

Longitudinal Trends in Therapy of Mineral Metabolism in the US

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Introduction

Disordered mineral metabolism in CKD is associated with mortality and its treatment may improve survival especially among Black and Hispanic patients. The 2003 KDOQI bone guidelines recommend ranges within which measures of mineral metabolism for patients with CKD should be maintained to reduce morbidity and mortality. While the KDOQI guidelines have been well publicized as the standard of care in the dialysis setting, it is not clear to what extent the management guidelines for pre-dialysis CKD patients have been embraced and implemented in practice.

Objective

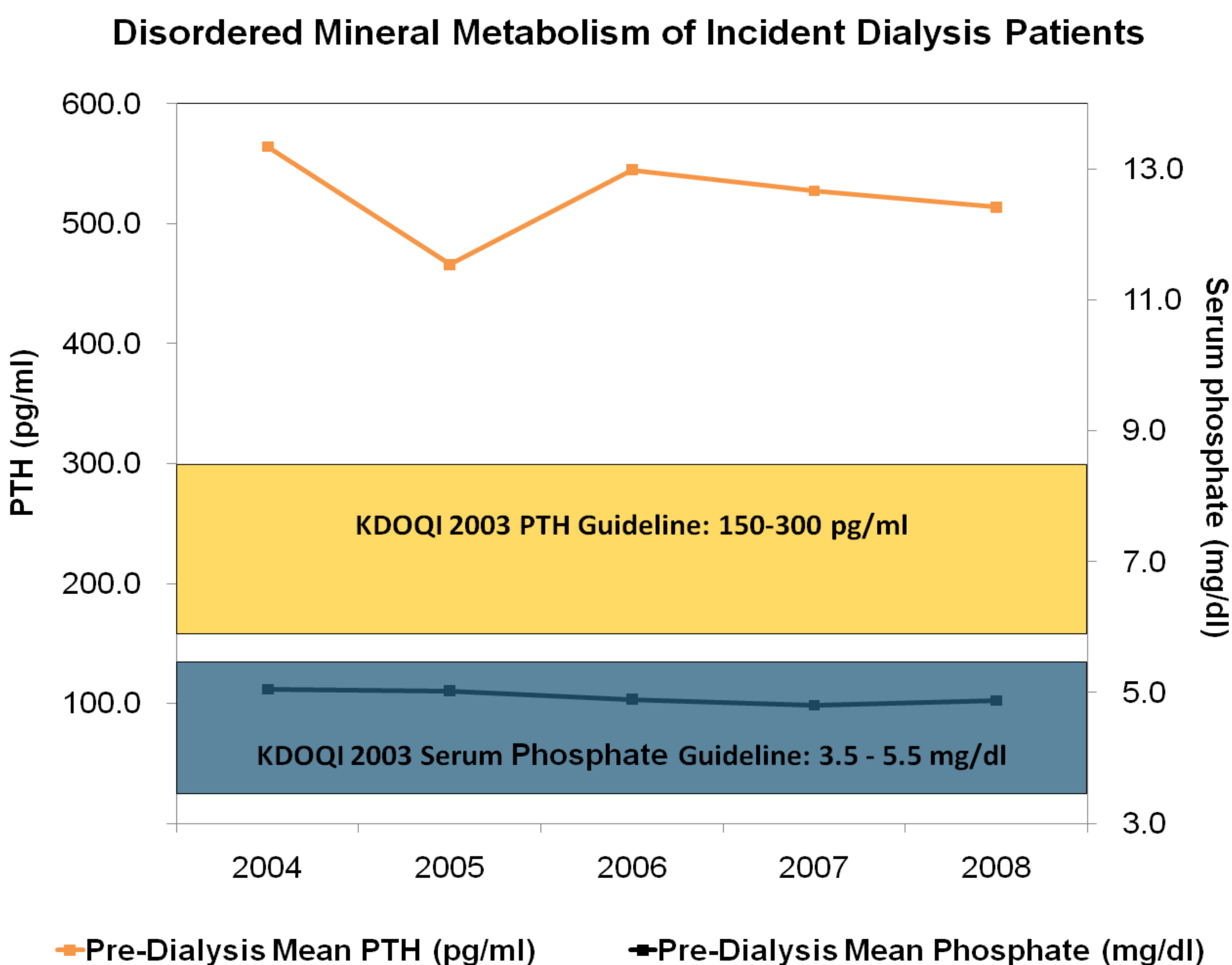
We hypothesized that the publication of the KDOQI bone guidelines in 2003 and several subsequent high-profile studies highlighting the benefits of regulating mineral metabolism in CKD, would have driven a gradual increase in interest in treating disordered mineral metabolism in pre-ESRD over time.

