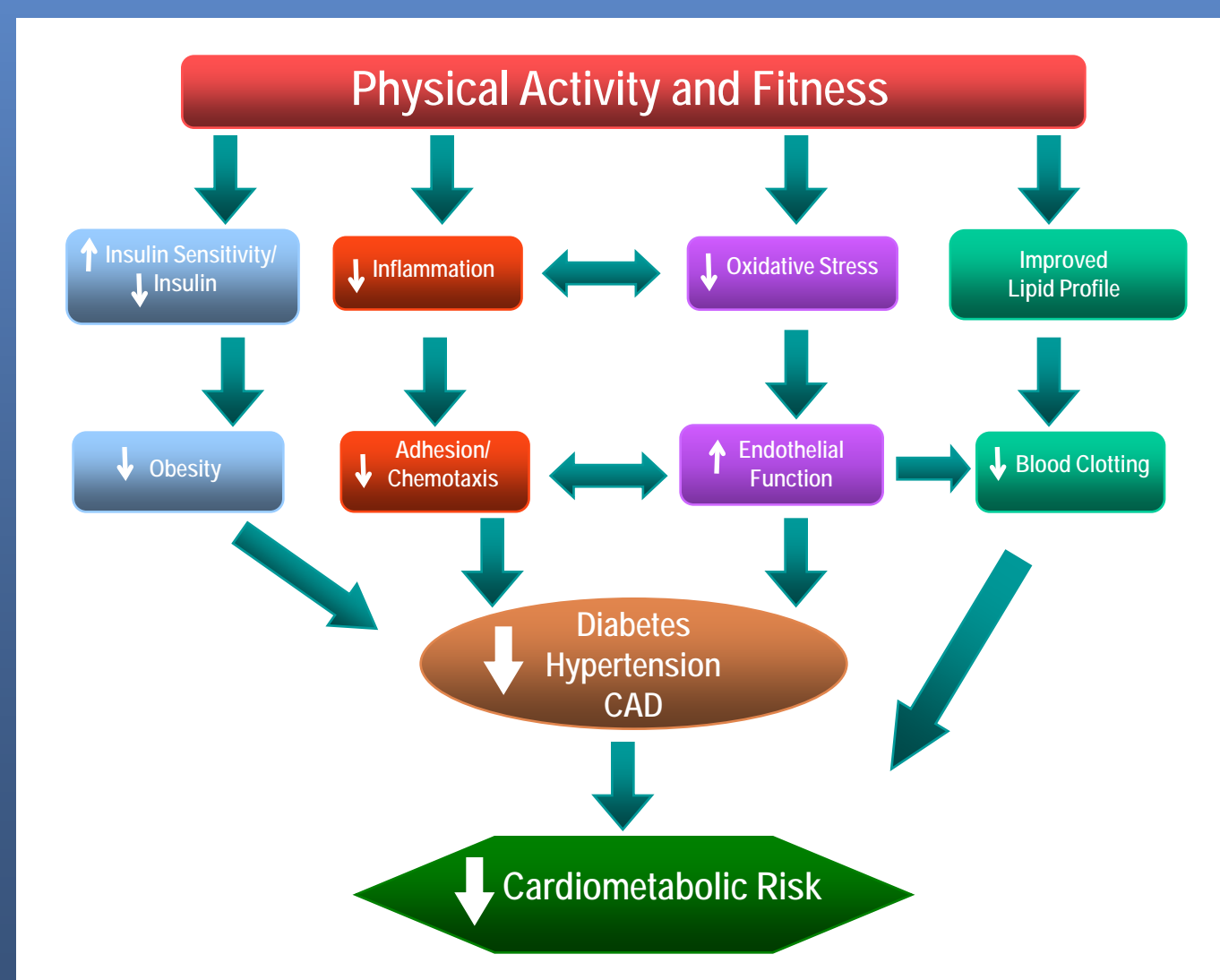


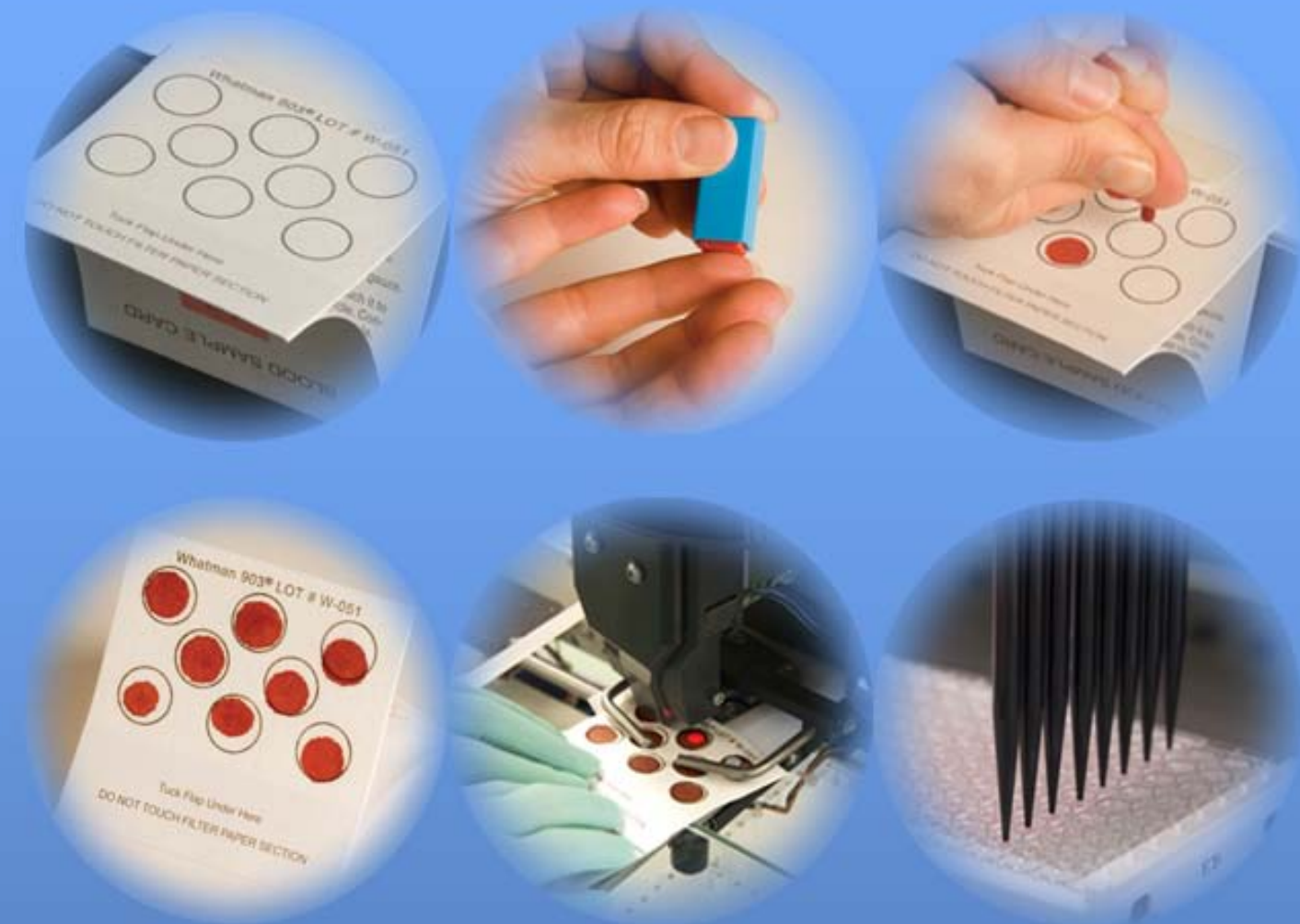
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Background

The prevalence of diabetes and cardiovascular disease is increasing at an alarming rate. Several clinical and observational studies have demonstrated reduced risk of diabetes when physical activity increases. Simple screening tools are needed to monitor effects of treatment interventions in individuals at high risk. We assessed the application of dried blood spot technology to measure important cardiometabolic risk markers. Dried blood spot collection has advantages compared to conventional blood draws, such as minimal invasiveness, low sample volume, convenience of repeated measurements and ease of sample storage and transport.



