

Using Evidence-Based Techniques to Modify Anemia Screening Practice

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Abstract

Routine screening of adolescents for iron-deficiency anemia is a widespread but unproven practice. Using evidence-based quality improvement techniques, including literature synthesis and presentation of clinic-specific data, my colleagues and I reevaluated a clinic policy of obtaining complete blood counts to screen for anemia in all new adolescent patients. Medical record review revealed clinically unsuspected anemia in 8 (3.5%) of 229 patients screened. All cases were mild, and only two patients received iron therapy. These data, coupled with national recommendations, led to a reversal of the clinic's policy requiring screening of all new patients. One year later, complete blood counts were obtained for only 6% of new patients.

(Am J Man Care 1997;3:1507-1509)

Routine screening of adolescents for iron-deficiency anemia, using either the hemoglobin or hematocrit, is a time-honored practice widely recommended in standard pediatric and adolescent medicine textbooks.^{1,3} In the preventive context, screening implies searching for and treating a disease or condition in asymptomatic persons. In determining whether to implement a screening program, policy makers must consider the effectiveness of treatment (including efficacy, compliance, and whether early treatment is more effective than later treatment); the burden of suffering caused by the condition (including death, disability, and discomfort); and the quality of the screening procedure (including cost, patient acceptance, safety, and the sensitivity and specificity of the test itself).⁴

Clinical studies in developed countries have provided conflicting evidence about the effectiveness of treating iron deficiency or mild iron-deficiency anemia in adolescents. Subjective improvement in concentration and mood has been reported among nonanemic iron-deficient girls after iron repletion⁵; concentration and memory also improved in anemic young pregnant women after iron repletion.⁶ Most other studies have not demonstrated a cardiovascular benefit associated with iron repletion⁷ or an improvement in psychomotor function or symptoms after correction of iron-deficiency anemia.⁸ Most studies that have reported on the adverse outcomes^{9,10} or effectiveness of treatment^{11,12} of iron-deficiency anemia in older children and adults were conducted in developing countries among populations with moderate or severe disease.

No studies have demonstrated the effectiveness of routine screening programs to detect and treat iron-deficiency anemia among unselected populations of adolescents in the United States. Given this lack of demonstrated effectiveness, most national recommendations, including Bright Futures,¹³ the American Medical Association's Guidelines for Adolescent Preventive Services (GAPS),¹⁴ and the US Preventive Services Task Force,¹⁵ do not endorse routine laboratory screening of adolescents for iron-deficiency anemia. Nonetheless, many payers, including managed care organizations, continue to recommend a screening complete blood count (CBC) at least once during adolescence, and some continue to reimburse laboratories for an annual CBC. Although the cost of a single CBC is fairly low (\$15 to \$20 in most labs), screening all adolescents who are seen for a well-child visit is costly.

At an urban hospital-based adolescent clinic serving predominantly poor, urban youth, healthcare providers believed that the demographic characteristics of the patient population placed it at high risk for iron-deficiency anemia. The clinic, therefore, elected to continue routine screening, using an automated

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CBC, despite recent national recommendations against such screening. The purpose of this study was to determine the rate of anemia detected by screening and whether evidence-based quality improvement techniques, including demonstration of clinic-specific anemia detection rates and presentation of literature review results, could be used to reevaluate long-standing clinic policy.

... METHODS ...

My colleagues and I conducted a retrospective medical records review of all new adolescent patients (n = 463) who were seen in an urban hospital-based clinic during an 8-month period in 1995 to 1996. We obtained demographic and laboratory data from computerized administrative and laboratory records. Clinical history was obtained through chart review. The main outcome measures were the proportion of patients who were screened for anemia using an automated CBC; the proportion with known, clinically suspected, and unsuspected anemia; and the proportion who received follow-up care for anemia detected by screening.

Anemia was considered to be clinically suspected if there was any item in the history or physical examination that the treating clinician had recorded as suspicious for anemia. As recommended by the Centers for Disease Control and Prevention (CDC), anemia was defined as a hematocrit below the fifth percentile for age and sex as determined by the Second National Health and Nutrition Examination Survey.¹⁶ The results of the medical records review and a literature synthesis (with emphasis on the evidence evaluated by the US Preventive Services Task Force) were then presented to the clinic staff for reconsideration of the clinic's policy of screening all

new patients for anemia. One year later, we conducted a 1-month records review of consecutive new patients (n = 65) to determine whether the anemia screening practice had actually changed.

