Web Material

Web Table 1. Variable Descriptive Statistics and Transformations Used in the Factor Analysis

VARIABLE (x)	Mean x	Median x	Range x	TRANSFORMATION of x
Slicer_15pctIn_Total	-917.4	-918.0	273.0	none
Slicer_15pctEx_Total	-859.1	-856.0	1521.0	none
Slicer_IntensityMean_Ex	-726.5	-722.8	438.3	none
Slicer_IntensityStdDev_Ex	163.8	162.4	176.1	none
Slicer_ExpInspMeanAtten_ratio	0.86	0.86	0.47	none
WallAreaPct_seg	61.4	61.2	23.5	none
TLCpred_race_adjusted	5.8	5.8	6.1	none
FRCpred_race_adjusted	3.1	3.2	2.3	none
FEV1pp_utah	76.8	81.0	150.4	none
FVCpp_utah	87.4	88.0	153.6	none
FEV1_FVC_utah	0.67	0.72	0.85	none
BDR_pct_FEV1	5.8	4.4	166.2	none
Insp_Below856_Slicer	58.9	64.0	90.1	$\log(\min(x)+1-x)$
BMI	28.9	28.0	51.8	$\log(x-\min(x)+1)$
Slicer_IntensityMean_In	-836.7	-841.0	358.9	$\log(x-\min(x)+1)$
Slicer_IntensityStdDev_In	131.6	130.3	278.9	$\log(x-\min(x)+1)$
pctGasTrap_Slicer	21.8	14.7	87.8	$\log(x-\min(x)+1)$
Exp_Below910_Slicer	9.1	3.6	75.6	$\log(x-\min(x)+1)$
FEF2575_utah	1.8	1.6	7.5	$\log(x-\min(x)+1)$
BDR_pct_FVC	3.9	2.1	373.2	$\log(x-\min(x)+1)$
Insp_Below950_Slicer	6.2	2.0	61.9	$-1/\sqrt{x-MIN(x)+1}$
Exp_Below950_Slicer	3.8	0.9	56.9	$-1/\sqrt{x-MIN(x)+1}$
pctEmph_UpperThird_Slicer	7.1	1.6	84.9	$-1/\sqrt{x-MIN(x)+1}$
pctEmph_LowerThird_Slicer	5.3	2.0	63.7	$-1/\sqrt{x-MIN(x)+1}$
Pi10_SRWA	3.7	3.7	1.3	$-1/(x-MIN(x)+1)$
Pi15_SRWA	5.2	5.1	1.4	$-1/(x-MIN(x)+1)$
Insp_Below910_Slicer	23.9	20.1	79.7	$\sqrt{x-\min(x)+1}$
PEF_utah	6.2	6.1	15.6	$\sqrt{x-\min(x)+1}$

Web Table 2. Correlations of Factor Scores Between Race/Sex Subgroup Models Compared to the White Male Subgroup.

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
White Female	1	0.99	0.99	0.99	0.97
Black Female	0.98	0.84	0.98	0.96	0.96
Black Male	0.98	0.91	0.99	0.99	0.99

Web Table 3. Coefficients for Derivation of Factor Scores

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
BMI	-1.20E-05	-0.00076	0.001342	0.012263	-0.00071
Insp_Below950_Slicer	0.248774	0.084539	-0.08694	0.288383	-0.08986
Insp_Below910_Slicer	0.244482	0.11173	-0.19102	-0.1675	0.014302
Insp_Below856_Slicer	0.137604	0.097834	-0.1569	-0.33468	0.066165
Slicer_15pctIn_Total	-0.13671	-0.02601	0.121237	0.088593	0.027063
Slicer_IntensityMean_In	-0.08096	-0.00763	0.112577	0.188124	-0.03398
Slicer_IntensityStdDev_In	0.000502	-0.00321	0.009737	0.045922	-0.01076
pctGasTrap_Slicer	0.005196	0.090231	0.165376	0.077538	0.043051
Exp_Below950_Slicer	0.083883	0.018621	0.165393	0.484894	0.042728
Exp_Below910_Slicer	0.123044	0.039635	0.326727	0.608872	0.089855
Slicer_15pctEx_Total	-0.00152	-0.00686	-0.0186	-0.00438	0.000166
Slicer_IntensityMean_Ex	0.067117	-0.0342	-0.42484	0.665428	-0.00461
Slicer_IntensityStdDev_Ex	0.013944	0.02311	0.014113	0.107818	0.005698
pctEmph_UpperThird_Slicer	0.080073	0.026664	-0.01842	0.121449	-0.09006
pctEmph_LowerThird_Slicer	0.052794	0.015467	-0.03107	0.030941	0.034871
Slicer_ExpInspMeanAtten_ratio	-0.23574	-0.02207	0.613104	-0.20726	-0.03309
Pi10_SRWA	-0.00144	-0.01145	-0.00296	0.00264	-0.01069
Pi15_SRWA	-0.00333	-0.02246	-0.00636	0.00276	-0.00738
WallAreaPct_seg	-0.0021	-0.02545	-0.00941	-0.00044	-0.0171
TLCpred_race_adjusted	-0.00693	0.031241	0.012534	-0.0171	0.504166
FRCpred_race_adjusted	-0.00544	0.025172	0.012718	-0.01093	0.437007

