State of California—Health and Human Services Agency
Department of Health Care Services

TOBY DOUGLAS
DIRECTOR

EDMUND G. BROWN JR.
GOVERNOR

January 21, 2011

CHDP Program Letter No.: 11-03

TO: ALL CHILD HEALTH AND DISABILITY PREVENTION (CHDP) PROGRAM DIRECTORS, DEPUTY DIRECTORS, NUTRITIONISTS, STATE CHILDREN'S MEDICAL SERVICES (CMS) BRANCH STAFF AND REGIONAL OFFICE STAFF

SUBJECT: CHDP HEALTH ASSESSMENT GUIDELINES (HAG) REVISIONS: SECTION 71 – IRON DEFICIENCY ANEMIA

Enclosed is CHDP Provider Information Notice (PIN) No.: 11-03 regarding the distribution of section 71, Iron Deficiency Anemia of the CHDP HAG. The manual is currently under revision and will be available online in its entirety upon completion.

Please distribute this Provider Information Notice without any revisions to providers in your county and complete and retain a copy of the "Report of Distribution" (DHCS 4504). The DHCS 4504 can be found at: http://www.dhcs.ca.gov/formsandpubs/forms/Forms/ChildMedSvcForms/dhcs4504.pdf.

If you have any questions, please contact your Regional Consultant staff.

Original Signed by Robert Dimand, MD.

Robert J Dimand, MD
Chief Medical Officer
Children's Medical Services

Enclosure

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CHDP Provider Information Notice No.: 11 - 03

TO: ALL CHILD HEALTH AND DISABILITY PREVENTION (CHDP) PROGRAM PROVIDERS AND MEDI-CAL MANAGED CARE PLANS

SUBJECT: CHDP HEALTH ASSESSMENT GUIDELINES (HAG) REVISIONS: SECTION 71, IRON DEFICIENCY ANEMIA

The purpose of this CHDP Provider Information Notice No. 11 - 03 is to inform CHDP providers of the revised sections of the CHDP HAG, section 71, formerly section 701, Hemoglobin or Hematocrit. The revised section includes the following additional items:

- Table 71.2: AAP Hemoglobin Concentration Cutoff Values for Anemia.
- Appendix A: Recommended Iron Supplementation for Breastfed Infants and Recommended Iron Replacement Therapy and Medical Management of Childhood Anemia.
- Appendix B: Dietary Reference Intakes for Iron by Age.

This revised section contains updated recommendations from the American Academy of Pediatrics and Centers for Disease Control and Prevention as well as California prevalence rates for anemia from the Pediatric Nutrition Surveillance System Children's Medical Services encourages you to review the updated section in its entirety.

The revised section and appendices can be downloaded from the following link: http://www.dhcs.ca.gov/services/chdp/Pages/Pub156.aspx

We hope that this updated information will assist you in preventing and detecting iron-deficiency anemia in your practice. If you have any questions, please contact your local CHDP program.

Original Signed by Robert Dimand, MD

Robert Dimand, MD
Chief Medical Officer
Children's Medical Services

Enclosure

IRON DEFICIENCY ANEMIA

RATIONALE

The main purpose of hemoglobin or hematocrit (Hb/Hct) testing is to screen for Iron Deficiency Anemia (IDA). Iron deficiency (ID) is the most common cause of anemia; other causes include lead poisoning, anemia of chronic disease, and hemoglobinopathies such as sickle cell disease and thalassemia.

Important risk factors for IDA include prematurity, low birth weight, various chronic health conditions, extensive menstrual or gastrointestinal blood loss, and previous diagnoses of IDA. Dietary risk factors significantly contribute to inadequate iron intake; these include the use of low iron infant formula, early introduction of cow's milk before 12 months of age, excessive milk or other beverage consumption, strict vegetarian or other highly restrictive diets, special therapeutic diets, and limited access to food. Pica, the ingestion of non-food items such as clay, dirt or laundry starch, may be an indicator of IDA as well as a behavior that exacerbates IDA.

