Antibacterial VS Plain Hand Soap

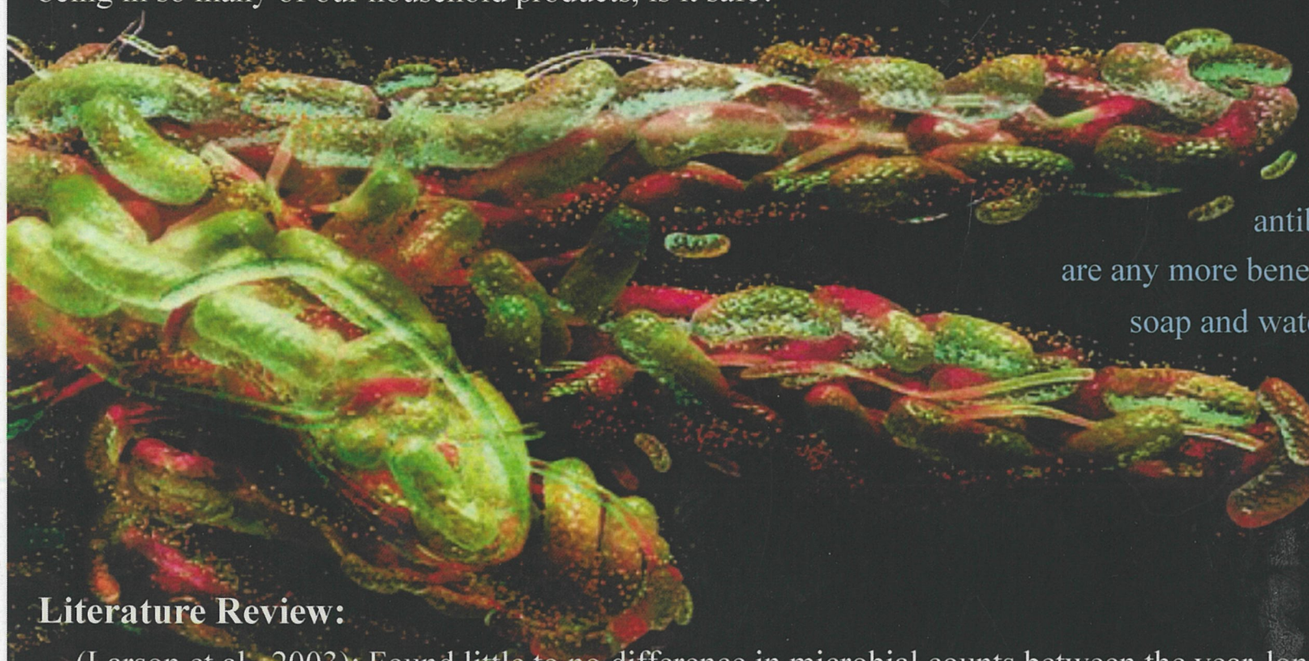
Introduction:

Global health, food security and development are at huge risk today from one of the world's biggest threats, antibiotic resistance (World Health Organization, 2016). The issue I have chosen to discuss is antibacterial soaps and their impact on antibiotic resistance.

Added to a variety of our consumer products is an ingredient called Triclosan, this includes body washes, cosmetics, toothpastes and antibacterial soaps. Triclosan is used in order to prevent or reduce contamination of bacteria ("5 things," 2016). With Triclosan being in so many of our household products, is it safe?

Search Question:

Do those who use antibacterial hand soap containing the ingredient Triclosan pose a risk of developing antibiotic resistance and does this risk outweigh the benefits? compared to regular hand soap?

