

# Laboratory

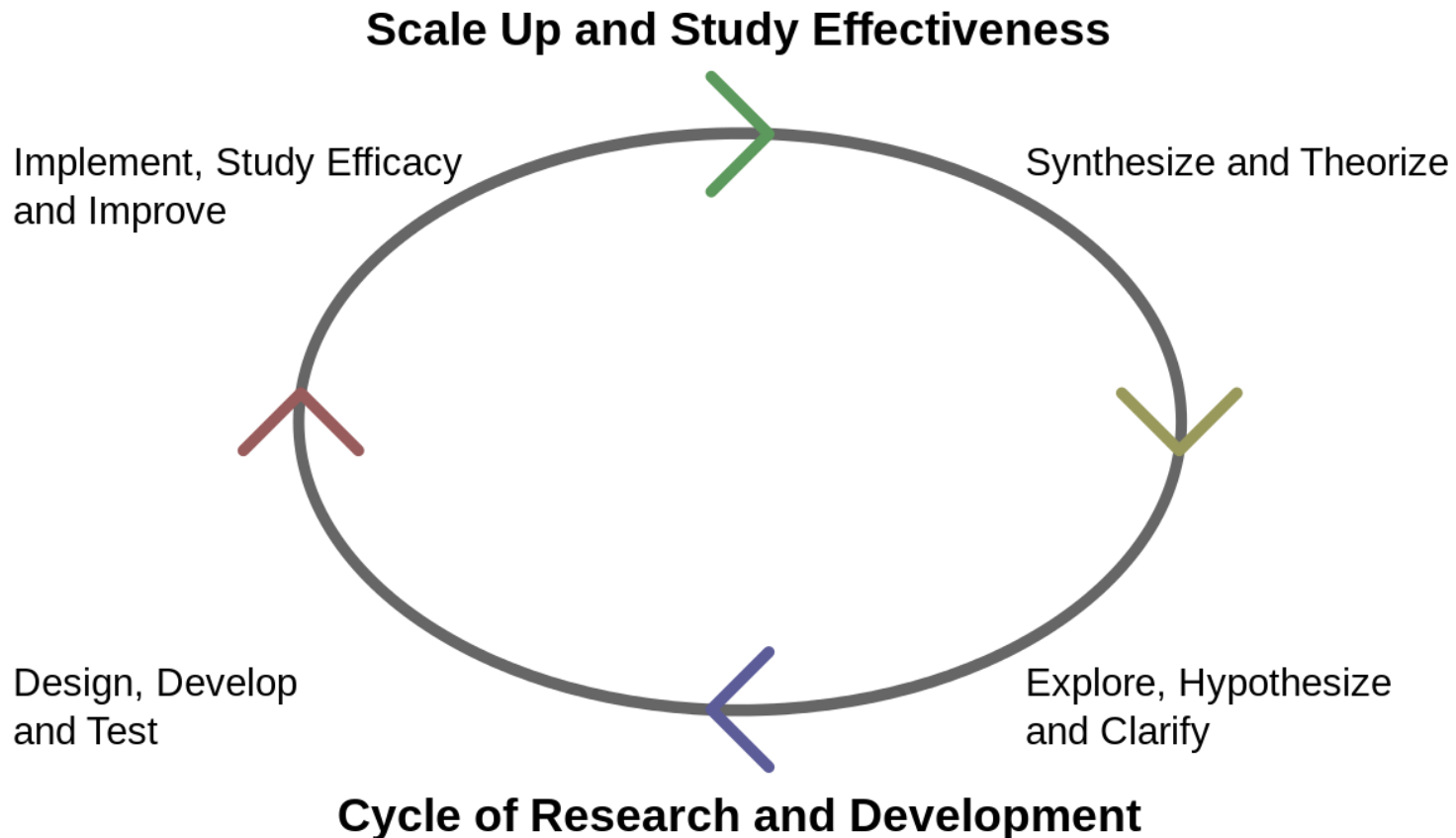
- A room or building or part of building equipped to conduct scientific experiments, research, or teaching, or for the manufacture of drugs or chemicals
- A place providing opportunity for experimentation, observation, or practice in a field of study

## Types

- Research & Development Labs
- Analytical Labs/Medical or Clinical Labs
- Manufacturing Labs

# Research & Development Labs

- innovative activities undertaken by corporations or governments in developing new services or products, or improving existing services or products



