Chapter Four

Confronting Epidemics in Nigeria: Taking Status Quo off the Table

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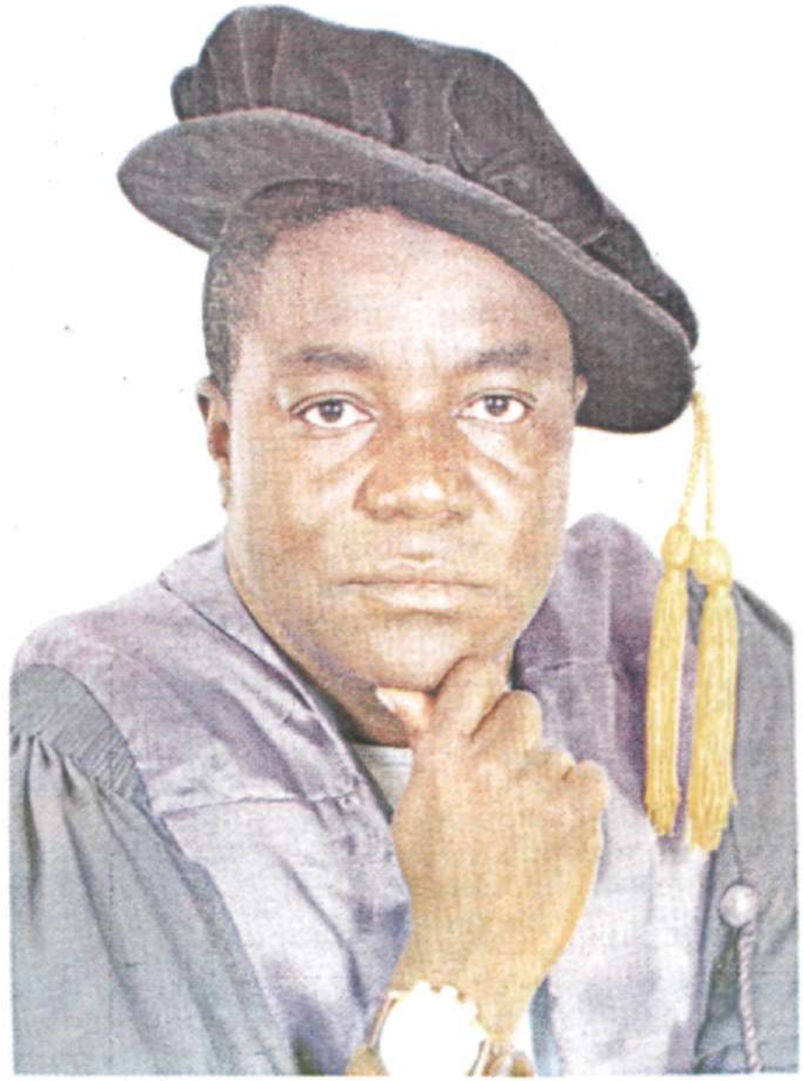
Wednesday, 9TH April, 2014.



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Preamble

I feel greatly honoured to be given this privilege to deliver this inaugural lecture on behalf of the Department of Community Medicine, the Faculty of Medicine Ahmadu Bello University Zaria. I am the first professor to deliver an inaugural lecture from this Department.

Sometime last year I was approached by the Dean of our Faculty on whether I would be able to present inaugural lecture on behalf of the Department. I could not respond in affirmative because it coincided with the time that I commenced my sabbatical leave in one of our collaborating partner the African Field Epidemiology Network (AFENET). However, 2 weeks ago when I was re-contacted by the dean I could not hesitate but to answer and swing into action. Therefore, this lecture I am presenting today is a product of 2-weeks effort, and I hope that it will meet the expectations of the organizers and the listeners. On a lighter note, perhaps this is in line with my lecture today, which is about dealing with emergencies. There is hardly any time to adequately prepare yet there is no room for mistakes.

Mr. Vice Chancellor Sir; kindly permit me to start today's lectures titled "Confronting Epidemics in Nigeria: Taking status quo off the table" by first and foremost presenting the outline of the presentation viz;

Outline of presentation

Background to Epidemics
Definitional Issues
The Pattern of Medical Epidemics in Nigeria
The effects and consequences of Epidemics
The Traditional approaches to control epidemic
The emerging trends in epidemics
The concept of one health
The Nigerian response to one health initiative
The role of Tertiary Institutions
The successes recorded
The challenges and prospects
Conclusion

1. BACKGROUND

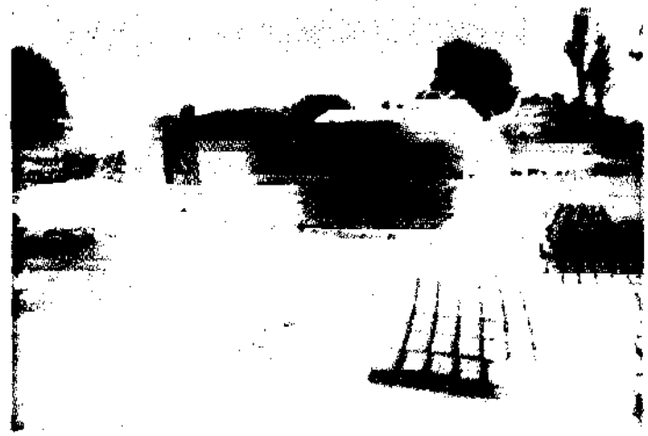
To vividly illuminate this presentation I will like to start with the following prologue:

"This was the only child we had with my wife, exclaimed Mal.Lawal (not his real name). We have been married for 15 years and 3 years ago we joyously welcomed our first son and only child, Master Musa Lawal (not his real name). Three days ago Musa was taken ill; his gums were swollen probably due to eruption of new teeth. His mother took him to a nearby health facility for treatment and was given a teething soothing mixture known as "Drug X". Yesterday he stopped passing urine and we were referred to the teaching hospital where we were informed that his kidneys had shut down and he died last night. While sobbing, Mal. Lawal explains that he can't understand what really happened , the rapidity of events in the last 72 hours is astonishing, from a bouncing playful boy to funeral arrangements for his precious baby boy. He explains, as he shows pictures of his boy, that something could have been done to prevent the death of his son."

Three months after the inception of the Nigeria Field Epidemiology and Laboratory Training Program of the ABU(NFELTP) (www.nigeria-feltp.net) in December 2008, the trainees of the program were requested to investigate an outbreak of mysterious deaths of children under 5 years of age in a number of states in Nigeria. The trainees with support from US Centers for Disease Control and Prevention (CDC, the US Food and Drug Administration (FDA, the National Agency for Food and Drug Administration and Control (NAFDAC), the Federal Ministry of Health (FMOH) discovered that over 100 children had suffered acute renal failure (rapid shutdown of kidneys) with nearly all of them subsequently dying. Systematic field investigations(the hallmark of NFELTP and other FELTPs)to gather information from care givers revealed that nearly all the children had taken a teething soothing mixture (known as Drug X). Further chemical analysis also revealed that the teething mixture had been contaminated with Diethylene Glycol (DEG, a cheap substitute for solvents used in most drugs manufacturing processing. DEG causes kidney damage and can rapidly cause death. Rapid investigation helped discover the contaminated batches of the implicated drug, and effectively recalling the drug and targeted public health messages to care givers to avoid the implicated drug. Hundreds of would be victims of drug poisoning were prevented from the permanent effects of the poisoning and death owing to the rapid investigations and timely response. As a follow up stricter drug

quality monitoring and capacity building for detection of drug contaminants were instituted by the Federal government of Nigeria.

My second story Mr Vice Chancellor Sir is Also a pathetic one which I intent to show with the Picture below



Chief of Dareta village, Nigeria. Site of 58 child deaths in last 3 months likely due to lead poisoning. Just after halting the process of making bricks for homes out of highly lead-contaminated gold mining waste (~ 200 times US EPA allowable limit for lead in soil).

NFELTP was created to build capacity in field epidemiology to support strengthening of public health systems particularly early detection of disease outbreak and rapid response. Over the years the program has supported training of disease detectives who have helped in early detection of outbreaks. These have ranged from infectious to non-infectious conditions, from rapid detection of lead poisoning in the north of the country to response to Lassa fever in the south of the country. Over 130 outbreaks have been investigated thoroughly and evidence provided for quality effective response preventing disease, disability and death".

Acknowledgement

I cannot conclude the celebration and celebration without paying due tribute to some people and institutions that have contributed to what we celebrate. So I would like to acknowledge Prof. Umaru Shehu the foundation Head of the Department of Community Medicine , late Prof. A. B. Bandipo, Prof. P. Singha, Dr. E. S. Essien, Dr C L Ejembi They developed the Department from scratch and laid the foundations for what we have today. I appreciate their invaluable contributions to my training and the guidance, nurturing and consolidation they have given me in my earlier career. They taught me the value of meticulous hard working and discipline in improving my skill as a public health physician.

I acknowledge Professor A. M. Yakubu my best teacher in the medical school. His systematic teaching of paediatrics might have kept my interest in that discipline, if I did not get a later vocation for Community Medicine and health for all.

I would like to acknowledge my other teachers in the Medical School like Professor Vahalia of Anatomy Department, Dr. Sheriff, Dr. Adeosun, Professor Ali, Professor Ogala, Professor Mr. and Professor Mrs. Mabogunje for instilling in me the determination for hard work, diligence, integrity as well as making a difference in whatever I do in my line through working with others to champion the processes for the attainment of positive change. I hope that I have justified your examples in the way I have done to myself ever since.

To my numerous friends, colleagues in the faculty such as the former Dean and current Dean Student Affairs Prof. M. S. Shehu, the present Dean faculty of Medicine Prof. Bakare, the Head of Community medicine Dr. M. N. Sambo, the past Heads of departments Dr. S. H. Idris, Dr. Shehu, and host of others too numerous to mention, I say thank you for your kind support and assistance.

I would like to acknowledge the following colleagues of mine with whom we have worked diligently from 2008 to date in the NFELTP program to get us to where we are now. Dr Patrick Nguku the Resident Advisor to the program, Dr Peter Nsubuga formerly from United State Center for Disease Control, Dr Okey

Nwanyawu the country CDC director, Dr Dalhatu Mohammed of CDC Nigeria, Dr Nasiru Sani Gwarzo who was in CDC during the take off of the program and its scale up but now in the FMOH. Prof Nasidi the director of the Nigerian Center for Disease Control (NCDC). My colleagues and friends the members of the faculty from University of Ibadan who are too numerous to mention here.

