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SUMMARY WITH CRITICAL APPRAISAL

Screening and Treatment of Obstetric Anemia: A Review of Clinical Effectiveness, Cost-Effectiveness, and Guidelines

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Abbreviations

AGREE	Appraisal of Guidelines for Research & Evaluation
AHRQ	Agency for Healthcare Research and Quality
BSH	British Society for Haematology
DSOG	Danish Society of Obstetrics and Gynecology
GRADE	Grading of Recommendations Assessment, Development, and Evaluation
Hb	Hemoglobin
HTA	Health technology assessment
IDAWGCR	Iron Deficiency Anemia Working Group Consensus Report
IV	Intravenous
MA	Meta-analysis
NICE	National Institute for Health and Care Excellence
OHTAC	Ontario Health Technology Advisory Committee
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
RCT	Randomized controlled trial
SAMNCP	South Australia Maternal & Neonatal Community of Practice
SSGO	Swiss Society of Gynecology and Obstetrics
SR	Systematic review
USPSTF	U.S Preventive Services Task Force
WHO	World Health Organization

Context and Policy Issues

Iron deficiency is a major cause of anemia.[1] Other causes of anemia include deficiency in nutrients (e.g., vitamin B12 and folate), inflammation, parasitic infections and disorders in hemoglobin (Hb) synthesis or red blood cell production and survival (e.g., hemoglobinopathies).[1] Iron deficiency anemia is defined as blood Hb concentrations of less than 110 g/L in the first trimester, less than 105 g/L in the second and third trimesters of pregnancy, and less than 100 g/L postpartum.[2] The serum ferritin level provides information about the capacity of the body to reserve iron and its concentration of less than 15 µg/L (a cut off that is associated with higher specificity) during pregnancy is diagnostic of iron deficiency anemia.[2,3] A level of less than 30 µg/L of ferritin (a cut off that is associated with higher sensitivity) should prompt treatment.[2,3] However, serum ferritin measurement may not be accurate during infection or inflammation, as it can be normal or elevated despite a low Hb concentration.[1]

Iron deficiency in pregnancy has significant negative effects on both maternal and fetal outcomes, including low birthweight, prematurity, perinatal mortality, increased risk of maternal infections and lowered tolerance to blood loss and infection.[1] It also affects immediate and long term neurodevelopment of infants.[4] It was found that low maternal iron intake is associated with increased risk of autism, schizophrenia and abnormal brain structure in the offspring.[4] A review reported that findings from several cross-sectional studies suggested that the prevalence of iron deficiency among pregnant Canadians and pregnant adolescents ranged from 3% to 66%.[5] Given the negative impacts of iron deficiency on maternal and child health, there is still uncertainty as whether screening of iron deficiency anemia in pregnancy should be part of routine care, and which type of testing (e.g., Hb or ferritin) is more effective to improve maternal and infant health outcomes.

The aim of this report is to evaluate the clinical effectiveness and cost-effectiveness of screening obstetric iron deficiency in the first or second trimester using ferritin testing, and to review evidence-based guidelines for assessing and treating obstetric iron deficiency.

In this report, gender-neutral language has been used where possible in order to be inclusive of all gender identities. When reporting results from the published manuscript, gender-neutral language was not used in order to be consistent with the terms used in the source material.

Research Question

1. What is the clinical effectiveness of screening obstetric iron deficiency in the first or second trimester using ferritin testing?
2. What is the cost effectiveness of for screening obstetric iron deficiency in the first or second trimester using ferritin testing?
3. What are the evidence-based guidelines for assessing and treating obstetric iron deficiency?

Key Findings

This review included ten guidelines. No clinical or economic studies were identified on screening for obstetric iron deficiency anemia in the first or second trimester using ferritin testing.

Routine hemoglobin measurement at each trimester of pregnancy is generally recommended to assess iron deficiency anemia. Serum ferritin testing should be reserved for pregnant persons with possible hemoglobinopathies (e.g., thalassemia, sickle cell anemia), anemia of infection, vitamin B12 or folic acid deficiency, unexplained iron deficiency anemia, non-anemic persons at risk of iron deficiency, or suspected chronic blood loss. After delivery, hemoglobin should be measured within 24 to 48 hours in persons with blood loss more than 500 mL, those with uncorrected anemia detected during pregnancy or those with symptoms suggestive of anemia postnatally. Oral iron is the first line treatment with repeated measure of hemoglobin to assess compliance, correct administration and response to treatment. Intravenous iron should be used in persons who are intolerant of, or do not respond to oral iron treatment, or those with moderately severe to severe anemia. One guideline could not assess the benefits and harms of screening and iron supplementation in pregnant persons due to insufficient evidence. While the scope and purpose of the included guidelines were clearly described, only half of the identified guidelines were explicit in terms of rigour of development and authors assessed the level of evidence, which was deemed to be of very low to moderate quality. Therefore, these recommendations should be interpreted with caution.

Methods

Literature Search Methods

A limited literature search was conducted by an information specialist on key resources including PubMed, the Cochrane Library, the University of York Centre for Reviews and Dissemination (CRD) databases, the websites of Canadian and major international health technology agencies, as well as a focused Internet search. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were obstetrics, iron deficiency and ferritin testing. No filters were applied to limit the retrieval by study type. For research question 3, search filters were applied to limit retrieval to guidelines. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2009 and November 8, 2019.

Selection Criteria and Methods

One reviewer screened citations and selected studies. In the first level of screening, titles and abstracts were reviewed and potentially relevant articles were retrieved and assessed for inclusion. The final selection of full-text articles was based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Q1-2: Antenatal obstetric patients in the outpatient or hospital setting Q3: Antenatal and postpartum obstetric patients in the outpatient or hospital setting
Intervention	Q1-2: Ferritin screening Q3: Ferritin testing, oral iron, IV iron administration, prenatal vitamin, diet
Comparator	Q1-2: Hemoglobin only, without ferritin Q3: Not applicable
Outcomes	Q1: Clinical effectiveness: transfusion rates, neonatal mortality, neonatal development, neonatal anemia or iron deficiency, maternal mental health/depression/anxiety; anemia in subsequent pregnancies; breastfeeding duration, maternal satisfaction Q2: Cost-effectiveness Q3: Evidence-based guidelines
Study Designs	Health technology assessments (HTAs), systematic reviews (SRs), randomized controlled trials (RCTs), and evidence-based guidelines

Exclusion Criteria

Studies were excluded if they did not meet the selection criteria in Table 1 and if they were published prior to 2009. Guidelines with unclear methodology or that were not clearly evidence-based were excluded. Previous published versions of the included guidelines by the same guideline societies or groups were excluded.

Critical Appraisal of Individual Studies

The quality of the evidence-based guidelines identified in this review was assessed using the Appraisal of Guidelines for Research and Development (AGREE) II instrument.[6] Summary scores were not calculated; rather, a review of the strengths and weaknesses were described narratively.

