**Team B9: Accessible Ventilation Coach for Opioid Overdose Bystanders**

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**Motivation**

Need for accessible and cost effective method to help overdose victims

- 110,000 drug overdose deaths in the US in 2023
- Main cause of death from opioid overdose is respiratory failure
- EMS response takes 7-14 minutes
- Currently no safe bystander options for ventilation

**Solution**

Develop an adjunctive device to the Bag Valve Mask to coach and empower bystanders to perform rescue breaths to overdose victims safely and effectively

- < 225 grams
- > 25 min battery life
- < $30 at production scale
- Coach 500ml compression
- Guide 15 breaths/min
- Instruct 'E-C Seal'

**Methods**

Device Calibration Using Lung Simulator

- Squeeze 100-500ml 10 times per deciliter
- Record volume output from Test Lung
- Record analog value from potentiometer
- Use equation to calibrate feedback
- Perform pilot user performance study

**Figure 1. Drug Overdose Death Count in the US**

**Results**

**Objectives**

- Revolutionize untrained bystander opioid overdose management
  - Reduce overdose mortality rates
  - Provide emergency care for patients in respiratory arrest
  - Affordable solution distributed with opioid prescription
  - Provide increased usability and safety for manual resuscitation

**Bioethical Implications**

- Data indicates that audio and visual feedback support bystander confidence and patient safety when performing rescue breaths

**Conclusion & Future Work**

Plag test involving 6 participants showed increase in BVM user efficacy when using device

- Accomplished all 6 design objectives

**Testing & Validation**

- Perform large-scale user performance feedback study
- Iterate design with feedback

**Commercialization**

- File provisional patent
- Consult contract manufacturing organization
- Patent & trademark
- 510k regulatory pathway

**References**


**Figure 2. Michigan Test Lung**

**Figure 3. Relationship Between Measured Volume and Device Reading**

**Figure 4. Michigan Test Lung Volume Output**

**Figure 5. Pilot Test Compression Rate**

**Figure 6. Pilot Test Volume Output**