... RESULTS ...

Most of the clinic's new patients were referred for primary care from other clinics or physicians. Routine physical examinations were the most common reason for the initial visit. Fifty-two percent of new patients self-described their race as black, 46% as white, and 2% as other. The adolescents in our study had a mean age of 14.7 years (standard deviation, 1.7; range, 11-19 years) and 62% were female. A CBC was obtained from 229 of 462 (49.6%) adolescents, 66% of whom were female. No gender difference was seen in the proportion of adolescents screened (53% of females versus 44% of males; chi square = 3.61; P = 0.057), although there was a trend toward screening girls.

The results of the screening CBCs are shown in the table. Of the 229 adolescents on whom CBCs were obtained, 8 (3.5%) were already known to be anemic. The underlying etiologies included sickle cell disease (2 patients), other chronic illness (3 patients), traumatic blood loss (2 patients), and menorrhagia (1 patient). Two additional cases (0.9%) were suspected in the initial clinic note based on the history or the physical examination. Of the eight cases of anemia detected by screening, six were in female patients (mean hematocrit, 34.0%; range 31.6% - 35.2%) and two were in male patients (hematocrits, 34.2% and 35.4%), giving an overall proportion of 3.9% of screened girls and 2.6% of screened boys with anemia detected only by the laboratory screening program. Of those, two received further diagnostic evaluation (stool guaiac tests and serum ferritin level) and two received prescriptions for iron. The remaining four patients were not further evaluated either because the clinician believed the anemia was clinically insignificant or because the patient did not return for follow-up.

We presented these results, along with the national recommendations, to the clinic staff during a routine quality improvement meeting. Given these data, especially the few cases of anemia detected by screening, the group decided to discontinue routine laboratory screening for anemia. Staff members stressed the importance of continuing to obtain a CBC in those patients for whom the history (including nutritional screening) or physical examination raised a clinical suspicion of iron-deficiency anemia.

Table. Hematologic Findings

	Hemoglobin (g/dL)	Hematocrit (%)
Females (n = 152)		
Mean ± SD	12.7 ± 1.1	38.7 ± 3.4
Median	12.8	38.9
Range	8.1 - 16.2	23.0 - 48.0
Males (n = 78)		
Mean ± SD	13.9 ± 1.3	42.1 ± 4.0
Median	14.0	42.0
Range	7.1 - 16.1	21.0 - 48.5

One year later, we reviewed the medical records of 65 consecutive new patients (19 males and 46 females). Of these, only four patients (6.2%), all female, had CBCs obtained.

... DISCUSSION ...

Our simple retrospective analysis was successful in changing clinic policy where previous presentations of national recommendations had failed. The proportion of new patients who had CBCs obtained decreased from 49.6% at baseline to 6.2% 1 year later. The clinicians had resisted changing policy because they believed that national recommendations did not account for the specific risk factors in their patient population. In addition, payer willingness to reimburse for this test, and in some cases, distinct recommendations to continue it, lent additional strength to arguments to continue screening for anemia. Clinic-specific data demonstrating that few cases of anemia were detected through laboratory screening and that none of these cases were severe led to a swift and near unanimous shift in opinion and subsequent change in policy. This outcome is consistent with previous work suggesting that physicians may be more likely to change their behavior when confronted with local data presented by colleagues.¹⁷ Our project involved a fairly straightforward screening issue where there is near consensus among expert groups. Using this approach for complicated clinical decisions or for topics where greater controversy exists among experts may be more difficult. There are, however, many other unproven but clinically widespread adolescent screening practices, such as universal tuberculosis testing and annual vision and hearing screening, that groups of practitioners might reevaluate using similar evidence-based techniques.

Acknowledgments

This paper was presented at the 1997 annual meeting of the Society for Adolescent Medicine held March 5-9, 1997, in San Francisco, CA.

The author thanks Mrs. Carol Schaeffer for secretarial assistance and Mr. Steve Glines for assistance with data collection. Mr. Glines was a participant in the minority high school science teachers initiative sponsored by the National Institutes of Health at the time this research was conducted.

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