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INTRODUCTION

Blue Bulb Syringes (BBSs)

- Used to remove oral and nasal secretions from newborns
- Provided to parents at hospital discharge
- Can be purchased by parents for home use during times of respiratory illness
- Multi-use device
- Current recommendation for cleaning: rinsing in warm, soapy water
- Previous research identified bacterial growth in a BBS¹
- No research studies have identified the efficacy of cleaning methods for killing bacteria growing in secretions inside the BBS
- Three inexpensive, widely-available antiseptics are effective in killing bacterial growth within a BBS



METHODS

Why *Escherichia coli*?

- Most common bacteria (approximately 10%) found in BBS used in vaginal deliveries¹
- Leading cause of neonatal sepsis in newborns^{2,3}
- Leading cause of Early Onset Neonatal Bacterial Meningitis (EONBM)⁴

Experimental study

Intervention

Application of a specific concentration of selected antiseptic

Negative control experiment showed that intervention is necessary to achieve bactericidal state

Experiments run in triplicate to ensure integrity of results

Null hypothesis

Intervention would have no impact on bacterial colony count

Criteria for selection of antiseptic included being inexpensive and widely available:

Triclosan: active ingredient in Equate® antibacterial dish detergent

Hydrogen Peroxide: Equate® hydrogen peroxide

Povidone-Iodine: active ingredient in Equate® antiseptic and Betadine, used in some countries as mouthwash for VAP prevention

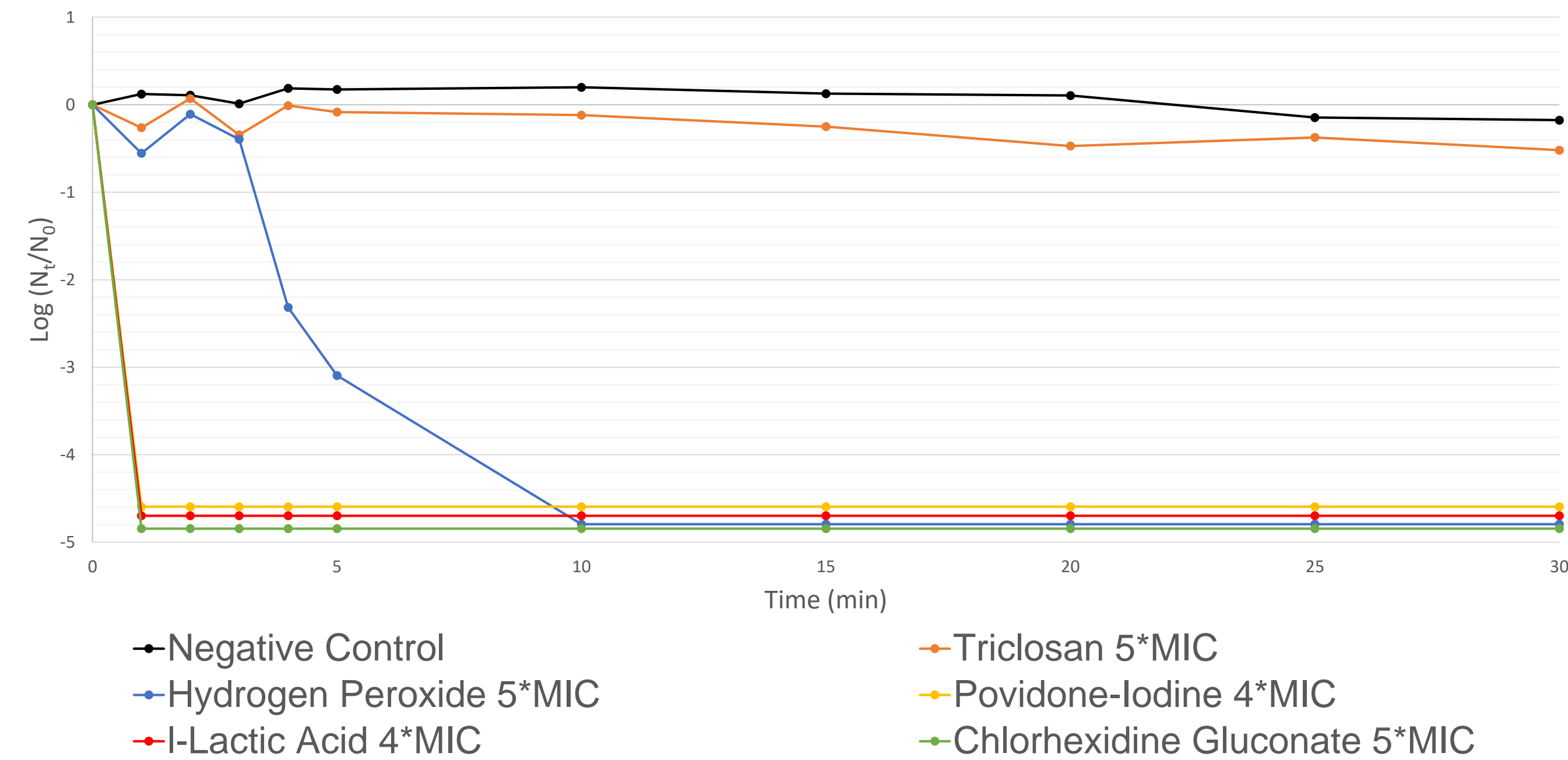
I-Lactic Acid: active ingredient in Palmolive® antibacterial dish detergent

