

## Short reports

# Review of the clinical activity of medical microbiologists in a teaching hospital

S L Wooster, J A T Sandoe, J K Struthers, K W Loudon, M R Howard

### Abstract

**Background**—The clinical interactive role of medical microbiologists has been underestimated and the discipline is perceived as being confined to the laboratory. Previous studies have shown that most microbiology interaction takes place over the telephone.

**Aim**—To determine the proportion of clinical ward based and laboratory based telephone interactions and specialties using a microbiology service.

**Methods**—Clinical microbiology activity that took place during November 1996 was prospectively analysed to determine the distribution of interactions and specialties using the service.

**Results**—In all, 1177 interactions were recorded, of which nearly one third (29%) took place at the bedside and 23% took place on call. Interactions involving the intensive treatment unit, general ward visits, and communication of positive blood cultures and antibiotic assays were the main areas of activity identified. There were 147 visits to 86 patients on the general wards during the study, with the number of visits to each individual varying from one to eight. The need for repeated visits reflected the severity of the underlying condition of the patients. Ward visits were regarded as essential to obtain missing clinical information, to assess response to treatment, and to make an appropriate entry in a patient's notes.

**Conclusions**—Ward visits comprise a significant proportion of clinical microbiology interactions and have potential benefits for patient management, service utilisation, and education.

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The increasing prevalence of multiresistant bacteria and nosocomial infection, and the paucity of new antibiotic classes to fight such infections are all reasons why medical microbiology should be an expanding specialty rather than contracting as it currently is. This specialty has long been considered laboratory based, and medical microbiologists have been

criticised for rarely visiting wards.<sup>1</sup> It has also been stated that the work of medical microbiologists is not as visible as surgery or medicine and therefore goes unnoticed.<sup>1</sup> Few studies have examined the clinical activity of medical microbiologists but these have shown that telephone conversations account for a high percentage of clinical interactions.<sup>1-3</sup> The roles of the consultant microbiologist involve overall management of the laboratory budget, appropriate clinical use of the laboratory facilities, production of clinically relevant and accurate results, hospital infection control, and importantly the management of patients with infections (through clinical interpretation of relevant laboratory results and antibiotic treatment advice). Medical microbiologists, with an intimate knowledge of infections, their aetiological agents, and their training in the use of antibiotics, are well placed to provide clinical services which extend beyond the laboratory, back to the bedside. The recent NHS Executive review of pathology services recognised the important role of pathologists in the clinical process and identified the complex interrelationships between the provision of test results and the use of that result.<sup>4</sup> In the light of the above comments and findings we reviewed our clinical activity over a period of one month to determine the proportion of clinical ward based and laboratory based telephone interactions and specialties using the service. This was facilitated by a system in place in our department whereby all telephone and ward based interactions are recorded in a designated log book.

### Methods

The medical microbiology department serves Central Manchester Healthcare NHS Trust which comprises Manchester Royal Infirmary, Manchester Royal Eye Hospital, St Mary's Hospital for Women and Children, University of Manchester Dental Hospital, and the Robert Barnes Hospital for Care of the Elderly (1093 beds in all), and includes all the major specialties associated with a major teaching centre. In addition to normal working hours, a routine diagnostic service is offered on weekdays, 1900-2130, and on Saturday and Sunday, 0830-1200 and 1500-1800. A 24 hour on call service is provided by scientific and medical

Department of  
Medical Microbiology,  
Clinical Sciences  
Building, Manchester  
Royal Infirmary,  
Oxford Road,  
Manchester M13 9WL,  
UK

S L Wooster  
J A T Sandoe  
J K Struthers  
K W Loudon  
M R Howard

Correspondence to:  
Dr Sandoe.

