



**CALIFORNIA STATE SCIENCE FAIR  
2011 PROJECT SUMMARY**

|   |                                       |
|---|---------------------------------------|
| <b>Name(s)</b><br>Grace I. Ng   | <b>Project Number</b><br><b>S1513</b> |
| <b>Project Title</b><br><b>Computer Keyboard Hygiene: What Lurks Between the Keys?</b>  |                                       |
| <b>Abstract</b><br><b>Objectives/Goals</b><br>In a recent study, office workers took samples from their computer keyboards and a toilet seat, discovering that their keyboards carried more germs than the average toilet seat. Researchers from various fields have performed numerous studies that have found pathological agents, which can cause food poisoning, diarrhea, and flu among other illnesses, on computer keyboards used in their facilities. This study attempted to compare the extent of the problem in different locations, also characterizing the usage/user profile, as well as correlating the condition of the keyboards sampled to the amount of bacteria growth.<br><b>Methods/Materials</b><br>Collect samples from computer keyboards located in a local university, hospital, public library, school library, households and workplaces. Record the location and condition of the computer keyboard at the time of collection. Inoculate samples onto chicken broth agar. Record the number of bacteria colonies and observe the size, shape, and color of the bacteria colonies growing on the surface of the agar over the 3-day incubation period. Properly dispose of the Petri dishes by submerging dishes in household bleach for 30 minutes.<br><b>Results</b><br>Of the fifty computer keyboards sampled, the number of colonies found in the university, hospital, public library, school library, household and workplaces was 35, 23, 106, 37, 36, and 13 colonies, respectively. The number of bacteria colonies grown on samples from multi-user keyboards was far dirtier than that of a single-user, 65 vs. 23 colonies. The average number of bacteria growth from keyboards in good vs. fair vs. poor conditions was 21 vs. 34 vs. 167 colonies.<br><b>Conclusions/Discussion</b><br>The results revealed that computer keyboards used by multiple users have far more bacteria growth than that of a single user. The results also suggest that the physical condition of a keyboard plays a key role in bacteria growth as keyboards in good condition had fewer colonies; keyboards in fair or poor conditions had 2 times more bacteria growth in the same setting. Surprisingly, computer keyboards at home were unexpectedly dirty, as they had more bacteria growth than those from school libraries. |                                       |
| <b>Summary Statement</b><br>This project examined how dirty computer keyboards are based on location, number of users and condition of the keyboard.  |                                       |
| <b>Help Received</b><br>Thanks to my parents for helping with the agar and setting aside a room for the sole purpose of growing the bacteria without causing a health hazard; also, thanks to my sister for her advice and guidance and my brother for technical support.   |                                       |