Summary of Evidence

Quantity of Research Available

A total of 568 citations were identified in the literature search. Following screening of titles and abstracts, 540 citations were excluded and 28 potentially relevant reports from the electronic search were retrieved for full-text review. Eleven potentially relevant publications were retrieved from the grey literature search. Of the 39 potentially relevant articles, 29 publications were excluded for various reasons, while 10 guidelines met the inclusion criteria and were included in this report. Appendix 1 presents the PRISMA flowchart[7] of the study selection.

Summary of Study Characteristics

The characteristics of the included guidelines[8-17] (Table 2) are presented in Appendix 2.

Country of Origin

Two guidelines were from the United Kingdom (UK),[8,9] one from Australia,[10] one from the United States of America (USA),[11] two from Switzerland,[12,17] one from Denmark,[13]

one from Turkey,[15] and one from Canada.[16] One guideline was an international guideline conducted by World Health Organization (WHO).[14]

Objectives

Six guidelines[8,10,12,13,15,17] provided recommendations for the diagnosis and treatment of iron deficiency anemia during pregnancy and postpartum period. Two guidelines[9,14] provided guidance for the antenatal care for uncomplicated pregnancies, in which it had recommendations for screening for anemia. One guideline[11] had recommendations for screening and supplementation for iron deficiency anemia during pregnancy. One guideline[16] provided specific recommendations on ferritin testing.

Target Users of the Guidelines

The intended users of all included guidelines[8-17] were healthcare professionals involved in the care of women during their pregnancy and postpartum periods. Two guidelines[14,16] extended their intended users to policy makers.

Methods Used to Formulate Recommendations

Five guidelines[8,9,11,13,14] used systematic methods to search for evidence, and the recommendations were graded according to the levels of evidence evaluated. The definition of levels of evidence and the definition of grades of recommendations can be found in Table 4. Five guidelines[10,12,15-17] did not clearly described if their searches for evidence were systematically conducted.

Summary of Critical Appraisal

The quality assessments of the identified guidelines[8-17] are presented in Table 3 in Appendix 3.

All identified guidelines[8-17] were explicit in terms of scope and purpose (i.e., objectives, health questions and population), and clarity of presentation (i.e., specific and unambiguous recommendations, different options for management of the condition or health issue, and easy to find key recommendations). In terms of stakeholder involvement, all identified guidelines[8-17] clearly defined target users. However, only four guidelines[8,9,11,14] clearly described their guideline development groups, and two guidelines[9,11] reported that they sought the views and preferences of the target population. For rigour of development, five guidelines[8,9,11,13,14] were explicit in terms of systematic methods used to search for the evidence, the criteria for selecting the evidence and the strengths and limitations of the body of evidence. Five guidelines[8,9,11,13,14] clearly described the methods of formulating their recommendations, seven guidelines[8,9,11,12,14,15,17] had been externally reviewed prior to their publication, four guidelines[8,9,11,14] provided updating procedures. All identified guidelines[8-17] considered the health benefits, side effects and risks in formulating the recommendations, and were explicit in the link between the recommendations and supporting evidence. For applicability, one guideline[14] described the facilitators and barriers to its application, five guidelines provided advice and/or tools on how the recommendations can be put into practice, three guidelines[9,14,16] considered cost in the recommendations. For editorial independence, it was unclear if the funding body of five guidelines[10,12,13,15,17] influenced the content of the guidelines. The competing interests of guideline development group members were addressed in all identified guidelines.[8-17]

Summary of Findings

The summary of findings are presented in Table 4 in Appendix 4.

Clinical Effectiveness of Screening Obstetric Iron Deficiency in the First or Second Trimester Using Ferritin Testing

No clinical effectiveness studies of screening obstetric iron deficiency in the first or second trimester using ferritin testing compared with hemoglobin testing were identified; therefore, no summary can be provided.

Cost-effectiveness of Screening Obstetric Iron Deficiency in the First or Second Trimester Using Ferritin Testing

No cost effectiveness studies of screening obstetric iron deficiency in the first or second trimester using ferritin testing compared with hemoglobin testing were identified; therefore, no summary can be provided.

Evidence-based Guidelines for Assessing and Treating Obstetric iron deficiency

Testing for iron deficiency anemia during pregnancy

Five guidelines[8-10,12,14] generally recommend a routine Hb testing at each trimester of pregnancy to assess iron deficiency anemia, which is defined as Hb < 110 g/L in first trimester and < 105 g/L in second and third trimesters. Of five guidelines, one [8] graded its recommendation as "*strong*" despite the quality of evidence being graded "very low", one [12] assigned its recommendation a "*grade B"* (well controlled clinical studies but no randomized clinical trials), one[13] did not provide a specific grading, but indicated "*it is good clinical practice*" in its recommendation, and one[14] indicated its recommendation was "*context specific*".

Three guidelines[8,10,16] do not recommend unselected routine screening with serum ferritin for anemia in pregnancy, rather serum ferritin (cut off < 30 µg/L) should be measured in pregnant persons with possible hemoglobinopathies (e.g., thalassemia, sickle cell anemia), anemia of infection, vitamin B12 or folic acid deficiency, unexplained iron deficiency anemia, non-anemic women at risk of iron deficiency, or suspected chronic blood loss. Of three guidelines, only one[8] graded its recommendation as "*strong*" despite the level of evidence being "very low".

Four guidelines[12,13,15,17] recommend to screen with Hb and serum ferritin in the first trimester for iron deficiency anemia. Of these guidelines, one[12] assigned a "*grade B"*, and one[13] did not provide a specific grading, but indicated "*it is good clinical practice*" in its recommendation.

One guideline[11] could not assess the balance of benefits and harms of screening for iron deficiency anemia in pregnant persons to prevent maternal health and birth outcomes due to insufficient evidence. This guideline graded its recommendation as an "*I statement*" indicating insufficient evidence.

Treatment of iron deficiency anemia during pregnancy

Oral iron is recommended as the first line treatment, with repeated checking of Hb at 2 to 3 weeks after starting treatment to assess compliance, correct administration and response to treatment.[8,10,12,13,15,17] Of these guidelines, one[8] graded its recommendation as "*weak*" based on "low-level" evidence, one[12] assigned a "*grade*

A", and one[13] did not provide a specific grading, but indicated "*it is good clinical practice*" in its recommendation.

One guideline[8] suggests 40 mg to 80 mg of elemental oral iron every morning as optimal dose ("*weak"* recommendation), while another guideline[10] recommend up to 100 mg to 200 mg of elemental iron daily.

Once Hb reaches the normal range, it is recommended that iron replacement should continue for three months and until at least six weeks postpartum ("*strong*" recommendation despite being of "very-low" quality evidence).[8,10]

Intravenous (IV) iron is recommended for women who could not tolerate or respond to oral iron, and for those with moderately severe to severe anemia (Hb ≤ 90 g/L).[8,10,12,13,15] Of these guidelines, one[8] graded its recommendation as "*weak*" based on "moderate-level" evidence, one[12] assigned a "*grade A" (*Requires at least one randomized controlled trial as part of a body of literature of overall good quality and consistency), and one[13] did not provide a specific grading, but indicated its recommendation was "*weak/conditional*".

