This paper presents a medical device that enables end-to-end blood testing by performing blood draws and providing diagnostic results in a fully automated fashion at the point-of-care” Balter et al (2018).

Abstract:

Diagnostic blood testing is the most commonly performed clinical procedure in the world, and influences the majority of medical decisions made in hospital and laboratory settings. However, manual blood draw success rates are dependent on clinician skill and patient physiology, and results are generated almost exclusively in centralized labs from large-volume samples using labor-intensive analytical techniques. This paper presents a medical device that enables end-to-end blood testing by performing blood draws and providing diagnostic results in a fully automated fashion at the point-of-care. The system couples an image-guided venipuncture robot, developed to address the challenges of routine venous access, with a centrifuge-based blood analyzer to obtain quantitative measurements of hematology. We first demonstrate a white blood cell assay on the analyzer, using a blood mimicking fluid spiked with fluorescent microbeads, where the area of the packed bead layer is correlated with the bead concentration. Next we perform experiments to evaluate the pumping efficiency of the sample handling module. Finally, studies are conducted on the integrated device – from blood draw to analysis – using blood vessel phantoms to assess the accuracy and repeatability of the resulting white blood cell assay.
Reference:


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