



The Royal College of Pathologists

Association of Medical Microbiologists

**Getting ahead of the curve – a strategy for infectious diseases
(including other aspects of health promotion)**

**Recommendations on configuration of clinical and
public health microbiology and virology services
for the diagnosis, prevention and
management of infection**

**Report of a Joint Working Group of The Royal College of
Pathologists and Association of Medical Microbiologists**

April 2002

INTRODUCTION

The implementation of the Chief Medical Officer's Strategy provides an opportunity to improve and strengthen our capability and capacity to prevent, manage and control infectious disease as part of the overall health protection function. As medical microbiologists and virologists we welcome the invitation to respond to the proposals set out in the Strategy. All microbiology departments currently contribute to both clinical and public health microbiology, and thereby to the health of both individual patients and the wider population.

Clinical microbiology and infection control services are an integral part of the care that all patients should receive and these services are provided to all health care sectors, e.g. hospitals, primary care, mental health care. Public health functions are delivered locally, regionally, and nationally through the provision of services including specialist testing, surveillance data, food and water microbiology, and support for consultants in communicable disease control.

The quality of service and level of support that microbiology departments offer to patients, colleagues and the wider population affects quality of care, use of resources and how efficiently others meet their obligations. They are fundamental to the delivery of the whole of the NHS agenda including national service frameworks, the national immunisation programme, controls assurance standards, support for cancer care, waiting list initiatives, and achievement of shorter in-patient stays.

THE CONTEXT AND DRIVERS FOR CHANGE

Microbiology departments are the focus for the management of infection at both the individual patient and population level. Most expert clinical advice on management of infection in the United Kingdom is provided from these departments and microbiology specimens are processed here. Where there are no infectious disease physicians, collaborative working between departments provides the infection service. These departments also provide key personnel and services for the hospital infection control function. Microbiology departments detect a substantial proportion of clusters and outbreaks of infectious disease and are likely to be involved at an early stage in the detection of deliberate releases of biological agents.

Several factors must be considered in planning the future provision of clinical microbiology services:

Increasing workload

- The growing burden of microbial disease (including the growing number of diseases and syndromes for which an infectious aetiology is demonstrated).
- Initiatives requiring microbiological support for example, cancer networks, *HIV and sexual health strategy*, tuberculosis.
- Initiatives on healthcare associated infections.
- Initiatives on the use of antimicrobial drugs (including antiviral drugs).
- Increased requirements for clinical microbiology advice both on the wards and by telephone, not only because more patients are being seen by NHS services, some with more complicated conditions, but also because of changing patterns of clinical service delivery for example delegation to nursing staff and junior doctors and increasing specialised care in the community.

Resource constraints

- The staffing crisis in medical microbiology and virology.
- Shortages of clinical scientists and biomedical scientists.
- Lack of academic infrastructure and poor recruitment to clinical professorships.
- Funding issues.
- The Working Time Directive.

Changes in healthcare delivery

- Emphasis on clinical governance and the quality of care.
- Devolution and regionalisation.
- Primary care commissioning.

Modernisation agenda

- Modernisation of pathology.
- Technical developments including molecular diagnostics and near-patient testing.
- Strategy for the provision of national specialist virology services.

Public expectations

- The increasing need to inform the public and patients.
- Meeting public concerns about the safety of food and water.
- Meeting concerns about the equity of health service provision.

RECOMMENDATIONS

Microbiology departments should be the clinical base for the management of infection in individuals and in populations, as highlighted in the Strategy.

Configuration

We recommend that all microbiology laboratories should become part of managed clinical networks.

An analysis of the functions and outputs required for particular populations and geographical areas is necessary. Managed networks will provide the infrastructure to deliver the clinical and public health microbiology functions required. The distribution of these functions within the network will depend on local circumstances and the services commissioned.

The precise configuration of such networks should be made on a regional basis with major input from local microbiologists. In deciding on configurations, due consideration should be given to current arrangements, as in some areas there may already be well-established networks with identified benefits. In other areas networks are embryonic, awaiting forthcoming guidance from the Modernisation of Pathology group. A flexible approach is vital so that it should be possible to build on established or developing systems. The configuration of such networks should be supported by the staff of the constituent laboratories.

Local flexibility is essential to allow for factors such as size and mobility of population, urban/rural mix, and geographical spread. This flexibility should also allow for the formation of microbiology networks that are either part of pan-pathology networks or monospecialty, either across an entire Region or at a sub-Regional level. Regardless of the approach, microbiology networks must develop close links and good relationships with other groups such as those working within the Health Protection Agency, other disciplines within pathology, cancer networks etc.

In terms of management arrangements for microbiology networks, once again we recommend flexibility of approach depending on local circumstance. While for the majority of networks it is likely that there would be a lead Trust, other solutions such as collaborations between universities and the NHS or partnerships with the private sector may be of advantage in some areas. We recommend that it is for local decision as to whether some elements of the network are managed through the Health Protection Agency or whether all aspects of the work are provided via commissioning, including the ability to respond to the threat of deliberate release or bioterrorism. However, overall management and commissioning should be standardised by maintaining a clear line of accountability to the Regional Director of Public Health but with close links to the Health Protection Agency for public health outputs.

Priority setting will need to occur at local, regional and national levels and network structures must be able to respond to all of these. Regardless of exact structure, each microbiology network should have a named medical lead with identified sessional commitment and clear lines of accountability together with support in the form of finance and general management as well as information technology. All networks will need the resources and capability to respond appropriately to a range of challenges, incidents or special requirements (Appendix 1). The ability to respond to the threat of deliberate release/bioterrorism is essential. This capability must be developed with the full involvement of the Health Protection Agency.

Whatever the configuration for the provision of microbiological services at local level we urge that migration to new management structures should be informed by careful planning, should be allied to appraisal of the available resources, should involve regular and accessible communications to all involved staff and stakeholders, and should be carried out expediently. A long drawn out process of change will prolong uncertainty and imperil morale.

