His Majesty's Government
Ministry of Health
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Teku, Pachali
Kathmandu

SITUATION ANALYSIS
HEALTH
LABORATORY SERVICES
IN NEPAL

Report prepared by:

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With the support and in collaboration with

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His Majesty's Government
Ministry of Health
DEPARTMENT OF HEALTH SERVICES

Pachali, Teku
Kathmandu, Nepal.

Date :

Foreword

Laboratory services are vital for appropriate treatment of common diseases and for epidemiological studies. It is well recognised that supportive laboratory services are essential in providing quality primary health care, especially at the peripheral level of the health care system.

In the early eighties, Nepal was among the pioneers in implementing a national system of health laboratory service in support of primary health care. Today, its public health laboratory network includes over 200 laboratories in all parts of the Kingdom. The challenge lies in ensuring the quality of laboratory service through a well-trained manpower with appropriate and affordable technologies for developing countries.

In order to manage this large network, ensure the quality of services and appraise the status of the actual situation, it is important to have periodic independent assessments in addition to internal mechanisms of reporting within the Department of Health Services. It is in this context that the present situation analysis conducted by the Health Service Management Consultant Mrs. Gabriele Mallapaty is viewed as a crucial first step in establishing the baseline information. It should serve as an up-to-date reference point and support the planning, monitoring and periodic evaluation of the public health laboratory sector. I am certain that all tiers of the Department of Health Services of His Majesty's Government of Nepal, International and National Non-Governmental Organizations working in health service programmes would benefit for this comprehensive analysis.

On behalf of the Department of Health, I would like to acknowledge Mrs. Mallapaty's voluntary services in conducting this situation analysis in collaboration with the National Public Health Laboratory. Her personal commitment and valuable contribution towards the improvement of laboratory service in Nepal is greatly appreciated.

B.D.Chataut
Director General

Dr. B.D.chataut
Director General
Department of Health Services.

April 2000

SUMMARY OF RECOMMENDATIONS

Based on findings from the situation analysis, a summary of priority actions required:

1) **Upgrade the quality of medical laboratory science education**
   - Curriculum revision to reflect latest needs and developments, e.g., Quality Assurance, Waste Management and Health Safety.
   - Revise Refresher Training and Quality Assurance Training Programmes.
   - Prepare training material appropriate for peripheral laboratory staff.
   - Revise the training policy to include in-service training, on-the-job training and training in specific areas).

2) **Quality Assurance Programme**
   - Continue the External Quality Assessment programme and expand to all regions.
   - Increase emphasis on Internal Quality Control Procedures.
   - Establish a climate of Quality Management lead by the National Public Health Laboratory.

3) **Prepare Standard Operating Procedures for PHC and District hospital level**
   - Simple bench-level SOPs for all essential test procedures and equipment.
   - Use SOPs for training and as reference material at the peripheral units.

4) **Establish a biomedical equipment maintenance system**
   - Provision for a post of a biomedical technician at the NPHL.
   - Establish a workshop with tools for laboratory equipment maintenance and repair.
   - Establish regional equipment maintenance centres with adequate staff provisions.

5) **Upgrade supervisory capacity at the NPHL**
   - Prepare a yearly plan of supervisory visits to peripheral laboratories to all parts of the country.
   - Upgrade supervisory skills through specific training programmes.

6) **Upgrade the supply and reagent distribution system to peripheral laboratories**
   - **C**omputerised database management system at the NPHL.
   - Upgrade reagent preparation capacity at the peripheral units, through the provision of additional minor equipment at PHC laboratory level and training.

7) **Standardise the organisational system and work processes**
   - Prepare a patient and specimen referral policy.
   - Standard essential test-procedure list for all levels.
   - Standard essential equipment list for all levels.

8) **Make all efforts to fill vacant posts at public health laboratories**

ACKNOWLEDGEMENT

I would like to express my special thanks to Dr. B.D. Chataut, Director General, Department of Health Services, for granting me permission to complete this report.

Thanks and gratitude to Dr. G.B. Shrestha, Director, NPHL and all staff of the National Public Health Laboratory for their openness and support in providing necessary information and allowing me the depth of the analysis. Thanks also to WHO for covering printing cost.

It is my sincere hope that through this effort I could contribute a small part to the advancement and development of Public Health Laboratory Services in Nepal. I also wish that in the future public health laboratory services in Nepal could stand out as exemplary among other South East Asian Nations.

The present document is just a beginning, an assessment of the current situation that should provide the baseline data for future planning and prioritising action. Few preliminary recommendations of major action points are included but further in-depth analysis of the findings is required.

Gabriele Mallapaty Kathmandu, April 2000

Consultant on PHC Laboratory Services &
Health Services Management.

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National Public Health Laboratory Teku, Kathmandu

Central Level Laboratories (6)

Bir Hospital	Kanti Hospital	Maternity Hospital	Mental Hospital Patan	National TB Centre	Ayurvedic Hospital

Regional Level Laboratory (1)

Western Region Regional Laboratory in Pokhara

Sub Regional Hospital Laboratory (1)

Central Region Sub Regional Hospital Laboratory in Birgunj

Zonal Level Laboratories (9)

Janakpur **Janakpur CR**	Bharatpur **Narayani CR**	Biratnagar **Koshi ER**	Chandragadhi **Mechi ER**	Rajbiraj **Sagarmatha ER**	Butwal **Lumbini WR**	Nepalganj **Bheri MWR**	Mahendranagar **Mahakali FWR**	Dhangadhi **Seti FWR**

District Level Laboratories (64)

Central Region			Eastern Region			Western Region			Mid-Western Region			Far-Western	
Bagmati Zone	Janakpur Zone	Narayani Zone	Koshi Zone	Mechi Zone	Sagarmatha Zone	Dhawalagiri Zone	Gandaki Zone	Lumbini Zone	Bheri Zone	Karnali Zone	Rapti Zone	Mahakali Zone	Seti Zone
7	**5**	**3**	**6**	**3**	**6**	**4**	**5**	**7**	**4**	**2**	**5**	**3**	**4**

PHC Centre Level Laboratories (132)

Central Region			Eastern Region			Western Region			Mid-Western Region			Far-Western	
Bagmati Zone	Janakpur Zone	Narayani Zone	Koshi Zone	Mechi Zone	Sagarmatha Zone	Dhawalagiri Zone	Gandaki Zone	Lumbini Zone	Bheri Zone	Karnali Zone	Rapti Zone	Mahakali Zone	Seti Zone
16	**11**	**8**	**15**	**11**	**12**	**5**	**15**	**11**	**7**	**4**	**8**	**3**	**6**

Health Post Level Laboratories (24)

Central Region			Eastern Region			Western Region			Mid-Western Region			Far-Western	
Bagmati Zone	Janakpur Zone	Narayani Zone	Koshi Zone	Mechi Zone	Sagarmatha Zone	Dhawalagiri Zone	Gandaki Zone	Lumbini Zone	Bheri Zone	Karnali Zone	Rapti Zone	Mahakali Zone	Seti Zone
1	**4**	**6**	**2**	**0**	**5**	**2**	**3**	**1**	**0**	**0**	**0**	**0**	**0**

1. INTRODUCTION

This situation analysis was prepared to provide the Department of Health Services, MoH and agencies working in the health field with up-to-date information on Public Health Laboratory Services in Nepal. One of the main goals was to generate a better perception of the needs and constrains that affect this essential public health function and initiate required changes for future health-planning action.

Public Health Laboratory Services are a vital function of any health care system. Shortcomings in Public Health Laboratory Services will affect the overall quality of healthcare service delivery and have negative spin-off affects on several essential public health functions. In particular: appropriate treatment of common diseases, prevention and control of infectious diseases, epidemiological studies and maternal & child health.

Public Health Laboratory Services are an integral part of the national health care system in Nepal. In the early 80th after the Alma Ata declaration, Nepal was among the first few countries that established laboratories at health centre level and instituted a system of health laboratory services in support of Primary Health Care. In Nepal, public health laboratories at all levels carry out both clinical diagnostic and public health functions.

The Annual Report (2054/55 – 1997/98) of the Department of Health Services, MoH outlines the new organisational structure of the DHS. At the central level, the department is divided into seven central divisions and five national centres. The National Health Training Centre (NHTC), the National Health Education, Information and Communication Centre (NHEICC), the National Tuberculosis Centre (NTC), the National Centre for AIDS and STD Control (NCASC) and the National Public Health Laboratory (NPHL).

The National Public Health Laboratory in Teku, Kathmandu is the National Reference and Referral Laboratory (**See attachment 1**). The NPHL has planning, organisational and

administrative responsibilities for the Public Health Laboratory Network in Nepal. The laboratory network includes 6 central-level laboratories, 1 regional laboratory, 1 sub-regional laboratory, 9 zonal-level laboratories, 64 district-level laboratories, 132 primary health care centre laboratories and 24 health post laboratories.

2. THE NATIONAL PUBLIC HEALTH LABORATORY

The Eighth Five-Year Plan and the New Health Policy of 2051/1994 state that the NPHL in Kathmandu, Teku is the only central and specialised reference laboratory in the country. The NPHL has the following major functions:

- National Reference and Referral Laboratory
- Supervision and Monitoring of Public Health Laboratories
- Training of Laboratory Assistants at the National Laboratory Training Centre
- Refresher Training for Laboratory Assistants and Laboratory Technicians
- Quality Assurance Programme and Training Activities
- Supply of Reagents and Equipment to Public Health Laboratories

The NPHL has the following specialised departments: Haematology, Biochemistry, Parasitology, Microbiology, Histology, Immunology, Virology, Coagulation, Registration & OPD Collection and Quality Control.

3. THE PUBLIC HEALTH LABORATORY NETWORK

3.1. THE ORGANISATIONAL STRUCTURE OF THE PUBLIC HEALTH LABORATORY NETWORK

3.1.1. The Number and Geographic Distribution of Laboratories in the Country

Nepal is divided into five development regions, the Central, the Western, the Mid-Western, the Far-Western and the Eastern Development Region. Each region is subdivided into zones and districts. The capital city Kathmandu is located in the Central Region. The largest number of laboratories is found in the Central Region with 73 laboratories followed by the Eastern Region with 63 and the Western Region with 53, the Mid-Western Region has 31 and the Far-Western Region has 18. When compared with the population density this represents a fairly even distribution of laboratories in the country **(See Map, attachment 2 and List, attachment 3)**.

At the Central Level, Nepal has one national laboratory the National Public Health Laboratory at the Department of Health Services, Teku Kathmandu. Six central level hospital (250-350 beds) laboratories in Kathmandu, the Bir Hospital, the Kanti Children Hospital, the Mental Hospital in Patan, the Maternity Hospital, the National Tuberculosis Centre in Thimi and the Ayurvedic Hospital.

There is one Regional Hospital (200beds) Laboratory in the Western Region in Pokhara and one Sub-Regional Hospital Laboratory in the Central Region in Birgunj.

There are nine Zonal Hospital (50-200 beds) Laboratories: two in the Central Region, Janakpur and Bharatpur; three in the Eastern Region, Biratnagar, Chandraghadi and Rajbiraj; one in the Western Region, Butwal; one in the Mid-Western Region, Nepalgunj; and two in the Far-Western Region, Mahendranagar and Dhangadhi.

There are 64 District Hospital (15-25beds) Laboratories. Only Kabre, Dolpa, Humla and Kalikot do not have district level laboratory facilities all other districts are covered by district or higher-level hospital laboratory facilities.

At the Primary Health Care Centre (PHC) level, 132 PHC centres have essential laboratory facilities. In the early 80th , Nepal establish basic laboratory facilities at the Health Posts (HP) level as well. Laboratory work at HPs was carried out by auxiliary health-workers after receiving two months training in laboratory techniques. In recent years HP have been gradually upgraded to PHC level laboratories. At present, there are 24 HP laboratory facilities registered with the NPHL but no supervision of staff or provision of supplies is given from the central level.

3.1.2. The Number and Category of Staff at each Level

Shortage of qualified staff in peripheral laboratories is one of the major challenges facing the NPHL. Preliminary results of a recent survey of all public health laboratories in the country show large numbers of vacant posts. 30% of laboratory assistant posts are vacant, 18% of laboratory technician posts and 20% of medical technologist posts are vacant **(See attachment 4).**

The assignment of staff at the various levels is as follows: PHC centre laboratories are staffed with one laboratory assistant. District hospital laboratories are staffed with one laboratory technician and two laboratory assistants. Zonal and Regional hospital laboratories have one pathologist, one medical technologist, varying numbers of laboratory technician and laboratory assistants, depending on patient load. Most Central hospital laboratories have similar staffing depending on workload. The Bir Hospital laboratory, the biggest and busiest hospital in the Kathmandu valley has four pathologists, three technologists, over 20 laboratory technicians and laboratory assistants.

3.1.3. Essential Test Procedures List for the Various Levels

A standard list of essential test procedures at each level has been prepared in 1994/2052. An updated list of essential laboratory tests performed at a district level laboratory has been prepared recently and is attached **(See attachment 5).**

3.1.4. Essential Equipment List for the Various Levels

Based on the standard list of essential test procedures a standard list of equipment and reagents should be prepared. The NPHL has a list of essential equipment required at the various levels but the list needs revision **(See attachment 6).**

3.1.5. National Health Problems and Locally Endemic Diseases

Nepal has large and diverse numbers of communicable diseases and several occur in endemic form. Some of the major infectious diseases endemic in Nepal that can be identified with simple laboratory techniques are listed below. This list is not complete and some tests are not appropriate for PHC level laboratories.

