

# EDITORIAL

## HEALTH LABORATORY SERVICES IN MALAYSIA

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Laboratory medicine is the study of disease and in particular the use of the conventional laboratory disciplines of biochemistry, microbiology, hematology and histology in this study. It has received progressive recognition during the past 100 years as an area of specialisation within medicine. The results that a clinical laboratory provide are an extension of the information that a clinician derives from the history and physical examination of his patient. The objective of the clinical laboratory in providing scientific data is that the data should be relevant to the prevention, diagnosis or treatment of disease. The laboratory may also provide evidence of the absence of disease in a particular person.

The use of routine investigations in medical practice is widespread. Special investigations are requested in a wide variety of conditions. Investigations are carried out routinely to give medical practice a scientific approach, to rule out any co-existing conditions and also to provide base line data of some parameters for future reference. Physicians are requesting more tests and tests of increasing sophistication on each patient. With advances in medical laboratory technology, dependence upon the laboratory for rational clinical practice and research is ever increasing. Another important factor contributing towards increasing utilisation of laboratory services is the awareness of the importance of laboratory tests in the general public. It is being increasingly recognised that no medical infrastructure is complete without pathological laboratory services. As a consequence the practice of scientific medicine

becomes handicapped without adequate laboratory support. The vital role played by the laboratory is well recognised in the developed countries, while its importance is being increasingly realised in Malaysia and so there is a growing demand for more laboratories of good standards all over the country.

### EVOLUTION OF LABORATORY SERVICES IN MALAYSIA

The beginnings of laboratory medicine in Malaysia can be traced to the founding of the Institute for Medical Research in 1900 in Kuala Lumpur. The IMR not only served as a research organisation to carry out studies on the medical and health problems prevailing then, but also offered routine diagnostic laboratory services to the medical profession and continues to do so in many disciplines. Branch laboratories of the IMR at Ipoh and Penang established in 1929 and 1954 respectively served the laboratory needs of the General Hospital at these places for many years and continues to do so today.

Since independence, with the ambitious five year programmes, there has been continuing expansion in the health services, both urban and rural. New hospitals and health centers have been built and there has been proportionate increases in the number of doctors and paramedical personnel. There has been a tremendous improvement in the health of the population. Life expectancy has increased and death rates decreased. Many new clinical specialities have been introduced in the bigger hospitals. As people become more aware of

the importance of health with socio-economic development, outpatient attendances and admissions at hospitals have markedly increased. The pattern of illnesses has also changed during the last twenty-five years and so also the requirements for quality laboratory services. <sup>1</sup>

In the early sixties, the General Hospital, Kuala Lumpur, started developing its own laboratory facilities, independent of the adjacent Institute for Medical Research and since then there has been a gradual expansion in laboratory facilities. During this period, many clinical laboratories were started all over the country, mainly to service the hospitals in the bigger towns and as part of the programme of decentralising laboratory facilities. The establishment of the Medical Faculty at the University of Malaya saw the development of modern laboratory facilities to provide adequate and efficient clinical laboratory support for the academic, patient care and research activities of the Medical Center. Since then similar facilities have also been set up at the Medical Center. Since then similar facilities have also been set up at the Medical Faculty of Universiti Kebangsaan — adjacent to the General Hospital and the Institute for Medical Research.

With the growing importance of laboratory services in medical practice, the need for such services was also being appreciated in the private sector. This period saw the beginning of private laboratories especially in Kuala Lumpur. Some group practices have comprehensive medical facilities including diagnostic services. There also mushroomed small laboratories which are ill equipped, poorly manned and in many cases devoid of any pathologist cover. In addition to the laboratory services in the Government Universities and private sector, there are laboratory facilities in the Malaysian Armed Forces staffed by qualified personnel.

Most of the government laboratories combine the functions of clinical and public health laboratories. The facilities for investigations and the range of services offered vary considerably in different laboratories and parts of the country. Sometimes the nature of services available in a laboratory depends very much on the initiative of the staff as well as the resources provided. As it is not possible for laboratories at all levels to offer all the tests in the various specialities, it is the function of the reference or level V laboratories to cater to the special requirements of all hospitals. The health

laboratory service in the government is divided into five functional levels of activity and some information on the services and staffing of these laboratories is summarised in Table I.

## **PROBLEMS IN THE PROVISION OF QUALITY LABORATORY SERVICES**

In spite of the achievements in the health services, currently there is dissatisfaction over various aspects of the laboratory services. There is concern about the poor state of affairs both within and without the government services. The laboratory services are finding it increasingly difficult to meet the needs of an increasingly sophisticated medical profession and general public who are demanding a full range of high quality services and a quick turn around time. Some aspects of the laboratory services including the problems encountered in offering an efficient laboratory service which would satisfy the needs of the profession are briefly considered, and suggestions for overcoming them are discussed in the following pages.