The prevalence of anemia in children and adolescents in the CHDP program is tracked in the Pediatric Nutrition Surveillance System (PedNSS). Analysis of PedNSS data shows prevalence of low hemoglobin or hematocrit (Hb/Hct) trending upward in most age/race/ethnicity categories between 1999 and 2009. The prevalence in infants 6-11 months of age in California increased from 16.2% in 1999 to 19.8% in 2009. When considering all factors including ethnicity, the highest prevalence was found among Black, non-Hispanic children and adolescents 5-20 years of age, increasing from 20.1% in 1999 to 24.5% in 2009. For the complete PedNSS report see the following link: http://www.dhcs.ca.gov/services/chdp/Pages/PedNSS2009.aspx.
Note: The current prevalence data listed here is based on the 1998 cutoff values.

ID (without anemia) in children may adversely affect long term neurodevelopment and behavior; some of the effects are irreversible.[1] Neuro-developmental and behavioral disturbances include decreased motor activity, decreased social interaction, and diminished attention to tasks. ID has also been linked to negative impacts on cognitive development in older children and adolescents.[2] Neuro-developmental delays associated with IDA may persist past school age if iron deficiency is not fully reversed.[3] Children with IDA are also at greater risk for lead poisoning than children with normal Hb/Hct, because IDA increases gastrointestinal absorption of lead and other heavy metals. Blood lead testing and screening is required for all young children in the CHDP

[1] Baker, Robert D., Greer, Frank R. and The Committee on Nutrition. Clinical Diagnosis and Prevention of Iron Deficiency and Iron-Deficiency Anemia in Infants and Young Children (0-3 Years of Age). *Pediatrics.* 2010; DOI: a0.1542/.2010-2576.
[2] CDC. Iron Deficiency --- United States, 1999-2002. *MMWR,* October 11, 2002 / 51(40); 897-899. (http://www.cdc.gov/mmwr/preview/mmwrhtmL/mm5140a1.htm)
[3] CDC. Recommendations to Prevent and Control Iron Deficiency Anemia in the United States. *MMWR,* April 03; 1998 / 47(RR-3); 1-36. Available from: (http://www.cdc.gov/mmwr/preview/mmwrhtmL/00051880.htm)

program, according to the protocol described in Section 74, Blood Lead Test and Management Guidelines.

Primary prevention of ID/IDA in infants and children can be achieved with the consumption of a varied and healthy diet that contains adequate amounts of key nutrients associated with red blood cell production such as iron, vitamin C and protein. For detailed analysis of iron deficiency and IDA please refer to the November 2010 clinical report from the American Academy of Pediatrics.[4]

SCREENING REQUIREMENTS

- Perform a nutrition assessment on all children. Assess for unbalanced, deficient or excessive dietary intake, such as excessive consumption of cow's milk by bottle. For diet assessment, use the CHDP nutrition screening tools located at: http://www.dhcs.ca.gov/formsandpubs/publications/Pages/CHDPPubs.aspx#brochures
    - What Does Your Child Eat? (DHCS 4035 A) and
    - Youth Nutrition and Activity Assessment for Ages 8 to 21 (DHCS 4466)

- Assess for risk factors (or multiple risk factors) associated with ID/IDA:
    - History of prematurity or low birth weight (< 2500 g)
    - Exposure to lead
    - Exclusive breastfeeding beyond 4 months of age without supplemental iron
    - Early weaning to whole milk before 12 months of age
    - Consumption of low-iron foods
    - Feeding problems (behavior or oral motor)
    - Poor growth, inadequate nutrition associated with special health care needs and/or low socioeconomic status especially in children of race/ethnic groups with high prevalence rates
    - Consumption of highly restrictive diets
    - Chronic disease and gastrointestinal blood loss

- Review signs and symptoms of IDA. Screen for pica signs and symptoms, especially in young children. This may include repetitive consumption of nonfood items, despite efforts to restrict it, for a period of 1 month or more. (See pica link listed in the *Health Education Resources* section of this guideline.)
- Test for IDA by performing Hb/Hct finger-stick testing. Start testing at approximately 1 year of age as recommended in Bright Futures[5] and by the American Academy of Pediatrics. Test at ages 2 and 3 and between ages 4 and

[4] Baker, Robert D., Greer, Frank R. and The Committee on Nutrition. Clinical Diagnosis and Prevention of Iron Deficiency and Iron-Deficiency Anemia in Infants and Young Children (0-3 Years of Age). Pediatrics. 2010; DOI: a0.1542/peds.2010-2576.
[5] Bright Futures, 3rd ed., 2008, page 228.