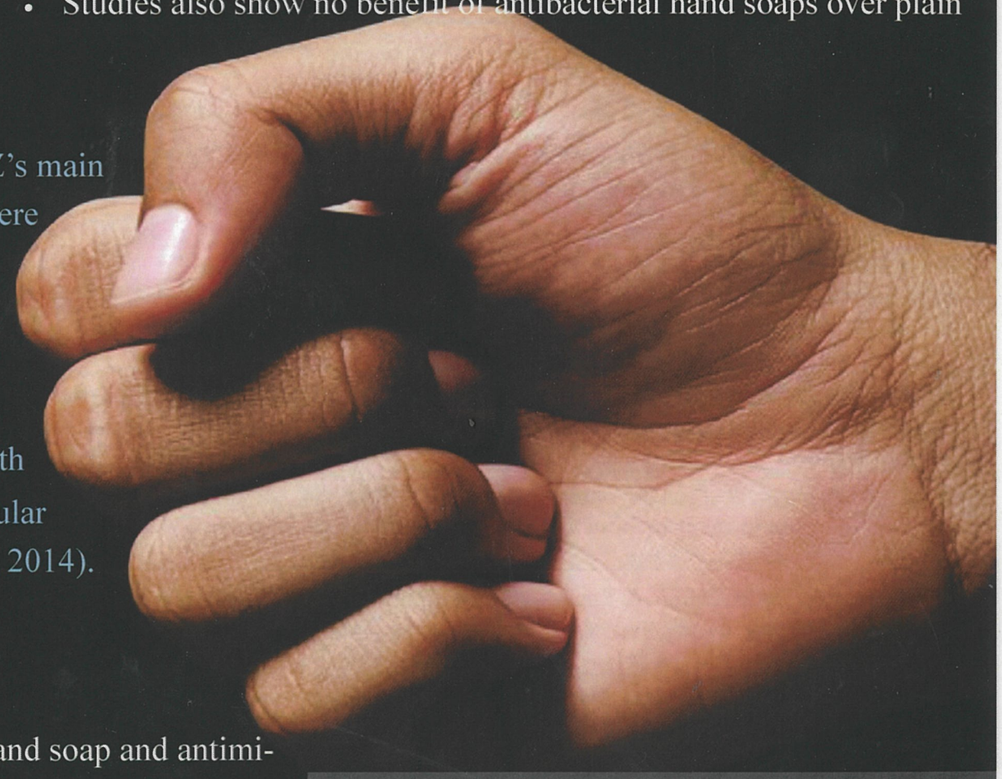


Consumer NZ's main advice is that there is no proof that antibacterial soaps are any more beneficial than plain soap and water, so save your money and health by buying regular soap (Wilson, 2014).

Findings/Implications:

Antibiotic cross resistance from Triclosan has occurred in the following bacterium Escherichia coli, Pseudomonas aeruginosa (Hoang, & Schweizer, 1999), Mycobacterium smegmatis (McMurry, McDermott, & Levy, 1999), and Mycobacterium tuerculosis (Slayden, Lee, & Barry, 2000). Antibiotic cross-resistance from Triclosan has not formed in Staphylococcus aureus (Heath, Li, Roland, & Rock, 2000).

- Studies prove that there is a link between the ingredient Triclosan and antibiotic resistance.
- Studies also show no benefit of antibacterial hand soaps over plain



Literature Review:

- (Larson et al., 2003): Found little to no difference in microbial counts between the year-long use of plain hand soap and antimicrobial hand soap, containing Triclosan.
- (Kim, Moon, Lee, & Rhee, 2015): Found from hand cultures that antibacterial hand soap containing the ingredient Triclosan was not more effective than regular hand soap and water.
- (Kim, & Rhee, 2016): Found no significant difference between triclocarban-based antibacterial soap and plain hand soap.
- (Fuls et al., 2008): Found that regular hand soap was less effective than antibacterial hand soap (contains misleading information).
- (Levy, 2000): Any drug that targets FabI gene, which has experienced a mutation from Triclosan, leads to the resistance of that drug.
- (Chuanchuen et al., 2001): When resistances to Triclosan occur, cross-resistance to antibiotics can also occur as a result.
- (Levy, 2000): Either antibiotics has selected for Triclosan resistance or Triclosan has selected for antibiotic resistance.

