

ANEMIA; IRON DEFICIENCY

Does Not Include Pregnancy-Related Anemia; Includes Case Identification Criteria for Recurrent Iron Deficiency Anemia

Background

This case definition was developed by the Armed Forces Health Surveillance Center (AFHSC) for the purpose of epidemiological surveillance of iron deficiency anemia not related to pregnancy. Due to regular menstrual bleeding, iron deficiency anemia is a condition that primarily affects women although young men and women engaged in strenuous physical activity (e.g., during basic training or operational deployments) are also at risk.¹ Iron deficiency anemia causes fatigue and reduced physical work capacity.² As such, the condition may impact situations that require maximal performance such as on the field of combat.³

Clinical Description

Iron deficiency anemia is a condition resulting from too little iron in the body which decreases the body's ability to produce hemoglobin. Iron deficiency is the most common cause of anemia in the United States.¹ Iron deficiency anemia has many causes that fall into two main categories: increased iron needs (e.g., due to rapid growth, pregnancy, or blood loss); or decreased iron intake and absorption (e.g., due to lack of heme iron sources in the diet or excessive antacid use). A person with mild iron deficiency anemia may have no signs or symptoms of the condition; in more severe cases the individual may have one or more of the following common signs or symptoms (i.e., pale skin, fatigue, weakness, shortness of breath, headache, dizziness, cold hands and feet, irritability, glossitis and decreased work and school performance). Treatment is based on the underlying cause and often includes dietary changes and iron supplementation.⁴

Case Definition and Incidence Rules

For surveillance purposes, a case of iron deficiency anemia is defined as:

- *One hospitalization* with any of the defining diagnoses of iron deficiency anemia (see ICD9 and ICD10 code lists below) in the *first or second* diagnostic position; or
- *Two outpatient medical encounters*, occurring *within a 365-day* period, with any of the defining diagnoses of iron deficiency anemia (see ICD9 and ICD10 code lists below) in the *first or second* diagnostic position; or

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¹ McClung, JP, Marchitelli, LJ, Friedl, KE and Young AJ. Prevalence of Iron Deficiency and Iron Deficiency Anemia among Three Populations of Female Military Personnel in the US Army. *J Am Coll Nutr*. February 2006; Vol 25 (1), 64-69.

² Centers for Disease Control and Prevention. Iron deficiency – United States, 1999–2000. *MMWR* 2002; 51:897–899.

³ Gardner G, Edgerton V, Senewiratne B, Barnard RJ, Ohira Y: Physical work capacity and metabolic stress in subjects with iron-deficient anemia. *Am J Clin Nutr* 1977; 30: 910-7.

⁴ Centers for Disease Control and Prevention. Recommendations to Prevent and Control Iron Deficiency in the United States. *MMWR* 1998; 47 (No. RR-3) p. 5.



Case Definition and Incidence Rules *(continued)*

- *Two outpatient medical encounters* with any of the defining diagnoses of “unspecified anemia” (see ICD9 and ICD10 code lists below) in the *first or second* diagnostic position, followed by *one outpatient medical encounter* with any of the defining diagnoses of iron deficiency anemia (see ICD9 and ICD10 code lists below) in the *first or second* diagnostic position, and all occurring within a *365-day* period.

Incidence rules:

For individuals who meet the case definition:

- The incidence date is considered the date of the first hospitalization or outpatient medical encounter that includes a diagnosis of iron deficiency anemia.
- An individual can be considered an incident case *once per lifetime*.
- *If analysis requires recurrent case counts*, an individual is considered a recurrent case if he or she has met the criteria for an incident case, and then has *one hospitalization or outpatient medical encounter, 365 days or more* after the incident date, with a defining diagnosis of iron deficiency anemia (see ICD9 and ICD10 code lists below) in the *first or second* diagnostic position.

Exclusions:

- Individuals with *possible* pregnancy-related anemia *within 2 years prior to a case defining encounter* as suggested by:
 - ICD9 codes 630-679 (complications of pregnancy childbirth, and the puerperium) and V22.x (normal pregnancy), V23.x (supervision of high-risk pregnancy), V24.x (postpartum care and examination), V27.x (outcome of delivery), V28.x (antenatal screening), V72.42 (pregnancy examination or test, positive result)
 - ICD10 codes O00-O9A (pregnancy, childbirth and the puerperium) and Z33-Z39 (persons encountering health services in circumstances related to reproduction; does not include contraceptive management (Z30) or procreative management (Z31).

Codes

The following ICD9 and ICD10 codes are included in the case definition:

Condition	ICD-10-CM Codes	ICD-9-CM Codes
Iron deficiency anemia	D50 (iron deficiency anemia)	280 Iron deficiency anemias
	- D50.0 (iron deficiency anemia secondary to blood loss; chronic)	280.0 (iron deficiency anemia secondary to blood loss; chronic)

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	- D50.1 (sideropenic dysphagia) – <i>evaluate when data available</i>	280.8 (other specified iron deficiency anemias)
	- D50.8 (other iron deficiency anemias)	280.1 (iron deficiency anemia secondary to inadequate dietary iron intake) 280.8 (above))
	- D50.9 (iron deficiency anemia, unspecified)	280.9 (iron deficiency anemia, unspecified)
Unspecified anemia	D53.9 (nutritional anemia, unspecified)	281.9 (unspecified deficiency anemia)
	D64.9 (anemia, unspecified)	285.9 (anemia, unspecified)

Development and Revisions

- In July of 2015 the case definition was updated to include ICD10 codes.
- This case definition was developed in July 2012 by the Armed Forces Health Surveillance Center (AFHSC) for descriptive epidemiology reports on iron deficiency anemia. The case definition was also used in a MSMR article on incident, recurrent, and chronic cases of iron deficiency anemia.⁵ The definition was developed based on reviews of the ICD9 codes, the scientific literature, and previous AFHSC analyses.

