

THE NATIONAL TUBERCULIN SURVEY AND THE ARMY

BY

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THIS work was undertaken as part of a National tuberculin survey under the direction of the Medical Research Council.

It was considered that the male age-group 18 to 21 could best be supplied from the Army and the necessary authority was obtained for 5,000 men in Southern Command to be tested.

ORGANIZATION

As Assistant Director of Pathology the author was instructed to arrange for the tests to be carried out on the personnel of suitable basic training units. It is in these units that the National Service man undergoes his first military training.

There were certain difficulties to be surmounted:

- (1) To fit the procedure into an already full medical, selection and training programme.
- (2) To ensure as far as possible that there were no variations in the technique in different units.
- (3) To organize a supply of dry sterile syringes and needles.
- (4) To correlate the results with mass miniature radiography findings and arrange for them to be recorded accurately.
- (5) To complete the survey in under six months.

Six units were selected, each having a fortnightly intake of some 60 to 100 men. In the case of one unit this number was increased for the last three months of the survey to over 250.

A conference of the medical officers concerned was held, the technique and procedures to be adopted demonstrated and ways and means of fitting the tests into the medical programme discussed. Commanding Officers of units were then approached and the rationale and purpose of the test described. The latter were most co-operative and no difficulties were experienced in arranging alteration to the twelve week training programme.

Doctor A. E. Brown who was the medical officer responsible for the practical co-ordination of the nation-wide survey for the Medical Research Council kindly supplied details of the technique to be carried out. It had been decided that

a patch test would be unsuitable for active soldiers and the Mantoux test was selected. This consisted of a first test using a dilution of 1/10,000 Old Tuberculin followed by a second test in negative reactions using 1/100 Old Tuberculin (Wilson and Miles, 1946).

The technique advised was the intradermal injection of 0.1 ml. of material into the skin of the forearm at the junction of the middle and upper two-thirds. Medical officers were instructed to insert the needle, as nearly parallel with the skin as possible, to a depth of $\frac{1}{8}$ of an inch and produce a wheal 7 mm. in diameter.

The criterion of a positive reaction was the appearance within forty-eight hours of an area of palpable infiltration 5 mm. or more in diameter. Erythema alone was not considered significant.

A second test was performed on all negative reactions using the dilution of 1/100.

The actual diameter found was measured with a punched card before recording.

Visits were paid to units by Dr. Brown and the author, both to check errors in technique and to try to achieve some measure of agreement in the readings of positive, negative and doubtful results.

All the materials used were provided by the Medical Research Council. The tuberculin was received ready diluted in small rubber-capped bottles.

All glass syringes were used and these, together with needles were sterilized by dry heat at the Southern Command Laboratory. The syringes were put up separately in test tubes according to the principles laid down by the M.R.C. (M.R.C., 1945).

The needles were sterilized in tins in batches of fifty.

Both test tubes and tins were painted green and red in order that during the survey the materials used for weak and strong tuberculin could be kept separate. Sufficient syringes were supplied to ensure that they need only be used once before re-sterilization.

In all 5,130 complete tests were done, there being some loss due to cross posting and illness.

The test, like all inoculations in the Army, was on a voluntary basis.

In general it was stated that the men co-operated well and only two refusals were reported, both from the R.A.M.C.

All National Service Men undergo mass miniature radiography and the results could therefore be correlated with the tuberculin test.

There were four possible findings by the radiologist concerned:

- (1) Pulmonary Tuberculosis. Confirmed at chest clinic by large plate X-ray.
- (2) Possibly Tb. No action required. This heading covered such reports as "healed calcified glands."
- (3) *Abnormal* but *not* Tb. (Congenital changes, etc.).
- (4) Normal.

Completion of the M.R.C. Record Card was an essential part of the survey. Fig. 1 will show that a busy medical officer would have been put to much difficulty in finding the time to fill it all in. Apart from this there was the problem of having men waiting about whilst their particulars were entered with consequent dislocation of the training programme.

DATE	MASS-RADIOGRAPHY NUMBER		X	AREA CODE NUMBER	
DAY / MONTH / YEAR					
SURNAME (Block Letters)			PRESENT HOME ADDRESS		
First Name(s)					
AGE (last birthday)	OCCUPATION	OCCUPATION CODE NO.	OCCUPATION OF PARENT OR GUARDIAN	OCCUPATION CODE NO.	
PARTICULARS OF FACTORY, SCHOOL, OR OTHER ESTABLISHMENT			TUBERCULIN TEST	Diameter of infiltration (not erythema) in mms. (Intra-dermal tests only)	
Indicate UNIT'S X-ray findings and disposal of patient by "X" in appropriate column (or clinic address in case of column "0")			Indicate RESULT by ringing +, - or ?		
0 Possibly or Definitely T.B. referred to Chest Clinic at :—(Give address of Clinic)	1 Possibly T.B. No action required	2 Abnormal Definitely not T.B.	3 Normal	0 + 1 — 2 ?mms
				0 + 1 — 2 ?mms
				0 + 1 — 2 ?mms

FIG. 1.