One guideline[11] could not assess the balance of benefits and harms of iron supplementation for pregnant persons to prevent maternal health and birth outcomes due to insufficient evidence. This guideline graded its recommendation as an "*I statement*" indicating insufficient evidence.

Testing for iron deficiency anemia during postpartum

Four guidelines[8,10,13,15] recommend that Hb be measured within 24 to 48 hours after delivery in women with blood loss more than 500 mL, those with uncorrected anemia detected during pregnancy or those with symptoms suggestive of anemia postnatally. Of these guidelines, one[8] graded its recommendation as "*weak*" despite being based on high-level evidence, and one did [13] did not provide a specific grading, but indicated "*it is good clinical practice*" in its recommendation.

One guideline[17] does not recommend ferritin measurement in the early postpartum period as it can be normal or elevated due to inflammation.

Treatment of iron deficiency anemia during postpartum

Oral iron is recommended for women with Hb <100 g/L postpartum, who are hemodynamically stable, asymptomatic or mild symptomatic.[8,10,12,13,15,17] Of these guidelines, one[8] graded its recommendation as "*weak*" despite of high-level evidence, one[12] assigned a "*grade A"*, and one[13] did not provide a specific grading, but indicated "*it is good clinical practice*" in its recommendation.

The use IV iron is reserved for women who are previously intolerant of, or do not respond to oral iron treatment, or those with moderately severe to severe anemia (Hb ≤ 90 g/L).[8,10,12,13,15,17] Of these guidelines, one[8] graded its recommendation as "*weak*" despite being based on "moderate-level" evidence, one[12] assigned a "*grade A"*, and one[13] did not provide a specific grading, but indicated its recommendation was "*weak/conditional*".

Limitations

Five of ten identified guidelines graded their recommendations, with the majority of the recommendations based on moderate to very low-quality evidence. No clinical

effectiveness or economic studies were identified on screening for obstetric iron deficiency anemia in the first or second trimester using ferritin testing.

Conclusions and Implications for Decision or Policy Making

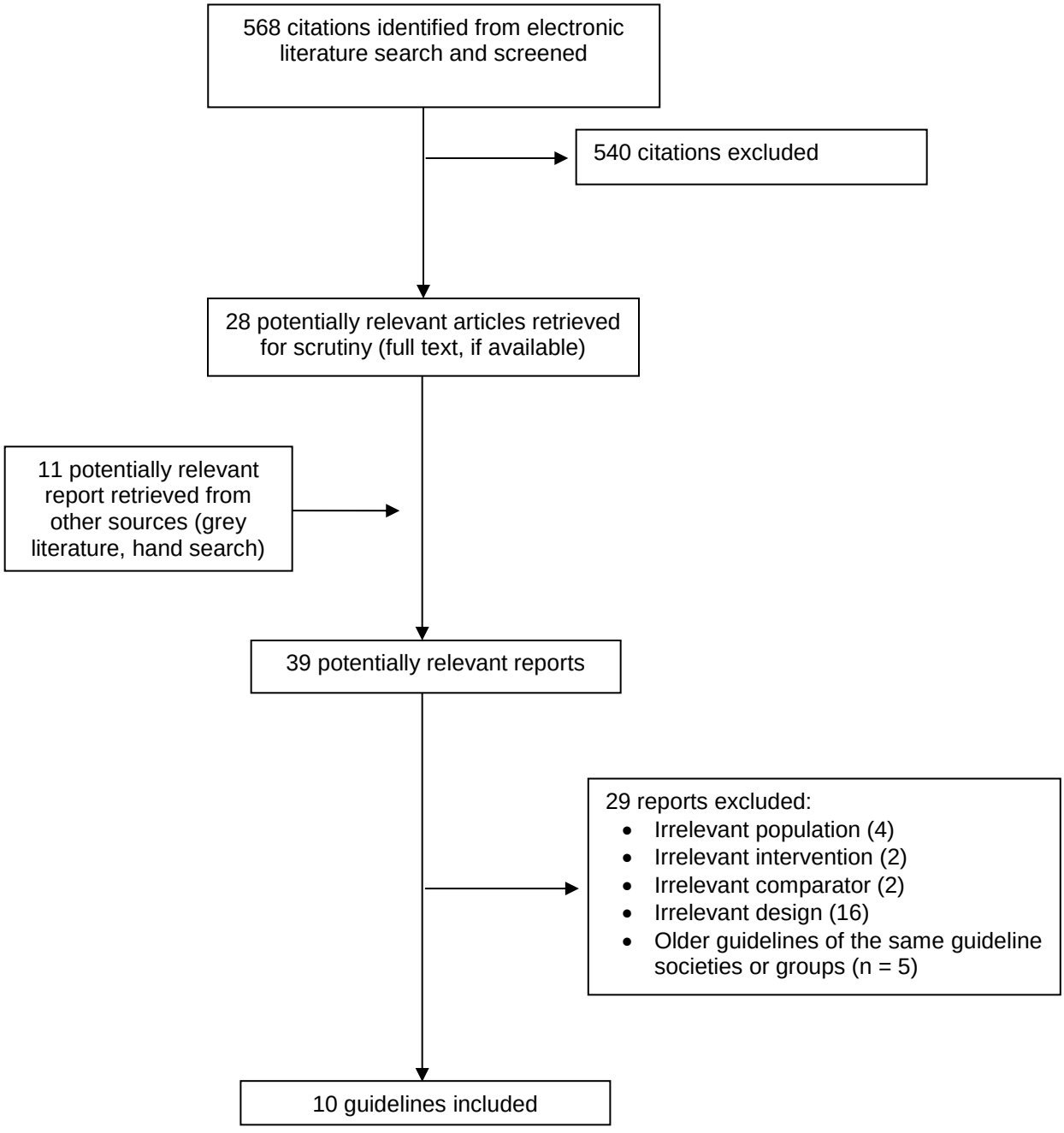
No clinical or economic studies were found regarding the screening of obstetric iron deficiency in the first or second trimester using ferritin testing. This review included ten guidelines.[8-17]

One guideline could not assess the benefits and harms of screening and iron supplementation in pregnant persons due to insufficient evidence. The majority of the identified guidelines recommend a routine Hb measurement at each trimester of pregnancy to assess iron deficiency anemia. Serum ferritin testing should be reserved for pregnant persons with possible hemoglobinopathies (e.g., thalassemia, sickle cell anemia), anemia of infection, vitamin B12 or folic acid deficiency, unexplained iron deficiency anemia, non-anemic persons at risk of iron deficiency, or suspected chronic blood loss. After delivery, Hb should be measured within 24 to 48 hours in persons with blood loss more than 500 mL, those with uncorrected anemia detected during pregnancy or those with symptoms suggestive of anemia postnatally. Oral iron is the first line treatment with repeated Hb testing to assess compliance, correct administration and response to treatment. IV iron should be used in persons who are intolerant of, or do not respond to oral iron treatment, or those with moderately severe to severe anemia. Judging from the sources of the guidelines, their recommendations are likely to be generalizable to pregnant persons in Canada. While the scope and purpose of the included guidelines were clearly described, only half of the identified guidelines were explicit in terms of rigour of development and authors assessed the level of evidence, which was deemed to be of very low to moderate quality. Therefore, these recommendations should be interpreted with caution. Higher quality evidence from RCTs and economic studies in the Canadian context are needed to better assess the comparative clinical effectiveness and cost-effectiveness of ferritin and Hb testing in obstetric anemia.