5. Thereafter, obtain Hb/Hct when indicated by risk assessment.

- Determine whether Hb is low by referring to the following table. Hematocrit value is approximately three times the hemoglobin value.

TABLE 71.2: AAP HEMOGLOBIN CONCENTRATION CUTOFF VALUES FOR ANEMIA[6]

Age in Years	Hemoglobin Concentration, g/dL
6 mo. to 6	11.0
6 - 14	12.0
Female	
≥ 15 (non-pregnant)	12.0
≥ 15 (pregnant)	11.0
Male	
≥ 15	13.0

NOTE: Treatment with iron is recommended for Hb values below the cutoff values for anemia listed above.

CONSIDERATIONS FOR REFERRAL, TREATMENT, AND/OR FOLLOW-UP

- Based on the findings of the nutrition assessment, provide nutrition counseling for all children at risk for ID/IDA. Other nutrient deficiencies may coexist with IDA; look for multiple and chronic dietary inadequacies during the nutrition assessment. For adequate iron dietary intake, see Appendix B: Dietary Reference Intake for Iron by Age.

- Provide supplemental iron for breastfed preterm and term infants (fully or partially) until infant is consuming sufficient amounts of high iron foods to meet the Dietary Reference Intake for age. See Appendix A for recommended supplementation.

[6] Assessing the iron status of populations: including literature reviews: report of a Joint World Health Organization/Centers for Disease Control and Prevention Technical Consultation on the Assessment of Iron Status at the Population Level, Geneva, Switzerland, 6–8 April 2004. – 2nd ed. http://www.who.int/nutrition/publications/micronutrients/anaemia_iron_deficiency/9789241596107.pdf

- Refer the family to the Supplemental Nutrition Program for Women, Infants, and Children (WIC) to obtain supplemental nutrient enriched foods and nutrition education. www.cdph.ca.gov/programs/wicworks/Pages/default.aspx

For children with documented low Hb/Hct:

- For health assessment-only providers, refer low Hb/Hct levels to designated follow-up health provider.

- If Hb is in the range of 10-10.9 g/dL or Hct is 30-32.9% and no other cause of anemia is identified, consider treating presumptively as IDA using iron replacement therapy and nutrition counseling. Recheck in 1 month, and if Hb has increased by 1 g this confirms the diagnosis of IDA. See Appendix A for dosages of iron replacement.

- If Hb is in the range of <10 g/dL or Hct <30%, or if history is not consistent with ID or if treatment with iron replacement therapy has not been effective, additional laboratory testing should be done to determine the cause. This may include CBC with RBC indices, serum ferritin, reticulocyte hemoglobin concentration (CHr), or hemoglobin electrophoresis.

  Note: these tests are not reimbursed by CHDP. If necessary refer to appropriate specialist.

- **Caution families to keep iron tablets out of reach of children at all times to prevent accidental iron overdose.**

- Check for elevated lead levels if not previously done in children under 6 years of age. See CHDP Provider Information Notice at: http://www.dhcs.ca.gov/services/chdp/Documents/Letters/chdppin0810.pdf

- Re-check Hb/Hct after four to six weeks of iron replacement therapy. Re-screen for risk factors and signs and symptoms of anemia. This follow-up visit is recommended to provide additional anticipatory guidance to the parent or legal guardian.

  - Follow-up visits are important when there is a history of peri- or postnatal problems. These are associated with low iron stores in preterm or low-birth weight infants.

  - If the child has not responded to iron replacement treatment, evaluate for adherence to treatment. Consider obtaining additional laboratory studies that are more specific and sensitive, such as serum ferritin and CHr assay (reticulocyte hemoglobin) to confirm ID. The only laboratory test covered by the CHDP program is finger-stick hematocrit/hemoglobin. Refer to an appropriate specialist to identify other causes of low Hb/Hct.

- If Hb/Hct has normalized, reinforce nutrition counseling and continue iron treatment for at least 2 additional months, then recheck Hb/Hct. Reassess Hb/Hct approximately 6 months after successful treatment is completed.

