Paper 2: Vitamin D

Windy Wang

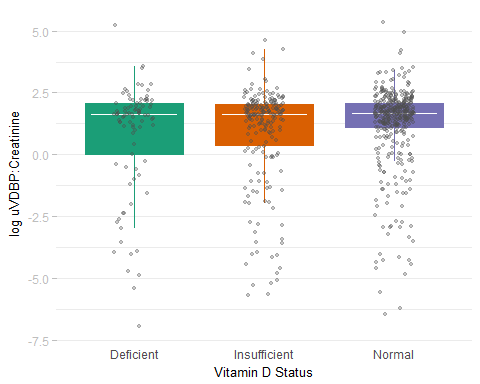
# PAPER 2: VITAMIN D RESULTS

### Subject Characteristics

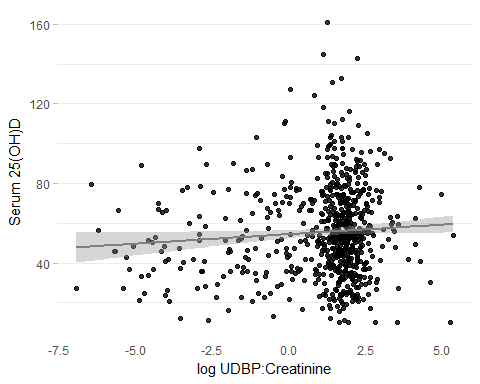
## [1] "Table 1: Subject characteristics across vitamin D status at baseline"  
## Stratified by vitdStatus  
## Deficient   
## n 89   
## Age (mean (sd)) 45.61 (8.39)   
## Sex = Male (%) 22 (24.7)   
## Ethnicity (%)   
## European 38 (42.7)   
## Latino/a 10 (11.2)   
## Other 23 (25.8)   
## South Asian 18 (20.2)   
## BMI (mean (sd)) 34.12 (7.18)   
## Waist (mean (sd)) 104.62 (15.01)   
## eGFR (mean (sd)) 102.64 (14.78)   
## ACR (median [IQR]) 0.54 [0.31, 0.95]   
## UrineCreatinine (mean (sd)) 12.68 (6.20)   
## UrineMicroalbumin (median [IQR]) 6.00 [2.99, 11.30]   
## UrinaryCalcium (mean (sd)) 2.04 (1.57)   
## UDBP (median [IQR]) 49.88 [7.57, 109.85]  
## udbpCrRatio (mean (sd)) 7.81 (20.39)   
## VitaminD (mean (sd)) 22.63 (5.49)   
## PTH (mean (sd)) 5.38 (2.18)   
## MET (mean (sd)) 35.77 (58.48)   
## Systolic (mean (sd)) 125.66 (14.84)   
## Diastolic (mean (sd)) 80.92 (9.96)   
## MeanArtPressure (mean (sd)) 95.83 (10.54)   
## OralContraceptive = 1 (%) 3 (7.3)   
## dmStatus (%)   
## NGT 71 (79.8)   
## PreDM 4 (4.5)   
## DM 14 (15.7)   
## Stratified by vitdStatus  
## Insufficient   
## n 202   
## Age (mean (sd)) 48.86 (9.62)   
## Sex = Male (%) 76 (37.6)   
## Ethnicity (%)   
## European 110 (54.5)   
## Latino/a 48 (23.8)   
## Other 28 (13.9)   
## South Asian 16 (7.9)   
## BMI (mean (sd)) 32.46 (6.52)   
## Waist (mean (sd)) 102.07 (15.60)   
## eGFR (mean (sd)) 95.59 (14.09)   
## ACR (median [IQR]) 0.57 [0.37, 0.94]   
## UrineCreatinine (mean (sd)) 12.51 (6.52)   
## UrineMicroalbumin (median [IQR]) 6.45 [3.00, 11.30]   
## UrinaryCalcium (mean (sd)) 2.51 (1.77)   
## UDBP (median [IQR]) 54.25 [12.63, 93.22]  
## udbpCrRatio (mean (sd)) 6.46 (10.42)   
## VitaminD (mean (sd)) 40.55 (5.52)   
## PTH (mean (sd)) 4.78 (1.76)   
## MET (mean (sd)) 47.19 (68.96)   
## Systolic (mean (sd)) 126.39 (15.86)   
## Diastolic (mean (sd)) 80.56 (10.50)   
## MeanArtPressure (mean (sd)) 95.83 (11.50)   
## OralContraceptive = 1 (%) 3 (5.0)   
## dmStatus (%)   
## NGT 167 (82.7)   
## PreDM 4 (2.0)   
## DM 31 (15.3)   
## Stratified by vitdStatus  
## Normal p test   
## n 391   
## Age (mean (sd)) 51.19 (10.30) <0.001   
## Sex = Male (%) 117 (29.9) 0.054   
## Ethnicity (%) <0.001   
## European 296 (75.7)   
## Latino/a 40 (10.2)   
## Other 35 (9.0)   
## South Asian 20 (5.1)   
## BMI (mean (sd)) 29.89 (5.38) <0.001   
## Waist (mean (sd)) 96.42 (14.70) <0.001   
## eGFR (mean (sd)) 92.72 (14.48) <0.001   
## ACR (median [IQR]) 0.53 [0.34, 0.92] 0.637 nonnorm  
## UrineCreatinine (mean (sd)) 11.39 (6.47) 0.063   
## UrineMicroalbumin (median [IQR]) 5.00 [2.10, 11.00] 0.039 nonnorm  
## UrinaryCalcium (mean (sd)) 2.28 (1.71) 0.089   
## UDBP (median [IQR]) 46.47 [17.88, 88.92] 0.948 nonnorm  
## udbpCrRatio (mean (sd)) 7.23 (14.19) 0.718   
## VitaminD (mean (sd)) 70.56 (17.57) <0.001   
## PTH (mean (sd)) 4.29 (1.49) <0.001   
## MET (mean (sd)) 54.52 (63.91) 0.038   
## Systolic (mean (sd)) 126.44 (16.38) 0.916   
## Diastolic (mean (sd)) 79.90 (10.36) 0.609   
## MeanArtPressure (mean (sd)) 95.41 (11.57) 0.893   
## OralContraceptive = 1 (%) 8 (7.1) 0.845   
## dmStatus (%) 0.020   
## NGT 331 (84.7)   
## PreDM 25 (6.4)   
## DM 35 (9.0)

