

THE MEDICAL MICROBIOLOGICAL LABORATORY SERVICES IN MALAYSIA

VKE LIM MBBS, MRCPATH*

INTRODUCTION

Microbial diseases remain a leading cause of morbidity and mortality in Malaysia. In 1976, a total of 7,117 cases of tuberculosis, 2,602 cases of infectious hepatitis, 1,183 cases of enteric fevers and 55 cases of cholera were reported in Peninsular Malaysia¹. In the same year, pneumonias, **bronchitis**, tuberculosis and gastroenteritis accounted for 2775 (12%) out of a total of 23,267 medically certified and inspected **deaths**². With the introduction of invasive techniques for diagnostic, monitoring and therapeutic purposes, immunosuppressive agents and the widespread use of antibiotics, hospital infection has also in recent years become important causes of morbidity and mortality. The diagnosis and effective management and control of microbial diseases depend to a great extent on an efficient and reliable microbiology diagnostic service. In a country like Malaysia where infection is still a major health problem, a good network of medical microbiology laboratories is imperative.

THE NETWORK OF SERVICES

Medical microbiology laboratories in Malaysia fall roughly into three categories: (a) government laboratories (b) university laboratories and (c) private laboratories.

Government laboratories

Microbiology laboratories in the Ministry of Health are part of an integrated diagnostic and public health laboratory service in the country³. Four levels of laboratory services are identified. The lowest level (Level 1) is that established at outpatient departments and health centres. Level 2 is that at a district hospital without specialist facilities. Level 3 is that at district hospitals with specialist facilities. The highest level (Level 4) is that at a General Hospital. In addition to the hospital laboratories there is the Bacteriology Division at the Institute for Medical Research (IMR), Kuala Lumpur which offers a diagnostic service to **near-by** hospitals (but not the Kuala Lumpur General Hospital) as well as providing certain reference services for the whole nation. Activities related to public health microbiology as well as the investigation of epidemics are also conducted by the IMR.

University laboratories

There are now three medical schools in the country. They are at the University of Malaya (UM) and the Universiti Kebangsaan Malaysia (UKM) in Kuala Lumpur, and the Universiti Sains Malaysia (USM) in Penang. The Department of Medical Microbiology at UM serves primarily the patients at the University Hospital. It also provides a diagnostic service for certain private hospitals and private practitioners in the Kuala Lumpur — Petaling Jaya area. Bacteriological monitoring pertaining to the control of hospital infection at the University Hospital is also conducted by this laboratory. The Department of Microbiology at the Faculty of Medicine, UKM provides a diagnostic microbiology service for patients in the UKM units at the Kuala Lumpur General Hospital (KLGH). The government units at KLGH are serviced by the government bacteriology laboratory of the hospital. The two laboratories cooperate closely especially in activities related to hospital infection. The USM medical school only started to admit students in 1981, but it has been quick in getting itself involved in diagnostic microbiology. The Department of Microbiology, USM has a full-time bacteriologist in the bacteriology laboratory at Penang General Hospital and its lecturers provide regular consultant service at the hospital.

Private laboratories

There are several private laboratories in Malaysia which offer microbiological services. The larger private hospitals like the Assunta Hospital in Petaling Jaya have departments of pathology which also conduct microbiological tests. Private hospitals which do not have their own laboratory facilities send their **specimens** to one of the independent private laboratories. These laboratories are all in the Kuala Lumpur-Petaling Jaya area with the exception of one in Penang. Private practitioners rely predominantly on these laboratories for microbiological investigations.

FACILITIES

Facilities in medical microbiology laboratories vary according to their designated status. The services offered by the various types of government

*Associate Professor, Department of Medical Microbiology, Faculty of Medicine, Universiti Kebangsaan Malaysia, Kuala Lumpur (Address for reprint requests).

laboratories are discussed by M. Jegathesan in an article in this issue. The IMR in addition to routine culture and sensitivity facilities is also the national reference centre for enteric bacteria. The IMR provides comprehensive serotyping and phage-typing services for *Salmonella*, *Shigella* and *E. coli*. Activities related to food microbiology and the investigation of epidemics are performed at the IMR. The IMR has also recently acquired a microcomputer for analysis of data. The university laboratories are in general better equipped. They offer additional investigations like serum antibiotic assays, MIC and MBC determinations and specialised anaerobic work including the use of gas-liquid chromatography. The medical microbiologists in these departments are also involved in the management of infectious diseases by participating in ward rounds and offering consultant advice. Chlamydia culture is performed in the UM laboratory. The UKM laboratory has also been recently designated a Streptococcus Reference Laboratory by the WHO. Mycobacterial culture are performed at the IMR, the National Tuberculosis Centre and at UM. Mycological diagnostic services are available at the IMR, UM and UKM laboratories. Parasitology diagnostic services (mainly microscopic examination of faeces and blood films for malaria and filarial parasites) are performed by the general clinical laboratories. The university departments of Parasitology are at the present time more involved in research activities rather than in diagnostic work.

