Inspiratory and expiratory flow meter –Product Design Specifications

Team:
Andrew Eley (Leader)
Sarah Offutt (Communicator)
Darshan Patel (BSAC)
Eric Bader (BWIG)

Function: Our client desires a peak inspiratory and peak expiratory flow meter in a single device to monitor for symptoms of asthma and vocal cord dysfunction. It should measure flows up to about 700 liters per second for adults, be cheap, durable, and easy to use with clear measurement readings.

Client requirements:
• measure both inspiratory and expiratory peak flow in a single device
• cheap to make
• Easy to read measurements
• Cannot compromise patient or user safety

Design requirements:

1. Physical and operational characteristics
   a. Performance requirements: The design must be able to measure inspiratory and expiratory peak flow rates.
   b. Safety: The design must not have materials that could be harmful to patient.
   c. Accuracy and reliability: This device should measure peak flow rates to about 700 L/min for expiratory and to about 400L/min for inspiratory to within 5 percent.
   d. Life in service: The final design will be given to patients who may use them daily for a period of time and then dispose when the device isn’t needed.
   e. Shelf life: The design should last indefinitely.
   f. Operating environment: The design must be easily sanitized for normal daily use by a patient.
   g. Ergonomics: The design must be portable and easily held up to the mouth in one hand.
   h. Size: The design must be small and easily portable. It may be thrown in a gym bag or a pocket. (Preferably less than 8 inches)
   i. Weight: The design must be light enough to hold up to the mouth and carry around. Should not exceed 1 lbs.
   j. Materials: The design should be made primarily of cheap lightweight plastics.
   k. Aesthetics, appearance, and finish: The device should look easy to use
with no rough surfaces. Should be easily understandable.

2. **Product characteristics:**
   
   a. *Quantity*: One model will be prototyped; if successful, it can be manufactured and used for future use.
   
   b. *Target product cost*: The cost of the entire device once in manufacturing should be less than $40.

3. **Miscellaneous:**
   
   a. *Standards and specifications*: May need FDA approval.
   
   b. *Customer*: The client would prefer the model to be inexpensive, light, and easy to read.
   
   c. *Patient-related concerns*: Must be able to be easily cleaned. Possibly dishwasher safe.