Letters to the Editor

Salmonella senftenberg Outbreak

To the Editor:

Salmonella senftenberg (group E) is a relatively rare serotype in this country, with only one previous outbreak reported.[1] Several outbreaks have been reported in other countries, particularly in India. This species is unusual because of its resistance to heat, compared to other *Salmonella.* It also has been reported to show resistance to disinfection by some quaternary ammonium compounds.[2]

Between May and August 1997, our acute-care hospital and skilled nursing home (which share a common kitchen) experienced a total of 11 *S senftenberg* infections. The average age of the infected patients was 73 years. The risk factors for most of these patients were pureed or chopped diet (nine cases), prior antibiotic use (seven cases), and antacid therapy (seven cases). Our first case, who had been admitted with bleeding of the gastrointestinal tract, had onset of diarrhea on May 17, 20 days after admission. Stool culture revealed *S senftenberg.* The second case was diagnosed on May 24, 3 days after the first case was discharged. These two cases were in two different nursing units, located in two separate buildings. The nine other cases were identified 7 to 45 days apart. The most recent date of admission for a case was July 5, and the last case was identified on August 16, 1997.

After the initial epidemiological workup, the New York State Department of Health Regional Epidemiology Program was contacted for assistance. Our investigation was expanded based on their recommendations.

Environmental cultures from the nursing units were performed, as well as surveillance cultures, on liquid supplements (Ensure Plus, Ross Product Division, Abbot Laboratories, Columbus, OH; Resource Diabetic, Novartis Nutrition Corp, Minneapolis, MN; and ready-to-eat pureed meals), and hospital-prepared purees. Microbiological sampling was done on common food items used by these patients, as well as food preparation equipment such as blenders, choppers, and slicers.

Stool cultures were performed on seven food handlers involved in preparation of pureed and chopped diets, three patient caregivers (two of whom were rotated recently between the acute hospital and skilled nursing facility), and 59 patients sharing the affected nursing units. All of these cultures were negative for *Salmonella.*

Cultures of one of two blenders used to prepare the puree and chopped foods grew *S senftenberg.* The organism was isolated from the blender vessel base, which contains the gear that meshes with the base motor assembly. This component is not designed for routine disassembly for cleaning. In addition to *S senftenberg,* the blender vessel base culture revealed heavy growth of *Klebsiella pneumoniae, Acinetobacter anitratus, Pseudomonas aeruginosa,* and *Serratia marcescens.* A second blender also was tested. The vessel base culture had light-to-moderate growth of *Enterobacter cloacae, P aeruginosa, A anitratus,* and *K pneumoniae.* However, no *Salmonella* was isolated from this blender.

Nine of the 11 patients infected with *S senftenberg* had received blenderized food, and eating blenderized food was associated with infection (relative risk, 7.14; P=.02).

The *S senftenberg* isolates from patients and blender were characterized further at the New York City Department of Health, Bureau of Laboratories. All isolates showed an identical biochemical and serological profile (*Salmonella* subspecies I, serotype 1,3,19: g, s, t: −). Pulsed-field gel electrophoresis was used to ascertain genetic relatedness. The DNA banding patterns of patient and blender isolates were identical. In contrast, two other *S senftenberg* strains from 1997 New York City cases that were not associated epidemiologically with this outbreak yielded molecular fingerprints distinct from each other and from the isolates involved in this outbreak.

In addition to the blender contamination, food preparation and holding-temperature issues were identified and may have played a role in this outbreak, also. Lateral transmission between patients may have been involved, given that two patients had not received blenderized food and five patients had been on the same nursing unit (although not at the same time).

One hypothesis for the blender-related transmission of *S senftenberg* is that the gaskets between the vessel and base of the blender may have deteriorated over time, allowing *Salmonella*-contaminated foodstuff to gain access to the protected environment of the base. The rapid rotation of the propeller used to blend the foods may have caused a negative-pressure gradient inside the blending container, resulting in small amounts of debris containing *S senftenberg* to be drawn from the base into the blending container and to mix with the pureed foodstuff, causing intermittent infections.

Review of the manufacturer's cleaning and sanitizing instruction manual for this Waring commercial blender (Waring Product Division, Dynamics Corp of America, New Hartford, CT) revealed that no recommendations were made for removal of the base of the vessel for cleaning.