References: Refer to back

Conclusion/Recommendations:

Why use an antibacterial hand soap when it is proven that there is no benefit over regular hand soap and it could potentially cause harm? The green party has managed to pass the Triclosan application to EPA where this ingredient can be reassessed for safety. I believe that New Zealanders should be made more aware of the daily products that they use and the impact they are having on their bodies.

By Lisa Wadham

Summary:

I have chosen a poster presentation format in order to display my evidence-based literature review. I have chosen this form of presentation due to evidence confirming that posters are visually an effective way to convey important information. The Health Information and Libraries Journal (Ilic & Rowe, 2013) discovered that poster presentations are the most effective and most commonly used presentation format for conveying information in academic and public health settings. A study carried out in the Journal of Pakistan Medical Association (Nishtar et al., 2004) found that a blood pressure check poster was very effective in a public health setting. It found that 97 % of patients understood the poster and 86 % actually took action from this poster and got their blood pressure checked.

Through research I have found that the effectiveness of a health poster presentation is dependent on the subject and setting. For example a study (Anderson, Sargeant, & Weese, 2014) reported that health professionals found that hand hygiene posters increased their personal awareness of hand hygiene especially during product contact times. Whereas sun awareness posters were found to be ineffective in a dermatology clinic setting (Jung, Senthilselvan, & Salopek, 2010).

I think that posters are beneficial in that they can be placed in a strategic location. I believe that my subject is important to everyone and does not focus on any particular group of people e.g. nurses. I think that information included would be of interest to anyone to further educate them on the type of hand soap that they use daily. Therefore a poster

Poster References:

Charles Herbert. (2014). Image: Antibacterial Soap. Retrieved from: http://www.thechirocentre.co.uk/blog/chiropractic/antibacterial-soap-good-idea/#.WRQJZcbaflU

Chuanchuen, R., Beinlich, K., Hoang, T. T., Becher, A., Karkhoff-Schweizer, R. R., & Schweizer, H. P. (2001). Cross-Resistance between Triclosan and Antibiotics inPseudomonas aeruginosa Is Mediated by Multidrug Efflux Pumps: Exposure of a Susceptible Mutant Strain to Triclosan Selects nfxB Mutants Overexpressing MexCD-OprJ. *Antimicrobial agents and chemotherapy*, *45*(2), 428-432.

Fuls, J. L., Rodgers, N. D., Fischler, G. E., Howard, J. M., Patel, M., Weidner, P. L., & Duran, M. H. (2008). Alternative hand contamination technique to compare the activities of antimicrobial and nonantimicrobial soaps under different test conditions. *Applied and environmental microbiology*, *74*(12), 3739-3744.

Heath, R. J., Li, J., Roland, G. E., & Rock, C. O. (2000). Inhibition of the staphylococcus aureusNADPH-dependent enoyl-acyl carrier protein reductase by triclosan and hexachlorophene. *Journal of Biological Chemistry*, *275*(7), 4654-4659.

Hoang, T. T., & Schweizer, H. P. (1999). Characterization of Pseudomonas aeruginosa enoyl-acyl carrier protein reductase (FabI): a target for the antimicrobial triclosan and its role in acylated homoserine lactone synthesis. *Journal of bacteriology*, *181*(17), 5489-5497.

Kim, S. A., Moon, H., Lee, K., & Rhee, M. S. (2015). Bactericidal effects of triclosan in soap both in vitro and in vivo. *Journal of Antimicrobial Chemotherapy*, dkv275.

Kim, S. A., & Rhee, M. S. (2016). Microbicidal effects of plain soap vs triclocarban-based antibacterial soap. *Journal of Hospital Infection*, *94*(3), 276-280.