Study Population and Methods

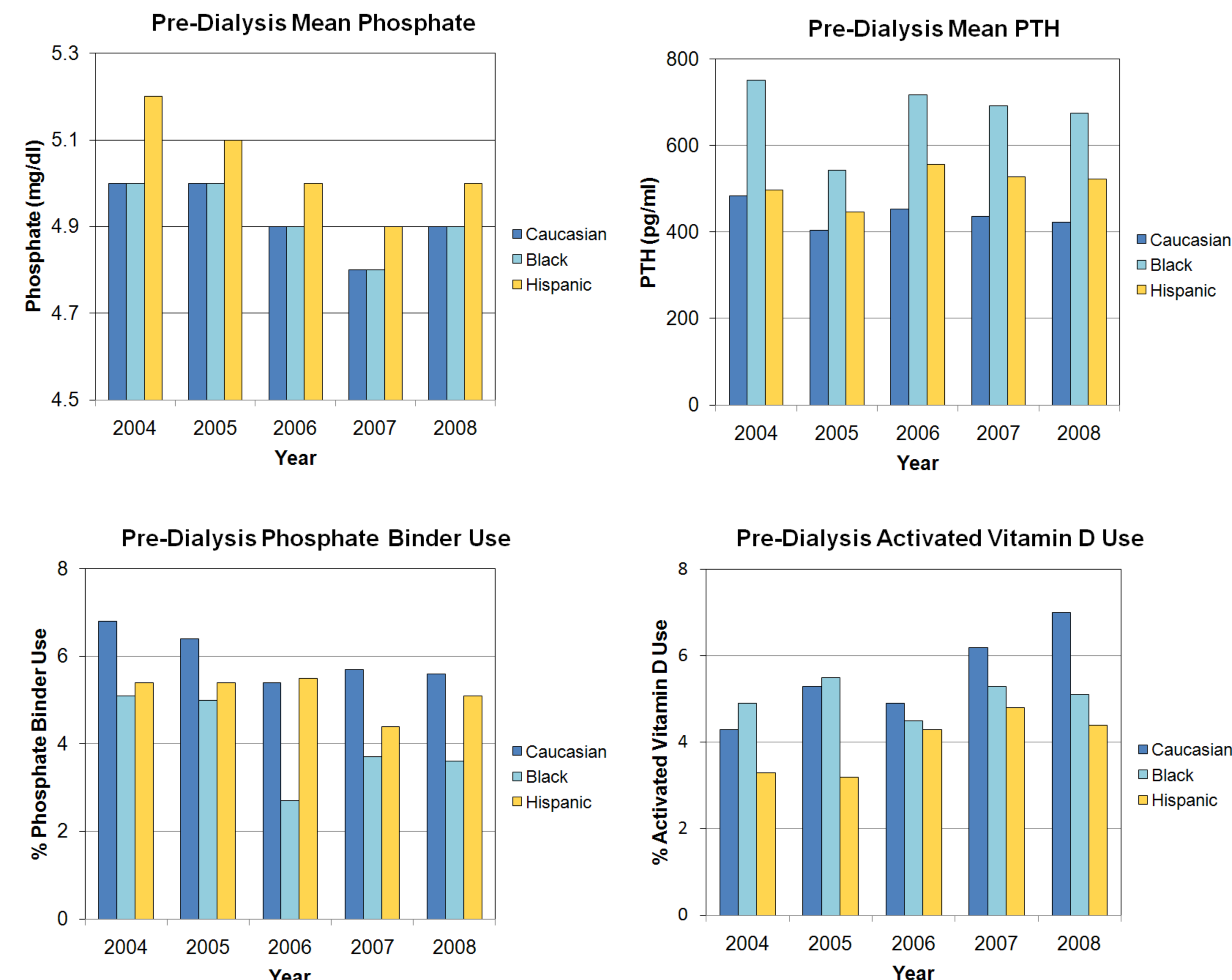
To assess US treatment patterns in pre-ESRD, we examined changes over time ('04-'08) in PTH and phosphate levels and frequency of therapy with phosphate binders and active vitamin D at the time dialysis was initiated, which served as the index time point to assess pre-ESRD care. Patients who initiated dialysis at an outpatient DaVita clinic (1st treatment within 14 days of ESRD) were analyzed (N = 91,732). We studied all patients and racial and ethnic subgroups.

