Comparison Noninvasive Hemoglobin and Invasive Spun Hematocrit Testing in WIC Participants
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Introduction
The Special Supplemental Nutrition Program for Women, Infants and Children (WIC) is funded by United States Department of Agriculture and provides Federal grants to States for nutrition assessments, health care referrals, nutrition education, and supplemental foods for low-income pregnant, breastfeeding, and non-breastfeeding postpartum women, and to infants and children up to age five who are found to be at nutritional risk.

Two major types of nutrition risk are recognized for WIC eligibility:
- Medically-based risks such as anemia, underweight, overweight, history of pregnancy complications, or poor pregnancy outcomes.
- Dietary risks, such as failure to meet the dietary guidelines or inappropriate nutrition practices.

Nutrition risk is determined by a health professional such as a physician, nutritionist, or nurse and is based on Federal guidelines.

Iron deficiency anemia (IDA) is by far the most common cause of anemia in children and women of childbearing age. It may be caused by a diet low in iron, insufficient assimilation of iron from the diet, increased iron requirements due to growth or pregnancy, or blood loss. Anemia can impair energy metabolism, temperature regulation, immune function, and work performance. Anemia during pregnancy may increase the risk of prematurity, poor maternal and perinatal outcomes, and may affect the development of the child.

Hemoglobin measurement is an essential component of anemia screening for nutrition consultation at WIC centers. To meet the needs of patients, WIC programs across the nation are looking for new options that can provide immediate results with no blood draw.

Results: Feasibility Among Population Screened
A total of 115 subjects were enrolled. Of the 115 subjects, 75 were children aged 0-4 yrs (both boys and girls), 38 were women ages 18-40 yrs, and 2 adolescent females, age 15-17 yrs. Spun hematocrit determination was obtained on 100% (115) of the participants. The Pronto device was able to obtain a measurement on 101 (88%) of the participants. The Pronto device was unable to obtain a measurement, classified as a test incomplete, on 14 participants, of which 11 (79%) were under 24 months. Nine (64%) were due to movement and 5 (36%) to low perfusion.

Results: Comparison of Test Methods to Identify Those at Anemic Risk
One hundred and one subjects had paired hematocrit and Pronto results. Based on the spun hematocrit results, 4 out of 101 (4%) participants were at risk of anemia (indicated as hematocrit of less than 33%). Based on the Pronto results, 3 out of 101 (3%) participants were at risk of anemia (indicated as SpHb of less than 11 g/dL). Noninvasive hemoglobin testing with the Pronto identified a similar proportion of participants at risk of anemia.

Results: Participant/Staff Satisfaction Survey
Seventy five participants completed the participant survey. Ninety five percent of the participants responded with "very satisfied" or "extremely satisfied" (4 or 5 to 6) to questions rating their comfort and satisfaction with the Pronto procedure. Ninety nine percent of participants responded "Yes" to the question, "Would you welcome the Pronto procedure on your next visit?".

Eight WIC staff clinicians completed the satisfaction surveys. On a scale of 1-5, (1 being "Not at all Satisfied" and 5 being "Extremely Satisfied"), 100% of the clinicians indicated that they were very or extremely satisfied with the ease of use, accuracy and time to obtain a measurement of the Pronto device. All surveyed were very or extremely satisfied "overall" with the Pronto and would "recommend the Pronto device to a colleague.

Conclusion
Noninvasive hemoglobin measurement with the Pronto device provided fast and easy hemoglobin measurement in the vast majority of WIC participants. The Pronto was able to identify a similar number of participants at risk for anemia compared to the standard measurement method (spun hematocrit), and both clinical staff and WIC clients were very satisfied with the Pronto test procedure. The Pronto may provide a hemoglobin screening method that confers greater patient comfort and staff satisfaction with similar clinical utility compared to the current, invasive screening method.

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*Supplies provided by Masimo Corporation.