Case Definition and Incidence Rule Rationale

- This case definition is designed to capture cases of iron deficiency that are *not pregnancy-related*. As such, individuals with a pregnancy-related diagnosis, defined above, are excluded. Using this case definition, the original analysis of iron deficiency anemia among the Active Component of the Armed Forces showed that, of 97,108 cases of iron deficiency anemia identified, 12,490 (12.8%) were excluded due to a pregnancy-related diagnosis.⁶

Cases are excluded for period of 2 years following pregnancy because iron deficiency anemia is a common complication of pregnancy. Iron loss to the developing fetus, blood loss during delivery, and insufficient iron intake during pregnancy to offset the iron losses contribute to post-partum iron deficiency anemia. Recovery of iron stores during the post-partum period depends upon an increased intake of iron in the diet and supplementary iron as needed. The pace of restoration of iron stores determines the duration of post-partum iron deficiency.⁷ The prevalence of iron-deficiency anemia in pregnant women in industrialized countries was estimated to be 18%.⁸

- The July 2012 MSMR article on iron deficiency anemia states that only individuals with pregnancy-related anemia defined by ICD9 code 648.2x (anemia; other current conditions in the mother classifiable elsewhere, but complicating pregnancy, childbirth, or the puerperium) *within the previous 2 years of a case defining encounter* are excluded. Additional analyses showed that the use of this code alone likely did not exclude a significant number of pregnancy-related anemia

⁵ Armed Forces Health Surveillance Center. Iron Deficiency Anemia, Active Component, U.S. Armed Forces, 2002-2011. Medical Surveillance Monthly Report (MSMR). 2012 July; 19(7): 17-21.

⁶ Detailed information on this analysis is available through the Armed Forces Health Surveillance Center; reference Defense Medical Surveillance System (DMSS) Request #120137 (Iron Deficiency Anemia, Final, Active Component U.S. Armed Forces, 2002-2011), 2012.

⁷ Atkinson L, Baxlet E. Postpartum fatigue. *American Family Physician*, July 1994.

⁸ World Health Organization. United Nations Children's Fund. Iron deficiency anemia; Assessment, Prevention and Control; A guide for program managers. World Health Organization, Geneva, 2001



cases; as such, the definition presented here was modified to exclude all pregnant women who had been pregnant within the 2 years prior to the case defining encounter.⁶

- The case finding criteria are limited to the first and second diagnostic position in an effort to capture cases of iron deficiency anemia that are the primary reason for an individual's medical hospitalization or outpatient medical encounter. The criteria increase the sensitivity of the case definition but may underestimate the number of cases. Because iron deficiency anemia often occurs secondary to other medical conditions, expanding the case finding criteria to include the third and fourth diagnostic positions should be considered when planning special studies.
- The specification that outpatient medical encounters must occur "within a 365- day period of each other" for case identification is used because individuals with iron deficiency anemia are typically treated for at least 6 months with iron supplementation. Six months of therapy is often required in a normal adult to rebuild the body's iron stores.⁹ In addition, patients not compliant with iron therapy secondary to the side effects of treatment may require treatment beyond six months to achieve adequate response. As such, 365 days was established to allow for the likelihood that "true" cases of iron deficiency anemia would be identified and treated within this timeframe.
- The case definition includes criteria to capture cases of *recurrent* iron deficiency anemia. These cases are important because post treatment (i.e., when iron supplements are no longer consumed) iron deficiency anemia commonly returns.¹⁰

Code Set Determination and Rationale

- ICD9 codes 281.9 (unspecified deficiency anemia) and 285.9 (anemia, unspecified) are included in the code set because these codes are often used as first encounter criteria for case identification because the diagnosis of iron deficiency anemia often requires two or more medical encounters to determine the specific type of anemia. The first medical encounter for a patient with symptoms of anemia may be characterized and recorded as "other or unspecified anemia."

Reports

None

Review

Jul 2015	Case definition reviewed and updated by the AFHSC Surveillance Methods and Standards (SMS) working group.
Jan 2013	Case definition reviewed and adopted by the AFHSC Surveillance Methods and Standards (SMS) working group.
Nov 2011	Case definition developed and reviewed by AFHSC staff.

Comments

None

⁹ Braunwald, E., Fauci, A., Longo, D. et al. 2008. *Harrison's Principles of Internal Medicine*. 17th ed. United States: McGraw-Hill Professional.

¹⁰ Ross, EM : Evaluation and treatment of iron deficiency in adults . Nutr Clin Care 2002 ; 5 (5) : 220-4.

