Unnecessary Vitamin D testing: an opportunity to reduce the carbon footprint of healthcare

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Background: Australia's vitamin D testing rates are high and continuing to increase despite introduction of restrictions to government funding of the tests.[1] Many are unnecessary,[2-4] representing wasted resources and avoidable carbon emissions. Healthcare accounts for 7% of Australia's total emissions.[5] Reducing unnecessary pathology testing is an opportunity to improve health, cut financial costs and safely reduce the footprint of healthcare,[6] aligning with a triple bottom line approach.[7]

Aims: We first aimed to compare annual testing rates in 2020 to 2018/2019 to assess whether testing was still increasing. Secondly, we sought to estimate the triple bottom line impact of unnecessary vitamin D testing, which involved estimating the number of unnecessary tests, costs to Medicare (Australia's universal funder), and carbon footprint.

Methods: To determine the number of tests, we obtained Medicare Item Reports for current vitamin D pathology services. To estimate the number of unnecessary tests, we reviewed literature to obtain the proportion considered unnecessary.
To estimate costs, we obtained each item's fee and benefit amounts from MBS Online, and calculated overall expenses and Medicare costs.
For the carbon footprint, we used data from our previous study of the carbon footprint of common pathology tests6 and distinguished between tests ordered as the primary test, and those ordered as an add on to other tests. The footprint for primary is 99g CO2 and 0.5g per add on tests. We conducted base case and sensitivity analyses. The base case calculation was based on 8% of vitamin D tests being the primary reason for the blood test[8]. Our sensitivity analysis calculated the footprint if 12% were the primary reason.

