Development of a Paper-based Test for *Salmonella* dublin Detection in Cow Milk

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In the United States, the dairy industry is worth approximately $140 billion dollars. Dairy products are a huge nutritional part of many people's diet throughout the world. Diseases such as *Salmonella* dublin can cause health and economic issues for dairies everywhere. *Salmonella* dublin is also a zoonotic disease, meaning that it presents health issues for humans and other mammals, as well as cattle. As with all diseases, prevention and management are key factors for controlling disease severity. Current testing methods are lab-based, so limit accessibility.to testing. The purpose of this research is to create a rapid, simple to use, low cost, field use device that will test cow milk for *Salmonella* dublin.

This presentation will describe progress towards the development of a paper-based microfluidic test, which uses a colostrum sample and can present results in less than 20 minutes. The device design uses a sandwich immunoassay format in a completely disposable device composed of porous materials. Fluids move through these materials using capillary flow, so there is no need for pumping instrumentation. A simple card design has been developed and will be presented. Preparation of this device is quite simple. First a schematic is designed to with all of the parameters that are desired. Next the card and components are cut using a laser to ensure precision, one of the components requires additional processing before it can be incorporated into the card. Once prepared the components are added to the card. User steps are simple; dilute a colostrum sample, add fluids to appropriate pads, fold the device closed, and count the number of colored spots that develop. Due to its high viscosity colostrum does not flow well in the paper strips, therefore it must be diluted. Experiments investigating the flow properties of different colostrum dilutions and the effectiveness of different immunoassay capture approaches will be presented. Finally, key next steps will be discussed.