

Commentary

Stethoscope hygiene: A call to action. Recommendations to update the CDC guidelines

Sarathi Kalra¹, Alpesh Amin², Nancy Albert³, Cindy Cadwell⁴, Cole Edmonson⁵, Robert Gaynes⁶, Mary Hand⁷, Mark Marinella⁸, Colleen Morely⁹, Sandra Sieck¹⁰ and Rajiv S. Vasudevan¹¹

¹University of South Alabama, Mobile, Alabama, ²University of California–Irvine, Irvine, California, ³Nursing Institute, Cleveland Clinic Health System, Cleveland, Ohio, ⁴Cadwell Consulting, Tacoma, Washington, ⁵AMN Healthcare, San Diego, California, ⁶Emory University, Atlanta, Georgia, ⁷Retired-National Institutes of Health, Bethesda, Maryland, ⁸Wright State University School of Medicine and Dayton Physicians Network, Dayton, Ohio, ⁹West Suburban Medical Center, Oak Park, Illinois, ¹⁰Sieck Consulting, Mobile, Alabama and ¹¹University of California–San Diego, San Diego, California

Abstract

Healthcare-acquired infections are a tremendous challenge to the US medical system. Stethoscopes touch many patients, but current guidance from the Centers for Disease Control and Prevention does not support disinfection between each patient. Stethoscopes are rarely disinfected between patients by healthcare providers. When cultured, even after disinfection, stethoscopes have high rates of pathogen contamination, identical to that of unwashed hands. The consequence of these practices may bode poorly in the coronavirus 2019 disease (COVID-19) pandemic. Alternatively, the CDC recommends the use of disposable stethoscopes. However, these instruments have poor acoustic properties, and misdiagnoses have been documented. They may also serve as pathogen vectors among staff sharing them. Disposable aseptic stethoscope diaphragm barriers can provide increased safety without sacrificing stethoscope function. We recommend that the CDC consider the research regarding stethoscope hygiene and effective solutions to contemporize this guidance and elevate stethoscope hygiene to that of the hands, by requiring stethoscope disinfection or change of disposable barrier between every patient encounter.

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The Centers for Disease Control and Prevention (CDC) reports that ~72,000 hospital patients with healthcare-acquired infections (HAIs) died during their hospitalization in 2015.¹ HAI mortality thus represents the equivalent of a jet airliner crashing, with zero survivors, every day in the United States. Although great effort has been undertaken to combat this tragedy by hand hygiene, the stethoscope, which drapes around necks, is placed in pockets, and is touched by unwashed hands day in and out, has predominantly been ignored. The lack of attention to stethoscope hygiene belies contemporary data. Current Centers for Disease Control and Prevention (CDC) guidelines² clearly state that “the stethoscope can be contaminated and spread disease.”^{3,4} Pathogens cultured from the medical practitioner’s fingers are duplicated on the stethoscope diaphragm,^{5–7} which functions as a third hand⁸ in the spread of disease. Furthermore, the ability of the stethoscope to transmit bacteria from the diaphragm to the patient has also been documented.^{9–12} Despite data reflecting the need to disinfect it before use, stethoscope hygiene is essentially ignored in contemporary clinical practice.^{13–16}

The CDC defines the stethoscope as a noncritical surface² and states that weekly disinfection with alcohol is acceptable unless it is visibly soiled. Although this would never be acceptable for the

hands, the tool with identical pathogens and that is rubbed on the skin of a majority of patients is subject to vastly different disinfection recommendations than hands. The differences in the recommendations between the hands and the stethoscope should be addressed, especially now that the possibility of stethoscope-related coronavirus disease 2019 (COVID-19) transmission must be considered.^{12,17} How many stethoscope transmissions may have occurred in the COVID-19 era?

The evidence suggests that isopropyl alcohol is partially effective in stethoscope disinfection.¹⁸ Recent studies show that disinfected stethoscopes can maintain significant rates of pathogen colonization.^{18–24} And after decades of alcohol disinfectant use, some pathogenic resistance to its sterilization effects have become apparent.^{25,26} Ultimately, although some pathogens are unaffected by alcohol (eg, *Clostridioides difficile* spores),²⁷ the critical intervention to prevent their spread is the actual disinfection of the stethoscope. Unfortunately, no observational study, of the many that have been performed, has ever documented a reasonable rate of disinfection practice.^{8,13–15,28} Clearly, current CDC recommendations are inconsistent with the overwhelming number of publications demonstrating that self-disinfection by medical providers is ineffectual,^{15,20,29} inconsistent,^{30,31} and almost never practiced.^{13,14,32} In fact, when medical practitioners are asked, their self-reported stethoscope disinfecting rates commonly exceed 50%; however, when cultured, the growth rate from stethoscopes reported to have been disinfected >50% of the time is similar to that of observational stethoscope disinfection studies with

Author for correspondence: Sarathi Kalra; Email sarathikalra@gmail.com

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disinfection rates in the single digits.^{8,13–15,28} Clearly, self-reported hygiene rates are not a reliable metric.

