48th Inaugural Lecture

Health in the Interest of the Public

by
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Vice Chancellor
Deputy Vice-Chancellors
Registrar
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Distinguished Guests
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Ladies and Gentlemen

PREAMBLE

I stand before this distinguished audience to deliver my Inaugural Lecture, the 48th in the Lagos State University.

I give praise and thanks to God Almighty who has been my strength, source, provider and helper. I quote from the book of First Corinthians 1:26-30 which says "Take a good look, friends, at who you were when you got called into this life. I don't see many of "the brightest and the best" among you, not many influential, not many from high-society families. Isn't it obvious that God deliberately chose men and women that the culture overlooks and exploits and abuses, chose these "nobodies" to expose the hollow pretensions of the "somebodies"? (The Message Version of the Holy Bible) That makes it quite clear that none of us can get by with blowing our own horn before God. Everything that we have - right thinking and right living, a clean slate and a fresh start – comes from God by way of Jesus Christ. That is why we have the saying, "if you are going to blow a horn, blow a trumpet for God. "[1] This is my story. I started from a very humble beginning and God has helped and has continued to help me.

An Inaugural lecture is an occasion of significance in the career of an academic staff in a university. It provides newly appointed professors with the opportunity to inform colleagues, the university community and the general public of their work to date, current research and future plans.[2] This Inaugural lecture affords me the opportunity to share my thoughts, experiences and contributions in public health – my area of specialisation as a physician. It is the fifth inaugural lecture from the College of Medicine and the second to be delivered by a serving Provost of the College.

Training and Work Experience

I graduated from the College of Medicine, University of Lagos as a doctor in 1988 (M.B;B.S.) and obtained a Master's Degree in Public Health (MPH) in 1992. I completed my Residency training in 1995, obtaining the Fellowship of the National Postgraduate Medical College of Nigeria (FMCPH), becoming a specialist in Public Health Medicine. My specializations are in clinical epidemiology, pharmaco-epidemiology and Immunization.

During the residency training, I was the best candidate and won the Faculty prizes at the Part I and II Examinations of the National Postgraduate Medical College of Nigeria. Residency in Public Health is a five-year programme. Nigeria is one of the few nations that provide clinical training to the highest levels for physicians in Public Health Medicine. It enables us produce doctors who specialize in epidemiology, health management, environmental health, occupational health, international health and reproductive health (as sub-specialties). Such specialists are prepared professionally and academically to the highest levels and can serve as programme managers, health administrators and university teachers in the Colleges of Medicine.

I became interested in Public Health in the final year of my undergraduate medical training due to the innovative way the Faculty of the Institute of Child

Health and Primary Care of the College of Medicine, University of Lagos presented the programme and the extensive field work in Pakoto, Ifo, Ogun State where we shuttled to and fro. The training convinced me that the best way to improve the health of Nigerians is the specialty of Public Health Medicine and that indeed the future of medicine is Public Health. I am very grateful to my teachers at that level and I make special mention of Dr (Mrs) Olayinka Abosede.

After my specialization, I worked as pioneer Medical Adviser for SmithKline Beecham (now GlaxoSmithKline) Anglophone West Africa and was responsible for developing the drug profile of the organization, building capacity for and conducting clinical trials in many university teaching hospitals in Nigeria.

I joined the Lagos State University College of Medicine (LASUCOM) as one of the pioneer staff in 1999 as a Lecturer I in the Department of Community Health and Primary Health Care and rose through the ranks to become a Professor of Community Health and Primary Health Care in 2008. I have served as an elected member of the Senate representing the University Congregation and as member of several Committees of the Academic Board of the College of Medicine. I have also served as Ag. Head of Department, Ag. Dean of the Faculty of Clinical Sciences, and currently the Provost of LASUCOM.

I have been an External Examiner to the University of Lagos at both the undergraduate and postgraduate levels and to the Obafemi Awolowo University, Ile-Ife at the post graduate level. I have been a resource person and examiner to the Faculty of Public Health of the National Postgraduate Medical College of Nigeria. I have published over 50 articles in both Nigerian and International peer-reviewed journals in my area of specialty. I have served as a reviewer for many peer-reviewed medical journals in different parts of the world.

