SUBJECT REVIEW REPORT

DEPARTMENT OF PARASITOLOGY

FACULTY OF MEDICINE
UNIVERSITY OF PERADENIYA

12th to 14th March 2007

Review Team :
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1. SUBJECT REVIEW PROCESS

The Quality Assurance and Accreditation (QAA) framework currently implemented in the University system in Sri Lanka, envisages reviewing all subjects/programmes and institutions in the national Universities of Sri Lanka. In keeping with this objective, the Quality Assurance and Accreditation (QAA) Council of the University Grants Commission, Sri Lanka appointed a team of senior academics from the Universities of Kelaniya, Ruhuna and Sri Jayawardenepura to undertake a subject review in Parasitology at the Faculty of Medicine, University of Peradeniya.

The Review Team comprised of:

Prof. Nilanthi de Silva (Review Chair)
Prof. Nelun de Silva
Prof. Sriyani Ekanayake

The subject review was undertaken to evaluate the quality of the Parasitology teaching programme at the Faculty of Medicine University of Peradeniya. The review visit was carried out by the above team from 12 – 14 March 2007 (see Annex 1 for programme). The process used was acquisition of additional information through discussion of issues, and gathering of and analysis of evidence. These findings were then compared with the Self Evaluation Report (SER) presented by the Department of Parasitology (DP).

The aim was to use all evidence to make a judgment as required by the Quality Assurance Programme on the quality of the eight review aspects listed below, as given in the Quality Assurance Handbook, for Sri Lankan Universities, published by the CVCD and UGC in July 2002:

1. Curriculum Design, Content and Review
2. Teaching, Learning and Assessment Methods
3. Quality of Students, including Student Progress and Achievements
4. Extent and Use of Student Feedback (Qualitative and Quantitative)
5. Postgraduate Studies
6. Peer Observation
7. Skills Development
8. Academic Guidance and Counseling

The Faculty is in the process of changing its MBBS curriculum at present. Students in the first and second years of study are following the new curriculum, while the more senior batches are following the old curriculum. The teaching programme for the last batch of students on the old curriculum has been completed, and students are awaiting their end-of-course examination. Currently, there are 2 batches of students on the new curriculum, and both 1st and 2nd year students receive inputs from the DP. Thus the review process covered both programmes.

The review processes adopted by the Review Team were:

- **meetings** with the Vice-Chancellor; Dean; Head of DP; academic and non academic staff in the DP; Senior Student Counselors in the Faculty; and undergraduate and postgraduate students (see Annex 2 for complete list of persons met during the visit).

- **observation** of teaching/learning sessions – 2 lectures for 2nd year students on the new curriculum and one laboratory demonstration of learning material on infective agents for self study by students
- **inspection** of academic facilities: lecture halls, tutorial rooms, laboratory and learning support facilities (library and e-library).
- **perusal** of documents (curriculum documents, timetables, handouts, examination papers, samples of answer scripts, records etc.).

2. BRIEF HISTORY OF THE UNIVERSITY, FACULTY AND THE DEPARTMENT

University of Peradeniya commenced with the inception of the University of Ceylon, on 1st July 1942 and shifted to Peradeniya on 6th October 1952. It is now one of the largest universities in the country, with over 10,000 internal students registered for its academic programmes in seven faculties and two postgraduate institutes.

The Peradeniya Medical School was established in 1961 and the first batch of 103 students was admitted in January 1962. The Peradeniya Medical School and Dental School were converted to an independent Medical and Dental Faculty in 1967. The School of Veterinary Science became a part of the Faculty in 1970. In 1980, Veterinary Medicine and Animal Science were separated to form a new Faculty of Veterinary Medicine and Animal Science. The Dental School became a separate Faculty in 1986. The Teaching Hospital, Peradeniya, the most significant addition to the Faculty of Medicine in recent years, was opened in June 1980. Currently, the Faculty has 15 Departments of study, including the DP, and 2 Units.

The DP was one of the initial departments that comprised the Faculty at its inception in 1963. The DP contributes to the MBBS degree programme. The Parasitology teaching programme for students on the old curriculum is in the 3rd year of the MBBS programme. The last batch of students on the old curriculum (2003/04 intake, 194 students) have currently finished their teaching programme and are on study leave prior to end-of-course examinations in April 2007. For students on the new curriculum, departmental teaching activities will extend throughout the first four years of study. Currently, there are 184 students in the 2nd semester of the 2nd year (2004/05 intake, new curriculum) and 200 1st year students (200 students, 2005/06 intake).

The DP has cadre provision for one Chair and 4 other academic posts; these are occupied by 1 Senior Professor, 2 Merit Professors, and 2 Senior Lecturers. One of the Senior Lecturers is due to go on post-doctoral training overseas this year, while all 3 senior staff members are due to retire by the end of next year. Steps have been taken to advertise two positions in anticipation of these changes.

Support staff in the DP includes a Chief Technical Officer, 4 Technical Officers (including one computer technician), 1 clerk and 2 laboratory attendants. All non-academic staff positions are filled at present.

3. AIMS AND LEARNING OUTCOMES

Old Curriculum

The stated learning objectives for the Parasitology programme for students on the old MBBS curriculum, as given in the SER, are listed below.

Subject Matter

***1. Protozoology*:** Malaria; amoebiasis; giardiasis; balantidiosis; trichomoniasis; leishmaniasis; trypanosomiasis; toxoplasmoais: Sarcocystis infection; intestinal coccidioses; pathogenic free-living amoebae.

***2. Helminthology*:** Intestinal nematode infections; lymphatic filariasis; onchocerciasis; loaiasis; Dirofilria infection; tape worm infestations; fluke infestations; trichinosis; guinea worm infestation; larva migrans.