## [1] "Table 2: Subject characteristics across visit numbers"  
## Stratified by fVN  
## Baseline 3Year   
## n 729 636   
## Age (mean (sd)) 49.78 (10.03) 54.64 (9.97)   
## Sex = Male (%) 232 (31.8) 190 (29.9)   
## Ethnicity (%)   
## European 475 (65.2) 455 (71.5)   
## Latino/a 108 (14.8) 65 (10.2)   
## Other 89 (12.2) 65 (10.2)   
## South Asian 57 (7.8) 51 (8.0)   
## BMI (mean (sd)) 31.11 (6.18) 31.30 (6.35)   
## Waist (mean (sd)) 99.06 (15.30) 100.28 (15.21)   
## MET (mean (sd)) 50.32 (65.50) 48.24 (59.65)   
## VitaminD (mean (sd)) 55.42 (22.96) 74.00 (26.37)   
## PTH (mean (sd)) 4.56 (1.71) 4.99 (1.83)   
## UDBP (median [IQR]) 47.56 [15.30, 93.10] 39.96 [8.55, 89.91]  
## udbpCrRatio (median [IQR]) 5.17 [2.51, 7.74] 4.91 [0.95, 7.85]   
## Systolic (mean (sd)) 126.19 (16.00) 127.29 (14.98)   
## Diastolic (mean (sd)) 80.13 (10.32) 80.04 (10.05)   
## MeanArtPressure (mean (sd)) 95.48 (11.40) 95.79 (10.65)   
## OralContraceptive = 1 (%) 16 (7.1) 0 (NaN)   
## dmStatus (%)   
## NGT 601 (82.4) 380 (59.7)   
## PreDM 38 (5.2) 136 (21.4)   
## DM 90 (12.3) 120 (18.9)   
## Stratified by fVN  
## 6Year p test   
## n 487   
## Age (mean (sd)) 57.24 (9.66) <0.001   
## Sex = Male (%) 140 (28.7) 0.494   
## Ethnicity (%) 0.033   
## European 355 (72.9)   
## Latino/a 48 (9.9)   
## Other 47 (9.7)   
## South Asian 37 (7.6)   
## BMI (mean (sd)) 31.04 (6.37) 0.764   
## Waist (mean (sd)) 100.68 (15.36) 0.149   
## MET (mean (sd)) 45.81 (59.44) 0.462   
## VitaminD (mean (sd)) 84.50 (28.17) <0.001   
## PTH (mean (sd)) 4.66 (1.94) <0.001   
## UDBP (median [IQR]) 48.91 [12.04, 89.70] 0.135 nonnorm  
## udbpCrRatio (median [IQR]) 5.08 [1.56, 8.34] 0.447 nonnorm  
## Systolic (mean (sd)) 125.95 (15.03) 0.277   
## Diastolic (mean (sd)) 79.52 (9.37) 0.560   
## MeanArtPressure (mean (sd)) 95.00 (10.35) 0.483   
## OralContraceptive = 1 (%) 0 (NaN) NaN   
## dmStatus (%) <0.001   
## NGT 306 (62.8)   
## PreDM 90 (18.5)   
## DM 91 (18.7)