DISEASE	**TEST METHOD**
Tuberculosis	Ziehl Neelsen stained sputum smear, Microscopy
Leprosy	Modified Ziehl Neelsen skin smear, Microscopy
Microfilariasis	Stained thick film and thin film, Microscopy
Malaria	Stained thick film and thin film, Microscopy
Intestinal worms	Direct stool smear, Microscopy
Bacillary Dysentery	Direct stool smear for RBCs and Pus cells, Microscopy
Typhoid	Blood culture and Gram Stain
Cholera	Direct Microscopy, Motility test
Amoebiasis	Direct stool smear, Microscopy
Leishmaniases (Kala-Azar)	Buffy-coat Preparation and Formol Gel (Aldehyde) test
HIV Screening	Spot test
Syphilis	RPR
Brucellosis	Latex agglutination test

Often infectious disease are identified and treated based on clinical symptoms alone without diagnostic laboratory confirmation. This will undoubtedly lead to wrong diagnosis and indiscriminate use of drug treatment, eventually leading to increased drug resistance. Likewise, for epidemiological surveillance the lack of adequate laboratory facilities poses a great challenge.

3.1.6. Budget Allocation for the Public Health Laboratory Sector in Nepal

According to the Health Information Bulletin, in 1991, 0.64 % of the health sector budget was allocated for the laboratory sector. The NPHL has two budget lines, a regular budget for the functioning of the national reference and referral laboratory in Teku, Kathmandu and a development budget to support public health laboratories all over the country.

Individual laboratory units in the periphery do not control a specific budget. However, for better planning purposes it might be important in the future to consider each unit as an individual cost control centre. Such cost are not necessarily defined in monetary values only but more in terms of resources necessary to deliver the service.

3.2. DOCUMENTATION ON WORK PROCESSES

3.2.1. Quality Assurance Programme

All laboratories, whether in developed or less developed countries, need a quality assurance programme to ensure that test results are reliable and reproducible. A well-organised Quality Assurance Programme includes Internal Quality Control (IQC) procedures, External Quality Assessment (EQA) programmes and Quality Management (QM).

IQC, is a set of procedures that are used in daily routine work to control daily variance of

test results, problems are identified immediately and the method is brought back on track. For example, running of positive and negative control, recording daily the temperature of the incubator or refrigerator and proper work organisation. EQA programmes are organised on a regional, national or international level and are concerned with the comparability of test results. EQA is a retrospective evaluation of quality. QM includes all other aspects of work organisation that contribute to obtaining reliable and reproducible test results. In many developing countries, as in Nepal, EQA programmes take prominence over IQC procedures and QM.

The NPHL established an EQA programme several years ago. This programme was supported by a medical technologist from International Nepal Fellowship for a three-year period. During the period 22 hospitals in the Central Regions were included in the EQA programme. According to available documentation, control-samples were dispatched four times. Control-samples included the following tests: Haemoglobin, Total White Blood Cell Count, Differential WBC Count, Urea, Glucose, Gram Stain and Stain for Acid Fast Bacilli. However, after the departure of the international expert the programme slowed down. Limited documentation is available about programme activities and procedures. Similar programmes have been conducted by INF experts in the Mid-Western and the Western Region, with limited involvement from the NPHL in Kathmandu. Currently efforts are underway to revive this programme with support of two INF experts at the NPHL.

Twice a year, the NPHL conducts training workshops on Quality Assurance for 10 laboratory assistants and laboratory technicians. The course outline for these training workshops needs updating to reflect latest developments in the field. The subject of Quality Assurance should also be included in the curriculum of both laboratory technicians and assistants.

3.2.2. Standard Operating Procedures

Standard Operating Procedures are written instruction protocols that include all aspects of laboratory work practices. Medical laboratories in western countries, that are preparing for accreditation need to write SOPs for each work process and must abide strictly to ISO and EN set standards. Standard operating procedures are certainly an important component of any quality system. Standard operating procedures help to prevent mistake rather than detecting them.

With WHO support, the NPHL made an effort to prepare SOPs, a draft has been sent to the WHO country office for review. However, it is worth noting that the SOPs in their current presentation still need revision, to fulfil their intended purpose.

In developing countries were resources are limited and needs are abandoned, health planners must keep in mind that writing SOPs involves great efforts, regarding manpower, time and resources. Therefore, SOPs must be written with a purpose in mind. Initially it might be best to prepare SOPs for essential test procedures only. It might also be considered to write bench-level SOPs for all essential test procedures that can be used both for training and at the laboratory units in the field.

3.2.3. Health And Bio-Safety Procedures

Health and bio-safety procedures include general safety instructions, chemical, fire and electrical safety, medical waste disposal and first-aid instructions. In Nepal, national guidelines on health and bio-safety are not available.

With the increased thread of HIV and Hepatitis and the prevalence of many infectious diseases in Nepal, urgent action is required in this regard. Medical waste management programmes need to be initiated, not only at laboratories, but at all medical facilities. Written guidelines and training on the subject are needed to protect workers and the

public. The subjects of bio-safety and waste-management should be included into the curriculum of medical laboratory education.

An important point to note here is that public health laboratory personnel in Nepal is not entitled for protective clothing allowance. Nurses and other health workers do receive protective clothing allowances.

3.2.4. Patient and Specimen Referral Systems

No clear instructions exist for patient and specimen referral to the next higher level laboratory. Written instruction protocols for patient referral and sample collection & transportation are needed. This would also facilitate epidemiological surveillance programmes, as sample collection could be carried out by PHC centre and District level laboratories in a reliable manner.

3.3. THE OPERATIONAL SUPPORT SYSTEM

3.3.1. Supply Order and Supply Distribution Systems

The NPHL has the responsibility to supply public health laboratories at PHC, District, Zonal and Regional level with major equipment, small supplies and reagents. Supplies are ordered through tenders and distributed on needs basis. This responsibility requires major organisational and managerial capacity. Therefore NPHL has assigned one additional full time staff to co-ordinate the planning and organisation of the Public Health Laboratory Network.

The system of supply and reagent distribution to peripheral laboratories requires revision and improvement to ensure regular supply and reagent replenishment at all peripheral laboratories in the country. To better manage this complex activity and keep track of supplies, equipment and personnel status in over 200 peripheral laboratories a

computerised relational database management system would greatly facilitate this function **(See attachment 7).**

3.3.2. Supervisory System

A well functioning supervisory system is an important component of the quality management system. It is a way of keeping in touch, knowing about problems and support peripheral staff to solve problems. Well-organised supervisory visits can be combined with quality assurance programmes, on-the-job training, competency-based assessment, equipment preventive maintenance and supply replenishment.

Staff members from the NPHL are supposed to visit laboratories in the periphery on a regular basis. The NPHL has a yearly schedule for supervisory visits to peripheral laboratories, however the timeframe for these visits is not fixed. Other constraints are lack of transportation and inaccessibility of some places. The NPHL is currently updating its supervisory system to establish a unified system and to co-ordinate with supervisory visits carried out by staff from the quality assurance programme **(See Form, attachment 8 and Questionnaire, attachment 9).**

3.3.3. Equipment Maintenance System

Well functioning equipment is essential to obtain reliable test results. Staff at all laboratories must be familiar with basic maintenance procedures, such as, changing the bulb of microscope, changing a fuse or cleaning equipment. Equipment maintenance must be part of medical laboratory science education. In addition, regular preventive maintenance of laboratory equipment is required to prolong the life of costly equipment and maintain the quality of service.

There is no national or regional biomedical equipment maintenance system in Nepal. The Physical Assets Management Project, a GTZ supported programme, is trying to

address this urgent need. The NPHL and most hospitals in Nepal do not have in-house equipment maintenance technicians. The NPHL has a budget item for general maintenance (building, etc.), however; there is no specific budget item for equipment maintenance at the NPHL. The NPHL has one maintenance staff, who does mainly general building maintenance and electrical works. The staff member is not qualified to carry out biomedical equipment maintenance and repairs.

A list of equipment at the NPHL, with details on maintenance status, has been prepared recently **(See attachment 10).** With over 130 pieces of equipment at the NPHL and more than 50 pieces of equipment lying in the stores, requiring repairs, there is an urgent need to establish a permanent post for a biomedical equipment technician at the NPHL. In addition, an equipment maintenance workshop with tools and spare-parts at the NPHL is required.

At present, broken equipment from peripheral laboratories is stored at the NPHL stores and replaced with new equipment. Many of the broken equipment require only minor repairs. This practice is certainly not cost-effective and does not contribute to effective management of limited resources.

3.3.4. Refresher Training Courses

The NPHL carries out refresher training programmes for 10 trainees twice a year at the Laboratory Training Centre. WHO supports one refresher training for 10 trainees per year. WHO also supports several external training programmes for senior laboratory personnel. Course content for the refresher-training programme needs to be updated to address latest developments and current needs.

It is also necessary to develop a training policy at the NPHL and to evaluate the effectiveness of current refresher training programmes. Alternate training programmes such as in-service-training, on-the-job training, regional or zonal training courses should

be considered. Training is also needed on specific subjects such as bio-safety, waste-management or managerial skills.

3.3.5. Communication Modes

Many places in Nepal are difficult to reach. The NPHL uses mail services, telegram, or telephone to communicate with peripheral laboratories. Up to district level, letters usually reach within one week. The NPHL might consider preparing a newsletter to share information and encourage a sense of team spirit.

3.4. MEDICAL LABORATORY SCIENCE EDUCATION SYSTEM

3.4.1. Educational Outline and Country Background

Structure of the educational system in Nepal:

1	2	3	4	5	6	7	8	9	10	11	12
Primary					**Lower Secondary**			**Secondary**		**Higher Secondary 10 + 2**	
Primary Education					Secondary Education			School Leaving Certificate S.L.C.		Intermediate in: Science, I.Sc. Art, I.A. Commerce, I.Com Education, I.Ed	

Technical S.L.C., Laboratory Assistant (1 year programme)

Certificate Programme, Laboratory Technician (2 years programme)

BMLT, Medical Technologist (3 years programme)

In Nepal, formal academic training in Medical Laboratory Sciences was introduced in 1972 at the Institute of Medicine, with a 2½ years certificate level programme. In 1987, a Bachelors programme in Medical Laboratory Technology (BMLT) was added. It was initially a two-academic years course. From 1996 onwards, this course was upgrade to a

three-academic years course. The BMLT programme is polyvalent and includes: Clinical Chemistry, Clinical Microbiology, Haematology and Blood Banking, Histopathology and Cytology. The Institute of Medicine, Tribhuvan University is the only recognised institution in Nepal offering academic training in Medical Laboratory Sciences.

The laboratory assistants training centre at the NPHL conducts one-year vocational training programmes since 1995. This training programme was initiated in an effort to fill vacant posts in public health laboratories all over the country. The curriculum for this programme was prepared jointly by the Council for Technical Education and Vocational Training (CTEVT) and the National Public Health Laboratory, DHS, Ministry of Health. Initially students were recruited via local newspaper advertisements and prospective student had to pass an entrance examination. At present students are selected at District Public Health Offices all over the country. There are plans for expanding this programme into a two-year course for laboratory technicians. This could open the career path for laboratory assistants, who have no scope for further professional advancement in the current system. Several private training institutions conduct one-year vocational training programmes as well.

3.4.2. Level of Training and Entrance Requirements

There are three levels of Medical Laboratory Science Education in Nepal:

a) Bachelor in Medical Laboratory Technology, Medical Technologist

This programme leads to a Bachelor in Medical Laboratory Technology. It is only offered at the Institute of Medicine, Tribhuvan University in Kathmandu. After completion of the three-year programme, students hold the title of Medical Technologist. This polyvalent programme is divided into practical and theoretical sessions. See curriculum outline **(Attachment 11).**

The basic entrance requirement for the BMLT programme is higher secondary education, with I.Sc. in biology or a Certificate in Health Science (Laboratory). In addition, all applicants must take a selection entrance examination conducted by the Institute of Medicine. Yearly six students are taken, two from the I.Sc. group and four from the Certificate in Health Laboratory Science group. After completion of the B.Sc. degree, students have to go abroad to pursue further studies. Presently M.Sc. level programmes in Medical Laboratory Science are not available in Nepal. Efforts are underway to establish a M.Sc. programme in the field of Microbiology.

b) Certificate in Health Science (Laboratory), Laboratory Technician

This programme leads to a Certificate in Health Science (Laboratory), (Radiography) or (Pharmacy), depending upon, which line the student follows. It is a two-year academic training followed by a six-month practical training, offered only at the Institute of Medicine, Tribhuvan University in Kathmandu. See curriculum outline **(Attachment 12).**

Entrance requirements for this programme are completion of higher secondary education (10 + 2 years) with Intermediate in Science (I.Sc.) and passing an entrance examination. After completion of the Certificate level programme students may enter the BMLT programme.

c) Technical S.L.C in the Field of Laboratory Assistant

One year non-academic, vocational training course leading to a technical S.L.C in the field of laboratory assistants. This course is offered at the Laboratory Assistants Training Centre at the National Public Health Laboratory and at various private institutions. It is a vocational training and lies under the jurisdiction of the Council for Technical Education and Vocational Training. See curriculum outline **(Attachment 13).**

Minimum requirement for acceptance to this programme is 10 years of schooling with passed S.L.C. After completion of this training students have no options for further professional advancement in this field.

