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# Surgical drain for fluid collection

## Unmet Need

Surgical drains are an essential component of various surgical procedures including chest drainage, abdominal surgery, plastic surgery, and neurosurgery. Roughly 4.2 million of these surgeries performed annually in the US require at least one drain. These devices can reduce compression and drain air or fluid from surgical sites to prevent accumulation of pus, blood, and other undesired material. Existing surgical drains face several issues that can complicate health care. One example includes clot formation and tissue obstructions which can impact fluid flow or cause leaks near the insertion site. Through clinician interviews, research, and market analysis, there is a demonstrated need to fix these issues in order to improve patient care and nursing workflow.

## Technology

Duke inventors have created a flexible internal fluid collection system that addresses many of the most pressing issues brought up by experienced clinicians. First, the design allows for customization of the draining apparatus through use of moldable tubing to optimize how the system is shaped in the operating room. Secondly, a foam and mesh encapsulation of the drain helps to prevent clots and particles from entering the tubing. This also allows for increased safety and efficacy when in proximity to delicate organs. Additionally, this feature can prevent the need for drain stripping and improve nursing workflow, which is especially important with current staffing shortages across the country. Lastly, a suture-free attachment mechanism is included to prevent unintentional removal of the fluid collection system as well as patient comfort. The technology has been physically demonstrated to be effective through use of a prototype.

## Other Applications

This technology could also be used in veterinary surgery applications.

## Advantages

- Customizable internal tubing
- Surrounding foam and mesh filters out particulates while maintaining patency, decreasing maintenance needs
- Suture-free securement device increases patient comfort