***3. Entomology*:** Mosquitoes; sand fly; house fly; tsetse fly; fleas; bugs; lice; ticks and mites.

***4. Miscellaneous*:** Snakes; zoonoses; insecticides and vector control.

Learning Aids: Three terms work consisting of 28 lectures (45 minutes each); Tutorials: approximately 20 hours; Practicals: 60 hours of practica1s (students in two groups)

Objectives

At the end of the course, student should be able to

1. Protozoology

1.1. Malaria

- name the human malarial parasites and indicate the two species found in Sri Lanka.
- describe the life cycle with stages find events in chronological order.
- identify these stages on a slide.
- stain a thin blood film with Leishman stain and identify the erythrocytic stages of P. falciparum, P. vivax and P. malariae.
- describe the pathological and clinical consequences of the erythrocytic cycle.
- describe briefly the immune responses to the malarial parasite.
- indicate the stages in the life cycle where preventive measures are applicable and briefly describe these measures.
- describe the geographical distribution of malaria in Sri Lanka.
- name the vector(s) in Sri Lanka.
- describe the seasonal incidence of the disease.
- name the drugs used and their sites of action.

1.2. Amoebiasis, giardiasis and balantidiosis

- list the common intestinal protozoa found in man and indicate the pathogenic parasities
- describe the two morphological forms of Entamoeba histolytical, Giardia lamblia and Balantidium coli met with clinically.
- recognize these forms on a slide.
- name the sites in the human body where these parasites can be found.
- describe the clinical consequences of the presence of these parasites at these sites.
- describe the mode of infection
- describe collection of a specimen of stools for examination in amoebiasis.
- describe the preventive measure applicable to each parasite.

1.3. Trichomoniasis

- identify Trchomonas vaginalis on a saline smear and on a fixed, stained smear.
- name the sites in the human body where the parasite is found
- describe the pathogenic effects of this parasite.
- describe the mode of infection

1.4. Trypanosomiasis and leishmaniasis

- name the parasites and the diseases caused by each
- name the vectors of trypanosomiasis and leismaniasis
- describe the geographical distribution of each disease
- identify the organisms on a slide

1.5. Toxoplasmosis

- name the parasite that causes toxoplasmosis
- identify the parasite in a smear
- describe the life cycle of Toxoplasma gondii
- describe the mode of transmission
- describe the laboratory diagnosis
- outline the preventive measures applicable to this disease

1.6. Sarcocystis infection

- identify Sarcocystis in a smear or tissue section
- recognize a Meischner's tube
- identify the habitat of this parasite
- name the pathological lesion caused by this parasite

1.7. Intestinal coccidioses

- name the parasites that cause intestinal coccidioses in man
- describe their mode of transmission
- describe their laboratory diagnosis
- identify the parasites in laboratory specimens

1.8. Pathogenic free-living amoebae

- name (to genus level) the free-living amoebae that are pathogenic to man.
- outline the clinical consequences of infection with these amoebae.
- outline their mode of transmission.
- describe their laboratory diagnosis.

2. Helminthology

2.1. Intestinal nematode infections (Ascaris lumbricoides, hookworms, Strongyloides stercoralis, Trichuris trichiura, Enterobiuss vermicularis)

- name the pathogenic intestinal nematodes found in man.
- name the common habitat of each.
- describe the mode of infection in each parasite.
- outline the stages in the life cycle of each.

- describe the clinical consequences of these stages in man.
- identify the adult worms.
- make faecal smears in iodine and saline to demonstrate helminth ova (and protozoal cysts).
- identify the ova on a slide.
- describe the methods of diagnosis.
- describe the preventive measures applicable to each parasite.

2.2. Lymphatic filariasis

- name the filarial worms that infect man in Sri Lanka.
- name the vectors in each case.
- describe the distribution of filariasis in Sri Lanka.
- outline the stages in the life cycle.
- describe the clinical consequences of the stages in man.
- make a thick blood film and stain with Delafield haematoxylin stain to demonstrate microfilaria.
- identify the microfilaria of Wuchereria and Brugia on a blood film.
- indicate the site in the life cycle where preventive measures are applicable and briefly describe these.
- describe the control programme carried out in Sri Lanka.
- describe the aetiology of tropical eosinophilia syndrome.
- list the clinical features of the condition.

2.3. Onchocerciasis and loaiasis

- name the parasites that cause these diseases.
- outline the clinical consequences of infection with these filarial worms.
- name (to genus level) the vectors of these parasites.
- describe the geographical distribution of these diseases.

2.4. Animal filarial infections

- name the animal filarial worm that can cause disease in man in Sri Lanka.
- outline the clinical consequences of infection with this parasite.

2.5. Tape worm infestations

- identify the scolices of Taenia saginata. T. solium. Hvmenolepis nana, H.. diminuta. Diphyllobothrium latum.
- recognize and differentiate the gravid segments of T. saginata and T. solium.
- identify the adults of Taenia species, Echinococcus granulosus., H. nana and H. diminuta.
- identify the larval stages of Taenia species and E. granulosus.
- identify the ova of Taenia species, H. nana, H. diminuta.
- name the definitive hosts in T. saginata. T. solium. E. granulosus, H. nana H. diminuta and D. latum.
- outline the life cycle in each case, indicating where preventive measures are applicable.
- describe cysticercosis in man.
- outline the geographical distribution of human hydatidosis.

- describe the sylvatic cycle of E. granulosus in Sri Lanka.

2.6. Fluke infestations

- name the flukes pathogenic to man.
- identify adult specimens of these flukes.
- outline the life cycle of each fluke.
- outline the preventive measures applicable in each.
- identify the ova of Clonorchis sinensis and the schistosomes of man
- describe the sylvatic cycle of Paragonimus westermani in Sri Lanka.

2.7. Guinea worm

- identify the adult worm.
- identify the intermediate host.
- outline the life cycle.
- describe the pathological lesion produced by this parasite.
- outline the preventive measures.

2.8. Trichinosis

- recognize the larval stage of Trichinella spiralis.
- outline the life cycle.
- describe briefly the clinical manifestations.
- outline the preventive measures.