### **PERSONNEL: GENERAL PATHOLOGISTS**

In the early days, the laboratories were under the control of the general pathologist, who was the histopathologist, cytologist, forensic expert, hematologist, microbiologist, clinical biochemist — in other words, an expert in all branches of pathology. The advances in analytical procedures and specimen processing along with the complexities and intricacies of data interpretation and the increasing workload in the clinical disciplines have all placed an increasingly greater demand on the laboratory services.

General pathologists are the only ones who are employed all over Malaysia except Kuala Lumpur and they are expected to manage all aspects of laboratory diagnostic services, which is a difficult task with the result every aspect of his function is less than ideal, which in turn leads to a very unsatisfactory state of affairs and limits the value and validity of laboratory procedures. The workload in these laboratories often far exceeds the capacity of the staff to handle them effectively or efficiently, which is detrimental to the quality of services provided. However, this in no way undermines the importance of the general pathologist as a member of the medical community.

**TABLE I**  
**HEALTH LABORATORY SERVICES IN MALAYSIA - ORGANISATION AND WORKLOAD**

Level:	I	II	III	IV	V
Location	Main health centers, Outpatient departments and Hospitals with less than 25 beds	District Hospitals	General Hospitals in State capitals or in big districts	Usually in large General Hospitals	University Hospital IMR
Services provided	Simple laboratory tests including blood counts, Hb., urine and stools examination	Simple tests in biochemistry, bacteriology, blood banking and serology	Routine tests in biochemistry, bacteriology, haematology, histology and serology	All the Tests done in III and in addition serves as a reference laboratory in the State	Offers all routine and sophisticated tests in all specialities and also serves as a reference center
Laboratory personnel +	Two junior laboratory assistants	Biochemist Laboratory assistants Junior laboratory assistants	Clinical pathologist Biochemist Microbiologist Laboratory assistants Junior laboratory assistants	Same as level III but with better facilities	Has all the specialists in laboratory medicine including Chemical Pathologists, Cytologist, Hematologists, Histopathologists, Immunologists, Microbiologists etc.
Numbers	63 health centers 24 polyclinics	75	14	2. Proposals to upgrade some more	In addition to the UH and IMR, the medical Faculty of UKM has similar facilities

**Selected examples of workload in laboratories serving a particular area<sup>x</sup>**

Population served	44,677	248,332	924,356	1,696,243	Varies
Beds	100	335	939	3539	920
Admissions	2685	13393	30440	111902	27983
Outpatients	24,994	127,317	558,665	1,085,498	248,694
Average number of laboratory tests done	14,353	72,650	234,499	857,726	1,300,574

(x): These represent the workload during 1979-80 for each example selected

(+): The staffing varies considerably at times

It is no longer possible for the general pathologist to be an expert in all branches and to function effectively or with equal distinction in all branches of pathology. This situation in developed countries has led to the emergence of specialities with pathologists specialising in particular areas to become specialists in Histopathology (Morbid Anatomy), Forensic Pathology, Blood Transfusion, Hematology, Medical Microbiology, Chemical Pathology, Virology, Immunology, Nuclear Medicine etc. The emergence of specialities is a commendable development and a desirable outcome of events in clinical medicine.

#### SPECIALISTS IN LABORATORY MEDICINE

There continues to be a shortage of trained pathologists in the country with the result many hospitals are without the services of a pathologist. There are only a handful of pathologists trained in specialities like Chemical Pathology, Hematology, Medical Microbiology, Forensic Pathology, Immunology, etc. These specialities are still in their infancy in this country. As a result the leadership that is so essential for the planned growth and development of laboratory services is void.

The pace of development as well as recognition of specialities in clinical medicine has outstripped similar developments in laboratory medicine, partly due to the absence of pressure groups to champion the cause of laboratory medicine. Naturally this has affected the overall progress and development of medical facilities. A range of circumstances has affected the recruitment and training of specialists in laboratory medicine as well as their subsequent retention in service. A recurring problem in many parts of the world has been the availability of adequate number of trainees for senior posts and the wider problem of recruitment of medical graduates to pathology. Many of the problems considered are interrelated.

The discipline of laboratory medicine does not attract sufficient numbers of medical graduates, in contrast to the numbers wishing to do clinical medicine. This can be partially attributed to the lack of or limited opportunities for professional advancement and job satisfaction. The lack of scope for proceeding to anything beyond 'general pathology' serves as a strong deterrent to medical graduates joining and remaining or opting to do pathology in the government service.

