

Gender-Based Bias in Diagnosis of Iron Deficiency



Sarah Patel MD, MPH¹; Thomas DeLoughery, MD²; Merav Sendowski, MD²
Oregon Health & Science University
¹Department of Internal Medicine, ²Department of Hematology and Oncology

INTRODUCTION

- Iron deficiency with or without anemia is symptomatic and common world-wide. In the previous century, bone marrow aspiration revealed that two-thirds of college aged women without anemia have low to absent iron stores¹
- Ferritin is a simple diagnostic blood test used to diagnose iron deficiency
- Epidemiologic studies in the US reveal prevalence is higher in young women and specifically non-Hispanic black women and Mexican-American women ²
- Iron deficiency remains under-diagnosed and under-treated, a lack of consensus of lower limit of ferritin exacerbates the existing problem

METHODS

- Twenty four laboratories in Oregon and Washington were identified based on patient referral pattern to OHSU Hematology clinic
- Using reference ranges posted on results and websites, data was collected on lab cut-off values for ferritin for years 2019-2021
- Data was reviewed and organized graphically to demonstrate the variability in reference range for ferritin among individual laboratories and between genders

RESULTS

- Of the 24 local and regional labs studied, 17 used a ferritin of 13 ng/ml or less to determine iron deficiency in women
- Ten laboratories did not supply information about gender and all 10 used a ferritin cut-off of 30 ng/ml or less for iron deficiency
- Fourteen laboratories supplied information on ferritin by gender. Of these, 10 used a lower cut-off for women compared to men and used a cut-off for both sexes that was less than 50 ng/ml
- OHSU was the only institution that used a cut-off ferritin of 50 ng/ml, applied to both men and women for diagnosis of iron deficiency

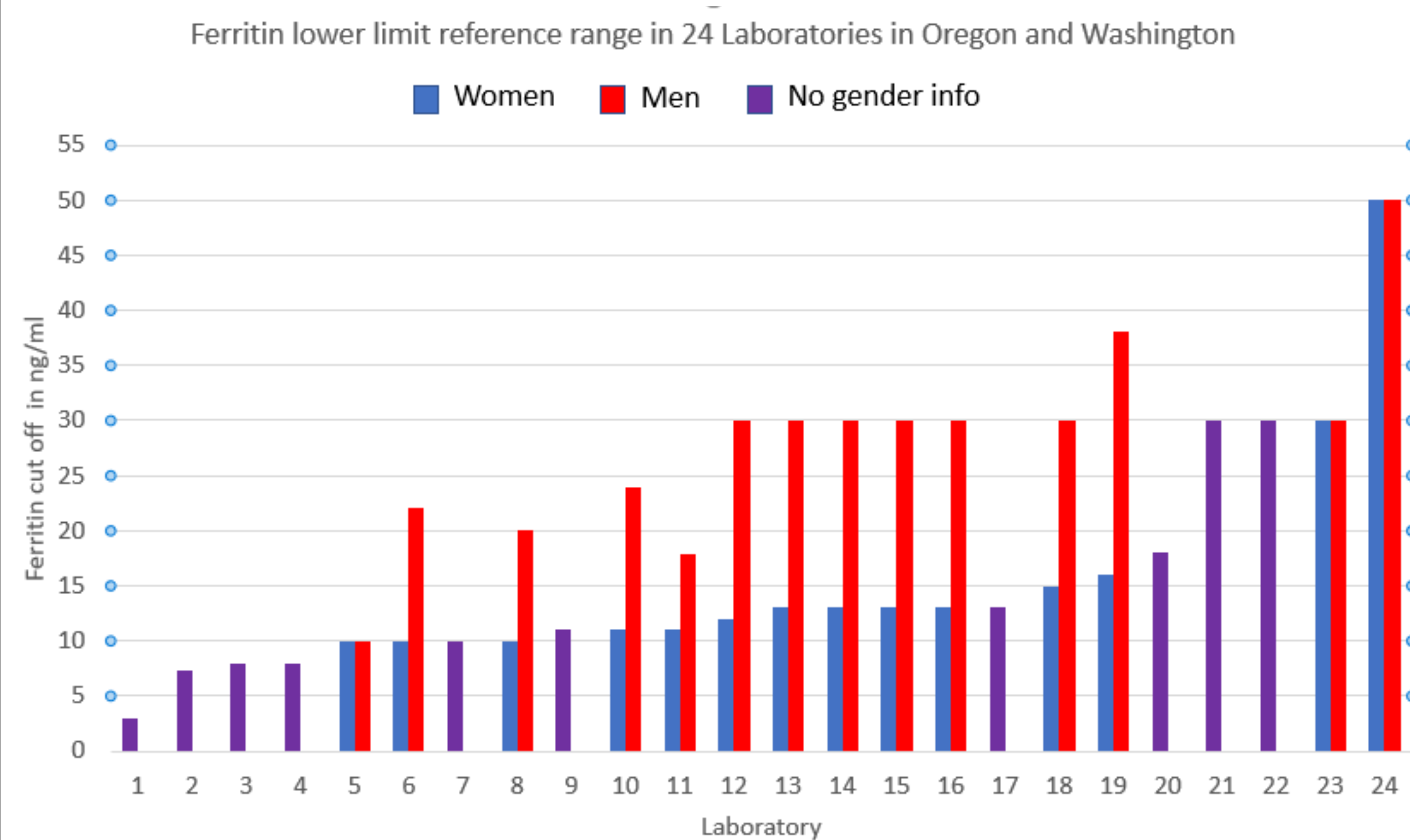


Figure 1. Ferritin lower limits at 24 laboratories in Oregon and Washington. Cut-offs for women presented in blue, for men in red. Laboratories without available gender information are displayed in purple.

DISCUSSION

- At our local institution a ferritin cut-off of 50 ng/ml is used to diagnose symptomatic iron deficiency in both women and men over the age of 18. Studies support this as a reasonable physiologic cut-off ^{3,4,5,6}
- The majority of local and regional labs define iron deficiency with lower ferritin values. Most labs that incorporate gender have lower ferritin cut-offs for women compared to men. This biased approach using an underlying disease state to determine the lower limit of normal incorrectly suggests that women are not iron deficient at levels that are low for men.
- Using a ferritin cut-off below 50 ng/ml reduces ability to diagnose and effectively treat symptomatic iron deficiency for all patients. Given the higher prevalence of iron deficiency in women, these less sensitive cut-offs disparately affect women and groups that are more likely to experience this condition and require treatment.
- Standardizing a higher cut-off for ferritin in iron deficiency is an actionable change that will impact many patients in the community. Clinicians needs the appropriate lab information to offer therapy for this extremely common and treatable condition.

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