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Table 1 The categorisation of clinical microbiology interactions

New blood cultures	Gram stain of new positive blood culture communicated to clinician and treatment advice given
Follow up blood culture	Culture and sensitivity result of previous day's positive blood culture communicated to clinician and advice given
Advice	Medical microbiologist contacted by clinician for advice
Antibiotic assay (levels)	Result of antibiotic assay telephoned to clinician or nursing staff and advice given
Infection control	Results or advice given regarding infection control
Notification	Notifiable infectious diseases communicated to the consultant for control of disease in the community (CCDC)
General practitioner	Results telephoned to surgery and advice offered, or General practitioner telephoning for advice
Others	For example, advice given on collection of appropriate specimens, calls to other hospitals
Intensive therapy unit ward round	Clinical and microbiological review of patients and prescription of antimicrobials where appropriate
General ward round	Visits to selected patients on the general wards with clinical and microbiological review of the need for antimicrobial agents

staff. Clinical work was carried out by one consultant, one specialist registrar, one senior house officer, and one lecturer (on call only). Data were collected during November 1996.

Clinical interactions with medical staff, nursing staff, or other health care workers were categorised as either laboratory based or ward based. The laboratory based interactions took place by telephone from the laboratory offices; ward based interactions took place at the bedside. Interactions were categorised according to the definitions in table 1. Telephone inquiries to the laboratory for results not requiring clinical input were logged separately. During the week (Monday to Friday), ward interactions consisted of a daily consultant led visit to the intensive treatment unit (ITU) where the clinical status and prescription of antibiotics for each patient was reviewed with the intensivists, based on a daily update of the microbiology results. This was followed by visits to other wards to review selected patients, assess the clinical significance of microbiology results, and advise on the appropriate prescription of antibiotics.

### Results

During the period of the study, 9145 specimens (149 189 Welcan units<sup>5</sup>) were received in the laboratory, of which 9% were from general practitioners. The total number of specimens for the year April 1996 to March 1997 was 106 804 (1 788 531 Welcan units). Over the 30 day period there were 1177 clinical interactions, of which 346 (29%) were ward based and 831 (71%) were laboratory based telephone communications. Nine hundred and forty telephone calls which did not require clinical input were recorded during the study.

The categorisation of clinical interactions is presented in fig 1. ITU and general ward rounds were the main areas of clinical activity identified, closely followed by communication of both new and follow up blood cultures. The on call interactions accounted for 23% of the 1177 interactions.

The distribution of interactions according to clinical specialty is shown in fig 2. The ITU ward round and those to general medicine and surgery were dominant. On average, seven patients were reviewed in ITU while five would be seen on the general ward round each day.

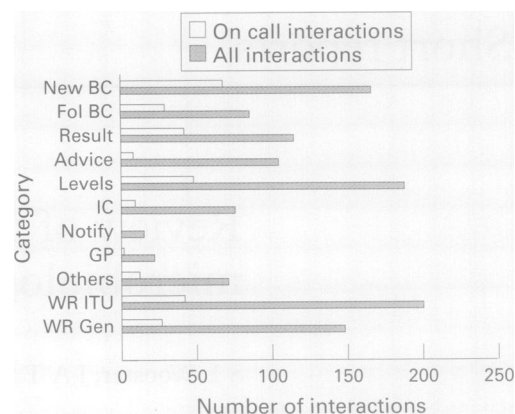


Figure 1 Distribution of clinical microbiology interactions according to category. Fol BC, follow up blood cultures; WR Gen, general ward round; GP, general practitioner; IC, infection control; New BC, new blood cultures; Notify; notification; WR ITU, intensive therapy unit ward round.

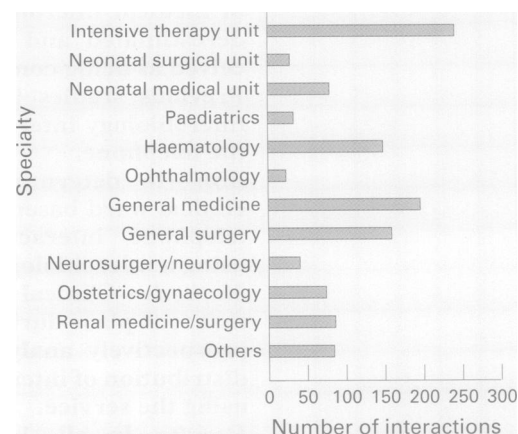


Figure 2 Distribution of total microbiology interactions by specialty.

