Objection 1:

- **"Disk covers do not protect patients from the tubing"**

Refutation:

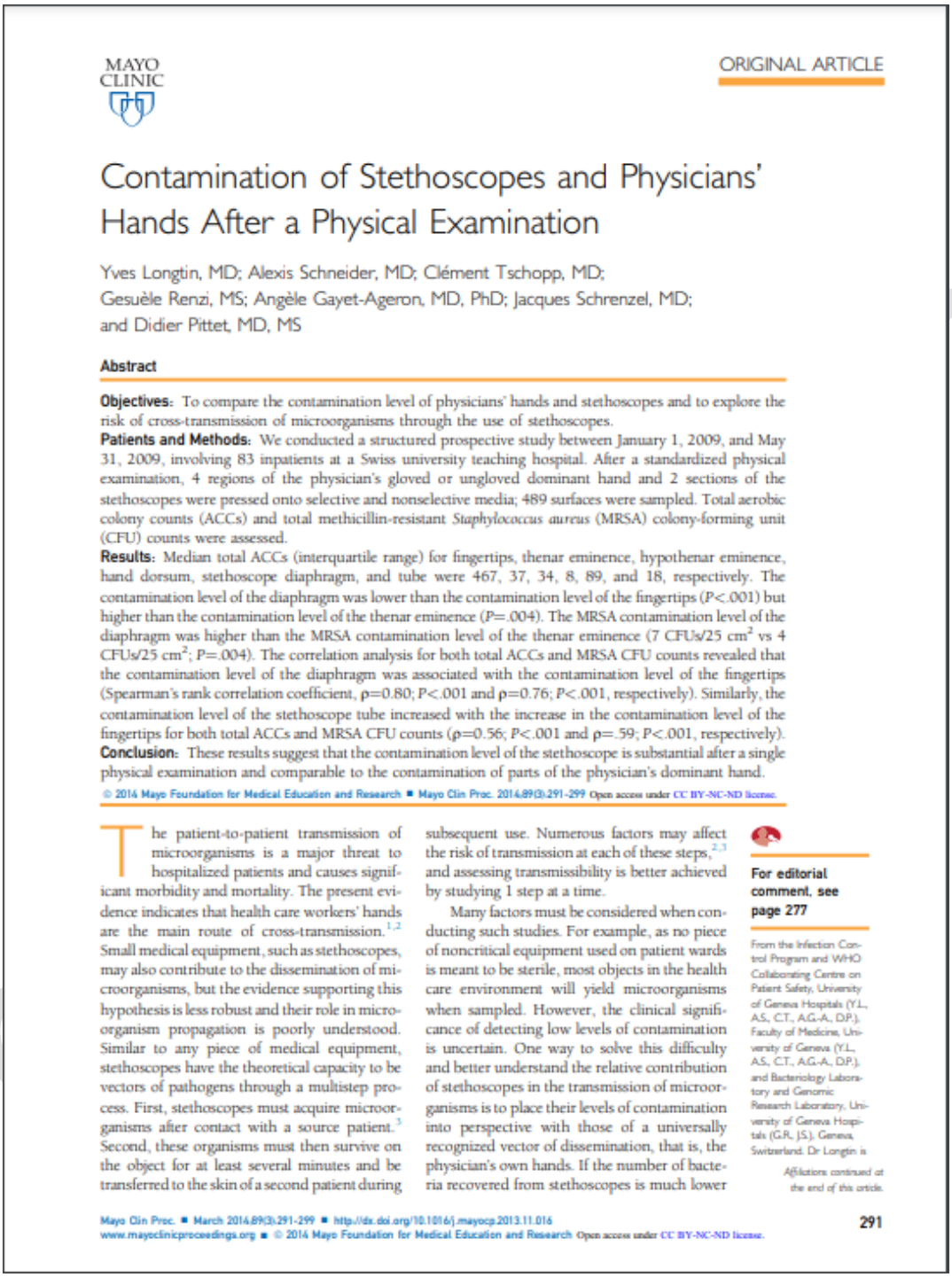
The majority of pathogens that a clinician harbors are in two places, the fingertips, and the stethoscope diaphragm, after those locations the population is small.[1] Therefore, these two locations should be cleaned and/or protected.

