

Structural Sexism in PBM: How to Overcome Disparities in Anemia Management

Sherri Ozawa, MSN, RN



A Global Definition of Patient Blood Management (PBM)

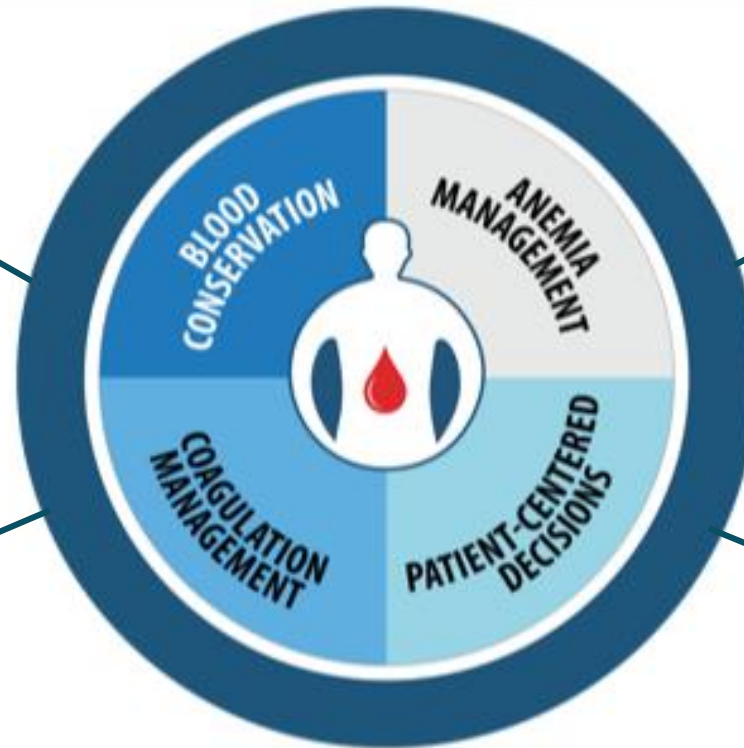


Patient Blood Management is a patient-centered, systematic, evidence-based approach to **improve patient outcomes** by managing and preserving a **patient's own blood**, while promoting patient safety and empowerment.

PBM Foundational Principles

- Minimizes Blood Loss.
- Optimizes Hemoglobin Levels Without Transfusion.
- Enhances Patient Safety & Reduces Costs.

- Optimizes Hemostasis & Reduces Bleeding Risk.
- Enhances Rapid & Targeted Decision-Making.
- Improves Patient Safety & Cost Efficiency.



- Reduces the Need for Transfusions.
- Improves Patient Outcomes & Recovery.
- Supports Cost Savings & Resource Optimization

- Respects Patient Preferences & Improves Engagement.
- Enhances Clinical Outcomes & Safety.
- Supports Ethical & Value-Based Care.

- **Focused on addressing modifiable risk factors and transfusion avoidance**

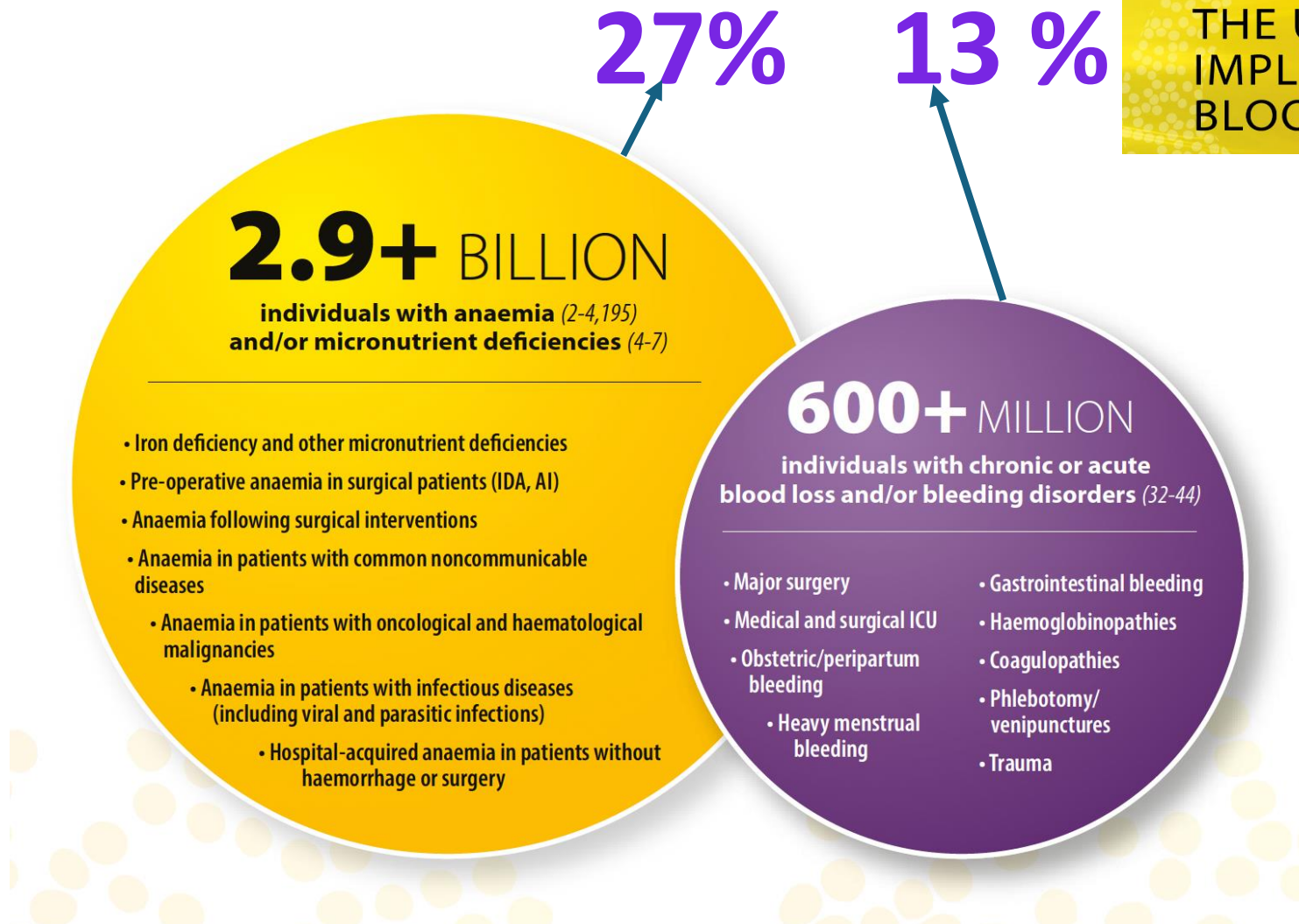
► *Anesth Analg*. 2022 Sep 1;135(3):476-488. doi: 10.1213/ANE.0000000000005873. Epub 2022 Feb 10.