Resources

Managed networks will require adequate resources for staff, facilities, management time and support and information technology. Issues such as staff and specimen transport and travelling time will need to be taken into consideration. Raising of standards in conforming to standard testing protocols, improving quality in line with accreditation requirements, improving contribution to surveillance, and taking part in new public health initiatives will all require additional funding.

National shortages of skilled staff of all grades will need to be addressed through detailed attention to workforce planning, recruitment and retention policies, structured training programmes and staff development initiatives. Workforce Confederations will play a key role, and we recommend that Health Protection Agency staff should also come within their remit. Nationally the rebuilding of an academic infrastructure for medical microbiology and virology, with recruitment of adequate numbers of medical and scientific trainees to meet projected service needs, will be of critical importance (Appendix 2).

Food, water and environmental microbiology services

Facilities for food and environmental microbiology services require special consideration and input from all stakeholders including CCDCs, Environmental Health Departments and representation from microbiology networks. The current configuration allows for significant input from medical microbiologists, sharing of information from both clinical and non-clinical specimens and excellent links with local authorities. Any new systems must build on existing strengths and ensure that issues around training, succession planning and accreditation are taken into consideration.

Reference/specialist laboratories

We recommend a critical review of all national reference facilities. This should take into account facilities which provide for very small numbers of specialist tests, e.g. diphtheria toxin confirmation, anthrax confirmation and those providing for larger scale testing, e.g. tuberculosis reference services, meningococcal reference facilities. Further recommendations are to be found on page 11 of Appendix 2.

Specialised pathology services including those for microbiology and virology are being addressed by the National Specialised Services Definitions Project. This work will also feed into the Modernisation of Pathology recommendations. It is important that duplicate work and conflicting recommendations are avoided and therefore close liaison is required.

Virology

We append a draft document (Appendix 3) supported by all virologists which recommends a national network that would link to local networks of pathology. Overall there is a requirement for a robust clinical virology service to be provided to each microbiology network as well as for training and updating for medical microbiologists.

Academia

There is a need to integrate the provision of infection services with academic centres of microbiology. There is also a need to make developments in academic clinical microbiology laboratories in line with the academic strategies emerging from the Academy of Medical Sciences.

Standard protocols

We recommend that there should be a minimum standard for both population sampling and individual patient testing protocols to which additional sampling or testing may be added depending on local needs or national initiatives and the provision of appropriate resources.

There should be a national group to provide evidence based, dynamic, regularly revised nationally accepted standard operating procedures. This is an expensive and time consuming process that will need new resourcing. Innovation must be encouraged and input from R&D programmes is essential.

Laboratory accreditation

We recommend that for each microbiology network it would become mandatory to be within an accreditation system, e.g. CPA.

Inspector of microbiology

We welcome the leadership role envisaged for the Inspector of Microbiology. Some of the functions, however, may best be achieved through other mechanisms:

- Function 1: Meeting responsibilities for public health surveillance – we believe that this output could best be monitored by the HPA at a Regional level, although another mechanism may be via the performance management responsibility of Strategic Health Authorities.
- Function 2: Promoting quality assurance in laboratories – this may be best achieved through CPA.
- Function 3: Identifying gaps in specialist testing - again this should be through the HPA and RDPH.

Function 4: Adherence to SOPs – this would not be possible through an Inspectorate process. Through CPA it may be possible to check that laboratories have standard operating procedures which take account of national standards. As part of the inspection process, CPA inspectors currently review SOP documentation and laboratory practice. The exact content of SOPs (methods, techniques, instrumentation) will vary according to local practice. The introduction of national standard protocols for investigations associated with population screening and other public health functions will require a change in emphasis in this part of the inspection process. We would recommend early discussions with CPA regarding these changes. In terms of output, audit is required to assess any major differences in rates of detection of organisms which would show whether protocols were being adhered to.

Functions 5 and 6: For these functions an Inspectorate working collaboratively with the Health and Safety Executive as well as with CPA for purely diagnostic laboratories may be a viable solution. However, we would recommend that multiple isolated inspections of the same facility be avoided. This function will be of particular importance for non NHS laboratories, especially in industry and universities, all of which should be registered by the Inspectorate and visited by them or the HSE.

APPENDICES

Appendix 1

How would the organisation respond to some tests?

Appendix 2

Consultant Workload and Staffing in Medical Microbiology and Virology
Report of a Working Group of The Royal College of Pathologists

Appendix 3

A National Strategy for Clinical Virology in the UK
The Formation of the UK Clinical Virology Network

MEMBERS OF THE WORKING GROUP

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APPENDIX 1

HOW WOULD THE NEW ORGANISATION RESPOND TO SOME TESTS?

1. A major community outbreak of gastro-intestinal disease

The initial recognition of an outbreak usually follows either calls from the public, environmental health or primary care teams or after laboratory recognition of a significant number of cases related in time and space with a similar pathogen. Early identification of the problem and setting up the incident team depends on good communication between public health (CCDC or equivalent), EHOs, clinicians (especially GPs) and the microbiologist. This will be improved by setting standard case definitions, sampling protocols and laboratory methods. The Regional team and Agency will facilitate communication by improving IT links and set standards which will be regularly monitored.

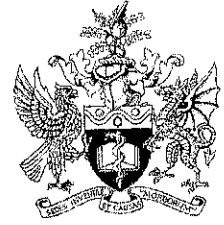
If the outbreak is large and covers other health communities served by different laboratories the network will assist in deploying staff or samples working to agreed protocols. It is worth stating that no lab in the UK has spare capacity to manage a "surge" but a managed network is more likely to deal with the situation than at present. Food and other environmental samples will be handled by a designated laboratory in the network which may or not be managed by the HP Agency. Similarly, virology specimens eg EM for SRSV (Norwalk-like viruses) will be processed by a designated laboratory to which each part of the network has equal access.

