

# A Clean Stethoscope is

Carl Leake, 3M Technical Services Specialist (Europe) for Auscultation Products, looks at the potential of the stethoscope as a vector for infection and suggests a suitable regime for keeping it clean - and protecting you and your patients from infection.

The stethoscope is used many times each day on many different patients, frequently with little regard to its cleanliness or its potential as a vector of infection. In 1995 an investigation by Jeffrey Jones and colleagues<sup>1</sup> made the news in a major daily newspaper. Their investigation was to determine the relationship between frequency & type of cleaning and incidence of *Staphylococcus* on stethoscopes in use in an emergency medicine room.

150 personnel working in this area had the patient contact components of their stethoscopes cultured, by pressing both the diaphragm and bell side on to mannitol agar and aerobically incubating the culture for 48 hours. Of the stethoscope users in this investigation, some 48% cleaned their stethoscopes daily or weekly, 37% monthly, 7% yearly and a further 7% admitted to having never taken the time to clean their stethoscope. The results quite dramatically illustrated the correlation between cleaning (or not cleaning) frequency and the number of colony forming units (C.F.U.'s) yielded at the end of the incubation period. (See Figure 1).

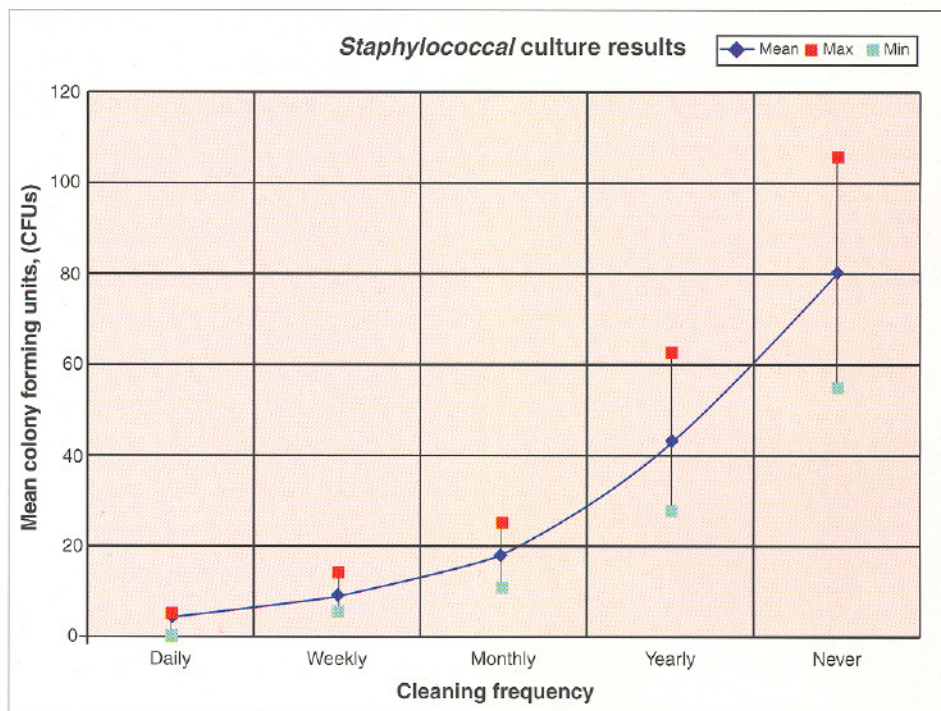


Figure 1. Redrawn from data provided in a paper by: Jones, J.S. 'Stethoscopes: A potential vector of infection?' *Ann. Emerg. Med.* 1995, 26:3, pp296-299.

Most of the stethoscopes had grown *Staphylococci* (89%), but this was found to be coagulase negative. However, 25 stethoscopes (19%) yielded *S.aureus*. In an earlier study of a hospital wide outbreak of methicillin-resistant *Staphylococcus aureus* (M.R.S.A.) by Arroyo et al<sup>2</sup>, some 67 physician's stethoscopes were sampled. *Staphylococci* were isolated from 63 of the stethoscopes and all but one were coagulase negative. Fortunately, the single *S.aureus* was methicillin-sensitive.

Arroyo also cited an earlier study in the Netherlands<sup>3</sup>, in which some 8% of the stethoscopes cultured yielded not only *S.aureus* but also *Serratia* and *Pseudomonas*. In this same study, the pervasive colonisation of

stethoscopes by *S. epidermidis* was also demonstrated. Other reports put this finding in perspective. Not only is *S. epidermidis* capable of producing serious infections in hospitalised patients, but it may also serve as a reservoir for antibiotic resistance in *S.aureus*.<sup>4,5</sup> Arroyo draws an interesting parallel in suggesting that the stethoscope appears in isolation rooms as 'the eleventh ungloved finger!'