A Global Definition of Patient Blood Management

Aryeh Shander^{1, 2}, Jean-Francois Hardy^{3, 4}, Sherri Ozawa^{2, 5}, Shannon L Farmer^{6, 7, 8, 9}, Axel Hofmann^{6, 8, 9}, Steven M Frank¹⁰, Daryl J Kor^{11, 12}, David Faraoni^{4, 13}, John Freedman^{14, 15}; Collaborators

THE URGENT NEED TO IMPLEMENT PATIENT BLOOD MANAGEMENT

Global prevalence of anemia and bleeding problems



Taken together, they represent one of the world's biggest, largely preventable public health and health-economic burdens.

WSJ November 15 2022

Why is PBM of Vital Importance to Women?



Women face existing gender-based inequities in Blood Health

Why do these inequities exist?

What is structural sexism and its relationship to PBM ?

How do we change structure to overcome the disadvantage of being a woman thus reduce risk ?

Equality vs. Equity vs. Justice

Equality



The assumption is that everyone benefits from the same supports. This is equal treatment.

Equity



Everyone gets the supports they need (this is the concept of "affirmative action"), thus producing equity.

Justice



All 3 can see the game without supports or accommodations because **the cause(s) of the inequity was addressed.** The systemic barrier has been removed.

Women's Morbidity Disadvantage

Women live longer than men, but spend more time living in poorer health

- EU: 19 Years of poor health for women vs. 15 for men
- In 7 member states women spend 25 + in poor health

Women face far greater individual and societal challenges that impede good health

- Rising gender-based violence
- Lack of access to healthcare services
- Widening post COVID 19 gender pay gap

European Institute for Gender Equality.(2019). Women live longer but with poorer health. Available from: https://eige.europa.eu/publications-resources/toolkits-guides/gender-equality-index-2019-report/women-live-longer-poorer-health?language_content_entity=en. [Accessed 28 February 2024]

World Health Organization. Women's health. Available from: <https://www.who.int/health-topics/women-s-health>. [Accessed 28 Feb 2024]

Gender Discrimination and Health Harms - Realities

Direct discrimination or harassment

- Gender bias in medical institutions (self-reported experiences)
- Not necessarily structural

Bias amongst physicians and medical institutions

- Anti women gender bias in medical education textbooks
- Lower reimbursement rates (30% lower for female specific surgical procedures)
- Women less likely than men to receive the most effective diagnostics and treatments

Disease and Women

Women spend 1/3 life in menopause – by 2030 1.2 billion women – ¼ see treatment for symptoms

8% of world has autoimmune disease, 78% women

2x as likely to suffer chronic pain

Women less likely to receive Indicated therapy for MI

In some conditions (inherited bleeding disorders) women diagnosed 7-10 years later than men

Pain in women is perceived as hysterical, emotional, fabricated – resulting in delayed care

Gaslighting (psychological manipulation)

Medical Gaslighting



- “Of course you’re tired you are a mom”
- “You are overthinking this”
- Slower response to care **even in emergency settings** -Abd pain
 - 33 minutes slower
 - 13% less likely to receive opiates

Chen, E. H., Shofer, F. S., Dean, A. J., Hollander, J. E., Baxt, W. G., Robey, J. L., Sease, K. L., & Mills, A. M. (2008). Gender disparity in analgesic treatment of emergency department patients with acute abdominal pain. *Academic Emergency Medicine : Official Journal of the Society for Academic Emergency Medicine*, 15(5), 414–418. <https://doi.org/10.1111/j.1553-2712.2008.00100.x>

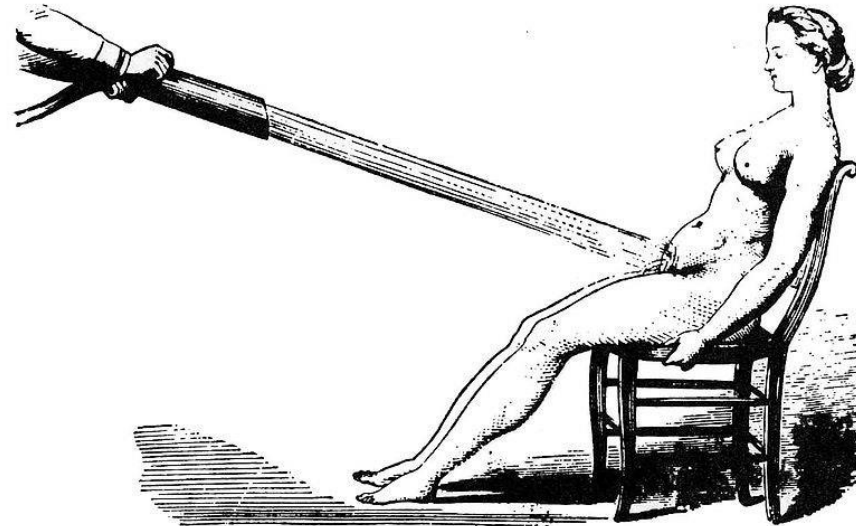
• “it’s only in her head”: Gaslighting in women’s health | *healthnews*. (n.d.). Retrieved December 3, 2022, from <https://healthnews.com/news/its-only-in-her-head-gaslighting-women-at-doctors-office/>

Hysteria- The Wastebasket Diagnosis

From 1900 BCE to the 1950's



“The uterus was believed to wander around the body
like an animal, hungry for semen.”



