

BME 484 Biomedical Engineering Capstone Design
Project Proposal

- Project Title:** UV Disinfection Cabinet for Medical Equipment Specifically Geared Towards Oxygen Tanks
- Team:** William Kiernan, Project Manager
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- Abstract:** Dr. Peter Pronovost, director of the Quality and Safety Research Group at Johns Hopkins University, has said that about 100,000 people die each year by infections from hospitals. We can begin to lower this number by enabling better methods of cleaning equipment that patients come into contact with. An inexpensive and efficient method of disinfecting medical equipment is through the use of UV light. This method has already been proven effective in both room and utensil sized elements. We will create a UV cabinet to be used to disinfect equipment larger than utensils, such as oxygen tanks, without removing the ability to safely enter the room. The equipment will be placed inside the cabinet and the cabinet will be closed to ensure no UV light escapes. The lights will then be activated for a certain period of time until all bacteria has been eliminated. There will be a system in place to indicate when the light is on and when the disinfection is complete.
- Innovation:** We are going to disinfect oxygen tanks using an enclosure containing UV-C light bulbs. This enclosure will be sized appropriately for D and E type cylinders and will be targeting hospital acquired infections.
- Materials:** UV lights
Wood
Wood screws
“Clean Trace” Bacteria Test Swabs (located at VA hospital)
Switch
LED signal light
24 AWG single strand wire
Timer
Lock
Hinges
- Subtasks:** Complete Product Design and Parameters
Acquire Necessary Materials
Test Disinfection Capabilities
Test Safety Mechanisms
Create Prototype
Refine Final Product Design
Create Final Product
- Timeline:** Complete Product Design and Parameters: 09/25/17
Acquire Necessary Materials: 10/02/17
Test Disinfection Capabilities: 10/23/17

Test Safety Mechanisms: 11/13/17
Create Prototype: 12/04/17
Refine Final Product Design: 03/12/18
Create Final Product: 04/13/18

- References:
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 - "Home", Xenex, 2017. [Online]. Available: <https://www.xenex.com>. [Accessed: 18- Sep- 2017].
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 - "Ultraviolet Light Disinfection Data Sheet", *www.clordisys.com*, 2017. [Online]. Available: <http://www.clordisys.com/pdfs/misc/UV%20Data%20Sheet.pdf>. [Accessed: 18- Sep- 2017].
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 - C. Donskey, *Evaluation of a Pulsed Xenon Ultraviolet Disinfection System for Reduction of Healthcare-Associated Pathogens in Hospital Rooms*, 1st ed. Society For Healthcare Epidemiology of America, 2017, pp. 2-7.
 - A. Rammelsberg, "How does ultraviolet light kill cells?", *Scientific American*, 2017. [Online]. Available: <https://www.scientificamerican.com/article/how-does-ultraviolet-ligh/>. [Accessed: 18- Sep- 2017].