Serum alkaline phosphatase and phosphate and risk of mortality and hospitalization.

BACKGROUND AND OBJECTIVES: Elevated alkaline phosphatase (AlkPhos) and phosphate levels are associated with cardiovascular morbidity and mortality in patients receiving dialysis. A retrospective cohort study was conducted to test these associations in outpatients with an estimated GFR \( \geq 60 \) ml/min/1.73 m\(^2\).

DESIGN, SETTING, PARTICIPANTS, & MEASUREMENTS: Patients with serum AlkPhos and phosphate levels measured between 2000 and 2002 (n = 10,743) at Montefiore Medical Center (MMC) clinics were followed through September 11, 2008 (median 6.8 years). Mortality data were obtained via Social Security Administration records (n = 949 deaths). Hospitalization data were obtained from MMC records.

RESULTS: The mean age was 51 years, 64% were women, 22% were white, 26% were non-Hispanic black, 16% were Hispanic, 13% had a diagnosis of hypertension, 9% had diabetes mellitus, and 8% had cardiovascular disease at baseline. AlkPhos and phosphate were independently associated with mortality and cardiovascular-related hospitalization after multivariable adjustment. Comparing patients in the highest (\( > \) or \( \geq 104 \) U/L) versus lowest quartile of AlkPhos (\( \leq 66 \) U/L), the adjusted
hazard ratio (HR) for mortality was 1.65 (P trend across quartiles <0.001). For the highest compared with the lowest quartile of serum phosphate (> or =3.8 mg/dl versus < or =3.0 mg/dl), the adjusted HR for mortality was 1.29 (P trend across quartiles = 0.008). High AlkPhos but not phosphate levels were also associated with all-cause, infection-related, and fracture-related hospitalization.

**CONCLUSIONS:** Higher levels of serum AlkPhos and phosphate were associated with increased mortality and cardiovascular-related hospitalization in an inner-city clinic population. Further studies are needed to elucidate mechanisms underlying these associations.