RELATIONSHIP BETWEEN LABORATORIES

There has been very little attempt so far to coordinate activities among the various laboratories. Any liaison or cooperation that exist is on a person to person basis. The IMR acts in a supervisory capacity to all government laboratories with the exception of the bacteriology laboratory in KLGH. The IMR also conducts 'up-date' courses for the government bacteriologists from time to time. It receives difficult isolates from the peripheral laboratories for identification and confirmation. In addition all laboratories including the university laboratories submit their enteric pathogens for further identification.

The university laboratories function to all intents and purposes as independent units. As mentioned earlier there is some degree of cooperation between UKM and GHKL and between USM and the Penang General Hospital. There is also very little liaison between the private laboratories and the government or university laboratories.

PERSONNEL AND THEIR QUALIFICATIONS

Medically qualified microbiologists

There are very few medically-qualified microbiologists in Malaysia. At the present time there are less than ten practising either in the university laboratories or the IMR. These are doctors who have obtained recognised post-graduate qualification in microbiology i.e. the MSc from the University of London (formerly the Diploma of Bacteriology), the Diploma of Bacteriology from Manchester, or the MRCPATH (Medical Microbiology). This is not surprising since microbiology has long been deemed a non-clinical science and many doctors are reluctant to take up a career which they believe would condemn them to a life behind a bench. However, there is a worldwide changing trend in the practice of medical microbiology with greater emphasis on clinical medicine and patient management. In fact, the fields of antibiotics and antimicrobial chemotherapy are fast coming into the realm of the clinical microbiologist and there is great stress on these topics in the finals of the MRCPATH examinations.

General pathologists

In most general hospitals in Malaysia, the general pathologist theoretically oversees the running of the microbiology service as well. Most of these consultants have the old DCP qualification or the MPath (Malaya) and have had some formal training in medical microbiology. The private laboratories are also supervised by general pathologists with similar qualifications.

Non-medically qualified microbiologists

At the present time the bulk of microbiology diagnostic work in Malaysia is performed by science graduates with BSc, MSc or PhD qualifications. There are non-medically qualified microbiologists in all general hospitals in West Malaysia and Sabah, the IMR and the National Tuberculosis Centre. The microbiology laboratory at Assunta hospital also employs a science-based bacteriologist. Many of the government microbiologists also hold the Diploma in Medical Microbiology conducted by SEAMEO.

Laboratory technologists

The government as well as the university laboratories are staffed by qualified technologists who hold certificates or diplomas awarded by the IMR and the local universities. There are also a handful with qualifications obtained from abroad.

Trainee technologists undergoing their in-service training are also employed in the Ministry of Health and the universities.

TRAINING

Medical graduates

There is a need in Malaysia for more medically qualified microbiologists. This is in keeping with the changing role of the medical microbiologist who is expected to function not only as a 'lab person' but also a consultant in infection and antimicrobial chemotherapy. The science of pathology has advanced and expanded so much in recent years that it is unreasonable to expect one single person to be an expert in all fields of pathology, as was the case before. A doctor who wishes to specialise in microbiology can attend one of the courses mentioned earlier. The MPath course (UM) also offers specialisation in Medical Microbiology. These are courses recognised by the Malaysian government as specialist qualifications and entitles the holder to specialist allowances. The trainee should also be encouraged to work towards the MRCP. The final examinations may be attempted after five years of recognised laboratory training. So far there has been no difficulty in obtaining recognition if one has worked with the IMR or the universities. In the United Kingdom many of the younger microbiologists also hold the MRCP. This is in keeping with their clinical roles.

Science graduates

There is and will continue to be a need for non-medically qualified microbiologists in this country. The scientist and the clinical microbiologist complement each other not only in diagnostic work but in research as well. Many of the newer techniques in microbiology like gas-liquid chromatography, electrophoresis and fractionation are often more competently handled by the scientist. The University of Malaya conducts a BSc Honours course in medical microbiology. SEAMEO also conducts a nine-month course in medical microbiology which leads to a diploma. This course is held annually at the IMR. Non-medically qualified microbiologists are also eligible for the MRCP and they should be encouraged to work towards it. The training of non-medically qualified microbiologists should not only involve bench work, but exposure to clinical medicine must also be given. At the moment it appears that this type of training is only feasible in the universities.