3.4.3. Scope of the Field

Medical Laboratory Science education in Nepal has a relatively short history. Therefore we find a general lack of qualified laboratory personnel. Laboratory assistants, laboratory technicians, medical technologists and pathologists do routine laboratory work in Nepal.

a) Pathologists

Pathologists are M.B.B.S. graduates with varying additional training in one of the medical laboratory science fields. Pathologist can run private laboratories and are allowed to be in charge of central level laboratories.

b) Medical Technologists (M.Sc)

Medical Technologist with M.Sc degree can be in charge of a central level laboratory and open a private laboratory.

c) Medical Technologists (BMLT)

Medical Technologists with BMLT are allowed to carry out all routine laboratory work independently and can be in charge of a zonal level hospital laboratory. No additional practical experience is required. They can also open a private laboratory.

c) Laboratory Technicians

Laboratory Technicians after completion of their certificate level education can carry out all routine laboratory work independently. Six months practical field-work experience is required. Laboratory technicians can be in charge of a district level hospital laboratory.

d) Laboratory Assistants

Laboratory Assistants are allowed to work independently at a PHC centre laboratory. At higher levels they are only allowed to work under the supervision of a laboratory

technician, medical technologist or pathologist. At the peripheral levels of the health care system, laboratory assistants carry out most routine work independently.

3.4.4. Educational Requirements

Quality Laboratory services can only be achieved if laboratory personnel are well trained. The NPHL is faced with a large number of vacant posts that require qualified technician level personnel. The NPHL is aware that to meet the challenges of the 21st century it needs to upgrade the quality standard of work at public health laboratories. High quality education plays a pivotal role to achieve this goal, especially at the peripheral and intermediate level of the health care system.

The NPHL conducts one-year laboratory assistant training programmes at the Laboratory Training Centre in Teku, Kathmandu. Currently efforts are under way to upgrade the one-year laboratory assistant training programme to a two-year laboratory technician training programme. It is anticipated to conduct a high standard two-academic years training programme, equivalent to the Certificate-level programme currently conducted at the Institute of Medicine. At the same time the programme should incorporate advancements in the professional field and meet the needs of district laboratories in the country. A detailed project proposal with curriculum outline and supporting documents has been prepared recently.

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STD-AIDS
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ABBREVIATION

BMLT	**Bachelor in Medical Laboratory Technology**
CTEVT	**Council for Technical Education and Vocational Training**
EQA	**External Quality Assessment**
DHS	**Department of Health Services**
GTZ	**German Agency for Technical Co-operation**
HMG	**His Majesty's Government**
HP	**Health Post**
INF	**International Nepal Fellowship**
IQC	**Internal Quality Control**
ISO	**International Organisation for Standardisation**
MOH	**Ministry of Health**
NPHL	**National Public Health Laboratory**
PHLN	**Public Health Laboratory Network**
OPD	**Out-Patient Department**
PHC	**Primary Health Care**
QA	**Quality Assurance**
QM	**Quality Management**
S.L.C	**School Leaving Certificate**
SOP	**Standard Operating Procedures**
WHO	**World Health Organisation**

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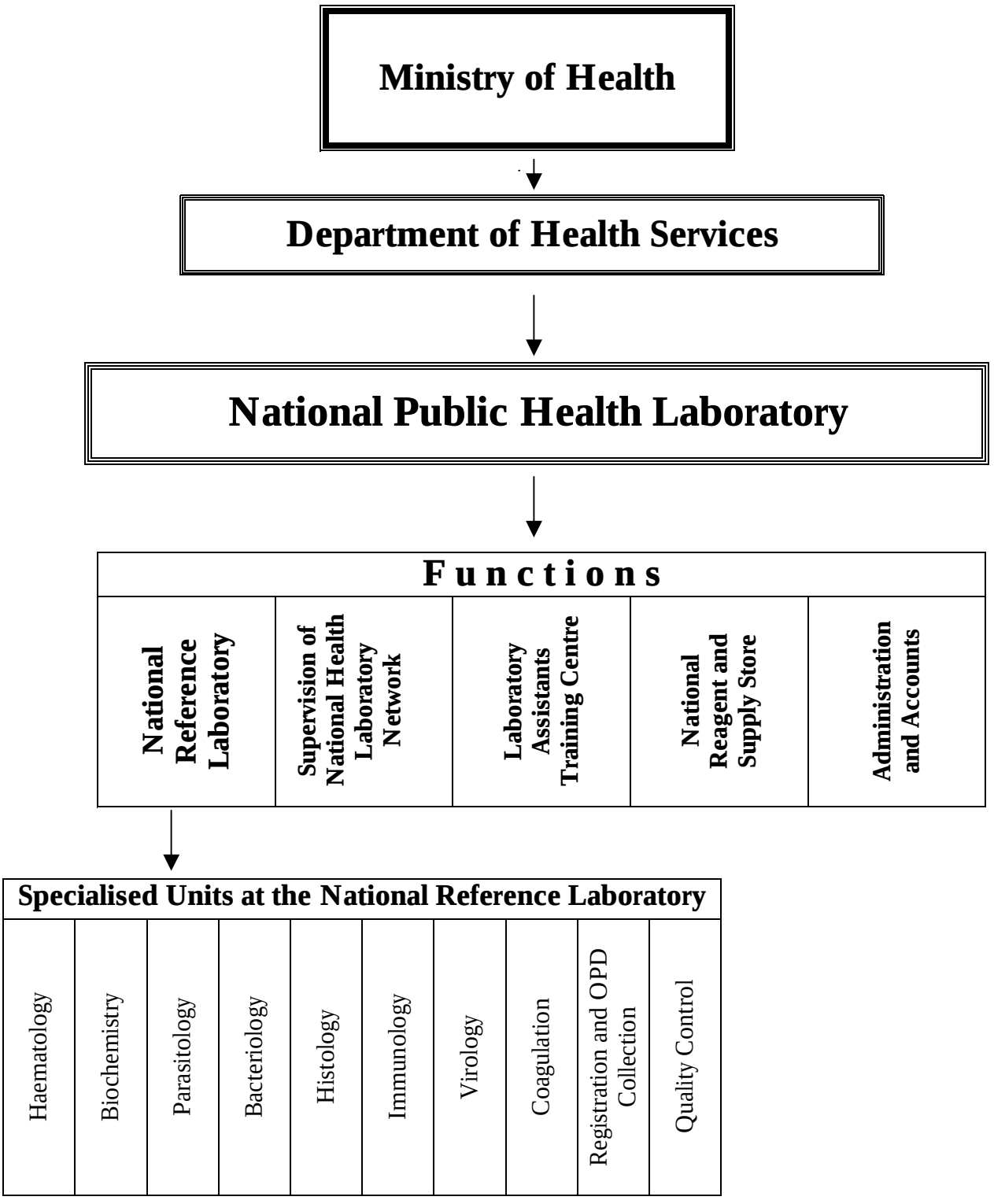
Attachment 1



Attachment 3

National Public Health Laboratories

March 2000

ID	Name	Level	DR	Zone	District
1	**NPHL**	N	CR	Bagmati	Kathmandu
2	**Ayurvedic Hospital**	C	CR	Bagmati	Kathmandu
3	**Bir Hospital**	C	CR	Bagmati	Kathmandu
4	**Kanti Hospital**	C	CR	Bagmati	Kathmandu
5	**Maternity Hospital**	C	CR	Bagmati	Kathmandu
6	**Mental Hospital in Patan**	C	CR	Bagmati	Kathmandu
7	**National Tuberculosis Centre**	C	CR	Bagmati	Kathmandu
8	**Teku Hospital**	D	CR	Bagmati	Kathmandu
9	**Mulpani**	PHC	CR	Bagmati	Kathmandu
10	**Ramghat**	PHC	CR	Bagmati	Kathmandu
11	**Patan (Mission)**	D	CR	Bagmati	Lalitpur
12	**Bhaktapur**	D	CR	Bagmati	Bhaktapur
13	**Balkot**	PHC	CR	Bagmati	Bhaktapur
14	**Chalnakel**	PHC	CR	Bagmati	Bhaktapur
15	**Dadhikot**	PHC	CR	Bagmati	Bhaktapur
16	**Dhading + DPHO**	D	CR	Bagmati	Dhading
17	**Gajuritar**	PHC	CR	Bagmati	Dhading
18	**Salyantar**	PHC	CR	Bagmati	Dhading
19	**Dhulikhel**	PHC	CR	Bagmati	Kabhre
20	**Khopasi**	PHC	CR	Bagmati	Kabhre
21	**Mithinkot**	PHC	CR	Bagmati	Kabhre
22	**Trisuli**	D	CR	Bagmati	Nuwakot
23	**Deurali**	PHC	CR	Bagmati	Nuwakot
24	**Kakani**	PHC	CR	Bagmati	Nuwakot
25	**Kharanitar**	PHC	CR	Bagmati	Nuwakot
26	**Samudratar**	PHC	CR	Bagmati	Nuwakot
27	**Betini**	HP	CR	Bagmati	Nuwakot
28	**Rasuwa + DPHO**	D	CR	Bagmati	Rasuwa
29	**Chautara**	D	CR	Bagmati	Sindhupalchok
30	**Bahrabise**	PHC	CR	Bagmati	Sindhupalchok
31	**Melamchi**	PHC	CR	Bagmati	Sindhupalchok
32	**Janakpur**	Z	CR	Janakpur	Dhanusha
33	**Mahendranagar**	PHC	CR	Janakpur	Dhanusha
34	**Sabaila**	PHC	CR	Janakpur	Dhanusha
35	**Yadukoha**	PHC	CR	Janakpur	Dhanusha
36	**Gangapipra**	HP	CR	Janakpur	Dhanusha
37	**Jiri**	D	CR	Janakpur	Dolakha
38	**Charikot**	PHC	CR	Janakpur	Dolakha
39	**Jhule**	HP	CR	Janakpur	Dolakha
40	**Namdu**	HP	CR	Janakpur	Dolakha
41	**Phasku**	HP	CR	Janakpur	Dolakha
42	**Jaleswor**	D	CR	Janakpur	Mahottari
43	**Goushala**	PHC	CR	Janakpur	Mahottari
44	**Loharpatti**	PHC	CR	Janakpur	Mahottari
45	**Ramechhap**	D	CR	Janakpur	Ramechhap
46	**Manthali**	PHC	CR	Janakpur	Ramechhap
47	**Malangawa**	D	CR	Janakpur	Sarlahi
48	**Barathahawa**	PHC	CR	Janakpur	Sarlahi

National Public Health Laboratories

March 2000

ID	Name	Level	DR	Zone	District
49	**Haripur**	PHC	CR	Janakpur	Sarlahi
50	**Lalbandi**	PHC	CR	Janakpur	Sarlahi
51	**Sindhulimadi+ DPHO**	D	CR	Janakpur	Sindhuli
52	**Kapilakot**	PHC	CR	Janakpur	Sindhuli
53	**Kalaiya**	D	CR	Narayani	Bara
54	**Simara**	PHC	CR	Narayani	Bara
55	**Chyutaha**	HP	CR	Narayani	Bara
56	**Fetaha**	HP	CR	Narayani	Bara
57	**Nichyuta**	HP	CR	Narayani	Bara
58	**Nijgadha**	HP	CR	Narayani	Bara
59	**Simaraungadha**	HP	CR	Narayani	Bara
60	**Bharatpur**	Z	CR	Narayani	Chitwan
61	**Baghaudamadi**	PHC	CR	Narayani	Chitwan
62	**Khairahani**	PHC	CR	Narayani	Chitwan
63	**Langadhi**	HP	CR	Narayani	Chitwan
64	**Hetauda + DPHO**	D	CR	Narayani	Makwanpur
65	**Bhimphedi**	PHC	CR	Narayani	Makwanpur
66	**Manahari**	PHC	CR	Narayani	Makwanpur
67	**Palung**	PHC	CR	Narayani	Makwanpur
68	**Birgunj**	SR	CR	Narayani	Parsa
69	**Pokhariya**	PHC	CR	Narayani	Parsa
70	**Satbariya**	PHC	CR	Narayani	Parsa
71	**Gaur**	D	CR	Narayani	Rautahat
72	**Chandranigahapur**	PHC	CR	Narayani	Rautahat
73	**Bhojpur**	D	ER	Koshi	Bhojpur
74	**Dingla**	PHC	ER	Koshi	Bhojpur
75	**Mulpani**	PHC	ER	Koshi	Bhojpur
76	**Pyauli**	PHC	ER	Koshi	Bhojpur
77	**Dhankuta + DPHO**	D	ER	Koshi	Dhankuta
78	**Budhabare**	PHC	ER	Koshi	Dhankuta
79	**Jeetpur**	PHC	ER	Koshi	Dhankuta
80	**Dandabasar**	PHC	ER	Koshi	Dhankuta
81	**Ankhisalla**	HP	ER	Koshi	Dhankuta
82	**Ligligebaddanda**	HP	ER	Koshi	Dhankuta
83	**Koshi Biratnagar**	Z	ER	Koshi	Morang
84	**Rangeli**	D	ER	Koshi	Morang
85	**Haraicha**	PHC	ER	Koshi	Morang
86	**Jhurkia**	PHC	ER	Koshi	Morang
87	**Letang**	PHC	ER	Koshi	Morang
88	**Urlabari**	PHC	ER	Koshi	Morang
89	**Khandhbari**	D	ER	Koshi	Sankhuwasabha
90	**Chainpur**	PHC	ER	Koshi	Sankhuwasabha
91	**Inaruwa**	D	ER	Koshi	Sunsari
92	**Harinagara**	PHC	ER	Koshi	Sunsari
93	**Itahari**	PHC	ER	Koshi	Sunsari
94	**Prakashpur**	PHC	ER	Koshi	Sunsari
95	**Terhathum + DPHO**	D	ER	Koshi	Terhathum
96	**Basantapur**	PHC	ER	Koshi	Terhathum
97	**Ilam**	D	ER	Mechi	Ilam