Another report by Smith et al<sup>6</sup> determined the level of contamination of stethoscopes with bacteria and fungi. The results of their tests on the diaphragm-side only of some 200 stethoscopes was alarming. 159 of the stethoscopes were contaminated with micro-

# a Healthy Stethoscope

organisms. 81 of the 159 had two or more micro-organisms isolated. A total of 265 organisms were isolated from the 159 contaminated stethoscopes! Some 17 distinct species of micro-organisms were isolated. Gram-positive cocci were most frequently isolated (94%), followed by gram-positive bacilli, gram-negative bacilli and yeast. Many of the micro-organisms isolated in this study - (*S.aureus*, *Candida*, *Acinetobacter* and *Listeria monocytogenes*) are known to cause serious infections in hospitalised patient populations.

In an article by Breathnach et al<sup>7</sup>, a survey was made of the current stethoscope cleaning practice of junior doctors in his hospital and an assessment made of the degree of carriage of *Staphylococci* and the effect of cleaning on this. It is alarming to find that of 29 doctors spoken to, only 3 had ever cleaned their stethoscopes, of which two had done so intermittently and one only once. Some 26 of the 29 instrument cultures yielded *Staphylococci*, the remainder being sterile. Most were coagulase negative, but five yielded *S.aureus*. The mean count was greater than 20 C.F.U.'s before cleaning (range 23 - 400), whilst after cleaning, the mean reduction in the bacterial count was 97% (range 87-100%).

With the current incidence of Methicillin-resistant *Staphylococcus aureus* in hospitals in the U.K. and mainland Europe<sup>8</sup>, perhaps now is the time to review our current cleaning procedures.

Cleaning a stethoscope is quite a simple procedure, requiring a swab impregnated with a 70% isopropyl alcohol solution (e.g. Sterets™ or Mediswabs™). By wiping the entire surface of the diaphragm and bell, a reduction in bacterial count of up to 94% (range 86-100%) has been demonstrated. **This procedure should be carried out at a minimum of once a week.**

The tubing should also be cleaned by using a soft cloth moistened with a mild soap solution, followed by drying and swabbing again with 70% isopropyl alcohol impregnated swabs. The use of 70% isopropyl alcohol is recommended for cleaning 3M™ Littmann™ Stethoscopes. The use of chlorhexidines, phenolics, hypochlorite solutions and substances containing quaternary compounds must be avoided, as they not only cause oxidation of the device but also denature the seals around both the diaphragm and bell. Additionally, the tubing of the stethoscope should be cleaned monthly with a vinyl protectant (such as Armor All®), which is available at most motor accessory shops.

Sterilising a stethoscope is more difficult. Given the nature of the tubing and seals, **a stethoscope should NEVER be steam sterilised** unless you are able to auscultate with a plastic lump! Stethoscopes should be gas sterilised using the cold cycle in a 3M™ Steri-Vac™ Gas Steriliser, followed by 36 hours aeration in a 3M™ Steri-Vac™ Aeration Cabinet.

A word of warning to those tempted to try covering the surfaces of the bell and/or diaphragm components of the

stethoscope. This will probably result in the frequency characteristics of the device changing. This change may be subtle, or it may be so gross that it is immediately noticeable. It is the subtle change that presents the danger, in that low amplitude, masked or rapid sounds may become undetectable if the frequency characteristics are shifted by the 'protective material'. This may result in either an incorrect or an incomplete diagnosis of your patient.

Keeping your stethoscope clean not only protects your patient from infection - it also protects you!

#### References

1. Jones J.S. et al (1995). 'Stethoscopes: A potential vector of infection?' *Annals of Emerg. Medicine*, 26: 3, Sept 1995, pp 296-299.
2. Arroyo J.C. et al (1983). 'The stethoscope - a vector of infection?' *Infection Control*, 1983, Vol 4, No 4, p189.
3. Christensen G.D. et al (1982). 'Nosocomial septicaemia due to multiple antibiotic resistant *S. epidermidis*.' *Ann. Intern. Med.*, 1982, 96, 1-10.
4. Weinstein R.A. et al (1982). 'Gentamicin resistant *Staphylococci* as hospital flora'. *J. Infect. Dis.* 1982, 145, 374-382.
5. Cohen M.L. et al (1982). 'Common R-plasmids in *S.aureus* and *S.epidermidis* during a nosocomial *S.aureus* outbreak'. *Antimicrob Agents Chemother*, 1982, 21, 210-215.
6. Smith M.A. et al (1996). 'Contaminated stethoscopes revisited'. *Arch. Intern. Med.*, Vol 156, pp 82-84.
7. Breathnach A.S. et al (1992). 'Stethoscopes as possible vectors of infection by *Staphylococci*'. *Brit. Med. Journ.*, Vol 305, pp1573-1574.
8. Voss A. (1994). 'Methicillin-resistant *Staphylococcus aureus* in Europe'. *Eur. J. Clin. Microbiol. Infect. Dis.* January 1994, Vol 13, No 1, pp 50-55.

Sterets is a trademark of Seton Prebbles Seton Group of Companies.

Mediswabs is a trademark of Seton Prebbles Seton Group of Companies.

Armor All is a trademark of Armor All Products Corp USA.

3M