REPORT ON THE EARLY DIAGNOSIS OF TUBERCULOSIS IN CHILDHOOD

BY DR. WILFRID SHELDON (LONDON—CHAIRMAN), DR. STANLEY GRAHAM (GLASGOW), DR. WILFRID GAI SFORD (WARWICK) AND DR. REGINALD LIGHTWOOD (LONDON)

1. Introduction: This report has been prepared because of the inadequate recognition of the importance of childhood tuberculosis and because of the increase of this disease during the early years of the war.

For the main part the rise in mortality has been caused by respiratory tuberculosis which has been most noticeable in young women between 15 and 25 years of age. Since October, 1941, a Committee of the Medical Research Council, set up at the request of the Minister of Health, has been investigating the causes of this increase. In the Summary Report referred to above, the Minister stated that "the public should take such simple precautions as drinking only pasteurized milk, or boiled milk if pasteurized milk is not available, and do all in their power to prevent the spread of disease by droplet infection." Before the House of Commons on June 30, 1942, the Minister said, "We must review our general approach, and give greater practical effect to the need for early diagnosis." Before the House of Lords on July 28, 1942, Lord Dawson remarked that the mortality from tuberculosis had increased by 13 per cent. in Great Britain since the war: that a novel feature in this war had been the extension in young children, particularly in the incidence of tuberculous meningitis, from which there had been an increased incidence of 50 per cent.

A recent analysis kindly supplied by Dr. F. M. B. Allen (Belfast) showed that the infection in 72 per cent. of cases of tuberculous meningitis was due to the human bacillus. The Medical Officer of the Lanark County Council has recently reported that the death rate from pulmonary tuberculosis in 1941 as compared with 1938 has increased by 442 per cent. in children from birth to 4 years of age, and by 340 per cent. for children between 5 and 14 years of age (Daley, A. J., and Benjamin, F.: Brit. med. J., 1942, 2, 417).

2. Comments: (a) Tuberculous meningitis is an end result of infection occurring primarily in some other part of the body, principally in the respiratory or alimentary systems. Its prevention can only be carried out by preventing these primary infections, or, if they have occurred, by diagnosing them at an early stage and instituting appropriate treatment.

(b) Primary alimentary infection is acquired mainly from infected and unsterilized milk, and this source could be almost entirely eliminated by legislation, or greatly lessened by educating the public to drink milk which has been either efficiently pasteurized or boiled.

(c) Respiratory tuberculosis in childhood is acquired almost entirely by droplet inhalation from infected adults and adolescents, and occasionally from older children if they cough a positive sputum: but seldom from young children, partly because they do not tend to produce sputum, and partly because their intrathoracic lesion is seldom of an "open" type.

Two points emerge from this:—First, that when an adult or adolescent is notified as suffering from pulmonary tuberculosis, examination of contacts must include children down to the age of infancy. Secondly, when a child is notified as suffering from intrathoracic tuberculosis, adults with whom he or she has been in contact must be examined, not merely to ascertain the source of infection, but to prevent this source from infecting other children, e.g. infection in a school child may require the examination not only of the relatives but also of the school teacher, as a possible means of protecting other children in the class.

(d) For the most part, the diagnosis of intrathoracic tuberculosis in infants and children is made by hospital physicians and general practitioners. Whether such children are examined by their general practitioner or at a hospital is, however, a purely fortuitous matter, depending upon the whim of the parent who may or may not consider the child sufficiently ill to seek advice. There is no machinery by which children exposed to infection have to be taken for examination, beyond that of the tuberculosis officer, and at the present day, this machinery works, as it were, in a watertight compartment, without involving either the hospital paediatrician or the general practitioner.

(e) A more widespread enquiry for child contacts is required to this is at present being carried out, for there is no doubt that many young children, infected by adults, elude examination by the tuberculosis officer. The success of such enquiry depends largely upon the information gathered by the tuberculosis nurses: the particular ease with which young children become infected should be brought to their notice, and they should be encouraged to widen their search beyond the immediate family circle when conducting the enquiry for child contacts.