To encourage medical graduates to make a career in laboratory medicine, it is imperative that steps be taken to present laboratory medicine to medical students in a favourable light. The attitudes of students deeply entrenched by the traditional teaching of pathology has to be modified. The emphasis in teaching pathology has been in histopathology with brief elements of hematology and chemical pathology. The practical classes are predominantly in microscopic pathology with brief interludes of macroscopic pathology. It is important to stress not only the anatomical aspects but also other aspects of laboratory medicine. There has to be greater emphasis given to the teaching of all aspects of clinical pathology, not only early in the curriculum, but also later when the student is acquiring first hand clinical competence.

In future, specialisation in both laboratory medicine as well as clinical medicine should be accorded the same priority and laboratory medicine not considered as part of clinical medicine. Failure to do so would mean that laboratory specialities would always be sub-specialities, remaining sub-servient and sub-standard and as such they would be unable to contribute the full benefits of advances in laboratory medicine to better clinical medicine and patient care.

The development of specialities like Blood Transfusion services, Chemical Pathology, Forensic Pathology, Histopathology, Immunology, Medical Microbiology, Public Health laboratory services and the like should be accorded high priorities keeping abreast with the parallel development of specialities in clinical medicine. Talented medical graduates must be attracted to the service and the new doctors recruited and those already in service be retained and adequate support provided to enable them to meet the needs of the medical profession and community. In practical terms, this calls for (a) the institution of adequate training posts/awards, (b) the establishment of suitable specialists posts, (c) the provision of adequate facilities and (d) opportunities for career advancement which are commensurate with other specialities in clinical medicine.

Since the institution of post-graduate training programmes in the University of Malaya in 1974, thirteen pathologists have successfully completed the MPath. course. Of these only eight remain still

in service with the University of Malaya or the Government. Pathologists are also trained overseas, mainly in the United Kingdom.

#### SCIENTISTS AND LABORATORY TECHNOLOGISTS

Whereas there were only a handful of scientists in the laboratory services in the early years — today their numbers have increased with the expansion of the laboratory services. The bulk of them are graduates in biochemistry with lesser numbers in microbiology, chemistry and pharmacy. Recruitment of scientists has not been a problem. With the introduction of organised training programmes for medical laboratory technologists, the availability of medical laboratory technologists have improved considerably.<sup>2</sup> Both these categories of personnel contribute significantly to the work of laboratories.

In order to further motivate the talented non-medical staff in laboratory medicine, it is necessary to improve the prospects and opportunities for educational and career advancement as this would have a salutary effect on laboratory performance.

The different backgrounds and training of the medically qualified pathologist, both the generalist and specialist, the scientist and the medical laboratory technologist gives them a different role both in the day-to-day work of a pathology laboratory and its administration. Their different roles emphasise the importance of adequate staffing of laboratories. All laboratory professionals working in clinical laboratories should have a sense of dedication and understanding of the problems of the clinician and the patient and also the importance of the laboratory findings to the clinician. Only with these qualities could laboratory performance be improved and proper attitudes developed.

#### CONTINUING EDUCATION

Professionals in laboratory medicine cannot remain in isolation. In order to do justice to his profession — there is need for constant study, hard work and accumulation of new knowledge. Continuing education programmes are currently not available to all personnel in laboratory medicine. Continuing education programmes should be made available to serving personnel for professional advancement. Refresher courses in various aspects of laboratory medicine would be useful to laboratory technologists. There should be

provision for the granting of educational leave for sabbaticals. Encouragement should be given to attend professional meetings and updating one's knowledge.

Pathologists have administrative responsibilities. As such there is need for emphasis on management aspects in their training programmes. This should cover such areas as productivity, efficiency, personnel, equipment acquisition and maintenance planning for the future, interdepartmental activities, continuing staff training, cost benefit and accounting, data availability, quality control, etc. The introduction of management aspects detailed above for all senior personnel in laboratory medicine would have beneficial effects on laboratory performance:

#### LABORATORY FACILITIES

The availability of laboratory facilities is one of the real problems in the provision of medical care. Doctors trained in well established medical schools when posted to peripheral areas often feel that they cannot treat patients or practise medicine in the way they have been taught, because of the absence of adequate laboratory facilities. It becomes essential to provide the minimum laboratory facilities which would yield the minimum essentials of test results to doctors and make it possible for them to dispense proper medical care to those who need it most. This would also serve as an incentive for doctors to practise modern medicine and diminish the rate of doctors leaving the service.

