

**Delivery of Aerosol Drugs through Continuous Airway Positive Pressure (CPAP)
Progress Report 04/22/2010-04/28/2010**

Names

Patrick Kurkiewicz, Co-leader
Anne Loevinger, Co-leader
Joe Decker, BSAC
Ryan Kimmel, BWIG
Steve Welch, Communications

Client

Dr. Mihai Teodorescu

Problem Statement

The CPAP system is most commonly used nightly in the homes by patients who struggle with sleep apnea. A method is needed for automated delivery of respiratory anti-inflammatory drugs, like albuterol, while using the CPAP device. Delivery of the necessary dose of such drugs should either be continuous or at timed intervals over a patient's sleep cycle.
Side Project Suggested by Dr. Teodorescu: Create an ultrasonic nebulizer from an ultrasonic humidifier.

Last Week's Goals

- Test how much albuterol is delivered to mask during a typical use (depending on time)
- 04/23/10 Meeting with advisor scheduled for 12:00-12:30 PM
- 04/23/10 Team meeting following meeting with advisor
- 04/23/10-04/24/10 Testing of amount of albuterol delivered to mask
- 04/28/10 Mechanical sub-team meeting

Summary of Accomplishments

- Completion of testing of the amount of albuterol that is delivered to the mask
- Analyze data from testing, including graphical and written analysis
- Creation of final poster for final presentation
- Improvements/addition of accessories to program
- Discuss team plan for completion of final course deliverables

This Week's Goals / Schedule

- Complete final accessories of nebulizer and program design
- Upload final poster to project website by 04/30/10 at 10:00 AM
- Completion of final course deliverables and submission by 05/05/10 at 4:00 PM:
 - Journal article (and Final Report including updated PDS)
 - Invention Disclosure Statement (IDS) to WARF
 - Team evaluation of client
 - Outreach Essay
 - Individual design notebooks
 - Individual peer-self evaluations
- 04/30/10 Meeting with advisor scheduled for 12:00-12:30 PM
- 04/30/10 Team meeting following meeting to assemble journal sections
- 05/05/10 Team meeting to practice Final Poster Presentation

Project Difficulties/ Reason for Missing Goals

No goals have been missed; however, since team has been focusing on construction and testing of the device, much of the writing and assembly of the final deliverables remains to be completed.

Activities

Team

- 04/23/10 Meeting with advisor scheduled for 12:00-12:30 PM (All team)
- 04/23/10 Team meeting following meeting with advisor (All team)
- 04/23/10 Testing of amount of albuterol delivered to mask (Patrick, Annie, Joe, Ryan)
- 04/28/10 Team meeting to assemble final poster (All team)

Patrick

- Attend advisor meeting and team meetings
- Testing of how much albuterol is delivered to the mask
- Complete section(s) of final poster

Annie

- Attend advisor meeting and team meetings
- Testing of how much albuterol is delivered to the mask
- Update final budget
- Complete section(s) of final poster
- Wrote weekly progress report

Joe

- Attend advisor meeting and team meetings
- Testing of how much albuterol is delivered to the mask
- Analyze data from testing, including graphical and written analysis (as a standalone unit and in comparison to commercially available systems)
- Complete section(s) of final poster
- Attend BSAC meeting

Ryan

- Attend advisor meeting and team meetings
- Testing of how much albuterol is delivered to the mask
- Complete section(s) of final poster
- Update project website

Steve

- Attend advisor meeting and team meetings
- Complete section(s) of final poster
- Wrote section(s) of journal article/final report regarding circuitry and programming
- Improvements/addition of accessories to program

Budget

- Ideally, final prototype should cost less than about \$400.

Expenses

- Total carried over from Fall 2009 Semester: \$260
- Total from Spring 2010 Semester so far: \$74.95
 - HDPE plastic solid for nebulizer reservoir (McMaster.com) \$12.00
 - Parking at UW- Hospital during meeting with Pulmonary Specialist \$5.00
 - Fittings for prototype including tubing and tubing adaptors (ACE) \$13.06
 - Polycarbonate tubing for nebulizer reservoir lid and base (McMaster.com) \$17.53
 - Plumbing kit (Polypropylene) for removable nebulizer design (ACE) \$5.26
 - Adhesive PTFE for inner nebulizer reservoir surfaces (McMaster.com) \$22.10
- Unit cost of current prototype: \$185.00

Project Schedule

Task	J.	February					March				April					M.
Week of:	29	5	12	19	26	5	12	19	26	2	9	16	23	30	7	
Deliverables (Date Due)																
Website																
PDS		Patrick					Patrick								Patrick	
Formal Progress Report	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick		Patrick	Patrick	Patrick	Patrick	Patrick	
Informal Week Summary	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick		Patrick	Patrick	Patrick	Patrick		
Notebook							Patrick								Patrick	
Midsemester Presentation							Patrick									
Final Presentation															Patrick	
Final Poster														Patrick		
Final Report															Patrick	
Client Evaluation															Patrick	
Peer and Self Evaluations															Patrick	
Meetings																
BSAC	Patrick		Patrick		Patrick		Patrick				Patrick		Patrick			
Team (Other than w/ client or advisor)					Patrick	Patrick								Patrick	Patrick	
Electrical Team (When meeting separately)	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick		Patrick	Patrick	Patrick	Patrick	Patrick	
Mechanical Team (When meeting separately)	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick		Patrick	Patrick	Patrick	Patrick	Patrick	
Client	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick		Patrick	Patrick	Patrick	Patrick	Patrick	
Advisor (in class)	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick		Patrick	Patrick	Patrick	Patrick	Patrick	
Dist. Entrepreneur Lec.								Patrick								
Project Research*																
Brainstorm Reservoir Options	Patrick	Patrick	Patrick	Patrick	Patrick											
Programming Options	Patrick	Patrick	Patrick	Patrick	Patrick											
Albuterol Delivery Rate	Patrick	Patrick	Patrick	Patrick	Patrick											
Project Development																
Order Parts Necessary For Improved Reservoir	Patrick	Patrick	Patrick	Patrick	Patrick											
Work On Reservoir / Mechanical Portion		Patrick	Patrick	Patrick	Patrick											
Finish Mechanical Portion of Design				Patrick	Patrick	Patrick	Patrick	Patrick	Patrick							
Test, Modify and Improve Mechanical Portion				Patrick	Patrick	Patrick	Patrick	Patrick	Patrick							
Test Albuterol Delivery Rate to Mask								Patrick	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick	
Test Entire Assembly												Patrick	Patrick	Patrick	Patrick	
Brainstorm Programming Options	Patrick	Patrick	Patrick	Patrick	Patrick											
Order Parts Necessary for program		Patrick	Patrick	Patrick	Patrick											
Work on Program		Patrick	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick		Patrick	Patrick	Patrick	Patrick	Patrick	
Refine Circuitry		Patrick	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick	Patrick							

*After this, research will be done on an as-needed basis.

KEY	
Full Team	Patrick
Electrical Team	Annie
Mechanical Team	Joe
	Ryan