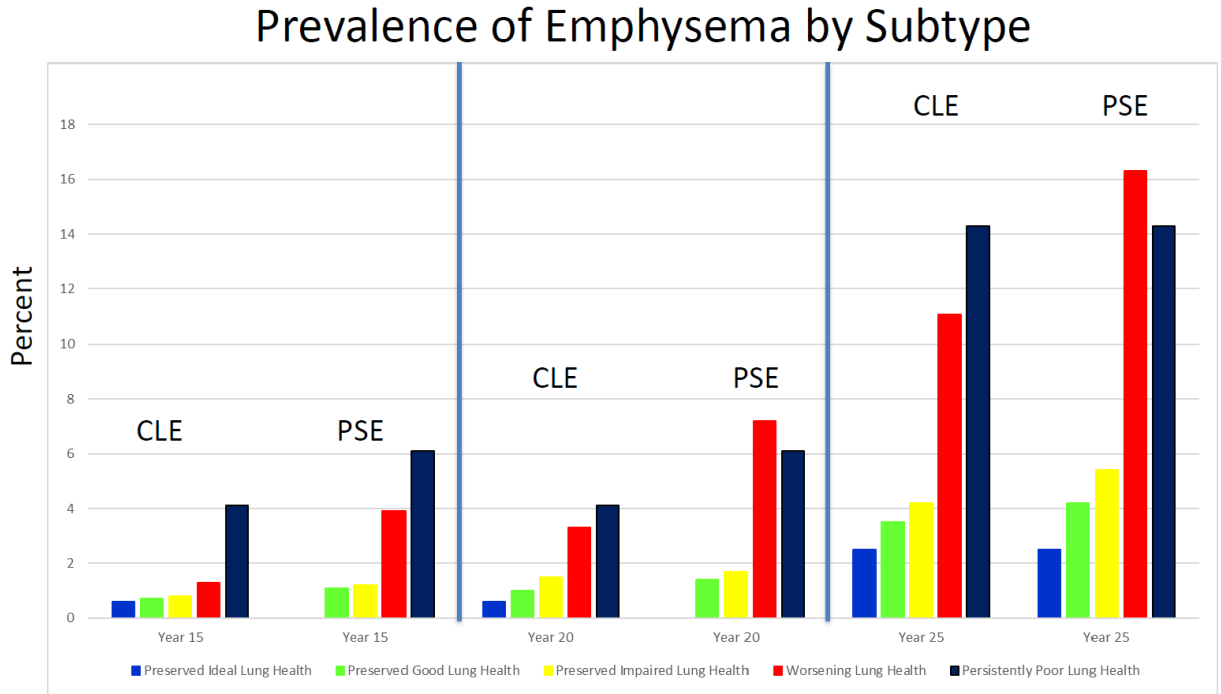


**Appendix Table 2:** Results of multi-variable logistic regression modeling to predict emphysema (CLE or PSE) on Year 25 CT scan. Note that the Preserved Ideal Lung Health trajectory is referent for these analyses.

	Estimate	OR	CI	P Value
Age (Y0)	-0.005	0.995	0.95-1.05	0.52
Race (Black=1)	1.57	4.78	3.23-7.10	<0.0001
Sex (male =1)	0.42	1.53	1.07-2.19	0.02
Pack Years (Y25)	0.1	1.11	1.09-1.12	<0.0001
BMI (Y0)	-0.17	0.85	0.80-0.89	<0.0001
Preserved Ideal	Referent Trajectory			
Preserved Good	0.34	1.40	0.57-3.45	0.47
Preserved Impaired	0.33	1.39	0.56-3.45	0.48
Worsening	1.62	5.06	1.84-13.96	0.002
Persistently Poor	1.58	4.85	1.43-16.44	0.01

Note that the model was also adjusted for CARDIA center and change in BMI from Y0 to Y25.

**Appendix Figure 4)** Prevalence of emphysema by subtype on the Year 15, Year 20 and Y25 CT scans. CLE: Centrilobular Emphysema; PSE: Paraseptal Emphysema.



**Appendix Figure 5) Prevalence of emphysema (centrilobular and/or paraseptal) by smoking status on the Year 15, Year 20 and Year 25 CT scans.**