National Public Health Laboratories

March 2000

ID	Name	Level	DR	Zone	District
98	**Mangalbare**	PHC	ER	Mechi	Ilam
99	**Phikkal**	PHC	ER	Mechi	Ilam
100	**Pasupatinagar**	PHC	ER	Mechi	Ilam
101	**Mechi**	Z	ER	Mechi	Jhapa
102	**Dhulabari**	PHC	ER	Mechi	Jhapa
103	**Shivagunj**	PHC	ER	Mechi	Jhapa
104	**Sanischare**	PHC	ER	Mechi	Jhapa
105	**Gauriganj**	PHC	ER	Mechi	Jhapa
106	**Surunga**	PHC	ER	Mechi	Jhapa
107	**Panchthar + DPHO**	D	ER	Mechi	Panchthar
108	**Rabi**	PHC	ER	Mechi	Panchthar
109	**Gopetar**	PHC	ER	Mechi	Panchthar
110	**Taplejung**	D	ER	Mechi	Taplejung
111	**Tellok**	PHC	ER	Mechi	Taplejung
112	**Dhungesangu Tembe**	PHC	ER	Mechi	Taplejung
113	**Khotang**	D	ER	Sagarmatha	Khotang
114	**Aiselukarka**	PHC	ER	Sagarmatha	Khotang
115	**Chisapani**	PHC	ER	Sagarmatha	Khotang
116	**Okhaldhunga**	D	ER	Sagarmatha	Okhaldhunga
117	**Raniban**	PHC	ER	Sagarmatha	Okhaldhunga
118	**Rumjatar**	PHC	ER	Sagarmatha	Okhaldhunga
119	**Sagarmatha**	Z	ER	Sagarmatha	Saptari
120	**Bavangama Katti**	PHC	ER	Sagarmatha	Saptari
121	**Kalyanpur**	PHC	ER	Sagarmatha	Saptari
122	**Kanchanpur**	PHC	ER	Sagarmatha	Saptari
123	**Bodebarsain**	HP	ER	Sagarmatha	Saptari
124	**HanumanNagar**	HP	ER	Sagarmatha	Saptari
125	**Paroha**	HP	ER	Sagarmatha	Saptari
126	**Sukhipur**	HP	ER	Sagarmatha	Saptari
127	**Lahan**	D	ER	Sagarmatha	Siraha
128	**Siraha**	D	ER	Sagarmatha	Siraha
129	**Aurahi**	PHC	ER	Sagarmatha	Siraha
130	**Mirchaiya**	PHC	ER	Sagarmatha	Siraha
131	**Golbazar**	HP	ER	Sagarmatha	Siraha
132	**Salleri + DPHO**	D	ER	Sagarmatha	Solukhumbu
133	**Gorakhani**	PHC	ER	Sagarmatha	Solukhumbu
134	**Salyan**	PHC	ER	Sagarmatha	Solukhumbu
135	**Udayapur Gaighat**	D	ER	Sagarmatha	Udayapur
136	**Katari**	PHC	ER	Sagarmatha	Udayapur
137	**Baitadi**	D	FWR	Mahakali	Baitadi
138	**Patan**	PHC	FWR	Mahakali	Baitadi
139	**Dadeldhura + DPHO**	D	FWR	Mahakali	Dadeldhura
140	**Jogbuda**	PHC	FWR	Mahakali	Dadeldhura
141	**Darchula**	D	FWR	Mahakali	Darchula
142	**Gokuleshwor**	PHC	FWR	Mahakali	Darchula
143	**Mahakali Mahendranagar**	Z	FWR	Mahakali	Kanchanpur
144	**Achham**	D	FWR	Seti	Achham
145	**Kamalbazar**	PHC	FWR	Seti	Achham
146	**Bajhang**	D	FWR	Seti	Bajhang

	National Public Health Laboratories				**March 2000**
ID	**Name**	Level	DR	Zone	District
147	**Bajura + DPHO**	D	FWR	Seti	Bajura
148	**Doti + DPHO**	D	FWR	Seti	Doti
149	**Kedarakharda**	PHC	FWR	Seti	Doti
150	**Seti**	Z	FWR	Seti	Kailali
151	**Bhajani**	PHC	FWR	Seti	Kailali
152	**Choumala**	PHC	FWR	Seti	Kailali
153	**Malwara**	PHC	FWR	Seti	Kailali
154	**Tikapur**	PHC	FWR	Seti	Kailali
155	**Bheri**	Z	MWR	Bheri	Banke
156	**Bankatawa**	PHC	MWR	Bheri	Banke
157	**Laxmanpur**	PHC	MWR	Bheri	Banke
158	**Bardiya + DPHO**	D	MWR	Bheri	Bardiya
159	**Rajapur**	PHC	MWR	Bheri	Bardiya
160	**Dailekh**	D	MWR	Bheri	Dailekh
161	**Lakran**	PHC	MWR	Bheri	Dailekh
162	**Jajarkot**	D	MWR	Bheri	Jajarkot
163	**Gorkhkot**	PHC	MWR	Bheri	Jajarkot
164	**Surket + DPHO**	D	MWR	Bheri	Surkhet
165	**Mehelkuna**	PHC	MWR	Bheri	Surkhet
166	**Salkot**	PHC	MWR	Bheri	Surkhet
167	**Dolpa**	PHC	MWR	Karnali	Dolpa
168	**Humla + DPHO**	PHC	MWR	Karnali	Humla
169	**Jumla + DPHO**	D	MWR	Karnali	Jumla
170	**Kalikot**	PHC	MWR	Karnali	Kalikot
171	**Kumalgaun**	PHC	MWR	Karnali	Kalikot
172	**Mugu**	D	MWR	Karnali	Mugu
173	**Dang**	D	MWR	Rapti	Dang
174	**Lamahi**	PHC	MWR	Rapti	Dang
175	**Shrigaun**	PHC	MWR	Rapti	Dang
176	**Tulsipur**	PHC	MWR	Rapti	Dang
177	**Pyuthan + DPHO**	D	MWR	Rapti	Pyuthan
178	**Bhringri**	PHC	MWR	Rapti	Pyuthan
179	**Khalanga**	PHC	MWR	Rapti	Pyuthan
180	**Rolpa + DPHO**	D	MWR	Rapti	Rolpa
181	**Sabi**	PHC	MWR	Rapti	Rolpa
182	**Rukum Musikot + DPHO**	D	MWR	Rapti	Rukum
183	**Jorzuri**	PHC	MWR	Rapti	Rukum
184	**Salyan**	D	MWR	Rapti	Salyan
185	**Tharmare**	PHC	MWR	Rapti	Salyan
186	**Baglung + DPHO**	D	WR	Dhawalagiri	Baglung
187	**Burtibang**	PHC	WR	Dhawalagiri	Baglung
188	**Galkot**	PHC	WR	Dhawalagiri	Baglung
189	**Harichour**	PHC	WR	Dhawalagiri	Baglung
190	**Jomsom + DPHO**	D	WR	Dhawalagiri	Mustang
191	**Lete**	HP	WR	Dhawalagiri	Mustang
192	**Tukuche**	HP	WR	Dhawalagiri	Mustang
193	**Myagdi**	D	WR	Dhawalagiri	Myagdi
194	**Darwang**	PHC	WR	Dhawalagiri	Myagdi

National Public Health Laboratories

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ID	Name	Level	DR	Zone	District
195	**Parbat + DPHO**	D	WR	Dhawalagiri	Parbat
196	**Lanku Deurali**	PHC	WR	Dhawalagiri	Parbat
197	**Gorkha + DPHO**	D	WR	Gandaki	Gorkha
198	**Gumda**	PHC	WR	Gandaki	Gorkha
199	**Jaubari**	PHC	WR	Gandaki	Gorkha
200	**Makaising**	PHC	WR	Gandaki	Gorkha
201	**Pokhara Regional Hospital**	R	WR	Gandaki	Kaski
202	**Batulechour**	PHC	WR	Gandaki	Kaski
203	**Bhedabhari**	PHC	WR	Gandaki	Kaski
204	**Naudanda**	PHC	WR	Gandaki	Kaski
205	**Sisuwa**	PHC	WR	Gandaki	Kaski
206	**Tellkot**	PHC	WR	Gandaki	Kaski
207	**Chandreswor**	HP	WR	Gandaki	Kaski
208	**Kunchha**	HP	WR	Gandaki	Kaski
209	**Yanjakot**	HP	WR	Gandaki	Kaski
210	**Lamjung + DPHO**	D	WR	Gandaki	Lamjung
211	**Gaunda**	PHC	WR	Gandaki	Lamjung
212	**Manang**	D	WR	Gandaki	Manang
213	**Syangja**	D	WR	Gandaki	Syangja
214	**Gahraunghangling(Waling)**	PHC	WR	Gandaki	Syangja
215	**Malunga**	PHC	WR	Gandaki	Syangja
216	**Panchmul**	PHC	WR	Gandaki	Syangja
217	**Tulasibhanjang**	PHC	WR	Gandaki	Syangja
218	**Bandipur**	D	WR	Gandaki	Tanahu
219	**Damauli**	PHC	WR	Gandaki	Tanahu
220	**Vimad**	PHC	WR	Gandaki	Tanahu
221	**Arghakhanchi + DPHO**	D	WR	Lumbini	Arghakhanchi
222	**Belkot**	PHC	WR	Lumbini	Arghakhanchi
223	**Thada**	PHC	WR	Lumbini	Arghakhanchi
224	**Sandhikhraka**	HP	WR	Lumbini	Arghakhanchi
225	**Gulmi + DPHO**	D	WR	Lumbini	Gulmi
226	**Durkot**	PHC	WR	Lumbini	Gulmi
227	**Johang**	PHC	WR	Lumbini	Gulmi
228	**Sringa**	PHC	WR	Lumbini	Gulmi
229	**Shivaraj**	D	WR	Lumbini	Kapilvastu
230	**Taulihawa**	D	WR	Lumbini	Kapilvastu
231	**Mahendrakot**	PHC	WR	Lumbini	Kapilvastu
232	**Nawalparasi PritibiChan.H.**	D	WR	Lumbini	Nawalparasi
233	**Chormara**	PHC	WR	Lumbini	Nawalparasi
234	**Jaganathpur**	PHC	WR	Lumbini	Nawalparasi
235	**Dumkauli**	PHC	WR	Lumbini	Nawalparasi
236	**Palpa**	D	WR	Lumbini	Palpa
237	**Kharseuli**	PHC	WR	Lumbini	Palpa
238	**Rampur**	PHC	WR	Lumbini	Palpa
239	**Tahu**	PHC	WR	Lumbini	Palpa
240	**Butwal Lumbini**	Z	WR	Lumbini	Rupandehi
241	**Bhim Hospital Bhairahawa**	D	WR	Lumbini	Rupandehi

