Len(s)wipe - A Laparoscopic Lens Wiper

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**DISEASE STATE**

- Laparoscopic Surgery
  - Over 15 million worldwide, 3.5 million in U.S. per year\textsuperscript{[2]}
  - Minimally invasive surgery that eliminates large incisions
  - Camera inserted into body to increase visualization
  - For various pathologies/conditions involving the abdominal area and pelvic organs

- Current Problem
  - Surgeons frequently remove scope from patient
  - Results in increased surgical time, risk of infection, and post-surgical complications

**OBJECTIVES**

1. Clean the lens of a laparoscope inside the patient’s body
2. Achieve mechanical success of prototype
3. Conduct successful efficacy testing of wiper blade on the lens
4. Ensure biocompatible, low cost, and ergonomic

**COMPETITORS & MARKET GAPS**

**ClickClean**
- Shields lens with device trigger that interchanges soiled film for new, clean film\textsuperscript{[2]}

**Clearify**
- Scope is removed from the body and cleaned with trocar wipes, microfiber cloth, and a warming hub\textsuperscript{[3]}

**Flowshield**
- Lens has vortex barrier of carbon dioxide dry gas delivered by external tube, which shields and defogs the lens\textsuperscript{[4]}

**Current Market Gaps:**
1. Safety - remain inside the patient
2. Simplicity - easy but effective mechanism for cleaning
3. Ease of Use - lightweight and easy operation
4. Cost Effectiveness - low cost solution

**MANUFACTURING**

- **Materials**
  - UHMWPE fishing line
  - Extension springs
  - Silicone squeegee blade
  - Threaded islets
  - ABS and PLA 3D printing filament

- **Prototyping Methods and Cost**
  - 3D printing for tubing/casing
  - Hand manufacturing for threader wire
  - Current Cost: $8.39 → Selling Price: $40.00

**CONCLUSIONS & FUTURE WORK**

- **Conclusions**
  - Verification of theoretical function and efficacy of our device
  - Sleek and more ergonomic design offers comfort and is an improvement from last year’s design
  - The wires are contained within the tubing so as to keep them secure and free from contact with the body
  - Low cost solution compared to competition

- **Future Work**
  - Test fully manufactured device with blood and bodily fluids
  - Manufacture samples with proposed manufacturing materials and technology
  - Create secondary model with lateral switch mechanism

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**REFERENCES**