### Cross-Sectional



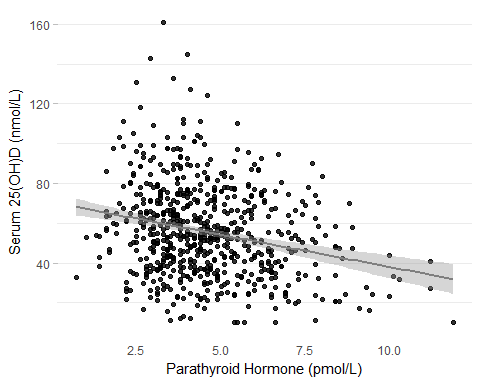
## # A tibble: 3 x 2  
## vitdStatus n  
## <ord> <int>  
## 1 Deficient 89  
## 2 Insufficient 202  
## 3 Normal 390  
## Df Sum Sq Mean Sq F value Pr(>F)   
## vitdStatus 2 25.3 12.649 3.69 0.0255 \*  
## Residuals 678 2324.0 3.428   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
## Tukey multiple comparisons of means  
## 95% family-wise confidence level  
##   
## Fit: aov(formula = log(udbpCrRatio) ~ vitdStatus, data = vitd)  
##   
## $vitdStatus  
## diff lwr upr p adj  
## Insufficient-Deficient 0.1169287 -0.43633887 0.6701963 0.8730480  
## Normal-Deficient 0.4642198 -0.04663777 0.9750775 0.0837455  
## Normal-Insufficient 0.3472911 -0.02968365 0.7242659 0.0782303



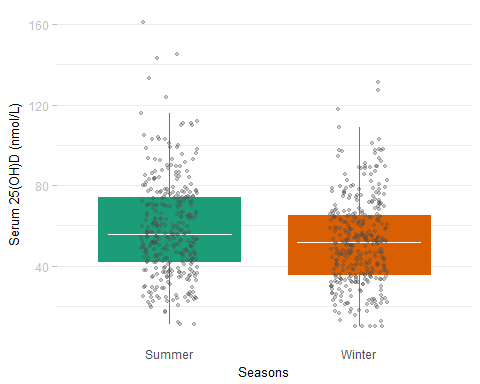
##   
## Spearman's rank correlation rho  
##   
## data: VitaminD and udbpCrRatio  
## S = 51002000, p-value = 0.4183  
## alternative hypothesis: true rho is not equal to 0  
## sample estimates:  
## rho   
## 0.03106497

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Yterms | Xterms | term | estCI | p |
| VitaminD | logudbpCrRatio | <-Xterm | 0.96 (0.03, 1.88) | 0.04 |
| VitaminD | logudbpCrRatio | <-Xterm | 0.32 (-0.53, 1.17) | 0.46 |
| VitaminD | logudbpCrRatio | ageBase | 0.25 (0.09, 0.41) | <0.001 |
| VitaminD | logudbpCrRatio | SexMale | 1.51 (-1.95, 4.96) | 0.39 |
| VitaminD | logudbpCrRatio | EthnicityEuropean | 14.83 (11.39, 18.26) | <0.001 |
| VitaminD | logudbpCrRatio | BMI | -1.2 (-1.46, -0.94) | <0.001 |
| VitaminD | logudbpCrRatio | MET | 0.01 (-0.01, 0.03) | 0.4 |
| VitaminD | logudbpCrRatio | fDMDM | -9.59 (-14.54, -4.65) | <0.001 |