2.9. Cutaneous and visceral larva migrans

- identify the nematodes and the stages in the life cycle that cause these diseases in man.
- describe the pathological lesions in these two conditions.
- describe the clinical consequences of infection

3. Entomology

3.1. Mosquitoes I

- list the diseases in Sri Lanka where mosquitoes act as a vector and name the vector(s) in each case.
- identify an adult male and a female mosquito.
- recognize the mouthparts of a mosquito.
- outline the life cycle of a mosquito.
- differentiate between an adult anopheline and a culicine mosquito.
- recognize a mosquito larva if shown specimens.
- differentiate between an anopheline and a culicine larva.

3.2. Mosquitoes II

- identify the adults of the following mosquitoes: Anouheles. Culex fatigans, Mansonia uniformis, M. annulifera, Ades aegypti, Aedes albopictos.
- describe the habits and breeding places of the above mosquitoes.
- identify the eggs of these Anopheles, Culex, Mansonia, Aedes mosquitoes
- identify the larvae of these mosquitoes.

- describe the control measures applicable to each of these mosquitoes.

3.3. Fleas

- identify the adults of Pulex irritans. Xenopsylla astia. X. Cheopis. Ctenoqephalides sp. (cat and dog fleas) and Nosopsylia sp. (rat flea).
- outline the life cycle of a flea.
- describe the medical importance of fleas, indicating the species responsible in each case.
- name the vectors that transmit bubonic plague to man.
- describe the mechanism of transmission of plague by the flea.
- list the reasons for X. cheopis being a more efficient vector than X. astia.
- describe the epidemiology of plague.
- describe the control measures applicable to plague.

3.4. Ticks

- recognize a tick when shown a specimen.
- list the important differences between hard ticks and soft ticks.
- identify a hard tick and a soft tick.
- distinguish between Argas persicus and Ornithodoros if given specimens.
- outline the life cycle of a soft tick and that of a soft tick.
- name the diseases transmitted to man by these ticks and indicate the species in each case.
- describe the modes of transmission in each of these diseases.

3.5. Mites and scabies

- name the causative organism of scrub typhus and scabies.
- describe the geographical distribution of scrub typhus.
- name the endemic areas in Sri Lanka.
- identify an adult ma1e and female of Sarcoptes scabiei and the adult of a trombiculid mite.
- identify the larva of a trombiculid mite.
- describe the habitat of the scabies mite in man.
- describe the clinical consequences of its presence in man.
- describe the treatment and control of scabies.
- outline the control measures in scrub typhus.

3.6. Dipteran flies of medical importance and myiasis.

- name the diseases transmitted by the sand fly and the tsetse fly.
- describe the mechanisms by which the house fly transmits disease.
- identify adult specimens of sandfly, tsetse fly, house fly, Sarcophaga and Chrysomyia.
- identify the wing of a house fly and a tsetse fly.
- identify maggots of a dipteran fly.
- describe the life cycle of the house fly.
- describe the methods of control of house flies.
- define myiasis and describe it, giving examples.

3.7. Lice

- identify the adults of Pediculus humanus and. Pthirus pubis.
- describe the medical importance of the head louse.
- name the diseases transmitted by the body louse.
- describe the mechanism of transmission in each disease.
- outline the life cycle of a louse
- name the habitat in the human body of each species.
- identify the egg of a louse.
- describe the treatment and control of pediculosis and infection with pthirus pubis.

3.8. Bugs

- identify an adult bed bug and a reduviid bug.
- name the habitat of bed bugs and the medically important reduviid bugs.
- name the disease transmitted by reduviid bugs.
- describe the mode of transmission.
- describe the medical importance of bed bugs.
- outline the life cycle of a bed bug.
- describe the control of bed bugs.

4. Miscellaneous

4.1. Snakes

- name the poisonous snakes found in Sri Lanka.
- name the important non-poisonous snakes found in Sri Lanka.
- recognize each if given a specimen.
- list the districts in which the poisonous snakes are commonly found in Sri Lanka.
- name the type of venom toxicity in each case.
- describe the clinical manifestations resulting from the bites of these poisonous snakes.
- outline the management and treatment in these cases.

4.2. Zoonoses

- define a zoonosis
- describe the different types of zoonosis
- name the important zoonotic diseases in the world
- name and describe the parasitic zoonoses in Sri Lanka

4.3. Vector control and insecticides

- list the different methods available for the control of medically important arthropods.
- list the different groups of insecticides.
- describe the insecticidal action of each group.
- name the insecticides in common use belonging to each group.
- list the advantages and disadvantages of each of these
- describe the different methods of insecticide formulation.
- describe the different methods of insecticide application.

New Curriculum

The learning objectives related to Parasitology, for 1st and 2nd year students on the new MBBS curriculum are listed in below. These were obtained from the documents presented by the department staff during the review visit.

Year 1: Infection, Immunity and Barrier Tissues

At the end of the module, student should be able to

Concepts: Introduction to Microbiology: An Overview
Objectives: 1. understand the interactions of microorganisms with human beings
2. state why medical undergraduates need to know about microorganisms
3. understand what medical microbiologist does

Concepts: Proving Causations of Infection - Causality - Koch's Postulates and Its Limitations
Objectives: 1. state Koch's postulates and their limitations
2. discuss how causal associations can be proved in infective diseases

Concepts: Microbial Classification and Visualization
Objectives: 1. describe the basis of microbial/parasitic classification (viruses, bacteria, prions, atypical agents, fungi, parasites)
2. state the means by which microorganisms/parasites can be visualized

Concepts: Host parasite Relationships
Objectives: 1. describe the different ways in which microorganisms relate to the human host
2. define the terms infection, disease

Concepts: Microbial Growth, Dissemination and Survival Within and Outside the Human Host
Objectives: 1. describe the dynamics of growth in different types of micro-organisms (e.g.: Virus, Bacteria, and Parasites)
2. list the different ways in which microorganisms survive for long periods within and outside the human host