#### EQUIPMENT

Existing facilities in many of the laboratories are often totally inadequate in relation to the functions of the laboratories. These include inappropriate or inadequate equipment, lack of standardisation in procedures, gross shortage of space, inappropriate location and design. Supplies of reagents, maintenance of equipment and processing of data leave much to be desired. In other words, growth in laboratory facilities have not kept pace with developments in other patient care activities.

Presently all the equipment used in laboratories are imported mainly from the advanced countries. The standardisation of equipment and procedures would greatly facilitate maintenance services and cut down costs. The training of laboratory personnel in equipment maintenance has to be given greater emphasis. Sometimes equipment remain unused because of minor faults which

could easily be rectified — if the personnel are properly trained. <sup>3</sup>

#### REAGENTS

The use of commercial kits allows for instantaneous transfer of technology. This is an expensive procedure. For those reagents which are used commonly, it may be economical to constitute them locally after taking steps to assure their quality. The reference laboratories can play an important role in this area.

#### MANUALS AND INFORMATION BULLETIN

Currently there is a paucity of manuals for equipment maintenance as well as test procedures. There is a need to make available handbooks and other bulletins, which would give the directions for the methods chosen, outline the sources of error and give procedures for quality assurance. These bulletins would also provide information to doctors who use the laboratory services on the proper interpretation of the reports and suggestions for the appropriate use of the laboratory. Senior personnel from the reference laboratories should periodically travel to the peripheral laboratories to supervise their activities and also provide continuing education.

#### SPACE

The developments in laboratory medicine have altered the requirements for space: Existing laboratory space has become totally inadequate in many hospitals. Because of safety and health considerations it is essential to have properly designed laboratories located within easy access of all users. The washing of glassware and disposal of infected materials needs special attention.

#### DATA PROCESSING IN LABORATORIES

With the increase in workload of laboratories — many problems are generated. The volume of information generated has increased considerably. At present, there are no electronic data processing facilities at any of the government laboratories and this poses major problems and delays in the storage, retrieval and reporting of results. The utilisation of laboratory data for research or audit is difficult. Currently consideration is given to this problem at the Medical Faculties. However, the implementation has to be dictated by resources available and is likely to take some time.

#### REFERENCE LABORATORIES

The provision of sophisticated laboratory services throughout the country would be unrealistic and so there is a need to develop centers of excellence, offering their services to the medical community. These centers would provide sophisticated tests. Such centers would prevent duplication of efforts, while maintaining high professional and ethical standards. The routinely performed test would be available in all laboratories, whereas the ones that are infrequently requested or requiring special equipment/procedures and personnel, would be available at the reference laboratories. The existing premier laboratories can serve as reference centers on specialised aspects of laboratory medicine and can be developed further if necessary, so that there is an equitable distribution of laboratory services in the country. It is emphasized that the proper planning and development of all types of facilities can only be achieved by the availability and continued presence of suitably qualified and experienced personnel in laboratory medicine.

#### QUALITY ASSURANCE

Even though the contributions of laboratory medicine to patient care activities have been significant, often there is not a fair confidence in all the laboratory services — to the same extent as seen in the developed countries and premier laboratories in the country. This may be due to many factors:

- i) Often there is a conflict in the clinical subjectivity and objective analytical results. In these situations, a specialist in laboratory medicine would be able to resolve the differences.
- ii) With the expansion in laboratory services as well as their increasing workload, the analytical performance of some of the laboratories has not matched those of the premier laboratories, partly because of the absence of any quality assurance programmes.
- iii) Often the faults are generalised resulting in a lack of trust in any result that is generated by a laboratory.

Doctors cannot make logical decisions either diagnostic or therapeutic unless the data that is generated by the laboratory is reliable and such data cannot be provided, unless the analytical methods that are employed are based on principles that provide accuracy and precision. It is the aim of all laboratories and the expectations of the users, that the service provided should be reliable,

efficient, quick and fairly economical. Every laboratory should aspire to generate reliable test results. For this there has to be internal quality control programmes and an external assessment of the quality of work. This would not only boost the pathologist's confidence in his laboratory's work, but others would also trust and rely on the services of such a laboratory with greater confidence. Quality control programmes are a must for all laboratories in many developed countries. All laboratories whether government or private have to take these programmes and unless their performance is found to be satisfactory, they are not accredited for public service. Running a quality control programme is a costly affair requiring considerable expertise. At some stage we should think of national quality control programmes in clinical pathology for all laboratories. The quality of the performance of laboratory analysis can only be effectively controlled and improved by the full time, on-site involvement of qualified professionals. For this, the government needs the expertise of the professionals and their associations. Efforts should be channelled into activities designed to improve service, so that there would not be any poorly functioning laboratories, even though there are many complexities involved with regard to the proficiency of clinical laboratories.