#### Possible Effect Modifiers

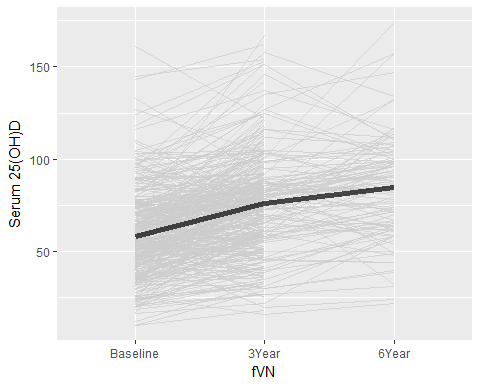
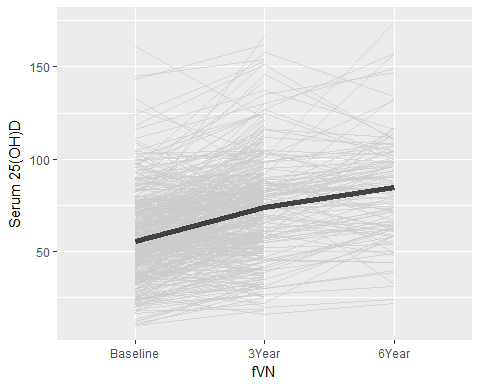


|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Yterms | Xterms | term | estCI | p |
| VitaminD | PTH | <-Xterm | -3.24 (-4.23, -2.24) | <0.001 |



## # A tibble: 2 x 2  
## Season n  
## <chr> <int>  
## 1 Summer 358  
## 2 Winter 371  
## Df Sum Sq Mean Sq F value Pr(>F)   
## Season 1 7047 7047 13.61 0.000243 \*\*\*  
## Residuals 680 352038 518   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
## 47 observations deleted due to missingness  
## Tukey multiple comparisons of means  
## 95% family-wise confidence level  
##   
## Fit: aov(formula = VitaminD ~ Season, data = dsBase)  
##   
## $Season  
## diff lwr upr p adj  
## Winter-Summer -6.428891 -9.850274 -3.007507 0.0002427

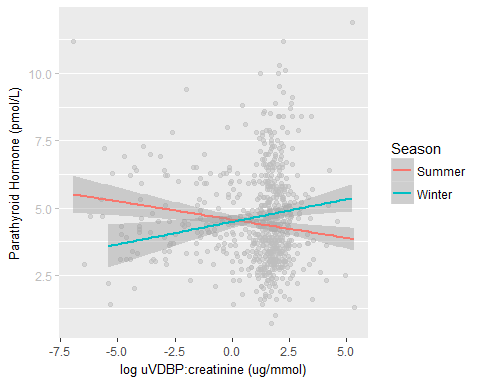
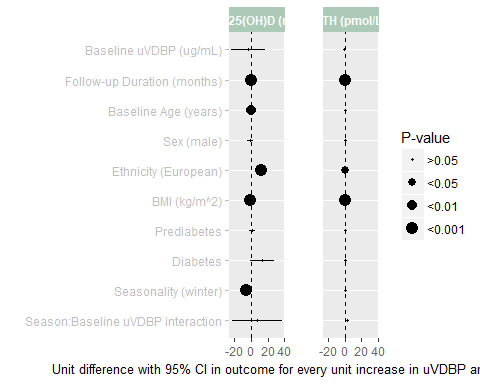
### Progression



## Df Sum Sq Mean Sq F value Pr(>F)   
## fVN 2 95369 47684 74.93 <2e-16 \*\*\*  
## Residuals 864 549807 636   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
## 372 observations deleted due to missingness  
## Tukey multiple comparisons of means  
## 95% family-wise confidence level  
##   
## Fit: aov(formula = VitaminD ~ fVN, data = dsComplete)  
##   
## $fVN  
## diff lwr upr p adj  
## 3Year-Baseline 18.332555 14.025870 22.63924 0.0000000  
## 6Year-Baseline 26.955529 20.519697 33.39136 0.0000000  
## 6Year-3Year 8.622974 2.089293 15.15665 0.0056913

