# Bulk Soap Contamination Study Summary

## Background

Microbiological contamination of soap has been shown to result in infections and nosocomial outbreaks. (1-4) Several studies conducted during the last 25 years have demonstrated that soaps can become contaminated with microorganisms. This contamination can occur after the product reaches the user (extrinsic contamination) (2;3;6). This includes both germicidal (antimicrobial) and bland hand washing products. Bacterial contamination has been observed in nonmedicated (3) and antimicrobial products including those whose active ingredients were PCMX (2), Benzalkonium chloride (6;7), Triclosan (1), and CHG (4-6;8-11). All types of soap regardless of the active ingredient or preservative system used are susceptible to contamination when exposed to adverse circumstances. Soap dispensers with sealed refills were developed in response to this contamination challenge. By contrast, open refillable soap dispensers continue to present significant risk of contamination during use. As a result of this evidence, the CDC recommends against using soap dispensers that allow for users to add soap to a partially empty dispenser since it can lead to bacterial contamination. (12)

A recent study conducted at the University of Arizona by a prominent microbiologist, Dr. Charles P. Gerba, revealed that liquid hand soap collected from open refillable (commonly known as bulk) dispensing systems are a public health risk. He found unsafe levels of bacterial contamination in open refillable dispensing systems, while no bacterial contamination was found in soap from sealed (a.k.a. bagged or cartridge) style dispensers. Dr. Gerba intends to submit his research findings for publication.

## Study Overview

### *Objective*

The objective of the study was to determine whether soap from open refillable dispensers in public restrooms contain significant levels of bacterial contamination, and to identify contaminating organisms. Samples of liquid soap were collected from open refillable dispensers and showers from across the country and their bacterial content analyzed.

### *Results*

Unsafe levels of bacterial contamination were found in 25% of the samples from open refillable dispensers. The average contamination level was over 1,000,000 bacteria per mL of soap. This level of contamination is 1000 times greater than recommended by cosmetic industry standards. (13) Coliforms, which are organisms associated with fecal contamination and which are known to cause illness, were present in 16% of the samples. Klebsiella was the most frequently isolated bacteria, followed by Enterobacter and Serratia. In contrast, no bacterial contamination was found in soap dispensed from sealed systems.

### *Conclusion*

Since these samples represent a diverse cross section of geographical locales and individual sites, it is concluded that soap from open refillable dispensers commonly found in the US are routinely contaminated with bacteria. The type and level of bacteria found in these systems represent a potential health risk to users. All unsealed, open, bulk dispensers should be eliminated and users should switch to the safer alternative, sealed soap dispensing systems, to avoid unnecessary public health risk.

Reference List

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