CHAPTER II

COMPARISON OF THE GROUPS

Introduction

Chapter I detailed the tuberculous contacts encountered by a proportion of the patients. Contacts, however, may be known and unknown, and, by dealing only with known contacts, an error may be introduced into the results. It will be shown, however, that any error of this nature is probably the same in each group and can be neglected. In this Chapter the data are regrouped as shown in Table 3, viz: Group A, *primary tuberculosis* (including primary pleurisy with serous effusion, and primary pulmonary tuberculous complex); Group B, *post-primary pulmonary tuberculosis*; Group C, *non-tuberculous chest conditions*; and Group D, *healthy soldiers*.

The main purpose of this grouping is to compare the primary and post-primary tuberculosis groups (A and B) with each other and with the healthy controls (Group D). Prior to this, however, it is necessary to compare the two components of Group A in order to determine whether or not they differ significantly from one another in any respect. The same argument applies to Group C, which contains the bronchiectasis patients as well as those with other non-tuberculous conditions. In all chi-squared calculations a probability of less than 0.05 (1 in 20) is regarded as being significant; corrections for small samples are made where appropriate. For certain comparisons, t tests are employed, and in these cases a t value of $+2.0$ or over is accepted as being significant ($P=0.05$).

Results of Comparisons

Section A.

**Group A. Cases with Pleural Effusion v. Cases of Primary Complexes.**

The 52 patients with primary pleurisy with serous effusions and the 18 patients with radiological primary tuberculous complexes were compared with regard to the 26 points which constitute the headings of the columns in Table 4, and in no instance was any significant difference found.

**Group C. Cases of Bronchiectasis v. Cases with Non-tuberculous Conditions.**

The 21 patients with bronchiectasis were compared with the 87 patients who had other non-tuberculous conditions, the points chosen for comparison being those at the top of Table 4. A significant difference arose at two points only, namely, the average age of the bronchiectatic patients was less than that of the other series (24
years), and fewer bronchiectatic patients had “mild” degrees of contact than expected, while more had “moderate” degrees of contact.

From the above it is apparent that the combination of the sub-units into logical disease groups will not exert a deleterious effect on the further analysis. Indeed, such pairings will enhance the value of the later results by providing larger groups for comparison.

Section B.

The upper three rows of Table 4 show the results in summary of the statistical calculations between the three experimental groups and the healthy group (D).

**Group A (Primary Tuberculosis) v. Group D (Healthy Soldiers).**

Group A is comparable with Group D in 23 respects and shows only three significant differences. Firstly, there are more regular soldiers in the primary tuberculosis group than in the healthy group (col. 3). Secondly, there are fewer works contacts in Group A (actual number = 0) than in Group D when compared with the total number of contacts. Thirdly, when compared with the total number of patients in each group, there are still significantly fewer works contacts in Group A than in Group D.

It is important to note that there is no significant difference between the two groups in respect of age (col. 1), proportion of patients with a contact history (col. 4), number of contacts encountered (col. 5), in the other sources of contacts, or in the severity of contact histories.

**Group B (Post-primary Tuberculosis) v. Group D (Healthy Soldiers).**

Group B shows 15 points of difference from Group D, and 11 points of similarity. Group B is significantly older (col. 1), has a longer average military service (col. 2), and has more regular soldiers (col. 3) than the control group (D). In addition, Group B reveals a greater number of patients with a positive contact history (col. 4), and a greater number of contacts encountered (col. 5) than Group D. These last two points are further illustrated by the family, Army and social contact histories, where Group B has more contacts than expected; on the other hand it is clear the Group B has fewer works and neighbour contacts, and fewer neighbour contact histories than expected.

**Group C (Non-tuberculous Chest Conditions) v. Group D (Healthy Soldiers).**

Group C shows nine points of difference from Group D, and 17 points of agreement. Group C is older (col. 1) than Group D, and has a longer average period of military service (col. 2), a greater number of regular soldiers (col. 3), a greater number of contacts among those giving a contact history (col. 5), a greater number with family and social contact histories, a greater number of family and social contacts over the whole group, and fewer works contacts than expected.