King, S. (2016) "A womb of one's own... Part two." *Menstrual Matters*, accessed 3/2/24,
<https://www.menstrual-matters.com/womb-part-2/>

Origins of concept of Structural Sexism



EDITORIAL

The Yentl Syndrome

Author: Bernadine Healy, M.D. [Author Info & Affiliations](#)

Published July 25, 1991 | N Engl J Med 1991;325:274-276 | DOI: 10.1056/NEJM199107253250301

[VO](#)

JOURNAL ARTICLE

The Yentl syndrome is alive and well FREE

C. Noel Bairey Merz [✉](#) [Author Notes](#)

European Heart Journal, Vol

<https://doi.org/10.1093/eur>

Published: 10 March 2011

[JACC Journals](#) > [JACC: Asia](#) > [Archives](#) > Vol. 4 No. 4

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Unequal Treatment and Yentl Syndrome: Are We Providing Appropriate Care for Our TAVR Patients?* [🔒 OPEN ACCESS](#)

Editorial Comment

Pranav M. Patel and Antonio H. Frangieh

JACC: Asia. 2024 Apr, 4 (4) 303–305

Original Research: Sex-Specific Disparities in Clinical Outcomes After Transcatheter Aortic Valve Replacement Among Different Racial Populations



Women with cardiac symptoms are less likely be triaged as emergent, to undergo electrocardiography, or be admitted to the hospital or observation unit

When did the National Institutes of Health (Est. 1887) Mandate that Women be included in clinical trials?

- 1900
- 1950
- 1979
- 1993
- 2007

NIH ensures that women and minorities are included in all clinical research

In trials including women and minorities, the trial should be designed and carried out so that it is possible to analyze whether the variables being studied affect women and minorities differently than others

Cost is not an acceptable reason for excluding women and minorities

Structural Sexism Defined

Societal systems, policies, and practices that systematically disadvantage individuals based on their gender, predominantly favoring men over women

Perpetuates unequal power dynamics and reinforces gender stereotypes

Ingrained in the fabric of society, often operating subtly but exerting profound influence, leading to disparities in opportunities, resources, and outcomes between genders.

Key Factor Medically: Underrepresentation of women in medical leadership and research

Antonym: Social Justice

Javidan, P. (2021). Structural Sexism: Foundations, Reproduction, and Responses. *Encyclopedia of the UN Sustainable Development Goals*, 1–14. https://doi.org/10.1007/978-3-319-71060-0_90-1



Structural Sexism and PBM Implications: Disproportionality

Patient Blood Management:



Patient blood management is a patient-centered, systematic, evidence-based approach to improve patient outcomes by managing and preserving a patient's own blood, while **promoting patient safety and empowerment.**

**EVEN MORE IMPORTANT FOR
WOMEN'S HEALTH -**

Where are the gaps?

Hgb thresholds and ferritin reference ranges

Dismissal/under-recognition of iron deficiency


Stigmatization of menstrual bleeding and complacency

The presence of un/under/delayed diagnosis of inherited bleeding disorders

Differences in sex-based transfusion practice



Sex specific definitions of anaemia contribute to health inequity and sociomedical injustice

Angela C Weyand  • Patrick T McGann • Michelle Sholzberg

Published: January, 2022 • DOI: [https://doi.org/10.1016/S2352-3026\(21\)00351-3](https://doi.org/10.1016/S2352-3026(21)00351-3) •



Hemoglobin thresholds according to biological sex are equivalent for men and women until menarche

Women <12 g/dL

Men <13 g/dL



These thresholds were first adopted by WHO in 1968 based on four published references and one set of unpublished observations, only two of which addressed sex differences



No inquiry about dietary habits, iron supplementation, or symptoms of anemia

Perioperative Anemia: Prevention, Diagnosis, and Management Throughout the Spectrum of Perioperative Care

Warner, Matthew A. MD^{*,†}; Shore-Lesserson, Linda MD^{†,‡}; Shander, Aryeh MD^{†,§}; Patel, Sephalie Y. MD^{†,||}; Perelman, Seth I. MD^{†,¶}; Guinn, Nicole R. MD^{†,#}

Author Information[☺]

Anesthesia & Analgesia 130(5):p 1364-1380, May 2020. | DOI: 10.1213/ANE.00000000000004727

[Ann Surg.](#) 2023 Apr; 277(4): 581–590.

Published online 2022 Sep 21. doi: [10.1097/SLA.00000000000005721](https://doi.org/10.1097/SLA.00000000000005721)

PMCID: PMC9994846

NIHMSID: [NIHMS1836628](#)

PMID: [36134567](#)

Recommendations From the International Consensus Conference on Anemia Management in Surgical Patients (ICCAMS)