References

1. Coad J, Conlon C. Iron deficiency in women: assessment, causes and consequences. *Curr Opin Clin Nutr Metab Care.* 2011;14(6):625-634.
2. Iron deficiency anemia in the childbearing year. Diagnosis and treatment. Toronto (ON): Association of Ontario Midwives; [2016]: https://www.ontariomidwives.ca/sites/default/files/Iron-deficiency-anemia-in-the-childbearing-year-PUB.pdf. Accessed 2019 Dec 2.
3. Daru J, Colman K, Stanworth SJ, De La Salle B, Wood EM, Pasricha SR. Serum ferritin as an indicator of iron status: what do we need to know? *Am J Clin Nutr.* 2017;106(Suppl 6):1634s-1639s.
4. Auerbach M, Georgieff MK. Guidelines for iron deficiency in pregnancy: hope abounds. *Br J Haematol.* 2019.
5. Cooper MJ, Cockell KA, L'Abbe MR. The iron status of Canadian adolescents and adults: current knowledge and practical implications. *Can J Diet Pract Res.* 2006;67(3):130-138.
6. Agree Next Steps Consortium. The AGREE II Instrument. [Hamilton, ON]: AGREE Enterprise; 2017: https://www.agreetrust.org/wp-content/uploads/2017/12/AGREE-II-Users-Manual-and-23-item-Instrument-2009-Update-2017.pdf. Accessed 2019 Dec 2.
7. Liberati A, Altman DG, Tetzlaff J, et al. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. *J Clin Epidemiol.* 2009;62(10):e1-e34.
8. Pavord S, Daru J, Prasannan N, Robinson S, Stanworth S, Girling J. UK guidelines on the management of iron deficiency in pregnancy. *Br J Haematol.* 2019.
9. National Institute for Health and Care Excellence. Antenatal care for uncomplicated pregnancies. *(Clinical guideline CG62)* 2019; https://www.nice.org.uk/guidance/cg62/resources/antenatal-care-for-uncomplicated-pregnancies-pdf-975564597445. Accessed 2019 Dec 2.
10. SA Maternal & Neonatal Community of Practice. Anemia in Pregnancy. *(Policy Clinical Guideline)*. Adelaide (AU): Department for Health and Ageing, Government of South Australia; 2016: https://www.sahealth.sa.gov.au/wps/wcm/connect/33aa3b804ee1d163abb0afd150ce4f37/Anaemia+in+pregnancy_27042016.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-33aa3b804ee1d163abb0afd150ce4f37-mSUn4RW. Accessed 2019 Dec 2.
11. Final Recommendation Statement: Iron Deficiency Anemia in Pregnant Women: Screening and Supplementation. Rockville (MD): U.S. Preventive Services Task Force; 2019: https://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/iron-deficiency-anemia-in-pregnant-women-screening-and-supplementation. Accessed 2019 Dec 2.
12. Breymann C, Honegger C, Hosli I, Surbek D. Diagnosis and treatment of iron-deficiency anaemia in pregnancy and postpartum. *Arch Gynecol Obstet.* 2017;296(6):1229-1234.
13. Anaemia and iron deficiency in pregnancy and postpartum. Copenhagen (DK): Danish Society of Obstetrics and Gynecology; 2016: http://www.nfog.org/files/guidelines/NFOG_guidelines_DEN_Anaemia%20in%20pregnancy%20and%20post%20partum_2016.pdf Accessed 2019 Dec 2.
14. WHO recommendations on antenatal care for a positive pregnancy experience Geneva (CH): World Health Organization; 2016: https://apps.who.int/iris/bitstream/handle/10665/250796/9789241549912-eng.pdf;jsessionid=2B6BCD8A0922D469E26FF7EAAB66BB9D?sequence=1. Accessed 2019 Dec 2.
15. Api O, Breyman C, Cetiner M, Demir C, Ecder T. Diagnosis and treatment of iron deficiency anemia during pregnancy and the postpartum period: Iron deficiency anemia working group consensus report. *Turk J Obstet Gynecol.* 2015;12(3):173-181.
16. Ontario Health Technology Advisory Committee. Appropriateness Phase 1 OHTAC Recommendations: Annual Health Exams, Aspartate Aminotransferase Testing, Chloride Testing, Creatine Kinase Testing, Ferritin Testing, Folate Testing, and Vitamin B12 Testing. 2013; https://www.hqontario.ca/Portals/0/Documents/evidence/reports/recommendation-appropriateness-phase-1-130722-en.pdf. Accessed 2019 Dec 2.
17. Breymann C, Bian XM, Blanco-Capito LR, Chong C, Mahmud G, Rehman R. Expert recommendations for the diagnosis and treatment of iron-deficiency anemia during pregnancy and the postpartum period in the Asia-Pacific region. *J Perinat Med.* 2011;39(2):113-121.

Appendix 1: Selection of Included Studies



Appendix 2: Characteristics of Included Studies

Table 2: Characteristics of Included Guidelines

First Author, Society/Group Name, Publication Year, Country, Funding	Intended Users/ Target Population	Intervention and Practice Considered	Major Outcomes Considered	Evidence Collection, Selection and Synthesis	Recommendations Development and Evaluation	Guideline Validation
BSH 2019[8] UK Funding: Did Not receive any funding	Intended users: Healthcare professionals Target population: Women during pregnancy and at postpartum period	Diagnosis and treatment of iron deficiency in pregnancy and in the postpartum period	All maternal and infant health outcomes	Systematic methods were used to search for evidence. GRADE nomenclature was used for evaluating the levels of evidence and assessing the strength of recommendations.	Members of Task Force reviewed literature and wrote recommendations and background evidence. All recommendations were graded.	Guideline was internally checked for accuracy prior to submission for peer-reviewed publication.
NICE 2019[9] UK Funding: Department of Health in the UK	Intended users: Healthcare professionals Target population: Women during pregnancy	Antenatal care for uncomplicated pregnancies	All outcomes during pregnancies (clinical, non-clinical, quality of life, health economic) related to the research questions.	Systematic methods were used to search for evidence. GRADE approach was used for assessing and rating the quality of evidence.	Committee members developed review questions, reviewed research evidence, incorporate economic evaluation, linked to other guidance, and wrote recommendations.	The draft version of the guideline was posted on the NICE website for consultation with registered stakeholders.
SAMNCP 2019[10] Australia Funding: Government of South Australia	Intended users: Healthcare professionals Target population: Women during pregnancy and at postpartum period	Treatment for women with anemia in pregnancy and in the postpartum period	All maternal and infant health outcomes	Unclear if systematic methods were used to search for evidence.	Recommendations were made based on review of published evidence and expert opinion.	Guideline validation was not reported.

