



ABLE: Accurate Blood Loss Estimator

A system for the accurate measurement of blood loss during surgery

Team Members:

Hannah Watry, Elisha Sanoussi, Risheek Pingili

Introduction: Clinical Need

Blood loss remains a primary cause of operating room deaths, yet the current standard of visual estimation is very inaccurate. Blood loss estimation takes into account many separate observations including:

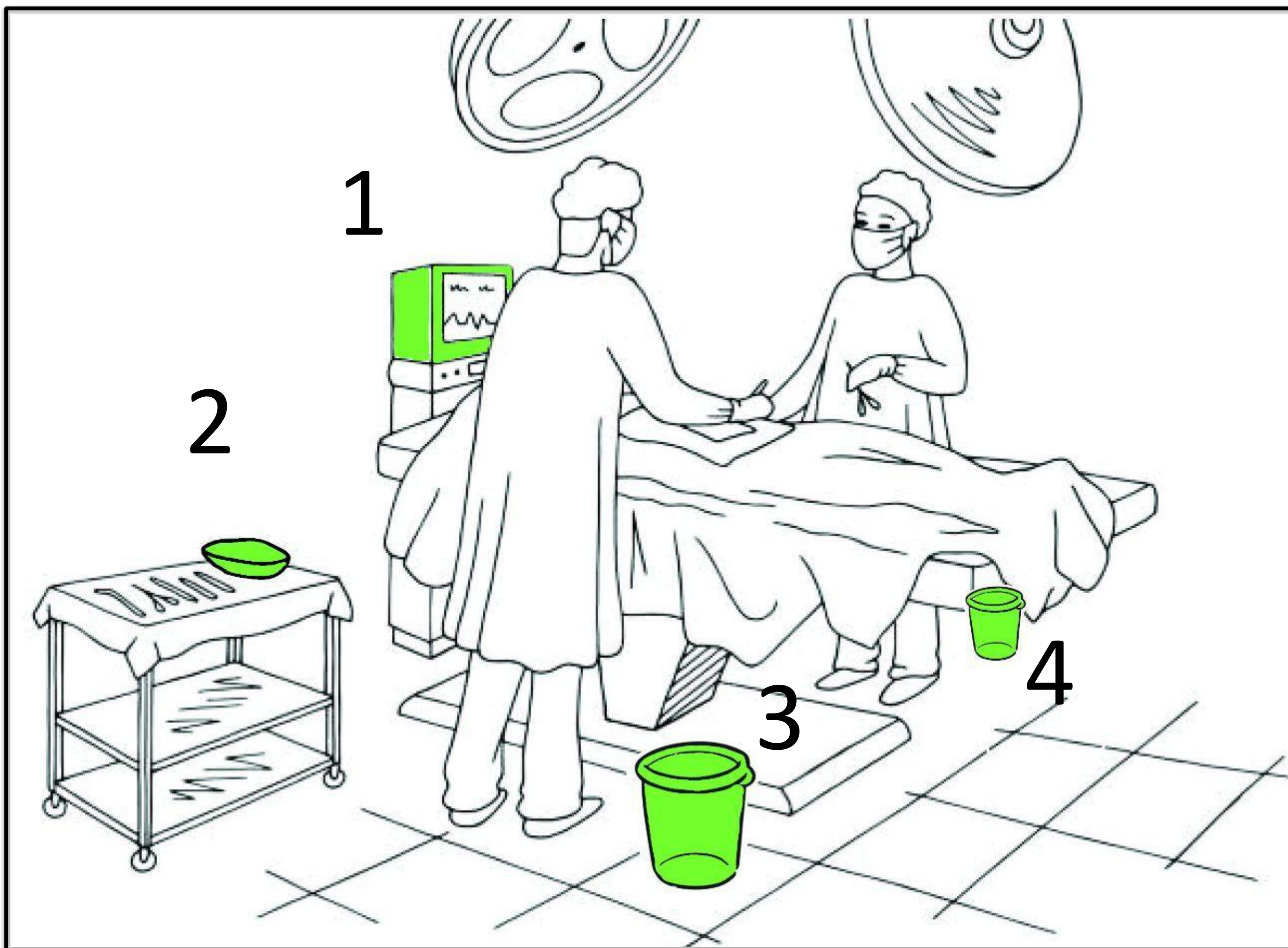
- Suction volume
- Hematocrit
- Vital signs (blood pressure and heart rate)
- Bloodiness of sponges

ABLE is a real-time, gravimetric solution that allows accurate quantification of blood loss to reduce mortality from under-transfusion, and reduce the costs and risks of over-transfusion estimated at \$10 billion annually in the US alone.

Need Statement

A quantitative method to measure blood loss in surgical patients to facilitate transfusion of an appropriate amount of blood during surgery.

