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# Poster Focus 1 Clinical/Public Health

## P145

### Albumin-adjusted calcium equation and reference interval for adjusted calcium. Data from the UK Biobank

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**Introduction:** UK Biobank (UKBB) is a health resource, with data on half a million participants aged 40-69 years, mainly white, equally represented from both sexes and is being used for various research projects.

When studying calcium metabolism, it is recommended to use the albumin-adjusted calcium, ideally with an equation based on the local population. However, UKBB did not provide an equation for this calculation. Moreover, the recommended range for calcium in the UK is the Pathology Harmony Range (2.20-2.60 mmol/L) but the best approach would be to calculate the range based on this large population.

**Aims:** To provide an equation for calculating the albumin-adjusted calcium. To calculate the reference interval for adjusted calcium.

**Methods:** We selected 374,565 patients based on available laboratory criteria (albumin, urea, creatinine, ALT, ALP) and a plot was created of total calcium against albumin. The regression equation was used to establish the adjusted calcium equation. In order to establish the UKBB reference interval, all participants with a measurement of calcium at the time of recruitment were included. Exclusion criteria were the same as above plus low eGFR (<60 ml/min/$m^2$) and/or low vitamin D (<50 nmol/L).

**Results:** The calculated equation was:

Adjusted calcium = Total calcium + 0.0177 (46.3 - albumin)

In total, 178,377 patients were involved in the reference interval calculation and the result was 2.25 to 2.56 mmol/L (9.0-10.24 mg/dl); the confidence intervals did not include the upper and lower ranges of the Pathology Harmony range.

**Conclusions:** We have provided an equation which can be used in future projects on calcium metabolism using UKBB data. We have established a population-based reference interval for albumin-adjusted calcium.

**Discussion:** The use of the correct equation and reference interval is essential when studying calcium metabolism. The UKBB interval remains to be validated in elderly and non-white populations.

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## P222

### Muscle density, but not size, correlates well with muscle performance

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**Objective:** To determine the associations of handgrip strength (HGS) and the Timed Up and Go test (TUG) with muscle size and density of different muscle levels.

**Methods:** 301 healthy participants were enrolled in this study and recruited for QCT imaging of the lumber, hip and mid-thigh. We also test muscle strength (HGS) and physical performance (TUG). Gluteus maximus muscle(GMaxM) and gluteus medius/minimus muscle(GM/MinM), trunk muscle at vertebrae L2 level and mid-thigh muscle were measured for cross-sectional areas and attenuations. Health-related covariates included blood pressure, diabetes mellitus, fracture history, fast serum glucose and the EuroQol five-dimension score (EQ-5D). General linear models were fitted using method of least squares to evaluate associations of TUG and handgrip strength with muscle CSA and density.

**Results:** None of the associations between muscle area and TUG was significant after adjustment for age, height and weight. The same result was observed in men for associations between muscle density and TUG. In contrast, in women GMaxM and trunk muscle density showed a significant association with TUG even after adjustment for age, height and weight, although slopes were rather small. Interestingly the slope was even negative in females ($\beta$ -0.06, $p = 0.001$, adjusted). In men but not in women muscle area of the gluteus maximus and of the mid-thigh were significantly associated with HGS but results were not significant for the trunk muscle. Gluteus maximus and trunk muscle density were significantly associated with HGS in men and women. Mid-thigh muscle density was significantly associated with HGS in men only.

**Conclusion:** Our study results show that muscle density performs better than muscle size in associating with muscle performance and seems to be as a surrogate for the role of physical performance as hip fracture risk factors.

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