If the blender's vessel base is not designed for disassembly, it would be prudent to have a policy for routine gasket replacement and to inspect the gaskets carefully for signs of deterioration, and to send the unit back to the manufacturer for inspection and resealing of the base at regular intervals. For those brands of blenders that can be disassembled, these findings suggest that greater attention be given to disassembling and sanitizing the blender vessel and base completely after each use.

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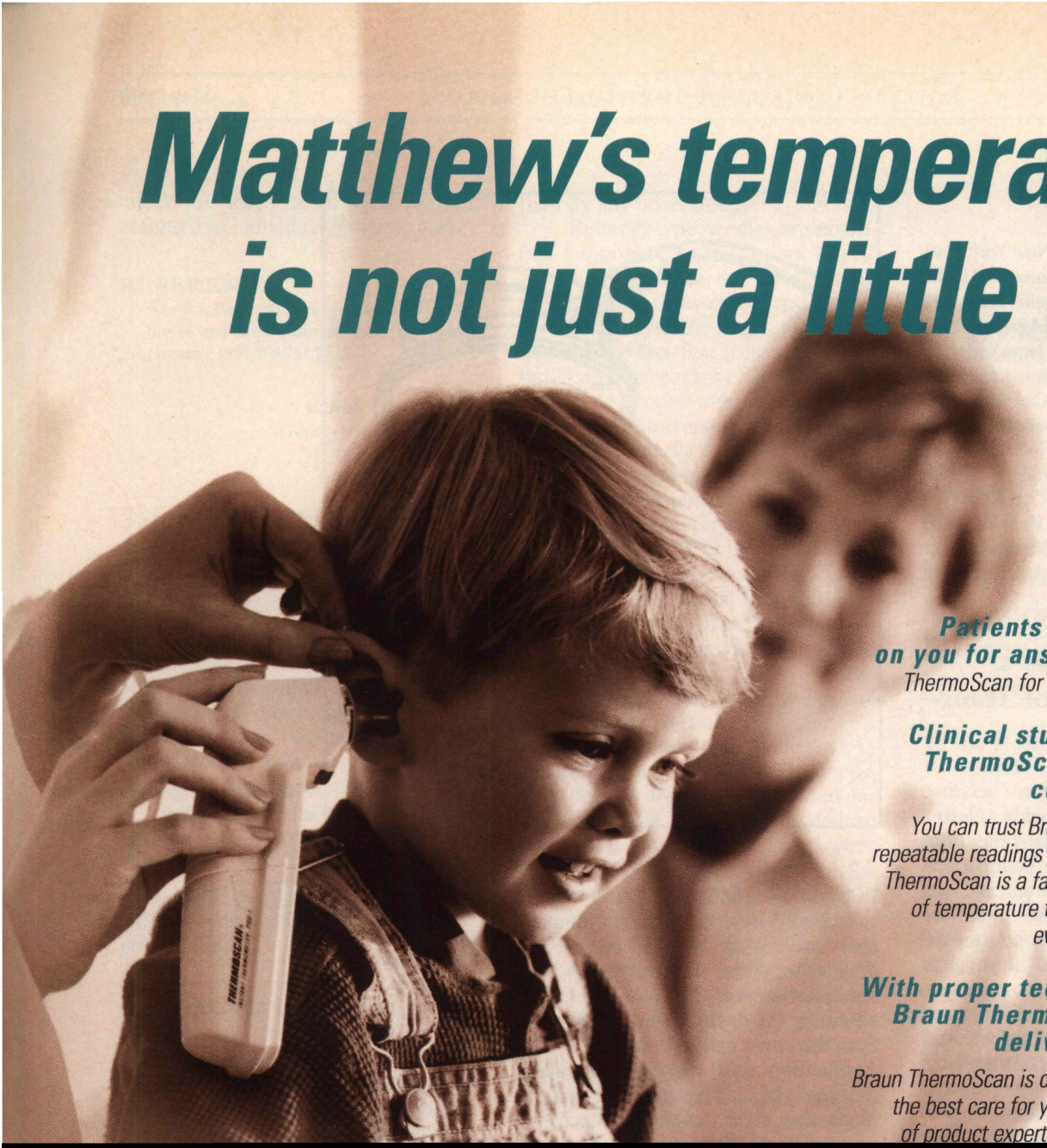
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The Stethoscope as a Potential Source of Transmission of Bacteria

To the Editor:

Dr. Itzhak Brook's letter (1997;19:608) is of importance not only in showing that the stethoscope may be a vector for both aerobic and anaerobic bacteria but also in demonstrating that the stethoscope may be contaminated when used in physical examinations.

