

**Delivery of Aerosol Drugs through Continuous Airway Positive Pressure (CPAP)
Final Progress Report 04/29/2010 - 05/05/2010**

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

- 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

Summary of Accomplishments

- Completion of final nebulizer accessories, including housing, and program functions
- Completion of all final course deliverables (listed above)

This Week's Goals / Schedule

- Planning of and practice for Final Poster Presentation
- 05/07/10 Final Poster Presentation session 12:05-2:05 PM (First floor of ECB)
- 05/07/10 Final team meeting with advisor - following presentations (~2:15 PM)
- By 05/07/10 Contact client, submit IDR to WARF, and submit article to journal

Project Difficulties/ Reason for Missing Goals

Goals for this semester have been completed. If the team had more time, further testing could be carried out, but accomplishments were on par with schedule and allotted time.

Activities

Team

- 04/30/10 Meeting with advisor 12:00-12:30 PM (All team)
- 04/30/10 Team meeting following meeting with advisor (All team)
- 04/30/10-05/05/10 Individual work on final deliverables (All team)
- 05/05/10 Handing in of final deliverables (All team)
- 05/05/10 Team meeting plan and practice for final poster presentation (All team)

Patrick

- Attend advisor meeting and team meetings
- Contributed to writing and editing of journal article, final report, and outreach essay
- Printed poster for final presentation
- Correspondence with team regarding final deliverables

Annie

- Attend advisor meeting and team meetings
- Contributed to writing and editing of journal article, final report, and outreach essay
- Completed Invention Disclosure Report (IDR) to submit to WARF
- Research submission process for journal articles and formatted report to fit requirements
- Wrote weekly progress report
- Troubleshooting with nebulizer
- Correspondence with team regarding final deliverables

Joe

- Attend advisor meeting and team meetings
- Contributed to writing and editing of journal article, final report, and outreach essay
- Correspondence with team regarding final deliverables
- Troubleshooting with nebulizer

Ryan

- Attend advisor meeting and team meetings
- Contributed to writing and editing of journal article, final report, and outreach essay
- Completed Team Evaluation of Client based on feedback from team
- Constructed housing for circuitry of nebulizer reservoir
- Correspondence with team regarding final deliverables
- Troubleshooting with nebulizer
- Updated project website

Steve

- Attend advisor meeting and team meetings
- Contributed to writing and editing of journal article, final report, and outreach essay
- Wrote section(s) of journal article/final report regarding circuitry and programming
- Correspondence with team regarding final deliverables
- Finalize functionality of program
- Troubleshooting with nebulizer

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	Patrick	
Notebook							Patrick								Patrick	
Midsemester Presentation						Patrick									Patrick	
Final Presentation															Patrick	
Final Poster														Patrick	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