Please Note: Health Assessments for individuals who require follow–up visits because of an identified condition, such as anemia, otitis media or asthma, are not benefits of the CHDP Program. See CHDP Provider Manual for covered benefits. (http://files.medi-cal.ca.gov/pubsdoco/publications/masters-mtp/chdp/manual/childhealthbil_c00.doc)

HEMOGLOBIN OR HEMATOCRIT TESTING

Accuracy, low cost, ease of use and increased provider office availability make finger stick testing of Hb/Hct the most commonly used screening technique/method for the detection of iron deficiency anemia. Changes in Hb/Hct only occur at late stages of iron deficiency; therefore finger-stick testing is a late indicator of iron deficiency. This test, however, remains the standard methodology by which most initial screening for IDA is accomplished. More specific tests are available to diagnose iron deficiency, such as serum ferritin concentration and reticulocyte hemoglobin concentration (CHr). These tests are not reimbursed by the CHDP program.

Providers should also ensure that individuals who perform finger stick testing for Hb/Hct are appropriately trained and rechecked on the procedure at recommended intervals as described in the CHDP Facility Review Tool Guidelines.

Basics of Finger Stick Testing

Proper procedure includes using an antiseptic technique: cleanse the site (usually distal lateral aspect of finger) with alcohol and wipe dry with clean gauze or air dry. Use a lancet finger puncture device to make a puncture lateral to the ball of the finger. Use opposite hand to support the finger and squeeze *lightly* to stimulate blood flow. When a well rounded drop has formed, touch a heparinized (or other anticoagulant) capillary collection tube horizontally to the drop (do not touch tube to patient finger). After collection, gently mix the tube containing anticoagulant to prevent hemolysis.

Proper technique is important when obtaining the blood sample to ensure accurate results. A low reading may arise from squeezing or milking the finger or from the presence of alcohol on the fingertip. A high reading may result from blood clotting or incomplete filling in the capillary collection tube. Specific techniques may vary depending on manufacturer guidelines.

Quality Assurance for Hemoglobin or Hematocrit Testing

Providers who test or examine any material from the human body must obtain a Clinical Laboratory Improvement Amendments of 1988 (CLIA) certificate to demonstrate compliance with CLIA standards and pertinent California law. The hemoglobin and hematocrit tests are either CLIA-waived or non-waived as determined by CLIA guidelines. A waived test is one that is a "simple laboratory procedure which…has an insignificant risk of an erroneous result."[7] Finger stick testing is a CLIA-waived test. Clinical laboratories or offices only conducting waived tests are exempt from routine federal inspections but must follow the manufacturers' recommendations for quality assurance and must maintain a CLIA certificate of waiver. Any FDA approved CLIA-waived test system is acceptable for determining hemoglobin or hematocrit. The FDA website is updated regularly and has more information on waived tests: www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfClia/testswaived.cfm.

When providers use CLIA-waived tests they are required to perform quality assurance checks according to the manufacturer's instructions. Providers should ensure that individuals who draw blood and process hemoglobin or hematocrit tests meet CLIA and California requirements and are appropriately trained and rechecked on procedures, including appropriate finger stick technique.

A non-waived test is moderately or highly complex and therefore requires a higher level of knowledge, training, and judgment to be performed properly. Clinical laboratories performing non-waived tests are required to comply with a series of quality standards (including participation in a proficiency testing program) and to obtain a CLIA certificate of registration or accreditation.

For additional information on laboratory testing please contact your local CHDP program or the California Department of Public Health, Laboratory Field Services at (510) 620-6160 or at http://www.cdph.ca.gov/programs/lfs/pages/default.aspx

[7] www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfClia/testswaived.cfm

HEALTH EDUCATION RESOURCES

The following nutrition education resources are reputable and provide guidance and prevention tips for ID/IDA and are freely downloadable. Most are available in English and Spanish.

