More Evidence to Support Screening of Child Contacts of Tuberculosis Cases: If Not Now, Then When?

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Evidence that informs the rationale for screening of children who are close contacts of a case of tuberculosis and for providing preventive therapy for this high-risk group has been available for >50 years [1, 2]. The policy is almost universally accepted, being included in global and almost all national tuberculosis control program guidelines [3]. However, in practice it is rarely implemented except in low-tuberculosis-burden, resource-rich settings [4]. Contact screening has 2 main roles. One is to identify at-risk contacts such as young or human immunodeficiency virus (HIV)–infected children who require preventive therapy. The other is to identify contacts of any age who have tuberculosis, that is, active, case finding.

In this issue of Clinical Infectious Diseases, Jagannath et al [5] provide additional compelling evidence from a well-conducted study of the potential of contact investigation as a public health intervention in a tuberculosis-endemic and resource-limited setting. Although the findings are largely consistent with previous studies, there are features worth highlighting that make this an important study. It is a large prospective study reporting 761 Ugandan children who were household contacts of an adult with tuberculosis, and half of the contacts were young children (aged <5 years). Case definitions were clearly defined, and contacts were carefully evaluated, including samples for culture taken from those with symptoms or suggestive radiological findings, thereby strengthening diagnostic certainty. Furthermore, the cohort was followed for 2 years, providing important outcome data that are not available from the many previous cross-sectional studies that have reported a high prevalence of infection with Mycobacterium tuberculosis in child contacts [6, 7].

Tuberculosis was diagnosed in 10% of child contacts. This represents a higher prevalence than is usually reported [6, 7] but cannot be dismissed as simply overdiagnosis given that the majority (71%) of cases were culture confirmed. Diagnostic yield from culture was 4-fold higher than from smear and, as expected, tuberculosis was significantly more common in the young children. The prevalence of disease in the young child contacts was extremely high, equivalent to 16,400 per 100,000 young child contacts. Active case finding identified 79 children with tuberculosis who had not been diagnosed previously. These data provide strong support for case finding in this high-risk age group. Moreover, this age group is still poorly represented by recording and reporting practices in many endemic settings.

A tuberculin test was positive at baseline in 63% of child contacts without disease, at the upper range of infection prevalence reported previously [6, 7]. Isoniazid preventive therapy (IPT) is very effective in preventing disease in these children [1, 8] but is rarely implemented in tuberculosis-endemic settings, and, when implemented, uptake and adherence are often poor. In this study, 74% of eligible contacts completed at least 6 months of IPT. Only 2 (<1%) children developed tuberculosis while receiving IPT and 1 after completion. This is a very positive outcome and an important observation strengthened by the 2 years of follow-up. The efficacy of IPT in this population cannot be determined from this study, but this finding supports the benefit of IPT for child contacts.

The main characteristics that were identified for disease were young age, HIV infection, and lack of a BCG scar. The increased risk for HIV-infected children is well established, and IPT is recommended for HIV-infected contacts irrespective of age once disease is excluded [3]. A recent study from Tanzania reported an additional protective effect of antiretroviral therapy...
The strong protective effect attributed to BCG in this study is notable given that these children all had localized rather than disseminated disease [10]. However, the assumption made by this analysis that the absence of a BCG scar means a lack of BCG vaccination may not be correct. The lack of a scar might mean that no immunization was given or that it was poorly administered. Alternatively, it might indicate deficiencies in the host’s innate immune response to mycobacterial infection.

Two recent studies further emphasize the potential of child contact screening and management. A study in Guinea-Bissau reported that all-cause under-5 mortality was 66% higher in households with an adult with pulmonary tuberculosis than it was in households in the same poor urban community without a tuberculosis case [11]. In South Africa, it was noted that 71% of 221 children with culture-confirmed tuberculosis had previously presented to the health service while still well as a known contact but had not received preventive therapy [12]. It is not evidence that is lacking, but rather recognition and political will.

There are a number of important challenges and barriers to overcome for successful implementation of child contact screening and management [8]. Indeed, there are almost no examples of large-scale implementation from tuberculosis-endemic countries, and the challenges are likely to vary between settings. In the past, tuberculin testing and chest radiography were included as part of the screening process in many guidelines, making it very difficult to implement in the resource-limited setting. The World Health Organization guidelines published in 2006 recognized this barrier and recommended a symptom-based screening approach for such settings [3]. This approach has the potential to decentralize contact screening and the provision of IPT to the community or primary-care level without requiring a large increase of resources. Adherence to IPT is often poor, and there is evidence of the effectiveness of shorter preventive therapy regimens [13]. Health workers and national tuberculosis control programs have not always been convinced of the rationale, benefits, and safety of contact screening and preventive therapy for young children.

To improve prevention and management of tuberculosis in children, it is increasingly recognized that collaboration and communication between child health services and national tuberculosis control programs must be strengthened. Indeed, integration and mutual support with the wider health sector is recognized as an important part of the global tuberculosis control strategy beyond 2015. The implementation and recording of contact screening and preventive therapy is an obvious intervention for national tuberculosis control programs to take the lead. In particular, pediatricians need to support the programs, as contact screening will identify children with suspected tuberculosis who require diagnosis and management.

We already have the policy, the evidence, and the tools we need to implement; even the political will is beginning to emerge. It will not be easy, but this recent study further highlights the consequences and missed opportunities of continued neglect.

Note

Potential conflicts of interest. Both authors: No reported conflicts.

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