First Author, Society/Group Name, Publication Year, Country, Funding	Intended Users/ Target Population	Intervention and Practice Considered	Major Outcomes Considered	Evidence Collection, Selection and Synthesis	Recommendations Development and Evaluation	Guideline Validation
USPSTF 2019[11] USA Funding: Unclear	Intended users: Healthcare professionals Target population: Women during pregnancy	Screening and supplementation for iron deficiency anemia in pregnant women	All maternal and infant health outcomes	Systematic review was conducted by the AHRQ. The Task Force assigns each recommendation a letter grade (an A, B, C, or D grade or an I statement) based on the strength of the evidence and the balance of benefits and harms of a preventive service.	Recommendations were made based on review of published evidence provided by the AHRQ systematic review.	A draft version of the recommendation statement was posted for public comment on the USPSTF website.
SSGO 2017[12] Switzerland Funding: SSGO	Intended users: Healthcare professionals Target population: Women during pregnancy and at postpartum period	Diagnosis and treatment of iron-deficiency anemia during pregnancy and postpartum period	All maternal and infant health outcomes	Unclear if systematic methods were used to search for evidence. Each recommendation was graded based on the level of evidence.	Unclear how recommendations development and evaluation were made.	The guideline was published in a peer-reviewed journal.
DSOG 2016[13] Denmark Funding: Unclear	Intended users: Healthcare professionals Target population: Women during pregnancy and at postpartum period	Prevention and treatment of iron deficiency and iron deficiency anemia in women during pregnancy and postpartum period without genetic causes of anemia or other nutrition deficits	All maternal and infant health outcomes	Systematic methods were used to search for evidence.	The recommendation statements were written based on the level of evidence.	Guideline validation was unclear.

First Author, Society/Group Name, Publication Year, Country, Funding	Intended Users/ Target Population	Intervention and Practice Considered	Major Outcomes Considered	Evidence Collection, Selection and Synthesis	Recommendations Development and Evaluation	Guideline Validation
WHO 2016[14]	Intended users: Public health policy makers, nongovernmental and other organizations, professional societies, health professionals and academic staff. Target population: All pregnant women and adolescent girls receiving antenatal care in any healthcare facility or community-based setting, and their unborn fetuses and newborns.	Nutritional interventions, maternal and fetal assessment, preventive measures, interventions for common physiological symptoms, and health interventions to improve the utilization and quality of antenatal care.	All maternal and infant health outcomes	Systematic methods were used to search for evidence. GRADE approach was used for assessing and rating the quality of evidence.	The guideline was developed in accordance with the methods described in the *WHO handbook for guideline development.*	The guideline was peer-reviewed.
IDAWGCR 2015[15] Turkey Funding: Not reported	Intended users: Healthcare professionals Target population: Women during pregnancy and at postpartum period	Diagnosis and treatment of iron-deficiency anemia during pregnancy and postpartum period	All maternal and infant health outcomes	Unclear if systematic methods were used to search for evidence.	Recommendations were made by an expert panel as a scientific consensus after reviewing the literature.	The guideline was published in a peer-reviewed journal.
OHTAC 2013[16] Canada Funding: Ontario government	Intended users: Ontario's Ministry of Health and Long-term Care, clinicians, health system leaders, and policy makers Target population: Women during pregnancy	Ferritin testing in community' based laboratories	Diagnosis of iron deficient anemia	Unclear if systematic methods were used to search for evidence.	Unclear how recommendations development and evaluation were made.	Guideline validation was unclear.
Asia-Pacific 2011[17] Switzerland	Intended users: Healthcare professionals	Treatment for iron-deficiency anemia during pregnancy	All maternal and infant health outcomes	Unclear if systematic methods were used to	Unclear how recommendations development and	The guideline was published in

First Author, Society/Group Name, Publication Year, Country, Funding	Intended Users/ Target Population	Intervention and Practice Considered	Major Outcomes Considered	Evidence Collection, Selection and Synthesis	Recommendations Development and Evaluation	Guideline Validation
Funding: Vifor Pharma	Target population: Women during pregnancy and at postpartum period in the Asia-Pacific region	and the postpartum period		search for evidence.	evaluation were made.	a peer-reviewed journal.

AHRQ = Agency for Healthcare Research and Quality; BSH = British Society for Haematology; DSOG = Danish Society of Obstetrics and Gynecology; GRADE = Grading of Recommendations Assessment, Development and Evaluation; Hb = hemoglobin; IDAWGCR = Iron Deficiency Anemia Working Group Consensus Report; IV = intravenous; NICE = National Institute for Health and Care Excellence; OHTAC = Ontario Health Technology Advisory Committee; SAMNCP = South Australia Maternal & Neonatal Community of Practice; SSGO = Swiss Society of Gynecology and Obstetrics; USPSTF = U.S Preventive Services Task Force; WHO = World Health Organization.

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Appendix 3: Quality Assessment of Included Studies

Table 3: Quality Assessment of Guidelines

AGREE II checklist[6]	BSH, 2019[8]	NICE 2019[9]	SAMNCP 2019[10]	USPSTF 2019[11]	SSGO 2017[12]	DSOG 2016[13]	WHO 2016[14]	IDAWGCR 2015[15]	OHTAC 2013[16]	Asia-Pacific 2011[17]
Scope and purpose										
1. Objectives and target patient population were explicit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2. The health question covered by the guidelines is specifically described	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3. The population to whom the guidelines is meant to apply is specifically described	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stakeholder involvement										
4. The guideline development group includes individuals from all relevant professional groups	Yes	Yes	Unclear	Yes	Unclear	Unclear	Yes	Unclear	Unclear	Unclear
5. The views and preferences of the target population have been sought	Unclear	Yes	Unclear	Yes	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear
6. The target users of the guideline are clearly defined	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rigour of development										
7. Systematic methods were used to search for evidence	Yes	Yes	Unclear	Yes	Unclear	Yes	Yes	Unclear	Unclear	Unclear
8. The criteria for selecting the evidence are clearly described	Yes	Yes	No	Yes	No	Yes	Yes	No	No	No
9. The strengths and limitations of the body of evidence are clearly described	Yes	Yes	No	Yes	No	Yes	Yes	No	No	No

AGREE II checklist[6]	BSH, 2019[8]	NICE 2019[9]	SAMNCP 2019[10]	USPSTF 2019[11]	SSGO 2017[12]	DSOG 2016[13]	WHO 2016[14]	IDAWGCR 2015[15]	OHTAC 2013[16]	Asia-Pacific 2011[17]
10. The methods of formulating the recommendations are clearly described	Yes	Yes	No	Yes	No	Yes	Yes	No	No	No
11. The health benefits, side effects, and risks have been considered in formulating the recommendations	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12. There is an explicit link between the recommendations and the supporting evidence	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
13. The guideline has been externally reviewed by experts prior to its publication	Yes	Yes	Unclear	Yes	Yes	Unclear	Yes	Yes	Unclear	Yes
14. A procedure for updating the guideline is provided	Yes	Yes	Unclear	Yes	Unclear	Unclear	Yes	Unclear	Unclear	Unclear
Clarity of presentation										
15. The recommendations are specific and unambiguous	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
16. The different options for management of the condition or health issue are clearly presented	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
17. Key recommendations are easily identified	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Applicability										
18. The guideline describes facilitators and barriers to its application	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	Yes	Unclear	Unclear	Unclear
19. The guidelines provides advice and/or tools on how the recommendations can be put into practice	Yes	Yes	Unclear	Yes	Unclear	Unclear	Yes	Unclear	Yes	Unclear