The M.R.C. kindly consented therefore to the employment of a civilian clerk whose duty was to accompany the M.M.R. Unit to the camp and complete a card for each man whilst he was being X-rayed.

The cards were then handed to the medical officer who completed them as soon as the results of Mantoux test and M.M.R. were available. The coding of occupations was carried out by the clerk when the cards were returned to Southern Command Laboratory.

All medical officers had a supply of cards in case the M.M.R. Unit broke down and the men tuberculin tested before X-ray. This in fact happened on several occasions but no difficulties were experienced.

It was hoped that one medical officer in each unit would be responsible for

both injecting and reading during the whole survey. "Exigencies of the Service" prevented this, however, but not to an appreciable extent.

At the end of the survey medical officers were asked the following questions:

(1) How many medical officers were concerned in injecting and/or reading the tests?

(2) Did the medical officer consider the man to be a fair cross section of the male community of that age-group?

(3) How many refusals were encountered?

(4) Were any severe reactions noted?

The replies are given in Table I together with figures showing the numbers of tests completed and the *approximate* numbers of men who were available. Losses were due mainly to cross posting and sickness, some of these occurring before the cards were completed and some between the day of radiography and the day of test.

TABLE I

Unit	M.O.s concerned	Type of men	Severe reactions	Refusals	Number of completed tests	Approx. numbers available in the groups tested	Percentage loss by posting, sickness, etc.
L.I.B.T.B. Bordon	1	Good cross section	Occasional	Nil	407	470	13%
Green Jackets T.B., Winchester	One injecting, three reading. No change in staff	Good cross section	Nil	Nil	266	350	21%
4 T.R.R.E., Aldershot	1	Good cross section	A few local at 1/100 following a ? at 1/10,000	Nil	690	800	13%
3 T.R.R.E., Cove	One injecting, reading, except for 100 men	"Selected". Some potential officers	Nil	Nil	662	770	14%
9 T.R.R.E., Cove	One M.O. did 95%. One did 5%	Good cross section	Nil	Nil	1,113	1,260	11%
Depot R.A.M.C. Crookham	Two injected and one read. One M.O. changed in survey	Good cross section	4% severe local at 1/10,000	2	1,992	2,120	6%

No severe general reactions were reported, those described as "severe local" were characterized by a wide zone of erythema and oedema. In one case seen by the author, the skin showed a 3-inch area of erythema with a central 1-inch

TABLE II

Unit	Positive test 1st	Positive test 2nd	Negative test	? test	Total tests	Posted or parity tested	Refused	Grand total	Normal X-ray	Abnormal X-ray pos. test. Not T.B.	Abnormal X-ray neg. test. Not T.B.	Positive test. T.B. on X-ray	Negative test. T.B. on X-ray	Positive test. T.B. on X-ray	Total X-rayed	Discrepancy due to
L.I.T.P., Bordon Camp	132	104	156	15	407	31		438	413	1					416	Of the 31 posted 22 had no X-ray
Green Jackets Trg. Bde., Winchester	83	70	112	1	266			266	262	1 1		2			266	
4 T. Regt. R.E.s Aldershot	286	152	252		690			690	687	1				2	690	
3 T. Regt. R.E.s Cove	311	140	211		662			662	653	3 1		1		3	662	
9 T. Regt. R.E.s Cove	475	234	381	23	1,113	22		1,135	1,119	1				1	1,124	+10 posted no X-ray + 1 also no X-ray but tested
R.A.M.C. Depot Crookham	1,007	421	539	25	1,992	12	2	2,006	1,951	30 5		4		4	2,005	+1 refused X-ray and Mantoux
Total	2,294	1,121	1,651	64	5,130	65	2	5,197	5,085	36 8		4 1		10	5,163	=34 not X-rayed
										1 2		1 2		1		

NOTE.— $\frac{3}{1} = 3$ positive at 1/10,000 (1st test). $\frac{4}{2} = 4$ positive at 1/100 (2nd test).

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dark necrotic patch. This case occurred with the 1/100 dilution and had been marked doubtful at 1/10,000. There was slight malaise, and resolution occurred without ulceration. A few similar cases were reported and it is possible that in doubtful reactions at 1/10,000 it would be more satisfactory to give the next test with a 1/1,000 rather than a 1/100 dilution.

Assessment of the results showed that 5,130 men were tested out of 5,197 who actually had cards filled in. The approximate numbers available in the intakes were 5,770 giving a loss of 11 per cent from cross posting and sickness.

It is not proposed to report in detail on the results as an analysis will no doubt form part of the official Medical Research Council report. A preliminary survey of the figures is, however, of interest.