Seasonal Variation in Vitamin D an Adult CF Clinic population
Joanne Barrett, Rachel Henderson*, Joanna Whitehouse.
West Midlands Adult Cystic Fibrosis Centre, Birmingham, UK.
*Department of Clinical Biochemistry, Heart of England NHS Foundation Trust, Birmingham, UK.

Abstract
Achieving vitamin D sufficiency in adults with cystic fibrosis (CF) can be a challenge due to multiple factors. In the UK, production of vitamin D from sunlight is limited to between April and October. We instigated a change in practice assessing the vitamin D status of patients during the winter months and compared the vitamin D status of the clinic and supplementation to a previous year. June 2008-May 2009, 210 levels were measured on 178 adult CF patients, 16 with pancreatic sufficiency (ps). Mean serum vitamin D level (25-hydroxyvitamin D) = 61.8 nmol/L, median monthly levels were highest in September at 80.5 nmol/L and lowest in February at 34.9 nmol/L. 46% (97/210) levels were measured between April – October. Patients achieving levels > 75 nmol/L =33% (70/210), 50 – 75 nmol/L = 31% (65/210), 30 – 50 nmol/L = 20% (43/210), 15-30 nmol/L =11% (23/210) and < 15nmol/L =4% (9/210). Median oral vitamin D supplementation was 900IU of vitamin D June 2011-May 2012, 445 levels were measured on 276 patients, 20 with ps. Mean serum vitamin D level 59.9 nmol/L, median monthly levels were highest in September at 69.4 nmol/L and lowest in December at 50.4 nmol/L. 31% (138/445) levels measured between April – October. Patients achieving levels > 75 nmol/L =27% (120/445) 50 – 75 nmol/L = 33% (145/445), 30 – 50 nmol/L = 24% (110/445), 15-30 nmol/L =11% (48/445), < 15nmol/L =5% (22/445). Median oral vitamin D supplementation was 1300 IU. Assessing vitamin D status during November-March identified 7% more suboptimal levels in our clinic. This change in practice has improved the vitamin D status of our clinic population in the winter months and increased our level of vitamin D supplementation.

Method
All serum vitamin D levels assayed from patients with cystic fibrosis who attended the West Midlands Adult CF Centre, were retrospectively obtained from the clinical chemistry electronic records between June 2008 - May 2009 and June 2011 – June 2012. Usual doses of vitamin D taken by patients were retrospectively obtained from medical records and pharmacy records.

Results

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<tr>
<td>&gt; 75 nmol/L</td>
<td>33% (70/210)</td>
<td>27% (120/445)</td>
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<tr>
<td>50-75 nmol/L</td>
<td>31% (65/210)</td>
<td>33% (145/445)</td>
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<td>30 – 50 nmol/L</td>
<td>20% (43/210)</td>
<td>24% (110/445)</td>
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<tr>
<td>15-30 nmol/L</td>
<td>11% (48/445)</td>
<td>11% (48/445)</td>
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<tr>
<td>&lt; 15 nmol/L</td>
<td>4% (9/210)</td>
<td>5% (22/445)</td>
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<tr>
<td>% during summer months</td>
<td>46% (97/210)</td>
<td>31% (138/445)</td>
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June 2008 – May 2009
210 serum vitamin D (25-hydroxyvitamin D) levels were measured on 178 subjects, 16 pancreatic sufficient.
Mean serum vitamin D level = 61.8 nmol/L (2 – 47 nmol/L)

June 2011 – May 2012
445 serum vitamin D levels were measured on 276 patients, 20 pancreatic sufficient.
Mean serum vitamin D level 59.9 nmol/L (5.6 – 246.6 nmol/L)

Conclusions
- Assessing serum vitamin D concentrations during November and March identified 7% more suboptimal levels.
- Our change in practice has reduced seasonal variation and increased the vitamin status of our clinic population during the winter months.
- Increased median vitamin D dose has led to this improvement.

Introduction
All pancreatic insufficient patients with Cystic Fibrosis (CF) require vitamin D supplements to prevent deficiency and it is recommended that people with CF achieve serum vitamin D [25-hydroxycolecalciferol ] levels of 50 - 75 nmol/L. Low bone mineral density and osteoporosis are complications of CF that have emerged with increasing survival. Whilst the aetiology of these conditions is multifactorial, vitamin D deficiency is an associated risk factor.2

Even with routine supplementation, achieving vitamin D sufficiency in people with CF is a challenge. Seasonal variation occurs in countries of low latitude such as the UK. It is only possible to produce vitamin D from the action of UV light on the skin between the months of April to October. It is recommended that vitamin D status is assessed at the end of winter when status is likely to be lowest, as this may ensure supplementation therapy is adequate all year.3

At the West Midlands Adult CF Centre it had been our usual practice to assess vitamin D levels primarily at annual review. This resulted in patients having their vitamin D status assessed at a similar time of year, annually. Following a review of the vitamin D status of our clinic in 2008-2009, we highlighted that patients who had a vitamin D level in the sufficient range were more likely to have had their vitamin D status assessed during the summer months each year. Following this we instigated a change in practice; assessing the vitamin D status of patients in our clinic during the winter months and comparing the vitamin D status of the clinic and level of supplementation between June 2011 – May 2012 and June 2008 – May 2009.