I also acknowledge the support and encouragements from the following institutions: Center for Disease Control Atlanta, AFENET, FMOH, FMOARD ABU Zaria and UI

I would like to acknowledge the Dan Amar of Zazzau Alhaji Garba, Alhaji, Dr Bashir Kurfi, Mal. Sani Hassan, Mrs. Ajayi a host of others who have stood by me through my most difficult and trying period in my life.

My father late Alhaji Mohammed Sabitu is not physically here but my mother Hajiya Ramatu Sabitu is here with me. I want to thank them for what they have done for me. I thank late Alhaji Adamu Ambi the Maji dadin Bauchi my senior brother for ensuring that I finished secondary school and entered University with minimal stress. I thank the rest of our family one and all.

I thank my children all the five of them Ramatu, Farida, Salim, Rukaya and Maryam who have always been supportive and helpful. I thank Hajiya Amina (Iyami) my beloved wife, sister and helpmate. She has always been there for me.

I remain grateful to the Ahmadu Bello University and Ahmadu Bello University Teaching Hospital for providing the conducive setting and giving me opportunity to be trained and later to train, teach and work in the institutions.

I thank you all for Listening. May the Almighty GOD Bless you abundantly

2. DEFINITIONAL ISSUES

Epidemic

The word Epidemic is from Greek *epi* (upon) , *demos* (people). It usually refers to the occurrence in a community or region of cases of an illness, specific health – related behavior, or other health – related events clearly in excess of normal expectancy.

It has also been defined as the occurrence of more cases of disease in a defined geographical area and or among a specific group of people over a particular period of time in excess of normal expectancy for that area and at that particular point in time. The amount of disease occurring in the past, in the absence of epidemic, defines the "expected" frequency. The term outbreak is sometimes used synonymously with epidemic.

There are several changes that may occur in an infectious agent that may trigger an epidemic these include:

- Increased virulence, i.e. the agent causing more severe disease than usual
- Introduction into a novel setting .i.e. agent getting into new population
- Changes in host susceptibility to the infectious agent i.e weaken immunity

Generally speaking, three major types of epidemics may be distinguished:

a. Common-source epidemics: which is further classified into two as follows
   - Single exposure or point source epidemics
   - Continuous or multiple exposure epidemics
b. Propagated epidemics: has three forms
   - Person-to-person
   - Athropod vector
   - Animal reservoir
c. Slow modern epidemics

Endemic

This refers to the constant presence of a disease or infectious agent within a given geographic area or population group. May also refer to the usual prevalence of a given disease within such an area or group.

Pandemic

This refers to an epidemic occurring worldwide or over a very wide area, crossing international boundaries and usually affecting a large number of people.

3. THE PATTERN OF MEDICAL EPIDEMICS IN NIGERIA

Major Epidemics	Year	No of cases	No of death	CFR
Cholera	2013	6400	352	5.5%
	2010	46,782	1841	3.9%
	1995	59134	4508	7.9%
CSM	2009	38586	2172	5.6%
Lassa Fever				
	2011	1246		
	2012	1723	70	4.1%
	2013	1700	112	6.6%
Measles				
	2005	150,000		
	2013	36,000	198	0.6%
Yellow Fever	1984 – 1992	20000	5000	25%

Fig 1: Occurrence of Cerebrospinal Meningitis over ten year period: 2002-2011

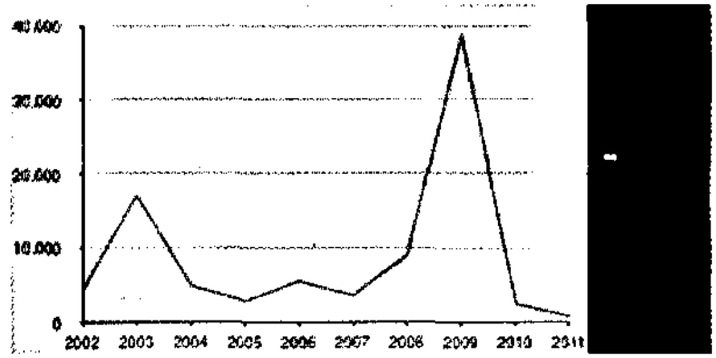


Fig 2: Trend in Measles occurrence over 10 years

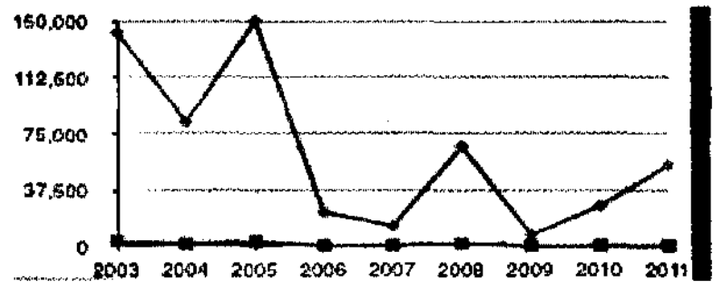


Fig 3: Trends in Lassa fever epidemic over ten year period: 2002-2011

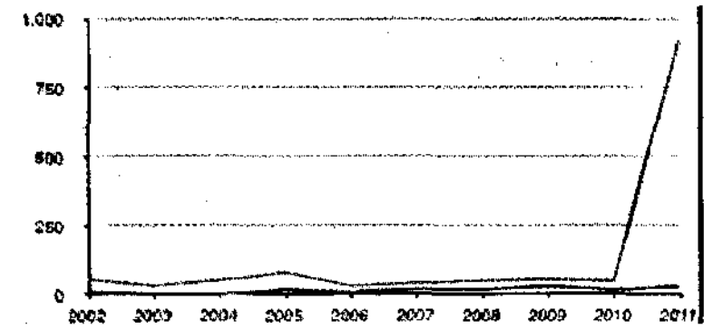


Fig 4: National HIV Median Prevalence in Nigeria: 1991-2010

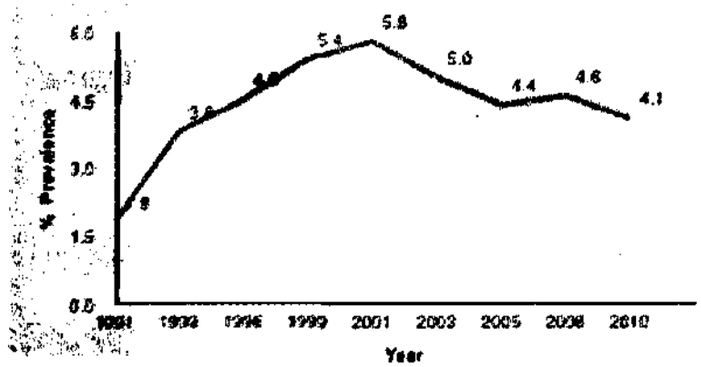
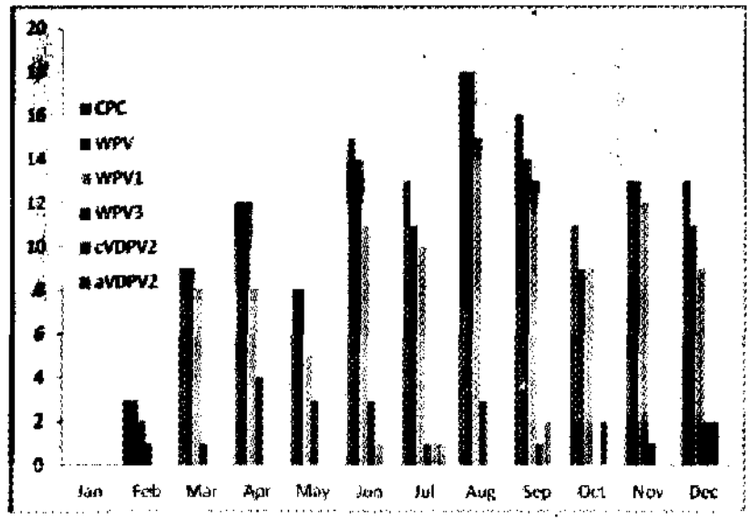


Fig 5: Monthly distribution of Wild Polio Virus (WPV) IN 2012



Epidemiology and Control of Some Epidemic Prone Diseases in Nigeria

CEREBROSPINAL MENINGITIS

Meningococcal meningitis, commonly designated as cerebrospinal meningitis, is the only form of bacterial meningitis which causes epidemics. Epidemics can occur in any part of the world.

Aetiology: It is caused by the meningococcus (Neisseria meningitidis) Gram-negative diplococcus with capsular polysaccharide antigens and different serogroups (A, B, C, X, Y, Z, 29-E, and W135). Serogroups A, B, and C associated with epidemics.

AETIOLOGY

Meningococcal disease is a contagious disease caused by the meningococcus (Neisseria meningitidis), a Gram-negative bacterium.

RESERVOIR

Humans and asymptomatic carriage in nasopharynx is common.

MODE OF SPREAD

Person-to-person by direct contact with respiratory droplets of infected peoplemost cases acquired through exposure to asymptomatic carriers, relatively few through direct contact with patients with meningococcal disease.

INCUBATION PERIOD

1-10 days, usually <4 day

SYPMTOMS AND SIGNS

Sudden onset of intense headache, fever, nausea, vomiting, photophobia and stiff neck. In addition, neurological signs can be observed, such as lethargy, delirium, coma, and/or convulsions.

However, infants may have illness without sudden onset and stiff neck. Meningococcal septicaemia is difficult to recognize outside an epidemic: abrupt onset, fever and shock occur irregularly, petechial rash or purpura may not be obvious initially and meningeal symptoms are usually absent.

HOW TO PREVENT MENINGOCOCCAL DISEASE

Meningococcal disease is potentially preventable through vaccination and/or chemoprophylaxis in special circumstances.

2. LASSA FEVER

Lassa fever is an acute viral hemorrhagic fever first described in 1969 in the town of Lassa, in Borno State, Nigeria located in the Yedseram river valley at the south end of Lake Chad. The infection is endemic in West African countries, and causes 300-500,000 cases annually with approximately 5,000 deaths.

Prevalence

The dissemination of the infection can be assessed by prevalence of antibodies to the virus in populations of:
Sierra Leone 8–52%
Guinea 4–55%
Nigeria approx. 21%

Like other hemorrhagic fevers, Lassa fever can be transmitted directly from one human to another. It can be contracted by an airborne route or with direct contact with infected human blood, urine, or semen. Transmission through breast milk has also been observed.