Attachment 4

National Public Health Laboratories

March 2000

Posts and Vacancies

ID	Name	Level	DR	Zone	District	POSTS						VACANCIES					
						Pa GI	Pa GII	MT GII	MT GIII	LT NGI	LA NGII	PA GI	PA GII	MT GII	MT GIII	LT NGI	LA NGII
						L11	L10-9	L9	L7-6	L5-6	L4						
1	**NPHL**	N	CR	Bagmati	Kathmandu	3	1	2	6	11	7	1	1	1	1	1	
2	**Ayurvedic Hospital**	C	CR	Bagmati	Kathmandu					2	1						
3	**Bir Hospital**	C	CR	Bagmati	Kathmandu	2	2	2	1	12							
4	**Kanti Hospital**	C	CR	Bagmati	Kathmandu		1	1	3	6	2			1	2		
5	**Maternity Hospital**	C	CR	Bagmati	Kathmandu				1		2						
6	**Mental Hospital in Patan**	C	CR	Bagmati	Kathmandu					2	1						
7	**National Tuberculosis Centre**	C	CR	Bagmati	Kathmandu				1	2	3						
8	**Teku Hospital**	D	CR	Bagmati	Kathmandu				1	4	2						
9	**Mulpani**	PHC	CR	Bagmati	Kathmandu						1						
10	**Ramghat**	PHC	CR	Bagmati	Kathmandu						1						
11	**Patan (Mission)**	D	CR	Bagmati	Lalitpur												
12	**Bhaktapur**	D	CR	Bagmati	Bhaktapur				1	2	1						
13	**Balkot**	PHC	CR	Bagmati	Bhaktapur						1						
14	**Chalnakel**	PHC	CR	Bagmati	Bhaktapur						1						
15	**Dadhikot**	PHC	CR	Bagmati	Bhaktapur						1						
16	**Dhading + DPHO**	D	CR	Bagmati	Dhading					1	1						1
17	**Gajuritar**	PHC	CR	Bagmati	Dhading						1						1
18	**Salyantar**	PHC	CR	Bagmati	Dhading						1						
19	**Dhulikhel**	PHC	CR	Bagmati	Kabhre						1						
20	**Khopasi**	PHC	CR	Bagmati	Kabhre						1						
21	**Mithinkot**	PHC	CR	Bagmati	Kabhre						1						
22	**Trisuli**	D	CR	Bagmati	Nuwakot					1	1						
23	**Deurali**	PHC	CR	Bagmati	Nuwakot						1						
24	**Kakani**	PHC	CR	Bagmati	Nuwakot						1						
25	**Kharanitar**	PHC	CR	Bagmati	Nuwakot						1						
26	**Samudratar**	PHC	CR	Bagmati	Nuwakot						1						
27	**Betini**	HP	CR	Bagmati	Nuwakot						0						
28	**Rasuwa + DPHO**	D	CR	Bagmati	Rasuwa					1	2					1	1
29	**Chautara**	D	CR	Bagmati	Sindhupalchok					1	1						
30	**Bahrabise**	PHC	CR	Bagmati	Sindhupalchok						1						
31	**Melamchi**	PHC	CR	Bagmati	Sindhupalchok						1						1
32	**Janakpur**	Z	CR	Janakpur	Dhanusha					6	2						
33	**Mahendranagar**	PHC	CR	Janakpur	Dhanusha						1						
34	**Sabaila**	PHC	CR	Janakpur	Dhanusha						1						
35	**Yadukoha**	PHC	CR	Janakpur	Dhanusha						1						
36	**Gangapipra**	HP	CR	Janakpur	Dhanusha						0						
37	**Jiri**	D	CR	Janakpur	Dolakha					1	1					1	1
38	**Charikot**	PHC	CR	Janakpur	Dolakha						1						
39	**Jhule**	HP	CR	Janakpur	Dolakha						0						
40	**Namdu**	HP	CR	Janakpur	Dolakha						0						
41	**Phasku**	HP	CR	Janakpur	Dolakha						0						
42	**Jaleswor**	D	CR	Janakpur	Mahottari						2						1
43	**Goushala**	PHC	CR	Janakpur	Mahottari						1						
44	**Loharpatti**	PHC	CR	Janakpur	Mahottari						1						
45	**Ramechhap**	D	CR	Janakpur	Ramechhap					1	1						
46	**Manthali**	PHC	CR	Janakpur	Ramechhap						1						
47	**Malangawa**	D	CR	Janakpur	Sarlahi					1	1						
48	**Barathahawa**	PHC	CR	Janakpur	Sarlahi						1						
49	**Haripur**	PHC	CR	Janakpur	Sarlahi						1						
50	**Lalbandi**	PHC	CR	Janakpur	Sarlahi						1						
51	**Sindhulimadi+ DPHO**	D	CR	Janakpur	Sindhuli					3						1	
52	**Kapilakot**	PHC	CR	Janakpur	Sindhuli						1						
53	**Kalaiya**	D	CR	Narayani	Bara					1	1						
54	**Simara**	PHC	CR	Narayani	Bara						1						
55	**Chyutaha**	HP	CR	Narayani	Bara						0						
56	**Fetaha**	HP	CR	Narayani	Bara						0						
57	**Nichyuta**	HP	CR	Narayani	Bara						0						
58	**Nijgadha**	HP	CR	Narayani	Bara						0						
59	**Simaraungadha**	HP	CR	Narayani	Bara						0						

Attachment 4

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						POSTS						VACANCIES					
						Pa GI	Pa GII	MT GII	MT GIII	LT NGI	LA NGII	PA GI	PA GII	MT GII	MT GIII	LT NGI	LA NGII
ID	Name	Level	DR	Zone	District	L11	L10-9	L9	L7-6	L5-6	L4						
60	**Bharatpur**	Z	CR	Narayani	Chitwan				1	4	2						
61	**Baghaudamadi**	PHC	CR	Narayani	Chitwan						2						
62	**Langadhi**	HP	CR	Narayani	Chitwan						0						
63	**Hetauda + DPHO**	D	CR	Narayani	Makwanpur					1	3						
64	**Bhimphedi**	PHC	CR	Narayani	Makwanpur						1						1
65	**Manahari**	PHC	CR	Narayani	Makwanpur						1						1
66	**Palung**	PHC	CR	Narayani	Makwanpur						1						1
67	**Birgunj**	SR	CR	Narayani	Parsa			1		4	2						
68	**Pokhariya**	PHC	CR	Narayani	Parsa						1						
69	**Satbariya**	PHC	CR	Narayani	Parsa						1						
70	**Gaur**	D	CR	Narayani	Rautahat					1	1						
71	**Chandranigahapur**	PHC	CR	Narayani	Rautahat						1						
72	**Bhojpur**	D	ER	Koshi	Bhojpur						3					1	1
73	**Dingla**	PHC	ER	Koshi	Bhojpur						1						
74	**Mulpani**	PHC	ER	Koshi	Bhojpur						1						1
75	**Pyauli**	PHC	ER	Koshi	Bhojpur						1						1
76	**Dhankuta + DPHO**	D	ER	Koshi	Dhankuta					1	3						2
77	**Budhabare**	PHC	ER	Koshi	Dhankuta						1						
78	**Jeetpur**	PHC	ER	Koshi	Dhankuta						1						1
79	**Dandabasar**	PHC	ER	Koshi	Dhankuta						1						1
80	**Ankhisalla**	HP	ER	Koshi	Dhankuta						0						
81	**Ligligebaddanda**	HP	ER	Koshi	Dhankuta						0						
82	**Koshi Biratnagar**	Z	ER	Koshi	Morang			1	1	5	2						
83	**Rangeli**	D	ER	Koshi	Morang					1	1						
84	**Haraicha**	PHC	ER	Koshi	Morang						1						1
85	**Jhurkia**	PHC	ER	Koshi	Morang						1						1
86	**Letang**	PHC	ER	Koshi	Morang						1						
87	**Urlabari**	PHC	ER	Koshi	Morang						1						
88	**Khandhbari**	D	ER	Koshi	Sankhuwasabha					2	1					2	1
89	**Chainpur**	PHC	ER	Koshi	Sankhuwasabha						1						
90	**Inaruwa**	D	ER	Koshi	Sunsari					1	1						1
91	**Harinagara**	PHC	ER	Koshi	Sunsari						1						
92	**Itahari**	PHC	ER	Koshi	Sunsari						1						
93	**Prakashpur**	PHC	ER	Koshi	Sunsari						1						
94	**Terhathum + DPHO**	D	ER	Koshi	Terhathum					1	1					1	1
95	**Basantapur**	PHC	ER	Koshi	Terhathum						1						1
96	**Ilam**	D	ER	Mechi	Ilam					1							
97	**Mangalbare**	PHC	ER	Mechi	Ilam						1						1
98	**Phikkal**	PHC	ER	Mechi	Ilam						1						
99	**Pasupatinagar**	PHC	ER	Mechi	Ilam						1						1
100	**Mechi**	Z	ER	Mechi	Jhapa				1	1	1						
101	**Dhulabari**	PHC	ER	Mechi	Jhapa						1						
102	**Shivagunj**	PHC	ER	Mechi	Jhapa						1						
103	**Sanischare**	PHC	ER	Mechi	Jhapa						1						
104	**Surunga**	PHC	ER	Mechi	Jhapa						1						
105	**Panchthar + DPHO**	D	ER	Mechi	Panchthar					2	1					1	
106	**Rabi**	PHC	ER	Mechi	Panchthar												
107	**Gapetar**	PHC	ER	Mechi	Panchthar					1	1						1
108	**Taplejung**	D	ER	Mechi	Taplejung					1							
109	**Tellok**	PHC	ER	Mechi	Taplejung						1						
110	**Dhungesangu Tembe**	PHC	ER	Mechi	Taplejung						1						
111	**Khotang**	D	ER	Sagarmatha	Khotang					1							
112	**Aiselukarka**	PHC	ER	Sagarmatha	Khotang						1						1
113	**Chisapani**	PHC	ER	Sagarmatha	Khotang						1						1
114	**Okhaldhunga**	D	ER	Sagarmatha	Okhaldhunga					1							
115	**Raniban**	PHC	ER	Sagarmatha	Okhaldhunga						1						
116	**Rumjatar**	PHC	ER	Sagarmatha	Okhaldhunga						1						
117	**Sagarmatha**	Z	ER	Sagarmatha	Saptari		1		1	2	1						
118	**Bavangama Katti**	PHC	ER	Sagarmatha	Saptari						1						
119	**Kalyanpur**	PHC	ER	Sagarmatha	Saptari						1						

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						POSTS						VACANCIES					
						Pa GI	Pa GII	MT GII	MT GIII	LT NGI	LA NGII	PA GI	PA GII	MT GII	MT GIII	LT NGI	LA NGII
ID	Name	Level	DR	Zone	District	L11	L10-9	L9	L7-6	L5-6	L4						
120	**Kanchanpur**	PHC	ER	Sagarmatha	Saptari						1						
121	**Bodebarsain**	HP	ER	Sagarmatha	Saptari						0						
122	**HanumanNagar**	HP	ER	Sagarmatha	Saptari						0						
123	**Paroha**	HP	ER	Sagarmatha	Saptari						0						
124	**Sukhipur**	HP	ER	Sagarmatha	Saptari						0						
125	**Lahan**	D	ER	Sagarmatha	Siraha					1	1						
126	**Siraha**	D	ER	Sagarmatha	Siraha					1	2						
127	**Aurahi**	PHC	ER	Sagarmatha	Siraha						1						1
128	**Mirchaiya**	PHC	ER	Sagarmatha	Siraha						1						1
129	**Golbazar**	HP	ER	Sagarmatha	Siraha						0						
130	**Salleri + DPHO**	D	ER	Sagarmatha	Solukhumbu					2	1						
131	**Gorakhani**	PHC	ER	Sagarmatha	Solukhumbu						1						
132	**Salyan**	PHC	ER	Sagarmatha	Solukhumbu						1						
133	**Udayapur Gaighat**	D	ER	Sagarmatha	Udayapur					1	1						1
134	**Katari**	PHC	ER	Sagarmatha	Udayapur						1						1
135	**Baitadi**	D	FWR	Mahakali	Baitadi					1	1						
136	**Patan**	PHC	FWR	Mahakali	Baitadi						1						
137	**Dadeldhura + DPHO**	D	FWR	Mahakali	Dadeldhura						3						2
138	**Jogbuda**	PHC	FWR	Mahakali	Dadeldhura						1						1
139	**Darchula**	D	FWR	Mahakali	Darchula					1	1					1	
140	**Gokuleshwor**	PHC	FWR	Mahakali	Darchula						1						
141	**Mahakali Mahendranagar**	Z	FWR	Mahakali	Kanchanpur		1		1	1	1		1		1		
142	**Achham**	D	FWR	Seti	Achham					1	1						
143	**Kamalbazar**	PHC	FWR	Seti	Achham						1						
144	**Bajhang**	D	FWR	Seti	Bajhang					1	1						
145	**Bajura + DPHO**	D	FWR	Seti	Bajura					1	1						
146	**Doti + DPHO**	D	FWR	Seti	Doti					1	3					1	2
147	**Kedarakharda**	PHC	FWR	Seti	Doti						1						1
148	**Seti**	Z	FWR	Seti	Kailali				1	2	1						
149	**Bhajani**	PHC	FWR	Seti	Kailali						1						
150	**Choumala**	PHC	FWR	Seti	Kailali						1						1
151	**Malwara**	PHC	FWR	Seti	Kailali						1						
152	**Tikapur**	PHC	FWR	Seti	Kailali						1						1
153	**Bheri**	Z	MWR	Bheri	Banke		1		1	1	2		1				
154	**Bankatawa**	PHC	MWR	Bheri	Banke						1						
155	**Laxmanpur**	PHC	MWR	Bheri	Banke						1						1
156	**Bardiya + DPHO**	D	MWR	Bheri	Bardiya					2	2					1	2
157	**Rajapur**	PHC	MWR	Bheri	Bardiya						1						
158	**Dailekh**	D	MWR	Bheri	Dailekh					2	1					1	1
159	**Lakran**	PHC	MWR	Bheri	Dailekh						1						1
160	**Jajarkot**	D	MWR	Bheri	Jajarkot					1							
161	**Gorkhkot**	PHC	MWR	Bheri	Jajarkot						1						
162	**Surket + DPHO**	D	MWR	Bheri	Surkhet					2	2					1	
163	**Mehelkuna**	PHC	MWR	Bheri	Surkhet						1						
164	**Salkot**	PHC	MWR	Bheri	Surkhet						1						1
165	**Dolpa**	PHC	MWR	Karnali	Dolpa						1						
166	**Humla + DPHO**	PHC	MWR	Karnali	Humla					1	1					1	1
167	**Jumla + DPHO**	D	MWR	Karnali	Jumla					2	1					2	
168	**Kalikot**	PHC	MWR	Karnali	Kalikot						1						
169	**Kumalgaun**	PHC	MWR	Karnali	Kalikot						1						
170	**Mugu**	D	MWR	Karnali	Mugu						1						
171	**Dang**	D	MWR	Rapti	Dang					1							
172	**Lamahi**	PHC	MWR	Rapti	Dang						1						1
173	**Shrigaun**	PHC	MWR	Rapti	Dang						1						
174	**Tulsipur**	PHC	MWR	Rapti	Dang						1						
175	**Pyuthan + DPHO**	D	MWR	Rapti	Pyuthan					2	1					2	1
176	**Bhringri**	PHC	MWR	Rapti	Pyuthan						1						1
177	**Khalanga**	PHC	MWR	Rapti	Pyuthan						1						1
178	**Rolpa + DPHO**	D	MWR	Rapti	Rolpa					1	1						1

