

**Table S1.** Associations of serum 25(OH)D (per 10 nmol/L) with FEV<sub>1</sub>, FVC, F<sub>ENO</sub> and presence of a common cold in men and women participating in the Netherlands Epidemiology of Obesity study with 25(OH)D levels < 50 nmol/L.

	<b>Crude</b>	<b>Multivariate<sup>1</sup></b>	<b>+ BMI, TBF, WC<sup>2</sup></b>
<b>Regression coefficient (95% CI) per 10 nmol/L 25(OH)D</b>			
<b>FEV<sub>1</sub> (%predicted)</b>	0.98 (-1.02 to 2.98)	-0.39 (-2.33 to 1.56)	-0.55 (-2.50 to 1.39)
<b>FVC (%predicted)</b>	2.12 (0.35 to 3.88)	0.52 (-1.16 to 2.20)	0.35 (-1.21 to 1.91)
<b>F<sub>ENO</sub> (ppb)</b>	-0.60 (-1.88 to 0.67)	-0.35 (-1.45 to 0.76)	-0.08 (-1.19 to 1.03)
<b>Odds Ratio's (95%CI) per 10 nmol/L 25(OH)D</b>			
<b>Common cold</b>	0.79 (0.64 to 0.98)	0.83 (0.66 to 1.04)	0.83 (0.66 to 1.04)

Results were based on analyses in a subset of participants with 25(OH)D levels < 50 nmol/L, weighted towards the BMI distribution of the general population (n=1498), and were derived from regression coefficients with 95% confidence intervals from linear regression analyses and expressed as difference in outcome measure per 10 nmol/L 25(OH)D. <sup>1</sup> Multivariate: Adjusted for age, sex, ethnicity, number of packyears, self-reported obstructive pulmonary disease, season, use of pulmonary and anti-inflammatory medication, educational level and physical activity. <sup>2</sup> Multivariate plus adjustments for BMI, total body fat and waist circumference.

BMI: Body mass index; OR: Odds Ratio. FEV<sub>1</sub>: Forced Expiratory Volume in 1 s; FVC Forced Vital Capacity; F<sub>ENO</sub>: fractional exhaled nitric oxide; ppb: parts per billion; OR: Odds Ratio.

**Table S2.** Associations of serum 25(OH)D (per 10 nmol/L) with FEV<sub>1</sub>, FVC, F<sub>ENO</sub> and presence of a common cold in men and women participating in the Netherlands Epidemiology of Obesity study using vitamin D and multivitamin supplements.

	<b>Crude</b>	<b>Multivariate<sup>1</sup></b>	<b>+ BMI, TBF, WC<sup>2</sup></b>
<b>Regression coefficient (95% CI) per 10 nmol/L 25(OH)D</b>			
<b>FEV<sub>1</sub> (%predicted)</b>	0.34 (-0.13 to 0.80)	0.09 (-0.41 to 0.59)	0.05 (-0.40 to 0.55)
<b>FVC (%predicted)</b>	0.73 (0.26 to 1.21)	0.46 (-0.05 to 0.98)	0.35 (-0.16 to 0.87)
<b>F<sub>ENO</sub> (ppb)</b>	-0.49 (-1.05 to 1.07)	-0.15 (-0.65 to 0.35)	-0.14 (-0.64 to 0.35)
<b>Odds Ratio's (95%CI) per 10 nmol/L 25(OH)D</b>			
<b>Common cold</b>	0.94 (0.87 to 1.01)	0.97 (0.89 to 1.05)	0.98 (0.90 to 1.06)

Results were based on analyses in a subset of participants using vitamin D and multivitamin supplements, weighted towards the BMI distribution of the general population (n=1461), and were derived from regression coefficients with 95% confidence intervals from linear regression analyses and expressed as difference in outcome measure per 10 nmol/L 25(OH)D. <sup>1</sup> Multivariate: Adjusted for age, sex, ethnicity, number of packyears, self-reported obstructive pulmonary disease, season, use of pulmonary and anti-inflammatory medication, educational level and physical activity. <sup>2</sup> Multivariate plus adjustments for BMI, total body fat and waist circumference.

BMI: Body mass index; OR: Odds Ratio. FEV<sub>1</sub>: Forced Expiratory Volume in 1 s; FVC Forced Vital Capacity; F<sub>ENO</sub>: fractional exhaled nitric oxide; ppb: parts per billion; OR: Odds Ratio.

**Table S3.** Associations of serum 25(OH)D (per 10 nmol/L) with FEV<sub>1</sub>, FVC, FeNO and presence of a common cold stratified by BMI category, in men and women participating in the Netherlands Epidemiology of Obesity study, aged between 45 and 65 years.