Prevention

Control of the "Mastomys" rodent population is impractical, so measures are limited to keeping rodents out of homes and food supplies, as well as maintaining effective personal hygiene. Gloves, masks, laboratory coats, and goggles are advised while in contact with an infected person.

Symptoms

In 80% of cases the disease is inapparent, but in the remaining 20% it takes a complicated course. It is estimated that the virus is responsible for about 5,000 deaths annually. After an incubation period of six to twenty-one days, an acute illness with multi-organ involvement develops. Non-specific symptoms include fever, facial swelling, and muscle fatigue, as well as conjunctivitis and mucosal bleeding. The other symptoms arising from the affected organs are:

Gastrointestinal tract (Nausea, Vomiting (bloody), Diarrhea (bloody), Stomach ache, Constipation, Dysphagia (difficulty

swallowing), Hepatitis, Cardiovascular system (Pericarditis, Hypertension, Hypotension, Tachycardia (abnormally high heart rate), Respiratory tract (Cough, Chest pain,Dyspnoea, Pharyngitis, Pleuritis Nervous system (Encephalitis, Meningitis, Unilateral or bilateral hearing deficit, Seizures Clinically, Lassa fever infections are difficult to distinguish from other viral hemorrhagic fevers such as Ebola and Marburg, and from more common febrile illnesses such as malaria.

The virus is excreted in urine for three to nine weeks and in semen for three months.

Diagnosis

ELISA test for antigen and IgM antibodies gives 88% sensitivity and 90% specificity for the presence of the infection. Other laboratory findings in Lassa fever include lymphopenia (low white blood cell count), thrombocytopenia (low platelets), and elevated aspartate aminotransferase (AST) levels in the blood.

Prognosis

About 15%-20% of hospitalized Lassa fever patients will die from the illness. It is estimated that the overall mortality rate is 1%, however during epidemics mortality can climb as high as 50%.

Treatment

All persons suspected of Lassa fever infection should be admitted to isolation facilities and their body fluids and excreta properly disposed of. Early and aggressive treatment using Ribavirin was pioneered by Joe McCormick in 1979.

3. MEASLES

Measles is a highly contagious, serious disease caused by a virus. In 1980, before widespread vaccination, measles caused an estimated 2.6 million deaths each year.

It remains one of the leading causes of death among young children globally, despite the availability of a safe and effective vaccine. Approximately 122000 people died from measles in 2012 – mostly children under the age of five.

Measles is caused by a virus in the paramyxovirus family.

Signs and symptoms

Fever, runny nose, a cough, red and watery eyes, and small white spots (Koplik's spots). After several days, a rash erupts, usually on the face and upper neck. Over about three days, the rash spreads, eventually reaching the hands and feet. The rash lasts for 5 to 6 days, and then fades. On average, the rash occurs 14 days after exposure to the virus (within a range of seven to 18 days).

Transmission

The highly contagious virus is spread by coughing and sneezing, close personal contact or direct contact with infected nasal or throat secretions.

Treatment

No specific antiviral treatment exists for measles virus.

Prevention: Routine measles vaccination for children combined with mass immunization campaigns in countries with high case and death rates, are key public health strategies to reduce global measles deaths.

4. CHOLERA

Cholera is an acute diarrhoeal infection caused by ingestion of food or water contaminated with the bacterium Vibrio cholerae. Every year, there are an estimated 3–5 million cholera cases and 100 000–120 000 deaths due to cholera. The short incubation period of two hours to five days, enhances the potentially explosive pattern of outbreaks.

Signs and Symptoms: profuse watery diarrhea with or without vomiting and abdominal pain/ cramps

Risk factors and disease burden: Cholera transmission is closely linked to inadequate environmental management. Typical at-risk areas include peri-urban slums, where basic infrastructure is not available, as well as camps for internally displaced people or refugees, where minimum requirements of clean water and sanitation are not met.

Prevention and control

A multidisciplinary approach based on prevention, preparedness and response, along with an efficient surveillance system, is key for mitigating cholera outbreaks, controlling cholera in endemic areas and reducing deaths.

Treatment

Cholera is an easily treatable disease. Up to 80% of people can be treated successfully through prompt administration of oral rehydration salts (WHO/UNICEF ORS standard sachet). Very severely dehydrated patients require administration of intravenous fluids. Such patients also require appropriate antibiotics to diminish the duration of diarrhoea, reduce the volume of rehydration fluids needed, and shorten the duration of V. cholerae excretion. Mass administration of antibiotics is not recommended, as it has no effect on the spread of cholera and contributes to increasing antimicrobial resistance.

5. YELLOW FEVER

Yellow fever is a serious viral infection that's usually spread by a type of mosquito known as the Aedes aegypti mosquito. It can be prevented with a vaccination. It mainly occurs in sub-Saharan Africa (countries to the south of the Sahara desert), South America and in parts of the Caribbean.

There have not been any recent cases of yellow fever in North America, Europe or Asia. Since 1996, six travellers from Europe and North America have died from the infection. None of them were vaccinated.

Signs and symptoms

Incubation period = 3 to 6 days,

Fever, muscle pain with prominent backache, headache, shivers, loss of appetite, and nausea or vomiting. Most patients improve and their symptoms disappear after 3 to 4 days.

Treatment

There is no specific treatment for yellow fever, only supportive care to treat dehydration, respiratory failure and fever.

Prevention

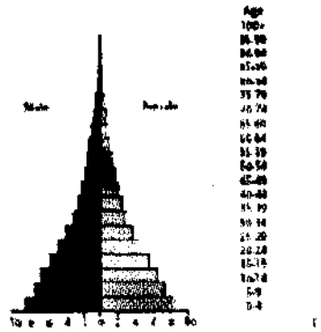
1. Vaccination

Vaccination is the single most important measure for preventing yellow fever. In high risk areas where vaccination coverage is low, prompt recognition and control of outbreaks through immunization is critical to prevent epidemics. To prevent outbreaks throughout affected regions, vaccination coverage must reach at least 60% to 80% of a population at risk. Few endemic countries that recently benefited from a preventive mass vaccination campaign in Africa currently have this level of coverage.

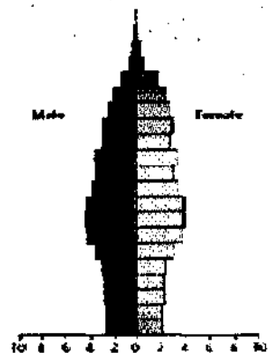
6. THE EFFECTS AND CONSEQUENCES OF EPIDEMICS

Medical effects:
Increased morbidity,
Increased mortality,
Increases disability
Interruption of basic public health services,

Demographic effects:
Population displacement
Changes in density of population



Rapid population growth –pre epidemic –post



Rapid population growth epidemic

Socio-economic effects:

- Decreased population in the productive age group with attendant decrease in productivity
- Disruption of public utilities such as banks, markets, etc
- Use of financial resources in control of epidemics. These resources will have channeled for other developmental projects
- It also creates an avenue for corruption through diversion of resources meant for control of epidemics

Consequences on international relations & travels:

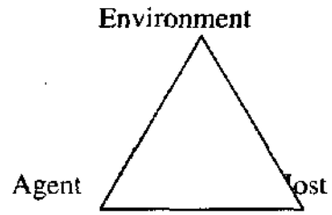
- Restriction of travels, e.g. in the year 1996/97, Saudi Arabian Government banned Nigerian pilgrims from entry into Saudi Arabia due to outbreak of cholera in some Nigerian States

- Unnecessary quarantine & humiliation of travelers

7. THE TRADITIONAL APPROACHES TO THE CONTROL OF EPIDEMICS

Principles of epidemic control

The process of anticipating, preventing, preparing for, detecting, responding and controlling outbreaks in order that the health and economic impact is minimised is termed outbreak management. Diseases are caused by interplay of three major factors: agent, host and environment. These three factors are referred to as epidemiologic triad. This model has helped epidemiologists in analysing different outbreak situations especially with regard to infectious diseases. The agent, host and favourable environment factors operating in combination determine not only onset of disease which may range from a single case of disease to epidemics, but also the distribution of the disease in the community



Agent factors: disease agents may be broadly classified into biological agents such as bacteria, viruses, etc; nutrient agents (proteins, fats, carbohydrates, etc), physical agents (excessive heat, cold, humidity, etc), chemical agents (urea, ketones, allergens, fumes, gases, etc), mechanical agents (friction, mechanical force, etc), absence/insufficiency/excess of a factor necessary to health (chromosomes, immunological factors, enzymes) and social agents (poverty, smoking, drug abuse, etc).

Host factors:

The host factors: may be classified as demographic, biological, socio-economic and life style factors.

Environmental factors: the environment of man has been divided into three components: physical, biological and

psychosocial. However, this separation is only artificial as they are closely related to each other and with host factors.

Traditional approaches to containing outbreaks were defensive, trying to secure borders from the entry of infectious diseases.

Modern solutions, in addition to the development of new anti-infective drugs and vaccines, are built on a combination of early warning surveillance systems, epidemic preparedness plans, and stockpiles of essential materials, speedy communications and information sharing through networks to rapidly contain epidemic threat.

Control of epidemics

To control epidemic, one must have information with respect to:

- Causative organism/source,
- Dynamic of disease transmission,
- Mode of transmission and
- Route of transmission

Three principles of dynamics of disease transmission are used to control epidemics, namely:

- Removal of source of infection,
- Prevent transmission, and
- Vector control measures

Removal of source of infection: this comprises of the following:

- Treatment of infected cases,
- Destruction of reservoir of infection, and
- Removal/correction of source of infection

Prevent transmission:

- Isolation of infected cases
- Hand washing and use of personal protective equipment
- Use of sterile supply
- Proper disposal of fomites
- Improved environmental sanitation
- Contact tracing
- Screening of suspected cases
- Quarantine of migrated cases
- Health education
- Increased resistance of suspects e.g. through immunization, prophylaxis, etc

Vector control measures:

- Prevent breeding of mosquitoes, flies, fleas, etc
- Destruction of adult vectors through the use of insecticides, pesticides, etc
- Personal protection from bites
- Increased personal hygiene
- Improved environmental sanitation

Prevention of epidemics

Epidemic prevention measures include:

Personal measures:

- Increase body resistance e.g. through immunization
- Change in diet habits
- Regular exercise
- Etc

Environmental measures

- Improved environmental sanitation
- Provision of adequate potable water supply
- Proper refuse/sewage disposal

Regular health education to people through mass media, meetings, seminars, etc

Epidemic preparedness and response (EPR): Epidemic Preparedness constitutes all the activities that have to be undertaken for central/peripheral levels to be ready to respond effectively to epidemics/outbreaks. When all the activities are put together in a plan then we have an Epidemic Preparedness Plan.

