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Reply: Portable, Consumer-Grade Pulse Oximeters Are Accurate for Home and Medical Use: Implications for Their Use in Patients with COVID-19

From the Authors:

We welcome the letter from Drs. Schrading and Page "Portable, Consumer-Grade Pulse Oximeters Are Accurate for Home and Medical Use: Implications for their Use in Patients with COVID-19" and the opportunity to reply. As we indicated in our review on this topic (1), data regarding the accuracy of finger oximeters are lacking. The authors are to be commended for their large patient-centered study of one medical and two nonmedical use (NMU) oximeters (2), which adds much needed information on this important question, particularly given the demands of caring for large volumes of patients in the midst of the coronavirus disease (COVID-19) pandemic.

While their study includes a much larger number of subjects than the highest quality study on this question (3) and suggests that these devices may be accurate for use as part of home monitoring programs, caution is still warranted for several reasons. First, their study only examines two NMU oximeters, a number that pales in comparison to the large number of such devices that are available on the market. Whether their findings apply to the plethora of other devices available to consumers is not clear, particularly in light of the problems with NMU devices demonstrated in the study by Lipnick and colleagues (3).

Second, Shrading and colleagues compared the results of the finger oximeters to those obtained from a nonportable pulse oximeter in the emergency department rather than the true gold standard of cooximetry performed on arterial blood samples. While the emergency department oximeter is a Food and Drug Administration–approved device, as a pulse oximeter, it is still prone to measurement errors. In light of recently published data highlighting the inaccuracy of pulse oximetry in Black patients (4), the fact that 50.5% of the patients in the study by Shrading and colleagues were Black raises some issues as to whether their gold standard provided the degree of accuracy necessary for this study.

Finally, although a strength of their study was the fact that they examined patients rather than healthy volunteers, the overwhelming majority of the measurements in their study were on patients whose oxygen saturation was >90%. The accuracy of all oximeters decreases as the oxygen saturation decreases, particularly when the saturation is <90%. The Bland–Altman plots for the NMU devices in this study show significantly worsening levels of agreement when the saturation fell below 90%, including some cases in which the finger oximeter overestimated the saturation obtained on the emergency department devices by >10%. Had they examined performance over the range of saturation values examined by Lipnick and colleagues (3), more significant problems may have become apparent.

The pressing demands of the pandemic often require us to institute new practice patterns before adequate data may be available to support those practices. The study by Schrading and colleagues (2) is an important contribution to the literature on these widely available devices, but we must be careful to not draw overly strong conclusions about the accuracy of all NMU oximeters from their results.

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