

# Endotracheal tube adaptor for administration of aerosolized medications

**Client:** Dr. Mark E. Schroeder

**Team Members:** Ryan Childs (BSAC)  
Ozair Chaudhry (Communicator)  
Timothy Barry (BWIG)  
Evan Joyce (Leader)

**Date:** October 23 to October 30, 2009

## Problem Statement

The goal of this project is to make design changes to an endotracheal tube adaptor that was fabricated last semester for product optimization. The adaptor works as an interface to introduce aerosolized medication (e.g. Albuterol) from a pressurized canister into an anesthesia circuit to an anesthetized, intubated patient. This project was initiated due to a recent change in the Albuterol canister used by the UW-Hospital. The new canisters have been fitted with a non-removable, plastic, actuation counter resulting in a mechanical incompatibility with the old adaptor used at the hospital. The adaptor should not impede the anesthesia circuit which flows at a rate of 4-5 Liters of air/minute and should solely act as a port to deliver medication should it be needed during surgery.

Last semester a prototype adaptor was produced that is universally compatible with all aerosolized medication canisters and also compatible with a specific gas sampling Luer port. It acts as a syringe to dispense medication in a simple fashion, with one hand, into the Luer port. This semester's objectives are: make the adaptor compatible with all Luer ports, adjust the size of the aperture at the distal end of the prototype for optimal medication delivery, and thoroughly test the prototype to ensure efficacy. The prototype will also be designed and constructed in a way such that it can be injection molded. Other objectives for the semester that put a spin on the "design" aspect of the class are: performing a market analysis of our adaptor, obtaining a design or utility patent, and licensing the technology to a medical supply company.

## Last Week's Goals

- Continue searching for funding options for patent costs (long-term)
- Finalize the mid-semester report
- Meet representatives from 3M to discuss our final design

## Accomplishments

- Finished mid-semester report
- Met with engineers at 3M (Ryan) to discuss injection molding requirements and our design

- Obtained valuable feedback from medical supply companies from Mark and his anesthesiology conference

### This Week's Goals

- Continue searching for funding options for patent costs (long-term)
- Meet with client to discuss funding of a new prototype and fabrication ideas
- Finalize dimensions for new design and contact the Physics shop
- Submit new design to rapid prototyping companies to get injection molding quotes
- Look at list of patents Ted sent our client

### Project Difficulties

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### Activities

Ozair Chaudhry

|            |                  |         |
|------------|------------------|---------|
| 10.23.2009 | Team meeting     | 2.00 hr |
| 10.28.2009 | Client meeting   | 1.50 hr |
| ~~~~~      | General research | 1.00 hr |

Timothy Barry

|            |                     |         |
|------------|---------------------|---------|
| 10.23.2009 | Team meeting        | 2.00 hr |
| 10.28.2009 | Client meeting      | 1.50 hr |
| ~~~~~      | Website maintenance | 1.00 hr |

Ryan Childs

|            |                       |         |
|------------|-----------------------|---------|
| 10.23.2009 | Team meeting          | 2.00 hr |
| 10.23.2009 | BSAC meeting          | 1.00 hr |
| 10.28.2009 | Client meeting        | 1.50 hr |
| ~~~~~      | SolidWorks dimensions | 1.00 hr |

Evan Joyce

|                  |                                      |         |
|------------------|--------------------------------------|---------|
| 10.23.2009       | Team meeting                         | 2.00 hr |
| 10.28.2009       | Client meeting                       | 1.50 hr |
| 10.29.2009<br>hr | Outlining photospectrometry protocol | 1.00    |
| ~~~~~            | Progress report                      | 1.00 hr |

## Project Schedule

| Tasks                           | September |    | October |   |    |    |    | March |    |    |    | December |    |
|---------------------------------|-----------|----|---------|---|----|----|----|-------|----|----|----|----------|----|
|                                 | 18        | 25 | 2       | 9 | 16 | 23 | 30 | 6     | 13 | 20 | 27 | 4        | 11 |
| <b>Research and Development</b> |           |    |         |   |    |    |    |       |    |    |    |          |    |
| Research                        |           |    |         |   |    |    |    |       |    |    |    |          |    |
| Brainstorm                      |           |    |         |   |    |    |    |       |    |    |    |          |    |
| Develop Designs Changes         |           |    |         |   |    |    |    |       |    |    |    |          |    |
| Detail/Evaluate Changes         |           |    |         |   |    |    |    |       |    |    |    |          |    |
| Change Prototype                |           |    |         |   |    |    |    |       |    |    |    |          |    |
| Test Prototype                  |           |    |         |   |    |    |    |       |    |    |    |          |    |
| <b>Website</b>                  | Tim       |    |         |   |    |    |    |       |    |    |    |          |    |
| <b>Deliverables</b>             |           |    |         |   |    |    |    |       |    |    |    |          |    |
| Midsemester Presentation        |           |    |         |   |    |    |    |       |    |    |    |          |    |
| Midsemester Report              |           |    |         |   |    |    |    |       |    |    |    |          |    |
| Final Presentation              |           |    |         |   |    |    |    |       |    |    |    |          |    |
| Final Report                    |           |    |         |   |    |    |    |       |    |    |    |          |    |
| Progress Reports                | Evan      |    |         |   |    |    |    |       |    |    |    |          |    |

## Expenses

- \$2000 retainer paid to patent attorney Ted Barthel