## 368 Failure of vitamin D therapy to achieve adequate serum levels in children with cystic fibrosis

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**Background:** Adequate serum Vitamin D levels are necessary to optimise bone health. Following recent recommendations[1], we changed our acceptable range of serum vitamin D from 19–57 ng/ml to 30–60 ng/ml. We wished to evaluate the serum levels in our clinic in light of this change.
**Method:** We used retrospective data from each child's most recent annual review between March 2006 and December 2007.
**Results:** 72 children with recent vitamin D levels were identified. Median age was 10 years (range 0.9–16.9). 34 were male and 65 (90%) were pancreatic insufficient. Median serum vitamin D was 25 ng/ml (range 8.8–61). Using our previous criteria, 16 children (22%) had levels below 19 ng/ml. Using the new range, 49 children (68%) had levels below 30 ng/ml. All but one patient had been prescribed vitamin D supplementation as per national guidelines (400–800 IU per day).
Median vitamin D in pancreatic sufficient children (29.5 ng/ml) was similar to pancreatic insufficient children (24.8 ng/ml, $p = 0.1$). There was no relationship between vitamin D and lung function. A greater proportion of patients had levels below 30 ng/ml when taken during winter/spring (29/35, 83%) compared to the summer/autumn months (19/37, 51%, $p = 0.006$).
**Conclusion:** Using the new range, the majority of children had inadequate serum vitamin D levels, despite apparent adequate supplementation. There appears to be some seasonal effect. We are collecting prospective data following increased supplementation, including high dose therapy when serum levels are below 20 ng/ml.

**Reference(s)**

[1] Cystic Fibrosis Trust. Bone Mineralisation in Cystic Fibrosis; 2007.

## 369 The effect of vitamin D supplementation on vitamin D level in children with cystic fibrosis (CF)

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**Background:** Vitamin D deficiency is increasingly being recognised and treated in children with CF. However the treatment guidelines are not proven and the effectiveness of Vitamin D preparations among CF patients is untested.
**Objective:** To evaluate the effectiveness of daily supplementation of 800 IU Vitamin D (cholecalciferol/D3) over a period of one year in children with CF.
**Methods:** During 2005–2006, serum 25(OH)D (Vitamin D) levels were measured in children with CF. Children who had vitamin D level <75nmol/L ($n = 35$) were commenced on an additional daily dose of 800 IU Vitamin D. Repeat vitamin D levels were measured one year after this intervention and recorded. Vitamin D levels were measured in the same Month for each child so that seasonal variation did not influence the results.
**Results:** Nineteen boys and 16 girls with mean age 13±0.5 (SE) were involved in the study. After the year of supplementation serum 25(OH)D levels were increased in 18 children but overall there was no significant improvement ($n = 35$), $P = 0.75$, (CI: −7.42, 5.37). When 11 children who admitted poor compliance (took supplement <7 days per week) were removed, there was still no improvement in serum (OH)D levels ($n = 24$), $P = 0.67$, (CI: −8.85, 5.77). In the 18 children whose levels did increase the improvement ranged from 9nmol/L to 18nmol/L (CI).
**Conclusion:** Although numbers may be small in this study it indicates that current dosage and method of supplementation with vitamin D in children with CF is grossly inadequate. Compliance may be one of the major factors causing the poor response to supplementation, which highlights the urgent need to source a high strength vitamin D preparation, which would be more acceptable among the CF population.

## 370 Bone mineral density and serum vitamin D levels in children with cystic fibrosis (CF)

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**Objective:** This was to review the bone density, calcium intake, serum vitamin D levels, vitamin D supplement dosage and use of steroids in children with CF.
**Method:** 19 patients with CF, 18 were pancreatic insufficient and 1 pancreatic sufficient, between the ages of 10 and 16 years completed a 3 day food diary to assess their calcium intake, had their serum vitamin D level taken and bone density assessed using a DEXA Scan. The drug history was taken from the medical notes to assess the steroid intake and the parents asked to report the vitamin D supplement dosage.
**Results:** The audit revealed that 81% of our children with CF had suboptimal serum vitamin D levels but only 5% had frank vitamin D deficiency determined by the serum result. 100% of children were meeting the RNI for calcium and reported taking 800iu vitamin D daily. 18% had a DEXA Scan z score of less than −2.0 standard deviations from the norm [a reduced bone mineral density (RBMD)] and 70% of these children had taken steroids in the last twelve months with 6% (1 child) having experienced bone fractures. There appeared to be no correlation between serum vitamin D and bone density.
**Conclusions:** RBMD exists in our children with CF and this may well be aggrevated by the use of steriods. This incidence of RBMD is in line with the reported incidence in adults of 20–30%. Serum vitamin D levels are not achieving the recommended point of >25ug/l despite the children reportedly taking 800iu per day. Calcium requirements are achieved.
There is disparity between the recommended dose of vitamin D supplementation and recommended serum levels. Bone density of children with CF should be assessed.

## 371 Seasonal variation of vitamin D and its relationship with vitamin D supplementation in children with cystic fibrosis

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**Aim:** To assess vitamin D levels among children with CF, to determine the seasonal variation and ascertain if any relationship exists between vitamin D level and supplementation (IU), Pancreatic Enzyme Replacement therapy (PERT), (IU/kg), Age and FEV 1%.
**Methods:** A retrospective review of Vitamin D from the years 2003–2007 was obtained from medical records ($n = 204$ vitamin D levels, taken from 86 patients). Vitamin D supplementation, PERT, age and FEV1% was obtained from the 86 patients and compared with their most recent vitamin D level (2006–07). Regression analysis was carried out and box plots of seasonal variation in Vitamin D were drawn.
**Results:** Twenty one per cent and 58% of Vitamin D levels were >75nmol/L and 50nmol/L respectively. Vitamin D levels varied each Month with the highest levels seen in August, September and October with median results of 69, 71 and 64 nmol/L respectively. The lowest levels were seen in December, January and February with medians of 40, 38 and 40nmol/L. No correlation between Vitamin D levels and vitamin D supplementation, PERT or FEV1% was found with r of −0.18 ($p = 0.119$), 0.12 ($p = 0.285$) and 0.2 ($p = 0.072$) respectively. There was a significant negative association between Vitamin D level and age ($r = -0.37$, $p = 0.000$).
**Conclusion:** These results show that low vitamin D levels are prevalent in children with CF as only 21% of levels were above 75nmol/L. It also highlights the seasonal variation of Vitamin D. The lack of positive correlation between Vitamin D Supplementation and Vitamin D levels show that current levels of Vitamin D supplementation (up to 2000 IU/day) may be inadequate to correct low levels in all Children with CF and thus an alternative source of vitamin D needs to be established.