



The potential benefits of geo-mapping for visualizing the vitamin D status of Dublin City

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Vitamin D deficiency (25(OH)D \leq 30 nmol/l) is a significant global health concern with determinants of vitamin D including ethnicity, economic status, season and geographic location⁽¹⁾. The potential mining of laboratory data linked to e.g., postal districts within Dublin could have major benefits for the analysis of vitamin D status, vitamin D requesting and the possible development of tools for evaluating epidemiological trends in defined population areas⁽²⁾. Therefore, the aim of this pilot study was to investigate and geo-map the vitamin D status of GP requested tests within the postal districts of the St. James's Hospital catchment area.

The catchment area of St. James's Hospital has a population of approximately 350,000. This includes Dublin City (e.g. Dublin 2), Dublin County (e.g. Lucan) and County Kildare (e.g. Leixlip). The St James's hospital laboratory information system was searched to create a data-set of total 25(OH)D concentrations (as measured by LC-MS/MS) from GPs requests in 2014 only. Results were tabulated according to geometric mean values for vitamin D in each postal district as well as the percentage of samples deficient (\leq 30 nmol/L) or sufficient ($>$ 50 nmol/L). A total of 5,677 GP samples were received for vitamin D requests in the time period studied and 5,287 were included in the study. Location areas examined only included those with $n > 100$: D6, D6W, D8, D12, D14, D16, D20, Lucan, County Dublin, Maynooth, County Kildare, Leixlip, County Kildare and the Rest of County Kildare. Summer period was defined as the months of March-September while winter period was defined as the months October-February.

A seasonal difference in vitamin D status was observed only in D14 ($P = 0.001$), D20 ($P = 0.03$), Maynooth ($P = 0.004$) and the Rest of Kildare ($P = 0.041$). In winter D16 had the highest concentration of 25(OH)D (62.02 nmol/L), while the area with lowest was D8 (44.54 nmol/L). In the summer period, D14 had the highest concentration (66.44 nmol/L) while again, the D8 area had the lowest (48.68 nmol/L). The locations which had the largest difference between genders included Maynooth ($P < 0.001$) and D6 ($P = 0.005$) in the winter period and Leixlip ($P = 0.033$) in the summer. In a multiple comparison test, there were significant differences between females only (in winter) between the locations D8 and: D6 ($P = 0.006$); D16 ($P = 0.024$) and Maynooth ($P = 0.023$).

For the first time in Ireland, a visual depiction of 25(OH)D data can be used to aid in the rapid identification of vitamin D status trends. This, along with census related sociological data, will give a clearer indication of local and city wide vitamin D status across the St. James's Hospital catchment area. It is envisaged that this will help inform public health policy regarding endemic vitamin D inadequacy within the Greater Dublin area.

1. Laird E, Ward M, McSorley E *et al.* (2010) *Nutrients* 7, 693–724.
2. Webster C (2013) *Ann Clin Biochem* 50, 31–38.