AGREE II checklist[6]	BSH, 2019[8]	NICE 2019[9]	SAMNCP 2019[10]	USPSTF 2019[11]	SSGO 2017[12]	DSOG 2016[13]	WHO 2016[14]	IDAWGCR 2015[15]	OHTAC 2013[16]	Asia-Pacific 2011[17]
20. The potential resource (cost) implications of applying the recommendations have been considered	No	Yes	No	No	No	No	Yes	No	Yes	No
21. The guideline presents monitoring and/or auditing criteria	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Editorial independence										
22. The views of the funding body have not influenced the content of the guideline	Yes	Yes	Unclear	Yes	Unclear	Unclear	Yes	Unclear	Yes	Unclear
23. Competing interests of guideline development group members have been recorded and addressed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

BSH = British Society for Haematology; DSOG = Danish Society of Obstetrics and Gynecology; IDAWGCR = Iron Deficiency Anemia Working Group Consensus Report; NICE = National Institute for Health and Care Excellence; OHTAC = Ontario Health Technology Advisory Committee; SAMNCP = South Australia Maternal & Neonatal Community of Practice; SSGO = Swiss Society of Gynecology and Obstetrics; USPSTF = U.S Preventive Services Task Force; WHO = World Health Organization.

Appendix 4: Main Study Findings and Author's Conclusions

Table 4: Summary of Findings of Included Guidelines

Recommendations
BSH 2019[8]
Testing for iron deficiency anemia during pregnancy *"Anaemia should be defined as haemoglobin concentration (Hb) <110 g/l in first trimester and <105 g/l in second and third trimesters and <100 g/L postpartum (2D)."*[8] p. 2 *"Haemoglobin concentration should be routinely measured at booking and at around 28 weeks' gestation (1D)."*[8] p. 4 *"If anaemia without an obvious other cause is detected, a diagnostic trial of oral iron should be given without delay, with a repeat full blood count in 2-3 weeks (1D)."*[8] p. 4 *"The optimal diagnostic strategy for anaemia in pregnancy is unknown but unselected routine screening with serum ferritin outside the context of research is not currently recommended (1D)."*[8] p. 4 *"Serum ferritin should be measured in women with a known haemoglobinopathy to identify concomitant iron deficiency and exclude iron loading states (1D)."*[8] p. 4 *"Non-anaemic women at risk of iron deficiency should be identified and either started on prophylactic iron empirically or have serum ferritin checked first (1D).*[8] p. 4 *"A serum ferritin level of <30 µg/l in pregnancy is indicative of iron deficiency. Levels higher than this do not rule out iron deficiency or depletion (2C)."*[8] p. 4 **Treatment of iron deficiency anemia during pregnancy** *"Until further research determines the optimal dose of elemental oral iron, 40-80 mg every morning is suggested, checking Hb at 2-3 weeks to ensure an adequate response (2C)."*[8] p. 5 *"Treatment for anaemia should be started promptly by the healthcare professional caring for the woman. Escalation to specialist medical care is required if anaemia is severe (Hb <70 g/l) and/or associated with significant symptoms or advanced gestation (>34 weeks), or if the Hb is failing to respond after 2-3 weeks of oral iron correctly taken (2B)."*[8] p. 5 *"In non-anaemic women at increased risk of iron depletion, 40-80 mg elemental iron once a day should be offered empirically, or serum ferritin should be checked and iron offered if ferritin is <30 µg/l (1B)."*[8] p. 5 *"Repeat Hb testing is required 2-3 weeks after commencing treatment for established anaemia, to assess compliance, correct administration and response to treatment (1B)."*[8] p. 6 *"Once the HB is in the normal range, replacement should continue for 3 months and until at least 6 weeks postpartum to replenish iron stores (1D)."*[8] p. 6 *"IV iron should be considered from the second trimester onwards for women with confirmed iron deficiency anaemia who are intolerant of, or do not respond to, oral iron (2B)."*[8] p. 6 *"IV iron should be considered in women who present after 34 weeks' gestation with confirmed iron deficiency anaemia and an Hb of <100 g/l (1C)."*[8] p. 6 **Treatment of iron deficiency anemia during postpartum** *"After delivery, women with blood loss >500 ml, those with uncorrected anaemia detected in the antenatal period or those with symptoms suggestive of anaemia postnatally should have their Hb checked within 48 h of delivery (2A)."*[8] p. 9 *"Women with Hb <100 g/l within 48 h of delivery, who are haemodynamically stable, asymptomatic, or mildly symptomatic, should be offered oral element iron 40-80 mg daily for at least 3 months (2A)."*[8] p. 9 *"Use of IV iron postpartum should be considered in women who are previously intolerant of, or do not respond to, oral iron and/or where the severity of symptoms of anaemia required prompt management (2B)."*[8] p. 9

Recommendations

"The decision to transfuse women in the postpartum period should be based on careful evaluation, including whether or not there is risk of bleeding, cardiac compromise or symptoms requiring urgent attention, considering oral or parenteral iron therapy as alternatives (1A)."[8] p. 9

Level of evidence:

(A) High: further research is very unlikely to change our confidence in the estimate of effect.
(B) Moderate: further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
(C) Low: further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
(D) Very Low: any estimate of effect is very uncertain.

Strength of recommendation:

Strong (grade 1): Strong recommendations are made if clinicians are certain that benefits do, or do not, outweigh risks and burdens. Grade 1 recommendations can be applied uniformly to most patients and words such as "recommend", "offer" and should" are appropriate.

Weak (grade 2): Weak recommendations are made if clinicians believe that benefits and risks and burdens are finally balanced, or appreciable uncertainty exists about the magnitude of benefits and risks. In addition, clinicians are becoming increasingly aware of the importance of patient values and preferences in clinical decision making. When, across the range of patient values, fully informed patients are liable to make different choices, guideline panel should offer weak recommendations. Grade recommendations require judicious application to individual patients and words such as "suggest" and "consider" are appropriate.

NICE 2019[9]

Screening for iron deficiency anemia during pregnancy

"Pregnant women should be offered screening for anaemia, Screening should take place early in pregnancy (at the booking appointment) and at 28 weeks when other blood screening tests are being performed. This allows enough time for treatment if anaemia is detected."[9] p. 21

"Haemoglobin levels outside the normal UK range for pregnancy (that is, 11 g/100 ml at first contact and 10.5 g/100 ml at 28 weeks) should be investigated and iron supplementation considered if indicated."[9] p. 21

This guideline did not grade its recommendations.

