

Hemoglobin or 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) or 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 \(www.dhs.state.mn.us\)](#).

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 the capillary method is used, refer to the [CDC Capillary Blood Sampling Protocol](#).

Hb / Hct values to define anemia

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
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

(Centers for Disease Control and Prevention, 1998). Note, Hb and Hct values may vary depending on the laboratory or specific test used.

Follow-up

All infants and youth with Hb or Hct values below the cutoffs per age on the above 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 \(www.pediatrics.aappublications.org\)](#).

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):

- History of prematurity or low birth weight.
- Lead exposure.
- Weaning to cow's milk and/or formulas with low-iron or no iron before 12 months.
- Exclusive breastfeeding beyond 4 months of age without supplemental iron.
- Children of low socioeconomic status or with special health needs, feeding problems, or poor growth and development and inadequate nutrition.
- Data from Minnesota's WIC program shows that American Indian infants and infants of color have higher incidence of anemia compared to white children (Minnesota Department of Health, 2017).

The 2012 US National Health and Nutrition Examination Surveys (NHANES) reported for females, ages 12 to 14 years, Non-Hispanic Black had a 17.8% prevalence of anemia in comparison to 1.8% of white and 4.9% of Hispanic females. In non-pregnant females 15 to 29 years of age, 3.6% of White Non-Hispanic had anemia compared to 21.5% of Black and 8.6 % of Hispanic females (Huu, 2016).

Professional Recommendations

American Academy of Pediatrics

The AAP recommends universal screening of Hb concentration at approximately 1 year of age. This should include an assessment of risk factors associated with ID/IDA. (Baker & Greer, 2010)

Resources

American Academy of Pediatrics

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

Minnesota Department of Human Services

- [Minnesota Health Care Programs Provider Manual C&TC Section \(www.dhs.state.mn.us\)](http://www.dhs.state.mn.us)

Minnesota Department of Health

- [Women, Infants and Children \(WIC\) Program \(www.health.state.mn.us\)](http://www.health.state.mn.us)
- [Child and Teen Checkups Program \(www.health.state.mn.us\)](http://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/content/early/2010/10/05/peds.2010-2576.abstract>

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>

Huu, C. L. (2016, November 2016). The Prevalence of Anemia and Moderate to Severe Anemia in the US Population (NHANES 2003-2012). doi:10.1371

Minnesota Department of Health. (2017, January). Minnesota Department of Health. Retrieved from Anemia in Infants and Children Participating in Minnesota WIC: <http://www.health.state.mn.us/divs/fh/wic/localagency/reports/wtstatus/healthequity/undup/anemiatrend.pdf>

For More Information

The Child and Teen Checkups (C&TC) program is administered through a partnership between the Minnesota Department of Human Services and the Minnesota Department of Health.

For questions about this fact sheet or to obtain this information in a different format, call 651-201-3760 or email health.childteencheckups@state.mn.us.

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