### Generalized Estimating Equations

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Yterms | Xterms | term | estCI | p |
| PTH (pmol/L) | Baseline uVDBP (ug/mL) | Baseline uVDBP (ug/mL) | 0.56 (-1.26, 2.39) | 0.55 |
| Serum 25(OH)D (nmol/L) | Baseline uVDBP (ug/mL) | Baseline uVDBP (ug/mL) | -2.87 (-19.34, 13.6) | 0.73 |
| PTH (pmol/L) | Baseline uVDBP (ug/mL) | Baseline uVDBP (ug/mL) | 0.71 (-0.97, 2.39) | 0.41 |
| PTH (pmol/L) | Baseline uVDBP (ug/mL) | Follow-up Duration (months) | 0.01 (0, 0.01) | <0.001 |
| PTH (pmol/L) | Baseline uVDBP (ug/mL) | Baseline Age (years) | 0.01 (0, 0.02) | 0.06 |
| PTH (pmol/L) | Baseline uVDBP (ug/mL) | SexMale | 0.02 (-0.25, 0.28) | 0.89 |
| PTH (pmol/L) | Baseline uVDBP (ug/mL) | EthnicityEuropean | -0.28 (-0.55, -0.02) | 0.04 |
| PTH (pmol/L) | Baseline uVDBP (ug/mL) | BMI (kg/m^2) | 0.06 (0.04, 0.08) | <0.001 |
| PTH (pmol/L) | Baseline uVDBP (ug/mL) | dmStatusPreDiabetes | -0.15 (-0.42, 0.12) | 0.28 |
| PTH (pmol/L) | Baseline uVDBP (ug/mL) | dmStatusDiabetes | 0.21 (-0.54, 0.97) | 0.58 |
| PTH (pmol/L) | Baseline uVDBP (ug/mL) | SeasonWinter | 0.07 (-0.11, 0.26) | 0.43 |
| Serum 25(OH)D (nmol/L) | Baseline uVDBP (ug/mL) | Baseline uVDBP (ug/mL) | 0.89 (-13.4, 15.18) | 0.9 |
| Serum 25(OH)D (nmol/L) | Baseline uVDBP (ug/mL) | Follow-up Duration (months) | 0.36 (0.31, 0.41) | <0.001 |
| Serum 25(OH)D (nmol/L) | Baseline uVDBP (ug/mL) | Baseline Age (years) | 0.27 (0.1, 0.43) | <0.001 |
| Serum 25(OH)D (nmol/L) | Baseline uVDBP (ug/mL) | SexMale | -1.23 (-4.79, 2.33) | 0.5 |
| Serum 25(OH)D (nmol/L) | Baseline uVDBP (ug/mL) | EthnicityEuropean | 12.24 (8.67, 15.81) | <0.001 |
| Serum 25(OH)D (nmol/L) | Baseline uVDBP (ug/mL) | BMI (kg/m^2) | -1.15 (-1.42, -0.89) | <0.001 |
| Serum 25(OH)D (nmol/L) | Baseline uVDBP (ug/mL) | dmStatusPreDiabetes | 1.01 (-2.62, 4.65) | 0.59 |
| Serum 25(OH)D (nmol/L) | Baseline uVDBP (ug/mL) | dmStatusDiabetes | 13.02 (-1.71, 27.75) | 0.08 |