Example: Three young boys, brothers, spent their nights during the winter of 1940-41 in a private air-raid shelter with their neighbours. The middle-aged neighbour father had phthisis and had infected his grown-up son and daughter, all three of whom were detected and dealt with by the tuberculosis officer. The three young brothers entirely escaped examination until by chance they were brought to hospital when all three were found to be infected.

(f) The time for which contact is necessary in order for infection of a child to occur is shorter than is often realized, and may be no longer than a day. This should be borne in mind when conducting an enquiry for child contacts.

Example: Two young children, evacuated to the country, spent one night in a house, with a phthisical aunt, who went next day to a sanatorium. Both children became infected, and one died of miliary tuberculosis.

(g) A high proportion of children, suffering from erythema nodosum and phlyctenular conjunctivitis, indicate by these disorders their recent infection with tuberculosis and therefore these illnesses often lead to the detection of early tuberculosis. These illnesses are not notifiable, and yet some simple machinery is required for which children suffering from them may be brought to the notice of the tuberculosis officer in order to undergo an investigation by him.

(h) The pathological process in intrathoracic tuberculosis in childhood differs from that in the adult. The latter tends to have a local lung lesion, spreading centrifugally, and progressing to cavity formation, with the production of a positive sputum: the former has a small primary focus in the lung, which seldom progresses to cavity formation, but instead the disease spreads along the lymphatics to the bronchial and hilar lymphatic glands. The primary focus in a child is seldom large enough to produce physical signs, and infection of the hilar glands is notoriously difficult to detect by clinical means alone.
1. To be expert at the diagnosis of adult pulmonary tuberculosis is not necessarily equivalent to being equally skilled in discovering intrathoracic tuberculosis in childhood. Further, to make the most of the clinical examination of infants and young children, practice in handling them is essential. Although paediatricians have an unrivalled experience in handling sick children, there are not enough trained observers to give the time to use the examination of child contacts on a national scale, and in any case, this work falls properly within the province of the tuberculosis officers.

The objective—namely, the early diagnosis of tuberculosis in children—would be courting disaster for the found, in a child until tubercle bacilli within the sputum is of supreme diagnostic importance in an diagnostic by methods need to be undertaken amongst the tuberculous officers and paediatricians. Broadly speaking, no such co-operation exists at present.

3. Methods of investigation of children: For the early diagnosis of intrathoracic tuberculosis in children, the following methods need to be employed:

(a) Clinical examination: An examination of the whole child is required, as the symptoms of intrathoracic tuberculosis also arise in other conditions, such as chronic dyspepsia, chronic infections in the upper respiratory tract. It must be acknowledged that however thorough the clinical examination, the diagnosis of intrathoracic tuberculosis by clinical examination alone presents great difficulty, and is indeed often impossible.

(b) Tuberculin skin tests: Whatever test is employed, whether the Mantoux intra-dermal test or the Vollmer patch test, their importance in the diagnosis of tuberculosis in young children is undoubted, and is sufficiently accepted by paediatricians. Although these tests, as with all other investigations, are liable to technical errors, and the significance of a positive reaction varies with the age of the child, the technique is relatively simple, and the significance of a positive reaction, at any rate in young children is straightforward. It is our opinion that the value of these tests in children is in general under-rated, and that because of this many infected children escape diagnosis at a stage of their disease when recovery should be possible. We wish to emphasize that these tests should be used far more widely, and recommend that every facility for carrying them out should be placed at the disposal of medical officers in charge of child welfare clinics, and of school medical officers.

(c) X-ray examination of the chest: An indifferent x-ray of the chest is worse than useless, as it may actually be misleading. Although it is impossible to get far with the investigation of child contacts without x-rays, their efficient use demands three qualities:—First, the apparatus must be sufficiently powerful to take a good picture with a short exposure, for young children may lie still nor hold their breath. Second, the radiographer needs to be experienced in the handling of children if satisfactory films are to be obtained without waste of material. Third, the interpretation of the film must be made by someone conversant with the picture of tuberculosis as met with in childhood: in practice, the opinion of a radiologist, provided he has had particular experience in the subject, would be of great help to the physician whether paediatrician or tuberculosis officer—in his full assessment of any individual case.