Larson, E., Aiello, A., Lee, L. V., Della-Latta, P., Gomez-Duarte, C., & Lin, S. (2003). Short-and long-term effects of handwashing with antimicrobial or plain soap in the community. *Journal of community health*, *28*(2), 139-150.

Levy, S. B. (2000). Antibiotic and antiseptic resistance: impact on public health. *The Pediatric infectious disease journal*, *19*(10), S120.

McMurry, L. M., McDermott, P. F., & Levy, S. B. (1999). Genetic evidence that InhA of Mycobacterium smegmatis is a target for triclosan. *Antimicrobial agents and chemotherapy*, *43*(3), 711-713.

Slayden, R. A., Lee, R. E., & Barry, C. E. (2000). Isoniazid affects multiple components of the type II fatty acid synthase system of Mycobacterium tuberculosis. *Molecular microbiology*, *38*(3), 514-525.

World Health Organization (2016). Antibiotic resistance: Fact sheet. Retrieved from: http://www.who.int/mediacentre/factsheets/antibiotic-resistance/en/

(2014). Antibacterial soaps. Retrieved from the consumer NZ website: https://www.consumer.org.nz/articles/antibacterial-

References:

Schneider, Z., & Whitehead, D. (2013). Identifying research ideas, questions, statements and hypotheses. In Z. Schneider, D. Whitehead, G. LoBiondo-Wood, & J. Haber (Eds.), *Nursing and midwifery research methods and appraisal for evidence – based practice* (4th ed.)(pp.57-77). Sydney, Australia: Mosby.

Ilic, D., & Rowe, N. (2013). What is the evidence that poster presentations are effective in promoting knowledge transfer? A state of the art review. *Health Information & Libraries Journal*, *30*(1), 12.

Nishtar, S., Zoka, N., Nishtar, S. S., Khan, S. Y., Jehan, S., & Mirza, Y. A. (2004). Posters as a tool for disseminating health related information in a developing country: a pilot experience. *JPMA. The Journal of the Pakistan Medical Association*, *54*(9), 456-460.

Anderson, M. E., Sargeant, J. M., & Weese, J. S. (2014). Video observation of hand hygiene practices during routine companion animal appointments and the effect of a poster intervention on hand hygiene compliance. *BMC veterinary research*, *10*(1), 106.

Jung, G. W., Senthilselvan, A., & Salopek, T. G. (2010). Ineffectiveness of sun awareness posters in dermatology clinics. *Journal of the European Academy of Dermatology and Venereology*, *24*(6), 697

PECOT: (Schneider & Whitehead, 2013).

PECOT Category	Information relating to question	Explanation
Population	The population of my proposed question are people 18 years or older who buy their own hand soap.	I have included a population age of 18 years or older as antibiotic resistance can affect anyone of any age, however, I wanted to ensure that the population was educated on hand washing and that this task occurs daily. In this population I included an inclusion criteria of those who buy their own hand soap as people may not have a choice in the type of soap that they use, for example, living in care facilities or prisons, healthcare workers or soap is provided to families.
Environment (Intervention)	Those who use antibacterial soap daily for hand washing.	I will look at articles that examine antibacterial soaps and how they are impacting antibiotic resistance. I will look in particular at antibacterial soaps that include the main ingredient Triclosan.
Comparison/ Control	Those who use plain hand soap daily for hand washing.	I will look at articles that compare antibacterial hand soap to traditional plain hand soap in order to discover if there are risks of antibacterial soap and do they outweigh its benefits/effectiveness over plain soap or not.
Outcome	The outcome of this research will allow me to discover whether antibacterial hand soap poses a risk for developing antibiotic resistance.	By reviewing a wide range of research through a literature review this will allow me to discover whether antibacterial hand soap can cause antibiotic resistance or not. If results from research find that antibacterial hand soap can pose a risk for developing antibiotic resistance I can then look into whether the benefits of antibacterial soap over plain soap outweigh the potential risk that is posed.
Time	There is no time frame	Time is not needed in this question as it do