with the patient's ARCM allows both the differentiation of 'true' from 'relative' polycythaemia and also the estimation of 'excess' red cell mass in true polycythaemia (Wetherley-Mein, 1974). It has been found to be simple to use and valuable in clinical practice; some examples are given in the Table.

Table Comparison of results of expected normal red cell mass (ENRCM) and actual red cell mass (ARCM) in true and relative polycythaemia

<table>
<thead>
<tr>
<th>Haematocrit (1/l)</th>
<th>ENRCM</th>
<th>ARCM</th>
<th>Excess RCM</th>
<th>Relative</th>
<th>Primary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>M</td>
<td>F</td>
<td>M</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>Height (m)</td>
<td>1-64</td>
<td>1-59</td>
<td>1-59</td>
<td>1-50</td>
<td></td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>83-1</td>
<td>66-5</td>
<td>66-6</td>
<td>40-6</td>
<td></td>
</tr>
<tr>
<td>ENRCM (1)</td>
<td>2-05</td>
<td>1-65</td>
<td>1-75</td>
<td>1-21</td>
<td></td>
</tr>
<tr>
<td>ARCM</td>
<td>2-13</td>
<td>2-01</td>
<td>3-29</td>
<td>2-79</td>
<td></td>
</tr>
<tr>
<td>Excess RCM</td>
<td>0-08</td>
<td>0-36</td>
<td>1-54</td>
<td>1-58</td>
<td></td>
</tr>
</tbody>
</table>

My thanks are due to Dr A. P. Kenny for mathematical assistance.

**Letters to the Editor**

**Bacterial contamination of laboratory forms**

It has been suggested that since request forms and positive culture plates are handled simultaneously by the same technician while working at the bench in the microbiology department, these forms should not be forwarded to the wards or the general practitioners because of the potential risk of cross-infection. Therefore, in many microbiology units the original report is filed in the laboratory office and a photocopy is sent to the clinician. To study this hazard we decided to examine the form filed in the laboratory for the presence of pathogens and other contaminants.

Altogether 129 bacteriology, 50 haematology, and 50 chemical pathology request forms were examined for this purpose. The haematology and chemical pathology forms were included to act as controls.

The forms normally rested on the work bench while being completed. But sometimes all of them were put together inside the bench book. The staff were instructed to wash their hands thoroughly before going to the rest room to eat, drink, or even smoke after handling these laboratory forms in order to minimise the possibilities of laboratory-acquired infection.

Forms from the wound swab bench were sampled with serum-coated swabs dipped in nutrient broth (Oxoid CM67) by sweeping method twice in front and thrice on the back from edge to edge. They were inoculated onto blood agar (two plates—Difco 0792-30) and on MacConkey agar (Oxoid CM76); one blood agar plate was incubated aerobically and one anaerobically. Then the swab was placed in nutrient broth and after overnight incubation subculture was made again as above.

The same swabbing technique was applied to forms from the faeces bench but blood agar, MacConkey, and deoxycholate citrate agar (Colindale Media Preparation Department) were inoculated, and the swab was left in Selenite F broth (Colindale—as above) overnight. After overnight incubation the broth cultures were subcultured, aerobically and anaerobically, on blood agar, and aerobically on MacConkey agar.

For forms from the TB room a wet calcium alginate swab (Medical Alginites Ltd) was used. After disintegration of the swab in 10 ml of Ringer's solution containing 1% sodium hexametaphosphate (British Drug House Chemical Ltd) the glass universal (4 x 4 in) was centrifuged for 15 minutes at 5000 rpm. After decanting the supernatant, the deposit was inoculated into Middlebrook's medium (Difco 0713) and incubated for one week at 37°C. Then the whole of this liquid

**References**


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medium was again centrifuged for 15 minutes at 5000 rpm and the deposit was inoculated onto two Löwenstein Jensen slopes (Colindale).

The haematology and chemical pathology forms were divided into two equal groups and treated like wound and faeces forms.

After photocopying of reports the top of the photocopier machine where the forms are placed was swabbed liberally, and the swab was examined in the same way as the wound swab.

The results have been summarised in the accompanying table. It is clear that only a few request forms grew organisms on direct culture. Very scanty coagulase-negative staphylococci were grown from the photocopier.

Previous reports have shown that medical laboratory workers, because of the nature of their work, are more vulnerable to infection while handling contaminated specimens (Harrington and Shannon, 1976, 1977). It has been suggested that since in the microbiology department the request forms are always handled by the technician simultaneously with virulent positive cultures, for example, multiresistant organisms, Salmonella typhi, pseudomonads, food-poisoning organisms, etc, at the same working bench stacking culture plates and request cards, these forms could well be highly contaminated. Assuming that they were, then cross-contamination may occur not only within the laboratory staff but also outside in the wards among clinical and nursing staff handling or sorting out patients’ laboratory reports. However, even after employing enrichment technique we have failed to confirm that this happens. In fact very few organisms were grown—mostly coagulase-negative staphylococci and an occasional pseudomonas or klebsiella. The very low recovery rate of the last two named organisms may well be explained by the fact that the forms were dry and showed no detectable moisture. We were also surprised to notice that the level of contamination was so low as not to be of any significance.

The fact that bacteria were more often isolated in haematology and chemical pathology departments may be explained by the fact that the liberal use of disinfectants for cleaning the working surface is perhaps more frequent in the microbiology department because of the risk of cross-infection. TB forms are, nevertheless, always handled at the same time as the stained smear. We did not expect to grow Mycobacterium tuberculosis, but the absence of even environmental non-pathogenic mycobacteria is rather surprising.

Nevertheless from the findings of this study no one working in the laboratory should develop a sense of complacency. Neither are we suggesting that for the office staff, in particular, hand washing will not be necessary after handling laboratory request forms. After handling forms hands must be washed, as has already been suggested (Department of Health and Social Security, 1972; Public Health Laboratory Service, 1976, unpublished).

But we believe that recommendations or guidelines for a code of practice should be based on sound and realistic microbiological evidence rather than on assumption.

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References


Broadsheet 88

With reference to Broadsheet 88 ‘Examination of cerebrospinal fluid protein’, the author mentions the difficulties when a small volume of CSF has to be shared among a number of departments. If the specimen is sent first to the bacteriology laboratory it can be centrifuged, providing the deposit for film and culture and the supernatant passed on for the biochemical analysis. This is particularly important if tuberculous meningitis is a possibility, and the best available deposit is thus obtained for the Ziehl Neelsen film.

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