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ID	Name	Level	DR	Zone	District	POSTS						VACANCIES					
						Pa GI	Pa GII	MT GII	MT GIII	LT NGI	LA NGII	PA GI	PA GII	MT GII	MT GIII	LT NGI	LA NGII
						L11	L10-9	L9	L7-6	L5-6	L4						
179	**Sabi**	PHC	MWR	Rapti	Rolpa						1						1
180	**Rukum Musikot + DPHO**	D	MWR	Rapti	Rukum					1	1					1	
181	**Jorzuri**	PHC	MWR	Rapti	Rukum						1						1
182	**Salyan**	D	MWR	Rapti	Salyan					1	1					1	1
183	**Tharmare**	PHC	MWR	Rapti	Salyan						1						1
184	**Baglung + DPHO**	D	WR	Dhawalagiri	Baglung					1	2						1
185	**Burtibang**	PHC	WR	Dhawalagiri	Baglung						1						1
186	**Galkot**	PHC	WR	Dhawalagiri	Baglung						1						
187	**Harichour**	PHC	WR	Dhawalagiri	Baglung						1						
188	**Jomsom + DPHO**	D	WR	Dhawalagiri	Mustang					1	2					1	1
189	**Lete**	HP	WR	Dhawalagiri	Mustang						0						
190	**Tukuche**	HP	WR	Dhawalagiri	Mustang						0						
191	**Myagdi**	D	WR	Dhawalagiri	Myagdi					1	1						
192	**Darwang**	PHC	WR	Dhawalagiri	Myagdi					1	1						
193	**Pharbat + DPHO**	D	WR	Dhawalagiri	Parbat					2						1	
194	**Lanku Deurali**	PHC	WR	Dhawalagiri	Parbat						1						
195	**Gorkha + DPHO**	D	WR	Gandaki	Gorkha					1	3						
196	**Gumda**	PHC	WR	Gandaki	Gorkha						1						
197	**Jaubari**	PHC	WR	Gandaki	Gorkha						1						
198	**Makaising**	PHC	WR	Gandaki	Gorkha						1						
199	**Pokhara Regional Hospital**	R	WR	Gandaki	Kaski	1			1	4	2						
200	**Batulechour**	PHC	WR	Gandaki	Kaski						1						
201	**Bherdabhari**	PHC	WR	Gandaki	Kaski						1						1
202	**Naudanda**	PHC	WR	Gandaki	Kaski						1						
203	**Sisuwa**	PHC	WR	Gandaki	Kaski						1						1
204	**Tellkot**	PHC	WR	Gandaki	Kaski						1						
205	**Chandreswor**	HP	WR	Gandaki	Kaski						0						
206	**Kunchha**	HP	WR	Gandaki	Kaski						0						
207	**Yanjakot**	HP	WR	Gandaki	Kaski						0						
208	**Lamjung + DPHO**	D	WR	Gandaki	Lamjung					1						1	
209	**Gaunda**	PHC	WR	Gandaki	Lamjung					1	1					1	1
210	**Manang**	D	WR	Gandaki	Manang					1							
211	**Syangja**	D	WR	Gandaki	Syangja					1							
212	**Gahraunghangling(Waling)**	PHC	WR	Gandaki	Syangja						1						
213	**Malunga**	PHC	WR	Gandaki	Syangja						1						
214	**Panchmul**	PHC	WR	Gandaki	Syangja						1						
215	**Tulasibhanjang**	PHC	WR	Gandaki	Syangja						1						
216	**Bandipur**	D	WR	Gandaki	Tanahu					1							
217	**Damauli**	PHC	WR	Gandaki	Tanahu						1						
218	**Vimad**	PHC	WR	Gandaki	Tanahu						1						
219	**Arghakhanchi + DPHO**	D	WR	Lumbini	Arghakhanchi					2	1					2	1
220	**Belkot**	PHC	WR	Lumbini	Arghakhanchi						1						1
221	**Thada**	PHC	WR	Lumbini	Arghakhanchi						1						1
222	**Sandhikhraka**	HP	WR	Lumbini	Arghakhanchi						0						
223	**Gulmi + DPHO**	D	WR	Lumbini	Gulmi					1							
224	**Durkut**	PHC	WR	Lumbini	Gulmi						1						1
225	**Johang**	PHC	WR	Lumbini	Gulmi						1						1
226	**Sringa**	PHC	WR	Lumbini	Gulmi						1						1
227	**Shivaraj**	D	WR	Lumbini	Kapilvastu					1							
228	**Taulihawa**	D	WR	Lumbini	Kapilvastu					1	1						
229	**Nawalparasi PritibiChan.H.**	D	WR	Lumbini	Nawalparasi					1	1						
230	**Chormara**	PHC	WR	Lumbini	Nawalparasi						1						
231	**Jaganathpur**	PHC	WR	Lumbini	Nawalparasi						1						
232	**Dumkauli**	PHC	WR	Lumbini	Nawalparasi						1						
233	**Palpa**	D	WR	Lumbini	Palpa					1	1					1	1
234	**Kharseuli**	PHC	WR	Lumbini	Palpa						1						
235	**Rampur**	PHC	WR	Lumbini	Palpa						1						1
236	**Tahu**	PHC	WR	Lumbini	Palpa						1						
237	**Butwal Lumbini**	Z	WR	Lumbini	Rupandehi				1	4	2						
238	**Bhim Hospital Bhairahawa**	D	WR	Lumbini	Rupandehi					2							

Attachment 5

TESTS PERFORMED AT A DISTRICT HOSPITAL LABORATORY

TEST	METHOD
HAEMATOLOGY	
Total WBC Count	- Neubauer Counting Chamber
Differential WBC Count	- Romanowshy stain - Wright Stain
Haemoglobin estimation	- Colorimetric method Drabkin - Sahli Method
Haematokrit (P.C.V.)	- Microhaematocrit Centrifuge Method - Wintrobe method
ESR	- Westergren method - Wintrobe method
Reticulocyte Count	- Brilliant Cresyl-blue Method
Platelet Count	- Counting Chamber Method
Blood Grouping	- Tile / Tube Method with Anti-A,-B, -AB & -D
PARASITOLOGY	
Malaria parasites	- Thick and Thin Film Giemsa Stain or Field Stain
Microfilaria (Burgia malayi, W.bancrofti)	- Thick and Thin Film Giemsa Stain or Field Stain - Urine Chyle (Screening method)
Leishmania donovani (Kala-Azar)	- Formol gel (Aldehyde) Test in Serum - Buffy coat for Amastigotes, Giemsa Stain - Sample collection for serological tests
Stool parasites (Entamoeba, Giardia, Ascaris, Strongyloides, Trichuris, Enterobius, Taenia, etc.)	- Direct Smear Saline - Direct Smear Iodine - Concentration Method
MICROBIOLOGY	
Sputum for AFB (TB)	- Ziehl-Neelsen Stain
Skin-smear for Leprosy	- Ziehl-Neelsen Stain
Neisseria gonorrhoeae	- Methylene-blue Stain - Gram Stain
Salmonella typhi	- Blood culture and Gram Stain
Urine	- Urine culture or Screening method
Water bacteriology	- Sample Collection
Skin Scrapping for Scabies	- Direct Smear with KOH
Skin Scrapping for Fungus	- Direct Smear with KOH
Bacillary Dysentery	- Direct Stool Smear for RBCs and Pus Cells
BIOCHEMISTRY BLOOD	
Creatinine (Serum)	- Jaffe-Slot alkaline picrate creatinine Method
Urea (Serum)	- Diacetyl Monoxime Method
Glucose (Plasma, Blood)	- Glucose Oxidase Peroxidase Method - o-Toluidine Method - Glucose Metre Method with Strip Test (Emergency)
Bilirubin total (Serum or Plasma)	- Modified Jendrassik & Grof Method
Albumin (Serum)	- Bromocresol Green Binding Method
SGOT / AST (Serum)	- Reitman-Frankel Method
SGPT / ALT (Serum)	- Reitman-Frankel Method
Alpha Amylase (Serum)	- Caraway Somogyi Amylase Method

Attachment 5

TESTS PERFORMED AT A DISTRICT HOSPITAL LABORATORY

TEST	**METHOD**
URINE	
Protein	- Sulphosalicylic Acid Method - Reagent Strip Test
Glucose	- Benedict Method - Reagent Strip Test
Bilirubin	- Fouchet Method - Reagent Strip Test
Urobilinogen	- Ehrlich's Method - Reagent Strip Test
Ketones	- Nitroprusside Method - Reagent Strip Test
Nitrite	- Modified Griess Method - Reagent Strip Test
pH	- pH Paper - Reagent Strip Test
Specific Gravity	- Urinometre - Reagent Strip Test
Urine microscopy	- Urinary Deposit, Microscopic Examination
Pregnancy Test	- Latex Slide Test - HCG-Test kits
BIOCHEMISTRY OTHERS	
Protein in C.S.F.	- Pandy's Test - Trichloroacetic acid Method
Occult Blood in Stool	- Aminophenazone Method - Test strips
OTHERS	
Syphilis Screening	- RPR
HIV Screening	- Spot test - Sample collection
Japanese Encephalitis	- Sample collection

Attachment 6

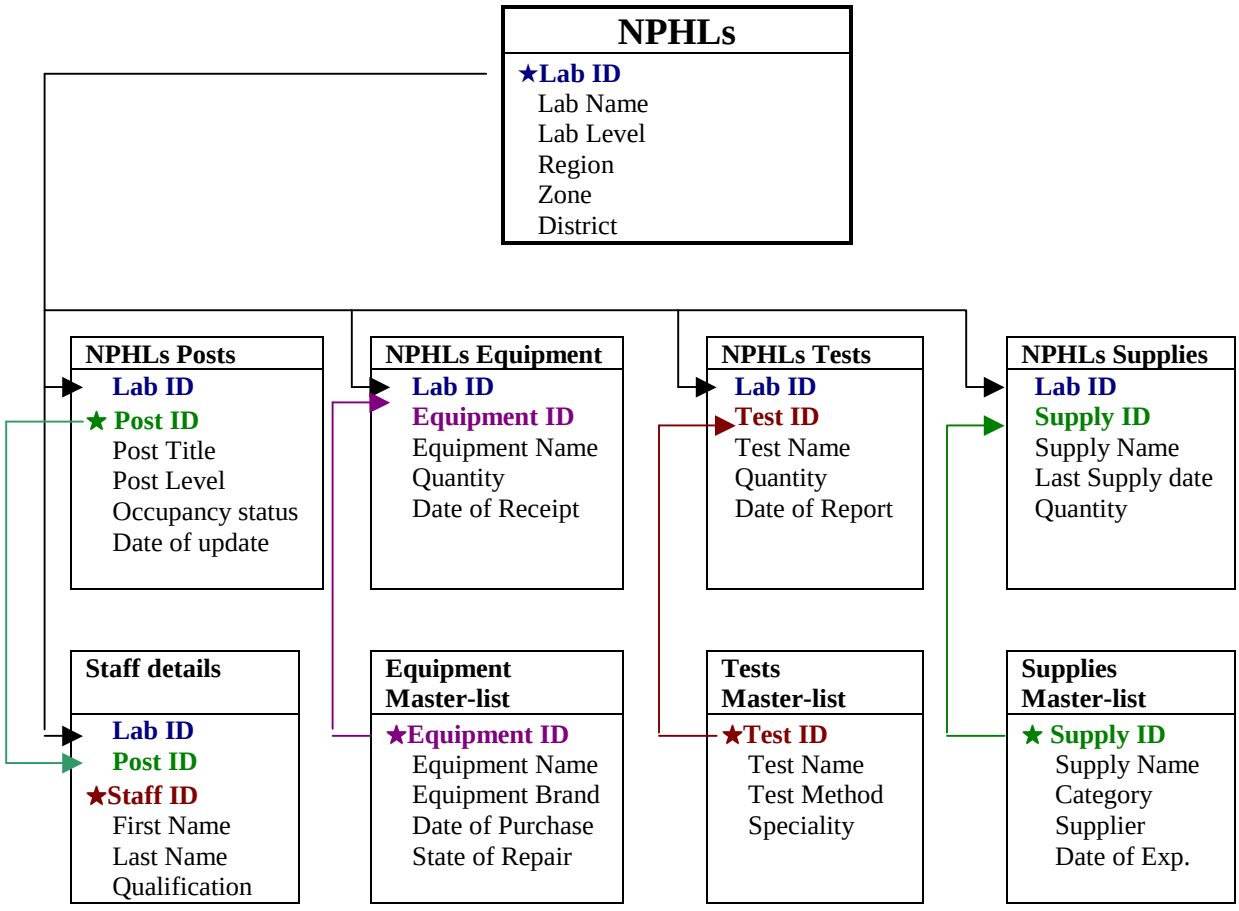
STANDARD EQUIPMENT LIST NPHL						
Major Equipment	**Central**	**Regional**	**SR**	**Zonal**	**District**	**PHC**
Microscope, Binocular	x	x	x	x	x	x
Microscope, Monocular	x	x	x	x	x	x
Centrifuge, Manual						x
Incubator	x	x	x	x	x	x
Pressure cooker						x
Hotair-oven	x	x	x	x	x	x
Balance Electrical, Analytical	x	x	x	x		
Balance Manual					x	x
Stove	x	x	x	x	x	x
Centrifuge, Electrical	x	x	x	x	x	
Haematocrit centrifuge	x	x	x	x	x	
Colorimetre	x	x	x	x	x	
Waterbath	x	x	x	x	x	
Autoclave	x	x	x	x	x	
Rotator	x	x	x	x	x	
Refrigerator	x	x	x	x	x	
Minor Equipment						
Auto-Pipettes 10, 20, 50, 100 ul	x	x	x	x	x	
Glass-pipettes 1, 2, 5, 10 ml	x	x	x	x	x	x
Pasteur Pipettes	x	x	x	x	x	x
Hb-Pipettes	x	x	x	x	x	x
WBC-Pipettes	x	x	x	x	x	x
RBC-Pipettes	x	x	x	x	x	x
Capillary Tubes (HK)	x	x	x	x	x	
Measuring Cylinder 100, 250, 500 ml	x	x	x	x	x	x
Beaker 250, 500, 1000 ml	x	x	x	x	x	x
Conical Flask 100, 250, 500 ml	x	x	x	x	x	
Centrifuge Tubes, round bottom	x	x	x	x	x	x
Centrifuge Tubes, conical bottom	x	x	x	x	x	x
Test tubes, long	x	x	x	x	x	x
Test tubes, standard	x	x	x	x	x	x
Kahn tubes	x	x	x	x	x	x
Glass Slides	x	x	x	x	x	x
Cover slips	x	x	x	x	x	x
Sahli Set	x	x	x	x	x	x
Counting Chamber	x	x	x	x	x	x
ESR Stand, Westergreen	x	x	x	x	x	x
ESR Stand, Wintrobe	x	x	x	x	x	x
Test tube rack	x	x	x	x	x	x
Kahn tube rack	x	x	x	x	x	x
Test tube brush, small, big	x	x	x	x	x	x