Concepts: Macro-Parasitic Growth, Dissamination and Survival Within and Outside the Human Host
Objectives: describe how microorganisms dissaminate within and outside the human host

Concepts: Methods of Preventing Infections
Objectives: describe the modes of transmission of the organisms /agents listed in 2005-1/SBM-7/03-1

Concepts: Diagnostic Procedures in Infective Diseases
Objectives: 1. outline the process by which an aetiological diagnosis can be made
2. describe the relavance by making an aetiological diagnosis
3. state the limitations of the diagnostic procedure

Year 2 Foundation Module 2: Scientific Basis of Ill Health

At the end of the module, student should be able to

Concepts: Infections
Objectives: Recall
1. the terms infection, infestation, disease, incubation period, host, pathogen, virulence, zoonoses

2. the spectrum of ionfective agents and their major morphological and biological characteristics that determine visualization/identification in the laboratory
3. the different modes of transmission of these agents to humans including source(s), entry into and exit from the human body.
4. the principles of the different mechanisms by which infective agents cause disease.
5. the principles underlying prevention of infection and ill health due to these agents

Concepts: Animal Bites and Stings
Objectives: 1. state the common animal bites in Sri Lanka
2. state the primary and secondary effects of animal bites
3. name the organisms that cause secondary infections of the animal bites
4. state the common marine animal and arthropod stings
5. list the effects of stings

Concepts: Poisonous Snakes and Envenomation
Objectives: 1. state how snakes are classified into poisonous and non-poisonous
2. name the poisonous snakes found in Sri Lanka
3. name common (important) non-poisonous snakes in Sri Lanka
4. recognize these (2&3) if shown a specimen/an image (see demonstration on snakes
5. state the major effects of snake venom in the different groups of poisonous snakes in Sri Lanka
6. state the principles underlying the treatment and management of snake bites.
7. state how snake bites can be prevented
8. recognize medically important snakes of Sri Lanka if shown specimens or images

Concepts: Biological Properties (Structure and Function) of Different Groups of Micro and Macro Organisms
Objectives: appreciate how biological properties of the different groups of micro/macro parasites determine the causation, diagnosis, management, prevention and control of major infective disease in humans

Concepts: Protozoa Introduction
Objectives: list the different characteristics of the different groups of Protozoa

Concepts: Sporozoa- Plasmodium
Objectives: 1. list the human malarial parasites indicating the species found in Sri Lanka
2. describe the life cycle with stages and events
3. name the vector(s) in Sri Lanka
4. identify stages that cause pathogenic effects
5. outline laboratory methods of visualization/identification of organism
6. identify points in the life cycle (lc) where preventive measures are applicable

Concepts: Protozoa (flagellates) - Leishmania
Objectives: 1. outline their life cycle indicating stages that cause pathogenic effects
2. outline laboratory methods of visualization/identification of organism
3. identify points in the life cycle where preventive measures are applicable

Concepts: Protozoa- Amoebae
Objectives: name amaoebae that parasitize humans

Concepts: Toxoplasma & Cryptosporidium
Objectives: 1. identify those tht cause human disease
2. state sources of infection, entry and exit of agent in each
3. outline their LC indicating stages that cause pathogenic effects
4. outline laboratory methods of visualization/identification of organism

Concepts: Protozoa- Ciliates
Objectives: name the ciliate that cause human disease

Concepts: Balantidium Coli
Objectives: 1. state sources of infection, entry and exit of agent in each
2. outline their LC indicating stages that cause pathogenic effects
3. outline laboratory methods of visualization / identification of organism
4. identify points in the lc where preventive measures are applicable

Year 2: Infection Immunity & Barrier Tissues

At the end of the module, student should be able to

Concepts: Helminths-Intestinal Nematodes; Ascaris, Necator, Trichuris, Enterobius vermicularis, Strongyloides stercoralis
Objectives: 1. list the different groups of parasitic helminths
2. list the major characteristics of parasitic nematodes
3. list the common intestinal nematodes in humans
4. outline the LCs with stages and events
5. write a comparative account of the different LCs.
6. state the stages that cause pathogenic effects and identify those stages of diagnostic importance
7. outline laboratory methods of visualization/identification
8. identify points in the LC where preventive measures are applicable

Concepts: Tissue Nematodes-Filarial Parasites
Objectives: 1. name the major tissue nematodes of humans indicating their location in the human body
2. list the major characteristics of the filarial parasites of humans indicating those found in SL
3. name the vectors of those parasites found in Sri Lanka.
4. outline the LC of *W. bancrofti* with stages and events
5. describe the phenomenon 'periodicity of microfilaria'
6. state the stages that cause pathogenic effects and identify those stages of diagnostic importance
7. outline laboratory methods of visualization/identification
8. identify points in the LC where preventive measures are applicable

Concepts: Cestodes -*Taenia solium, T. saginata, Hymenolepis diminuta, H.nana*, *Echinococcus granulosus*
Objectives: 1. list the major characteristics of the different groups of parasitic cestodes of humans indicating those found in Sri Lanka
2. outline the LCs with stages and events
3. state the stages that cause pathogenic effects and identify those stages of diagnostic importance
4. outline laboratory methods of visualization/identification of organism
5. identify points in the LC where preventive measures are applicable

Concepts: Trematodes Intestinal, Tissue and Blood Trematodes

Objectives: 1. list the major characteristics of the trematodes of medical importance indicating those found in Sri Lanka
2. outline the LC of a trematode and that of a blood fluke with stages and events
3. state the stages that cause pathogenic effects and identify those stages of diagnostic importance of the major trematodes of humans
4. outline laboratory methods of visualization/identification of organism
5. identify points in the LC where preventive measures are applicable

Concepts: Arthropods - Mosquitoes

Objectives: 1. list the major characteristics of the different groups of arthropods of medical importance
2. list the major characteristics of the different groups of mosquitoes
3. list the major mosquito bone diseases Globally
4. list the mosquitoes of medical importance in Sri Lanka indicating the diseases they transmit
5. outline the LC of a mosquito with stages and events
6. recognize LC stages in those of major medical importance in Sri Lanka
7. describe the breeding habits of the medically important mosquito species in Sri Lanka
8. outline the strategies used for control of these mosquito species in Sri Lanka

