CHEST Online Supplement

Associations Among 25-Hydroxyvitamin D Levels, Lung Function, and Exacerbation Outcomes in COPD

An Analysis of the SPIROMICS Cohort

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e-Table 1. IRB approval numbers for study recruitment centers.

Institution	Institutional Review Board Committee Name	Approval Number
Columbia University	Columbia University IRB2	IRB-AAAE9315
University of Iowa	University of Iowa Hawk IRB-01	2013088719
Johns Hopkins University	Johns Hopkins IRB-5	NA_00035701/CR00018131
University of California-Los Angeles	UCLA Medical IRB 1	10001740
University of Michigan	University of Michigan IRBMED B1	HUM00036346
National Jewish Health	National Jewish Health Institutional Review Board	19970
University of California-San Francisco	UCSF IRB Parnassas Panel	10-03196
Temple University	Temple University IRB A2	21416
University of Alabama at Birmingham	University of Alabama at Birmingham IRB 2	120906004
University of Illinois	University of Illinois IRB #3	2013-0939
University of Utah	University of Utah IRB Panel Review Board 5	00027298
Wake Forest University	Wake Forest University IRB #5	00012805

e-Table 2. Logistic regression modeling* of associations between vitamin D and odds of COPD severe exacerbations in the year prior to enrollment

	Odds of Severe Exacerbation in Previous Year (Continuous Vitamin D)			Odds of Severe Exacerbation in Previous Year (Vitamin D Deficiency status)		
	OR	95% CI	P	OR	95% CI	P
25-OH-Vitamin D (per 10 ng/ml decrease)	1.06	(03-1.20)	0.36			
25-OH-Vitamin D (<20 vs. ≥20 ng/ml)				1.38	(0.98-1.93)	0.06
Age (per 10 years)	0.54	(0.44-0.66)	<0.001	0.55	0.45-0.67	<0.001
Female Sex	1.17	(0.88-1.56)	0.29	1.15	0.86-1.53	0.34
African-American Race	2.09	(1.45-3.00)	<0.001	2.02	1.43-2.09	<0.001
Current Smoking	0.54	(0.39-0.76)	<0.001	0.53	0.38-0.74	<0.001
Pack Years Smoked (per 10 pack-years)	0.98	(0.92-1.04)	0.41	0.97	0.92-1.04	0.39
Season						
Spring	0.84	0.56-1.27	0.51	0.84	0.56-1.27	0.47
Summer	0.87	0.87-1.31	0.69	0.88	0.58-1.34	0.75
Fall	0.95	0.63-1.42	0.75	0.96	0.64-1.44	0.71
Winter	(ref)					

* Adjusted for all covariates in table

e-Table 3. Logistic regression modeling* of associations between vitamin D and odds of COPD exacerbations in the year after enrollment in the SPIROMICS cohort

	Odds of Exacerbation at One Year (Continuous Vitamin D)			Odds of Exacerbation at One Year (Vitamin D Deficiency status)		
	OR	95% CI	P	OR	95% CI	P
25-OH-Vitamin D (per 10 ng/ml decrease)	1.06	(0.61-1.18)	0.28			
25-OH-Vitamin D (<20 vs. ≥20 ng/ml)				1.14	(0.83-1.50)	0.48
Age (per 10 years)	0.66	(0.56-0.78)	<0.001	0.66	(0.56-0.78)	<0.001
Female Sex	1.56	(1.23-1.92)	<0.001	1.57	(1.21-1.95)	<0.001
African-American Race	0.79	(0.55-1.14)	0.19	0.80	(0.56-1.15)	0.21
Current Smoking	0.60	(0.45-0.79)	<0.001	0.60	(0.46-0.79)	<0.001
Pack Years Smoked (per 10 pack-years)	1.01	(0.97-1.06)	0.59	1.01	(0.97-1.06)	0.58
Season						
Spring	0.82	(0.58-1.18)	0.02	0.81	(0.57-1.16)	0.02
Summer	1.12	(0.79-1.58)	0.50	1.11	(0.78-1.57)	0.51
Fall	1.29	(0.92-1.82)	0.03	1.29	(0.91-1.81)	0.03
Winter	(ref)					

* Adjusted for all covariates in table

e-Table 4. Logistic regression modeling* of associations between vitamin D and odds of severe COPD exacerbations in the year after enrollment in the SPIROMICS cohort

	Odds of Severe Exacerbation at One Year (Continuous Vitamin D)			Odds of Severe Exacerbation at One Year (Vitamin D Deficiency status)		
	OR	95% CI	P	OR	95% CI	P
25-OH-Vitamin D (per 10 ng/ml decrease)	1.09	(0.93-1.27)	0.34			
25-OH-Vitamin D (<20 vs. ≥20 ng/ml)				0.87	(0.56-1.36)	0.55
Age (per 10 years)	0.67	(0.53-0.85)	0.001	0.51	(0.52-0.83)	<0.001
Female Sex	1.38	(0.97-1.97)	0.23	1.37	(0.96-1.94)	0.08
African-American Race	1.43	(0.89-2.28)	0.64	1.55	(0.97-2.48)	0.53
Current Smoking	0.70	(0.47-1.05)	0.08	0.72	(0.48-1.07)	0.10
Pack Years Smoked (per 10 pack-years)	1.02	(0.96-1.10)	0.50	1.03	(0.96-1.94)	0.46
Season						
Spring	0.59	(0.33-1.04)	0.16	0.57	(0.32-1.01)	0.004
Summer	1.21	(0.73-1.98)	0.60	1.16	(0.71-1.91)	0.19
Fall	1.30	(0.80-2.13)	1.33	1.27	(0.78-2.06)	0.05
Winter	(ref)					

* Adjusted for all covariates in table

e-Table 5. Comparison of point estimates of multivariable models with full cohort versus restriction to participants not reporting vitamin D supplementation

	Full Cohort (N=1609)		No Vitamin D Supplementation (N=1226)	
	Estimate*	P	Estimate*	P
Continuous Vitamin D				
Baseline FEV_1% predicted	-1.04	0.03	-2.16	0.004
Annual FEV_1 % predicted rate of change	-0.19	0.28	-0.20	0.39
Any AECOPD in prior year	1.11	0.04	1.02	0.02
Any severe AECOPD in prior year	1.06	0.36	0.99	0.16
Any AECOPD at one year	1.06	0.28	0.99	0.13
Any severe AECOPD at prior year	1.09	0.34	0.99	0.30
Vitamin D <20 vs. ≥20 ng/ml				
Baseline FEV_1% predicted	-4.11	0.004	-4.46	0.003
Annual FEV_1 % predicted rate of change	-1.27	0.02	-1.05	0.09
Any AECOPD in prior year	1.32	0.049	1.43	0.02
Any severe AECOPD in prior year	1.38	0.06	1.40	0.07
Any AECOPD at one year	1.14	0.48	1.12	0.48
Any severe AECOPD at prior year	0.87	0.55	0.86	0.53

Adjusted for all covariates as described in methods and main tables.

*Estimates from linear regression for FEV_1% predicted models and logistic regression (odds ratio) for exacerbation models.