

Delivery of Aerosol Drugs through Continuous Airway Positive Pressure (CPAP) Progress Report 01/28/2010-02/03/2010

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

- Obtain parts and create proof-of-concept prototype
- Schedule a meeting with Professor Chesler
- 01/29/2010 Meeting with advisor scheduled for 12:00-12:30 PM
- 02/01/2010 First meeting with client scheduled for 12:00 PM at the UW Sleep Lab
 - Present updated design and semester schedule to client
- 02/02/2010 Electrical/programming team meeting
- 02/02/2010 Mechanical sub-team meeting to test proof-of-concept prototype
 - Creation/testing of prototype

Summary of Accomplishments

- Proof-of-concept prototype constructed and functions as desired
- First client meeting of Spring 2010
- Mechanical sub-team meeting and research for improved nebulizer design
- Electrical/programming sub-team meeting

This Week's Goals / Schedule

- Obtain parts and create fully functional prototype
- Determine parameters for albuterol delivery timing and design efficiency
- Contact Professor Chesler to discuss air flow issues within system circuit
- 02/05/2010 Meeting with advisor scheduled for 12:00-12:30 PM
- 02/08/2010 Meeting with pulmonary specialist scheduled for 12:30 PM at VA Hospital
- 02/09/2010 Electrical/programming team meeting
- 02/10/2010 Mechanical sub-team meeting to test proof-of-concept prototype

Project Difficulties/ Reason for Missing Goals

- Mechanical sub-team needs to obtain parts for prototype before official testing
- Specific algorithms for program depend on results of prototype testing

Activities

Team

- 01/29/10 Team meeting and advisor-team meeting
02/01/10 Team meeting with advisor (Patrick, Ryan, Joe, and Steve)
02/02/10 Electrical/programming sub-team meeting (Steve and Patrick)
02/03/10 Mechanical sub-team meeting (Annie, Ryan, Patrick, and Joe)

Patrick

- Circuitry programming work and meeting
- Mechanical meeting and experimentation with prototype
- Meeting with client
- Team correspondence and planning

Annie

- Wrote progress report
- Mechanical meeting and experimentation with prototype
- Team correspondence and planning

Joe

- Calculations to determine the theoretical amount of medication that makes it to the lungs
- Meeting with client
- Mechanical meeting and experimentation with prototype

Ryan

- Mechanical meeting and experimentation with prototype
- Meeting with client
- Work to obtain shop permit

Steve

- Circuitry/programming work and meeting
- Correspondence with client to plan meeting with pulmonary specialist
- Meeting with client

Budget

- To be determined

Costs

- Total carried over from Fall 2009: Semester \$260
- HDPE plastic solid for nebulizer reservoir (McMaster.com) \$11.50

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																
Formal Progress Report																
Informal Week Summary																
Notebook																
Midsemester Presentation																
Final Presentation																
Final Poster																
Final Report																
Client Evaluation																
Peer and Self Evaluations																
Meetings																
BSAC																
Team (Other than w/ client or advisor)																
Electrical Team (When meeting separately)																
Mechanical Team (When meeting separately)																
Client																
Advisor (in class)																
Dist. Entrepreneur Lec.																
Project Research*																
Brainstorm Reservoir Options																
Programming Options																
Albuterol Delivery Rate																
Project Development																
Order Parts Necessary For Improved Reservoir																
Work On Reservoir / Mechanical Portion																
Finish Mechanical Portion of Design																
Test, Modify and Improve Mechanical Portion																
Test Albuterol Delivery Rate to Mask																
Test Entire Assembly																
Brainstorm Programming Options																
Order Parts Necessary for program																
Work on Program																
Refine Circuitry																

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

KEY	
Full Team	Patrick
Electrical Team	Annie
Mechanical Team	Joe
	Ryan