

**Southwest Health Equity Research Collaborative
PILOT PROJECT PROGRAM**

PI: Andrew Koppisch, PhD

Associate Professor, Chemistry & Biochemistry

Project Title: “*Novel Ionic Liquid Formulations to Combat Diabetic Foot Ulcer Infections*”

Proposal Abstract:

Approximately 30 million Americans (nearly one in ten) live with diabetes or prediabetes. These diseases disproportionately affect minority populations relative to the national averages, and this trend is also observed in the southwest U.S. In Arizona, the mortality rates associated with diabetes are approximately eight-fold higher than the state average for Native American communities and two-fold higher for Hispanic/Latino populations. Thus, while diabetes is one of the most significant diseases on the globe today, it also represents a very significant area of health disparity for minority populations residing in Arizona and the surrounding states.

Approximately fifteen percent of diabetics will have a foot ulcer during their lifetime, and infections that establish within these chronic wounds are a serious threat to the patient's livelihood. Microbial biofilms that cause these infections are difficult to treat with common antibiotics and if they are not eliminated, may easily spread into surrounding tissue and/or bone. At that point, amputation of the foot is one of the only remaining medical options.

This project aims to synthesize and characterize new therapies for the microbial biofilms that cause many identified infections to foot ulcers. The materials we propose to develop (known as ionic liquids and deep eutectic solvents, or IL/DES) are fluid salts that are very effective at killing bacteria, yet remain safe to humans. We will develop new IL/DES formulations that specifically target two common foot ulcer pathogens: *Pseudomonas aeruginosa* and *Candida albicans*.