Participant Characteristics

	2004	2005	2006	2007	2008
Total Patients	12,264	13,467	19,386	21,832	24,783
Male (%)	55.4	56.0	56.1	56.1	57.1
Mean age at dialysis onset (yrs)	61.7	61.9	62.2	61.9	62.0
PTH mean pre-dialysis (pg/ml)	564.2	465.9	544.9	527.3	513.7
Phos mean pre-dialysis (mg/dl)	5.1	5.0	4.9	4.8	4.9
Caucasian Patients	6,022	6,810	9,848	11,065	12,481
Male (%)	58.7	58.5	58.5	58.5	59.7
Mean age at dialysis onset (yrs)	65.2	65.6	65.9	65.7	65.7
PTH mean pre-dialysis (pg/ml)	483.9	404.2	452.6	436.5	422.4
Phos mean pre-dialysis (mg/dl)	5.0	5.0	4.9	4.8	4.9
Black Patients	3,364	3,572	5,499	6,285	7,033
Male (%)	50.5	51.1	51.3	51.9	52.6
Mean age at dialysis onset (yrs)	57.7	57.6	57.6	57.3	57.7
PTH mean pre-dialysis (pg/ml)	751.0	542.4	717.1	692.0	674.3
Phos mean pre-dialysis (mg/dl)	5.0	5.0	4.9	4.8	4.9
Hispanic Patients	1,834	1,986	2,520	2,864	3,329
Male (%)	54.9	56.5	57.5	56.5	56.5
Mean age at dialysis onset (yrs)	58.4	57.6	58.2	58.3	58.0
PTH mean pre-dialysis (pg/ml)	497.3	447.2	557.2	527.0	523.1
Phos mean pre-dialysis (mg/dl)	5.2	5.1	5.0	4.9	5.0
Other Ethnicity Patients	1,044	1,099	1,519	1,618	1,940



Results



Although mean PTH was markedly elevated and decreased minimally from '04 to '08 (564 to 514 pg/ml), only 6% of incident dialysis patients were already treated with active vitamin D in '08, compared to 4.5% in '04. Serum phosphate decreased slightly from '04 to '08 (5.1 to 4.9 mg/dl) yet only 5% of patients were on binders at initiation in '08. In '08, compared to Caucasians, Black and Hispanic patients were less likely to be treated with phosphate binders (3.6% and 5.1% vs. 5.6%) or active vitamin D (5.1% and 4.4% vs. 7.0%) prior to dialysis despite higher mean PTH levels (674 and 523 vs. 422 pg/ml) and similar serum phosphate. In contrast, during the first year after initiation of dialysis, Black and Hispanic patients were more likely than Caucasians to receive active vitamin D (85% and 80% vs. 68%) and phosphate binders (73% and 76% vs. 68%).

Conclusions

Despite the explosion of publications in the area, dissemination of clinical practice guidelines, and proliferation of CKD clinics, treatment of disordered mineral metabolism in pre-ESRD in the US is woefully inadequate and perhaps worse among minorities. While incomplete ascertainment of medications is a possible limitation, the markedly elevated PTH levels support these conclusions. Determining the causes of these dismal results is critical to developing strategies to improve outcomes in CKD, and will be especially important for maintaining appropriate care of minority patients.

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