

Endotracheal tube adaptor for administration of nebulized medications

Client: Dr. Mark E. Schroeder

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

Date: April 17 to April 24, 2009

Problem Statement

The goal of this project is to develop an endotracheal tube adaptor that can consistently deliver aerosolized medication (Albuterol or Ipratropium) to an anesthetized patient during surgery by anesthesiologists at the UW-Hospital. The adaptor will be used on an intubated patient who is anesthetized with medication from an anesthesia circuit. The device 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.

A recent change to the metered dose inhalers (MDI) made by GlaxoSmith&Klein, specifically the addition of an actuation counter on the top of the canister, has rendered our client's current adaptor ineffective. Our client would prefer an adaptor that either works with the patient's plastic dose dispenser, directly with the new MDIs, or as an addition to the current adaptor used. The adaptor we are pursuing acts as a "syringe" to dispense medication in a simple fashion, with one hand, into the Luer port of a readily available plastic anesthesia elbow. The elbow has a locking cap on the Luer port which will be used to prevent the circuit from being broken when the "syringe" adaptor is not in use.

Last Week's Goals

- Begin testing prototype with Cascade Impactor and math equations for hypothetical pressure drop
- Finish at least two other forms of testing
- Begin work on poster for final report

Summary of Accomplishments

- Slightly modified prototype where nipple fits it to ensure a secure fit with not gas blow back
- Handed out surveys to Mark and colleagues and were able to get some constructive feedback
- Wrote up protocol for testing prototype with a cascade impactor or laser diffraction and set up meeting with professor who has a cascade impactor
- Attempted to run SolidWorks tutorial for air flow

- Heard back from GSK; they are not interested at this time but think it is a novel idea
- Continued working on poster for final presentation

This Week's Goals

- Finish testing: survey, cascade impactor, analytical measurements, hypothetical flow model
- Finish work on poster for final report

Project Difficulties

- Finding an analytical chemistry professor on campus to help measure minute medication amounts

Activities

Ozair Chaudhry

4.17.2009	Writing survey and adjusting prototype	2.00 hr
4.19.2009	Client meeting	2.00 hr
4.22.2009	Group meeting	2.00 hr
~~~~~	Testing research	1.00 hr

Timothy Barry

4.17.2009	Writing survey and adjusting prototype	2.00 hr
4.21.2009	Group meeting--testing	1.00 hr
4.22.2009	Group meeting--testing	2.00 hr
~~~~~	Testing research	1.00 hr
~~~~~	Website	1.00 hr

Ryan Childs

4.17.2009	Writing survey and adjusting prototype	2.00 hr
4.19.2009	Client meeting	2.00 hr
4.21.2009	Group meeting—testing	1.00 hr
4.22.2009	Group meeting—testing	2.00 hr
~~~~~	Testing research	1.00 hr

Evan Joyce

4.17.2009	Writing survey and adjusting prototype	2.00 hr
4.21.2009	Group meeting—testing	1.00 hr
4.22.2009	Group meeting--testing	2.00 hr
~~~~~	Researching patents	1.00 hr
4.09.2009	Progress report	1.00 hr

## Project Schedule

Tasks	January		February				March				April				May	
	23	30	6	13	20	27	6	13	20	27	3	10	17	24	1	8
<b>Research and Development</b>																
Research	█	█	█				█								█	
Brainstorm		█	█	█			█								█	
Develop Prelim. Designs				█	█	█	█								█	
Detail/Evaluate Designs							█	█	█						█	
Build Prototype							█			█	█	█	█		█	
Test Prototype							█					█	█	█		█
<b>Website</b>		Timothy														
<b>Deliverables</b>							█	█							█	
Midsemester Presentation							█	█							█	
Midsemester Report							█	█								
Final Presentation															█	█
Final Report							█								█	█
Progress Reports	Evan															

## Expenses

- Prototype cost -- \$675 from Physics shop (15 materials, 660 labor)
- Additional touch-up -- \$55 from Physics shop (labor)