**Objective**
To construct an in-house vertical flow-based point-of-care (POC) device for diagnosing Systemic Lupus Erythematosus (SLE) in serum by detecting ANA and anti-dsDNA biomarkers in the comparative BSA range of 50 μg/ml to 250 μg/ml.

**Background**
- Systemic Lupus Erythematosus (SLE) is an autoimmune disease that causes multiple organ system inflammation and tissue damage.
- The antibodies, anti-double stranded DNA (anti-dsDNA) and anti-nuclear antibodies (ANA), are used as biomarkers for SLE.
- The vertical flow assay (VFA) has antigens (Hep 2 lysate and dsDNA) bound to the nitrocellulose membrane (NCM).

**Methods**
- Developed a standard curve by running the VFA system under 5 different concentrations (0, 0.5, 1, 5, and 10 IU/ml) of antigens and obtaining signal intensity measurements via the use of an image processing software (ImageJ).
- Evaluated the standard curve’s validity in distinguishing healthy vs. active SLE levels of biomarkers by running healthy vs. active SLE patient samples.
- Determined the ideal membrane through quality of colorimetric signal in all four zones.
- Adjusted the in-house fabricated assay diluent’s Tween20 concentrations, pH, and presence of other reagents to develop an all-purpose assay diluent.

**Results**
- The membranes from Figure 2 were analyzed in Image J to obtain a standard curve, shown in Figure 3. The standard curve established that the signal intensities increases as the concentration of biomarkers increased.

**Conclusion**
The in-house VFA system for diagnosing SLE produced successful results. The standard curve shows a signal gradient effect with increments in concentration of human serum standard. Based on the observing score (OS), patients and healthy samples were able to be distinguished.