Chlorhexidine Gluconate: active ingredient in Peridex® mouthwash



RESULTS

Disinfection of *E. coli* V050-A1 in Mueller-Hinton broth, 22C, with different antiseptics at multiples of the Minimum Inhibitory Concentration (MIC)



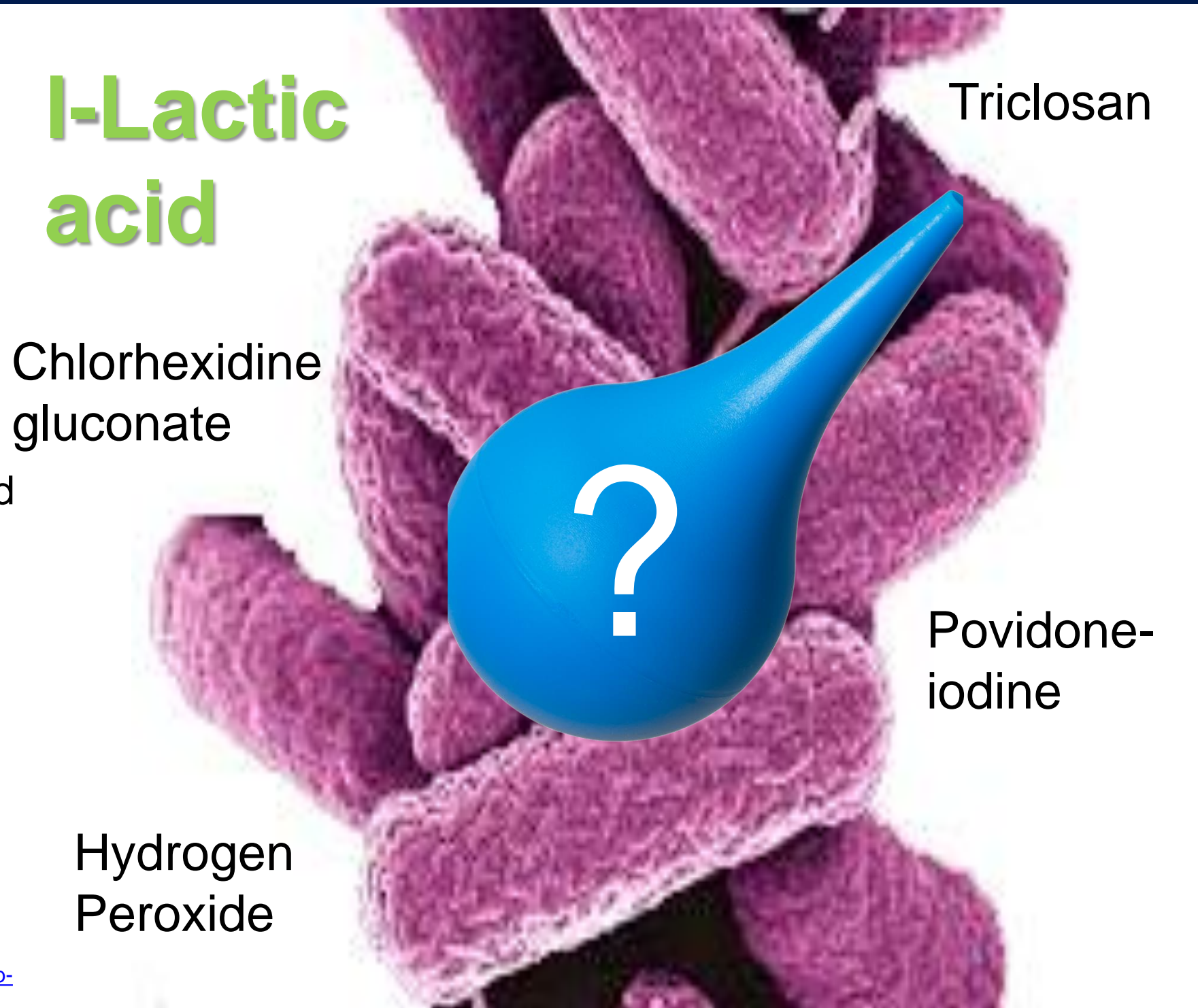
Antiseptic	Antiseptic Cost with 8 oz. sterile water	FDA Approved	Pros	Cons	Application of Use
Triclosan	\$0.58	Currently approved, but banned beginning in 2019	Commonly found in household products	Ineffective in killing E. coli in under 30 minutes	Not recommended; research supports FDA ban
Hydrogen Peroxide	\$0.21	Yes	Inexpensive	4 minutes to kill 99% of E. coli	Home use, since it require 10 minute soak
Povidone-iodine	\$0.26	Not for mucosal contact	Killed 99% of E. coli in 27 seconds	Not currently FDA approved for mucosal contact	Countries which permit mucosal contact
I-Lactic acid	\$3.66	Yes	Killed 99% pf E. coli in 26 seconds	Most expensive option	Home use, followed by rinse with clean water and drip dry
Chlorhexidine gluconate	\$3.15	Yes	Killed 99% of E.coli in 25 seconds	Surgical scrub strength (4%) causes ARDs/death in rats	Hospital or home use, must be mouthwash strength (0.12%)

PRACTICE IMPLICATIONS

- Blue Bulb Syringes have the potential to cause disease in a newborn or young child if reused
- Three antiseptics identified which are more effective than the current recommendation at killing bacterial growth in a BBS
- Identified antiseptics are inexpensive and widely available and can be used in underdeveloped areas of the world
- Effective killing of bacteria in a has potential to break the chain of infection at the mode of transmission

- **I-lactic acid is FDA approved, has a rapid kill rate, and is widely available**

Photos: E.coli, retrieved from <http://www.npr.org/tags/136926984/e-coli>. Blue bulb, retrieved from <https://www.indy-pen-dance.com/Bulb-Syringes.html>



SELECTED REFERENCES

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ACKNOWLEDGEMENTS

Sigma Theta Tau International, Beta Phi Chapter, UAH

Research and Creative Experience for Undergraduates, UAH

Laboratory assistants: Tanuj Alapati, Lana Harwell, Alex Moore

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Marsha Adams, PhD, RN, CNE, ANEF, FAAN, Dean, College of Nursing