Concepts: Flies

Objectives: 1. list the dipteran flies of major medical importance globally and those found in Sri Lanka
2. describe the medical importance of dipteran flies as vectors of diseases and in myiasis
3. outline the LC of a house fly with stages and events
4. describe the breeding habitats of flies of medical importance in Sri Lanka
5. identify preventive and control methods used against these insects

Concepts: Fleas, Lice and Bugs

Objectives: 1. list the medical importance of fleas, lice and bugs and name those of medical importance of Sri Lanka
2. name the fleas transmitting plague
3. describe the mechanisms of transmission of plague by fleas
4. identify preventive and control methods that are used against these insects

Concepts: Ticks & Mites

Objectives: 1. list the major characteristics of ticks & mites
2. state the medical importance of ticks and mites
3. list the major diseases transmitted by ticks and mites globally and identify those relevant to Sri Lanka
4. identify preventive and control methods that are used against these arthropods

Foundation 3 Module: Basic laboratory Skills in Parasitology

At the end of the module, student should be able to,

Concepts: Basic Laboratory Bench Skills in Infective Disease Diagnosis

Objectives: 1. effectively use a compound light microscope to visualize infective agents and diseased tissue under different magnifications (X100,X400,X1000)
2. make wet faecal smears in iodine and saline and identify parasitic stages

3. identify malaria parasites in a stained thin blood film

4. FINDINGS OF THE REVIEW TEAM

4.1 Curriculum Design, Content and Review

Old Curriculum

Under the old curriculum, 3rd year students followed a traditional course in medical parasitology: students learned about parasites that affect humans and arthropod vectors from a disease perspective. Detailed learning objectives that specify the required knowledge and practical skills have been identified and repeatedly revised at periodic intervals since the 1980s. These learning objectives were included in the handouts that are given to students.

New Curriculum

The document titled 'Curriculum Revision 2006 of the Faculty of Medicine, University of Peradeniya' states that "… *Beyond 2004* denotes the revised curriculum of the faculty that incorporates changes suggested by the World Federation of Medical Education (WFME) 2003: conforming to the needs and demands of the modern world… As opposed to traditional methods of teaching, the new curriculum focuses mainly on early clinical relevance, self-directed learning, professional development and community oriented learning".

The new curriculum is conducted on a semester system, with credit rated modules, and assessment based on Grade Point Averages.

The streams that constitute the MBBS programme during the first eight semesters are:

- **SBM** – Scientific Basis of Medicine – providing the knowledge base to perform the CLM skills
- **CLM** – Clinical Laboratory Management – imparting clinical, laboratory and patient management skills
- **CLR** – Communication, Learning and Research – Improving communication skills, English proficiency, web based learning and Research skills
- **DIS** – Doctor in Society – Empowering doctors role in society in relation to population issues and judicial medicine issues.
- **HCT** – Hospital Community based Training.
- **YES** – Year –end Extra Semester Programme

The teaching activities involving the DP are in two streams: SBM and CLM. The detailed learning objectives for both streams are given in a document that is made available to all students through the Faculty website. In the first two years, much of the Parasitology input occurs through the SBM stream; in the 3rd and 4th years, the teaching will be through the CLM stream.

In the new curriculum, the discipline of medical parasitology has been merged with that of microbiology into a composite infective diseases programme with inputs commencing in the 1st year, and going on until the 4th year, instead of being limited to the 3rd year, as in the past. The overall aim is to introduce concepts, definitions and principles underlying infective disease in the 1st year; to introduce systematics of infective agents in the 2nd year; and specific diagnostic laboratory skills in the 3rd year. The study of infective disease is incorporated into the different system-based modules, while major multi-system disease and special topics

relating to infective disease, diagnosis, prevention and control are to be taken up as special learning topics.

This approach has many positive aspects: it enables the holistic study of infective agents, their morphological and biological properties, interactions with the host, disease outcomes and prevention and control from a comparative perspective. The approach overcomes the traditional, artificial division of infective agents (based on their size) into microbiology and parasitology. The practice of introducing basic concepts in the 1st year, and then re-visiting the disease agents and diseases at increasing levels of complexity over a 4-year period is likely to encourage deeper learning among students.

However, because learning activities that were previously concentrated into one year are now spread out over 4 years, great care needs to be taken in ensuring that staff and students are clear about what is expected of students at each level of learning. Also, because the systematics of infective agents are taken up separately from the disease conditions they cause, staff need to take care in ensuring that students appreciate the clinical relevance of what they learn in the 1st and 2nd years.

The judgment of the Review Team on this aspect is GOOD.

4.2. Teaching, Learning and Assessment Methods

Old curriculum

The teaching/learning programme consisted of 28 lectures of 45 minutes each, 3 - 5 tutorials and 12 - 15 hours of practicals per student, over the course of 3 terms. The lectures are delivered as PowerPoint presentations using other visual aids. Handouts are given to students to supplement the lectures and practical skills. E-Learning facility and videotapes are available for the students. Tutorials are conducted by dividing the batch into 6 groups. Questions or special topics are given prior to the tutorial class and the academic staff members discuss the answers with the students. Laboratory classes and demonstrations provide the students an opportunity to acquire practical skills. Assessment methods consist of continuous assessments held at the end of first and second terms and an end of year examination. One-hour theory paper consisting of 2 essay questions is given for the first continuous assessment and a spot test (20-25 spots) for the second continuous assessment. The end of the course evaluation comprises a 2-hour theory paper with 4 essay questions, a spot test of 20 spots, a 40-minute practical exam and a viva-voce examination (10 minutes per student).