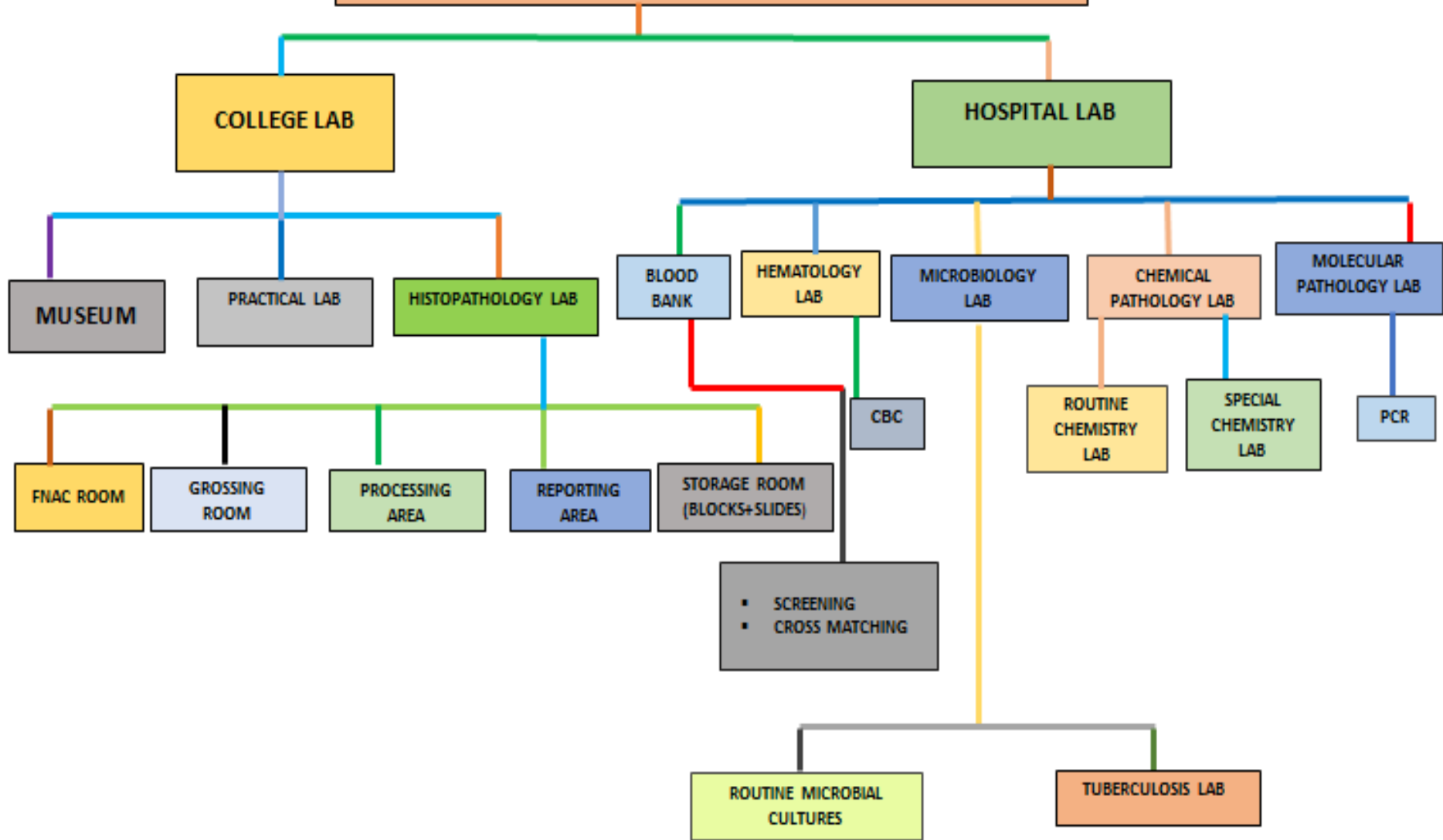
## **Medical or clinical laboratories**

- Laboratories where clinical investigations are carried out on clinical specimens to obtain information about the health of a patient to aid in diagnosis, treatment, and prevention of disease

## **Manufacturing Labs**

- Manufacturing /Production or preparation of drugs
- Synthesis and purification of certain chemicals/reagents etc