2. Reduce the incidence of a specific infection, e.g. TB, meningococcal, chlamydia

A planned long term programme would need to be agreed as a national or local priority and additional funding including those for laboratory testing allocated. If the present capacity for genotyping *M. tuberculosis*, improving access to meningococcal PCR or screening a risk population for *C. trachomatis* is insufficient this must be expressed implicitly before the programme can start. The benefits of the new system of distinct commissioning for such PH programmes would be that a network would be able to develop resources across a health community to match need. Contracts would be agreed with specialist providers e.g. university departments for typing or molecular diagnostics. Improved IT links would facilitate laboratory reporting to a required regional or sub-regional surveillance centre.

3. Uncontrolled serious illness in a hospital

One of the major advantages of a complete microbiological network will be in managing HAI. Whereas at present some infection control teams are isolated and short of resources it will be possible to share expertise to improve surveillance of HAI, access to epidemiological methods and typing and infection control staff to assist in managing the incident. A common example is dealing with *C. difficile* diarrhoea in wards control of which may require strict antibiotic policy, environmental cleaning, patient cohorting and testing individuals.



The Royal College of Pathologists

**Consultant workload and staffing in
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Archived

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SUMMARY

The range, complexity and volume of work carried out by consultant microbiologists and virologists have all increased considerably over the last ten years, with only a small increase in staffing numbers. In comparison, there has been a major expansion in consultant numbers in other medical specialties and in numbers of general practitioners (GPs). Consultant microbiologists and virologists make major contributions, not only to the welfare of individual patients, but to public health as well.

A recent questionnaire survey of consultant microbiologists and virologists confirmed a rising workload, with many respondents working long hours, accompanied by heavy on-call commitments and consequent deteriorating job satisfaction and morale.

The working group proposes a formula for assessing the adequacy of consultant microbiologist staffing. The formula is based on the size of the resident population served, adjusted by weighting factors for:

- the number of acute hospital sites served
- the presence of doctors in training in the department
- the requirement to provide support for a range of tertiary referral units
- participation in undergraduate teaching
- additional population served for virology.

The formula is applicable to clinical microbiology laboratories and should be applied by CPA inspectors as part of the laboratory accreditation process.

In addition, the working group proposed that:

- in order to safeguard consistent high standards of clinical practice, single-handed consultant posts should no longer be regarded as acceptable, either for microbiology or for virology
- no consultant microbiologist or virologist should be required routinely to be on-call more frequently than 1 in 3
- clinical virology needs a nationally coordinated strategy and staffing structure, geared to meeting the needs of the UK population. A 'hub and spoke' structure is proposed, with a significant increase in the consultant medical virologist and consultant clinical scientist establishments and support for local microbiology laboratories
- in order to safeguard the future staffing position, the impact on clinical microbiological services of new consultant appointments in acute specialties is recognised and funded
- consultant microbiologist and virologist job plans should generally include sessions with fixed clinical commitments.

The working group recommendations may result in an increase in bids for additional consultant microbiologist and virologist posts. Medical workforce planning issues and academic medical microbiology and virology infrastructure will be of paramount importance. The erosion of academic microbiology and virology in the UK is therefore a cause for considerable concern. The working group recommends that the Royal College of Pathologists and the Association of Academic Clinical Bacteriologists and Virologists should consider what options are available to improve the current position as a matter of some urgency.

INTRODUCTION

Recent developments in the NHS have led to increasing pressures on consultant time. Involvement in managerial and clinical governance issues, participation in professional development and clinical audit are all essential, but add to the workload of consultants who already have heavy clinical commitments. Structured programmes for doctors in training require that they have protected time for personal development and that consultants set aside time to teach them. This further increases the burden on consultants with teaching responsibilities. For many years, consultant microbiologists and virologists have responded to rising workloads by re-prioritising their activities, but the scope for further refocusing is now very small.

Over the last 10–15 years a profound cultural change has occurred among both hospital doctors and GPs. The current generation of doctors has grown up with, and now expects, the availability of a comprehensive clinical microbiology service at all times. This is a reasonable expectation, given the ever-increasing range and complexity of clinical microbiology. Hospital Trust Boards and Health Authorities often see the need to expand clinical services through the appointment of new consultants, but do not always recognise that new appointments must be supported with adequate resources in diagnostic services.

Consultant microbiologists and virologists now act increasingly at the interface between the laboratory and the ward (or primary care) doctor. Key roles are to advise on the investigation and management of individual patients and to interpret the results of the tests undertaken in light of the patient's clinical condition. This increasingly clinical role has been highlighted in a number of recent audits and studies.^{1–4} The diverse range of activities now carried out by consultant microbiologists and virologists was summarised recently in the College's *Medical and Scientific Staffing of NHS Pathology Departments*.⁵ The activities include:

- ward visits and clinical liaison with general and specialist units
- 24-hour telephone advice and support for hospital practitioners
- hospital and community infection control
- interpretation of laboratory results
- microbiology advice to primary care
- teaching doctors in training (microbiologists and other), laboratory staff, nurses, and other hospital and primary care staff
- investigation and management of outbreaks
- public health microbiology
- support for the Consultant in Communicable Disease Control (CCDC) and Environmental Health Departments
- investigation and management of imported infections
- laboratory management

- clinical and laboratory audit
- CME/CPD
- research and development
- undergraduate teaching (in medical school departments)
- regional, national and international responsibilities.

The workload of consultant microbiologists and virologists has been rising for many years. Audit Commission data confirmed steady workload growth in microbiology laboratories throughout the 1970s and 1980s, as measured by requests for investigation.⁶ The same trend has continued throughout the 1990s (Public Health Laboratory Service, unpublished data). The range and complexity of the workload undertaken by consultant microbiologists and virologists has risen faster still, with increasing requirements for sophisticated clinical microbiology and virology services, growing demands for consultant input into infection control and antimicrobial prescribing, and by the need for a greater participation by consultants in audit, management and teaching.

