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Biotin Interference and Laboratory Testing: Possible Implications/Ramifications for Emergency Medicine



To the Editor:

Biotin (also known as vitamin B7 or vitamin H) interference in clinical immunoassays has been reported to alter results for some patients.¹ There are very few laboratory and clinical studies determining the magnitude, the necessity of addressing this issue, or the development of recommendations on how to manage the potential risk of biotin interference in laboratory testing. Physicians, unless otherwise warned, expect all laboratory test results to be accurate for optimal patient management. When unrecognized erroneous results are reported to them, misdiagnoses with resultant clinical mismanagement of patients can occur.

Biotin levels higher than those observed with the normal dietary intake of biotin-rich foods can interfere with troponin, human chorionic gonadotropin, thyroid-stimulating hormone, and other laboratory results. Specifically, this interference has resulted in misdiagnoses and mistreatment of heart disease, thyroid conditions, breast cancer, pregnancy, and fertility, with associated increases in adverse events and one death.²⁻⁴

Supplemental biotin is consumed by many individuals wishing to improve their hair, nail, and skin health and beauty, by expectant mothers for better fetal development, and as therapeutic treatments for patients with multiple sclerosis, dermatitis, diabetes, and other chronic illnesses. The Food and Nutrition Board at the National Academies of Sciences, Engineering, and Medicine has established the adequate intake for adults (not a daily recommended

amount) as 30 µg for men and women. There is no evidence that daily dosages of this amount interfere with testing. However over-the-counter biotin supplements can contain up to 10 mg of biotin, leading to concentrations in the blood at which interference in laboratory testing can occur.

The Mayo Clinic reported from an outpatient survey sent to 4,000 individuals, of which 1,944 were completed and returned. It showed that 7.7% of individuals (79.2% women, 20.8% men) used multivitamin or biotin supplements. Also, the authors reported that quantification of biotin in residual waste plasma samples (1,442) from emergency department patients that were sent for electrolyte analysis revealed that 737 (51.1%) contained biotin levels less than 5 ng/mL; 598 (41.5%), 5 to 9 ng/mL; 100 (6.9%), 10 to 29 ng/mL; and 7 (0.4%), greater than 30 mg/mL. At concentrations greater than 10 ng/mL (7.4% of samples measured), biotin could cause interference in some laboratory tests. Chart review of these patients indicated that 1.9% of these patients had biotin and 30.8% had multivitamins listed in their medical records.⁵

Given the increase in both biotin supplement use and the percentage of patients with higher biotin blood levels that may interfere with the accuracy of laboratory testing results, patients and physicians must be made aware of this potential problem. Emergency physicians, hospitalists, laboratorians, and the manufacturers of testing equipment should initiate further clinical studies of biotin interference in laboratory testing. Specifically, these efforts should include reviewing all laboratory tests that use technology potentially affected by the presence of biotin in blood samples, developing methods to determine the amount of biotin present (emergency physicians cannot accurately

estimate this based on patient history), and, if the levels are high, providing an accurate possible conversion or substituting an alternative reliable test.

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Aerosol Barrier Hood for Use in the Management of Critically Ill Adults With COVID-19



To the Editor:

There has been significant discussion about the management of critically ill patients with coronavirus disease 2019 (COVID-19). We share concerns with many of our colleagues about the potential for airborne spread of the virus

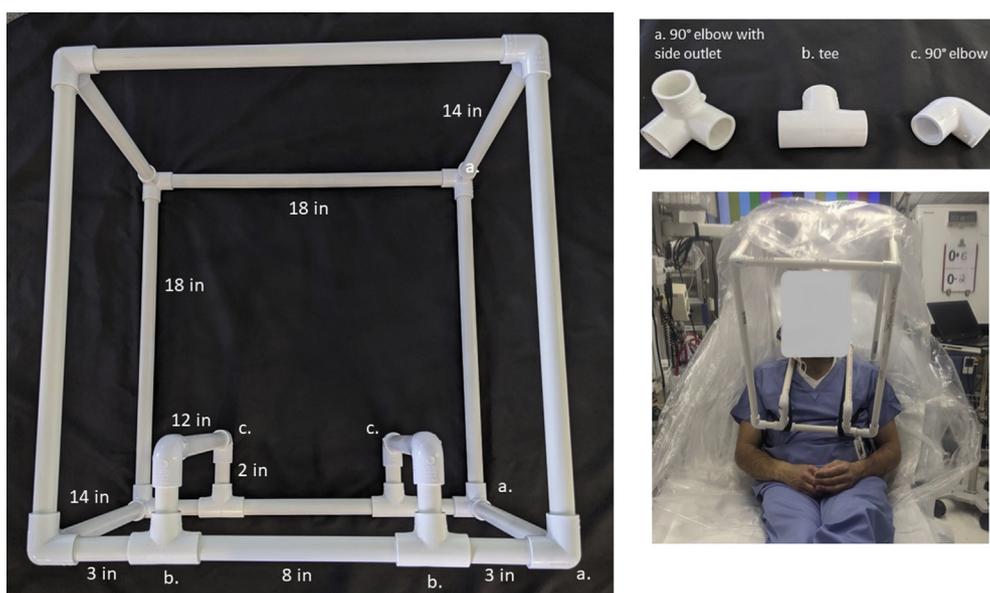


Figure 1. Aerosol hood design and proper application.