Validity of a multi-stage asthma case-detection procedure for school children

Case detection is a process used to identify persons with unrecognised or undiagnosed disease, and to distinguish those who have symptoms of the disease from those who do not. Schools provide an ideal setting for asthma case-detection programmes for children. The aim of this study was to determine the validity of a multi-stage case-detection procedure, consisting of questionnaires, spirometry and exercise testing, to evaluate bronchial hyperresponsiveness.

Methods
The study was performed in 10 elementary schools in four inner-city school systems, with a total enrolment of 3,539 children. Results of the case-detection procedure were compared with the diagnosis of an asthma specialist study physician, to determine the sensitivity and specificity of the case-detection procedure.

Results
Ninety-eight per cent of children returned the asthma symptoms questionnaire and 79% of those consented to additional testing. A total of 327 out of the 415 (79%) children identified with the questionnaire enrolled in the study and 178 (54%) attended the physician visit. Results indicated that the three-stage procedure (questionnaires, spirometry and exercise testing) had good validity, with sensitivity, specificity and predictive values of 82, 93 and 93%, respectively. A two-stage procedure (questionnaires and spirometry) had similar validity, with sensitivity, specificity and predictive values of 78, 93 and 93%, respectively. However, given the time and expense associated with the two- or three-stage procedure and the difficulty of obtaining physician follow-up evaluation of the case-detection diagnosis, schools may prefer to use a two-item questionnaire that has a lower sensitivity (66%), but higher specificity (96%) and predictive value (95%).

Conclusion
The case-detection programme was well received by school personnel and can help identify children with unrecognised or undiagnosed asthma, as well as those with a current diagnosis but poorly controlled disease.

Keywords
Asthma
Case detection
Diagnosis
Exercise testing
Spirometry

Message
Case-detection programmes are well received by school personnel and can identify children with unrecognised or undiagnosed disease

Original article

Editorial comment
Recent studies have indicated that the prevalence of asthma among elementary school-aged children ranges 10–20%. The broad definition of asthma with a five-item questionnaire has a low predictive value and results in many unnecessary referrals to the physician. Use of the questionnaire plus spirometry has higher sensitivity and specificity, and it misses fewer children with asthma when compared with a two-item questionnaire, which is simple and easy to use. Recent research has found that spirometry screening in schools by community nurses is technically feasible. However, such testing can be difficult and requires training. Out of the 164 children who were classified as negative for asthma with the questionnaire, 31 (19%) were diagnosed with asthma by the physician. Furthermore, 15 (48%) were classified as having persistent asthma. These children were classified as negative with the questionnaire because they reported no symptoms on the questionnaire. One of the strengths of this study was its excellent response rate of 98% for the symptoms questionnaire, with 79% consenting to the study. This high rate was achieved with the use of small incentives for the children, classroom teachers and the school principal. The primary limitation of this study is the use of a single physician evaluation as the standard method. A series of physician examinations over time represents the best standard method for asthma detection, even if this is rarely practical in large epidemiological studies.

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