

Thesis Project Portfolio

Designing a Modified Armboard for Cardiovascular Medicine

(Technical Report)

Obamacare: A Lasting Legacy or Hanging by a Thread?

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

Jason Woloff

Spring, 2020

Department of Biomedical Engineering

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Sociotechnical Synthesis

The U.S. healthcare sector serves patients at a frequency of roughly once per second. Global spending on healthcare as of 2017 is estimated at \$7.724 trillion; it is projected to rise at an annual rate of 5.4% to \$10.059 trillion USD by 2022 (Allen, 2019). Such a large facet of society always has room for improvement. Expensive research is conducted everyday in pursuit of the next cure that can save lives or medical device that revolutionizes surgery. However, medical innovations range from zero tech to high tech. A modest improvement to patient care or better access to this care can be significant contributions. My technical and STS research topics reside in the zero-to-low tech end of this spectrum.

Technical work from the capstone team looked to improve upon the armboard device currently in use in the cardiovascular medicine department of the University of Virginia hospital. During operation, an armboard ensures proper and comfortable positioning of the patient. With insight from medical professionals about the limitations of surgical armboard models in use at the UVA hospital the team designed and prototyped a new model to optimize performance with respect to the technologists using the equipment and comfort of the patient. With continued work to refine the model the universal armboard will ideally promote more efficient procedures by medical professionals, improve patient experience, and lower costs.

The STS research is loosely coupled to the capstone project. In the earlier stages my research focused on how Obamacare and the opponents and defendants of the legislature affected the healthcare industry regarding patient access to care. My focused evolved throughout work on the paper to a more generalized flaw in policymaking in the US using the Affordable Care Act as an example to showcase the harmful and counterproductive tactics used.

There is still much that can be done across both topics. The progress of the capstone project was in fact interrupted by the COVID-19 pandemic as more work was intended to be conducted to present a complete final model. Even with this project aside there are many other “minor” improvements that can be made in healthcare that could have a widespread positive effect. Additionally, the topics discussed in the STS research have immense room for expansion as further exploration of policymaking around the ACA and other legislature is sure to yield examples of both positive and negative methods currently in practice.