

## STEM

### Universal Method for Analysis of Counterfeit Medication for the Kilimanjaro School of Pharmacy in Tanzania

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It is common for drugs to be sold by vendors in markets throughout Tanzania; however, these drugs are often counterfeit, mimicking the size, shape, and packaging of genuine drugs without offering the desired efficacious effect. This poses a major problem. These counterfeit drugs waste resources, put individuals at risk of continued illness, and discourage individuals from purchasing genuine and life-saving medications. With the research being conducted by this global development team (GDT) for project partners at the Kilimanjaro School of Pharmacy (KSP), our goal is to develop a universal method for distinguishing between counterfeit and non-counterfeit drugs in Tanzania. The team will also develop training materials for the project to implement at KSP. High-performance liquid chromatography (HPLC) is used to compare samples of drugs with standards to test for the presence of the active pharmaceutical ingredient (API) of each drug. Various solvent and buffer solutions were researched and chosen with the hopes of simplifying the method and easing the implementation in Tanzania while still allowing for the testing of many drugs. Using the pure component of each drug obtained from the United States Pharmacopeia (USP), chromatograms have been collected from HPLC experiments used as standards for the project. So far, this research has allowed the team to test the possibility of using HPLC to distinguish between counterfeit and the genuine drugs and to develop

preliminary methods for extraction and analysis of five commonly used and commonly counterfeit medications in Tanzania. Current methods to combat the counterfeit drug problem are selective to the pharmaceutical ingredient being tested and not universal. Continued research will be completed to further simplify the methods and make this project even more comprehensive for a variety of commonly counterfeited medications.

*Research advisors Stephen Byrn and Kari Clase write, "This project provided students with both an opportunity to conduct important research and subsequently a global experience so they could see the impact of their efforts on global health by simplifying counterfeit testing. Confirmatory testing currently requires a specific solvent and column for a specific drug. A universal method will enable scientists to use a single column and solvent system instead of analyzing each drug separately."*



Project partner, Sister Zita of the Kilimanjaro School of Pharmacy, preparing a sample for high-performance liquid chromatography analysis.

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