SAMNCP 2019[10]

Testing for iron deficiency anemia during pregnancy

"In view of the relative plasma expansion being particularly marked in the second trimester, it would seem reasonable to define anaemia as: Hb <110 g/L in first trimester; Hb <105 g/L in second and third trimesters; Hb <100 g/L in postpartum period."[10] p. 3

"Unselected screening with routine use of serum ferritin is generally not recommended although it may be useful for centers with a particularly high prevalence of 'at-risk' women."[10] p. 5

"Complete blood examination (CBE) should be assessed at booking and at 28 weeks."[10] p. 5

"Women with haemoglobin <110 g/L before 12 weeks or <105 g/L beyond 12 weeks are anaemic and should be offered a trial of therapeutic iron replacement, unless they are known to have a thalassaemia / haemoglobinopathy. These women should have serum ferritin checked and offered therapeutic iron if the ferritin is <30 micrograms/L."[10] p. 5

"Serum ferritin is the most useful and easily available parameter for assessing iron deficiency. Ferritin levels <15 micrograms/L are diagnostic of established iron deficiency. A level of <30 micrograms/L in pregnancy should prompt treatment."[10] p. 5

"Serum ferritin should be checked before starting iron in women with known thalassaemia / haemoglobinopathy as there is a risk of iron overload because of dyserythropoiesis. Serum ferritin should also be checked in women with likely multifactorial anaemia (e.g. with risk factors for multiple deficiencies, chronic disease / inflammation."[10] p. 5

Treatment of iron deficiency anemia during pregnancy

"In iron deficiency anemia the oral dose of iron should be 100 – 200 mg of elemental iron daily." [10] p. 7

Recommendations
"In non-anaemic iron deficiency lower doses of elemental iron (e.g. 20 – 80 mg daily)may be considered, and may be better tolerated than higher doses."[10] p. 7 *"Repeat haemoglobin testing and reticulocyte response is required 2 weeks after commencing treatment for established anaemia, to assess compliance, correct administration and response to treatment."*[10] p. 8 *"Once haemoglobin is in the normal range, replacement should continue for three months and until at least 6 weeks postpartum to replenish iron stores."*[10] p. 8 *"In non-anaemic women, repeat haemoglobin and serum ferritin is required after 8 weeks of treatment to confirm response."*[10] p. 8 *"IV iron is preferred when rapid restoration of haemoglobin and iron stores is required, because it leads to a more rapid increase in these values than other routes of administration."*[10] p. 8 *"In women requiring iron in the peripartum period, intravenous iron is preferred when oral iron is poorly tolerated (affecting compliance), or absorption is likely to be impaired."*[10] p. 8 **Treatment of iron deficiency anemia during postpartum** *"Postpartum women with estimated blood loss >500 mL, uncorrected anaemia detected in the antenatal period or symptoms suggestive of anaemia postpartum should have their haemoglobin checked within 48 hours."*[10] p. 9 *"Women who are haemodynamically stable, asymptomatic or mildly symptomatic, with haemoglobin <100 g/L should be offered elemental iron 100 – 200 mg daily for 3 months with a repeat complete blood examination and ferritin on completion of iron therapy to ensure haemoglobin and iron stores are replete."*[10] p. 9 *"The decision to transfuse should be based on careful evaluation including whether or not there is risk of bleeding, cardiac compromise or symptoms requiring urgent attention, considering oral or IV iron therapy as an alternative."*[10] p. 9 This guideline did not grade its recommendations.
USPSTF 2019[11]
Screening and supplementation for iron deficiency anemia in pregnant persons *"The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for iron deficiency anemia in pregnant women to prevent adverse maternal health and birth outcomes (I statement)."*[11] p.1 *"The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of routine iron supplementation for pregnant women to prevent adverse maternal health and birth outcomes (I statement)."*[11] p.1 I statement = The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.
SSGO 2017[12]
Diagnosis and treatment of iron-deficiency anemia in pregnancy and postpartum *"Iron deficiency occurs frequently in pregnancy and can be diagnosed in the first trimester by means of serum ferritin screening (threshold value < 30 µg/L). Regular Hb checks at least once per trimester are generally recommended (Grade B)."*[12] p. 1233 *"In case of iron deficiency with or without anaemia in pregnancy, oral iron therapy should be given as first-line treatment. In case of severe iron-deficiency anaemia, intolerance of oral iron, lack of response to oral iron, or in the case of clinical need for rapid and efficient treatment of anaemia, intravenous iron therapy should be administered (Grade A)."*[12] p. 1233 *"In the postpartum period, oral iron therapy should be administered for mild iron-deficiency (haemorrhagic anaemia), and intravenous iron therapy for moderately severe to severe anaemia (Hb < 95 g/L) (Grade A)"*[12] p. 1233 *"If there is an indication for intravenous iron therapy in pregnancy or postpartum, ferric carboxymaltose is the first-choice product based on existing studies and our own experience. Particular care is recommended for all intravenous iron products in accordance with the Swissmedic information documents (Grade C)."*[12] p. 1233 Level of evidence:

Recommendations
Ia: Evidence obtained from meta-analysis of randomized controlled trials Ib: Evidence obtained from at least one randomized controlled trial IIa: Evidence obtained from at least one well-designed controlled study without randomization IIb: Evidence obtained from at least one type of well-designed quasi-experimental study III: Evidence obtained form well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies IV: Evidence obtained from expert committee reports or opinions and/or clinical experience of respected authorities Grade of recommendation: Grade A: Requires at least one randomized controlled trial as part of a body of literature of overall good quality and consistency addressing the specific recommendation (evidence levels Ia, Ib) Grade B: Requires the availability of well controlled clinical studies but no randomized clinical trials on the topic of recommendations (evidence levels IIa, IIb, III) Grade C: Requires evidence obtained from expert committee reports or opinions and/or clinical experience of respected authorities. Indicates an absence of directly applicable clinical studies of good quality (evidence level IV)
DSOG 2016[13]
Screening and treatment of iron-deficiency anemia in pregnancy and postpartum *"It is good clinical practice to screen with haemoglobin and serum ferritin in the first trimester."*[13] p. 2 *"There is weak/conditional recommendation against routine treatment with iron to all pregnant women from the first trimester (provided that recommendation 1 is followed)."*[13] p. 2 *"It is good clinical practice to offer pregnant women in the second or third trimester with findings of haemoglobin <6.5 mmol/L additional blood test with ferritin prior to treatment with iron."*[13] p. 2 *"It is good clinical practice to individualise screening for iron deficiency, with or without anaemia, in pregnant women at 28 weeks of gestation, in order to examine women who are at increased risk of anaemia.* [13] p. 2 *"It is good clinical practice to check for haemoglobin and ferritin in pregnant women in the second and third trimester 2-4 weeks after starting treatment for iron deficiency, with or without anaemia."*[13] p. 2 *"In case of treatment response and the absence of symptoms of anaemia, it is good clinical practice to control the haemoglobin and ferritin every 8 weeks the rest of pregnancy."*[13] p. 2 *"It is good clinical practice to recommend women with low ferritin in the second and third trimesters prophylactic oral iron in pregnancy."*[13] p. 2 *"It is good clinical practice to treat pregnant women with anaemia (haemoglobin <6.5 mmol/L) in the second or third trimester with oral iron."*[13] p. 2 *"There is weak/conditional recommendation for intra venous iron rather than oral iron, if the woman has difficulty in absorbing oral iron or severe gastrointestinal side effects."*[13] p. 2 *"It is good clinical practice to offer women, who do not respond to oral therapy, parenteral treatment."*[13] p. 2 *"It is good clinical practice to treat pregnant women with severe anaemia (haemoglobin <4.3 mmol/L) in the third trimester with intra venous iron."*[13] p. 2 *"It is good clinical practice not to screen for anaemia with haemoglobin after birth simply because of blood loss between 500 and 1000 ml."*[13] p. 2 *"It is good clinical practice not to screen for iron deficiency simply because of blood loss more than 500 mL."*[13] p. 3 *"It is good clinical practice to check for anaemia if there are subjective symptoms such as syncope, tachycardia, extreme pallor and/or constant headaches."*[13] p. 3 *"It is good clinical practice to check the haemoglobin within 24 hours after birth and a blood loss more than 1000 mL."*[13] p. 3