Increases in the numbers of identified pathogens and disease syndromes have been accompanied by a rapidly expanding repertoire of laboratory diagnostic tests, including molecular tests, and by a growth in the range of antimicrobial agents. A sustained rise in the prevalence of MRSA and of numbers of hospital-acquired infections have led to the issuing of a Health Service Circular⁷ and a report by the National Audit Office.⁸ There is similar concern regarding the prevalence and rising trend of antimicrobial resistance, not only in bacteria but also in viruses and protozoa. Such resistance is already compromising patient management and may be associated with inappropriate prescribing of antimicrobials.⁹

To these changes must be added increases in the numbers of travel-associated infections, the increasing requirement for outbreak detection and management, and the availability of a far greater number of other communicable disease interventions, notably vaccines. Advice to professional colleagues and to the public is now required in all these areas.

In contrast to this rising workload, consultant microbiologist and virologist numbers increased only modestly between 1987 and 1997, and subsequently (data from the Department of Health's Medical and Dental Workforce Census and from the Royal College of Pathologists).

A questionnaire survey of consultant microbiologists and virologists carried out in June 1999 elicited a high response rate (~80%). It confirmed that many of these professionals are working unacceptably long hours, and have demanding on-call commitments as well.¹⁰ These increasing pressures are resulting in deteriorating job satisfaction and morale, with large numbers of consultants in all age groups actively planning early retirement.

THE COLLEGE WORKING GROUP

In March 2000, the Royal College of Pathologists' Specialty Advisory Committee in Microbiology commissioned a working group to examine consultant workload and staffing in medical microbiology and virology with the following objectives:

- to produce a robust formula that could be utilised by Clinical Pathology Accreditation (CPA) inspectors to assess whether consultant numbers in a laboratory (or group of laboratories) were adequate

- to assess the impact of the appointment of new consultant posts in other specialties on medical microbiologists' and virologists' time
- to produce advice on drafting business cases and job plans when making the case for new consultant microbiologists and virologists
- to consider the problems encountered by single-handed consultant microbiologists and virologists and to make recommendations for overcoming them
- to consider briefly the repercussions of any recommendations on consultant microbiologist and virologist training and on medical workforce planning
- to consider briefly the implications of any medical workforce planning recommendations on academic microbiology and virology in the UK. .

The members of the working group were selected so that the views of consultants with experience of district general hospitals and teaching hospitals, and including both NHS and Public Health Laboratory Service (PHLS) employees, could be represented. Membership of the working group is detailed in Appendix 1. The working group included members of the Association of Clinical Pathologists, the Association of Medical Microbiologists and the Hospital Infection Society.

Whilst recognising the key role played by biomedical scientists in the provision of microbiological and virological diagnostic services in the UK, the remit of working group did not include a consideration of the staffing issues related to this group of health care professionals, since a study by the Institute of Biomedical Sciences was already in progress.

ASSESSING THE REQUIREMENT FOR CONSULTANT MEDICAL MICROBIOLOGIST STAFFING

College guidelines on recommended numbers of consultant medical microbiologists were based in the 1980s on the population served (a recommendation that there should be two consultant medical microbiologists per 250 000 population), and more recently on the volume and content of the job (the 1999 College formula⁵).

The working group attempted to devise a formula applicable to all types of clinical microbiology laboratories in the UK, whether teaching hospital, district general hospital or PHLS. However, the medical workforce implications of public health microbiology and the specific additional requirements of Public Health Laboratories were excluded from consideration, as were the needs of private hospitals.

Options for a formula based on numbers and complexity of laboratory specimens, numbers of acute beds served, and resident population served, were all explored. The first option was rejected primarily because laboratory workload is not measured in a standardised way in UK microbiology laboratories and also because laboratory (analytical) workload does not always correlate with clinical workload.

The second option was rejected because of the difficulty in defining the term 'acute bed', and also because it did not take into account the provision of clinical microbiological services to the primary care sector.

The formula finally selected for calculating the requirement for consultant medical microbiologists was derived from a model proposed by Dr Hugh Webb of the Belfast City Hospitals Trust, to whom the working group is indebted.

The formula is based on the resident population served by the department of microbiology (1), with weighting factors for:

- number of acute sites covered (2)
- availability of support from doctors in training (3)
- tertiary clinical referral units served (4)
- undergraduate teaching commitments (5)
- additional resident population for virology (6).

Weighting for regional and sub-regional specialties made it possible to take into account the fact that the resident population for (some) teaching hospitals is small. Use of catchment population was not feasible since it varies between specialties within individual hospitals.

THE MODIFIED WEBB FORMULA

Population served (1)

The baseline is set at one consultant microbiologist per 150 000 resident population. This baseline figure, and the attendant weighting factors, were established following detailed modelling of consultant numbers relative to resident population served, across a range of district general hospitals and teaching hospitals, where the working group assessed the medical microbiologist workforce as adequate (or in some cases, inadequate), but not excessive. Numbers of GPs were not considered in this model, since GP list sizes now show less variation than in the past, and therefore numbers of GPs are probably reflected with reasonable accuracy within the resident population estimate on which the formula is based.

Number of acute hospital sites covered (2)

If two or more acute hospital sites are served, the resident population figure (1) is multiplied by 1.1. This takes into account the additional complexity inherent in a multi-site service, and the loss of time caused by travelling between sites.

Support from medical microbiologists in training (3)

If there are no medical microbiologists in training in the department, the result of (2) is multiplied by 1.15, or if there is a single trainee, by 1.05. If there is more than one full-time trainee, no weighting factor is applied. The working group recognised that the training needs and the service contributions made by trainees vary according to their experience but, following wide consultation, on balance it was felt that trainees make a positive impact.

Tertiary referral specialist clinical services (4)

For each of the following tertiary referral clinical services covered, the result of (3) is multiplied by the factor(s) indicated, up to a maximum of 1.4.