New curriculum

The contents and subject matter of the new curriculum are the same as the old curriculum but have been merged with Microbiology into an infective disease programme. The inputs commence from the first year and spreads over the first 4 years. Learning objectives are module-based. In the first year, concepts, definitions and principles underlying infective diseases are introduced. In the second year systematics of infective diseases are introduced. Systematics of infective agents and diseases are to be taught in the third year with emphasis on specific diagnostic laboratory skills. Evaluation includes formative assessment for each module and summative assessment at end of each year. Each assessment consists of theory questions (SAQs and MCQs of both True/False and Best Answer types) and OSPE where relevant.

In both old and new curricula, the teaching learning activities are most appropriate for the specified learning outcomes. It was clear that the staff take a lot of trouble in preparing

teaching materials of all sorts: lectures, handouts, bench aids, instructional videos, and CDs for self-study and self-assessment by students. It is to the great credit of the DP that despite perennial financial constraints within the university system, they have managed to obtain a variety of different types of equipment for teaching in the student laboratory (which is shared with the Microbiology Dept), and maintained them in working condition.

However, the Review Team noted with concern that the 60 microscopes used by students are all more than 10 years old now; and that all departmental staff (academic and non-academic) have to share just 3 computers and one laser printer. The Team also noted that the department has access to only one tutorial room, which is shared with the Departments of Community Medicine and Microbiology.

The range of assessment tools also matches the expected learning outcomes, in both old and new curricula. However, students following the new curriculum seem to be burdened with a large number of end-of-semester assessments (run over 7 – 8 days), and it is possible that when all students in the faculty are on the new curriculum, staff will find it difficult to cope with such a large volume of assessment. Furthermore, some important exam regulations have not yet been finalized. The second year students expressed some concern that although they are aware that they have to face a bar at the end of the current semester, they have not yet been informed of the exact manner in which this bar will be implemented. However, the Review Team is cognizant of the fact that these issues are not the direct responsibility of the DP, but of the Faculty as a whole.

The Review Team rates this aspect of the DP as SATISFACTORY.

4.3. Quality of Students, including Student Progress and Achievements

Old curriculum

Under the old curriculum, the continuous assessments carried 15% of the marks; the essay paper 45% of the marks; the practical examination 30% of the marks and the viva voce examination 10% of the marks. Students were required to obtain an overall average of 50% or more in order to pass Parasitology, and 70% or more to be awarded a Distinction. The progress of students for the past few years in Parasitology is shown in Table 1.

As Table 1 shows, the proportion of students referred in Parasitology is relatively low: 15% or less. Between 3 – 15% of students have been awarded Distinctions each year. Analysis of the marks obtained in the individual components of the examination indicated that while the average mark for the end-of-course theory paper was 47 – 49%, the average mark for the spot test was much higher (64 – 74%). This reflects the fact that most students who failed did so because of low marks in the theory paper. The SER attributes this relatively poor performance in answering essay questions to poor command of the English language and inadequate essay writing skills.

Table 1: Performance of Students in Parasitology Examinations

Year	**Total marks ≥60%**	**Total marks 50 – 59%**	**Referrals (total marks <50%)**	**Distinctions**
2003	53.2%	31.3%	8.5%	5.2%
2004	47.8%	31.6%	5.6%	15.1%
2005	32.5%	50.1%	13.9%	3.5%

New curriculum

Only one batch of students has undergone Parasitology-related assessments under the new curriculum. These are incorporated in the relevant end-of-semester examinations. An analysis of marks obtained by 2nd year students in the Semester 1 assessment of the Foundation 2 module indicated that students achieved a mean score of 64.4% in the 8 assessment items relating to Parasitology.

The Review Team is of the opinion that the Quality of Students, including Student Progress and Achievements is GOOD.

4.4. Extent and Use of Student Feedback (Qualitative and Quantitative)

The documentation provided to the reviewers, the presentation of the Head of the DP, discussions held with students and staff, indicated that there is a comprehensive mechanism in place in the DP to obtain quantitative feedback from students on a regular basis in the undergraduate as well as the postgraduate degree programmes. The documents scrutinized contained well-structured questionnaires for all aspects of teaching and learning and analysis of feedback obtained as charts. Quantitative feedback has been used by the majority of the academic staff to obtain feedback from students from the 1990's. Feedback has been obtained on individual teachers during lectures and on practicals and demonstrations conducted in the department.

The undergraduate student ratings for lectures and tutorials have been very good on aspects such as capturing their attention, creating an interest in the subject and creating a friendly environment, clarity and confidence. Good ratings were given for the teachers in the DP for being accessible and punctual, student friendly, thoroughness in the subject matter and treating students fairly. However the scores were marginally satisfactory in terms of encouraging active learning during lectures. Though there was no documentation of the outcomes of these evaluations, there was evidence of progressive improvements taking place in the teaching learning activities through subsequent student evaluations.

The postgraduate teaching learning programmes too have been evaluated regularly from 1996 to 2006 and very good ratings have been given by the postgraduates for organization of the training programme, academic and technical staff assistance during practical sessions.

However the Review Team noted that the DP has not used qualitative feedback from the students in terms of formal staff, student department meetings and liaison committees. The Team wishes to recommend initiation of qualitative feedback and establish a formal mechanism to facilitate bilateral communication.

The Review Team judges this aspect as GOOD.

4.5. Postgraduate Studies

Postgraduate studies in the DP are carried out through the appropriate Boards of Study of the Postgraduate Institute of Medicine (PGIM), University of Colombo, Postgraduate Institute of Science (PGIS) and Postgraduate Institute of Agriculture (PGIA) University of Peradeniya. Their most significant contribution to postgraduate studies is the training of postgraduate students in MD Parasitology, Diploma in Medical Microbiology in collaboration with the PGIM, University of Colombo. In addition the DP offers its major contribution in terms of a two-week course for the M.Sc. course in Medical Microbiology, a new course conducted by the PGIS, University of Peradeniya.