Recommendations

"It is good clinical practice to offer oral iron therapy to maternity leave women with symptomatic anaemia."[13] p. 3

"There is weak/conditional recommendation against the use of intra venous iron rather than oral iron by postpartum iron deficiency anaemia."[13] p. 3

"In case of anaemia due to postpartum haemorrhage, there is weak/conditional recommendation against the use of intra venous iron followed by oral iron rather than oral iron alone."[13] p. 3

"There is weak/conditional recommendation for blood transfusion in severe and symptomatic anaemia."[13] p. 3

WHO 2016[14]

Assessment for anaemia during pregnancy

"Full blood count testing is the recommended method for diagnosing anaemia during pregnancy. In settings where full blood count testing is not available, on-site haemoglobin testing with haemoglobinometer is recommended over the use of the haemoglobin colour scales as the method for diagnosing anaemia in pregnancy (Context-specific recommendation)."[14] p. 41

Types of recommendation:

- Recommended
- Context-specific recommendation:
  - Only in the context of rigorous research
  - Only with targeted monitoring and evaluation
  - Only in other specific context
- Not recommended

IDAWGCR 2015[15]

Diagnosis of iron deficiency anemia during pregnancy

"The serum ferritin level, which is the most sensitive test at baseline, should be measured together with the Hb level to diagnose iron deficiency. A serum ferritin level <30 µg/L during pregnancy should prompt treatment. Monitoring in further periods should be based on the Hb concentration, which should be measured in each trimester."[15] p. 175

Treatment of iron deficiency anemia during pregnancy

"IV iron therapy should be considered from the 2nd trimester onwards in pregnant women with iron deficiency anemia that cannot tolerate or do not respond to oral iron therapy." [15] p. 176

"With severe anemia (Hb ≤9 g/dL), the presence of risk factors (such as coagulation disorders, placenta previa) and conditions that require prompt resolution of anemia (paleness, tachycardia, tachypnea, syncope, heart failure, respiratory failure, angina pectoris, and signs of cerebral hypoxia) are other potential indications for IV iron therapy."[15] p. 176

"The IV iron therapy dose should be individual patient based and bringing the Hb level up to at least 11 g/dL should be the target of the therapy."[15] p. 176

"Switching from oral to IV iron therapy or stating IV therapy initially is contingent upon risk-benefit assessment; however, such assessment should be performed on an individual patient basis and requirements should be evaluated carefully."[15] p. 176

During pregnancy in Turkey:
Oral iron: 9 < Hb ≤ 11 g/dL (1st and 3rd trimesters); 9 < Hb ≤ 10.5 g/dL (2nd trimester)
IV iron: Hb ≤ 9 g/dL

Diagnosis of iron deficiency anemia during postpartum

"The Hb concentration must be checked within 24-48 h after delivery in cases of blood loss >500 mL during postpartum period, untreated anemia during the antenatal period, or symptoms of anemia during postnatal period."[15] p. 176

Treatment of iron deficiency anemia during postpartum

"In patients with an Hb level ≤10 g/dL who are hemodynamically stable and asymptomatic or mildly symptomatic, oral iron 100-200 mg/day should continue for up to 3 months, and complete blood count and serum ferritin values should be checked at the end of treatment."[15] p. 177

Recommendations
"IV iron therapy should be considered in patients who cannot tolerate or do not respond to oral iron therapy, and have significant symptoms or moderate-severe/severe anemia."[15] p. 177 *"The physician should start IV iron therapy whenever the Hb value is less than or equal to 9 because this is considered as severe anemia."*[15] p. 177 *"The therapeutic iron dose should be determined on an individual patient basis and should achieve an Hb level ≥11 g/dL."*[15] p. 177 During postpartum in Turkey: Oral iron: 9 < Hb ≤ 11 g/dL IV iron: Hb ≤ 9 g/dL This guideline did not grade its recommendations.
OHTAC 2013[16]
Ferritin testing in community-based laboratories *"OHTAC recommends removing ferritin from the Ontario laboratory requisition form."*[16] p. 4 *"OHTAC recommends adding ferritin to the antenatal form 1 to ensure appropriate screening of asymptomatic pregnant women in accordance to guidelines."* [16] p. 4 *"OHTAC recommends restricting ferritin testing to individuals with the following conditions:* – *Suspected iron overload* – *Unexplained iron deficient anemia* – *Asymptomatic pregnant females* – *Suspected chronic blood loss"*[16] p. 4 This guideline did not grade its recommendations.
Asia-Pacific 2011[17]
"Consensus recommendations for diagnosis of iron deficiency anemia during pregnancy in the Asia-Pacific region • *Hb <10.5 g/dL* • *Ferritin <20 µg/L* • *If ferritin >20 µg/L, other causes of anemia such as thalassemia and vitamin B12 deficiency should be excluded"*[17] p. 10 *"Consensus recommendations for diagnosis of iron deficiency anemia during the postpartum period in the Asia-Pacific region* • *Hb <10 g/dL* • *Ferritin measurement is not recommended in the early postpartum period since it can be normal or elevated due to inflammation* • *Treatment can commence once:* – *The cardiovascular system is stable* – *There is no ongoing bleeding"*[17] p. 11 Treatment of iron deficiency anemia in pregnancy and the postpartum period in the Asia-Pacific region Oral iron: 10 < Hb ≤ 10.5 g/dL IV iron: Hb ≤ 10 g/dL This guideline did not grade its recommendations.

BSH = British Society for Haematology; DSOG = Danish Society of Obstetrics and Gynecology; Hb = hemoglobin; IDAWGCR = Iron Deficiency Anemia Working Group Consensus Report; IV = intravenous; NICE = National Institute for Health and Care Excellence; OHTAC = Ontario Health Technology Advisory Committee; SAMNCP = South Australia Maternal & Neonatal Community of Practice; SSGO = Swiss Society of Gynecology and Obstetrics; USPSTF = U.S Preventive Services Task Force; WHO = World Health Organization.