I have also had the opportunity to work with the World Health Organization as a National Professional Officer for Integrated Disease Surveillance and

Response/Avian Influenza (IDSR/AI). In this position, I had the responsibility of implementing and strengthening disease surveillance for the country and of controlling the Avian influenza (Bird flu) pandemic. In addition, I have had the opportunity of establishing two public health services namely the Family Support Programme (Lagos State) Model Primary Health Care Centre in Mafowoku, Somolu Local Government Area (LGA), Lagos State established in 1997 and the Sabongidda-Ora Vaccination Project in, Sabongidda–Ora, Owan west LGA, Edo State established in 1998. These two projects particularly the second have defined my public health career, and a number of studies were conducted in that community.

I. Definitions and Concepts

Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.[3] This definition was given at the formation of the World Health Organization (WHO) in 1948 and has not been amended. Many judge their state of well-being by absence of symptoms such as headache, pain or fever whereas even if they were physically well, they may not be as well mentally or socially. It may be of interest to note that some illness e.g. hypertension at the initial stages have no symptoms. Therefore to judge one's state of health by the absence of apparent disease or infirmity may be fraught with grave danger.

The Ottawa Charter on health promotion argues that to reach a state of health, an individual or group must be able to identify and realise aspirations to satisfy needs and to change or cope with the environment. Health is therefore seen as a resource for everyday life, and not the objective of living. Health is a positive concept emphasizing social and personal resources as well as physical capacities.[4] Health is not produced primarily by health facilities or health workers. There are fundamental conditions and resources for health. These include peace, shelter, education, food water, a stable eco-system,

sustainable resources, social justice and equity.[4] Without these, aspirations for well being (health) cannot be achieved.

The Public may be defined as constituting a community, state or nation or a particular group of people with a common interest or aim.[5]

A simple approach to the topic of this Inaugural lecture may be that we are interested in the total well being (health) of community. However, public health in the sense of the health of the public has several dimensions. First, it may refer to the sum of the health of all individuals in the relevant group or population. Second, it may refer to the way that health is "distributed" in a population. Third, it may also refer to the underlying social and environmental conditions that might affect the health of each member of the public.[6]

A gold standard definition of Public Health is given by Winslow as follows:

> *Public Health is the science and the art of preventing disease, prolonging life, and promoting physical health and efficiency through organized community efforts for the sanitation of the environment, the control of community infections, the education of the individual on principles of personal hygiene, the organization of medical and nursing services for the early diagnosis and preventive treatment of disease, and the development of the social machinery which will ensure to every individual in the community a standard of living adequate for the maintenance of health*.[7]