There were 147 visits to 86 patients on the general wards during the study, the number of visits to each individual varying from one to eight. The need for repeated visits reflected the severity of the underlying condition of the patient, as in a case of *Cardiobacterium hominis* endocarditis and another of recurrent peritonitis following multiple surgical procedures.

### Discussion

During the four week period of the study there were 1177 clinical interactions. Chadwick *et al* reported 136 telephone interactions over a six week period,<sup>2</sup> Balfour<sup>3</sup> reported 280 clinical interactions over a 10 week period, and Mehtar<sup>1</sup> reported 2397 interactions over a 12 month period. Nearly one third (29%) of all clinical activity during this study was ward based, compared with 18% reported by Balfour.<sup>3</sup> Figure 2 shows the broad range of specialties with a clinical microbiology input. ITU and general ward rounds are the main specialist areas involved, followed by haematology and the regional neonatal unit. Ophthalmology was identified as the specialist area with the least clinical microbiology input, but here there was essentially one interaction each day where conditions such as endophthalmitis were discussed. Communication of antibiotic assay results was also an important activity, accounting for 16% of interactions. This may be accounted for by the introduction of a pulsed

dose/once daily gentamicin regimen two years before the audit; many of these interactions involved discussion of patient's renal function and calculation of creatinine clearance in order to determine the appropriate dosing interval for aminoglycosides (and glycopeptides). Eighty four per cent of laboratory based telephone interactions and the majority of ward based clinical interactions were proactive, compared with 49% of all interactions reported by Balfour.<sup>3</sup> The time spent between the different components of the microbiologists' work vary with local circumstances<sup>1</sup> and the relatively small proportion of time spent in infection control (6%) during the study period probably reflects normal variation.

Ward visits were regarded as essential in many cases to obtain clinical information which was not forthcoming during telephone communications (such as the patient's current status and past medical history) and to document advice in a patient's notes. As well as being an important part of communication between clinicians, such entries may provide significant documented evidence in medico-legal cases. We found that the medical microbiologist on site at weekends often visited patients with positive blood cultures because the on call doctor was unfamiliar with the patient concerned. Such a situation appears to have arisen from the reduction in junior doctors' working hours, with on call doctors providing cross cover for more wards and larger numbers of patients.

It is our belief that ward based interaction is also central to the continuing education of not only all grades of medical microbiologist, but all staff caring for patients with infections. This point was highlighted by Philpott-Howard, who stated that the trainee medical microbiologist should have extensive experience in clinical microbiology.<sup>6</sup> He also identified the importance of the ward presence of medical microbiologists in highlighting their clinical role and attracting undergraduates and house officers to the specialty.

Fundamental to the future provision of pathology services is optimal utilisation of resources. It is difficult to assess the cost-effectiveness of clinical microbiology liaison

but there are many areas where cost benefits might be anticipated, and ward based liaison expected to enhance these benefits. In 8% of all interactions it was recommended to start antibiotics, in 12% to change of existing treatment, in 3% to stop antibiotics, and in 77% to take no action or not to begin antibiotics. The cost benefits of these recommendations cannot be accurately assessed from this simple audit. However, a change in treatment often comprised a change from broad spectrum (often expensive) empirical antibiotics to narrow spectrum agents on the basis of clinical and culture results. Reduction in the number of antibiotics or stopping them completely will inevitably have cost benefits in terms of drug and drug administration savings. Ward visits allow more stringent monitoring of antibiotic usage and adherence to antibiotic policies, which has been shown to have cost benefits.<sup>1</sup>

Our generalist approach is responsive to the needs of each patient and individual hospital unit through personal contact with appropriate staff. Regular service provision reviews provide a forum for feedback between users and providers of medical microbiology at Central Manchester Healthcare Trust. Appreciation of the interactive clinical service we provide is expressed through these meetings and during ward visits. It has been stated that the work pattern of medical microbiologists is not as visible as surgery or medicine and therefore is unnoticed by all, including management.<sup>1</sup> While a ward based clinical microbiology approach makes this discipline visible and more accessible, low staff numbers (often single handed consultants) will inevitably hamper service provision.

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