Medical professionals generally understand the vector potential of the stethoscope. Although calls for regular stethoscope hygiene are not unusual,³³ why are these disinfection practices universally ignored? It is the simple math of time. If a medical practitioner seeing 30 patients per day is expected to engage in a before-and-after stethoscope disinfection of 60 seconds, this equates to an hour per day dedicated to stethoscope disinfection. At this time cost, medical practitioner stethoscope hygiene between patients is not a viable strategy for promoting stethoscope hygiene. A more acceptable strategy could be disinfecting the stethoscope while introducing themselves or while having a discussion with the patient.

Alternatives to washing have been suggested. The most popular suggestion, and the one recommended by the CDC,²² is the disposable stethoscope. With this strategy, a patient receives an inexpensive stethoscope that every subsequent medical provider shares. This option is a tremendously undesirable solution for 2 reasons. First, medical providers are generally not interested in sharing what is likely a contaminated device among a group of practitioners. Is there a more effective way of inoculating all your staff³⁴ than sharing the same undisinfected equipment? Second, disposable stethoscopes are lack quality and functionality. In a study of >200 auscultations, 10.9% of cardiac murmurs were simply misdiagnosed by physicians using the disposable stethoscope. In comparison, when high-quality stethoscopes with aseptic barriers were used, there was a 0% misdiagnosis rate.^{35,36}

Finally, the CDC recommends that if dedicated disposable devices are not available, the stethoscope should be disinfected after use on a patient who is on contact precautions before using this equipment on another patient.² This implicit strategy of “the medical practitioner should wash it” relies upon interventions, such as education, that have been unequivocally proven to fail.¹⁶ Self-administered stethoscope hygiene has inherent human compliance challenges and logistical drawbacks that undermine its success to the point that it simply does not work.

Another common approach to preventing the spread of disease between patients is for the medical practitioner to wash their hands and then place a disposable glove over the stethoscope diaphragm. Although this solution is likely acoustically superior to the disposable stethoscope, handling the stethoscope diaphragm effectively shares contaminants between it and the medical practitioner's just-washed hands.

Clearly, hand washing saves lives. In fact, the World Health Organization advocates that effective hand hygiene is the single most important practice to prevent and control HAIs.^{37,38} Because pathogens on the hands are identical to the pathogens on the stethoscope, it follows that if removing pathogens from the hands by washing is an effective infection control intervention, then preventing the same bugs from being spread by the stethoscope could have similar beneficial effects.

Recently, disposable barriers to prevent the spread of pathogens have been evaluated and recommended³⁰ because they allow high-fidelity acoustic performance.^{35,36} Disposable barriers that can be applied via a touch-free dispenser (thus preventing contamination with hand pathogens) have been documented to prevent the transmission of many HAI pathogens, including methicillin resistant *Staphylococcus aureus*, *C. difficile*, and vancomycin-resistant *Enterococcus*.^{39–41} Such barriers are acoustically invisible to the sound transmission of the stethoscope. Although data demonstrating that compliance with stethoscope barriers would be superior to that of standard cleaning/disinfection is unavailable, some have

even recommended that barriers be impregnated with antibiotics or copper to inhibit bacterial growth.⁴² However, these latter solutions are probably inferior to the simple barrier because they are likely to ultimately result in higher rates of bacterial resistance.

Ultimately, the “triple aim”³⁸ of patient care includes quality, experience, and costs. Fewer HAIs would clearly contribute to higher quality, improved patient experience, and markedly lower costs. Use of an aseptic membrane as a barrier between the patient and a contaminated stethoscope diaphragm would contribute to all aspects of this triple aim. The logic of resistance to adopting disposable aseptic stethoscope diaphragm barriers as a standard of care is unclear given our current healthcare environment.

We are currently amid a COVID-19 pandemic, with the potential to amplify deficiencies in infection control. Our HAI prevention strategies need to reflect contemporary interventions that are universally easy to use. Since 2008, >20 publications have asserted the need to elevate the priority of stethoscope hygiene. During this period, innovation has brought highly effective aseptic barriers to market that have the potential to block pathogen transmission, improve provider compliance, and save clinician's time. We recommend that the CDC consider the research that has evolved in the area of stethoscope hygiene and effective solutions and contemporize its guidance to elevate stethoscope hygiene to that of hands. Stethoscope disinfection or the use of disposable barriers should be required between every patient encounter.

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