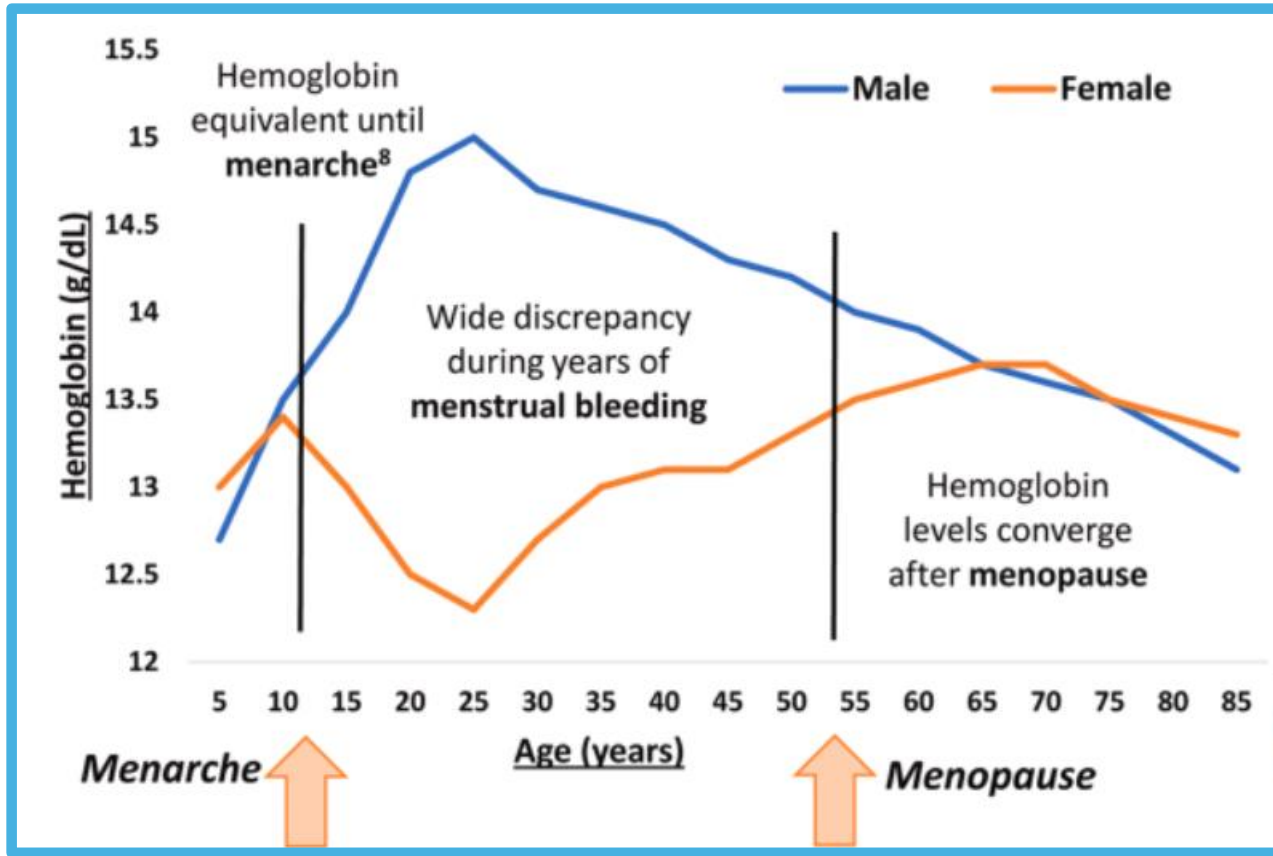
[Aryeh Shander](#), MD,^{✉*,†} [Howard L. Corwin](#), MD,[‡] [Jens Meier](#), MD,^{§||} [Michael Auerbach](#), MD,^{¶#} [Elvira Bisbe](#), MD,^{||**} [Jeanna Blitz](#), MD,^{††} [Jochen Erhard](#), MD,^{‡‡} [David Faraoni](#), MD,^{§§} [Shannon L. Farmer](#), DHSc,^{||||¶¶} [Steven M. Frank](#), MD,^{###} [Domenico Girelli](#), MD,^{***} [Tiffany Hall](#), RN,^{†††} [Jean-François Hardy](#), MD,^{||††} [Axel Hofmann](#), Dr rer medic,^{§§§} [Cheuk-Kwong Lee](#), MD,^{|||||} [Tsin W. Leung](#), MD,^{¶¶¶} [Sherri Ozawa](#), RN,^{####} [Jameela Sathar](#), MD,^{****} [Donat R. Spahn](#), MD,^{††††} [Rosalio Torres](#), MD,^{†††} [Matthew A. Warner](#), MD,^{§§§§} and [Manuel Muñoz](#), MD^{|||||||}



**Recommendation:
Single Hgb threshold
to define pre
surgical anemia
13g/dL**



Sex Based Hgb Thresholds



How do sex hormones impact hemoglobin?

- Estrogens regulate erythropoiesis
- Androgens stimulate erythropoietin
- Testosterone impacts hemoglobin mean and upper limits of normal
- No proof that higher levels of tissue oxygenation for a given red cell mass in women explain a lower baseline HGB

Takeaway: Lower limit of “normal” in HGB in men and women cannot be explained by sex hormones

So if not hormonal influence then what is the explanation?

Murphy, W. G. (2014). The sex difference in haemoglobin levels in adults — mechanisms, causes, and consequences. *Blood Reviews*, 28(2), 41–47. <https://doi.org/10.1016/j.blre.2013.12.003>

Shahani, S., Braga-Basaria, M., Maggio, M., & Basaria, S. (2009). Androgens and erythropoiesis: past and present. *Journal of Endocrinological Investigation*, 32(8), 704–716. <https://doi.org/10.1007/BF03345745>

Blobel, G. A., & Orkin, S. H. (1996). Estrogen-induced apoptosis by inhibition of the erythroid transcription factor GATA-1. *Molecular and Cellular Biology*, 16(4), 1687–1694. <https://doi.org/10.1128/mcb.16.4.1687>

Chronic blood loss from menses and iron deficiency is the only other major difference between the sexes

- **Women are iron deficient during menstrual years because**
 - **Chronic blood loss**
 - **Lack of clinician and patient assessment of normal menstruation**
 - **High prevalence of ID = Lower baseline hgb = low hemoglobin reference intervals**



