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## **Interdisciplinary Research With Nursing Biology: Identification of Microbial Growth in Blue Bulb Suction Devices**

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## Research and Creative Experience for Undergraduates (RCEU) Proposal

### Interdisciplinary Research with Nursing and Biology: Identification of Microbial Growth in Blue Bulb Suction Devices

#### Faculty/Research Mentor

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Laboratory work will be with Dr. Joseph Leahy in the College of Science and Department of Biology

#### Project Summary

*Overview/Specific Aims.* The World Health Organization has a Millennium Goal to decrease mortality of children under 5 years of age by two thirds in 2015. As many as 41% of children die in the first month of life; thus, it is essential to identify and promote best practices in neonatal care. Delivery of neonates is the starting point of health promotion. At the time of delivery, neonates are commonly suctioned to remove secretions from the mouth and nose and to promote respirations. Blue bulb suction devices are sterile when they are first used in the delivery room, so it is assumed that the suction device would not be contaminated with bacteria because a neonate is in a sterile environment prior to birth unless the mom has an infection or meconium stool is expressed prior to delivery. No study has explored microbial growth in blue bulb syringes at time of delivery.

Blue bulb syringes are multi-use suction devices. These suction devices are always kept with the neonate in case secretions pool and occlude the oral or nasal airway. If airway clearance is compromised, immediate suction is needed to clear the airways and prevent respiratory distress. Manufacturer guidelines encourage rinsing with soap and water between uses and sterilizing prior to storage. It is common practice to use the suction syringe and not immediately clean the device.

The focus in national and global healthcare is on prevention of illness and promotion of health. Blue bulb suction devices may contain microbial growth from pathogenic secretions, surfaces where the bulb may be located, and from not being effectively cleaned between uses. It is known in the literature that suction equipment can develop both gram positive and gram negative in 24 hours of use. No research has identified microbial growth in blue bulb syringes.

The specific aim of this study is to identify microbial growth in blue bulb syringes. This is a continuation of an ongoing research project. A pilot of fifty blue bulb syringes have been collected and analyzed. Gram positive and gram negative organisms have been identified in this small sample. Species identification is ongoing. An additional 100 blue bulb syringes have been collected, but funding for a student is needed to continue to culture the bulb syringes.



Figure 1. Blue bulb syringes to be cultured.

### **Student Involvement**

*Student Duties.* The undergraduate student will collaborate with an interdisciplinary team of researchers, Dr. O'Neal (Nursing) and Dr. Leahy (Biology), to contribute new knowledge to the fields of nursing and microbiology. This interdisciplinary research opportunity will involve the student regularly working in the lab to continue to refine the laboratory procedure of extraction of secretions from the blue bulb syringes, plating, incubating, and assessing for microbial growth. This procedure takes approximately 8 hours of labor and 48 to 72 hours incubation time. It is projected a total time of 800 lab hours is needed to complete this project if only one person is processing all bulb syringes. This project can accommodate two students if funding is available.

*Student Qualifications.* The student will be expected to be autonomous and self-directed as this person will have the responsibility for processing cultures in the laboratory setting. It is projected that 100% of the students' time will involve laboratory work. This will match with any honor students' interest in learning more about bench research and contributing to nursing science. Nursing or biology majors may be interested in supporting this research. Any student at any point in their program of study can participate in this study: Freshmen to seniors are invited to work with an interdisciplinary team of scientists.

*Student Benefits.* The RCEU experience working with nursing and biology faculty members will provide the undergraduate student an opportunity to learn about research development, ethics, and laboratory experimentation. The student will be directly involved in the laboratory processing of blue bulb syringes and microbial identification. The student will benefit by learning about laboratory experiments and applying infection control principles at the bench that can be applied at the bedside as well. The student will be invited to present not only at the RCEU conference, but additional nursing and/or biology conferences as identified by the faculty mentor.

This RCEU experience provides a clear benefit of learning new techniques and being exposed to new environments that is over and above what is routinely provided in the nursing program. An outcome of this RCEU project is that the student will have an opportunity to develop an abstract for submission to the Southern Nursing Research Conference fall 2015. The student will be involved in the development of the abstract, presentation, and a possible manuscript related to this research project.

### **Student Learning Outcomes**

By the end of summer 2015, the student will

1. Identify microbial growth in at least 50 and possibly 100 blue bulb syringes.
2. Develop an understanding of the rigor needed to conduct laboratory procedures.
3. Demonstrate knowledge by presenting at conferences.

### **Mentor Supervision and Interaction**

The student will have weekly meetings with Dr. O'Neal and selected meetings with Dr. Joseph Leahy to discuss research progress and evaluate student developed learning outcomes. Dr. Leahy will oversee the student work in the lab. Dr. O'Neal will actively provide leadership and mentorship to assist the student in meeting his/her goals associated with this project. The selected student who is interested in this study will make an indirect difference in patient care practices and by identifying microbial growth in blue bulb syringes.