Introduction:
Vitamin D deficiency is a recurring problem in patients undergoing orthopedic surgery. [1] Vitamin D is affected by UVB sunlight exposure, which can be influenced by geographic area. [2-3] Furthermore, low vitamin D levels have been shown to affect patient outcomes postoperatively. [6-7] This surgeon started checking vitamin D levels in total joint patients when a number of patients with very low levels and no risk factors were noted. The purpose of this study is to evaluate vitamin D levels of patients undergoing total joint arthroplasty. Given the fact that all patients are from San Diego, a perennially sunny area, we hypothesize that vitamin D levels should be within the normal range.

Methods:
We retrospectively collected laboratory results of 25-hydroxy vitamin D from 135 patients (65 men and 70 women) who underwent elective primary total knee and hip arthroplasty from January 2011 to April 2012. Age range was 45 to 99 years of age and the mean age of patients was 70.8 years. All patients were residents of San Diego, California. Unicompartmental arthroplasty, revisions, infections, and the second surgery of a staged bilateral knee or hip arthroplasty were excluded. All surgeries were within 30 days of the lab draw and were done by one orthopedic surgeon. Vitamin D status was defined as deficient (<20 ng/mL), insufficient (20-29 ng/mL), normal (30-80 ng/mL), and possible toxicity (>80 ng/mL).

Results:
Of the 135 patients, 64 (47%) had low vitamin D levels (25-hydroxy vitamin D <30 ng/mL). Of the 64 patients with low vitamin D levels, 37 (27%) were vitamin D insufficient and 27 (20%) were vitamin D deficient. In the men 26 of 65 (40%) had low vitamin D levels whereas in the women 35 of 70 (50%) showed low vitamin D levels (Figure 1). Of the men who had low vitamin D levels 15 (58%) were insufficient and 11 (42%) were deficient. Of the women who had low vitamin D levels 22 (63%) were insufficient and 14 (40%) were deficient.

Two patients experienced fractures in the one-year period following their operation. One was a tibial stress fracture diagnosed one month following total knee arthroplasty in a 70 year old female with a preoperative vitamin D level of 22 ng/mL. This was treated conservatively and healed uneventfully. The other was a 68 year old female who obtained an L-5 compression fracture 5 months postoperative of total hip arthroplasty with a preoperative vitamin D level of 26.9 ng/mL.

Figure 1 Number of Men and Women with Vitamin D level < 30 ng/mL (insufficient + deficient)

Conclusion:
Overall, 47% of our total joint arthroplasty patients were low in vitamin D, despite living in a sunny area. This is concerning because of the increased risk for intraoperative fractures, postoperative periprosthetic fractures, and/or stress fractures.[4-5] The two patients in our study that experienced postoperative fractures were categorized as having vitamin D insufficiency. Regardless of patient geographic area, age, or sex, we recommend consideration of vitamin D screening in patients undergoing total joint arthroplasty and managed accordingly to obtain optimal outcomes. Further study with larger numbers of patients is needed to determine if correction of the deficiency preoperatively is warranted.

References:
8. Patton CM, Powell AP, Patel AA. Vitamin D in Orthopedics. JAAOS 2012-March;20(3): 123-129