Barton, J. C., Wiener, H. H., Acton, R. T., Adams, P. C., Eckfeldt, J. H., Gordeuk, V. R., Harris, E. L., McLaren, C. E., Harrison, H., McLaren, G. D., & Reboussin, D. M. (2020). Prevalence of iron deficiency in 62,685 women of seven race/ethnicity groups: The HEIRS Study. *PLOS ONE*, 15(4), e0232125. <https://doi.org/10.1371/journal.pone.0232125>

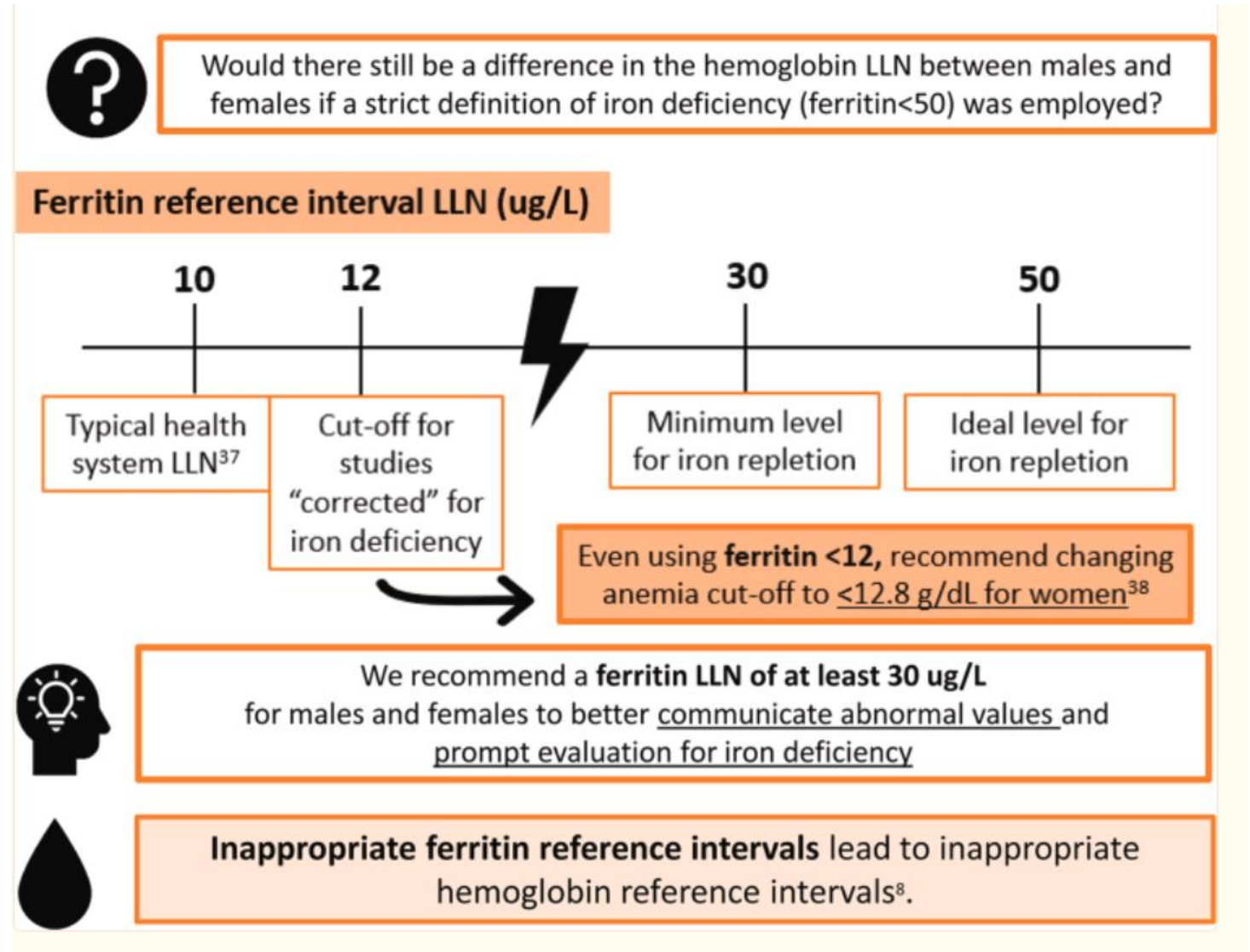
DePalma, R. G., Hayes, V. W., & O'Leary, T. J. (2021). Optimal serum ferritin level range: iron status measure and inflammatory biomarker. *Metallomics*, 13(6). <https://doi.org/10.1093/mtomcs/mfab030>

Weyand, A. C., & James, P. D. (2020). Sexism in the management of bleeding disorders. *Research and Practice in Thrombosis and Haemostasis*, 5(1), 51–54. <https://doi.org/10.1002/rth2.12468>

Hinton, P. S., Giordano, C., Brownlie, T., & Haas, J. D. (2000). Iron supplementation improves endurance after training in iron-depleted, nonanemic women. *Journal of Applied Physiology*, 88(3), 1103–1111. <https://doi.org/10.1152/jappl.2000.88.3.1103>

Fe Deficiency and Ferritin Reference Intervals

- Globally 30% women Hgb under 12g/dL
- 50% from ID
- In the US 10% had hgb<12 g/dL BUT
- 30% of US women have ID (ferritin < 25)



Ferritin Reference Ranges



Blood (2022) 140 (Supplement 1): 11078–11079



64th ASH Annual Meeting Abstracts

ONLINE PUBLICATION ONLY

102. IRON HOMEOSTASIS AND BIOLOGY

The Origin of Ferritin Reference Intervals: A Systematic Review

Judy Truong, MD¹, Kanza Naveed^{2,*}, Daniel Beriault, MSc, PhD FCACB^{3,*}, David Lightfoot^{4,*},
Michael Fralick, MD PhD SM^{5,*}, Michelle Sholzberg, MDM, MSc⁶⁻¹⁰