Cancer Centre (serving a population of 1 million or more) 1.1

Cardiac surgery 1.1

Transplant services *viz.*

allogeneic BMTs	1.1
liver/pancreas	1.1
renal	1.1
cardiac/lung	1.1
Neurosurgery	1.1
Burns/plastic surgery	1.1
High level cystic fibrosis (Level 1 or 2 service)	1.1
Spinal injuries	1.1

Weighting factors should be applied such that a laboratory or department serving a hospital with two such units each with a weighting factor of 1.1 would have a cumulative weighting factor of 1.2 (1.1 + 1.1) and not 1.21 (1.1 x 1.1), up to a maximum weighting factor of 1.4.

The list of tertiary referral units is not comprehensive. Others may need to be included with a weighting factor of 1.05–1.1 depending on the clinical microbiology support required, for example hospitals providing inpatient care for large populations of HIV infected individuals.

Undergraduate teaching commitments (5)

For the following undergraduate teaching commitments per department the result of (4) is multiplied by one only of the factors indicated:

- 20 or more lectures/1 h teaching sessions per annum 1.05
- 40 or more lectures/1 h teaching sessions per annum 1.1
- provision of practicals as well as lectures and teaching sessions 1.2

The working group recognised that many consultant microbiologists and virologists carry out a variety of other teaching commitments, for example to GPs, nurses and hospital doctors. Since this is a commitment common to most consultants and most departments, it was not included as a specific weighting factor.

Laboratories requiring dual CPA inspection in microbiology and virology

A number of UK microbiology laboratories offer a sizeable virology service in addition to their microbiology service, but without the benefit of a specialist consultant clinical virologist. These laboratories are identified by the need for separate CPA virology inspectors in addition to microbiology inspectors during the CPA accreditation assessment process.

In such laboratories, the resident population served by the laboratory for virology is often larger than the resident population served for microbiology. Where the resident population for virology is at least 250 000 larger than the resident population for microbiology, an additional weighting factor of 1.1 should be applied (6).

Contribution of associate specialists, clinical assistants and clinical scientists

The contribution to clinical microbiological services made by associate specialists, clinical assistants and clinical scientists needs to be taken into account in arriving at a figure for the recommended level of consultant microbiologist staffing in a particular department. These members of staff provide an important, often critical contribution to the clinical microbiology service of a laboratory.

Consultant clinical scientists may be expected to contribute to the clinical microbiology service in equal part with their medically-qualified colleagues.

Contribution of infectious disease physicians

Infectious disease physicians play a major role in managing inpatients with infections. Where there are such physicians in post, they may be expected to deliver clinical services that in other circumstances would be required of consultant medical microbiologists. Due allowance for this contribution should be made.

Laboratories serving popular tourist areas

Additional clinical microbiological workload may be generated by transient rises in the resident population such as occur in hospitals serving popular tourist and holiday destinations. However, since most holidaymakers and tourists are relatively healthy, the working group felt that additional weighting would only be necessary in exceptional circumstances.

Application of the formula

Any proposed formula that attempts to model the consultant staffing requirements of a broad range of microbiology departments will inevitably be open to criticisms of lack of precision. The working group members were in agreement that it was not possible to attempt to identify and to include within the formula every factor that might influence the need for consultant staffing. CPA inspectors must be alert to the possibility that there may be special local factors that would require consideration when assessing the adequacy of consultant microbiologist staffing. Such factors could determine a need for either a higher or a lower level of consultant staffing.

CONSULTANT MEDICAL VIROLOGIST STAFFING LEVELS

The working group members were unanimous that there was a severe shortage of consultant medical virologists with a total of about 40 w.t.e.s (whole-time equivalents) in the UK, together with about a dozen consultant clinical scientists, leading to:

- a lack of critical mass for the specialty
- potential problems in maintaining peer group interactions and professional standards, especially for single-handed virologists
- an inability to meet rising demands for clinical virology associated with characterisation of new viruses, rapid growth in availability of antiviral agents and clinical requirements, including participation in the management of HIV-infected individuals
- problems in recruiting trainees and in effective succession planning.

The working group felt that a fundamental review of clinical virology services in the UK was urgently required, with consideration of the need for a national strategy to address the above problems. The working group's view was that that single-handed clinical virological practice was no longer

acceptable and that numbers of consultant medical virologists and consultant clinical scientists should be based on the size of the population served with a weighting factor if there were substantial patient populations with blood-borne viral infections. As a minimum, there should be one consultant virologist per 1 000 000 people.

The working group recommended that consultant virologists should work in groups of two or more (as determined by the size of population served and other local factors). Each such 'hub' should also be supported by at least one consultant clinical scientist. Since medical microbiologists in district general hospitals spend the majority of their time dealing with bacteriological rather than virological matters, support and regular training and updating should be provided from such a local centre of excellence. A minimum of 20 such hubs was identified as being required for the UK.

These proposals would involve an increase in the numbers of consultant medical virologists and of consultant clinical scientists, and a restructuring of the UK clinical virology service. A coherent national policy would be beneficial, with possibly a regional or national management framework.

Even if funding for new consultant virology posts were available immediately, a major expansion of the consultant establishment could not be achieved straight away, since there are insufficient trainees to fill a large increase in consultant posts. An evolutionary approach would therefore be required. The working group recommended that consultant virologists and consultant scientific colleagues in the UK should identify a range of medical workforce planning options, addressing both the required numbers of consultant and scientific posts and their distribution. The options should be scrutinised to assess their capacity to meet the needs of the UK population in respect of local, regional and national clinical virology service provision, training and succession planning in clinical virology, and support for medical microbiologists. If appropriate, a detailed business case should be prepared for the Department of Health.

SINGLE-HANDED CONSULTANT MEDICAL MICROBIOLOGISTS AND VIROLOGISTS

In addition to the need for single-handed consultants to be continuously available during the working day, Saturday morning (and often Sunday morning) working is commonplace and difficult to avoid, and weekday and weekend on-call commitments are generally onerous.¹⁰ Single-handed consultants often have difficulty in attending meetings and in taking study leave and annual leave. There are real risks that single-handed consultants become professionally isolated, with the potential for erosion of professional standards. The working group concluded that the concept of single-handed consultant microbiologist or virologist practice could no longer be supported.