4. Notification: The notification of tuberculous children is in a thoroughly unsatisfactory position. Some of the reasons for this are:

(a) Physicians hesitate to notify because they realize the difficulty of skin tests and x-ray, in whom the diagnosis is made at an early stage of their infection, recover completely, but once they are notified, the stigma of tuberculosis attaches to them long after recovery has been made, and is likely to lead to a persistent, although unnecessary, imposition of invalidism.

(b) Notification usually follows the fact that the local authority shall undertake treatment. The difficulty at once arises that the local authority does not possess the accommodation required for the treatment of tuberculous children. They are unsuitable for treatment in adult sanatorium; even convalescent homes will not accept children labelled as tuberculous. A position has been reached, therefore, where the very fact of notification makes it often extremely difficult for either the doctor concerned or the tuberculosis officer, to arrange suitable treatment. Believing that the risk that a young child with a primary lung infection will infect others is remote, the avoidance of notification enables these children to obtain their necessary convalescence under other guises.

(c) It has already been pointed out that the diagnosis of intrathoracic tuberculosis in children, on clinical examination alone, is often impossible, although the result of skin tests and x-ray findings may leave no reasonable doubt about the diagnosis. If the notification of anyone suffering from tuberculosis is statutorily required, should a child in whom evidence of tuberculosis rests on—(1) a positive skin test, or (2) a positive x-ray finding, or (3) a combination of these, be notified, but in each instance without physical signs, be notified?

(d) The need for notifying children suffering from erythema nodosum and phlyctenular conjunctivitis to the tuberculosis officers has already been pointed out: yet seeing that only a percentage of these children—albeit the majority—are tuberculous, they should not have to be labelled as tuberculous in order to have them investigated by the tuberculosis officer.

5. Co-operation between paediatricians and tuberculosis officers: Closer co-operation between Paediatricians and Tuberculosis Officers is highly desirable and is long overdue. The following suggestions are put forward as a means of bringing about such co-operation:

(a) Special clinics for the investigation of child contacts are required. Whenever possible these should be set up at children’s hospitals, or in the children’s department of general hospitals, because it is here that the necessary facilities are available, e.g. radiographers experienced in x-ray examination, x-ray apparatus suitable for children, in-patient accommodation for special investigations if required, and the services of a visiting paediatrician. It would also avoid the attendance of children at an adult tuberculosis clinic, where unless special precautions are taken, or a special session is reserved for children, the risk of their becoming infected is great.

(b) The children who should attend these clinics would be discovered through the machinery of the tuberculosis officer.
The children at these clinics should be examined by the tuberculosis officer, and each hospital would have to consider the advisability of affiliating the tuberculosis officer in some suitable manner to the medical staff.

(d) The ultimate responsibility for the work at the clinic, when set up at a hospital, should rest with the paediatrician, on whose opinion the tuberculosis officer should be able to call in any doubtful or difficult case. Where clinics are held at hospitals with medical schools, the medical students should attend for instruction. It may be mentioned that such an arrangement bears comparison with the L.C.C. Rheumatism Clinics for children maintained before the war at some of the London hospitals.

(e) Short courses of instruction in childhood tuberculosis should be given by paediatricians and should be available to tuberculosis officers as well as to general practitioners. Arrangements for these courses might possibly be made through the British Post-Graduate Medical School.

6. The general practitioner: In the attack against respiratory tuberculosis in children the part to be played by the general practitioner cannot be overlooked. In many districts, especially country districts, the responsibility for finding and examining child contacts will be his. It should be the duty of the county tuberculosis authority to place within reach of the general practitioner the means for conducting an efficient examination, including skin tests, as it must be the duty of paediatricians to see that men going into practice are taught the need for, and methods of examining child contacts. The attendance of general practitioners at post-graduate courses of instruction in this subject has already been mentioned.

