

## **Thesis Portfolio**

### **Growth Factor Release from Microporous Annealed Particle (MAP) Hydrogel to Improve Wound Healing**

(Technical Report)

### **Disparities between Quality of Diabetic Care due to Income Differences**

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Sciences  
University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree  
Bachelor of Science in Engineering

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## **Sociotechnical Synthesis**

A gap in treatment options exists in diabetic wound healing, often resulting in severe consequences, including amputation for patients who suffer from these chronic wounds. Microannealed particle gel (MAP gel), specifically loaded with Epidermal Growth Factor (EGF), provides an environment that is suitable for tissue integration and vascularization for healing of these complex wounds. In preparing for the availability of this alternative medical treatment, the human and social dimensions of the technology must be considered to ensure that all people, regardless of socioeconomic background, have access to it to prevent disparities in quality of care. The STS theories of techno-politics, which addresses how policies develop around technologies and create positive and negative power dynamics, and inclusive innovation can be applied to analyze the human and social dimensions of developing a new diabetic wound healing treatment. In order to analyze whether there is a current disparity in the quality of diabetes care for those who face financial insecurities as well as understand the important considerations to bring a new medical treatment to the marketplace, data from the CDC on the cost of diabetes care in each state across the country will be compared to the range of wealth for residents of each state. In addition, interviews with diabetes advocacy groups in Washington D.C. will allow for an understanding of the personal and daily implications of the cost and disparities of care. Gaps in quality of care for diabetic patients due to their differences in financial standing will be uncovered and analyzed. Through the unison of predicting the social implications of a new healthcare treatment and the development of a technology that fills an apparent gap in the diabetic care space, many patients' qualities of life stand to be dramatically improved.

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