Aside from the fingertips and the stethoscope diaphragm, contact with the patient is minimal. Neither the physician's elbows, nor the stethoscope tubing are rubbed on the patient like the diaphragm and the fingertips. If you believe that you should clean the entire stethoscope, then you should also clean both entire arms between patients. However, **as the elbows and stethoscope tubing are rarely, and never intentionally, in direct contact with the patient, full barrier precautions for the tubing are not necessary.**

If protocols are in place at a facility that require disinfection of the stethoscope tubing, they may still be carried out in addition to use of The DiskCover System.

Citation:

1. Longtin Y. Contamination of Stethoscopes and Physicians' Hands After a Physical Examination. Mayo Clin Proc. 2014;89(3):291-299.



MAYO CLINIC

ORIGINAL ARTICLE

Contamination of Stethoscopes and Physicians' Hands After a Physical Examination

Yves Longtin, MD; Alexis Schneider, MD; Clément Tschopp, MD; Gesuèle Renzi, MS; Angèle Gayet-Ageron, MD, PhD; Jacques Schrenzel, MD; and Didier Pittet, MD, MS

Abstract

Objectives: To compare the contamination level of physicians' hands and stethoscopes and to explore the risk of cross-transmission of microorganisms through the use of stethoscopes.

Patients and Methods: We conducted a structured prospective study between January 1, 2009, and May 31, 2009, involving 83 inpatients at a Swiss university teaching hospital. After a standardized physical examination, 4 regions of the physician's gloved or ungloved dominant hand and 2 sections of the stethoscopes were pressed onto selective and nonselective media; 489 surfaces were sampled. Total aerobic colony counts (ACCs) and total methicillin-resistant *Staphylococcus aureus* (MRSA) colony-forming unit (CFU) counts were assessed.

Results: Median total ACCs (interquartile range) for fingertips, thenar eminence, hypothenar eminence, hand dorsum, stethoscope diaphragm, and tube were 467, 37, 34, 8, 89, and 18, respectively. The contamination level of the diaphragm was lower than the contamination level of the fingertips ($P<.001$) but higher than the contamination level of the thenar eminence ($P=.004$). The MRSA contamination level of the diaphragm was higher than the MRSA contamination level of the thenar eminence (7 CFUs/25 cm^2 vs 4 CFUs/25 cm^2; $P=.004$). The correlation analysis for both total ACCs and MRSA CFU counts revealed that the contamination level of the diaphragm was associated with the contamination level of the fingertips (Spearman's rank correlation coefficient, $\rho=0.80$; $P<.001$ and $\rho=0.76$; $P<.001$, respectively). Similarly, the contamination level of the stethoscope tube increased with the increase in the contamination level of the fingertips for both total ACCs and MRSA CFU counts ($\rho=0.56$; $P<.001$ and $\rho=.59$; $P<.001$, respectively).

Conclusion: These results suggest that the contamination level of the stethoscope is substantial after a single physical examination and comparable to the contamination of parts of the physician's dominant hand.

The patient-to-patient transmission of microorganisms is a major threat to hospitalized patients and causes significant morbidity and mortality. The present evidence indicates that health care workers' hands are the main route of cross-transmission.[1,2] Small medical equipment, such as stethoscopes, may also contribute to the dissemination of microorganisms, but the evidence supporting this hypothesis is less robust and their role in microorganism propagation is poorly understood. Similar to any piece of medical equipment, stethoscopes have the theoretical capacity to be vectors of pathogens through a multistep process. First, stethoscopes must acquire microorganisms after contact with a source patient.[3] Second, these organisms must then survive on the object for at least several minutes and be transferred to the skin of a second patient during subsequent use. Numerous factors may affect the risk of transmission at each of these steps,[2,3] and assessing transmissibility is better achieved by studying 1 step at a time.

Many factors must be considered when conducting such studies. For example, as no piece of noncritical equipment used on patient wards is meant to be sterile, most objects in the health care environment will yield microorganisms when sampled. However, the clinical significance of detecting low levels of contamination is uncertain. One way to solve this difficulty and better understand the relative contribution of stethoscopes in the transmission of microorganisms is to place their levels of contamination into perspective with those of a universally recognized vector of dissemination, that is, the physician's own hands. If the number of bacteria recovered from stethoscopes is much lower

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From the Infection Control Program and WHO Collaborating Centre on Patient Safety, University of Geneva Hospitals (Y.L., A.S., C.T., A.G.-A., D.P.), Faculty of Medicine, University of Geneva (Y.L., A.S., C.T., A.G.-A., D.P.), and Bacteriology Laboratory and Genomic Research Laboratory, University of Geneva Hospitals (G.R., J.S.), Geneva, Switzerland. Dr Longtin is

Affiliations continued at the end of this article.

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