In spite of the numbers of family and social contacts revealed, there is no overall increase in the number of contact histories (col. 4), and this must be due to the balancing effect of the non-significant differences between Army, works, and neighbour contact histories.

From the above it may be concluded that Group D (composed of healthy soldiers)
Table 3. Four Disease Groups

<table>
<thead>
<tr>
<th>Clinical Condition of Subjects</th>
<th>Age</th>
<th>Service</th>
<th>Regulars</th>
<th>No. with Positive Contact History</th>
<th>No. of Contacts</th>
<th>Family Contacts</th>
<th>Army Contacts</th>
<th>Works Contacts</th>
<th>Neighbour Contacts</th>
<th>Social Contacts</th>
<th>Degree of Contact</th>
<th>Total Patients</th>
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<tr>
<td></td>
<td>Mean (yrs.)</td>
<td>Scatter (yrs.)</td>
<td>Mean (yrs.)</td>
<td>Scatter</td>
<td>Mean (yrs.)</td>
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<td>No. per cent</td>
<td>No. Contacts</td>
<td>No. by Patients</td>
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<td>No. by Patients</td>
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<tr>
<td>Primary Tuberculosis (Group A)</td>
<td>19\textsuperscript{10/12}</td>
<td>16-32</td>
<td>1\frac{1}{2}</td>
<td>2 days-12 yrs.</td>
<td>14</td>
<td>20</td>
<td>26</td>
<td>42</td>
<td>19</td>
<td>13</td>
<td>7</td>
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<tr>
<td>Post-primary Tuberculosis (Group B)</td>
<td>22\textsuperscript{10/12}</td>
<td>15-54</td>
<td>3\textsuperscript{10/12}</td>
<td>0-22 yrs.</td>
<td>105</td>
<td>30</td>
<td>205</td>
<td>347</td>
<td>179</td>
<td>130</td>
<td>52</td>
<td>46</td>
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<tr>
<td>Non-tuberc. Chest Conditions (Group C)</td>
<td>21\textsuperscript{7/12}</td>
<td>14-43</td>
<td>3\textsuperscript{4/12}</td>
<td>2 days-28 yrs.</td>
<td>36</td>
<td>33</td>
<td>43</td>
<td>72</td>
<td>33</td>
<td>23</td>
<td>9</td>
<td>7</td>
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<tr>
<td>Control Group (Group D)</td>
<td>20\textsuperscript{4/12}</td>
<td>18-42</td>
<td>2</td>
<td>6 mths.-22 yrs.</td>
<td>13</td>
<td>9</td>
<td>40</td>
<td>57</td>
<td>19</td>
<td>15</td>
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Notes: (a) Figures in **bold print** refer to number of contacts.
(b) Figures in ordinary print refer to patients.
### Table 4. Summary of Calculations between the Groups

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**Notes:**
- S = significant results.
- * = significant difference between the means of the two groups.
- t = less than.
- > = greater than.
- ± = corrected for small numbers.
- † = corrected for small numbers.

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**Chest Diseases in the Army**

**Degree of Contact**

**Social**

- No. with Soc. Con. Hist. v. Total No. of Patients
- No. of Social Contacts v. Total No. of Patients
- No. of Social Contacts v. Total No. of Contacts

**Neighbour**

- No. with Neigh. Con. Hist. v. Total No. of Patients
- No. of Neighbour Contacts v. Total No. of Patients
- No. of Neighbour Contacts v. Total No. of Contacts

**Works**

- No. with Works Con. Hist. v. Total No. of Patients
- No. of Works Contacts v. Total No. of Patients
- No. of Works Contacts v. Total No. of Contacts

**Army**

- No. with Army Con. Hist. v. Total No. of Patients
- No. of Army Contacts v. Total No. of Patients
- No. of Army Contacts v. Total No. of Contacts

**Family**

- No. with Fam. Con. Hist. v. Total No. of Patients
- No. of Family Contacts v. Total No. of Patients
- No. of Family Contacts v. Total No. of Contacts

**Contact History**

- No. with Contact History v. No. of Contacts
- Number with Contact History v. Total Number
- Number of Regular Soldiers v. Total Number
- Military Service v. Total Number
- Age. v. Total Number
differs from the other three groups by having comparatively few regular soldiers (col. 3), and therefore comparatively many national servicemen. This may account for the greater number of works contacts among Group D soldiers (col. 14).