FEV1pp_utah	-0.03722	0.641778	0.390157	0.146651	-0.10309
FVCpp_utah	-0.00162	0.211195	0.127951	0.043775	-0.12647
FEV1_FVC_utah	-0.03094	0.216483	0.134076	0.067394	0.097611
PEF_utah	-0.00203	0.034665	0.018976	0.008069	0.032864
FEF2575_utah	-0.00953	0.104866	0.058748	0.021032	0.08008

Web Figure 1

**Forced Expiratory Flow at 1 Second / Forced Vital Capacity**
N=10,129
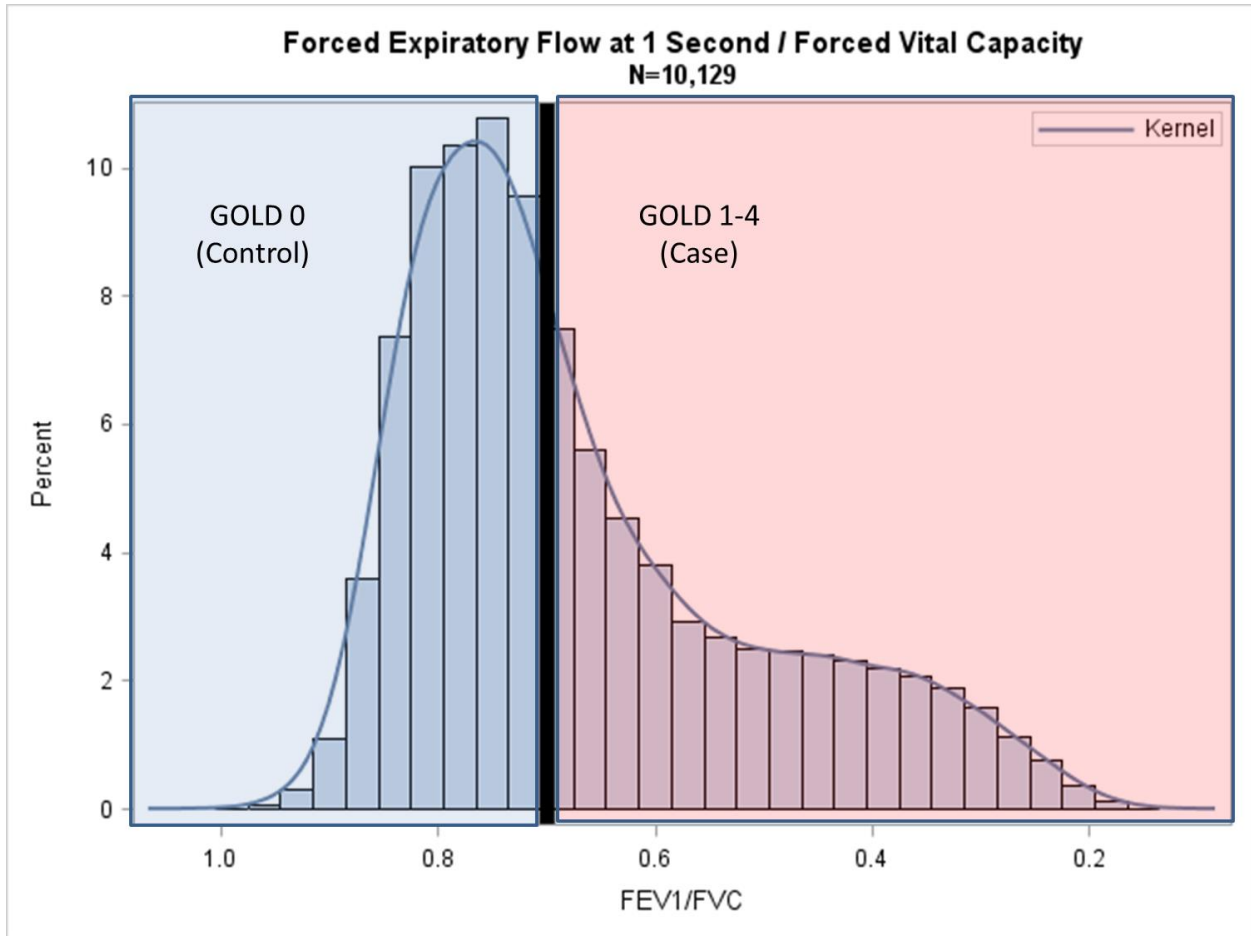
Figure 1 illustrates the distribution of FEV1/FVC measurement in the COPDGene population. COPD is commonly diagnosed using this measure where a value less than 0.8 represents disease (case) and a value greater than 0.8 versus no-disease (control). This figure does not represent the distribution of FEV1/FVC in the general population and represents the COPDGene population of >10 pack-year smokers recruited from 21 clinical sites in the US.

