



# CALIFORNIA STATE SCIENCE FAIR 2006 PROJECT SUMMARY

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| <b>Name(s)</b><br>Amy H. Lee  | <b>Project Number</b><br><b>J1420</b> |
| <b>Project Title</b><br><b>How Clean Is Your Hospital?</b>  |                                       |
| <p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b><br/>The object of this project is to determine which chemical cleaning-agent, commonly used in hospitals, kills the most bacteria.</p> <p><b>Methods/Materials</b><br/>Using a disk-diffusion method, I first prepared three agar plates with three bacteria: Pseudomonas aeruginosa, Escherichia coli, and Staphylococcus aureus. Then I soaked the sterile disks with cleaning-agents such as Epi-Clenz Instant Antiseptic Hand Cleanser, Aseti-Chlor, Germicidal Disposable Cloth Sani-Cloth Plus, and Stat III TB Germicidal Detergent. Next, I placed a disk on one of the four quadrants of a plate and repeated on all four quadrants, using disks with different chemical agents. Then I covered the agar plates and placed them in an incubator. I compared the results from 8, 16, 24, and 32 hours. Finally, I repeated the entire experiment two more times for accuracy.</p> <p><b>Results</b><br/>The test results show that Germicidal Disposable Cloth Sani-Cloth Plus was the only chemical cleaning-agent that killed all three bacteria. Stat III TB Germicidal Detergent killed both Escherichia coli and Staphylococcus aureus. However, Epi-Clenz Instant Antiseptic Hand Cleanser and Aseti-Chlor agents did not kill any bacteria at all. The length of time the bacteria grew (8, 16, 24, and 32 hours) in the incubator did not make a difference in determining which chemical cleaning-agent killed the most bacteria. Surprisingly, the cleaning-agents became less effective after 32 hours.</p> <p><b>Conclusions/Discussion</b><br/>I conclude that my hypothesis was correct. Germicidal Disposable Cloth Sani-cloth Plus made the greatest difference by killing all three different bacteria. The length of time (8 to 32 hours) the bacteria grew in the incubator was not a factor. However, the bacteria grew over the cleaning-agents after the 32 hours of incubation time. It verified that the cleaning-agents became less effective after 32 hours. Active ingredients of the Germicidal Disposable Cloth Sani-cloth Plus produce quaternary ammonium disinfectants, which are powerful bactericidal against gram-positive bacteria and less effective against gram-negative bacteria. But my experiment results showed that Germicidal Disposable Cloth Sani-cloth Plus killed all three bacteria: one gram-positive and two gram-negatives.<br/>For further research I would like to expand this project to find out which antibiotics would kill certain types of bacteria. I would like to use the same three bacteria to see which antibiotic works best.</p> |                                       |
| <b>Summary Statement</b><br>My project explored which chemical cleaning-agent, commonly used in hospitals, kills the most bacteria over time.   |                                       |
| <b>Help Received</b><br>I received help on sterilizing all the necessary materials from the Sterile Processing Department in Ridgecrest Regional Hospital. Also, the Laboratory Department allowed me to use their incubator and microscope. Mrs. Chalise and Mrs. Sherri, microbiologists at the hospital, provided bacteria.  |                                       |