# FUNCTIONAL ORGANOGRAM PATHOLOGY DEPARTMENT



# LABORATORY

CEO

Director Lab

Histopathologist/  
consultant

Lab Manager

Technical supervisor

Technologist

Technician

PATHOLOGY  
STAFF/FRONT OFFICE  
STAFF

HOUSEKEEPING

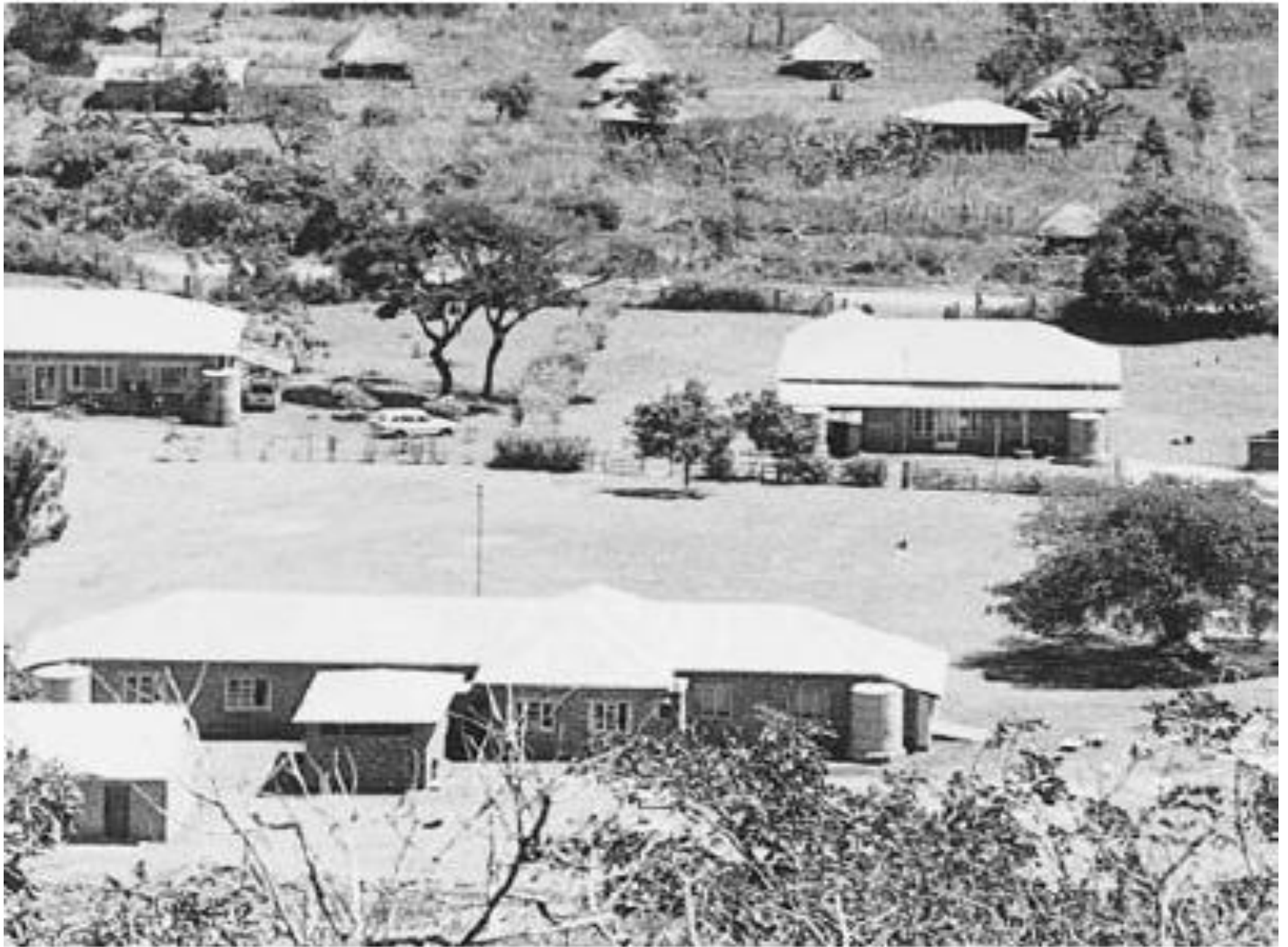
# Medical Lab Sciences

- **Role of Medical Laboratory Sciences:**
- The role of medical laboratory science is to assist in the diagnosis, treatment and control of disease.