| Serum 25(OH)D (nmol/L) | Baseline uVDBP (ug/mL) | SeasonWinter | -5.47 (-7.87, -3.07) | <0.001 |
| PTH (pmol/L) | Baseline uVDBP (ug/mL) | Baseline uVDBP (ug/mL) | -0.66 (-2.56, 1.24) | 0.5 |
| PTH (pmol/L) | Baseline uVDBP (ug/mL) | Follow-up Duration (months) | 0.01 (0, 0.01) | <0.001 |
| PTH (pmol/L) | Baseline uVDBP (ug/mL) | Baseline Age (years) | 0.01 (0, 0.02) | 0.07 |
| PTH (pmol/L) | Baseline uVDBP (ug/mL) | SexMale | 0.01 (-0.26, 0.28) | 0.94 |
| PTH (pmol/L) | Baseline uVDBP (ug/mL) | EthnicityEuropean | -0.29 (-0.56, -0.03) | 0.03 |
| PTH (pmol/L) | Baseline uVDBP (ug/mL) | BMI (kg/m^2) | 0.06 (0.04, 0.08) | <0.001 |
| PTH (pmol/L) | Baseline uVDBP (ug/mL) | dmStatusPreDiabetes | -0.18 (-0.45, 0.1) | 0.21 |
| PTH (pmol/L) | Baseline uVDBP (ug/mL) | dmStatusDiabetes | 0.25 (-0.5, 1) | 0.51 |
| PTH (pmol/L) | Baseline uVDBP (ug/mL) | SeasonWinter | -0.08 (-0.32, 0.17) | 0.54 |
| PTH (pmol/L) | Baseline uVDBP (ug/mL) | Baseline uVDBP (ug/mL):SeasonWinter | 2.41 (-0.06, 4.89) | 0.06 |
| Serum 25(OH)D (nmol/L) | Baseline uVDBP (ug/mL) | Baseline uVDBP (ug/mL) | -3.16 (-23.85, 17.53) | 0.76 |
| Serum 25(OH)D (nmol/L) | Baseline uVDBP (ug/mL) | Follow-up Duration (months) | 0.36 (0.31, 0.41) | <0.001 |
| Serum 25(OH)D (nmol/L) | Baseline uVDBP (ug/mL) | Baseline Age (years) | 0.27 (0.1, 0.43) | <0.001 |
| Serum 25(OH)D (nmol/L) | Baseline uVDBP (ug/mL) | SexMale | -1.25 (-4.83, 2.32) | 0.49 |
| Serum 25(OH)D (nmol/L) | Baseline uVDBP (ug/mL) | EthnicityEuropean | 12.2 (8.63, 15.77) | <0.001 |
| Serum 25(OH)D (nmol/L) | Baseline uVDBP (ug/mL) | BMI (kg/m^2) | -1.16 (-1.43, -0.89) | <0.001 |
| Serum 25(OH)D (nmol/L) | Baseline uVDBP (ug/mL) | dmStatusPreDiabetes | 0.93 (-2.72, 4.59) | 0.62 |
| Serum 25(OH)D (nmol/L) | Baseline uVDBP (ug/mL) | dmStatusDiabetes | 13.14 (-1.61, 27.9) | 0.08 |
| Serum 25(OH)D (nmol/L) | Baseline uVDBP (ug/mL) | SeasonWinter | -5.91 (-9.13, -2.7) | <0.001 |
| Serum 25(OH)D (nmol/L) | Baseline uVDBP (ug/mL) | Baseline uVDBP (ug/mL):SeasonWinter | 7.09 (-22.84, 37.03) | 0.64 |