Device Workflow



1. Display monitor
2. Saline with gravimetric sensor
3. Sponge receptacle with gravimetric sensor
4. Suction canister with gravimetric sensor

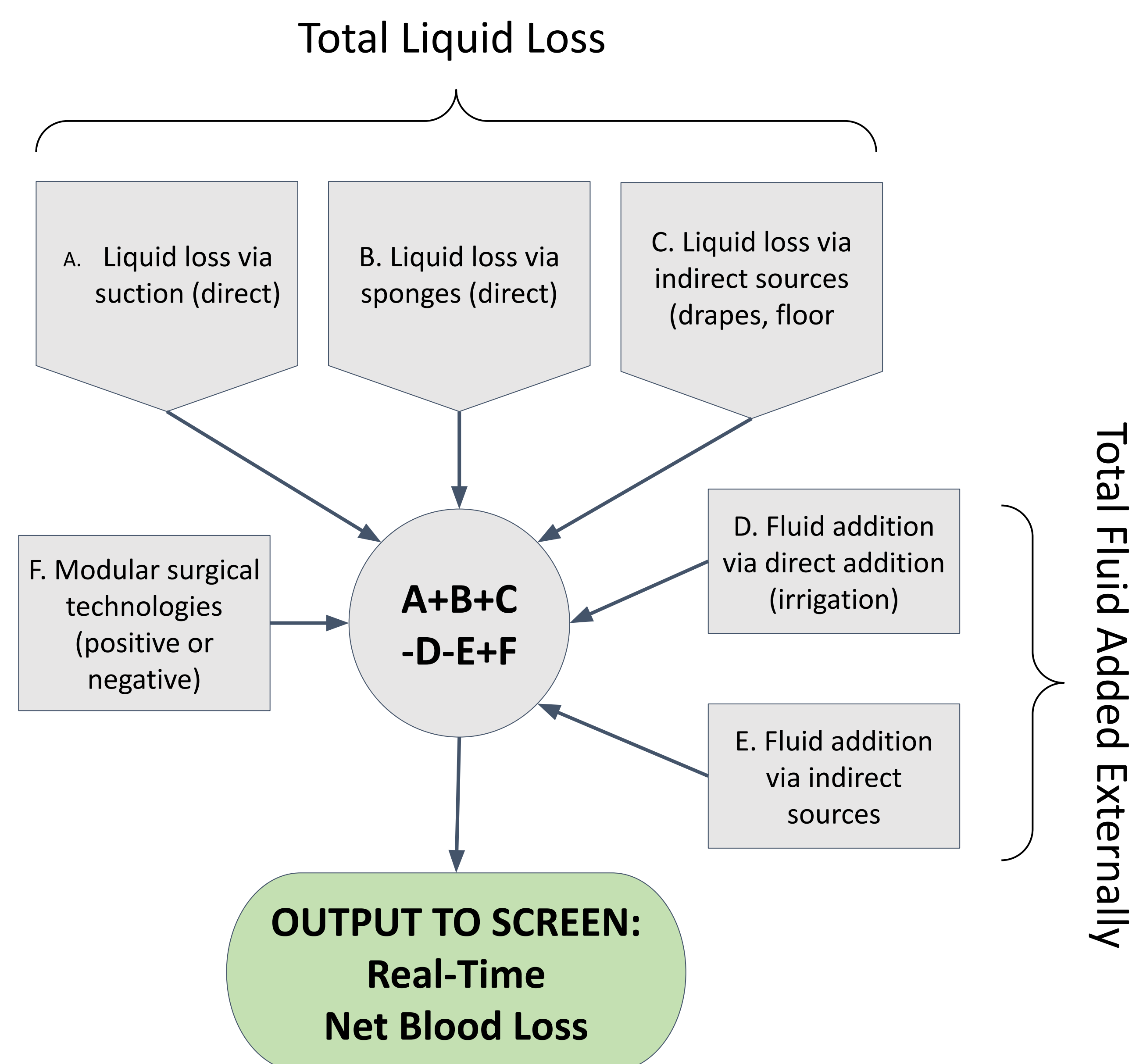
Stakeholder Analysis

Primary Users	Anesthesiologists Surgeons
Secondary Users	Circulator Nurses Scrub Technicians
Key Opinion Leaders	Anesthesiologist Leaders Surgeon Leaders
Primary Buyers or Payers	Hospital Administrators
Other	IT Support Systems Biomedical Engineers & Techs In-hospital Blood Bank

Business Model Alternatives

Business Model	Device Cost	Disposables Cost	Licensing Fee	Maintenance Contract
Disposable Sale Model (Razor Blade Model)	Device sold at cost	Unique disposables purchased from ABLE	No	Yearly (optional, but recommended)
Device Sale Only	Device sold for profit	Purchased from routine vendors	No	Yearly (optional, but recommended)
Subscription Model	Device leased to hospital on annual basis	Purchased from routine vendors	Yearly	Included in annual subscription
Device Sale + Software licensing	Device sold for moderate profit	Purchased from routine vendors	Yearly	Yearly (optional, but recommended)

Device Schematic



Acknowledgements

We would like to thank Dr. Alexander Lin for serving as our sponsor and Prachi Shinglot. We would like to thank Verna Rodriguez, Joy Ahn, Shuvo Roy, and Dorian Liepmann.

Works Cited and Images

Lin, Alexander. Real-Time Intraoperative Blood Loss Monitoring. US Patent 11,633,111 B2. Issued April 25 2023.

iStock Image. (2018) <https://www.istockphoto.com/vector/operating-room-graphic-black-white-interior-sketch-illustration-vector-surgeon-gm1022682370-274540133>