Section C.

In this section, Groups A, B, and C are compared statistically with each other. The results are summarized in the lower three rows of Table 4.

**Group A (Primary Tuberculosis) v. Group B (Post-primary Tuberculosis).**

The difference between the average ages is significant, Group A being younger (col. 1); this is reflected in the average period of military service (col. 2). Both groups contain regular soldiers in similar proportions (col. 3). The number of persons revealing a history of previous contact with tuberculous persons is significantly less in Group A (col. 4), and the total number of persons contacted is also significantly less in Group A (col. 5); this is probably due to a reduced number of family and works contacts in Group A. Group B, on the other hand, yields fewer neighbour contact histories compared with Group A.

**Group A (Primary Tuberculosis) v. Group C (Non-tuberculous Chest Conditions).**

Apart from a significant difference in ages, and therefore in the average duration of military service (cols. 1 and 2), Groups A and C show similarity in 24 out of 26 points examined.

**Group B (Post-primary Tuberculosis) v. Group C (Non-tuberculous Chest Conditions).**

There is no difference between the groups with regard to age (col. 1), military service (col. 2), or the proportion of regular soldiers (col. 3). The number of patients giving a contact history (col. 4) is greater in Group B than in Group C, and the same is true of the number of contacts revealed (col. 5); these differences would appear to be due to the family and works contact histories.

**Conclusions**

From Tables 3 and 4, the following conclusions appear to be permissible: **Group A (Primary Tuberculosis):** (i) the average age at which primary tuberculosis occurs in this series is high, being nearly 20 years; (ii) a high proportion of patients does not reveal a significant history of known contacts; (iii) while the upper half of Table 2 suggests that the groups with primary (A) and post-primary (B) tuberculosis are very different from each other, the lower half shows several points of similarity; (iv) it appears that this group is connected with the other groups in various ways. If Group C (Non-tuberculous Chest Diseases) is omitted for the moment, it would appear that Groups A, B, and D form a linear relationship, with Group A occupying a position intermediate to the other two (i.e. healthy persons—primary tuberculosis—post-primary tuberculosis), which is the case in nature; and (v) apart from the low average age and the short period of military service, Group A is very similar to Group C.
Group B (Post-primary Tuberculosis): (i) the average age of this group is three years older than the primary tuberculosis group (A), and 2½ years older than the control group (D); (ii) the incidence of positive contact histories is highly significantly greater than in both the control group and the primary tuberculosis group; (iii) the number of contacts encountered is also highly significantly greater than in the control group and the primary tuberculosis group; (iv) the most important contacts in this series are from family, Army, and social sources; and (v) the number of regular soldiers is comparable with the number in the primary tuberculosis group.

Group C (Non-tuberculous Chest Conditions): (i) this group plays no major part in this investigation, but shows many points in common with the primary tuberculosis group (A), and is less comparable with the post-primary tuberculosis group (B); and (ii) this group could never have acted as a "control group" for Groups A and B, as had been my original intention.

Some of the conclusions drawn from Table 4 may be displayed as follows:—

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<table>
<thead>
<tr>
<th>Healthy Controls</th>
<th>Primary Tuberculosis</th>
<th>Post-primary Tuberculosis</th>
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the symbols being equivalent to the bondage or similarity between the groups.

It is also of interest to note that comparison of the incidence of the three arbitrary grades of severity of contact histories among the four groups of soldiers shows no instance in which any group had a significantly heavy or light overall contact history (col. 26 of Table 4). It is recalled that in assessing these grades of contact, not only were numbers of contacts considered, but also the frequency of contact, intimacy of contact, total time over which these contacts were made, and the time since contact was last made.

(To be continued)
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J. F. Boyd

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