# Organization and staffing of lab services

## Importance of laboratory practice in health care

- essential role in the surveillance, prevention, control, diagnosis and management of diseases of greatest public health importance
- A typical health system consists of
  - A network of Primary Health Care (PHC) facilities, including village health clinics, maternity centres, health centres and small urban clinics. Mobile health units
  - System for referral of serious ill patients to specialist care
  - Referral Hospital
  - Health related departments including social and rehabilitative services, environmental health, nutrition, agriculture, water supply and sanitation



Typical community-based district hospital



# The growth of health systems has led to

- Accessible health services and health decision
- Awareness to health issues and demanding health services
- Identify and assess community health care needs
- Ensure effectively, efficiently and equitably used health services

# Why the laboratory is needed in health care??

Important role in improving the:

- quality,
- efficiency,
- cost-effectiveness,
- planning and management of health care

## **What difference can the laboratory make to the quality of health care?**

- Laboratory investigations increase the accuracy of disease diagnosis
- The laboratory has an essential role in screening for ill health and assessing response to treatment
- The laboratory is needed to work with others in reducing infection in the community and investigating epidemics rapidly

## **In what ways can the laboratory contribute to achieving efficiency and cost effectiveness in health care?**

- help to reduce expenditure on drugs
- lower health care costs by identifying disease at an early stage
- Significant savings can be made when the laboratory participates in local disease surveillance and control

## **What information can the laboratory provide to achieve rational health planning and good health management?**

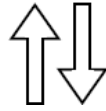
- Reliable laboratory test results with relevant patient data, provide information on the health status of a community, health patterns, and disease trends
- Public health laboratory activities provide accurate epidemiological information for health planning

# Structuring of a laboratory network

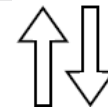
- A laboratory service must be integrated in the health system which exists within its locality/district if it is to function as a network, be accessible, and provide a service that is needed by the community and those managing health care in the district
- A lab service network consists of
  - Outreach community-based laboratory facilities
  - hospital laboratory with facilities to service the clinical, epidemiological, and training requirements of a first referral hospital
  - Specimen collection and transport system
  - Mobile laboratory work as required by district

# Laboratory service network

**CENTRAL**  
Hospital Laboratory  
Public Health Laboratory  
Specialist Laboratory Units



**REGIONAL/PROVINCIAL**  
Hospital Laboratory  
More clinical and public health  
laboratory facilities



**DISTRICT LABORATORY SERVICES**

District Hospital Laboratory

Outreach laboratories in  
Health centres  
Maternity health units

Two horizontal arrows, one pointing right and one pointing left, indicating bidirectional communication between the District Hospital Laboratory and Outreach laboratories.

# Community-based laboratory facilities

- A reliable community-based laboratory service is one of the most important ways of improving the
  - quality of PHC
  - avoiding patients and pregnant women having to travel to the district hospital for essential lab investigations
- community-based laboratory practice must:
  - meet the health needs of individuals and community
  - operate in an acceptable way
  - be accessible to the community and affordable
  - be reliable and sustainable



# Establishing a health centre laboratory

- What is likely to be the affect on morbidity and mortality in the area if essential laboratory facilities were to be made available. How will the results of tests be used?
- Is the health centre sufficiently well attended and what is likely to be the demand for laboratory tests?
- Is it possible to train local community health workers to use laboratory facilities correctly, particularly in early diagnoses, follow-up, care, and local disease surveillance?
- Is there a person trained or can be trained to perform the required tests competently and manage safely and efficiently a health centre laboratory?
- Can the necessary measures be taken to ensure the safe collection, transport and disposal of specimens?

# Establishing a health centre lab ....

- Is it possible for the health centre laboratory to be visited regularly by the district laboratory coordinator or a senior person from the district hospital laboratory?
- Is it possible to organize a reliable system for supplying the laboratory with reagents and other essential supplies?
- Is the cost of running the laboratory affordable, including the cost of supplies, maintaining equipment, and staff salaries? How will laboratory expenditures be met?

