

Hemoglobin/Hematocrit

CHILD AND TEEN CHECKUPS (C&TC) FACT SHEET FOR PRIMARY CARE PROVIDERS

C&TC Requirements

General

The following are C&TC requirements for Hemoglobin (Hb) and Hematocrit (Hct) screening:

- One baseline Hb or Hct screening is required between 9 and 15 months of age.
- One Hb or Hct screening is required between 12 and 20 years of age for all menstruating females.

Personnel

Physician, nurse practitioner, physician assistant, registered nurse, medical assistant, or lab technician may complete the screening.

Documentation

It is not necessary to have a complete record of laboratory test results on the documentation forms. Test results may be found elsewhere in the chart but documentation forms should indicate where this information can be found. For more information, refer to [MHCP Provider Manual - Child and Teen Checkups \(www.dhs.state.mn.us\)](http://www.dhs.state.mn.us).

Screening Procedure

Three basic methods are used to determine Hb concentration and Hct level:

- Venipuncture with analysis by an automated cell counter,
- Capillary sampling with analysis by a hemoglobin meter, or
- Capillary sampling with a micro hematocrit analysis by centrifuge.

If capillary method is used, observe the following principles of collection:

- In infants, the best site is the lateral aspect of the plantar surface of the heel or toe. In older children, the best sites are the medial and lateral parts of the pulp of finger.

- Warm the heel or finger in order to ensure good blood flow and accuracy of the test. Before puncture, clean the site by washing with soap and drying with clean, low-lint towel, or if unavailable, use an alcohol wipe (Centers for Disease Control and Prevention, 1997).

Below is a reference table of *Hb concentration and Hct values used to define anemia* when screening children for iron deficiency and iron deficiency anemia (Centers for Disease Control and Prevention, 1998). Note, Hb and Hct values may vary from this chart depending on the laboratory or specific test used.

Sex	Age	Hb (<g/dl)	Hct (<%)
Both	6 months – 2 years	11.0	32.9
Both	2 – 5 years	11.1	33.0
Both	5 – 8 years	11.5	34.5
Both	8 – 12 years	11.9	35.4
Males	12 - 15 years	11.8	35.7
Males	15 - 18 years	13.3	39.7
Males	≥18 years	13.5	39.9
Females (non-pregnant)	12–15 years	11.8	35.7
Females (non-pregnant)	15-18 years	12.0	35.9
Females (non-pregnant)	≥18 years	12.0	35.7

Importance of Screening

Iron deficiency (ID) is the most common nutritional deficiency in the world. Iron Deficiency Anemia (IDA) is a common cause of anemia in young children (Baker & Greer, 2010).

IDA is associated with psychomotor and cognitive abnormalities in children. Infants and toddlers in the following groups are at highest risk for ID and IDA (Baker & Greer, 2010).

- Infants born to mother with IDA, diabetes, or pregnancy-induced hypertension with intrauterine growth restrictions during pregnancy.
- Infants born prematurely or with low birth weight.
- Infants fed cow's milk and/or formulas with low-iron or no iron before 12 months.
- Infants exclusively breastfed beyond 4 months without supplemental iron.
- Children aged one to five years who consume more than 24 ounces of cow, goat, or soy milk per day.
- Children with special health needs, feeding problems, or poor growth and development and inadequate nutrition.
- Data from Minnesota's WIC program shows that infants of color and American Indian infants have higher incidence of anemia compared to white children (Minnesota Department of Health, 2015).

Adolescent females and young adult women in the following groups are at the highest risk for ID and IDA:

- Menstruating females, especially those with heavy menstrual blood loss (>80 ml/month).
- Adolescent females with increased need for iron due to rapid growth during puberty.
- Adolescent females and young adult women with a history of or existing eating disorders.
- Adolescent females and young adult women who are dieting to control weight.

Follow-up

All infants and children with Hb/Hct values below the cutoffs per age on the previous table should have further evaluation and follow-up. Refer to the recommendations in the [Clinic Report - Diagnosis and Prevention of Iron Deficiency and Iron-Deficiency Anemia in Infants and Young Children](#) (www.pediatrics.aappublications.org).

Professional Recommendations

American Academy of Pediatrics (AAP)

- The AAP recommends universal screening for anemia with determination of Hb concentration at approximately 1 year of age. This should include an assessment of risk factors associated with ID/IDA.

Resources

American Academy of Pediatrics (AAP)

- [Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents](http://www.brightfutures.aap.org) (www.brightfutures.aap.org)

Minnesota Department of Human Services (DHS)

- [MHCP Provider Manual - Child and Teen Checkups](http://www.dhs.state.mn.us) (www.dhs.state.mn.us)

Minnesota Department of Health (MDH)

- [Women, Infants and Children \(WIC\) Program](http://www.health.state.mn.us) (www.health.state.mn.us)
- [Child and Teen Checkups Program](http://www.health.state.mn.us) (www.health.state.mn.us)

References

Baker, R. D., & Greer, F. R. (2010). Clinical Report - Diagnosis and Prevention of Iron Deficiency and Iron-Deficiency Anemia in Infants and Young Children (0-3 Years of Age). *Pediatrics*, 104(1), 119. Retrieved from <http://pediatrics.aappublications.org>

Centers for Disease Control and Prevention. (1997). *Capillary Blood Sampling Protocol*. Retrieved from Centers for Disease Control and Prevention: <http://www.cdc.gov/>

Centers for Disease Control and Prevention. (1998). *Recommendations to Prevent and Control Iron Deficiency in the United States*. Atlanta: Morbidity and Mortality Weekly report. Retrieved from <http://www.cdc.gov/mmwr/preview/mmwrhtml/00051880.htm>

Minnesota Department of Health. (2015, August). *Minnesota Department of Health*. Retrieved from Anemia in Infants and Children Participating in Minnesota WIC: <http://www.health.state.mn.us/>

For More Information

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