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Yterms | Xterms | term | estCI | p |
| PTH (pmol/L) | Urinary VDBP (ng/mL) | Baseline uVDBP (ug/mL) | 0.19 (-0.31, 0.68) | 0.46 |
| Serum 25(OH)D (nmol/L) | Urinary VDBP (ng/mL) | Baseline uVDBP (ug/mL) | 4.44 (-3.62, 12.5) | 0.28 |
| PTH (pmol/L) | Urinary VDBP (ng/mL) | Baseline uVDBP (ug/mL) | 0.33 (-0.19, 0.85) | 0.21 |
| PTH (pmol/L) | Urinary VDBP (ng/mL) | Follow-up Duration (months) | 0.01 (0, 0.01) | <0.001 |
| PTH (pmol/L) | Urinary VDBP (ng/mL) | Baseline Age (years) | 0.01 (0, 0.02) | 0.06 |
| PTH (pmol/L) | Urinary VDBP (ng/mL) | SexMale | 0.02 (-0.25, 0.29) | 0.88 |
| PTH (pmol/L) | Urinary VDBP (ng/mL) | EthnicityEuropean | -0.28 (-0.54, -0.01) | 0.04 |
| PTH (pmol/L) | Urinary VDBP (ng/mL) | BMI (kg/m^2) | 0.06 (0.04, 0.08) | <0.001 |
| PTH (pmol/L) | Urinary VDBP (ng/mL) | dmStatusPreDiabetes | -0.14 (-0.41, 0.13) | 0.3 |
| PTH (pmol/L) | Urinary VDBP (ng/mL) | dmStatusDiabetes | 0.21 (-0.55, 0.97) | 0.58 |
| PTH (pmol/L) | Urinary VDBP (ng/mL) | SeasonWinter | 0.07 (-0.12, 0.26) | 0.46 |
| Serum 25(OH)D (nmol/L) | Urinary VDBP (ng/mL) | Baseline uVDBP (ug/mL) | 4.55 (-1.48, 10.58) | 0.14 |
| Serum 25(OH)D (nmol/L) | Urinary VDBP (ng/mL) | Follow-up Duration (months) | 0.36 (0.31, 0.41) | <0.001 |
| Serum 25(OH)D (nmol/L) | Urinary VDBP (ng/mL) | Baseline Age (years) | 0.27 (0.11, 0.43) | <0.001 |
| Serum 25(OH)D (nmol/L) | Urinary VDBP (ng/mL) | SexMale | -1.19 (-4.75, 2.38) | 0.51 |
| Serum 25(OH)D (nmol/L) | Urinary VDBP (ng/mL) | EthnicityEuropean | 12.28 (8.71, 15.84) | <0.001 |
| Serum 25(OH)D (nmol/L) | Urinary VDBP (ng/mL) | BMI (kg/m^2) | -1.15 (-1.42, -0.89) | <0.001 |
| Serum 25(OH)D (nmol/L) | Urinary VDBP (ng/mL) | dmStatusPreDiabetes | 1.03 (-2.59, 4.65) | 0.58 |
| Serum 25(OH)D (nmol/L) | Urinary VDBP (ng/mL) | dmStatusDiabetes | 12.98 (-1.76, 27.73) | 0.08 |
| Serum 25(OH)D (nmol/L) | Urinary VDBP (ng/mL) | SeasonWinter | -5.58 (-8, -3.15) | <0.001 |
| PTH (pmol/L) | Urinary VDBP (ng/mL) | Baseline uVDBP (ug/mL) | 0.04 (-1.01, 1.08) | 0.95 |
| PTH (pmol/L) | Urinary VDBP (ng/mL) | Follow-up Duration (months) | 0.01 (0, 0.01) | <0.001 |
| PTH (pmol/L) | Urinary VDBP (ng/mL) | Baseline Age (years) | 0.01 (0, 0.02) | 0.07 |
| PTH (pmol/L) | Urinary VDBP (ng/mL) | SexMale | 0.02 (-0.25, 0.28) | 0.9 |
| PTH (pmol/L) | Urinary VDBP (ng/mL) | EthnicityEuropean | -0.28 (-0.54, -0.01) | 0.04 |
| PTH (pmol/L) | Urinary VDBP (ng/mL) | BMI (kg/m^2) | 0.06 (0.04, 0.08) | <0.001 |
| PTH (pmol/L) | Urinary VDBP (ng/mL) | dmStatusPreDiabetes | -0.14 (-0.41, 0.12) | 0.29 |
| PTH (pmol/L) | Urinary VDBP (ng/mL) | dmStatusDiabetes | 0.22 (-0.54, 0.98) | 0.56 |
| PTH (pmol/L) | Urinary VDBP (ng/mL) | SeasonWinter | 0.04 (-0.17, 0.26) | 0.68 |
| PTH (pmol/L) | Urinary VDBP (ng/mL) | Baseline uVDBP (ug/mL):SeasonWinter | 0.39 (-0.85, 1.63) | 0.54 |
| Serum 25(OH)D (nmol/L) | Urinary VDBP (ng/mL) | Baseline uVDBP (ug/mL) | 4.84 (-9.01, 18.69) | 0.49 |
| Serum 25(OH)D (nmol/L) | Urinary VDBP (ng/mL) | Follow-up Duration (months) | 0.36 (0.31, 0.41) | <0.001 |
| Serum 25(OH)D (nmol/L) | Urinary VDBP (ng/mL) | Baseline Age (years) | 0.27 (0.11, 0.43) | <0.001 |
| Serum 25(OH)D (nmol/L) | Urinary VDBP (ng/mL) | SexMale | -1.19 (-4.75, 2.38) | 0.51 |
| Serum 25(OH)D (nmol/L) | Urinary VDBP (ng/mL) | EthnicityEuropean | 12.28 (8.71, 15.84) | <0.001 |
| Serum 25(OH)D (nmol/L) | Urinary VDBP (ng/mL) | BMI (kg/m^2) | -1.15 (-1.42, -0.89) | <0.001 |
| Serum 25(OH)D (nmol/L) | Urinary VDBP (ng/mL) | dmStatusPreDiabetes | 1.03 (-2.58, 4.65) | 0.58 |
| Serum 25(OH)D (nmol/L) | Urinary VDBP (ng/mL) | dmStatusDiabetes | 12.97 (-1.79, 27.73) | 0.08 |
| Serum 25(OH)D (nmol/L) | Urinary VDBP (ng/mL) | SeasonWinter | -5.55 (-8.28, -2.83) | <0.001 |
| Serum 25(OH)D (nmol/L) | Urinary VDBP (ng/mL) | Baseline uVDBP (ug/mL):SeasonWinter | -0.38 (-15.41, 14.65) | 0.96 |