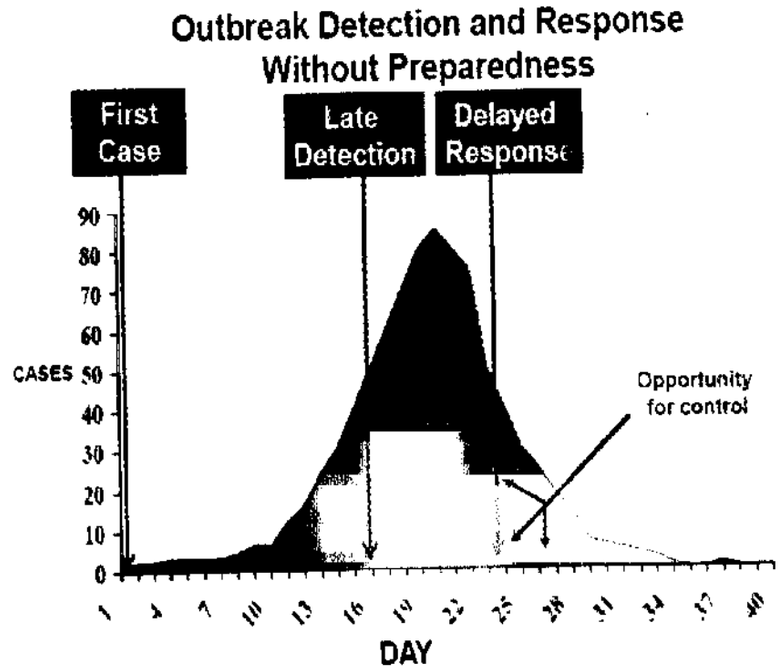
The objectives of EPR are:

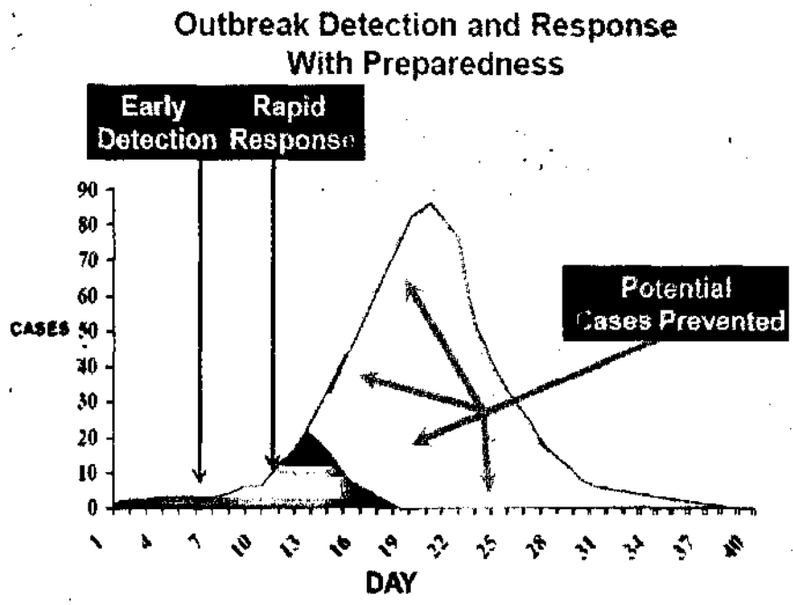
1. **Anticipation/prediction** so that epidemics can be prevented e.g. meningitis, measles
2. **Preparedness** so there is readiness to respond.
3. **Early detection** to know when there is a problem.
4. **Rapid Response:** this ensures that guidelines/trained staff/supplies are in place before epidemic.

5. **Effective Response** by adopting appropriate control methods and ensuring that adequate resources and logistics are available.
6. **Evaluation** to identify what went right and what went wrong before and during the outbreak.

The elements of epidemic preparedness are as follows:

- ✓ Ensure that routine surveillance system can detect outbreaks
- ✓ Ensure that staff are organized to confirm, investigate, and respond to outbreaks
- ✓ Maintain buffer stocks of drugs, essential equipment, materials and supplies
- ✓ Ensure financial support for preparation and response





Steps of epidemic investigation and control

The occurrence of an epidemic always signals some significant shift in the existing balance between agent, host and environment. It calls for a prompt and thorough investigation of the cases to find out the factors responsible and to guide in advocating control measures to prevent further spread. The objectives of epidemic investigation are:

a. To define the magnitude of the epidemic or involvement in terms of time, place and person,
b. To determine particular conditions and factors responsible for the occurrence of the epidemic
c. To identify cause, source(s) of infection, and modes of transmission to determine measures necessary to control the epidemic; and
d. To make recommendations to prevent recurrence.

There are 10 major steps for investigating and controlling epidemics:

1. Verify the diagnosis: This is the first step in outbreak investigation, as it may happen sometimes that the report may be spurious, and arise from misinterpretation of signs and symptoms by the lay public. Here, clinical and laboratory studies will help to confirm the diagnosis of the disease in question.

2. Establish the existence of an outbreak: attempt to compare the current incidence with past levels of the disease will help to determine whether an excessive number of cases have occurred.

3. Describe the epidemic with respect to person, place and time: Here, the cases are counted to determine the frequency. A graph of cases by time of onset need to be plotted (epidemic curve). A graph of cases by location also needs to be plotted (spot map). Rates of illness in population at risk by age, sex, occupation, exposure to specific food items, and other relevant attributes need to be calculated.

4. Formulate a hypothesis: Identify the type of epidemic-common source or propagated. After defining the population that has been at the highest risk of acquiring the diseases, consider the possible source(s) from which the disease may have been contracted. Compare ill populations (cases) with well population (controls) with regard to exposure to the postulated source. Determine relative risk for exposed and non-exposed persons.

5. Search for additional cases and their characteristics: This can be achieved via medical surveys, epidemiological case sheet and active search for more cases.

6. Analyse data: the data collected should be analysed on an on-going bases using the classical epidemiological parameters: time, place and person.

7. Testing hypothesis: all reasonable hypotheses need to be considered and weighed by comparing the attack rates in various groups for those exposed and for those not exposed to each factor.

8. Plan a more systematic study: a study of the population at risk or a sample of it may be needed to obtain additional information. The approach may be retrospective or prospective.

9. Execute control and prevention measures: It may be necessary to implement temporary control measures at the commencement of an epidemic on the basis of known facts of the disease. These measures may be modified or replaced in the light of new knowledge acquired from the epidemic investigation.

10. Prepare a written report: at the end of the investigation, a report is usually prepared and submitted to appropriate authorities. This report includes discussion of factors leading to the epidemic, evaluation of measures used for control and recommendations for preventing similar episodes in future.

Main actors of epidemic control

The actors involved in investigation and control of epidemics comprise of the following:

Epidemiologist
Clinician (pathologist)
Microbiologist/laboratory scientist
Environmental specialist
Veterinarian
Toxicologist
Auxiliaries: e.g. nurses, drivers, etc
Ministry of Health
Press officer
Others

8. THE EMERGING TRENDS OF EPIDEMICS

Avian Influenza (H_5N_1)

Avian influenza refers to a large group of different influenza viruses that primarily affects birds. On rare occasions, these bird viruses can infect other species such as humans and pigs. H_5N_1 strain is a strain with pandemic potential, since it might ultimately adapt into a strain that is contagious among humans. The H_5N_1 strain first infected humans in Hong Kong in 1997, causing 18 cases including 6 deaths. Since mid 2003, this virus has caused the largest and most severe outbreaks in poultry on record. In December 2003, infections in people exposed to sick birds were identified.

Epidemiological determinants of Avian Influenza

Agent factors: Influenza viruses belong to the family orthomyxoviridae. There are 3 viral sub types: influenza types A, B and C. The 3 viruses are antigenically distinct and there is no cross immunity between them. Influenza types A and B are responsible for most epidemics globally.

Both influenza types A and B have 2 distinct surface antigens: haemaglutinin (H) and neuraminidase (N). The H antigen initiates infection while the N antigen is responsible for the release of the virus from the infected cell.

Host factors:

a. Age and sex: Influenza affects all ages and box sexes. In general attack rate is lower among adults. The highest mortality rate during epidemics is seen among certain high risk groups such as old people, children under 18 months, and persons with diabetes and chronic heart disease.
b. Human mobility: is an important factor in the spread of the disease.
c. Immunity: immunity to influenza is sub type specific. Antibodies against H and N antigens are important in immunity to influenza. A person with low titres of the antibodies may be infected but will experience a mild form of the illness.

Environmental factors:

a. There is seasonal variation in the occurrence of the epidemics. The epidemics are commoner in winter months in the northern hemisphere and in the winter or rainy season in the southern hemisphere.
b. Over-crowding: It enhances transmission.

Mode of transmission

Influenza is mainly transmitted from person to person by droplet infection or droplet nuclei created by sneezing, coughing or talking. The portal of entry of the virus is respiratory tract.

Incubation period: 18 to 72 hours

Diagnosis

This is achieved via (a) viral isolation or (b) Paired sera test using complement fixing antibodies.

Prevention

All attempts to control influenza epidemics have so far met with little success and the prospects of achieving control remain poor. However, the following will minimize occurrence and spread of outbreaks:

- Good ventilation of public buildings,
- Avoidance of crowded places especially during epidemics,
- Encouraging sufferers to cover their faces with handkerchief when coughing or sneezing,
- Staying at home after noticing first signs of influenza,
- Hygienic practices during handling of poultry/poultry products,
- Vaccination is not recommended for control of spread in general population

Swine flu (H_1N_1)

Swine flu is a relatively new strain of influenza (flu) that was responsible for a flu pandemic during 2009-2010. It is an infection caused by any one of several types of swine influenza viruses. It is also called **pig influenza**, **hog flu** and **pig flu. Swine influenza**

virus (SIV) or **swine-origin influenza virus (S-OIV)** is any strain of the influenza family of viruses that is endemic in pigs. As of 2009, the known SIV strains include influenza C and the subtypes of influenza A known as H1N1, H1N2, H2N1, H3N1, H3N2, and H2N3.