# Establishing a health centre lab ....

- Can the health centre provide adequate facilities for a laboratory to operate effectively and safely, i.e. can a room be provided that is:
- structurally sound with secure door(s), proof, adequate light and ventilation.
- sufficiently large to be sub-divided into areas for working, reception of patients and specimens, keeping records, decontamination of infected material and cleaning of laboratoryware.
- provided with running water.
- provided with separate sinks for cleaning lab-ware & hand-washing.
- fitted with facilities for the safe disposal of specimens.
- wired for mains electricity or if unavailable, supplied with an alternative source of power, e.g. battery, rechargeable from a solar panel.
- fitted with appropriate washable working surfaces, seating for patients and staff, secure storage cupboards, and shelving.

# Staffing a health centre laboratory

- usually be staffed by a laboratory worker or a local community health worker trained to examine and perform relevant work
- participate in community health education and disease surveillance

# Activities of a health centre laboratory

- To investigate by referral or testing on site, important diseases and health problems affecting the local community
- To assist the health worker in deciding the severity of a patient's condition.
- To collect & refer specimens for testing to district lab, for specific investigations
- To notify the hospital lab at an early stage of any result of public health importance and send specimens for confirmatory tests
- To screen pregnant women for routine investigations and for STDs
- To promote health care and assist in community health education
- To keep careful records
- To keep an inventory record
- To send an informative monthly report

# Activities of a district hospital laboratory

- In consultation with district health management team, public health officers, and clinical staff, to decide which laboratory tests are needed and can be performed at district level
- To prepare and implement standard operating procedures
- To support the work of the outreach laboratories by:
  - testing specimens referred from community health centres, maternity health units and returning test results speedily.
  - confirming a test result that indicates serious illness or is of major public health importance.
  - supplying standardized lab supplies
  - checking the performance of equipment.
  - implementing and monitoring safe working practices
  - training health centre laboratory personnel and arranging supervision and continuing training in the work place

# Activities of a district hospital lab ....

- To refer specimens to the regional laboratory that cannot be tested locally
- To participate in external quality assurance programmes organized by the regional or central laboratory.
- To keep accurate records and send a report regularly to the district management team and director of the regional laboratory, and suggestions for managing problems and improving the laboratory service to the community.

# Role of the laboratory in district health care

## PATIENT CARE

### Diagnosis

- More accurate with fewer misdiagnoses.
- Earlier diagnosis.

### Treatment

- Correct treatment with drugs used selectively.
- Less over-prescribing.
- Side effects & progress monitored.

### Assessment/screening

- Is referral required?
- Pregnant women screened for ill health.
- Donor blood screened for pathogens.

## PUBLIC HEALTH

### Epidemics

- Earlier pathogen identification
- Earlier containment

### Surveillance/control

- More effective.
- Disease carriers identified.
- Contacts traced.
- Water supplies tested.

### Health information

- Causes of disease.
- Sources of infection.
- Risk factors.
- Prevalence and incidence rates.



**OUTCOME**



# OUTCOME

- Improvement in the quality of care with:
  - acute illness more rapidly diagnosed,
  - less preventable advanced/chronic illness,
  - reduced mortality.
- Reduced transmission of infectious diseases.
- Lower expenditure on drugs.
- More efficient use of health resources.
- Better health planning and management.
- Greater patient satisfaction.
- Greater motivation of health workers

# Code of professional conduct for medical personnel

- Be dedicated to the use of clinical lab science to benefit mankind
- Place the well-being & service of patients above own interests.
- Be accountable for the quality & integrity of clinical lab services
- Exercise professional judgement, skill, and care while meeting established standards
- Do not misuse professional skills or knowledge for personal gain, and never take anything from place of work
- Be at all times courteous, patient, and considerate to patients and their relatives. Safeguard the dignity and privacy of patients
- Do not disclose to a patient or any unauthorized person the results of investigations and treat with strict confidentiality any personal information
- Respect and work in harmony with the other members of hospital staff or health centre team.

# Code of professional conduct for medical personnel

- Promote health care and the prevention and control of disease.
- Follow safe working practices and ensure patients and others are not put at risk. Know what to do should an accident or fire occur and how to apply emergency First Aid.
- Do not consume alcohol or take unprescribed drugs that could interfere with your work performance during laboratory working hours or when on emergency stand-by.
- Use equipment and laboratory-ware correctly and do not waste reagents or other laboratory supplies.
- Strive to improve professional skills and knowledge and adopt scientific advances that benefit the patient and improve the delivery of test results
- Fulfill reliably & completely the terms & conditions of employment.

# Brain-to-brain loop

