

Delivery of Aerosol Drugs through Continuous Airway Positive Pressure (CPAP) Progress Report 10/04/2009 – 10/10/2009

Names

Patrick Kurkiewicz, leader
Joe Decker, BSAC
Steve Welch, BWIG
Annie Loevinger, Communications

Clients

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.

Last Week's Goals

- Team meeting at 5:30 on 10/5 in ECB
- Divide up responsibilities for oral presentations
- See if we can borrow a microcontroller from Amit
- Get educated on programming details and get quotes for parts needed
- Explore possibility of using a 555 timer with current flow to blower as input
- Pick up ultrasonic nebulizer and test functionality
- Meeting with Professor Webster at 12:40 on 10/9

Summary of Accomplishments

- Met with professor Webster on 10/9 and discussed ways of measuring change in air flow (like a Drag Force Flowmeter)
- Discussed programming options on 10/9 and concluded that a DAQ board hooked up to a computer is sufficient for automation. In the future, a microcontroller will be used. A 555 timer is also an option.
- Acquired ultrasonic humidifier
- Came up with new idea for delivering albuterol only during inhalation
- Discovered that humidifier doesn't suspend albuterol in air the same way it does with water, but if the albuterol is diluted, it works
- Discovered piezo component of humidifier vibrates at 2.5MHz
- Divided up power point slides

This Week's Goals

- Have Power Point slides ready for group meeting at 6PM on 10/12/09
- Practice presentation 10/15/09
- Annie – Continue researching patents for functioning of CPAP and nebulizers
- Patrick & Joe – Work on finding ways to modify the piezo component of the ultrasonic humidifier to make it smaller and spill proof
- Steve – Look into buying a valve and getting the “new idea” ready for testing

- Use a spectrophotometer to ensure that albuterol is actually getting nebulized
- Once the above listed tasks are completed, testing will be done to determine if the piezo portion can be placed distal to the patient and still deliver a significant portion of nebulized drug

Project Difficulties/ Reason for Missing Goals

- Ultrasonic humidifier takes 7-10 days for delivery to WalMart

Activities

Team

10/05/09 Met at ECB and discussed programming options
 10/09/09 Met with Professor Webster
 10/09/09 Did lab work with ultrasonic humidifier

Patrick

- Picked up ultrasonic humidifier
- Stopped by Wal-Mart to see if ultrasonic humidifier was delivered (it was not)
- Wrote last week's progress report

Annie

- Correspondence with client and advisor

Joe

- BSAC meeting

Steve

Costs

- Ultrasonic Humidifier - \$30.56 (Reimbursed by client \$40 cash)

Project Schedule																	
Task	September				October					November				Decem			
	4	11	18	25	2	9	16	23	30	6	13	20	27	4	11		
Deliverables (Date Due)																Key	
Website																Team	
PDS																Patrick	
Progress Report																Annie	
Notebook																Joe	
Midterm Presentation																Steve	
Final Presentation																	
Final Poster																	
Final Report																	
Client Evaluation																	
Peer and Self Evaluations																	
Meetings																	
BSAC																	
Team																	
Client																	
Advisor (in class)																	
Dist. Entreprenuer Lec.																	
Project Research*																	
Current Devices																	
CPAP System																	
How a Nebulizer Works																	
Aerosol Delovery Methods																	
Albuterol/ related drugs																	
Project Development																	
Select Project																	
Brainstrom Ideas																	
Narrow Ideas																	
Select Idea																	
Work on Design																	
Buy Necessary Parts (no later than)																	
Work on Prototype Fabrication																	

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