Swine influenza virus is common throughout pig populations worldwide. Transmission of the virus from pigs to humans is not common and does not always lead to human flu, often resulting only in the production of antibodies in the blood. If transmission does cause human flu, it is called zoonotic swine flu. People with regular exposure to pigs are at increased risk of swine flu infection.

Agent factors: Of the three genera of influenza viruses that cause human flu, two also cause influenza in pigs, with influenza A being common in pigs and influenza C being rare. Influenza B has not been reported in pigs. Within influenza A and influenza C, the strains found in pigs and humans are largely distinct, although because of reassortment there have been transfers of genes among strains crossing swine, avian, and human species boundaries. Influenza types A has 2 distinct surface antigens: haemaglutinin (H) and neuraminidase (N). The H antigen initiates infection while the N antigen is responsible for the release of the virus from the infected cell. There is no cross immunogenicity between influenza sub types A and C.

Transmission

Influenza is quite common in pigs. The main route of transmission among pigs is through direct contact between infected and uninfected animals. These close contacts are particularly common during animal transport. Intensive farming may also increase the risk of transmission, as the pigs are raised in very close proximity to each other.

People who work with poultry and swine, especially those with intense exposures, are at increased risk of zoonotic infection with influenza virus endemic in these animals, and constitute a population of human hosts in which zoonosis and reassortment can co-occur. Other professions at particular risk of infection are veterinarians and meat processing workers, although the risk of

infection for both of these groups is lower than that of farm workers.

Symptoms

The symptoms of swine flu are similar to those of influenza and of influenza-like illness in general. Symptoms include fever, cough, sore throat, body aches, headache, chills and fatigue. The 2009 outbreak has shown an increased percentage of patients reporting diarrhea and vomiting. The most common cause of death is respiratory failure. Other causes of death are pneumonia (leading to sepsis), high fever (leading to neurological problems), dehydration (from excessive vomiting and diarrhea), electrolyte imbalance and kidney failure. Fatalities are more likely in young children and the elderly.

Diagnosis

Real-time PCR is the method of choice for diagnosing H1N1. This method allows a specific diagnosis of novel influenza (H1N1) as opposed to seasonal influenza.

Prevention

Prevention of swine influenza has three components: prevention in swine, prevention of transmission to humans, and prevention of its spread among humans.

In swine

Methods of preventing the spread of influenza among swine include facility management, herd management, and vaccination. Because much of the illness and death associated with swine flu involves secondary infection by other pathogens, control strategies that rely on vaccination may be insufficient.

Facility management includes using disinfectants and ambient temperature to control viruses in the environment. They are unlikely to survive outside living cells for more than two weeks, except in cold (but above freezing) conditions, and are readily inactivated by disinfectants. Herd management includes not adding pigs carrying influenza to herds that have not been exposed to the virus. The virus survives in healthy carrier pigs for up to three months, and can be recovered from them between outbreaks.

Carrier pigs are usually responsible for the introduction of SIV into previously uninfected herds and countries, so new animals should be quarantined. After an outbreak, as immunity in exposed pigs wanes, new outbreaks of the same strain can occur.

In humans

Prevention of pig-to-human transmission

Swine can be infected by both avian and human flu strains of influenza, and therefore are hosts where the antigenic shifts can occur that create new influenza strains.

The transmission from swine to humans is believed to occur mainly in swine farms, where farmers are in close contact with live pigs. Although strains of swine influenza are usually not able to infect humans, this may occasionally happen, so farmers and veterinarians are encouraged to use face masks when dealing with infected animals. The use of vaccines on swine to prevent their infection is a major method of limiting swine-to-human transmission. Risk factors that may contribute to swine-to-human transmission include smoking and, especially, not wearing gloves when working with sick animals, thereby increasing the likelihood of subsequent hand-to-eye, hand-to-nose or hand-to-mouth transmission.

Prevention of human-to-human transmission

Influenza spreads between humans when infected people cough or sneeze, then other people breathe in the virus or touch something with the virus on it and then touch their own face. "Avoid touching your eyes, nose or mouth. Germs spread this way." Swine flu cannot be spread by pork products, since the virus is not transmitted through food. The swine flu in humans is most contagious during the first five days of the illness, although some people, most commonly children, can remain contagious for up to ten days. Diagnosis can be made by sending a specimen, collected during the first five days, for analysis.

Recommendations to prevent spread of the virus among humans include using standard infection control, which includes frequent washing of hands with soap and water or with alcohol-based hand sanitizers, especially after being out in public. Chance

of transmission is also reduced by disinfecting household surfaces, which can be done effectively with a diluted chlorine bleach solution. Experts agree hand-washing can help prevent viral infections, including ordinary and the swine flu infections. Also, avoiding touching one's eyes, nose or mouth with one's hands helps to prevent the flu. Influenza can spread in coughs or sneezes, but an increasing body of evidence shows small droplets containing the virus can linger on tabletops, telephones and other surfaces and be transferred via the fingers to the eyes, nose or mouth. Alcohol-based gel or foam hand sanitizers work well to destroy viruses and bacteria. Anyone with flu-like symptoms, such as a sudden fever, cough or muscle aches, should stay away from work or public transportation, and should seek medical advice.

Social distancing, another tactic, is staying away from other people who might be infected, and can include avoiding large gatherings, spreading out a little at work, or perhaps staying home and lying low if an infection is spreading in a community. Public health and other responsible authorities have action plans which may request or require social distancing actions, depending on the severity of the outbreak.

The increasing incidence of Animal to man transmission of diseases call for paradigm shift and change of status quo in the way and manner epidemics are investigated and respond to in the country. This brings us to the concept of one health.

9. THE CONCEPT OF ONE HEALTH

One health is where there is convergence of Human - Animal – Environment interface. It is the collaborative effort of multiple disciplines working locally, nationally and even globally to attain health of humans, animals and our environment. As once said by a German physician of high reputation by name Rudolf Virchow (1821 – 1902) "between animal and human medicine there are no dividing lines ------ nor should there be"

Why is one health

Julie Gerberding Director CDC during a news conference in 2004 was quoted as saying twelve out of the last thirteen human emerging infectious diseases I the world have arisen from animal's

sources. So what we really need to work on is the relationship between the human health surveillance system and the animal health surveillance systems. One very important point of intersection is the laboratories. We have to do more to share our laboratory capacities.

The focus of one health

When we focus on one health we can diminish the threat and minimize the national and global impact of diseases of animal origin including Zoonosis and those with pandemic potentials like H5N1 and H1N1. The strategic elements to follow should focus around the following:

a) Dealing with the root cause and drivers of infectious diseases particularly at the animal human ecosystem interface
b) Building robust and well governed public and animal health systems (WHO International Health Regulation)
c) We also need to build national and international emergency response agencies.
d) Promoting wide ranging collaboration across sectors and disciplines is also encourage
e) Developing targeted and national disease control programs through strategic research

10. THE NIGERIAN RESPONSE TO ONE HEALTH INITIATIVE

All stakeholders in the business of disease surveillance in this country agreed to the concept of one health as a viable alternative for this in other to improve the desired surveillance and response in the country. This was made possible due to the lesson learnt from the handling of the H5N1 epidemics in the country and later H1N1. The concept emphasized the need for collaboration of all the necessary stakeholders for an improvement on the way and manner the surveillance and response are being organized in the country.

NFELTP was conceived
How it all stated in Nigeria

The first meeting on the proposed NFELTP was held in January 2007, between CDC and FMOH. In march, 2007, a team of experts came from CDC Atlanta, CDC South Africa, CDC Zimbabwe and CDC Nigeria for an assessment visit. They paid a courtesy call to Hon. Minister of State for health and Conducted stakeholders workshop (FMOH, FMARD, NIMR, SMOH, Universities, NUC, NAVRC Enugu, NTBLTC –Zaria, CDC on 12th and 13th March, 2007. The steering committee for the NFELTP was inaugurated by Hon. Minister of Health on the 14th March, 2007.

First multi-sectoral steering committee launched by the Honourable Minister of Health in March 2007

NFELTP is a service oriented, completely based training program. It is a two year full time training in applied epidemiology. Veterinary epidemiology and Laboratory, epidemiology and Management. It puts a lot of emphasis on Service. The Field epidemiology Component is similar to other Field Epidemiology Training programmes that are modeled after the Epidemic Intelligence Service (EIS) programme of the United States Centre for Disease Control (CDC) in Atlanta. The laboratory component is based on CDC's emerging infections programme. The Nigerian

programme is the first to introduce the Veterinary Component. The NFELTP is tailored to strengthen public health capacity in accordance with the Nigerian's culture, national priorities, establishing relationships as well as the existing public health infrastructures.

The primary objectives of NFELTP are as follows:

- Training leaders in applied epidemiology and public health laboratory practice. The emphasis is on problem solving issues of public health concern.
- Proving epidemiologic services to the federal, state and local government health authorities in Nigeria.

Other secondary objectives include:

- Strengthening capacity to respond to public health emergencies such as outbreaks, epidemics, natural disasters and emerging infectious disease.
- Strengthening public health and veterinary surveillance system.
- Strengthening laboratory participation in surveillance and field investigations.
- Strengthening the linkage between public health and veterinary epidemiology.
- Conducting research activities on priority public health problem.
- Improving communications and networking within the Nigeria and throughout the region.
- Strengthening affiliations with the international organization such as the TEPHINET and AFENET as well as other FELTP.

Vision of the Programme

To become a lead training programme for improving the health of the people of Nigeria and beyond by addressing Nigerians public health needs and priorities through training and service provision in applied epidemiology and laboratory management.

Mission of the Programme

To assist the Federal Ministry of Health and the Federal Ministry of Agriculture in building a sustainable network of highly skilled field epidemiologist, Veterinarians and laboratory managers who are measurably improving public health services through:

- Strengthening Nigerians public health capacity by developing a cadre of health professionals with advance skills in applied epidemiology and laboratory management.
- Contributing effectively to research activities on priority public health problem.
- Improving Nigeria's national and regional capacity to respond to public health emergencies such as disease outbreak, natural disasters and other unusual public health event including those that could be the results of chemical or biological terrorism.
- Boosting Nigeria's national disease and veterinary surveillance system.

Implementing Partners for the Programme

These include the following:

- (FMOH) – Federal Ministry of Health
- (FMOA) - Federal Ministry of Agriculture
- Ahmadu Bello university (ABU)
- University of Ibadan (UI)
- Nigerian Centre for Disease Control (NCDC)
- United State Centres for Disease Control and Prevention in Atlanta
- African Field Epidemiology Network (AFENET)
- World Health Organisation (WHO)

Governance Structure

There is a steering committee that oversees the implementation of the NFELTP programme in the country where all the partners are represented. There is a director and resident Advisor that see the day to day running of the programme in the Federal Ministry of Health. There are also focal desk in all the partner organisations that help run the programme affectively.