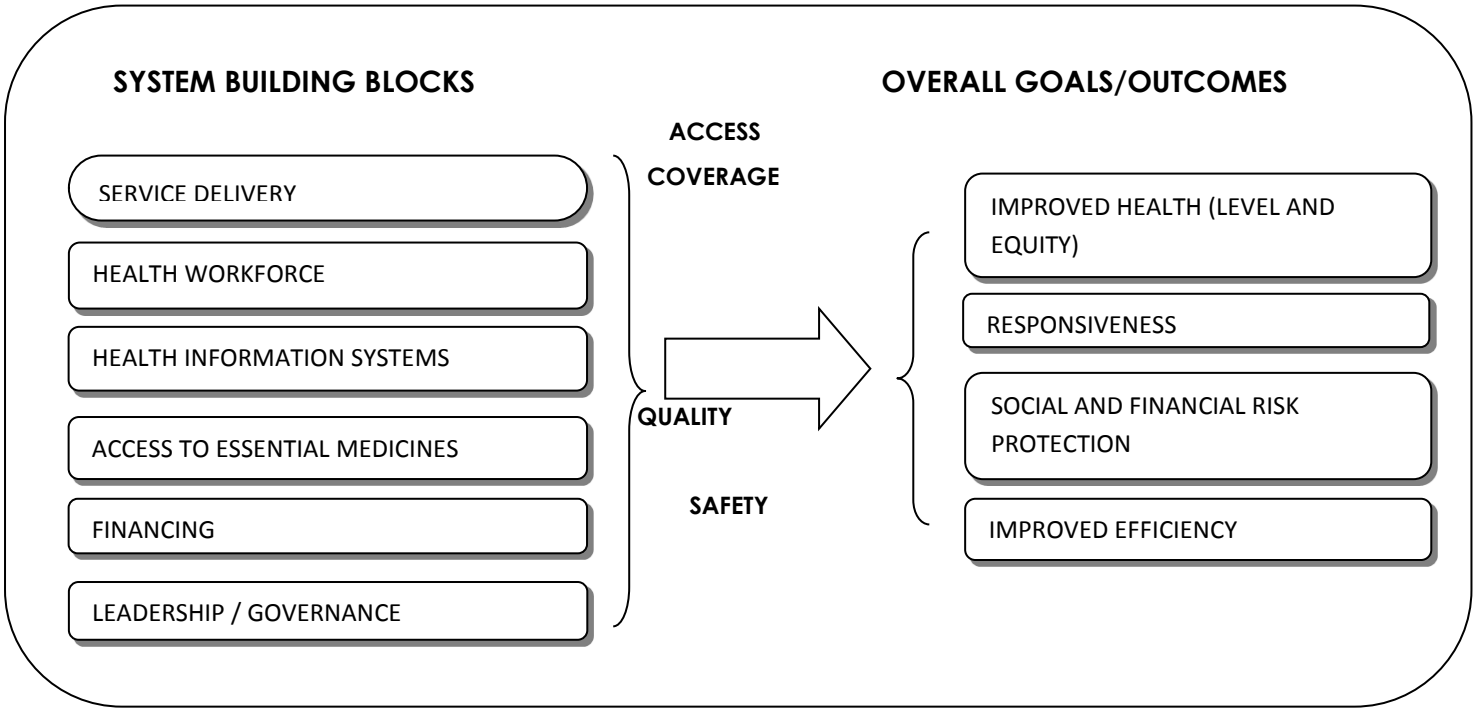
Winslow was forward-looking as it appears nearly all aspects of public health are included in the definition. The core areas of public health are disease prevention, health promotion, access to medical services, organization of services, the role and involvement of the community and an appropriate emphasis on the social environment or the social determinants of health.

Health System

A health system consists of all the organizations, institutions, resources and people whose primary purpose is to improve health. This includes efforts to influence determinants of health as well as more direct health improvement services. The health system delivers preventive, promotive, curative and rehabilitative interventions through a combination of public health actions and the pyramid of health care facilities that deliver personal health care by both state and non-state actors. The actions of the health system should be responsive and financially fair while treating people respectably.

The WHO framework describes health system in terms of six core components or building blocks, namely: health workforce, service delivery, access to essential medicines, financing, health information system and leadership/governance (see Figure 1).[8]

Figure 1. The WHO Health Systems Framework.[8]



THE SIX BUILDING BLOCKS OF A HEALTH SYSTEM: AIMS AND DESIRABLE ATTRIBUTES

The Public Health Approach

The application of public health to health care may be considered to consist of four steps:

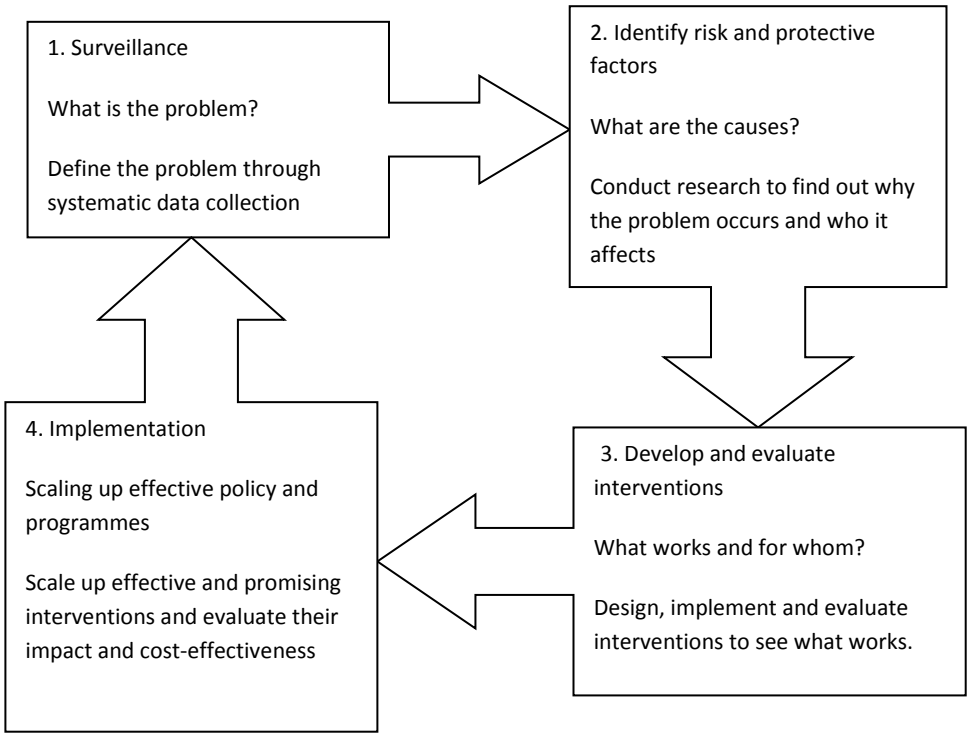
(a) To define the problem through systematic collection of information (surveillance).

(b) To identify the causes (risk and protective factors) using research

(c) To develop and evaluate interventions

(d) To implement effective interventions in a wide range of settings (see Figure 2).[9]

Figure 2. The steps of the public health approach.[9]



Prevention is one of the prime functions of public health. Prevention is not only better than cure, it is cheaper, wiser and more cost effective than cure. In Public Health, we utilize a three-layered (in five stages) model of prevention, namely primary, secondary and tertiary levels of prevention (see Table 1).

Table 1. Two Classifications of Preventive Medicine.[10]

Three Levels of Prevention	Five Stages of Prevention
Primary • Target population: entire population with special attention to health of individuals. • Objective: prevent onset of illness • Methods: education, Immunization, nutrition, sanitation, etc.	1 **General health promotion** • Target population: entire population with special attention to healthy individuals • Objective: prevent onset of illness • Methods: education, nutrition, sanitation, life style changes etc. **2. Specific Prophylaxis** • Target population: entire population with special attention to healthy individuals. • Objective: prevent onset of specific diseases • Methods: education, immunization, nutritional supplement (vitamin A, iodine), chemoprophylaxis (e.g. against malaria).
Secondary • Target population: sick individuals • Objective: early diagnosis and treatment to prevent further damage to the individual and in cases of infectious diseases, spread to the community. • Methods: screening of high risk groups e.g. Pap smears, sputum examination for TB; monitoring of vulnerable groups – children, pregnant women.	**3. Early Diagnosis and Treatment** • Target population: sick individuals • Objective: early diagnosis and treatment to prevent further damage to the individual and in cases of infectious diseases, spread to the community. • Methods: screening of high risk groups e.g. Pap smears, sputum examination for TB, blood test for HIV, monitoring of vulnerable groups – children, pregnant women.
Tertiary	**4 Limiting damage (limitation of disability)**

• Target population: sick patients • Objective: reduce damage from disease and restore function. • Method: clinical care and rehabilitation	• Target population: sick patients • Objective: limit damage from disease • Methods: skilled clinical care and social support to limit physical and social damage from the disease **5. Rehabilitation** • Target population: convalescent patients • Objective: restore function and capability • Methods: physical and social rehabilitation

Advantages of the Public Health Approach

The advantage of the public health approach may be seen in the selection of options to address three health problems in Nigeria; road traffic injury (RTI), vesico-vaginal fistula (VVF) and typhoid fever. The causes of RTI include bad roads, vehicular malfunction, drunk driving and excessive speeding. RTIs are a leading cause of morbidity and mortality in Nigeria. The RTI rate in Nigeria was 41/1000 population, mortality was 1.6/1000 with estimates that over 4 million people may be injured and 200,000 potentially killed.[11] On a cost effectiveness basis, which option is sustainable? Is it to train more orthopaedic surgeons and build more trauma hospitals or build and maintain good roads and implement driver education? The latter option is a primary prevention strategy.