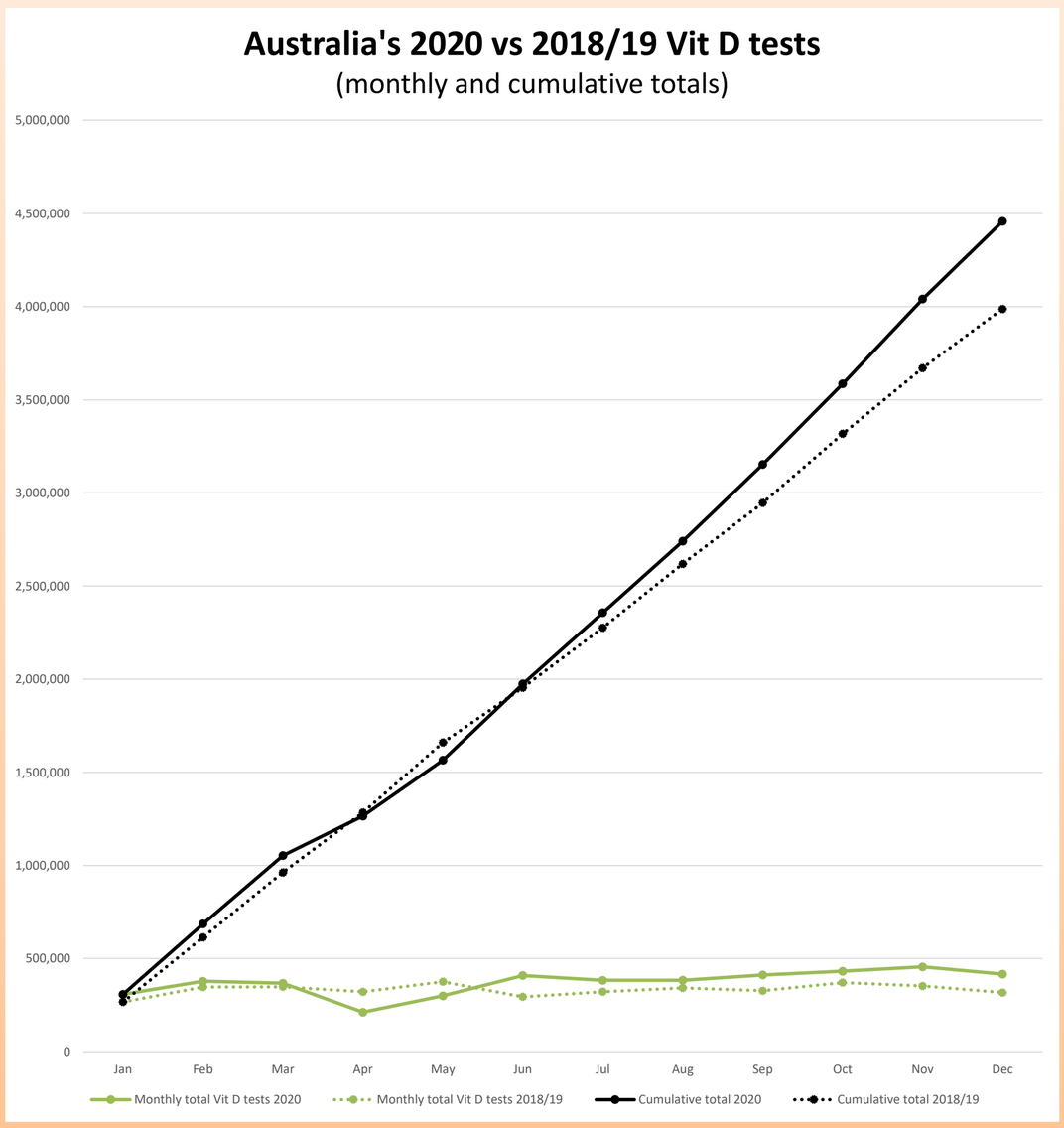
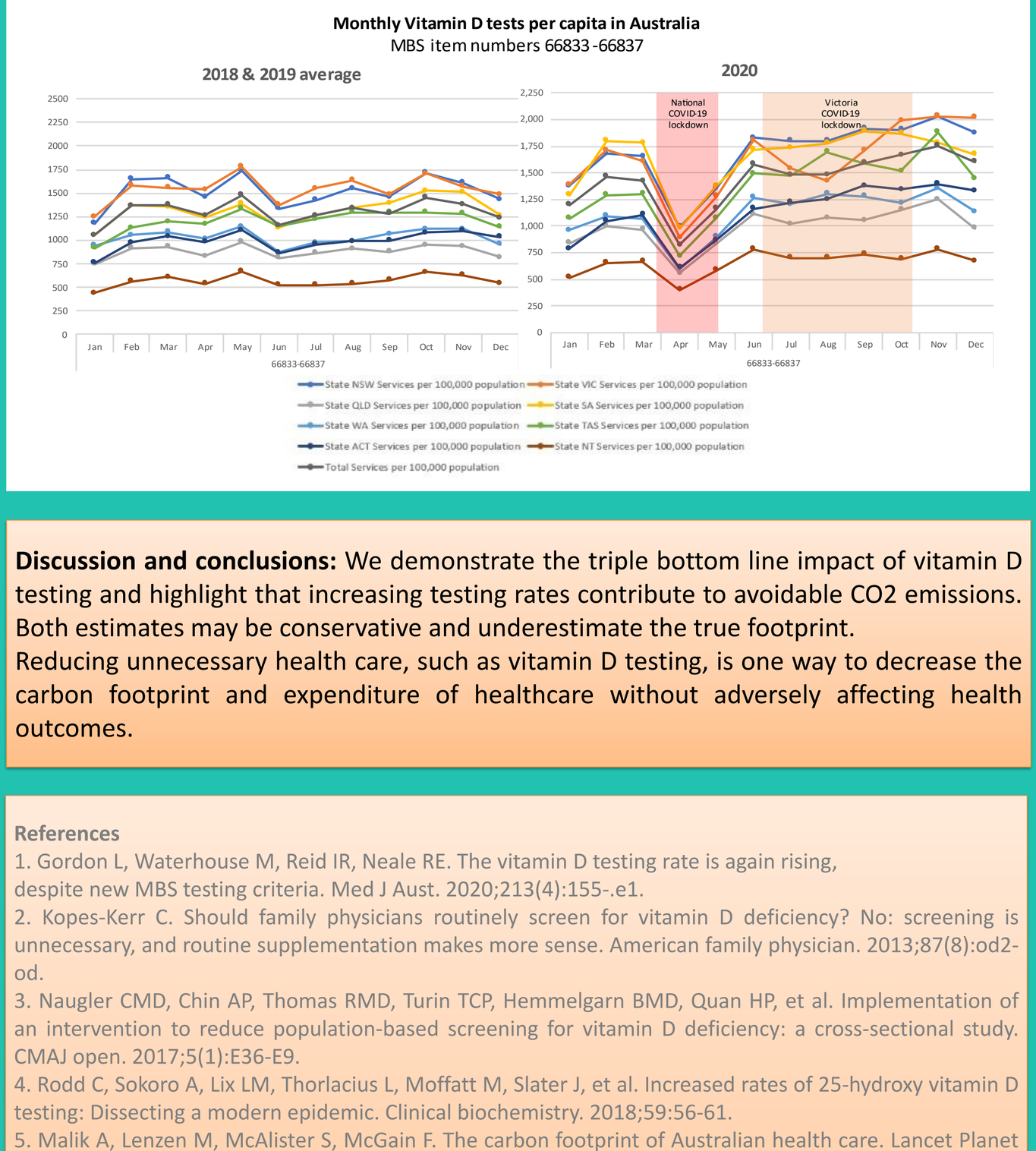


Figure 1. Australia's vitamin D testing rates in 2020 (solid line) and the average rates from 2018 and 2019 (dotted line). Black lines represent the cumulative totals, and the green lines represent the monthly rates

Results: MBS funded 4,457,657 tests in 2020, equating to approximately one test for every five Australian adults. This is an 11.79% increase from the mean 2018-2019 total (3,987,648). From our literature review, 75-90% of vitamin D tests are unnecessary, equating to 3-4million unnecessary tests in 2020. Testing fees totalled >$134million, costing Medicare >$100million not including patient out-of-pocket costs. The footprint for the base case and sensitivity analysis was >37,000kg and >55,000kg CO2e respectively, equivalent to driving >240,000km-360,000km in a standard passenger car.

Use the QR code to watch a video presentation on our study

Figure 2: Monthly vitamin D tests per capita in Australia. Shaded areas represent significant covid lockdown periods in Australia



Discussion and conclusions: We demonstrate the triple bottom line impact of vitamin D testing and highlight that increasing testing rates contribute to avoidable CO2 emissions. Both estimates may be conservative and underestimate the true footprint.
Reducing unnecessary health care, such as vitamin D testing, is one way to decrease the carbon footprint and expenditure of healthcare without adversely affecting health outcomes.

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