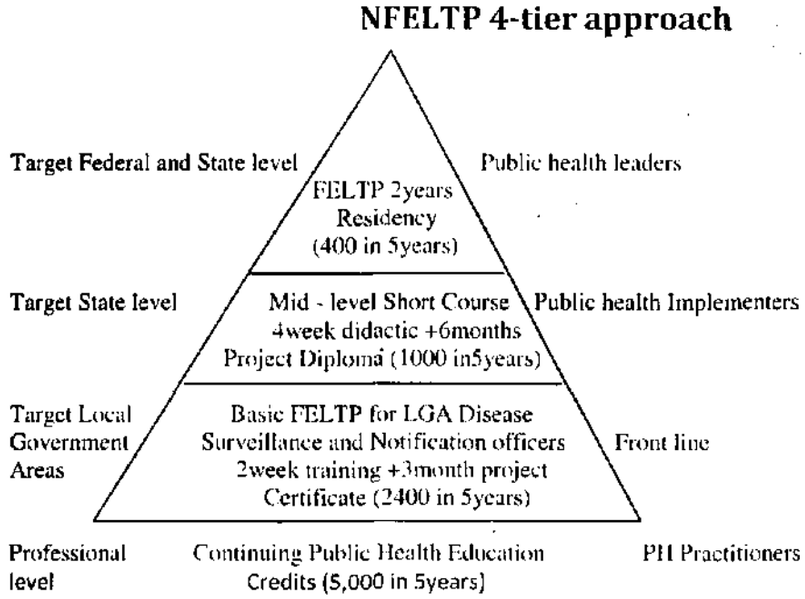


Figure 1:

11. THE ROLE OF TERTIARY INSTITUTIONS

Under FELTP arrangement universities are supposed to be centers for Human capital development of the critical mass of professionals to fight against the epidemics. To this effect ABU and UI were selected for this task. To achieve this objective the universities embarked on purposeful actions that span through following.

(a) Curriculum development

The curriculum of NFELTP programme was developed through series of activities that started with the review of the E.I.S curriculum, working with the FMOH to get the priorities of government and the various NUC requirements. All these were synchronized to come up with a befitting curriculum that prescribe 25% class room activities that include teaching and 75% field placement to ensure skill acquisitions and utilization of knowledge already acquired during the class room activities.

(b) Teaching and Supervision

The teaching of the curriculum of NFELTP are being done by the faculty from the University as well as faculty from university of Ibadan and we also get guest lecturers from the FMOH, FMARD as well as technical support from experts from CDC and AFENET. In addition to these teachings, the faculty also embarks on field supervision of students in their various field site quarterly.

Accreditation of Field Sites

All the field training sites are usually accredited by the university and the FMOH and
FAMARD to ensure that all students are exposed to the critical deliverables requirements for solving problem.

Admission of the Candidate

All candidates for the programme are expected to purchase the admission forms from the University post graduate school and also sit for the screening examination and interview. The selection is usually done by a special selection committee.

12. THE SUCCESSES RECORDED

(a) Capacity Building

NFELTP trainees and graduates 2008 – 2014

NFELTP main goal is to build applied epidemiology capacity as well as public health leaders and implementers across all the states in the country. The program's long course is modeled after the CDC Epidemic Intelligence Service (EIS) program, which is a 2 year training program responsible for public health workforce development in the US public health system.

NFELTP's 2 year long course component leads to a Masters in Public Health (Field Epidemiology) from 2 leading Universities (Ahmadu Bello University and University of Ibadan). We also run a 6 month (1 month didactic and 5 month field project) and a 3 month (2 weeks didactic and 3 month field project) short courses.

1. Long course admissions and graduations (2008 – 2014)
(2 year Masters in Public Health in field epidemiology)

Year of admission	Year of completion	Number Admitted	Number Graduated	Comments
2008	2010	13	13	Inaugural cohort
2009	2012	13	12	Death of one resident, delayed completion due to university strike
2011	2014	39	35	Delay in admission due to funding delay, delay in completion due to university strike. Three residents dropped out as a result of medical or personal challenges
2012	2014	40		Expected to complete in June 2014
2013	2015	49		Expected to complete in 2015
2014	2016	53		Expected to complete in 2016
Total		**207**	**60**	

2. Short course 6 month course on Professional HIV/AIDs Program Management Short Course through an EFMC

Year of admission	Year of completion	Number Admitted	Number Graduated	Comments
April 2013	**September 2013**	**47**	**44**	**Trained on HIV/AIDs epidemiology, surveillance, program management, monitoring and evaluation. Conducted 2 competency-based field projects**

3. Short courses – 3 month – assorted

Type of short course	Month/Year	Persons trained	Venue	Comments
HIV competency-based Monitoring and evaluation	July-October 2012	75	Abuja	Competency based monitoring and evaluation of programs with emphasis on HIV. Course done through EFMC
Outbreak investigation	November 2011	40	Ibadan	State RRT trained on outbreak investigation – funded by FMOH
Outbreak investigation	September 2011	35	Minna	State RRT trained on outbreak investigation – funded by FMOH
Outbreak investigation	June 2011	33	Kaduna	State RRT trained on outbreak investigation – funded by FMOH
Basic epidemiology course and health leadership and management	January 2011	87	Sokoto	Equipping frontline health care workers with basic epidemiology and health leadership and management skills in northern Nigeria – funded by US Department of Health & Human Services– Health Diplomacy
Zoonoses outbreak and surveillance Short course	September 2010	32	Vom	Zoonoses surveillance and outbreak – USAID funded
Outbreak and surveillance	July – October 2008	35	Minna	State epidemiologists training on outbreak investigation and surveillance with emphasis on vaccine preventable diseases
HIV/TB collaboration (2 courses)	2007/08	66	Zaria, Sokoto	HIV/TB epidemiology and collaboration, data analysis
Outbreak and surveillance (2 courses)	2007/8	70	Enugu Lagos	Emphasis on surveillance and outbreak investigation on influenza and vaccine preventable diseases-supported by GID and USAID

Total of 517 on 3 month short courses on HIV/TB collaborations, zoonoses, outbreak investigation and surveillance

NFELTP residents by Zone 2008-2014 (207)

Zone	Number	PER 1 MILLION POPULATION	% COVERAGE***
North West	42	[illegible]	23%
North Central	44	1.83	36%
South West	40	1.21	24%
North East	31	1.41	28%
South East	32	1.78	36%
South South	18	0.90	18%
Total	**207**	**1.34**	**27%**

***Recommendation = 5 epidemiologist per 1 million population

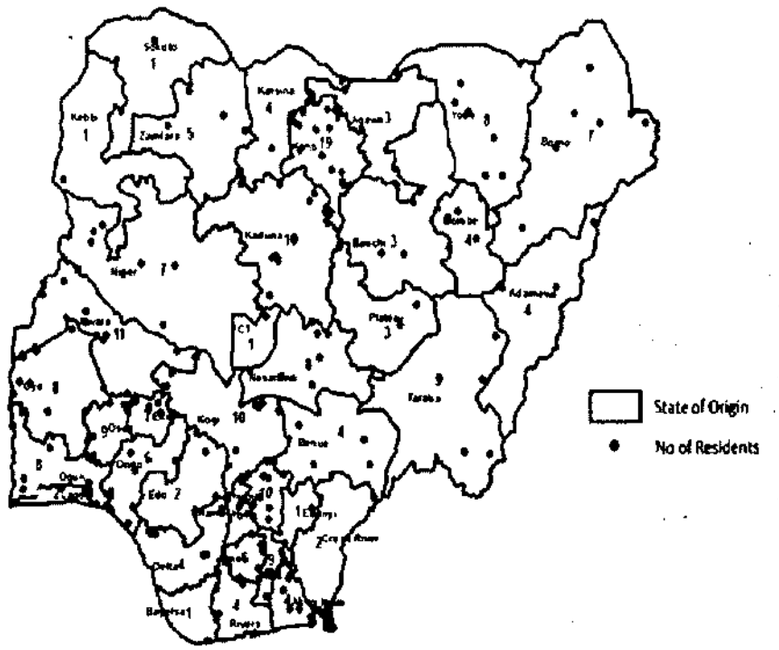
Cohort 6 selection

Univ	Med	Vet	Lab	Total
UI	16	3	6	25
ABU	18	3	8	29
Total	34	6	14	54

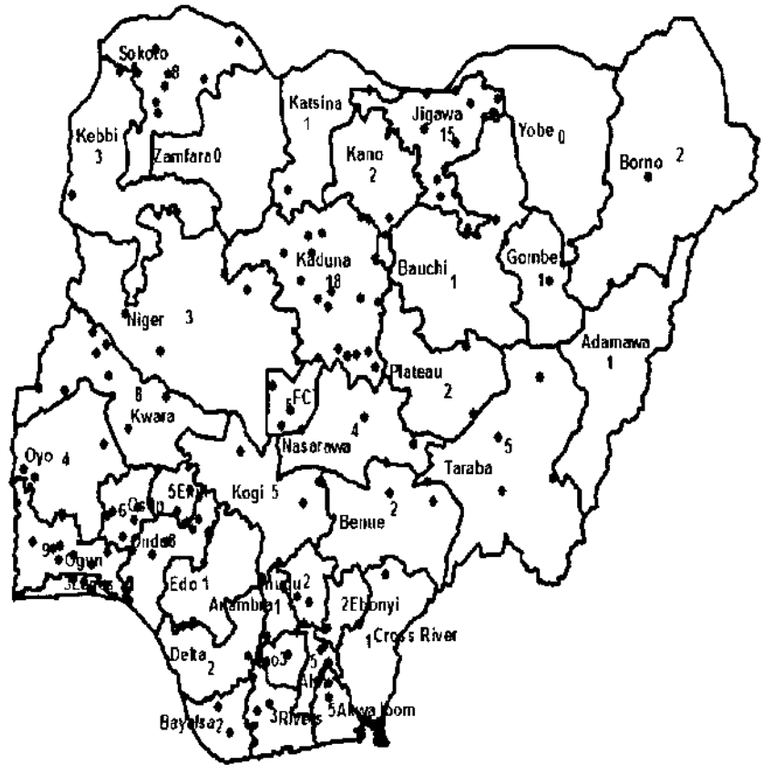
- **300 applied**
- **160 shortlisted**
- **140 interviewed**
- **54 selected**
- **13(24%) females**
- **From 25 states**