#### **UTILISATION OF LABORATORY SERVICES**

In recent years there has been concern expressed over inappropriate utilisation of the laboratory services at many meetings, <sup>4</sup> which contributes to the expanding laboratory workload. The routine use of laboratory tests, without prior demonstration of medical significance is wasteful of laboratory resources and detrimental to the quality of health care. Unnecessary tests represent severe financial and personal inconvenience to the patient and sometimes they may even give misleading information. With regard to cost effectiveness of laboratory services — there is a need for re-evaluation of the clinical value of the services provided. Test efficacy should be more systematically and continually/critically evaluated, before new procedures are introduced. Many reasons have been attributed to the increase in workload of laboratories — amongst which are physician, laboratory, patient, hospital, medical science and societal factors. Because the doctor controls virtually all laboratory test ordering, the clinician factors take on the most significance. <sup>5</sup> The doctor who orders laboratory tests for his patients

must have an awareness of the problem and a strong commitment to using the laboratory in an effective and logical manner. Only in this way can test utilisation that is appropriate to the individual patient problem be assured. Close communication between doctors and laboratory professionals concerning the correlation of laboratory data with clinical observations can be one of the more effective means of utilising laboratory services and also improving the quality of laboratory performance.

Medical education has an important role in the effective utilisation of the laboratory. It may be worthwhile to lay more stress on effective clinical judgement and critical use of laboratory facilities. Abandonment of clinical judgement in favour of unquestioning acceptance of laboratory data is to be discouraged. This would have the advantage of ensuring that doctors posted to places without adequate laboratory support would not be disillusioned.

#### **PRIVATE LABORATORIES**

The facilities in the private laboratories vary considerably. Many of them are general purpose laboratories. Some of them have pathologist cover, others do not. To safeguard the interests of the public, particularly those who seek laboratory assistance, it becomes imperative that there be some form of regulation governing the setting up and operations of private laboratories. Laboratory accreditation must be made obligatory. By registering the laboratories, the information regarding the pathologist cover, technical staff, tests performed, facilities available in the form of equipment, etc. will have to be provided in order to assess the work of the laboratory and its suitability to provide diagnostic services. In this respect the government needs the expertise of the professionals and the professional bodies, who would also serve as watchdogs for ethical and professional standards.

#### **RESEARCH IN LABORATORY MEDICINE**

Many of the problems we face in this part of the world have to be solved using the weapons of science and technology. As such it is essential for us to generate interest in scientific activities, to stimulate scientific thought and finally build up reputable medical institutions. Malaysia offers tremendous opportunities for various types of research in laboratory medicine in addition to supporting clinical research. The promotion of

medical research in the various laboratory specialities — both basic as well as applied is essential for the progress of medicine. Routine service functions without a research component becomes uninteresting after some time.

Currently, the level of research activities undertaken in laboratories other than the major ones in Kuala Lumpur can be considered as insignificant. Again these are related to staffing as well as facilities. A positive step towards encouraging research activities would be for the government laboratories to have closer links with the academic institutions in the country, so that the resources available can be utilised effectively and to the mutual benefit of both. Establishment of reference values for the local population in Clinical Chemistry, Hematology and Immunology has to be given priority as such baseline information is not available.

#### **ORGANISATION OF LABORATORY SERVICES**

It is regrettable that in spite of the vital role of laboratory services in health care, there is no separate division of health laboratory services in the Ministry of Health at present and as such laboratory services lack identity which is so essential for progress. A division of laboratory services headed by a specialist in laboratory medicine with its own budget and programmes could augur well for the growth and development of laboratory services in Malaysia. Such a set-up is long overdue. Otherwise, the present system of haphazard development, fragmentation of activities, duplication of efforts and widespread dissatisfaction both on the part of the providers and users of the service would perpetuate. The division of laboratory services could also assist in the accreditation of private laboratories, quality assurance programmes, co-ordination of laboratory activities and facilities and staff training programmes.

#### **CONCLUSION**

An efficient laboratory service is an essential

prerequisite for any good health service system. Laboratory services are a high cost oriented technology, requiring very specialised expertise, sophisticated equipment and the kind of environment and atmosphere which is conducive to scientific work. The lack of these facilities does not minimise the importance or the role which laboratory services play in the practice of modern day scientific medicine. In Malaysia demands would be placed for the development of many specialities in medicine. As a professional community, laboratory professionals have a firm responsibility for maximising the clinical effect of their work, so that the information that is provided is optimised in relation to the amount of money that is spent. It is also their firm belief that progress in laboratory medicine would contribute to the enhancement of general standards of medical practice and health in Malaysia.

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