- 40 studies analyzing the lower limit normal of ferritin
- Total 30,474 females and 29,615 males
- **Lower limit normal was 8μg for Females, 27 μg for males**
- Female lower limit normal is **regrettably** lower than males
- Female lower limit “normal” falls in line with clinical iron deficiency.
- Not evidence based, maximizes health inequity and medico-social injustice

Many US institutions using Ferritin of 100 μg as a LLN



Consequences of Anemia in Women



Impact of Lower Hemoglobin Thresholds in Women

Study	Population	Age	Results	Design
Health ABC	Community dwelling adults	70-79 YO	5X higher mortality in women w/ hgb <11g/dL	Longitudinal population based
PRAISE	CHF Patients N=1130	>65 YO	52% higher risk of death in women w/ hgb <12	Multicenter randomized clinical trial of amlodipine vs. placebo
Cardiovascular Health Study	Community dwelling adults	>65 YO	Lower survival rates for women with hgb <12.6	Longitudinal population-based study of CAD and stroke
Women's Health and Aging study	Community dwelling disabled women N=1002	>65 YO	Increased morbidity w/lower hgb, as hgb increase mortality decreased up to 13.9	Prospective and population based

Zakai, N. A., Katz, R., Hirsch, C. H., Shlipak, M. G., Paulo H.M. Chaves, Newman, A. B., & Cushman, M. (2005). A Prospective Study of Anemia Status, Hemoglobin Concentration, and Mortality in an Elderly Cohort. *Archives of Internal Medicine*, 165(19), 2214–2214. <https://doi.org/10.1001/archinte.165.19.2214>

Dariusz Mozaffarian, Nye, R. G., & Levy, W. C. (2003). *Anemia predicts mortality in severe heart failure*. 41(11), 1933–1939. [https://doi.org/10.1016/s0735-1097\(03\)00425-x](https://doi.org/10.1016/s0735-1097(03)00425-x)

Patel, K. V., Harris, T. B., Faulhaber, M., Angleman, S. B., Connelly, S., Bauer, D. C., Kuller, L. H., Newman, A. B., Guralnik, J. M., & for the Health, A. (2007). Racial variation in the relationship of anemia with mortality and mobility disability among older adults. *Blood*, 109(11), 4663–4670. <https://doi.org/10.1182/blood-2006-10-055384>

Consequences of Maternal Anemia

- For mom - IDA is associated:
 - Increased risk of placental abruption
 - Post partum depression
 - Death
 - Post partum hemorrhage
 - Composite severe maternal morbidity and mortality
- For baby
 - Developmental delays
 - Impaired cognition
 - Long term behavioral and motor function issues
 - Attention and learning problems
 - Decreased social engagement into adulthood



Disproportionate Impact

Impact of Anaemia on Cognitive Impairment and Depression Levels Among Young Adults: A Cross-sectional Study Highlighting Gender Disparities

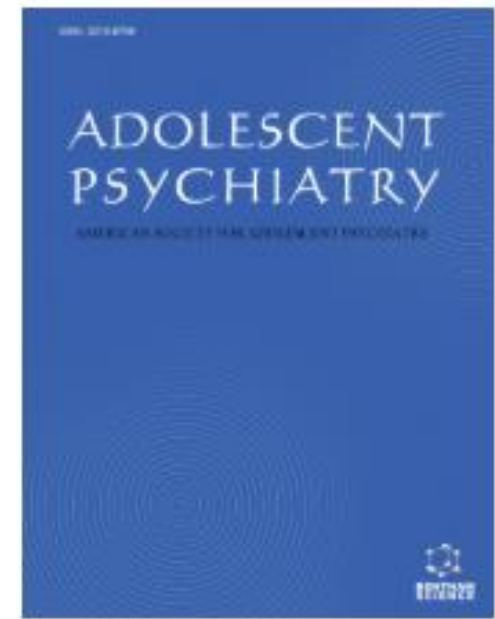
Authors: Vinitha Chandrasekaran¹, Neena Elsa Varghese¹, Krishnaveni K² and Rameswari R

[+ View Affiliations](#)

Source: Adolescent Psychiatry, Volume 15, Issue 2, Jul 2025, p. 174 - 187

DOI: <https://doi.org/10.2174/0122106766313207241015111247>

- 546 Adults evaluated, age 17-25
- Prevalence of anemia = 73.2% - 29.4% male, 43.7% female
- Subjects reported:
 - Forgetfulness
 - Distractibility
 - False triggering
 - Depression