The documentation provided to the reviewers indicated that there has been a continuous stream of postgraduate students working in the DP from 2000. They included students who

followed MD Parasitology programme, Diploma in Medical Microbiology, Post MD Parasitology training programme, MPhil and PhD. research programs. From 2000 to 2006 there has been two PhD and four MPhil research students who have successfully completed their degrees. There has been an input into the MSc course in Integrated Water Resources Management of the PGIA in 2003/04. The DP has also made contributions to the Practical and Tropical Pediatrics component of James Cooke School of Public Health and Tropical Medicine, Australia.

The Review Team is satisfied that the DP possesses a sufficient infrastructure, facilities and equipment to conduct postgraduate research and provide a dedicated supervisory service to all postgraduate students.

It is the view of the Review Team that the status of Postgraduate Studies of the DP can be judged as GOOD.

4.6. Peer Observation

Procedures for observing teaching by peers have not been established in the DP from its inception. However there seems to be an informal tradition of peer observation of lectures in the department. Junior lecturers regularly sit in at senior lecturers' and professorial lectures of the department. The Head of the DP reviews junior lecturers' lecture content prior to the lecture. Constructive criticism is encouraged from junior as well as senior colleagues. Recently the teachers in the department realized the need for such appraisals to enhance the teaching quality and have initiated such practices in the teaching learning activities of the new curriculum with structured questionnaires developed by the Department of Microbiology.

After introduction of the new curriculum, a formal process of peer review has been set up within the Medical Faculty. The original SER did not contain any information regarding this aspect of the review. The documents provided subsequently included information regarding peer review of 3 lectures by a non-departmental staff member. The reviews were performed using a structured assessment form with an overall judgment regarding the teaching session. The reviewer was from the department of Microbiology and his comments suggest that the quality of lectures was excellent and that peer review is a useful experience for improving teaching the content areas that are shared by these two departments. The DP should attempt to continue this process, extend it to other teaching/learning methods and obtain the views of colleagues from other departments regarding the quality of teaching offered by its staff members.

The Review Team was provided with the completed peer evaluation forms with comments. The Review Team was impressed by the cooperation of the academic staff in the implementation of an effective peer observation process for the future.

The Review Team judges this aspect as SATISFACTORY.

4.7. Skills Development

Opportunities are provided for undergraduate students to develop personal and subject specific skills under both the old and the new curricula. In the undergraduate programme the subject specific skills (practical skills) are incorporated into the academic programme.

Old curriculum

In the old curriculum the course provides practical training throughout the parasitology programme conducted during the third year of the curriculum. These include skills in examining stained blood film, preparation and examinations of faecal smears, use of microscope and identifying protozoan/helminths infecting humans and vectors of medical importance. Students who fail the end of course examinations are given the opportunity to relearn skills by way of revision practical sessions. There is evidence that communication skills are strengthened in the old curriculum. In tutorial classes the students are given topics and questions and are given an opportunity to discuss and present.

New curriculum

In the new curriculum, basic laboratory bench skills in infective disease diagnosis are to be taught in Year 3. These skills are to be taught in the foundation and the infection and immunity modules in the CLM stream. Four hours/student are allocated for training students to attain these skills. In addition laboratory facilities with technical assistance will be made available during time allocated for independent learning throughout the semester for practice of specific skills. The evaluation will be done at the end of the semester and will be on an OSPE format. In the new curriculum communication, learning and research skills and web based learning skills are included in a separate stream referred to as the CLR stream.

It is the view of the Review Team that the Skills Development in the DP can be judged as GOOD.

4.8. Academic Guidance and Counseling

In the old curriculum the students whose performance is poor in their end of term tests and those failing the end of course examinations are called up for discussion and given a feed back regarding their performance. Theory papers are handed over to the students for their scrutiny. Students who are weak in their English and language writing skills are referred to the ELTU directly or through student advisors. In the new curriculum the students can seek advise from the Academic Committee for academic guidance.

The Review Team judges this aspect as GOOD.

5. CONCLUSIONS

1. Curriculum Design, Content and Review

Strengths/Good Practices

1. The overall MBBS curriculum has been changed to focus on early clinical relevance, self-directed learning, professional development and community-oriented learning.
2. Monitoring and revision of the Parasitology curriculum has taken place on a regular basis in the past; the parasitology input in the new curriculum appears to be well thought out, and as such it is likely to work well.
3. The new curriculum design enables the holistic study of infective agents, their morphological and biological properties, interactions with the host, disease outcomes and prevention and control from a comparative perspective.

4. The practice of introducing basic concepts in the 1st year, and then re-visiting the disease agents and diseases at increasing levels of complexity over a 4-year period is likely to encourage deeper learning among students.

Weaknesses

None of note with current level of implementation of new curriculum

2. Teaching, Learning and Assessment Methods

Strengths/Good Practices

1. Copies of lectures presentations are made available at the e-library for students to refer.
2. Handouts supplementing lectures are regularly updated
3. A MCQ Bank with both multiple true/false and best answer type questions has been initiated for the new curriculum
4. Students are given an opportunity to observe written comments made by academic staff in their answer scripts and spots discussed following completion of tests, so that students can learn from their mistakes

Weaknesses

1. Lack of space to conduct tutorials
2. Lack of resources – inadequate computers and printers to prepare teaching material
3. Too many exams are conducted at the end of the semester under the new curriculum
4. Students following the new curriculum were uncertain of the nature of the bar at the end of the second year.
5. About 7 modules are scheduled for each semester, and as a result there is no flexibility in re-arranging lectures if they are missed due to strikes etc.

3. Quality of Students, including Student Progress and Achievements

Strengths/Good Practices

1. The proportion of students referred in Parasitology under the old curriculum is relatively low and has remained so over the last three batches of students.
2. Average student performance in the Parasitology component of the Foundation 2 module assessment was good.

