Epidemiology of tuberculosis and levels of vitamin D in Australia: person, place and time

To the Editor: We recently reported the impact of latitude on seasonality of tuberculosis in Australia, with greater cyclic variation in southern parts of the continent.[1] We hypothesise that this seasonality is partly determined by differences in ultraviolet radiation exposure and subsequent vitamin D synthesis.[1-3]

Vitamin D deficiency (serum 25-hydroxyvitamin D levels below 50 nmol/L)[3] has become a significant public health concern in Australia. Australians with darker skin, including some migrants and Aboriginal and Torres Strait Islander people, are at particular risk of both vitamin D deficiency[3,4] and tuberculosis.[1,5]

Similar to our findings regarding tuberculosis incidence,[1] a recent Australian study found that vitamin D deficiency was most prevalent in spring and that risk was highest for residents in major cities, people from socioeconomically disadvantaged areas, and those aged 20–39 and ⩾ 80 years.[2] These factors also apply to tuberculosis, including the age distribution (Box).

The correlations between seasonal variations in, and risk factors for, vitamin D deficiency and tuberculosis in Australia reinforce the ecological association between these conditions. Such associations cannot determine causality; but their consistency argues that guidelines should consider the potential impact of vitamin D deficiency on people at greatest risk of tuberculosis.[1] The increased risk of tuberculosis conferred by vitamin D receptor polymorphisms supports a causal role for vitamin D deficiency in active tuberculosis.[6]

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Despite increasing observational data regarding vitamin D deficiency and risk of tuberculosis, evidence supporting vitamin D supplementation to reduce this risk is lacking.[6] However, given the broader potential health impacts of vitamin D deficiency in high-risk populations, we support recent calls to increase vitamin D testing in these groups and to promote supplementation for those at greatest risk of both tuberculosis and vitamin D deficiency, including migrants with darker skin.[3]

Serum 25-hydroxyvitamin D levels of at least 50 nmol/L at the end of winter have been recommended for optimal bone and muscle function,[3] with supplementation continued into spring to avert depletion.[2] This seasonal focus on ensuring adequate vitamin D levels in people at risk of both vitamin D deficiency and tuberculosis could also reduce the seasonal peak of disease each spring, particularly in the southern states of Australia.[1]

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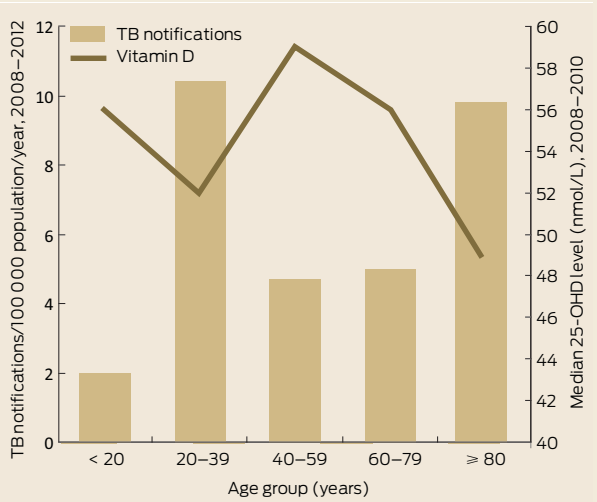
Age distribution of tuberculosis (TB) notifications* and vitamin D levels† in Australia



25-OHD = 25-hydroxyvitamin D. * Source: National Notifiable Diseases Surveillance System. † Source: Boyages and Bilinski.[2]

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