Intergenerational Cycle of Iron Deficiency

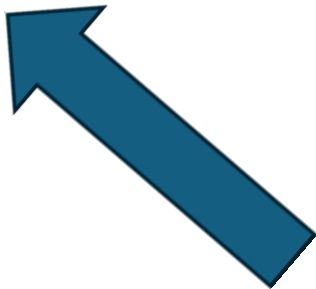
Adolescent
with Iron
Deficiency



Pregnant with
Iron
Deficiency



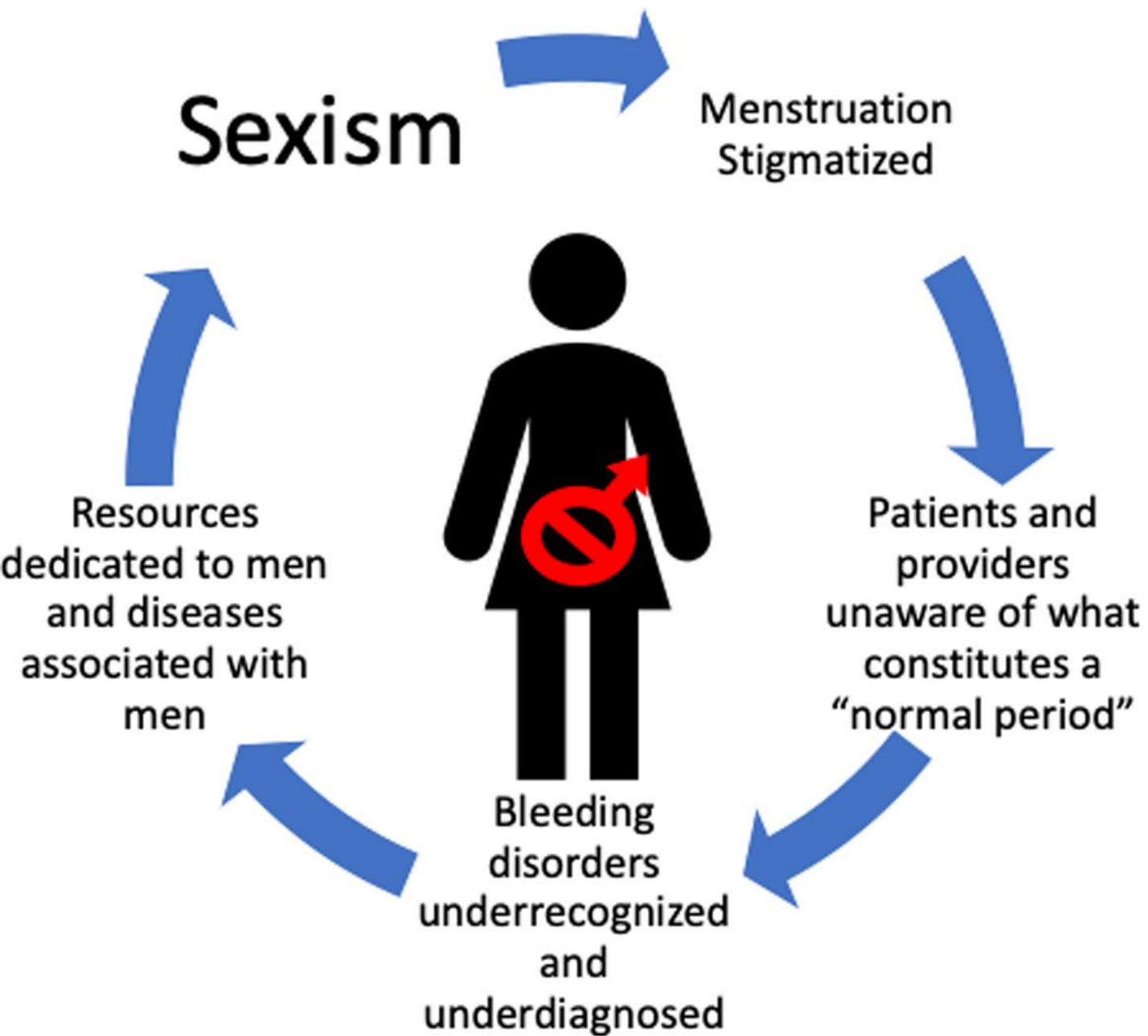
Increased risk of
maternal and
neonatal
morbidity and
mortality