It was appreciated that this recommendation would be very difficult to implement in departments serving small but isolated populations. If, after applying the formula, it was clear that a department warranted only one (or less than one) w.t.e. consultant microbiologist, then special consideration would be required to meet the needs of that consultant.

The following options, not mutually exclusive, would be worthy of exploration.

1. Where an additional whole-time post could not be justified on the basis of workload, consideration should be given to the creation of an additional part-time post, or alternatively a post shared with an adjacent microbiology department.
2. An on-call rota shared with colleagues in the vicinity. An on-call commitment of 1 in 3 (weekend and weekdays) was considered the maximum acceptable frequency for any consultant microbiologist or virologist, whether or not in single-handed practice. For single-handed practitioners, it should be noted that this option would not address CPD issues and the need for professional interaction.
3. A further alternative would be the establishment of formal links with consultant colleagues in other Trusts in the vicinity to form a medical microbiology consortium, meeting workload and on-call standards as set out above, and providing a framework for local professional interaction.

It is important that Trust managers do not see the latter option merely as a possible cost-saving exercise. The total clinical and administrative workload must be met with an adequate number of consultant sessions. Similarly, sufficient support must be available to each consultant on each site, including administrative and infection control staff and cover for periods of leave. These are issues that are likely also to be of interest and concern to the newly established Workforce Development Confederations.

LABORATORY MERGERS AND RATIONALISATIONS

Mergers and rationalisation of analytical microbiology laboratory services have become increasingly frequent in the last few years. Rationalisations, either partial (e.g. of virus isolation, virus serology, media production), or complete (reprovision of the whole microbiology service on another site) can generate considerable savings. However they may create the need for more, not less, consultant medical microbiologist time. When laboratory services are rationalised on to a single site distant from the acute hospital, there is an ongoing additional time commitment associated with travel between the laboratory site and the acute hospital site. This can be considerable, and needs to be built into financial models.

APPOINTMENT OF NEW CLINICAL CONSULTANTS

Most other medical specialties have increased their consultant numbers markedly in recent years. For example, in the period 1987–1997, numbers of consultant paediatricians increased by 80%, orthopaedic surgeons by 50%, medical consultants (all medical specialties, including elderly care) by 70%, consultant obstetricians by 30% and consultant surgeons by 25% (Department of Health's Medical and Dental Workforce Census). Consultant appointments in all these specialties impact significantly on the work of medical microbiologists. During this period, the number of consultant medical microbiologists and virologists increased by just 12.5%.

New consultant appointments in 'acute' specialties generate approximately 0.5 sessions of consultant microbiologist time. In other words, 20–22 new 'acute specialty' appointments would equate to the need for an additional whole-time consultant microbiologist.

Specialties that should be included under the heading 'acute' include:

- surgical specialties
- medical specialties
- haematology
- oncology
- obstetrics and gynaecology
- genitourinary medicine
- orthopaedics
- paediatrics
- care of the elderly
- intensive care.

Specialties where the appointment of a new consultant has little impact on consultant medical microbiologists' workload include:

- psychiatry
- pathology
- clinical genetics
- palliative care.

This guideline can be used not only to assess the historical impact of new clinical consultant appointments on the medical microbiologist establishment, but also to make a case for more medical microbiologist sessions, if appropriate. It can also be used as a mechanism of assessment in future planning. Funding for consultant microbiologists should be included in Health Improvement Programme (HIMP) bids for consultant staffing.

The impact of Cancer Units and Centres on clinical microbiology and virology services is considerable, is increasing in line with the frequency of use and the intensity of chemotherapeutic regimes, and will need to be kept under constant review. The impact can probably best be assessed by taking into account either the population served, the number of consultant haematologists and clinical oncologists employed, or the numbers of severely immunocompromised patients.

CONSULTANT MICROBIOLOGIST AND VIROLOGIST JOB PLANS

The working group members wish to encourage microbiologists to assess the need for additional consultant staffing using the formula set out in this report. The critical importance of making a good local business case is also stressed. In making a business case for an additional consultant colleague, the clinical component of the post carries great weight since this is more easily understood by hospital managers and likely to be supported by clinical colleagues.

Job plans for new posts should set out fixed and flexible sessions, in keeping with job plans of clinical specialists. Attendance on specific ward rounds (e.g. haematology/oncology rounds) and any regular outpatient commitments should be emphasised. The British Medical Association recommends that fixed commitments should be limited to seven sessions per week. Examples of activities that may be designated as fixed sessions include case conferences and laboratory rounds, daily ward rounds on

specific wards, infection control activities, surveillance and ward liaison, outpatient clinics, audit and on-call. Any excess fixed commitment can be highlighted when a case is made for extending the consultant establishment. Flexible or variable commitments include CPD, research, and local and external committee meetings. External committees could be regional, national or international.

It may also be worth considering making a case for more consultant microbiologist time to be dedicated to achieving specific and identified cost savings in antibiotic prescribing. As well as improving antimicrobial prescribing practice (thereby perhaps favourably influencing the local prevalence of antibiotic resistance), such initiatives could part-fund a new consultant microbiologist or virologist post, thereby improving the likelihood of its acceptance. When drawing up a business case and a job plan for an additional consultant post, there will clearly be a need to review not only the total clinical workload of the whole department, but also the job plans of all consultants already in post.

A pack of information to support the preparation of business cases for new consultant microbiologist posts is available from the following people:

- Professor Keith Cartwright, Public Health Laboratory, Gloucestershire Royal Hospital, Great Western Road, Gloucester GL1 3NN
- Dr Steve Rousseau, Postgraduate Dean, PHLS HQ, 61 Colindale Avenue, London NW9 5DF
- Ms Fiona Addiscott, Medical Workforce Department, The Royal College of Pathologists, 2 Carlton House Terrace, London SW1Y 5AF.