COPD Disease Axes and Mortality
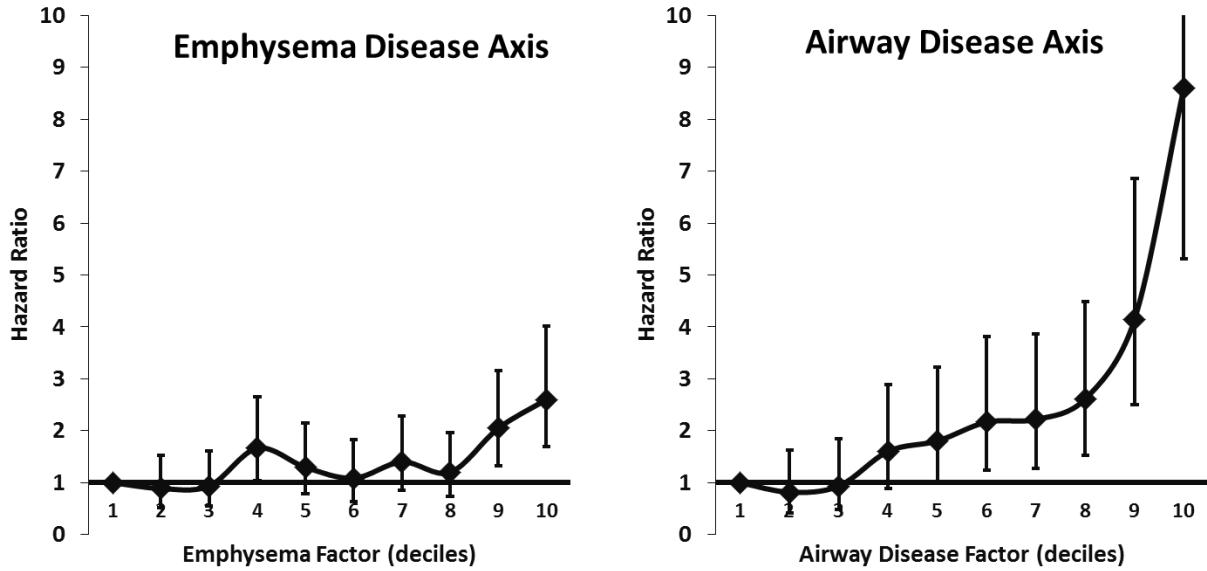
Cox Proportional Hazard Model: Models indicate a statistically significant synergistic interaction between the Emphysema and Airway Disease Axes. Airway Disease Axis included a statistically significant quadratic term.