Background
Preeclampsia is a multi-system hypertensive disorder of pregnancy and a significant cause of maternal mortality worldwide. Efforts to develop models for prediction of preeclampsia only yielded modest results. Anti-angiogenic signalling and vascular abnormalities manifest prior to the development of clinical signs, even as early as mid-gestation. It was hypothesized that impaired indices of microcirculatory function could be detected using sidestream dark field (SDF) imaging. The objective of this study was to examine microvascular function in women at high risk for preeclampsia at mid-gestation using SDF imaging.

Methods
With REB approval, women presenting for a prenatal clinic visit between 16 and 22 weeks gestation of pregnancy were screened for eligibility. Patients at high risk for preeclampsia were recruited if they met at least one of the following criteria: previous preeclampsia, pre-existing renal disease or diabetes mellitus, antiphospholipid syndrome, BMI ≥ 35, pre-existing hypertension, or both age > 40 years and family history of preeclampsia in a first degree relative. Participants were excluded if they were smokers, consumed caffeine within 6 hours of imaging or were non-English speaking. Investigators performed analytical non-invasive SDF imaging of the 5 different visual fields of the sublingual microcirculation. Video images were analyzed blindly following randomization to determine the microcirculatory parameters (microvascular flow index (MFI), perfused vessel density (PVD), total vessel density (TVD), and proportion of perfused vessels (PPV)). After delivery, charts were reviewed to determine if they developed gestational hypertension, preeclampsia or severe preeclampsia. The primary outcome was the difference in MFI between the normal participants and participants with preeclampsia.

Results
Data from sixty-six patients were included in the final analysis. Twelve of the participants (18.2%) developed preeclampsia or severe preeclampsia during the course of their pregnancy. Obesity was a common risk factor for inclusion across all groups, representing over 50% of participants with no preeclampsia. MFI was not significantly different between participants with normal pregnancies and participants with preeclampsia or severe preeclampsia (2.75 ± 0.38 vs. 2.80 ± 0.34, respectively; p = 0.459). Similarly, there were no significant differences in TVD, PVD and PPV between the two groups.

Discussion
We did not detect a functional difference in microcirculation between women who did develop preeclampsia and those who did not. SDF imaging of the sublingual microcirculation may remain an appropriate tool to identify women at risk for the disease, albeit later in pregnancy.

References: