



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

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Project Title Cancer, Children, and Chemotherapy: A Continued Study on Preventing Oral Infections	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this project is to expand upon my previous study concerning children with cancer who suffer from mouth sores from chemotherapy by testing a broader variety of mouthwashes & creating my own formulation (after searching for drug interactions) in order to find which mouthwash is most effective in killing bacteria while continuing to be effective for an extended period of time & also providing other oral benefits. Using mouthwash fewer times a day my improve their quality of life.</p> <p>Methods/Materials Home: Create two mouthwashes. UCR Lab: Prepare all 5 mouthwashes, negative & positive controls, for serial dilutions with a 1:10 dilution in H₂O. Dilute stock E.coli & add to each mouthwash. Complete dilutions to 10⁻⁸. Begin membrane filtration process starting with negative control & becoming more concentrated. Plate filters & put in incubator for 24 hours. Place all left over solutions & dilutions in incubator for reactivation process. Day 2-Count colony forming units of bacteria on plates from Day 1. Repeat membrane filtration procedure. Day 3-Count plates from Day 2. Complete reactivation calculations for results.</p> <p>Results During Year 2, I discovered that Chlorhexidine(CHL) & Over the Counter (OTC) are the 2 most effective mouthwashes in killing bacteria and for the longest. These two mouthwashes were 100,000 times more effective than the next most effective of the mouthwashes, Stannous Fluoride (SF) at initially inactivating bacteria. SF was 10,000 times more effective than the fourth most effective, Miracle Magic Mouthwash (M3W). M3W was still effective in killing the bacteria but at a weaker concentration level. All four of the effective mouthwashes had 0% regrowth of bacteria after 24 hours. Magic Mouthwash (MMW) appeared to feed the bacteria.</p> <p>Conclusions/Discussion OTC & Chl initially inactivated the bacteria completely & continued to perform as well after 24 hours. SF may do as well as OTC & Chl at a slightly higher concentration. Due to the fluoride, SF strengthens teeth & prevents cavities & does not stain teeth as badly as Chl. In addition to killing germs M3W strengthens teeth, neutralizes acid & numbs the mouth which is useful for painful mouth sores. It is unclear why MMW did not do well in Year 2. Further testing on MMW with a larger number of samples is needed. Since Chl, OTC, SF & M3W were all effective, I would suggest choosing a mouthwash based on oral problems or concerns & cost.</p>	
Summary Statement The purpose of this project was to find out which mouthwash is the most effective in killing bacteria and that continues to be effective for an extended period of time while providing other oral benefits.	
Help Received I used lab equipment and resources of Marilynn Yates at UCR under the supervision of Dane Reano and Kaitie Curnyn. J. Morana, DDS provided Stannous Fluoride & Chlorhexidine. Mother helped type & took pictures.	