

**CT-Based L1 Bone Mineral Density in Dutch Trauma Patients:  
Are North American Reference Values Valid in Europe?**

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**Purpose:** Opportunistic screening for bone mineral density (BMD) of the first lumbar vertebra (L1) using CT is increasingly used to identify patients at risk for osteoporosis. An extensive study in the United States has reported sex-specific normative values of CT-based BMD across all ages. The purpose of the current study is to validate these North American references values for the Dutch trauma population.

**Methods:** All trauma patients aged 16 years or older, admitted to our Level I trauma center during 2017, who underwent a CT scan of the chest or abdomen at 120 kVp within 7 days of hospital admission, were included. BMD measurements in Hounsfield units (HU) were performed manually in L1 or an adjacent vertebra. Student t test was performed to compare the Dutch mean BMD value per age group to the North American reference value. Linear regression and Pearson correlation rho ( $\rho$ ) were performed to assess the correlation of BMD and age.

**Results:** 626 patients were included (68.1% men, aged 16-95 years). Mean BMD decreased linearly with 2.4 HU per year of age with a correlation coefficient ( $\rho$ ) of  $-0.77$ . Sex-specific analysis showed that BMD of women in the age groups  $<30$  and 35-39 years was significantly higher than BMD of men at these ages. Dutch mean BMD values in the age groups over 35 years were significantly lower than the North American reference values.

**Conclusion:** Our findings indicate that using North American BMD thresholds in Dutch clinical practice would result in overdiagnosis of osteoporosis and osteopenia. Dutch guidelines may benefit from the population-specific thresholds reported here.