Laboratory technologists

The IMR, UM and UKM all conduct training programmes for laboratory technologists. All three

centres offer a basic three-year certificate programme followed by a further two-year more specialised course leading to a diploma or advanced certificate.

PROBLEMS IN THE SERVICE

At present there are several major problems inherent in the microbiology services in this country. One of the most glaring defects is the lack of coordination between laboratories. With the lack of resources in this country there must be coordination of activities so that we can all derive the maximum benefits. Perhaps, because of this there is also very little standardization of tests among the various laboratories. Although individual laboratories may from time to time exercise some form of internal quality control, there is no formal country-wide quality control programme. There is no formal accreditation of laboratories both private or public. The only attempt at accreditation so far has been in respect to frozen cooked prawns⁴. A survey of private laboratories performed some years ago revealed some rather disappointing results⁵. Very little attention has so far been paid to laboratory safety and workers' health. There is no national code of practice which all laboratories have to adhere to. Laboratories in Malaysia have not been assessed to ascertain as to what class of pathogens they can safely handle. So far we have been fortunate enough not to encounter one of the more virulent pathogens, but with the ease and rapidity of modern inter-continental travel we can never be sure.

The shortage of medically-qualified microbiologists has already been mentioned. The changing emphasis in medical microbiology would require the services of at least one clinical microbiologist per general hospital. This demand will become even more apparent when the younger clinicians who have been trained abroad recently come back to take up the various specialist posts in the hospitals. Despite this lack in clinical microbiologists, the microbiology service in Malaysia is still essentially hospital-orientated. The public health aspects of microbiology is still very much underdeveloped in spite of the fact that infection still plays such an important role in this country.

SUGGESTED PROGRAMMES FOR THE FUTURE

In order to overcome some of the problems faced at the moment, a central coordinating body, preferably with authority, would have to be set up. This body will have several tasks which would include

- (a) organising and running a national quality control programme akin to the one being run by the Public Health Laboratory Service in the United Kingdom
- (b) drawing up a national code for laboratory safety, designating laboratories according to class of pathogens which they can safely handle and monitoring all laboratories to ensure that standards of laboratory safety are maintained
- (c) standardising certain laboratory tests like sensitivity testing
- (d) drawing up a programme for accreditation of laboratories both private and public, taking into account not only performance but the safety aspect as well
- (e) designating reference laboratories; this is to streamline activities and to ensure that the laboratory with the appropriate expertise specialise in that area. This will also avoid duplication.
- (f) holding regular scientific meetings and disseminating relevant information.

This central coordinating body should comprise representatives from the government, universities and the private sector. The IMR would appear to be the most suitable location but in order for such a programme to work, cooperation from the university and private laboratories would be required.

There should be a long term plan by the Ministry of Health to set up a system of laboratories which will be responsible for all microbiological aspects of public health from the testing of water to the investigation of epidemics. Such public health laboratories should be located in every state if possible.

One of the reasons why doctors are reluctant to take up microbiology as a postgraduate qualification is the virtual non-existence of suitable posts for them in the Ministry of Health. No posts for clinical microbiologists exist at the moment in hospitals. Such posts should be created, initially in all general hospitals. There should also be medical officers' posts for trainee microbiologists. In addition to hospital microbiologists, posts for public health microbiologists should also be created.

CONCLUSION

There are many areas for improvement in the microbiological services in Malaysia today. The lack of medically qualified microbiologists, the lack of quality control, safety standards and standardisation will all have to be looked into. There must be more coordination of activities between laboratories in the country. A system of public health laboratories should be planned. With a more efficient microbiological service in the country we would come much closer to overcoming infectious diseases as other more developed countries have done. It is really up to the microbiologists themselves to impress among the administrators the need for upgrading the present services. The setting up of a cardiothoracic unit is of course more politically rewarding than a system of public health laboratories, but until basic health problems like infection are effectively contained, there can be but little improvement in the general standard of health in the country.

ACKNOWLEDGEMENTS

I would like to thank Dr. Bhagwan Singh, Director of Health Services Malaysia; Dr. M Jegathesan, Head of the Bacteriology Division, IMR and Mrs. Ireland, Librarian, IMR for all their invaluable assistance. I would also like to thank Puan Rohana Ariffin for kindly typing the manuscript.

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