Attachment 6

STANDARD EQUIPMENT LIST NPHL						
Major Equipment	**Central**	**Regional**	**SR**	**Zonal**	**District**	**PHC**
Spatula	x	x	x	x	x	x
Filter paper	x	x	x	x	x	x
Lens paper	x	x	x	x	x	x
pH paper	x	x	x	x	x	x
Clay seal	x	x	x	x	x	
Lancets	x	x	x	x	x	x
Drop bottle	x	x	x	x	x	x
Wash bottle	x	x	x	x	x	x
Lab Register	x	x	x	x	x	x
Lab Forms	x	x	x	x	x	x
Spirit lamp	x	x	x	x	x	x
Timer	x	x	x	x	x	x
DWBC Counter	x	x	x	x	x	
Culture Set	x	x	x	x		

Attachment 7

Public Health Laboratory Network
Relational Database Management System



Attachment 8

HMG
MINISTRY OF HEALTH
NATIONAL PUBLIC HEALTH LABORATORY
Tel.: 252421, Fax: 252375

SUPERVISORY VISITS TO PERIPHERAL LABORATORIES

Name of Supervisor: …….. Date of Last Visit:…….
Title of Supervisor: …… Date of Present Visit ……
Name of In-charge: ……
Title of In-charge: ……

LAB INFO

Lab ID	
Lab Name	
Level	
Region	
Zone	
District	

STAFF INFO

	PA	**MT**	**LT**	**LA**
No. of Posts				
No. of Vacancies				
Remarks				

EQUIPMENT INFO

Name	***State of repair***	***Qty.***
Microscope		
Centrifuge		
Colorimeter		
Hot-air oven		
Water-bath		

INFO ON SUPPLIES PROVIDED

Name	***Qty.***

TEST INFO

Name	***Tests/ m***
Total WBC Count	
Differential WBC Count	
Haemoglobin	
PCV	
Malaria thick film	
Stool parasites	
Sputum for AFB	
Skin-smear for Leprosy	
Urine examination	
Urea	
Glucose	
Creatinine	
Bilirubine	
RPR	
Pregnancy test	
Blood Grouping	

Supervisor Signature: …… **In-charge Signature:** …….

Attachment 9

HMG
MINISTRY OF HEALTH
NATIONAL PUBLIC HEALTH LABORATORY
Tel.: 252421, Fax: 252375

QUESTIONNAIRE FOR SUPERVISORY VISITS

Lab ID:…….
Lab Name: ……..
District: ……...

No.of population served:……

Name of Supervisor: ……..
Title of Supervisor: ……..
Name of In-charge: ……
Title of In-charge: ……
Date of Last Visit: ……
Date of Present Visit: …….

Building and Furniture

1) Number of rooms: [ ] quare-metres: [ ]

2) Condition of the building: good ☐ passable ☐ needs repair ☐

Specify needs of repair: ……..

3) Condition of furnishing: good ☐ passable ☐ needs repair ☐

Specify needs of repair: …….

4) Do you have regular water supply? Yes ☐ No ☐

5) Do you have regular electricity supply? Yes ☐ No ☐

Inventory and Supply management

6) Do you have an inventory list of equipment? Yes ☐ No ☐

7) Do you have an inventory list of reagents and stains? Yes ☐ No ☐

If yes, when did you last update these lists? [ ]

8) How often do you receive supplies like reagents?

Once a months ☐ Every 6 months ☐ Once a year ☐

9) Do you plan your supply requirements in advance? Yes ☐ No ☐

10) Do you have difficulties receiving your supplies? Yes ☐ No ☐

If yes, why? ……..

11) Do you prepare stains and reagents by yourself in the lab? Yes ☐ No ☐

If yes, do have difficulties doing so? ……

……

Attachment 9

HMG
MINISTRY OF HEALTH
NATIONAL PUBLIC HEALTH LABORATORY
Tel.: 252421, Fax: 252375

QUESTIONNAIRE FOR SUPERVISORY VISITS

Equipment and Maintenance

12) Do you know how to repair simple problems of your equipment?
(E.g. changing a bulb of the microscope) Yes ☐ No ☐

13) Do you have spare-parts at the lab? (E.g. bulbs, fuses) Yes ☐ No ☐

14) Do all your equipment function well? Yes ☐ No ☐

If, No, please name the equipment and specify the repair that is needed.

……..

……..

Personnel

15) How many staff do you have in the lab? ☐

16) Where did you receive your training? (Please specify for all staff)

…….

…….

17) Since when do you work in this lab? (Please specify for all staff)

…….

18) Are you from this area? Yes ☐ No ☐

Quality Assurance Programme

19) What are the internal quality control procedures that you follow?

…….

…….

20) Did you receive External Quality Control Samples in the past? Yes ☐ No ☐

If yes, please state when, what samples and how many times.

……

……

Attachment 9

HMG
MINISTRY OF HEALTH
NATIONAL PUBLIC HEALTH LABORATORY
Tel.: 252421, Fax: 252375

QUESTIONNAIRE FOR SUPERVISORY VISITS

21) Did you send your test results to the NPHL? Yes ☐ No ☐

If no, please state why…….

…….

22) How long did it take to receive feedback from the NPHL?

One month ☐ Three month ☐ Did not receive feedback ☐

23) Were <u>all</u> your results within the permitted control range? Yes ☐ No ☐

If no, did you try to control the problems? Yes ☐ No ☐

24) Did you ask the NPHL staff for help? Yes ☐ No ☐

If no, please state why……

If yes, please state what help you received…….

25) When did you last have a visit from staff of the NPHL? (Please give date) ☐

26) Do you think you or other staff in the lab need additional training? Yes ☐ No ☐

If yes, please specify what training and why…….

……

…….

<u>Bio-safety and Waste Disposal</u>

27) Do you use disinfectant in the laboratory? Yes ☐ No ☐

If yes, what kind of disinfectant do you use?

28) How do you clean your glassware?

……

29) What do you do with used needles?

…….

30) Do you wear protective clothing and gloves during work? Yes ☐ No ☐

31) How do you dispose off waste?

Liquid waste?……

Solid waste?..……

Attachment 9

HMG
MINISTRY OF HEALTH
NATIONAL PUBLIC HEALTH LABORATORY
Tel.: 252421, Fax: 252375

QUESTIONNAIRE FOR SUPERVISORY VISITS

Additional Questions to the Head of the Hospital or Health Centre

Name of In-charge: ……

Title of In-charge:……..

32) Are you satisfied with the work done in the lab? Yes ☐ No ☐

If no. why? ……..

33) What are your major complaints about the work done in the lab?

……

34) What tests would you like to have done in the lab, that are not done now?

…….

35) Do you feel the lab staff is overloaded with work? Yes ☐ No ☐

Remarks on training provided during the visit and general comments:

Attachment 10

Equipment Status at NPHL

March 2000

ID	Section	Equipment	Model	Manufacturer	UsM	YoR	Util.	G.St.	Reason if Not Used	Rec.from	Remarks
1	Haematology	Refrigerator	Gold Cold	Gordrej	No	5	1	2		NPHL	
2	Haematology	Incubator	Economy Size	Gallenkamp	No	15	4	2	no method for this equipment	British Aid	
3	Haematology	Waterbath	Hythermea	Hotpach, USA	No	15	4	3	needs repair	NPHL	
4	Haematology	Diluter		Hati	No	10	1	2		NPHL	
5	Haematology	Diluter		Hati	No		1	3		NPHL	
6	Haematology	Hotair oven		Helios	No	10	1	2		UNICEF	
7	Haematology	Microhaematocrit Centrifuge	KH1204	Kubota	No		1	3		NPHL	
8	Haematology	Haemoglobinometre	Hb 210	Erma, Japan	No		1	3		NPHL	Original cuvette broken used with replacement cuvette
9	Haematology	Centrifuge	Medifuge	Heraeus	No		1	1		NPHL	
10	Haematology	Cellcounter	Excell 200	Metertech	Yes		1	2		NPHL	WBC, RBC, HB
11	Haematology	Cellcounter	9120	Biochem-Immunsystem	Yes		4	1	Shortage of chemicals	NPHL	WBC, RBC, HB, Differential, MCH
12	Haematology	Binocular Microscope		Olympus	No	14	1	2		NPHL	Mirror
13	Haematology	Binocular Microscope		NOVEX	No	1	1	1		NPHL	Electrical
14	Biochemistry	Centrifuge		Jouan USA	No	20	4	4	Broken	NPHL	
15	Biochemistry	Centrifuge	Septatec Medifuge	Heraeus	No	17	4	4	Broken	NPHL	
16	Biochemistry	Centrifuge	EBA-8	Hettich	Yes	3	1	2		NPHL	
17	Biochemistry	Centrifuge	GS-6R	Beckman USA	No	5	1	2		UNICEF	For 72 tubes
18	Biochemistry	Waterbath		Gallenkamp	No	15	1	3		NPHL	
19	Biochemistry	Spectrophotometre	Junior-35	Perkin Elmer	No	20	4	4	Broken	NPHL	no cuvette
20	Biochemistry	Autoanalyser	900 S	Human	Yes	4	1	2		NPHL	Servicing done by company
21	Biochemistry	Semi-Analyser	4020	Hitachi-Boehringer	Yes	5	1	2		NPHL	
22	Biochemistry	Semi-Analyser	Emerald	Snijder	No	4	4	1	No Manual	WHO	Manual has been ordered, should arrive within a week
23	Biochemistry	Spectrophotometre	BTR 815	Biotron	Yes	10	4	4	Electrical Problem	WHO	
24	Biochemistry	Flam-Photometre	CL-26D	Elico, India	Yes	3	1	2		NPHL	Double Parametre measurement
25	Biochemistry	Flam-Photometre	CL-PFP-7	Jenway	Yes	5	4	2	Used only as spare	NPHL	Single Parametre measurement, used as spare
26	Biochemistry	Magnetic Steerer	MR 2002	Heidolph	No	20	2	3		UNICEF	
27	Biochemistry	Balance		Ohaus	No	1	2	2		UNICEF	
28	Biochemistry	Balance		Ohaus	No	15	4	3	Needs Repair	UNICEF	
29	Biochemistry	Waterpurifier-Deioniser		Fistreen	No	14	2	2		NPHL	
30	Biochemistry	Diluter		Hati	No	15	2	3		NPHL	
31	Biochemistry	Diluter		Hati	No	15	2	3		NPHL	
32	Biochemistry	Diluter		Hati	No	15	4	3	Used for sugar	NPHL	Now Kinetic method
33	Biochemistry	Vortex mixer		Heidolph	No	20	1	3		WHO	
34	Director	Binocular Microscope		NOVEX	No	1	1	1		NPHL	
35	Virology	Elisa Reader	SLT 963	RPR	No	6	4	4	Mechanical defect	NPHL	
36	Virology	Centrifuge	SNo. 91021	Gemmy	Yes	1	1	1		NPHL	
37	Virology	Centrifuge	Labofuge	GL France	No	7	3	3		WHO	

UsM: User Manual
YoR: Year of receipt or estimated age
Utilisation: (1)Daily (2)Once a week (3)Once a months (4)Not used
General Status: (1)New (2)Good (3)Passable (4)Decayed
Reason if not used: e.g.. Small repair, Calibration/Verification, User manual, Consumables, User training, Proper installation, etc.
Received from: Donation, Supplied through NPHL procurement, Others,
Remark: Give any additional information