OTHER MICROBIOLOGICAL SPECIALTIES

The working group briefly considered the position of other, smaller microbiological specialties such as parasitology, mycology and malariology. These specialties are generally provided as national reference services in the UK. Key issues are maintenance of critical mass, continuing professional development for consultants and clinical scientists, training and succession planning. The working group recommended that for such small specialties there should normally be a single 'centre of excellence' (usually this would be a national reference laboratory) with adequate medical or senior scientific staffing to ensure maintenance of continuing professional development.

The working group recommends that CPA inspectors of supra-regional and national reference laboratories and similar sub-specialty units should address the issue of continuity of clinical service provision during the assessment process. If a small specialty warrants only a single consultant, specific arrangements should be in place to ensure that individual's continuing professional development, adequate continuity of service provision during periods of leave, and a clear mechanism to ensure smooth succession planning. International collaboration and interaction are of especial importance where there is only a single consultant specialist.

The working group identified the need for long-term vision and great care in succession planning, since such specialties are often dependent on the skills of just one or two key individuals.

WORKFORCE PLANNING IMPLICATIONS

Applying the proposed formula to medical microbiology laboratories in the UK is likely to result in the identification of the need for a significant increase in the consultant establishment in this specialty in the UK. The same is likely to be true of the working group's recommendations regarding the restructuring of medical virology.

Numbers of National Training Numbers (NTNs) and the numbers of medical microbiologists and virologists in training are driven by the projected numbers of consultant vacancies, both for new and replacement posts. If anticipated early retirements (as indicated by responses to the recent national questionnaire) are included in the calculations, rather than the numbers expected to retire at 65, the need for additional consultant microbiologists and virologists over the next few years will be greater than had been predicted.¹⁰

The working group recommends that the Royal College of Pathologists attempt to obtain more detailed information from consultant microbiologists and virologists in post, particularly those over the age of 50, regarding their retirement intentions. In order to improve the numbers – and accuracy – of replies, such inquiries may need to be repeated annually or biennially, accompanied by an explanation of the reasons for making these requests. An increase in microbiology and virology training posts (and therefore in NTNs), both in the short- and medium-term, may be required.

ACADEMIC INFRASTRUCTURE IN MEDICAL MICROBIOLOGY AND VIROLOGY

The academic infrastructure in the UK to support the training of medical microbiologists and virologists has been eroded to such an extent that most medical schools no longer support Chairs in medical microbiology or virology. This erosion threatens the whole future of microbiology and virology as medical specialties, unless urgent means are found to strengthen the academic infrastructure. Better recognition of the importance of teaching and training (as well as R&D) as key functions of academic microbiology and virology departments may be an initial step.

SHORT-TERM ACTION FOR MICROBIOLOGISTS – CONTROLLING WORKLOAD

One short-term answer to managing excessive workload is to prioritise activities and to minimise or cease to carry out work that is considered least important. A survey of the range of clinical and other activities carried out by consultant microbiologists has been carried out in South West England (Riordan T, *paper in preparation*). In addition to identifying variations in practice, the survey has provided a self-assessment by consultant microbiologists of the relative importance of a range of their daily activities.

If consultant microbiologists or virologists reduce workload deliberately, they should give good notice of impending changes. They should also maintain a strong clinical and managerial presence within the Trust and with primary care colleagues, not only because this is of direct benefit to patients, but because the support of clinicians and managers is of the utmost importance when making a case for an increase in consultant microbiology or virology sessions. Other strategies, such as formally sharing an on-call rota to alleviate out-of-hours commitments, should be considered.

Consideration should also be given to the possibility of delegating appropriate tasks to other professionals and support staff. For example, opportunities for delegation may arise if appreciable

numbers of specialist nurse consultants (e.g. in infection control) are appointed during the next few years.

COMMENTS

Comments should be sent to Professor Keith Cartwright at the Public Health Laboratory, Gloucestershire Royal Hospital, Great Western Road, Gloucester GL1 3NN by 31 July 2001.

ACKNOWLEDGEMENTS

The working group is indebted to Dr Hugh Webb, the originator of the prototype workload assessment formula, and to those colleagues who tested its validity in pilot form.

Professor Keith Cartwright
8th April 2001

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APPENDIX 1: MEMBERSHIP OF THE WORKING GROUP

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APPENDIX 3

A NATIONAL STRATEGY FOR CLINICAL VIROLOGY IN THE UK THE FORMATION OF THE UK CLINICAL VIROLOGY NETWORK

Summary

Issues

Clinical virology is becoming increasingly complex, with rapid developments in areas including molecular diagnostics, antiviral chemotherapy, new viral vaccines, identification of new human viruses, and management of infection control problems in both the hospital and local community.

There is an increasing need for specialist virological advice, surveillance, and diagnostic tests to support, for example:

- the DH sexual health strategy, which includes the control of blood borne and sexually transmitted infections
- tertiary referral services for immunocompromised patients, including cancer centres, bone marrow transplant and solid organ transplant units, which have increased substantially over the last ten years
- rapid testing in primary care to manage community infectious illness in a more cost effective and evidence-based manner.

Specialist clinical virology services in the United Kingdom are provided by 38 whole time equivalent consultant medical virologists and 18 grade C scientists. A proportion of these scientists do not carry out clinical work. This equates to one medical consultant per 1.5 million population. Across the country, there is an unequal clinical and diagnostic service provision due to problems with all levels of staff recruitment and retention. The distribution of consultant clinical virologists today reflects past patterns of investment and difficulties in filling posts, rather than current clinical need. The result is a specialty group, most of whose practitioners are carrying very large clinical workloads, maldistributed geographically, and with a significant proportion of consultants practising in isolation which has clinical governance implications.

The proposal in the new strategy for infectious disease and health protection is that the Health Protection Agency will take on the functions of the Public Health Laboratory Service. This may create a period of uncertainty, as the major objective of the PHLS is to provide an effective and efficient service for diagnosis, prevention and control of infections and communicable disease in England and Wales. The detection of infection and infectious agents, and resulting epidemiological analysis, investigation of outbreaks, development of strategies for prevention and control, and the provision of advice, may be compromised.