Weaknesses

None of note

4. Extent and Use of Student Feedback

Strengths/Good Practices

Use of comprehensive, well-structured questionnaires to obtain student feed back on teacher evaluation on a regular basis

Weaknesses

Absence of a formal Student-Staff Liaison Committee and qualitative feedback

5. Postgraduate Studies

Strengths/Good Practices

Involvement of the staff in postgraduate training programmes of the PGIM, University of Colombo, PGIS and PGIA, University of Peradeniya

Weaknesses

None

6. Peer Observation

Strengths/Good Practices

Commencement of peer observation of lectures conducted by all the teachers in the Parasitology Department, by someone outside the department

Weaknesses

Lack of evidence of peer observation practices as part of the routine practices of the structure of the department

7. Skills Development

Strengths/Good Practices

1. Equipment for learning practical skills is available in the Department and include microscopes, a visual presenter, TV monitor, Microscope with video and camera attachment
2. Video programmes and CD for demonstration of laboratory skills have been prepared and are available to the students

Weaknesses

1. Microscope numbers are inadequate for the large number of students; only 60 microscopes are in satisfactory condition; and the newest among them are over 10 years old
2. Funds are not available for maintenance of equipment and for purchase of spare parts.

8. Academic Guidance and Counseling

Strengths/Good practices

The Departmental staff offer specific academic guidance to weak students who have difficulty in passing examinations

Weaknesses

None

Based on the observations made during the visit by the review team and discussed above, the eight aspects were judged as follows:

Aspect Reviewed	Judgment Given
Curriculum Design, Content and Review	Good
Teaching, Learning and Assessment Methods	Satisfactory
Quality of Students, including Student Progress and Achievements	Good
Extent and Use of Student Feedback	Good
Postgraduate Studies	Good
Peer Observation	Satisfactory
Skills Development	Good
Academic Guidance and Counseling	Good

The overall judgment is suspended

6. RECOMMENDATIONS

1. It is recommended that all staff members of the DP agree about the different levels of knowledge and skills required of students at different stages of learning under the new curriculum; and that this is clearly conveyed to students.
2. The departmental staff and the Curriculum Coordinating Committee (CCC) may consider obtaining qualitative feedback on the teaching programme from students, in addition to the quantitative feedback that is already obtained. If the CCC retains responsibility for obtaining all student feedback, specific feedback could be sought on departmental level inputs in order to facilitate any remedial measures that may be required.
3. The DP may consider extending the recently introduced practice of intra-departmental peer observation and feedback to include all staff members, junior and senior.
4. It is recommended that the Faculty take cognizance of the fact that departments such as Parasitology, which are responsible for conducting laboratory based teaching activities, require extra financial support for purchase and maintenance of laboratory equipment (such as microscopes) as well as items such as computers and printers which are essential for development of subject-specific and generic skills.
5. Departmental recommendations regarding purchase of such items of equipment that they deem most appropriate for their needs should be given serious consideration.
6. Timetabling of the teaching learning activities in the new curriculum need to be incorporated some leeway to cope with unexpected problems such as non-academic staff strikes, etc.
7. It is recommended that the Faculty ensure that students are made aware of regulations pertaining to bar examinations well in advance of the implementation of such bars.

8. The Faculty may wish to consider reducing the number of end-of-semester examinations in the new curriculum since they are very stressful for students and will place a heavy workload on staff when all batches of students have switched over to the new curriculum.

7. ANNEXES

ANNEX 1. PROGRAMME FOR THE REVIEW VISIT

Day 1: Monday, 12.03.2007

8.15 – 8.45 am	Meeting of QAAC Representative with Review Team
8.45 – 9.15 am	Observe teaching: Lecture on Intestinal Nematodes for Y2 students by Prof Sarath Edirisinghe
9.15 – 9.30 am	Discuss Review visit programme with Head of Dept
9.30 – 10.15 am	Meeting with Vice-Chancellor and Dean / Medicine
10.15 – 10.30 am	Tea
10.30 – 12.00 pm	Presentation on Self-Evaluation Report by Head of Dept
12.00 – 12.30 pm	Observation of facilities: dept labs, e-library and main library
12.30 – 1.30 pm	Lunch
1.30 – 2.30 pm	Perusal of documents
2.30 – 3.30 pm	Meeting with non-academic staff
3.30 – 4.30 pm	Meeting with academic staff
4.30 – 5.00 pm	Meeting with 3rd year students (old curriculum)

Day 2: Tuesday, 13.03.2007

8.00 – 9.00 am	Observe teaching: Lecture on Cestodes for Y2 students by Dr Devika Iddawela
9.00 – 10.15 am	Perusal of documents
10.15 – 10.30 am	Tea
10.30 – 12.30 am	Perusal of documents
12.30 – 1.30 pm	Lunch
1.30 – 2.00 pm	Observe teaching: Material on infective agents for student generated learning activity
2.00 – 3.00 pm	Meeting with 2nd year students (new curriculum)
3.00 – 4.00 pm	Meeting of reviewers

Day 3: Wednesday, 14.03.2006

9.00 – 10.00 am	Meeting with student counselors
10.00 – 10.15 am	Tea
10.15 – 11.00 am	Wrap-up meeting with Departmental staff
11.00 – 11.30 am	Meeting of reviewers and report writing
11.45 – 12.30 pm	Wrap-up meeting with Chairman, IQAU

ANNEX 2. LIST OF PERSONS MET BY THE REVIEW TEAM

1. Vice-Chancellor, University of Peradeniya

2. Dean, Faculty of Medicine, University of Peradeniya

3. Members of the academic staff in Department of Parasitology

   Senior Professor and Head of Department
   Professors - 2
   Senior Lecturers – 3
   Technical Officers – 5

4. Non-academic staff members in Dept of Parasitology
   Chief Technical Officer
   Technical officers - 4
   Clerk – 1
   Laboratory Attendants – 2

5. Groups of undergraduate students from 2nd and 3rd years of study and two postgraduate students

6. Student Counselors: Deputy Proctor and 2 of the Senior Student Counselors in the Faculty of Medicine

7. Chairman, Internal Quality Assurance Unit, University of Peradeniya and Medical Faculty Representative in IQAU