INDUSTRIAL TRAINING REPORT

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INTRODUCTION

The industrial training 1ST June and terminated August 30TH. The place of attachment was Nigerian Center for Disease and control, National reference laboratory Gaduwa , Abuja.

The NCDC is the country’s national public health institute with its mandate to detect, prepare and respond to infectious disease outbreak and public health emergencies. Their core functions include

* Coordinate surveilliance systems to collect, analyse and interpret data on diseases of public health importance examples are cholera and lasser fever.
* Support states in responding to smaal outbreaks, and lead the response to large disease outbreaks.
* Develop and maintain a network of reference and specialized laboratories.
* Conduct, collate, synthesize and disseminate public health research to inform policy.

The national reference laboratory is a high risk laboratory, for safety of its staff and the environment a compulsory bio-safety and bio-security training was given by the bio-safety officer to all interns.

Bio-security is protection from microbial agents, toxins, harmful reagents and machines, it involves safe guarding ourselves from accidental exposure and infection. It goes a long way to prevent outbreak of diseases and a possible epidemic. There are four risk groups namely:

* Group 1: agents involved here are not known to cause disease in healthy adults and are curable. They can be worked on on a bench top example is E.coli
* Group 2:it involves communicable diseases such as measles and *salmonella,* and others which are contacted by exchange of infected bodily fluids example HIV.
* Group 3: pathogens that cause lethal infections especially when there is contact with infected blood eg hepatitis B.
* Group 4: pathogens here are dangerous agents that are easily transmitted via aerosol eg ebola.

The risk groups are differentiated by their transmission and their cure. Lassa fever is categorized as risk group 3 it is transmitted by coming in contact with infected rats and has cure compared to ebola in group 4.

LAYOUT OF THE BUILDING

The national reference laboratory different sections equipped with facilities and personnel to carry out different functions to facilitate the organizations goals we have the

SAMPLE RECEPTION

The sample reception receives the samples from TRANEX. TRANEX is a transport company that specializes in transporting samples from different states in the country. Most samples that come in are blood, cerebrospinal fluid and fecal samples. The sample comes encased in primary, secondary and tertiary packaging. The tertiary packaging is the giostyle, the secondary packaging is the falcon tube that contains the sample bottle, the primary packaging is the universal or sample bottle which contains the sample to be assayed. A personnel dressed in complete personal protective equipment carries the giostyle into the bio-safety cabinet and starts de-contamination, after de-contamination is done the sample is kept in a plastic bag and distributed to the other laboratories based on their kind, if bacteria , virus and highly pathogenic organisims.

BIOREPOSITORY

A Biorepository is a biological materials repository, it collects, processes, stores and distributes biospecimens to support scientific research, future investigations, drug discovery etc. it contains ultra-low temperature freezers. The Biorepository in NRL is the largest Biorepository in Africa. Samples are aliquotted into micro tubes and given nrl numbers and stored in racks inside the freezer. One of the daily activities of interns and staff is to fill the temperature chart. it helps to know the condition of the freezers.

BACTERIOLOGY

This section carries out assay on samples for cholera, cerebrospinal meningitis and monkey pox.

DATA ROOM

All flies and records of the organization are kept in this room. There are soft wares that are used to computerize these records, they include SUMMERS,EPIINFO and THE NCDC DATA PORTAL. The NCDC DATA PORTAL allows for easy search by filtering sensitive information that may be only accessible to those with a log in. the EPIINFO software is used to keep track of samples that have been worked on during outbreaks in epidemiological weeks. The software analyses the data and represents them in charts.

MEGA LABORATORY

The mega lab contains two large conventional polymerase chain reaction machines that are fully automated when commands are issued. Its main use at NRL is for HIV viral load assay.

HIV is an RNA virus that targets the CD4 cells of the immune system. the CD4 cells are a type of T cells that increase the risk and impact of other infections and diseases when activated. Without management, the infection might progress to an advanced stage known as AIDS. The management of HIV involves the use of Antiretrovirals such as maraviroc and enfurvitide, they slow the virus activity.

LABORATORY WORK FLOW FOR HIV VIRAL LOAD ASSAY

There are three stages involved.they include:

Pre analytical stage: in this stage the samples are transported from their different locations to the sample reception, the samples are registerd and given NRL number based on their location and serial number, each health care center has a code that helps to identify the location of the sample.

The sample information is inputed in the laboratory information systems (LIMS). The softtware helps to keep record of patient viral load assays.

The samples received are plasma samples for viral load testing and they are aliquoted into cryvioal tubes. Dried blood spot for early infant diagnosis and dried blood spot for viral load testing.there are citerias for acceptance and rejection of the samples. The acceptance citerias are

1. Information on tube labels match information on lab request form
2. Tube not broken or sample not spilled during transportation.
3. Sample aliquot is not less thatn 1.5ml
4. Sample must be shipped with thermometer and in a frozen condition.
5. Adequate information on request form.

REJECTION CITERIA

1. Mismatched sample and form labelling
2. Inappropriate specimen for the test requested.
3. Plasma that arrives at a temperature of above 80 degred celsius
4. Plasma tubes that contains less that 1.5ml
5. Poorly labled samples.
6. Plasma sample without request form.

PROCEDURE FOR VIRAL LOAD SAMPLE REGISTRATION

* Proper assesment of the viral load samples, noting all acceptance and rejection criteria.
* Assigning facility codes and serial numbers to each patient form e.g NRL/19/GHAN/21902 for easy recognition.
* Printing of cryolabels containing the facility code and serial numbers assigned to each patient form.

**NOTE:** take note of how many aliquot the sample comes in before printing the cryolabels.

* Labelling of the viral load sample with the cryolabels printed. Informaion on the patient form must correspond with information on plasma tube before labelling.

Sorting of plasma samples into pending and storage boxes.

Laboratory information management system is a software solution used to effectively manage laboratory samples, and the associated data thus standardizing operations by maintaining workflows, tests, and reporting procedures.

LIMS registration for viral load entails information like: **sample serial number, facility name, patient name, date of birth, gender, ART status, sample collection date and time, indication for viral load test, clinician name, lab personnel who received sample E.T.C.**

ANALYTICAL STAGE

The aliquotes are arranged in the pcr trays and the viral load assay is carried out using the pcr machine. The viral load assay is a laboratory test that measures the amount of HIV in a blood sample. Results are reported as the number of copies of HIV RNA per milliliter of blood. Examples of viral load tests include quantitative branched DNA (bDNA), reverse transcriptase-polymerase chain reaction (RT-PCR), and qualitative transcription-mediated amplification. Viral load tests are used to diagnose acute HIV infection, guide treatment choices, and monitor response to antiretroviral therapy (ART).

The steps in polymerase chain reaction are ;

ep 1: Denaturation. As in DNA replication, the two strands in the DNA double helix need to be separated. ...

Step 2: Annealing. Primers bind to the target DNA sequences and initiate polymerisation. ...

Step 3: Extension. New strands of DNA are made using the original strands as templates.

RELEVANCE OF TRAINING TO PHARMACOLOGY

I have seen in practical how polymerase chain reaction machine operates in HIV viral load assay to aid patient monitoring.i have also been imparted with knowledge on bio safety and biosecurity and how it applies to life and work,also the safety precautions taken when receieving samples bearing in mind that all samples are treated as highly infectious.