

Clinical Inquiries

FROM THE FAMILY PRACTICE INQUIRIES NETWORK

Does Screening for Tuberculosis in Children Decrease Morbidity or Mortality?

Searchable Question

Among pre-kindergarten children, does routine tuberculosis screening with lower purified protein derivative (PPD) result in morbidity or mortality from tuberculosis than that among children who are not routinely screened?

Evidence-Based Answer

Routine screening of low-risk children for tuberculosis infection before entering kindergarten is not necessary. [Strength of recommendation: C] Targeted screening of high-risk children for tuberculosis infection using the intradermal Mantoux test is recommended, but targeted screening has not been shown to reduce morbidity or mortality. [Strength of recommendation: C]

Evidence Summary

Routine screening of pre-kindergarten children for tuberculosis has been widely practiced. However, tuberculosis in this age group is uncommon. In 1995, there were a little more than 1,500 new cases of tuberculosis among young children in the United States.¹ Many children could therefore have a false-positive skin test and undergo needless evaluation and treatment.² Current recommendations^{1,3,4} suggest that a targeted approach to screening is more appropriate, although there are no data regarding effects on morbidity and mortality in this age group.

Targeted screening identifies two groups of children at high risk of tuberculosis infection: (1) children exposed to

Factors Placing Preschool Children at Higher Risk of Tuberculosis Infection

- Contact with persons who have confirmed or suspected tuberculosis
- Immigration from or recent travel to regions where tuberculosis is endemic (Asia, Middle East, Africa, Latin America)
- Radiographic or clinical findings consistent with tuberculosis
- Exposure to at-risk persons, such as parents who emigrated from regions where tuberculosis is endemic
- Residence in a high-prevalence region
- Immunosuppressive disorders

Information from Preventive services for children and adolescents. Bloomington, Minn.: Institute for Clinical Systems Improvement, 2003. Accessed February 16, 2004, at <http://www.icsi.org/knowledge/detail.asp?catID=29&itemID=190>.

tuberculosis, and (2) children with latent tuberculosis who are at an increased risk of progression to active disease and would benefit from treatment of the latent infection.³ [Level of evidence: 5] Certain populations are at greater risk (*see accompanying table*).

Identifying high-risk children for targeted screening can be accomplished by asking the child's parents about risk factors predisposing the child to infection. In a study⁵ of high-risk children one to 18 years of age in southern Bronx, N.Y., targeted screening produced a negative predictive value (i.e., the likelihood that children not targeted for screening would have a negative PPD result) of 99.8 percent. The positive predictive value (i.e., the probability of a positive PPD result among targeted children) remained low, however, because of the low prevalence of positive PPDs. [Level of evidence: 1B]

Children with at least one identifiable risk factor are much more likely to have positive skin-test results (odds ratio, 35; 95 percent confidence interval, 12.1 to 102.4). This study did not differentiate between pre-kindergarten and older children, although 75 percent of positive PPDs occurred in children older than 11 years.

Cost-benefit analyses confirm the value of targeted screening in children of kindergarten age, although no data for younger children are available. In one California study,² the estimated ratio of active tuberculosis cases prevented per 10,000 children in kindergarten who were screened improved from 6.4 in the routine-screening group to 74.8 in the targeted-screening group. Targeted screening resulted in significant net cost savings and an improved efficiency of the screening process. In addition, fewer children with false-positive skin tests required evaluation and treatment with potentially harmful medications.² [Level of evidence: 2C]

Recommendations from Others

Practice guidelines and policy statements from the United States Preventive Services Task Force, the Centers for Disease Control and Prevention, and the American Academy of Pediatrics recommend against routine screening for tuberculosis in children, because the risk of tuberculosis infection in the general school-aged population is low, and because false-positive results might result in prophylactic treatment with a potentially harmful medication.^{3,4,6,7} [References 3, 4, 6, and 7--Level of evidence: 5] The guidelines do recommend screening children at high risk.

Clinical Commentary

When tuberculosis screening for school-aged children is considered, it seems that less is better. New recommendations for pre-kindergarten children are based primarily on consensus statements, but the consensus is clear: physicians should target high-risk children. Convincing school health officials to adopt a policy of targeted screening may be easier if the task is approached according to these consensus recommendations.

J. BURT BANKS, M.D.
*Department of Family Medicine,
East Tennessee State University Quillen College of Medicine
Johnson City, Tenn.*

REFERENCES

1. Clinician's handbook of preventive services: put prevention into practice. 2d ed. Washington, D.C., U.S. Dept. of Health and Human Services, Office of Disease Prevention and Health Promotion, 1998:52-62.
2. Mohle-Boetani JC, Miller B, Halpern M, Trivedi A, Lessler J, Solomon SL, et al. School-based screening for tuberculous infection. A cost-benefit analysis. JAMA 1995;274:613-9.
3. Centers for Disease Control and Prevention. Targeted tuberculin testing and treatment of latent tuberculosis infection. Atlanta: Centers for Disease Control and Prevention, 2003. Accessed February 16, 2004, at http://www.guideline.gov/summary/summary.aspx?ss=15&doc_id=4004.
4. American Academy of Pediatrics Committee on Infectious Diseases. Update on tuberculosis skin testing of children. Pediatrics 1996;97:282-4.
5. Ozuah PO, Ozuah TP, Stein RE, Burton W, Mulvihill M. Evaluation of a risk assessment questionnaire used to target tuberculin skin testing in children. JAMA 2001;285:451-3.
6. Preventive services for children and adolescents. Bloomington, Minn.: Institute for Clinical Systems Improvement, 2003. Accessed February 16, 2004, at <http://www.icsi.org/knowledge/detail.asp?catID=29&itemID=190>.
7. Screening for tuberculous infection--including bacille Calmette-Guérin immunization. In: Guide to clinical preventive services. 2d ed. Washington, D.C.: U.S. Department of Health and Human Services, U.S. Preventive Services Task Force. Accessed February 16, 2004, at <http://hstat.nlm.nih.gov/hq/Hquest/db/local.gcps.cps/screen/Browse/s/40950/cmd/HF/action/GetText?IHR=CH25>.

Address correspondence to J. Burt Banks, M.D., ETSU Family Physicians of Bristol, 208 Medical Park Blvd., Bristol, TN 37620 (e-mail: banksji@mail.etsu.edu). Reprints are not available from the author.

Clinical Inquiries provide answers to questions submitted by practicing family physicians to the Family Practice Inquiries Network (FPIN). Members of the network select questions based on their relevance to family medicine. Answers are drawn from an approved set of evidence-based resources and undergo peer review. The strength of recommendations and the level of evidence for individual studies are rated using criteria developed by the Evidence-Based Medicine Working Group (http://www.cebm.net/levels_of_evidence.asp).

This series of Clinical Inquiries is coordinated for American Family Physician by John Epling, M.D., State University of New York Upstate Medical University, Syracuse, N.Y. The complete database of evidence-based questions and answers is copyrighted by FPIN.

Copyright Family Practice Inquiries Network. Used with permission.