Analysis By State of Origin (N=207)

ALL States have at least 1 resident



Analysis by Place of Work: State Level (N= 148) 35 States have at least 1 resident


Sokoto
Katsina
1
Jigawa
15
Yobe 0
Kebbi
3
Zamfara 0
Kano
2
Borno 2
Kaduna
18
Bauchi 1
Gombe
1
Niger 3
Adamawa
1
Plateau
2
FC
Kwara
Nasarawa
4
Taraba
Oyo 4
Kogi 5
Benue
2
Ogun
Edo 1
Anambra 1
2Ebonyi
Cross River
Delta 2
Bayelsa 2
3Rivers
5Akwa Ibom

Analysis by place of work – Federal Level (N=59)

Place of Work	Residents
FMOH	40
FMARD	7
NVRI	6
ABU	2
UI	1
Nigeria customs	1
NPHCDA	2

Number of Residents by University

Cohort	Ahmadu Bello	University of Ibadan	Total
1 - 2008	10	3	13
2 - 2009	13	0	13
3 - 2010	30	9	39
4 - 2011	31	9	40
5 - 2012	30	19	49
6-2013	28	25	53
Total	**142 (69%)**	**65 (31%)**	**207**

Number of Residents 2008 - 2014

Cohort - Year of admission	Medical	Veterinary	Laboratory	Total
1 - 2008	6	4	3	13
2 - 2009	6	4	3	13
3 - 2010	17	13	9	39
4 - 2011	24	2	14	40
5 - 2012	33	4	12	49
6-2013	34	6	13	53
Total	120 (58%)	33 (16%)	54 (26%)	207

First Cohort completion

Third cohort NFELTP

(a) Surveillance System:

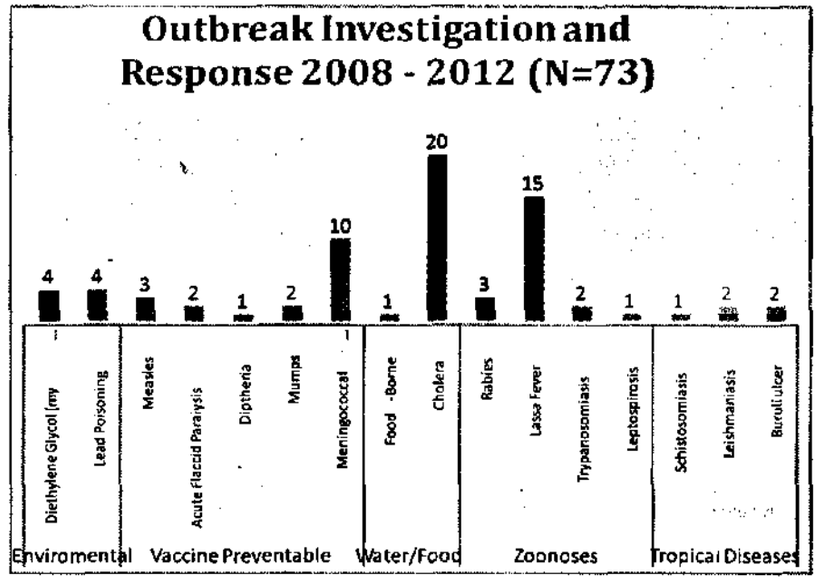
1. Integrated Disease Surveillance and Responses
   - ❖ Capacity building
   - ❖ Data analysis and feedback
   - ❖ Evaluation
   - ❖ Malaria
2. Animal Disease Surveillance System.
   - o Evaluation
   - o Rabies
   - o Live bird Markets
3. Human Immune Deficiency Virus (HIV)
   - ✓ ANC Sentinel surveillance
   - ✓ Integrated Biological and Behavioural survey
   - ✓ Most at Risk populations (Men who have sex with Men) (MSM)
   - ✓ PMTCT.

(c) One health Activities

1. Collaboration between human, animal and environment. (Epidemiological triangle). NFELTP is a collaboration initiative.
2. Rabies
    - Dogs bite victim description
    - PEP completion studies
    - Investigations, canine vaccinations in Cross River State
3. Food safety
4. Brucellosis – document gaps in abattoir diagnosis
5. Animal Human Interface – Bat studies

(d) Polio Activities

1. Creation of National Stop transmission of Polio (NSTOP) to build capacity and offer service.
2. Identification of under scored population.
3. Micro-planning for campaign in the high risk states/ LGA.
4. Strengthening surveillance.
5. Outbreak investigations for polio and other vaccines preventable diseases.
6. Data management and technical support for State operations Centres particularly with inter-campaign dash board monitoring.
7. Operational research
    - Evaluation of cold chain (Forward and Reverse)
    - Characterization of Chronically IPD missed children



Response to Public Health Emergencies

- Acute Renal failure outbreak
  - Identification of contaminant
  - Refining public health messages
- Cerebrospinal meningitis
  - Enhanced surveillance
  - Micro planning – vaccination
- Cholera outbreaks
  - Identification of risk factors for transmission
  - Cross border control activities
  - Cholera preparedness – Niger, Adamawa, oyo
- Rabies
  - Better collaboration between human and animal health sectors in surveillance and response
- Leptospirosis
  - Risk Factors
- Lassa fever - nosocomial spread, KAP, impact on ART
- Lead poisoning outbreak – Environmental, Risk factors, Magnitude/prevalence, characterize in animal tissue

Table: Protocol Based Research Studies Conducted by First 2 cohorts (n=26)

Type	Number	Details
Vaccination assessment	2	Coverage , Chronically missed
Measles	1	Risk Factors
Surveillance (Animal, Human, Lab)	4	Assessment , performance, QSE
Cholera	1	Risk Factors
Malaria	2	Treatment access, RDT Validity
Road Traffic Injuries	1	Characterization (Motor Cycles)
Hepatitis	1	Prevalence in ANC setting
Brucellosis	3	Abattoirs, Febrile illnesses
HIV	2	PMCT , Disclosure
Schistosomiasis	1	Prevalence and co-morbidity
Influenza	1	Prevalence and characterization
Rabies	1	Food safety
Human African Typanosomiasis	1	Prevalence
Tick-Borne Relapsing Fever	1	In human, ticks and animals
Tuberculosis	4	Bovine, Treatment outcomes, treatment access, sputum conversion
Total	**26**	

Assessments

- Seatbelt use assessment in Abuja
  - Usage rate 68%
  - Lower ; commercial, outside city centre, weekend
- Strengthening various surveillance systems
  - Evaluations
  - Data analysis
- Laboratory assessment for epidemic preparedness

Recent Field Deployments

- November 2012
  - Supporting creation of flood disaster EWARN, EOC, Anambra gastroenteritis among IDP
  - HIV – DQA/SQA, ART outcome evaluation
  - Support to IPD, Routine Immunization assessment ,
- October 2012

  - Rabies outbreak in cross rivers, Lassa fever Oyo, Lagos, Plateau
- August 2012
  - Nomadic outreach , IPDs , HIV protocol development
- July 2012
  - Cholera surveillance and preparedness assessment – 2 states
- June 2012
  - 14 residents involved in Immunization Plus Day preparations in 7 states
- Micro-plans improvement – reaching nomadic communities
- June 2012
  - Measles outbreak in Sokoto state
- May 2012
  - Suspected HAT in Kaduna state
- May 2012
  - Lead poisoning cluster survey Zamfara state
- March 2012
  - Lassa fever outbreak in Taraba state
  - Assessment of infection control practices – nosocomial spread
  - Impact of Lassa fever on HIV program
- Jan- February 2012 - Lassa fever outbreaks – Ebonyi, Nasarawa , Rivers , Lagos,

Other achievements

- Support to other programs
  - Cameroun, S/Leone, B/Faso, Rwanda ,South Caucasus, one health fellowship /EPT
- International conferences
  - AFENET – Addis Ababa – won 1st and 2nd best oral poster presentations
  - TEPHINET Conference – 7 posters , 8 orals – Jordan
  - ICID – Bangkok Thailand (1 poster)
  - 61st EIS 2012 – Atlanta USA (1 oral , 1 poster) – best oral presenter
  - EPISON conference – Calabar , Nigeria – 5 orals , 8 poster

- 5th AFENET – Dar es salaam Tanzania (8 orals , 5 poster) – best outbreak investigation
- ESCAIDE – 2011 – 1 oral
- ASTMH – 1 poster
- ISID – NTD – Boston USA – 1 oral , 3 posters
- IMED – February 2011 – Vienna Austria (3 posters)
- TEPHINET Global December 2010– Cape Town , South Africa(4 orals ,5 posters)
  Won 3rd prizes for both oral and poster
- ESCAIDE November 2010 –Lisbon Portugal (2 orals , 4 posters)
- EIS April 2010 – Atlanta USA(1 oral)
- ICID March 2010 – Miami USA (1 poster)
- NID October 2010 (3 orals , 4 posters)
- ICEID conference – Atlanta USA(1 oral , 3 poster)
- HIV national conference May 2010 – Abuja (1 poster)
- EIS April 2009 – Atlanta USA (1 poster)
- AFENET/TEPHINET; Mombasa September 2009(6 orals ,11 posters) ;
  3rd best oral
  - Institutionalization within the ministries; collaborations
  - Recognition by Global Outbreak Alert & Response Network(GOARN)

(e) <u>Publications</u>

Over 40 publications in peer review journals.