General

California Department of Public Health (see page 3 for low reading level patient/parent information)

- http://www.cdph.ca.gov/HealthInfo/healthyliving/childfamily/Documents/MO-NUPA-04iron.pdf

Centers for Disease Control and Prevention (foods high in iron and vitamin C)

- http://www.cdc.gov/nccdphp/dnpa/nutrition/nutrition_for_everyone/iron_deficiency/index.htm#Vitamin%20C

National Library of Medicine – National Institutes of Health

- http://www.nlm.nih.gov/medlineplus/ency/article/007134.htm

Nemours (parent, child and teen materials)

- http://kidshealth.org/parent/medical/heart/ida.htmL
- http://kidshealth.org/parent/en_espanol/medicos/ida_esp.htmL (Spanish)
- http://kidshealth.org/parent/emotions/behavior/pica.htmL (Pica)

Infants and Children

California Women, Infants and Children (WIC) Program

- http://www.cdph.ca.gov/programs/wicworks/Documents/NE/WIC-NE-EdMaterials-IronForStrongBlood.pdf

California Women, Infants and Children (WIC) Program (Spanish)

- http://www.cdph.ca.gov/programs/wicworks/Documents/NE/WIC-NE-EdMaterials-IronForStrongBloodSpanish.pdf

United States Department of Agriculture (USDA):

- http://www.nal.usda.gov/wicworks/Sharing_Center/MO/Iron_Foods.pdf
- http://www.nal.usda.gov/wicworks/Sharing_Center/MO/Iron_Foodssp.pdf

Appendix A:

Recommended Iron Supplementation for Breastfed Infants[8]

Category	Age Group	Dosage of Elemental Iron	Supplement Type
Term infants, fully or partially breastfed	Begin at age 4 months*	1 mg/kg/day	Drop
Preterm infants, breastfed	Up to 12 months of age*	2 mg/kg/day	Drop

**Provide supplemental iron until infant is consuming sufficient quantity of high iron foods to meet the Dietary Reference Intake for age.*

Recommended Iron Replacement Therapy and Medical Management of Childhood Anemia[9,10]

Category	Age Group	Dosage of Elemental Iron*	Supplement Type
Infants and children	< 5 years	3 – 6 mg/kg/day	Drop or elixir
Children	5 – 12 years	60 mg/day	Tablet or elixir
Female adolescents	12 – 18 years	60 – 120 mg/day	Tablet
Male adolescents	12 – 18 years	120 mg/day	Tablet

**The choice of preparation and dosage should be determined by the health provider.*

Common Oral Forms of Iron[11]

- Infants: Ferrous Sulfate drops (ex.: Fer-In-Sol): 37.5 mg Ferrous Sulfate/0.5mL which yields 7.5 mg elemental iron/0.5 mL
- Children: Use Ferrous Sulfate Elixir: 220 mg Ferrous Sulfate/5 mL which yields 44 mg elemental iron/5 mL
- Older Children/Adolescents: Use Ferrous Sulfate: 325 mg Ferrous Sulfate/tablet which yields 65 mg elemental iron/tablet

Note: Because product dosage forms and strengths may change at any time, it is recommended that providers specify the mg dose required rather than mL needed.

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[8] Baker, Robert D., Greer, Frank R. and The Committee on Nutrition. Clinical Diagnosis and Prevention of Iron Deficiency and Iron-Deficiency Anemia in Infants and Young Children (0-3 Years of Age). Pediatrics. 2010; DOI: a0.1542/peds.2010-2576.

[9] Centers for Disease Control. Recommendations to Prevent and Control Iron Deficiency Anemia in the United States. *MMWR.* 1998 April 03; 47(RR-3):1-36. Available from: http://www.cdc.gov/mmwr/preview/mmwrhtml/00051880.htm.

[10] Pediatric Nutrition Handbook, 6th ed., 2009, page 418

[11] Drug Facts and Comparisons Online (www.drugfacts.com)

Appendix B:

Dietary Reference Intakes for Iron by Age[12]

Category	Age	Iron (mg/day)
Infants	0.0 – 0.5 year	0.27 mg*
	0.5 – 1.0 year	11 mg
Children	1 – 3 years	7 mg
	4 – 8 years	10 mg
Adolescents by sex	Females: 9 – 13 years 14 – 18 years	8 mg 15 mg
	Males: 9 – 13 years 14 – 18 years	8 mg 11 mg

* *For healthy breastfed infants*, *adequate intake is defined as mean intake.*

[12] 2004 Dietary Reference Intakes: Recommended Intakes for Individuals, Elements. Food and Nutrition Board, Institute of Medicine, National Academies