Attachment 10

Equipment Status at NPHL

March 2000

ID	Section	Equipment	Model	Manufacturer	UsM	YoR	Util.	G.St.	Reason if Not Used	Rec.from	Remarks
38	Virology	Microelisa Heating block	N202 020	Belgium	No	10	2	3		NPHL	
39	Virology	Incubator		Narang, India	No	6	1	3		NPHL	
40	Virology	Refrigerator	Gold Cold	Gordrej	No	1	1	2		NPHL	
41	Virology	Refrigerator	Pharmaceutical	Sanyo	No	10	1	3		British Aid	
42	Virology	Lab Watch		Smith	No	6	1	2		British Aid	
43	Virology	Balance		Ohaus	No	15	3	2		UNICEF	
44	Virology	Micro Shaker	SNo. 980	Dynatech	No	8	2	2		NPHL	
45	Microbiology	Safety Cabinet	Class I/A	Hepaire	No	10	1	2		NPHL	
46	Microbiology	Incubator	U30	Memmert	No	12	1	2		UNICEF	
47	Microbiology	Incubator	J.M.I.	Medical Instruments	No	12	1	2		Japan Aid	Thermometre broken
48	Microbiology	Incubator	B 5050	Heraeus	No	7	1	2		NPHL	
49	Microbiology	Bionocular Microscope	One Fifty	A.O.Scientific	No	10	4	2	Illumination defect	NPHL	
50	Microbiology	Centrifuge	EBA-III	Hettich	No	17	1	2		WHO	4 Tubes
51	Microbiology	Colony Counter	Quebec Darkfield	American Optical	No	7	4	3	No tests for this instrument	NPHL	
52	Microbiology	Refrigerator		Sanyo	No	7	1	2		NPHL	
53	Microbiology	Incubator	Model 2	Precision Thelco	No	12	1	3		NPHL	
54	Microbiology	Incubator	U30	Memmert	No	12	4	2	Needs repair	UNICEF	
55	Microbiology	Refrigerator	Gold Cold	Gordrej	No	2	1	2		NPHL	Light inside is not working
56	Microbiology	Incubator	Model 6	Precision Thelco	No	12	4	3		T.Booley F.	
57	Microbiology	Hotairoven		Gallencamp	No	20	1	3		NPHL	Used for culture plate sterilisation process
58	Microbiology	Waterbath	48003	Boekel	No	17	1	2		UNICEF	
59	Microbiology	Waterbath		Beckman USA	No	20	4	3	Indicator light broken	NPHL	
60	Microbiology	Refrigerator		Philips	No	20	1	3		NPHL	
61	Microbiology	Incubator	SM 302	Toshniwall	No	20	1	3		NPHL	
62	Microbiology	Autoclave	SM303	Stermite	No	10	4	4	Received damaged	NPHL	
63	Microbiology	Autoclave	Gold Cold	Stermite	No	10	1	3		NPHL	One switch knob broken
64	Microbiology	Refrigerator		Philips	No	8	4	3	Needs repair	NPHL	
65	Microbiology	Refrigerator		Samsung	No	1	1	1		NPHL	
66	Microbiology	Refrigerator		Electrolux	No	13	4	2	Needs repair	NPHL	
67	Microbiology	Waterbacteriology Incubator	CHD	Millipore	No	7	4	2	Big incubator used	NPHL	
68	Microbiology	Binocular Microscope	Micro Star	Olympus Japan	No	2	4	1	Problem with condensor	NPHL	Mirror only
69	Microbiology	Flurescent Microscope	Tropical	American Optical	No	20	4	2	No tests used	NPHL	Complete with camera attachment
70	Microbiology	Refrigerator		Philips	No	10	1	2		NPHL	
71	Microbiology	Balance		Ohaus	No	20	1	2		UNICEF	
72	Immunology	Refrigerator	Classical Popular	Gordrej	No	1	1	1		NPHL	

UsM: User Manual
YoR: Year of receipt or estimated age
Utilisation: (1)Daily (2)Once a week (3)Once a months (4)Not used
General Status: (1)New (2)Good (3)Passable (4)Decayed
Reason if not used: e.g.. Small repair, Calibration/Verification, User manual, Consumables, User training, Proper installation, etc.
Received from: Donation, Supplied through NPHL procurement, Others,
Remark: Give any additional information

Attachment 10

Equipment Status at NPHL

March 2000

ID	Section	Equipment	Model	Manufacturer	UsM	YoR	Util.	G.St.	Reason if Not Used	Rec.from	Remarks
73	Immunology	Centrifuge	EBA 8	Hettich	No	2	1	2		UNICEF	8 Tubes
74	Immunology	Rotator		Yankee	No	17	1	3		NPHL	Speed variation knob needs repair
75	Immunology	Suction			No	15	4	4	Broken	NPHL	
76	Immunology	Waterbath		Gallenkamp	No	15	2	3		NPHL	
77	Immunology	pH Metre	7020	Electronic instruments	No	7	3	3		NPHL	
78	Immunology	Tube Shaker		Bender & Hobein	No	15	4	3	Broken knob	NPHL	One tube
79	Immunology	Incubator	U30	Memmert	No	17	1	2		UNICEF	
80	Immunology	Balance		Ohaus	No	8	3	2		UNICEF	
81	Immunology	Refrigerator		Philips	No	7	4	3	Broken	NPHL	
82	Immunology	Refrigerator	Classical Popular	Gordrej	No	1	1	1		NPHL	
83	Immunology	Centrifuge	Labofuge	Heraeus	No	7	4	2	not in use now	NPHL	
84	Immunology	Deepfreezer		Philips		11	1	2		NPHL	
85	Immunology	Flurescent Microscope	Diastar	Reichert	No	7	4	2	no tests	NPHL	
86	Histology	Microtom	Histocut	Reichert Jung	No	7	4	2		NPHL	
87	Histology	Microtom	Histostat 820	Reichert	No	16	1	2		NPHL	
88	Histology	Microtom		American Optical	No	17	4	3	Mechanical problem	NPHL	
89	Histology	Paraffin Section Mountingbath		Electrothermal	No	7	1	2		NPHL	
90	Histology	Wax Dispenser		Electrothermal	No	7	4	2	No work	NPHL	
91	Histology	Hot plate	Type 2200	Thermolyne	No	20	4	3	Switch broken	NPHL	
92	Histology	Refrigerator	150 DL	Snowcap	No	7	1	3		NPHL	
93	Histology	Microtom		Baird & Tatlock	No	20	4	4	Broken	NPHL	
94	Histology	Paraffin Section Mountingbath		Electrothermal	No	20	4	4	Broken	NPHL	
95	Histology	Paraffin Dispenser		Thermolyne	No	20	4	4	Broken	NPHL	
96	Histology	Microtome Knife Sharpener		Spencer	No	15	4	3	not in use now	NPHL	
97	Histology	Paraffination Station	Elliot	Shandon	No	20	3	3		NPHL	
98	Histology	Cytology Stainer		Shandon Southern	No	15	4	3	not in use now	NPHL	
99	Histology	Paraffination Station		Histokinette	No	18	4	3	not in use now	NPHL	can not been opened during power cuts
100	Histology	Binocular Microscope		Novex	No	4	4	2	not in use now	NPHL	
101	Histology	Teaching Microscope	Model 1049	American Optical	No	10	4	2	not in use now	NPHL	Missing AC adaptor
102	Histology	Double view Microscope		Olympus	No	16	4	2	not in use now	NPHL	
103	Parasitology	Refrigerator	Gold Cold	Gordrej	No	3	1	2		NPHL	
104	Parasitology	Incubator	S 30	Memmert	No	16	1	2		NPHL	
105	Parasitology	Waterbath		Narang Scientific Works	No	3	1	2		NPHL	Broken Thermometre
106	Parasitology	Centrifuge	Omnifuge	Heraeus	No	7	1	3		NPHL	8 Tubes
107	Parasitology	Binocular Microscope	LH D	Olympus	No	2	1	2		NPHL	Mirror only

UsM: User Manual
YoR: Year of receipt or estimated age
Utilisation: (1)Daily (2)Once a week (3)Once a months (4)Not used
General Status: (1)New (2)Good (3)Passable (4)Decayed
Reason if not used: e.g.. Small repair, Calibration/Verification, User manual, Consumables, User training, Proper installation, etc.
Received from: Donation, Supplied through NPHL procurement, Others,
Remark: Give any additional information

Attachment 10

Equipment Status at NPHL

March 2000

ID	Section	Equipment	Model	Manufacturer	UsM	YoR	Util.	G.St.	Reason if Not Used	Rec.from	Remarks
108	O.P.D	Needle destroyer			No	4	4	4	Broken	NPHL	
109	O.P.D	Waterbath		Narang Scientific Works	No	4	1	2		NPHL	
110	Coagulation	Hotairoven	U30	Memmert	No	17	1	2		UNICEF	
111	Coagulation	Incubator		Memmert	No	17	2	2		UNICEF	
112	Coagulation	Refrigerator	Gold Cold	Gordrej	No	5	1	2		NPHL	
113	Coagulation	Refrigerator	Shachlock	Fisher & Paykol	No	7	1	2		NPHL	
114	Coagulation	Refrigerator	Tropical	Philips	No	7	1	2		NPHL	
115	Coagulation	Spectrophotometre	UV 210	Shimadzu	No	7	4	3	Electronic flactuation	NPHL	Double Bean with Printer
116	Coagulation	Spectrophotometre		Lamda	No	7	4	3	Use about 3 years ago	NPHL	System with pipetting device
117	Coagulation	Semi-analyser	Star Fax	Awareness Technology	Yes	4	2	2		NPHL	
118	Coagulation	Coagulometre	Humaclot	Human	Yes	5	1	2		NPHL	
119	Coagulation	Waterbath	Precitherm	Boehringer	No	5	1	2		NPHL	
120	Coagulation	Analyser	Humalyser PFV	Human	Yes	5	4	2	was broken, now repaired	NPHL	used as spare
121	Coagulation	Colorimetre	AE 114	ERMA	No	3	1	2		NPHL	
122	Coagulation	Mixer		Thermonics	No	7	3	3		NPHL	Temperature does not work
123	Coagulation	Centrifuge	KS 4000	Kubota	No	7	1	2		Japan Aid	24 Tubes
124	Coagulation	Balance		Ohaus	No	7	3	3		UNICEF	
125	Coagulation	Centrifuge	Labofuge	Heraeus	No	7	3	2		NPHL	
126	Coagulation	Refrigerator	Gold Cold	Gordrej	No	4	1	2		NPHL	
127	Coagulation	Electrophoresis		Shandon	No	7	3	2		NPHL	used when tests come
128	Coagulation	Elisa Reader	Star Fax 2100	Awareness Technology	YES	1	3	1		NPHL	
129	Coagulation	Elisa Reader	Star Fax 303	Awareness Technology	Yes	1	3	1		NPHL	
130	Coagulation	Elisa Incubator & Shaker	Star Fax 2200	Awareness Technology	Yes	1	3	1		NPHL	
131	Coagulation	Printer	LX 300	Epson	Yes	1	3	1		NPHL	
132	Training	Analytical Balance		Sartorius	Yes	10	2	2		NPHL	

UsM: User Manual

YoR: Year of receipt or estimated age

Utilisation: (1)Daily (2)Once a week (3)Once a months (4)Not used

General Status: (1)New (2)Good (3)Passable (4)Decayed

Reason if not used: e.g.. Small repair, Calibration/Verification, User manual, Consumables, User training, Proper installation, etc.

Received from: Donation, Supplied through NPHL procurement, Others,

Remark: Give any additional information

Attachment 11

Curriculum Outline Bachelor in Medical Laboratory Technology

Three academic years

The BMLT course is divided into the following four major subjects, with theory classes, practical sessions, and additional project assignments during the third year.	
Medical Microbiology	
Bacteriology	50%
Parasitology	25%
Virology	15%
Mycology	10%
Clinical Biochemistry	100%
Haematology	
Haematology	80%
Blood Bank	20%
Histopathology	
Histopathology	60%
Cytopathology	20%
Anatomy & Physiology	20%

At the
Institute of Medicine
Maharajgunj Campus
Tribhuvan University Teaching Hospital
Kathmandu, Nepal

Attachment 12

Curriculum Outline Certificate in Health Science (Laboratory)

Two academic years

First Year

Subject Area	**Hours of Classes per Year**	
	Theory	**Practical**
English	50	
Nepali	50	
Nepali Parichaya	50	
Chemistry	100	60
Botany	75	60
Zoology	60	60
Physics	100	60
Elementary Maths & Statistics	90	60
First Aid/ Primary Health Care/MCH	45	45
Total	**620**	**345** **1 unit = 2 hours**

Second Year

Subject Area	**Hours of Classes per Year**	
	Theory	**Practical**
Microbiology	100	100
Parasitology	100	100
Clinical Biochemistry	100	100
Histopathological and Cytological Techniques	100	100
Haematology	100	100
Hygiene and Sanitation	50	
Foundation of Health education	50	
Anatomy and Physiology	50	
Total	**650**	**500** **1 unit = 2 hours**

At the
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Attachment 13

Curriculum Outline Laboratory Assistant Training (Technical S.L.C)

Subject Area	Number of Classes	
	Theory	Practical
Anatomy, Basic Chemistry & General Topics Anatomy and Physiology Basic Chemistry Basic Mathematics Blood Banking General Topics **Total**	**100**	**60***
Parasitology Introduction Malaria Parasites, Amoeba, Giardia, Trichomomas, Leishmania Ascaris, Hookworm, Strongiloides, Trichuris trichuria Enterobius vermicularis Filaria, Tapeworm Special Techniques Regent Preparation **Total**	**100**	**50***
Bacteriology Introduction Media Urine Culture, Blood Culture, Pus Culture Anaerobic Culture, Throat Swab T.B, Water Bacteriology, Fungus Rapid Diagnostic Techniques Basic Virology and Methods **Total**	**130**	**60***
Haematology Introduction Physiology of the RBC, Normal Red Cell Values Haemoglobin, Blood Films, Anaemia Morphology of WBCs, Leukaemia Haematological Methods Reagent Preparation **Total**	**100**	**50***
Biochemistry Introduction Colorimetry Blood Sugar, Blood Urea, Serum Bilirubin, Protein Enzymes (Amylase, Alkaline Phosphates SGOT,SGPT,etc.) Urine Examination, Chemical (Sugar, Protein, Bile, Chyle, Urobilinogen, pH, Colour, Specific Gravity,) Pregnancy Test Urine Examination, Microscope Reagent Preparation Stool Examination, Chemical (Occult Blood test, Reducing Substances) **Total**	**130**	**60***

* Practical: 1 class = 4 hours
Theory: 1 class = 1 hour