Infant with Iron Deficiency



Neurocognitive effects, educational challenges

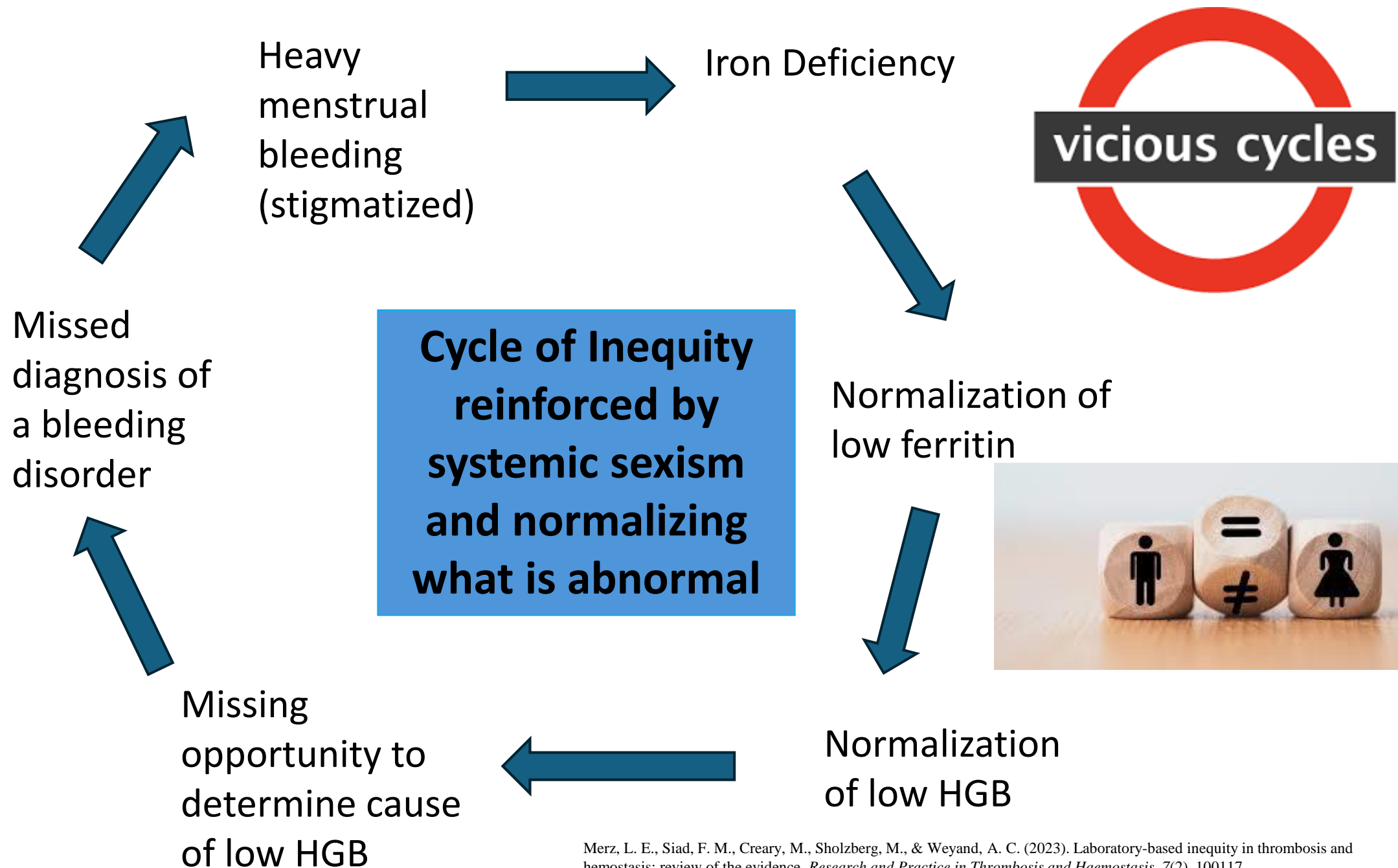


Sexism is a long-standing issue in bleeding disorders, leading to inequity for affected women

Clinical and research focus within bleeding disorders has been on men and hemophilia

Stigmatization of menstruation leads to decreased awareness and inadequate care

Women with BDs are underrecognized, underdiagnosed, and undertreated



What can we do?

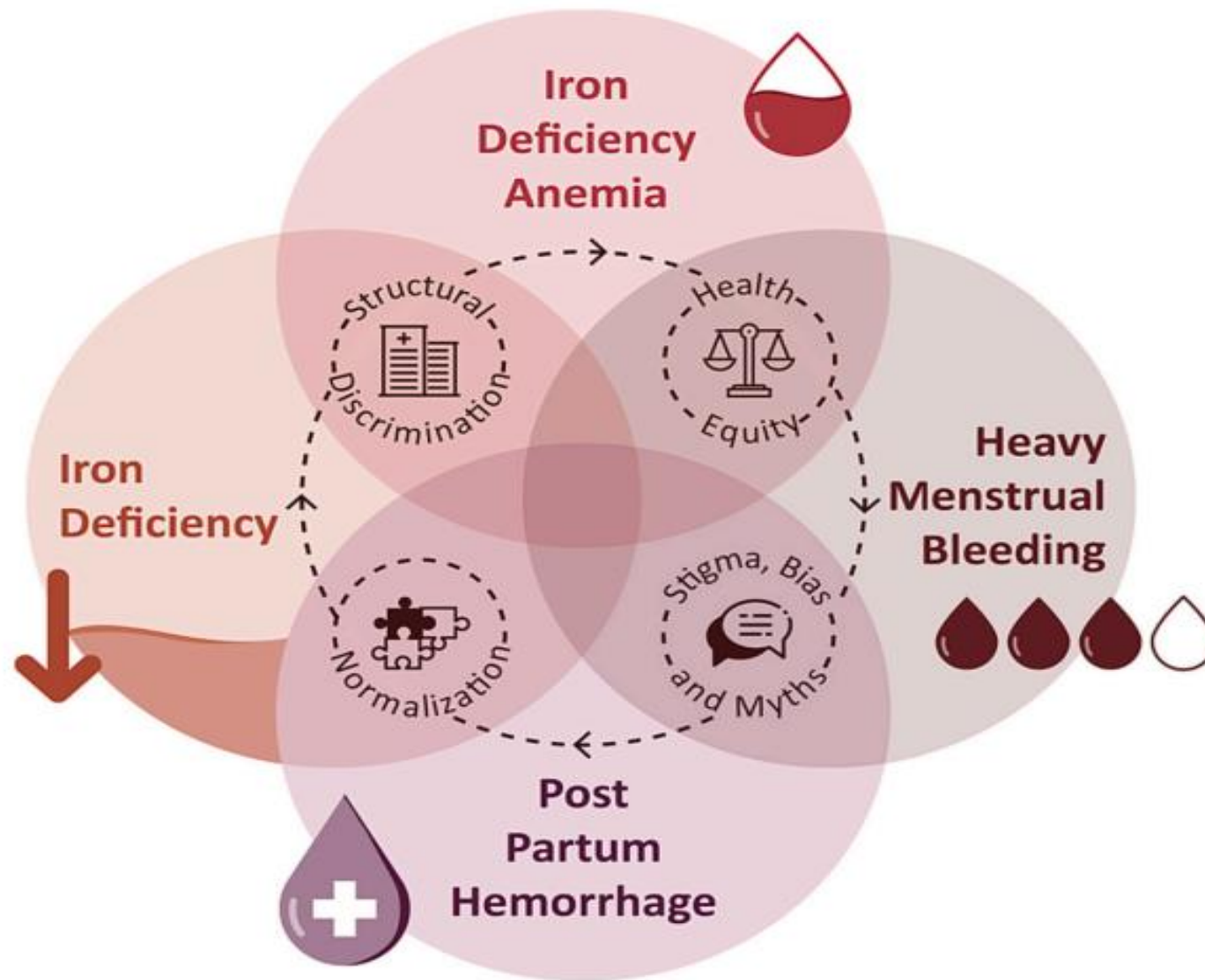
Address structural sexism in care:

- Re-evaluate and change reference ranges to make women and men the same (Hgb, Ferritin, etc.)
- Take anemia and iron deficiency seriously and treat it
- Informed conversations about menstrual bleeding
- Treat menstrual bleeding (especially menorrhagia) as a significant health issue
- Proactively detect hereditary bleeding disorders

Multidisciplinary care

Encourage and foster patient empowerment

Call out structural sexism and adjust practice to address it



Blood Reviews

Volume 64, March 2024, 101159

Iron deficiency anemia among women: An issue of health equity

Grace H. Tang ^a, Michelle Sholzberg ^b  

Thank you