1. O Biya, S.Gidado, S.Haladu, P Nguku, J Durant, LB Davis, MJ Brown, A Neri, C Dooyema; Notes From the Field :Outbreak of Acute Lead Poisoning Among Children Aged <5years -----Zamfara , Nigeria ,2010; MMWR
2. A Abubukar, E Awosanya, O Badaru, S Haladu, P Nguku, P Edwards, R Noe, M Teran-Maciver, A Wolkin, L Lewis, M Nguyen; Fatal Poisoning Among Young Children from Diethylene Glycol-Contaminated Acetaminophen --- Nigeria, 2008—2009. MMWR , 2009 / 58(48);1345-1347
3. Nykonia Preacely , Oladayo Biya , Saheed Gidado, Halima Ayanleke, Mohammed Kida, Moses Akhimien , Aisha Abubakar, Ibrahim Kurmi, Ikeoluwapo Ajayi, Patrick

Nguku, Henry Akpan ; Hospital – Based Mortality in Federal Capital Territory Hospitals . 2005 – 2008. Pan African Medical Journal 11, 66, 11/04/2012

4. Aworh, M.K., Nwosuh C., Ajumobi, O.O., Okewole, P.A., Okolocha, E.C., Akanbi B.O., Nguku P. ; A Retrospective study of rabies cases reported at Vom Christian Hospital, Plateau State, Nigeria, 2006 – 2010. Nigerian Veterinary Journal 32 Vol 4
5. Pius Stephen Ekong, Raymond Juryit , Ndahi Mwapu Dika , Patrick Nguku, Monica Musenero ; Prevalence and risk factors for zoonotic helminth infection among humans and animals – Jos , Nigeria 2005 – 2009 . Pan African Medical Journal 12.6.12/05/2012
6. Sabitu K, Nguku P, Akpan H; Field Epidemiology Training in Nigeria: a novel approach to building sustainable epidemiological capacity to strengthen public health systems. Nigerian Journal of Epidemiology Vol.1 No.1 June 2011
7. Peter Nsubuga, Kenneth Johnson , Christopher Tetteh , Joseph Oundo , Andrew Weathers , James Vaughan , Suzanne Elbon , Mufuta Tshimanga , Faustine Ndugulile, Chima Ohuabunwo, Michele Evering-Watley, Fausta Mosha, Obinna Oleribe, Patrick Nguku, Lora Davis, Nykiconia Preacely, Richard Luce, Simon Antara, Hiari Imara, Yassa Ndjakani, Timothy Doyle, Yescenia Espinosa, Ditu Kazambu, Dieula Delissaint, John Ngulefac, Kariuki Njenga ; Field Epidemiology and Laboratory Training Programs in sub-Saharan Africa from 2004 to 2010: need, the process, and prospects. Pan African Medical Journal. 2011; 10:24
8. Carrie A. Dooyema, Antonio Neri, Yi-Chun Lo, James Durant, Paul I. Dargan, Todd Swarthout, Oladayo Biya, Saheed O. Gidado, Suleiman Haladu, Nasir Sani-Gwarzo, Patrick M. Nguku, Henry Akpan, Sa'ad Idris, Abdullahi M. Bashir, Mary Jean Brown ; Outbreak of fatal childhood lead poisoning related to artisanal gold mining in Northwestern Nigeria , 2010. Environmental Health Perspectives , Volume 120 / Number 4 / April 2012
9. Abubakar A, Sambo MN, Idris SH. Antenatal Care Services in a Rural Community in North Western Nigeria: The Wide Gap between Knowledge and Use of Maternal Health Services. Nigerian Journal of Maternal and Child Health 2009; 3 (1):32-39
10. Abubakar AA, Idris SH, Sabitu K, Shehu AU,Sambo MN. Emergency preparedness & the capability to identify

outbreaks: A case study of Sabon Gari Local Government Area, Kaduna state. *Annals of Nigerian Medicine January-June 2011; 4(1):21-27*

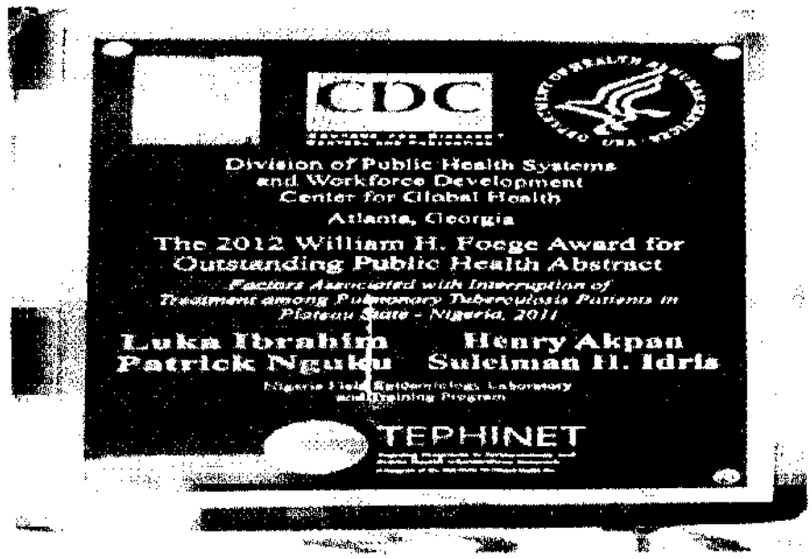
CDC Global Director's Visit
12th – 15th June 2010



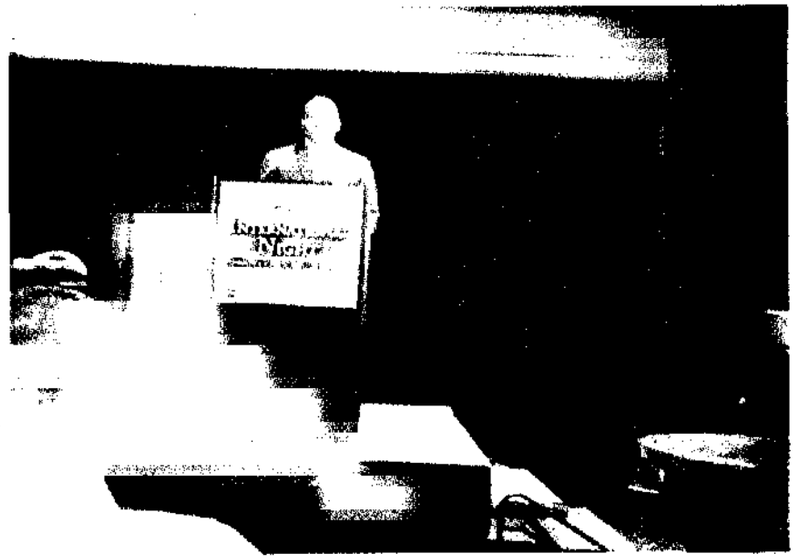

Where else can FELTP take you?


Cultural Night

AFENET
Conference Mombasa, Kenya Sept 2009



- **Dr Luka Ibrahim first resident from Africa to win the prestigious William Foege Award 61st EIS Conference USA 18th April 2012**



(f) **Nigerian Centre for Disease Control**

This was established in 2010 with help of US CDC with Professor Abdusalami Nasidi M.D, Ph. D, OON as its founding Director. It usually co-ordinate the various health responses and intervention activities in the country. It also has the responsibilities to prevent and control health emergencies and outbreaks. The NFELTP has since been incorporated in this NCDC.

13. CHALLENGES AND PROSPECTS

1. Getting a critical mass so as to reach all states and LGAs in the country as well as the Federal level.
   Maintaining quality of the training despite the grossing number of residents. Getting adequate number of mentors and supervisors to be attached to each and every resident is a big challenge at present.

Developing a Carcer pathway for the graduate of the NFELTP is also a very big challenge at present. Getting then

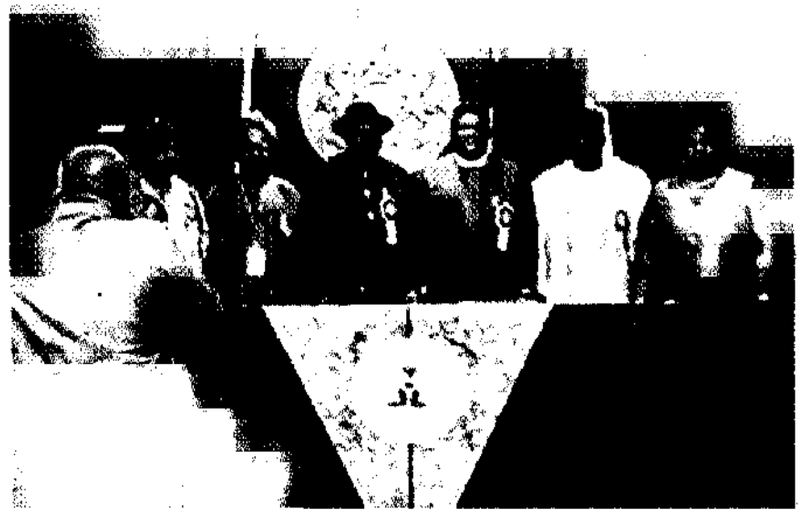
deployed back to their working positions and retaining them is also a big challenge.

3. Security Challenges particularly in the Northern Eastern Nigerian has made the recruitment and posting of NFELTP residents to the area a bit more difficult.
4. Funding and sustainability of the programme has been done mainly by donors especially the United States Centre for Disease Control (CDC) with some minimal funding from the Nigerian Government with the present global economic crisis most donors, have been reducing their funding, without the commensurate increases from the home government. This could be a great challenge to the sustenance of the programme in the country.
5. Long Strike Activities by members of the Academic Staff Union of the Universities (ASUU) leading to long delays in academic activities have been a great challenge to the continuous academic activities that this noble programme requires.

LESSON LEARNT

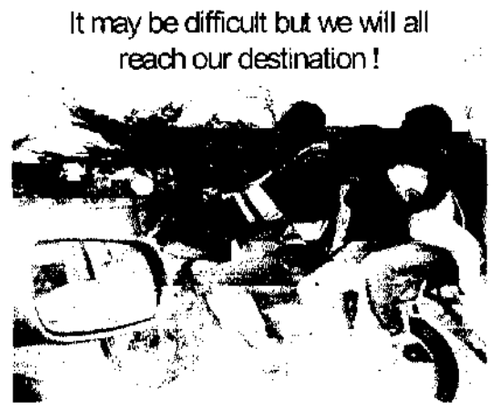
(1.) Partnership is critical for success.
(2.) Funding required – broad base
(3.) Clear planning is important.
(4.) Government leadership.
(5.) Networking is critical for success.
(6.) Career pathway, retention.
(7.) NELTP programmes should be aligned to national priority areas.

Mr. Vice Chancellor sir, please permit me before the conclusion of this presentation to present another story with the slides below. This story is a happy ending one. The three pictures are showing certification of Nigeria to be guinea worm free country. One of our resident of the program who is the Director of the Guinea worm eradication program in the FMOH is seen here accompanying the Minister of Health to receive the certificate from the President and Commander in Chief of the Federal Republic of Nigeria Mr Goodluck Ebelle Jonathan



12. CONCLUSION

The NFELTP programme has strengthened the public Health System in Nigeria through competency –based training and service provision. Some of the areas strengthened are the workforce, the systems, institutions as well as the culture of change that is induced. NTELTP programme has now become institutional and we are getting off the old ways.



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