

## **Delivery of Aerosol Drugs through Continuous Airway Positive Pressure (CPAP) Progress Report 09/20/2009 – 09/26/2009**

### **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 of 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**

- Acquire Albuterol nebulizer samples and inhaler canisters from Dr. Teodorescu
- Select ultrasonic piezo buzzers and order before 9/25
- Look into purchasing an oscillator
- Draft an experiment for evaporation test and execute
- Meeting with Professor Webster at 5:30 PM on 9/21
- Meeting with Dr. Teodorescu at 9:30 AM on 9/24
- Team meeting at 12:00 PM on 9/25
- Read articles that Dr. Teodorescu has suggested

### **Summary of Accomplishments**

- Received feedback from Professor Webster on PDS report
- Tested US Flowmeter and a piezo buzzer to see if they produced a "mist" in distilled H<sub>2</sub>O
- Acquired 25-3ml doses of Albuterol, which were made to be used in nebulizers
- Received quote from APC for ultrasonic nebulizer components
- Purchased ultrasonic humidifier (to be picked up from Wal-mart in 7-10 days)
- Concluded that when an Albuterol solution evaporates, a residue is left behind, which means that delivery through evaporation would prove ineffective
- Searched PubMed and found a couple of relevant articles

### **This Week's Goals**

- Meet with Dr. Teodorescu at 9:30AM on 10/1
- Meet with Professor Webster at 12:40 PM on 10/2
- Pick up ultrasonic humidifier and test it to see if it can perform necessary function
- Divide up tasks for power point presentation
- Contact Dean R. Hess @ [dhess@partners.org](mailto:dhess@partners.org) to discuss his work

- Read article from PubMed: “Aerosol Kinetics and Bronchodilator Efficacy...”
- Begin brainstorming programming options for CPAP delivery system

### **Project Difficulties/ Reason for Missing Goals**

- Dr. Teodorescu was out of town this week, so we couldn't meet with him

### **Activities**

#### **Team**

9/21/09 Met with Professor Webster  
9/25/09 Met with Professor Webster  
9/25/09 Did lab work, ordered ultrasonic humidifier

#### **Patrick**

- Worked on second progress report
- Printed and read article from PubMed

#### **Annie**

- Correspondence with client and advisor
- Performed research on composition of Albuterol

#### **Joe**

- Performed research & checked out book on aerosol medications from Ebling Library

#### **Steve**

- Acquired quote for Nebulizer components from APC
- Met with Amit to discuss ultrasonic piezo buzzers

Project Schedule																
Task	September				October					November				Decem		
	4	11	18	25	2	9	16	23	30	6	13	20	27	4	11	
<b>Deliverables (Date Due)</b>																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																
<b>Meetings</b>																
BSAC																
Team																
Client																
Advisor (in class)																
Dist. Entreprenuer Lec.																
<b>Project Research*</b>																
Current Devices																
CPAP System																
How a Nebulizer Works																
Aerosol Delovery Methods																
Albuterol/ related drugs																
<b>Project Development</b>																
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.*