The detection of new and re-emerging viruses and recent bioterrorist threats has demonstrated the requirement for rapid laboratory diagnosis using new technology in specialist centres by experienced staff, in conjunction with specialist advisers.

In most district general hospitals, provision of virology advice falls largely to consultant medical microbiologists, few of whom who have received specialist training

in this area, and amongst whom a recent survey indicates there is considerable demand for updates in both clinical and laboratory aspects of diagnostic virology.

Managing individuals with chronic viral infections increasingly requires close interaction between virologists and clinical teams, especially with the need to monitor individuals on therapy by measuring the viral burden and development of antiviral resistance. Antiretrovirals cost approximately £8400 per annum per patient. The antiviral therapy cost of managing a patient with hepatitis C infection receiving ribavirin and interferon is £5100 over a six month treatment course. Identifying patients who can, and those who cannot, benefit from such treatment has cost-saving implications.

Solutions and progress to date

Reorganise the specialty into a network of 25 specialist virology centres and units. This will enable comprehensive and equal service provision across the population and facilitate best practice. By developing this critical mass and infrastructure, we will be able to deliver our goals:

- each would be staffed by two to three consultant clinical virologists and by at least one grade C scientist
- the Grade C clinical scientist will be supported by at least one Grade B clinical scientist to coordinate research and development and technology transfer
- to staff these Centres, a national increase in the number of consultant medical virologist and consultant clinical scientist posts will be required
- support will be given to single-handed consultant virologists in the short term, and in the longer term there will be a redistribution of consultant clinical virology posts so that single-handed practice is phased out
- a sufficient number of training centres and training posts will be created to safeguard succession planning for future generations of medical, scientific and technical staff
- being in large Centres, this approach will recognise the value of close interaction between PHLS/HPA, NHS and universities
- service level agreements will be agreed nationally, between the HPA and the Network to provide public health information and epidemiology for the HPA. This will ensure geographical equality of data
- being population and service based, this will be compatible with the Pathology Modernisation Programme
- coordination of diagnostic and reference work across the Network
- formation of area virology service committees with shared protocols to incorporate services from DGH laboratories.

So far, within the last 18 months, there have been three well-attended meetings, with up to 90% attendance of senior medical and scientist and scientist staff, to discuss the problems facing the profession and to seek ways to address them. A representative committee has been appointed, a constitution agreed and Professor Paul Griffiths has been elected as the Chief Executive Officer of the Clinical Virology Network representing the UK and Eire. A website with educational, practical and interactive elements will be live by June 2002. A working group has begun to prioritise and commission a wide range of activities for the benefit of the network and the practise of

clinical and public health virology. There is an urgent need to meet with the CMO and the DH to allow discussion about the development and implementation of a national strategy for clinical virology services

Outputs and response to *Getting Ahead of the Curve*

The formation of a comprehensive clinical virology network of accredited laboratories will deliver several key objectives identified in the DH strategy for combating infectious diseases by:

- developing and adopting agreed Standard Operating Procedures, clinical guidelines and disease management policies. We will ensure participation in a wide range of quality assessment schemes
- providing timely, high quality and accurate surveillance reports to national public health bodies, such as CDSC and SCIEH. This will include coverage, amongst others, of a range of viral infections including respiratory, sexually transmitted, blood-borne and the vaccine-preventable infections such as measles, mumps, rubella, hepatitis A and B. This will be provided under service level agreements with the HPA or its agents
- establishing a coordinated system for evaluating and managing the introduction of new technologies, for example, the use of near patient tests will require careful evaluation and will require quality assurance support from accredited laboratories
- providing a framework for clinical governance, which will include providing updates for microbiologists and carrying out clinical and laboratory audits
- centralising confirmation of all notifiable virus infections ensuring timely and definitive reporting of blood borne and sexually transmitted infections
- contributing to HPA/DH rapid risk assessment and providing technical and scientific expertise to respond to natural outbreaks or deliberate releases of virus infections. For example, the network is currently preparing a response to the potential deliberate release of smallpox virus including a rollout of rapid assays derived from three laboratories within the network for the detection of vesicular rash causing pathogens.

Other measurable outputs include:

- the development of a continually updated UK Clinical Virology Network website for sharing reliable, robust and accurate information on virology between members of the network and any other interested parties such as CCDC, microbiologists, clinicians members of the public and the government
- the deployment of molecular diagnostics will be rapid and coordinated nationally
- the provision of a stable, high quality national virology service, working to common standards, responsive to local needs, with equity of access across the country
- provision of clinical support, and regular training and updates to medical microbiologists working in district general hospitals in their vicinity
- a centralised point of contact for virology for workforce development confederations to discuss the case for an increase in the numbers of consultant medical virologists and clinical scientists.

Recommendations on configurations of clinical and public health microbiology and virology services for the diagnosis, prevention and management of infection
(RCPath/AMM, April 2002)

[Click here to download \(28 pp, 202 KB\)](#)

This report has been produced by a Joint Working Group of the Royal College of Pathologists and the Association of Medical Microbiologists, in response to a request from Dr Mary O'Mahony at the DoH (England) to take forward the proposals contained in the CMO's strategy document, *Getting Ahead of the Curve*.

It was circulated for comment (albeit on a very short time frame) to the Council members of AMM, to the SAC of The Royal College of Pathologists and to the Virology Sub-committee of the SAC. It has also been sent to Dr Bob Spencer and to Dr Alasdair Macgowan, representing the Hospital Infection Society and British Society for Antimicrobial Chemotherapy, respectively.

The document is accompanied by three appendices. The first of these gives brief examples as to how the proposed structure would respond to particular infection problems. The second is a previously published document from The Royal College of Pathologists which presents a formulaic approach to assessing consultant staff numbers in microbiology and virology. This has been accompanied by detailed guideline documents on writing business cases for new consultants. The third appendix is the Executive Summary from the Virology Network.