		Crude	Multivariate <sup>1</sup>	+ BMI, TBF, WC <sup>2</sup>
<b>Regression coefficient (95%CI) per 10 nmol/L 25(OH)D</b>				
FEV <sub>1</sub> %	BMI <25	0.06 (-0.42 to 0.54)	-0.09 (-0.63 to 0.45)	-0.10 (-0.61 to 0.42)
	BMI 25-30	0.46 (0.14 to 0.78)	0.24 (-0.11 to 0.59)	0.12 (-0.23 to 0.46)
	BMI ≥30	0.70 (0.44 to 0.97)	0.69 (0.39 to 0.99)	0.46 (0.17 to 0.75)
FVC%	BMI <25	0.39 (-0.08 to 0.86)	0.09 (-0.42 to 0.59)	0.10 (-0.39 to 0.60)
	BMI 25-30	0.68 (0.37 to 0.98)	0.50 (0.18 to 0.82)	0.36 (0.05 to 0.67)
	BMI ≥30	0.88 (0.61 to 1.14)	0.72 (0.42 to 1.01)	0.46 (0.18 to 0.74)
FeNO (ppb)	BMI <25	-0.24 (-0.65 to 0.18)	0.21 (-0.22 to 0.63)	0.23 (-0.19 to 0.65)
	BMI 25-30	-0.15 (-0.43 to 0.12)	0.14 (-0.16 to 0.44)	0.14 (-0.16 to 0.44)
	BMI ≥30	-0.36 (-0.53 to -0.19)	-0.24 (-0.42 to -0.05)	-0.24 (-0.43 to -0.04)
<b>Odds Ratio's per 10 nmol/L 25(OH)D</b>				
Common cold	BMI <25	0.95 (0.88 to 1.02)	1.02 (0.94 to 1.10)	1.02 (0.94 to 1.11)
	BMI 25-30	0.96 (0.91 to 1.01)	1.00 (0.94 to 1.06)	1.00 (0.94 to 1.06)
	BMI ≥30	0.89 (0.85 to 0.93)	0.96 (0.91 to 1.01)	0.97 (0.92 to 1.01)

Results were based on analyses weighted towards the BMI distribution of the general population (n=6138), and were derived from regression coefficients with 95% confidence intervals from linear regression analyses and expressed as difference in outcome measure per 10 nmol/L 25(OH)D stratified by BMI-category (BMI<25: 43%, BMI 25 -30: 41% and BMI ≥30: 16%). <sup>1</sup> Multivariate: Adjusted for age, sex, ethnicity, number of packyears, self-reported obstructive pulmonary disease, use of pulmonary and anti-inflammatory medication, educational level, season and physical activity. <sup>2</sup> Multivariate plus adjustments for BMI, total body fat and waist circumference. FEV<sub>1</sub>: Forced Expiratory Volume in 1 s; FVC: Forced Vital Capacity; FeNO: fractional exhaled nitric oxide; ppb: parts per billion; BMI: Body Mass Index.

**Table S4.** Crude associations of serum 25(OH)D (per 10 nmol/L) with FEV<sub>1</sub>, FVC, FeNO and presence of a common cold stratified by age, in men and women participating in the Netherlands Epidemiology of Obesity study, aged between 45 and 65 years.

	<50 years	50-55 years	55-60 years	>60 years
<b>Regression coefficient (95% CI) per 10 nmol/L 25(OH)D</b>				
FEV <sub>1</sub> (%predicted)	0.55 (0.08 to 1.02)	0.69 (0.15 to 1.23)	0.32 (-0.24 to 0.87)	0.38 (-0.06 to 0.82)
FVC (%predicted)	0.84 (0.36 to 1.32)	0.99 (0.46 to 1.52)	1.03 (0.52 to 1.54)	0.57 (0.11 to 1.02)
FeNO (ppb)	-0.30 (-0.84 to 0.24)	-0.43 (-0.87 to 0.00)	-0.05 (-0.37 to 0.28)	-0.04 (-0.40 to 0.32)
<b>Odds Ratio's (95%CI) per 10 nmol/L 25(OH)D</b>				
Common cold	0.91 (0.84 to 0.99)	0.90 (0.83 to 0.98)	1.00 (0.93 to 1.07)	0.94 (0.88 to 1.01)

Results were based on analyses weighted towards the BMI distribution of the general population (n=6138), and were derived from regression coefficients with 95% confidence intervals from linear regression analyses and expressed as difference in outcome measure per 10 nmol/L 25(OH)D stratified by age-category (age <50: 21%, 50-55:22%, 55-60: 23% and ≥60: 34%).FEV<sub>1</sub>: Forced Expiratory Volume in 1 s; FVC: Forced Vital Capacity; FeNO: fractional exhaled nitric oxide; ppb: parts per billion; BMI: Body Mass Index.

**Table S5.** Crude associations of serum 25(OH)D (per 10 nmol/L) with FEV<sub>1</sub>, FVC, FeNO and presence of a common cold stratified by sex, in participants of the Netherlands Epidemiology of Obesity study, aged between 45 and 65 years.

	<b>Men</b>	<b>Women</b>
<b>Regression coefficient (95% CI) per 10 nmol/L 25(OH)D</b>		
<b>FEV<sub>1</sub> (%predicted)</b>	0.54 (0.16 to 0.92)	0.33 (0.01 to 0.65)
<b>FVC (%predicted)</b>	0.56 (0.23 to 0.89)	0.72 (0.39 to 1.04)
<b>FeNO (ppb)</b>	0.00 (-0.36 to 0.36)	-0.17 (-0.42 to 0.07)
<b>Regression coefficient (95% CI) per 10 nmol/L 25(OH)D</b>		
<b>Common cold</b>	0.92 (0.87 to 0.97)	0.96 (0.91 to 1.01)

Results were based on analyses weighted towards the BMI distribution of the general population (n=6138), and were derived from regression coefficients with 95% confidence intervals from linear regression analyses and expressed as difference in outcome measure per 10 nmol/L 25(OH)D stratified by sex (men: 44%, women: 56%). FEV<sub>1</sub>: Forced Expiratory Volume in 1 s; FVC: Forced Vital Capacity; FeNO: fractional exhaled nitric oxide; ppb: parts per billion; BMI: Body Mass Index.