



Infusing a CURE into the Medical Laboratory Science Program

Angela Brown, Jane Bartlett, Erin Brown, Lisseth Bustamante, Ewurabena Okai,

Hannah Swanson, Holli Winter, Valerie Wozniak

Faculty Mentors- Beverly Barham, PhD, MT(ASCP) and Deborah Johnson, MS, MT(ASCP), SM

Introduction

Medical Laboratory Science (MLS) students completed a course-based undergraduate research experience (CURE) infused into the required research design course.

Students were both the primary researchers in an environmental protocol and then became human subjects when they shared their reflections of the entire process. This work was supported by IRB-2019-412. All students completed CITI training modules for "student researchers with minimal risk research".

The CURE protocol investigated the incidence of opportunistic mycobacteria detected in residential plumbing through fluorescent staining. Assignments included working in small groups to review the literature pertaining to environmental testing. Students assembled the environmental collection kits with instructions on acceptable specimen collection. All students performed fluorescent staining and reported their results. Once the environmental specimens were analyzed, students then became the human subjects in this CURE and provided their reflections of the entire process. Informed consent was obtained allowing student reflections to be shared.

Objectives

Students - Environmental Researchers

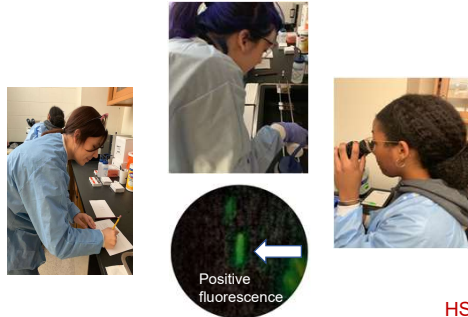
1. Participate in review of literature
2. Assemble collection kit
3. Identify a specific residence for testing
4. Prepare the specimens for fluorescent testing, complete staining process and analyze data
5. Share data

Students - Human Subjects

1. Participate in a human subjects research protocol
2. Understand the requirements of informed consent
3. Reflect on the CURE by completing short, anonymous surveys.

Methods-Environmental Protocol

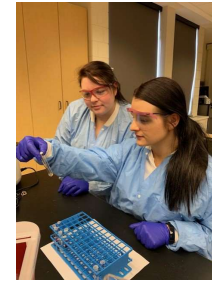
1. Assemble collection kits including: swabs, instructions, data collection/permission forms, gloves, in a zip lock collection bag
2. Identify a residence for testing
3. Obtain written permission to swab the outer edge of 2 different faucets in the residence
4. Process the collection swabs and prepare specimens for fluorescent staining
5. Perform modified Auramine O fluorescent stain
6. Read the stained slides and report results adhering to all quality control measures
7. Analyze the data



HS, JB

Methods-Human Subjects

1. Required participation in the CURE as a member of the 2021 MLS cohort
2. In class, participate in the various parts of the CURE including:
 - a. develop a research question
 - b. literature review
 - c. informed consent
 - d. reflections using anonymous surveys



HW, VW

Conclusion

The process of infusing a CURE into a required course can result in many valuable outcomes for the students and the instructors. Developing a research question and then following through with data collection and analysis gives every student an equitable experience and equal access for a research experience. Having the students then reflect on these experiences, gives instructors the feedback that helps correct any flaws and reinforces those areas that are most beneficial for students.

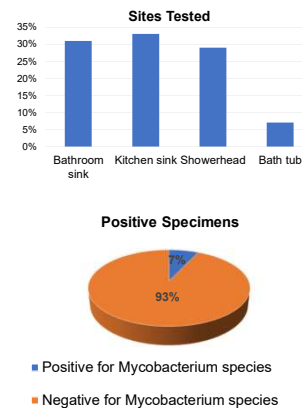
Team CURE 1

- Jane Bartlett
- Angela Brown
- Erin Brown
- Herve Bufone
- Lisseth Bustamante
- Bill Carpio
- Emily Clark
- Kayla Cryder
- Halle Fox
- Miriam Garvue
- Jacob Gray
- Zoe Guither
- Ewurabena Okai
- Tyler Peugh
- Natalia Radon
- Aaron Semar
- Dariusz Starostka
- Hannah Swanson
- Natalie Szklanecki
- Lauren Williams
- Holli Winter
- Valerie Wozniak

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Results-Environmental Specimens

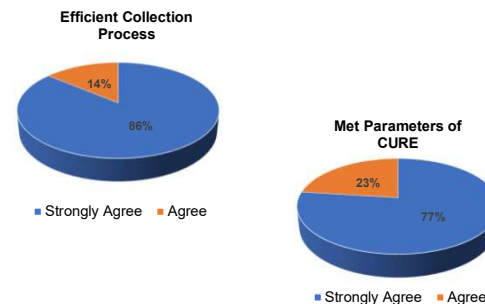


Environmental testing data:

- 7% (3 out of 44) specimens collected were positive for *Mycobacterium* species
- All specimens collected used city water sources
- Specimens from 6 different zip code areas

AB, EO

Results-Human Subjects



Human subjects data:

- 90% of students agreed they had a better understanding of the IRB process
- All students agreed the collection process was easily completed
- All students agreed the fluorescent staining process was easily completed and interpreted
- All students agreed this CURE met the parameters of the CURE model

LB, EB