The various textbook recommendations for cleaning before and after use are known commonly.[1-3] However, these are not always adhered to, nor are adequate to prevent contamination of patients.[4] Furthermore, hygiene rituals for stethoscopes often ignore the need for meticulous cleaning.

The risk of contamination is high, especially in clinical settings and particularly for patients in the intensive-care unit or neonatal intensive-care unit.[5] In those very high-risk settings, the use of individual stethoscopes for each patient is known to be the most effective prevention. (Unfortunately, this makes doctors now a target of potential cross-infections via earpieces).

To minimize this hazard, using single-use stethoscope-covers (Figure) would assure a high hygiene standard. Such covers could be used before physical examination and could be disposed of easily thereafter. We were able to detect 13 different patented devices designed to decrease stethoscope contamination, but only two seem to be feasible for real practice (Wurzburger, US Patent #5,538,004, 1996; Rothan-Tondeur, PCT #WO 96/38088, 1996).

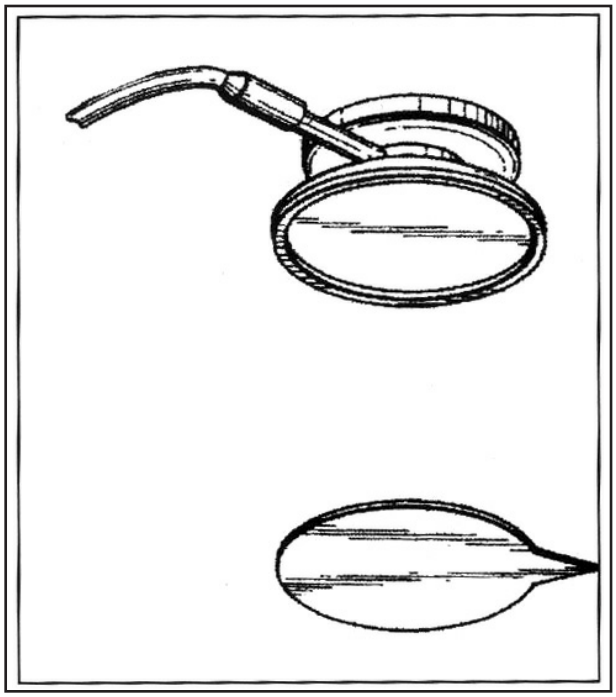


FIGURE. Single-use stethoscope cover.

These devices involve a disposable cover that is attached to the diaphragm of the stethoscope prior to examination of the patient. After obtaining the desired clinical information, the cover can be removed easily. Application and disposal of these devices take 3 to 5 seconds. Because disposable stethoscopes are unrealistic, we believe these covers are a good alternative to disinfection procedures; but, as long as such covers are not available, meticulous disinfection of stethoscopes prior to use should be carried out.

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The author replies.

I agree with the comments made by Assadian and colleagues that my report illustrates that the stethoscope can be a vector for nosocomial transmission of microorganisms. Implementation of their suggestion, to use one of the commercially available single-use stethoscope covers, indeed could reduce this risk. This, of course, needs to be studied prospectively.

Assadian and colleagues also noted that the use of an individual stethoscope for each patient may make the caregiver a target of potential cross-infection via earpieces. We recently have demonstrated the potential for this phenomenon.[1] We studied the bacterial flora of 35 earpieces from stethoscopes used individually by nurses. Fifty-three isolates, 36 aerobic and 17 anaerobic, were recovered. The number of isolates per earpiece ranged from 14 to 204 (average 92). The predominant isolates were *Staphylococcus epidermidis* (16), *Propionibacterium acnes* (12), and *Staphylococcus aureus* (7). The suggestion of Assadian and colleagues to disinfect the diaphragm therefore should be expanded to dis-

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