7. Accommodation for treatment: Although this report is concerned with diagnosis, it must be pointed out that a widespread enquiry into child contacts would give rise to a large number of young children found to be suffering from a primary tuberculosis infection and the care of these children would create a problem of its own. It must be recognised that for many children the outcome of their illness is decided in the first few months after infection, from which it is clear that early diagnosis can only lead to satisfactory results if followed by prompt and efficient treatment. Further, the majority of children needing treatment will be of the infant, toddler and pre-school age group. For the majority of them treatment away from their homes would be required, and to nurse them through their illness in hospital wards would overload the capacity of the hospitals; nor is the environment of a hospital ward the best setting for their recovery. To nurse them in adult sanitary accommodation is unwise owing to the risk of further infection: the nursing staff of these establishments is not particularly trained in the nursing of children and the accommodation that would be needed is not available. To meet this situation, convalescent homes in the country—preventoria—should be established and some of the existing convalescent homes possibly be given over for the care of these children. In addition to children showing a primary complex, those who are suffering from the various allergic manifestations (erythema nodosum, epiphlebitis, pleurisy with effusion, phlyctenular conjunctivitis) should be eligible for these homes.

8. Summary: (a) In order to improve the present position with regard to the early diagnosis of intrathoracic tuberculosis in children, a much greater effort must be made to discover and examine children who have been exposed to cases of pulmonary tuberculosis of the adult type.

(b) To discover these children the machinery used by the tuberculosis officers should be employed.

(c) Special clinics should be set up for the examination of child contacts.

(d) Such clinics, whenever possible, should be set up at children’s hospitals or children’s departments of general hospitals and should be under the direction of a paediatrician.

(e) The investigation of children at these clinics should be carried out by the tuberculosis officer who should be affiliated to the medical staff of the hospital. It is considered that if co-operation on these lines could be established, some of the problems arising out of notification would find an automatic solution.

(f) Short courses of a post-graduate type, devoted to the subject of intrathoracic tuberculosis in children should be conducted by paediatricians.

(g) A corollary to the previous recommendations must be that convalescent homes in the country should be used for the care of children suffering from primary tuberculosis.

9. Recommendations to the executive committee of the British Paediatric Association: (a) This report be referred through the Chief Medical Officer of the Ministry of Health to the Minister, with a request for his assistance in putting the recommendations into practice.

(b) Copies of this report should be sent to the Association of Tuberculosis Officers, the Society of Medical Officers of Health, the British Post-Graduate Medical School, the Co-ordination Committee of the London Children’s Hospitals, the Children’s Hospitals and those General Hospitals having Children’s Departments throughout the country.

(c) The executive committee should ask for a conference with a similar committee from the Association of Tuberculosis Officers in order to discuss the whole question of notification of tuberculosis in children. If at such a conference, agreement can be reached that difficulties exist and if practical solutions to these difficulties can be found, the combined committee should then approach the appropriate authority.

(d) In addition to a conference on notification, a conference embracing the other suggestions in this report will be required between the British Paediatric Association and the Association of Tuberculosis Officers and any other authorities concerned. If co-operation at such a conference can be obtained, the executive committee should then be prepared to approach the medical boards of hospitals containing a paediatric department to put this scheme before them.

(e) The executive committee should consider the advisability of publishing, at the appropriate time, as much of this report as they think fit in the medical press.

ARRANGEMENTS FOR NEWLY BORN BABIES IN MATERNITY HOSPITALS

BY CHARLES MCNEIL (EDINBURGH—CHAIRMAN), N. B. CAPON (LIVERPOOL—SECRETARY), W. R. F. COLLIS (DUBLIN), S. GRAHAM (GLASGOW) and A. MONCRIEFF (LONDON)

(Report prepared by the British Paediatric Association, at the request of the Goodenough Committee)

An ideal plan, assuming no restrictions, financial or otherwise: the chief aims being to safeguard the health of newly born infants, and to ensure that each baby on discharge from the hospital, with its mother, is breast fed, is in the care of a mother who has been instructed and is competent in the handling of her infant and that the mother is happy and anxious to have a family of reasonable size.