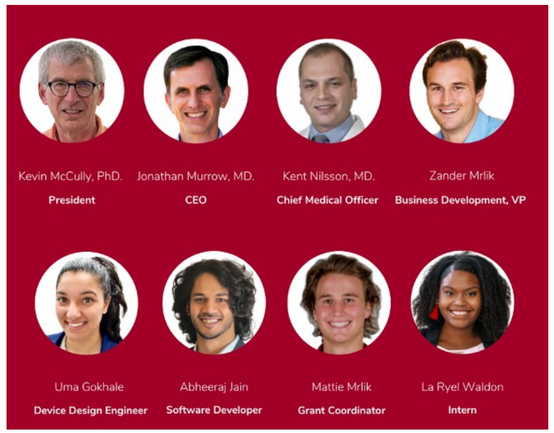
Novel Near Infrared Technology Accurately Diagnoses Vascular Disease

Team



Background

Diabetic vascular disease continues to inflict a high burden of morbidity. Despite available diagnostic tools, **amputation rates for advanced vascular disease have increased** in the past several decades. At the same time, **patients with lower socioeconomic status suffer late diagnosis and more advanced disease on presentation**. Black patients suffer disproportionately higher rates of PAD than other demographic groups, with amputation rates for advanced PAD that are 2-4 times higher. (Bevan, 2020) **The current ineffective strategy for screening involves in-office testing by physicians using ABI testing**, which is underutilized by primary care clinicians, inaccurate in diabetes, and costly for many patients.(Mohler, 2004)

Infrared RX has developed a reliable, non-invasive, and cost-effective diagnostic tool for diagnosing vascular disease.

ABI testing is <u>unreliable</u> for 1 in 4 patients.

Figure: IRX Logic Model Flow chart illustrates implementation of IRX FLOW device in decreasing disparities

Need

Peripheral Arterial Disease (PAD)

- Diabetes, high cholesterol, smoking
- Leg pain when walking
- Detection essential for treatment, but current diagnosis has flaws
- Untreated: amputation, heart attacks, stroke
- High degree of health disparity
- Approximately 6% of the US adult population (40 years or older, or over 7 million people) have PAD. Despite available diagnostic tools, amputation rates for advanced PAD has increased in the past several decades.

OPPORTUNITY

- Ability to offer to a broader population
- Accurate diagnosis at the earliest stages
- Ability to monitor progress with therapy
- Ease of use, fast, inexpensive, and reliable

Solution

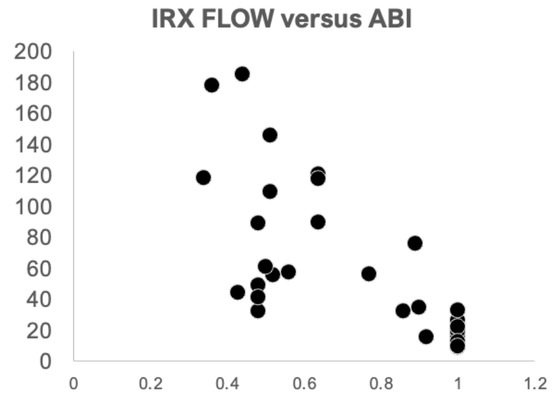
IRX FLOW

- **Non-invasive light sensor**
- **Automated data acquisition platform**
- **Special training not required**
- **Ten minutes to test both legs**

Research

Table: Subject characteristics.

Variable	PAD N = 21	No PAD N=15
Age (years)	70±8.1	70±7.3
Gender (%)		
Male	67	67
Female	33	33
Diabetes (%)	33	0
Ankle-Brachial Index		
Right PT	0.85 ± 0.28	-
Right DT	0.85 ± 0.30	-
Left PT	0.87 ± 0.25	-
Left DT	0.76 ± 0.21	-
IRX FLOW	46.4 ± 44.6	16.4±7.0



Graph: Correlation between IRX FLOW and ABI testing. Pearson correlation = 0.75 ($p<0.05$).

1. Bevan, G. H. and K. T. White Solaru (2020). "Evidence-based medical management of peripheral artery disease." *Arteriosclerosis, thrombosis, and vascular biology* **40**(3): 541-553.
2. Chen, L., et al. (2021). "Disparities in peripheral artery disease hospitalizations identified among understudied race-ethnicity groups." *Frontiers in cardiovascular medicine* **8**: 515.
3. Crawford, F., et al. (2016). "Ankle brachial index for the diagnosis of lower limb peripheral arterial disease." *Cochrane Database of Systematic Reviews*(9).
4. Curry, S. J., et al. (2018). "Screening for peripheral artery disease and cardiovascular disease risk assessment with the ankle-brachial index" *JAMA* **320**(2): 177-183.