Bloodspot Collection

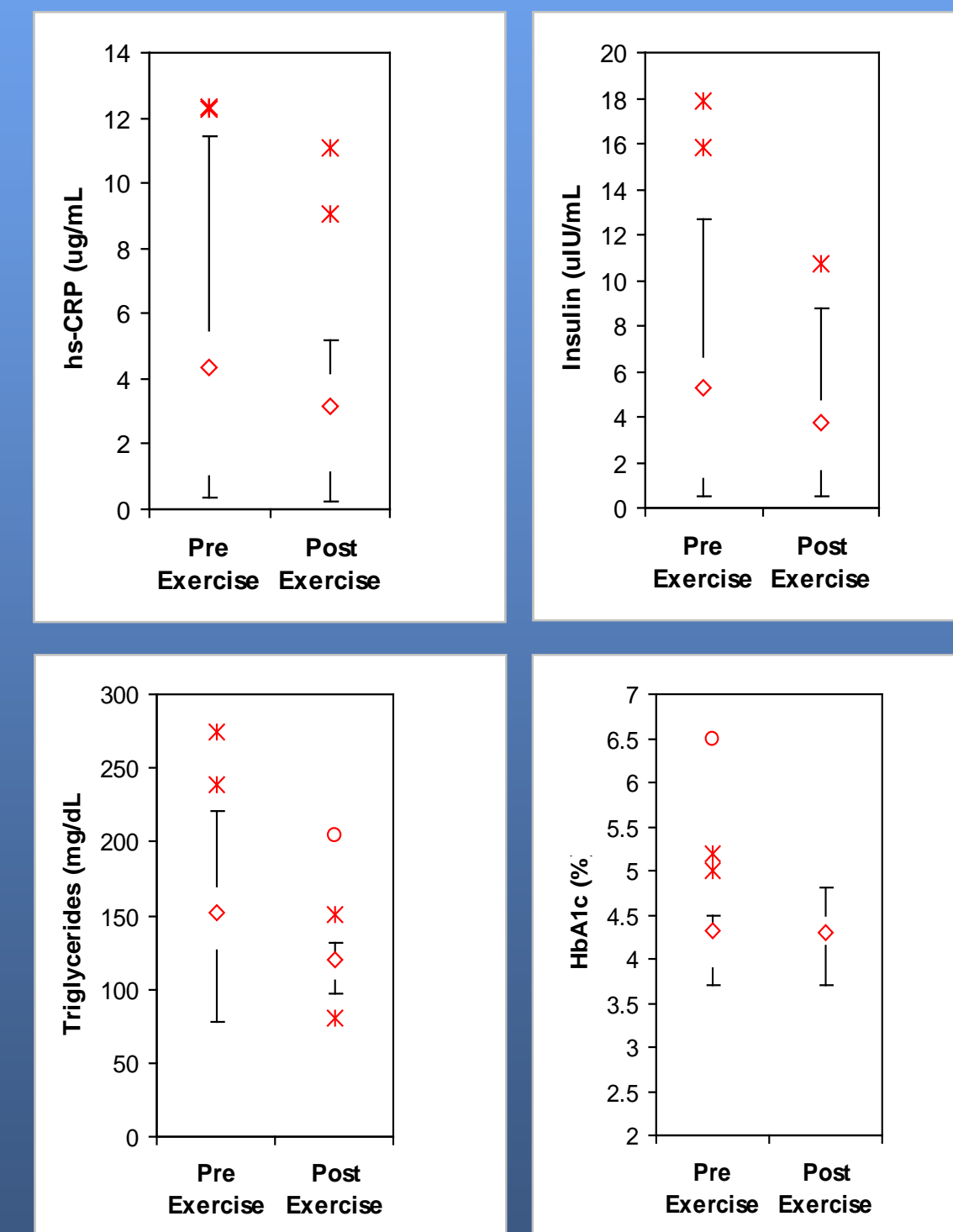


Methods

Fifteen participants (28- 63 years of age) enrolled in a fitness study that included 30 minutes per day of exercise/ brisk walking five days a week for four months. Levels of insulin, hemoglobin A1c, C-reactive protein and triglycerides were measured in blood spot samples obtained by a finger stick before and after the program. Dried blood spot samples were stored at - 20 C until used for analysis using modified methods developed in house from commercially available assays.

Results

Insulin levels decreased significantly from 5.9 uIU/mL to 4.0 uIU/mL ($p < 0.05$); triglycerides dropped by 18% from 146 mg/dL to 119 mg/dL ($p < 0.05$) and C-reactive protein levels decreased from 4.29 mg/L to 3.14 mg/L ($p < 0.05$). The HbA1c levels remained unchanged during the program.



Summary

Cardiometabolic risk factors including obesity, inflammation, hyperinsulinemia, insulin resistance, dyslipidemia and type 2 diabetes are on the rise. New treatments and strategies for managing such conditions also continue to proliferate. A few studies have earlier shown that exercise and weight loss are associated with lower cardiometabolic risk factors. The objective of this study was to investigate the effects of exercise training on triglycerides, hemoglobin A1c, high sensitivity C-reactive protein and insulin levels using a dried bloodspot screening method. The study demonstrated reduced insulin, triglycerides and hs-CRP levels after a 4-month exercise training program. We conclude that exercise/ brisk walking for 30 minutes per day, five days a week for four months improved cardiometabolic risk factors. This type of simple and convenient blood spot screening method has important implications for monitoring overall cardiometabolic health of high risk individuals and can better equip clinicians to help their patients reduce cardiometabolic risks.

References

- Sanjay Kapur, Sonia Kapur, and David Zava, (2008). Cardiometabolic Risk Factors Assessed by a Finger Stick Dried Blood Spot Method, *J Diabetes Sci Technol* 2(2):236-41.
- Kim ES, IM JA, Park JH., et al. (2007). Improved insulin sensitivity and adiponectin levels after exercise training in obese Korean youth. *Obesity* 15(12): 3023-30.
- Ivey FM, Hafer-Macko CE, Macko RF (2008). Exercise training for cardiometabolic adaptation after stroke. *J Cardiopulm Rehabil Prev*, 28(1):2-11.