

Hand Lotions as an Unrecognized Source of Pathogenic Bacteria



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Introduction

Hand washing and other hygiene methods are required in health care settings. The CDC recommends that hand lotions be used to mitigate the damage to the skin from frequent washing. Hand lotions are routinely used by HC workers and most female ‘patients’ and these are frequently shared (such as tubes left in nursing stations). During a hand washing experiment two students had extremely high levels of *E. coli* in their results, while all other students had few bacteria in general. The students remembered they had each used the same lotion shortly before the lab class, and subsequent plating from that tube showed a ‘lawn’ of *E. coli*. If HC workers contaminate their hands with high levels of one type of pathogen, it may increase the risk that infectious dose level is acquired by the user or passed on to a patient. Recontamination of even properly washed hands with the use of lotions raises the possibility that many infections and even outbreaks where the source is not identified may be caused by lotions. Because of the critical implications of being contaminated from hand lotions, we initiated a preliminary study to determine if hand lotions are routinely contaminated. The literature has many reports on bacterial studies in the production of lotions, but few on lotions as sources of nosocomial infections. Beck (1995), Morse, et al. (1967, 1968) describe hand cream as the source of an HAI and the risk, and Clark, et al. (1995) & Grohskopf, et al. (2001) provide cases. No recent examples were found in the literature, but Guan et al. (2007) reported almond oil as the source of an infection.

Materials and Methods

- 1) Collect lotions: 75 tubes of lotions, collected from Hospital nursing units, HC workers (Nursing Homes, home health, Nurse Techs) and general students.
- 2) Put small drop from each tube onto sterile cotton swab.
- 3) Swish/mix swab into 2 ml Nutrient broth.
- 4) Streak Wet swab onto EMB
- 5) Rewet swab in between, swab MSA
- 6) Incubate 24-48 hours @ 37C
- 7) Count Colonies – low, med, high/ Identify.

Tentative Recommendations

- > Use smaller lotion sizes (faster turnover)
- > Do not wipe tube edge onto hands
- > Pump lotions may be preferable to tubes



RESULTS

- > Out of the lotions that were sampled, 23 of the 88, 26%, had recognizable growth of bacterial colonies on either the EMB or on the MSA media plates.
- > Growth on EMB was most common (gram -, coliforms/fecals) while some samples grew on MSA and did show mannitol fermentation (probable *Staph aureus*)

Conclusions

This study clearly indicates that hand lotions have a high rate of contamination following use and may be frequent sources of bacterial contamination of HC workers as well as patients. The 26% detected are only those we were able to confirm as growing with multiple colonies. Fastidious organisms, anaerobic (which might thrive in the low oxygen environment of hand lotions), fungi/yeasts, or those in low numbers (including recently opened tubes) were not detected in this study. The implications and need for further study is great, and we suggest the following:

- Determine what species are able to grow in lotions, focusing on MRSA, *C. diff*, coliforms and other common pathogens of the elderly (and other populations).
- What types of lotions or ingredients either inhibit or enhance bacterial growth.
- Do “pump” lotions have lower contamination rates? Is it primarily those lotions which are ‘rubbed’ against the skin that pick up bacteria?
- Are highly drug resistant bacterial more likely to be able to grow in the hostile environment of lotions?
- How are health care organizations able to use policy, rules, and quality control to avoid this source of contamination.
- How quickly does contamination normally occur and how fast do the bacteria grow? What population size are they able to achieve?
- What is the survival of bacteria on HC workers hands or on patients receiving lotion, and how easily are these passed to others?
- Do the lotions help the survival of bacteria on the skin and on other surfaces touched?
- A related question that is unanswered is whether lotions also impair the effectiveness of hand sanitizers or soaps that are used subsequently.
- Do shared lotions have a greater risk of contamination and a higher diversity of bacteria?

References

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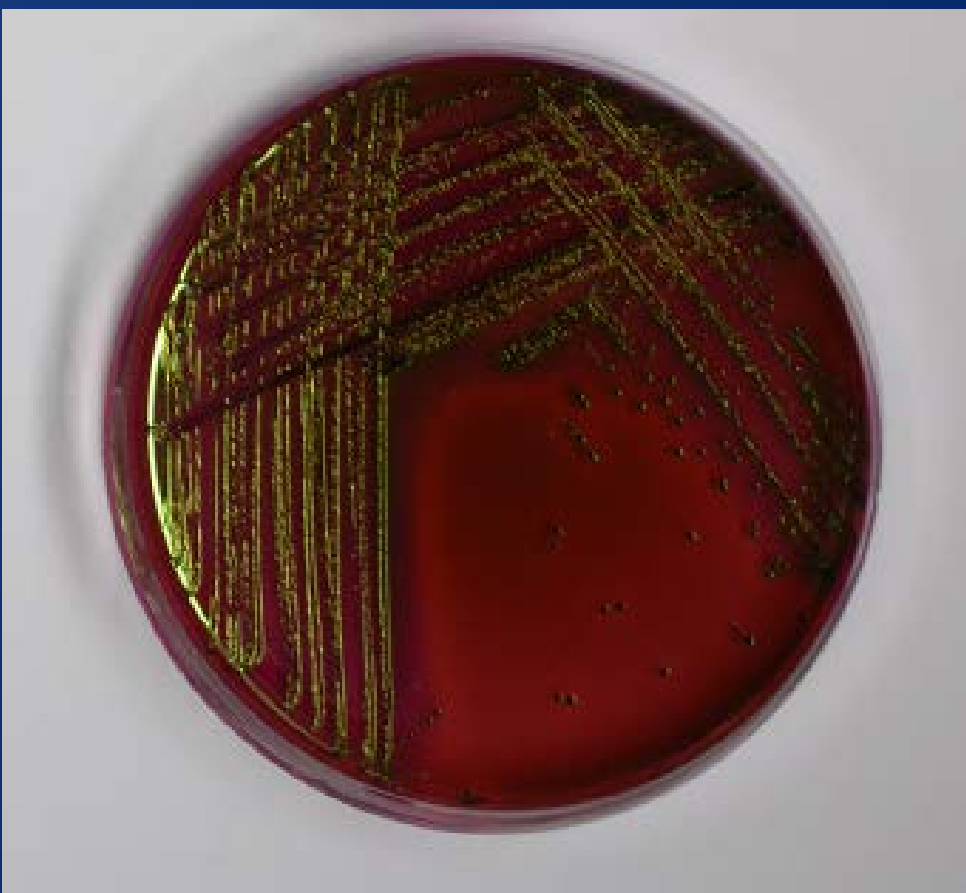
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Lotion samples growing bacteria on EMB (colilforms/fecal bacteria and MSA (*Staphylococcus*))



Eosin Methylene Blue Agar Plate (EMB) with *E. coli* growth (metallic green)