VVF occurs commonly in northern Nigeria particularly in young girls, who skip womanhood, move from being girls to become mothers. When pregnant, on account of narrow pelvis may have prolonged labour which causes damage to the bladder and results in leakage of urine from the bladder to the Vagina. Nigeria has the highest prevalence of VVF in the world. About 400,000 – 800,000 women live with the problem and about 20,000 new cases occur annually with 90% being left untreated.[12]. We can and should train gynaecologists (VVF

specialists) but this needs about 6-8 years post M.B;B.S. to achieve. Should we not consider more favourably the option of increasing access to education for the majority of these girls? A 16 year old girl at the 100 level in the University is unlikely to be married, become pregnant or become an addition to the VVF statistics.

Typhoid fever is an infectious disease that is transmitted through contaminated food and water. It is curable with the use of antibiotics. Is it not much cheaper to provide safe potable water to all citizens and eliminate the disease than to allow people become ill, treat them with expensive antibiotics that may not always be affordable with some may have complications such as bleeding, perforation requiring surgery and death.

The strategies for tackling the above mentioned problems are not mutually exclusive but show the need to prioritise and select strategies that are in the best interest of the community and not the convenience of the state or the health system. The health system must become an advocate for the health of the public and the nation needs to realize that the health of the public is a key driver to its socio-economic development.

Questions about the Nigerian Health System

We must ask the following questions:

(a) After 50 years of .independence are the indices of health in Nigeria better than they were at independence although we have produced large numbers of health workers and multiplied health facilities (Tables 2-4)?
(b) Should the provision of health services be equated with better health?

Table 2. Selected Health Indicators for Nigeria and Other Countries[13]

Indicator	Nigeria	Ghana	South Africa	Afghanistan	USA
Life Expectancy at Birth (years)					
1990	48	60	63	44	75
2009	54	60	55	48	79
Infant Mortality Rate/1,000					
1990	126	77	47	140	9
2010	88	50	41	103	7
Maternal Mortality Rate/100,000 (2010)	630	350	300	460	21
Crude Death Rate/1,000 (2010)	39.9	31.5	21.2	43.6	13.9
Crude Birth Rate/1,000 (2009)	13.0	9.5	13.3	15.8	8.1
Treatment success for smear positive TB (%)	83	87	73	86	60
Total Health Expenditure as % of GDP (2009)	6.1	5.0	8.5	7.6	13.4
Per Capital Government expenditure on Health (US$) (2009)	48	43	407	5	3795
Physician Density/10,000	4.0	0.9	N/A	2.1	24.2
% of population with access to improved drinking water (2010)	58	86	91	50	99
% of population with Improved Sanitation (2010)	31	14	79	37	100

Table 3. Cause – Specific Mortality and Morbidity in Nigeria among children aged less than 5 years (2010) [13]

Indicator	Statistics	
Age-standardized mortality rate (ASM)	**Disease category**	**ASM/100,000**
	Communicable Diseases	832
	Non-Communicable Diseases	809
	Injuries	76
Leading causes of death	**Disease**	**% Contribution**
	Human immune-deficiency virus/Acquired immune-deficiency syndrome (HIVIV/AIDS)	4
	Diarrhoea	11
	Malaria	20
	Pneumonia	17
	Measles	1
Incidence rate of leading causes of morbidity	**Disease**	**Incidence/100,000**
	Malaria	36060
	Tuberculosis	133
	HIV/AIDS	217

Table 4. Number of some categories of Health Workers per 100,000 population in Nigeria (2006).[14]

Staff Type	Number of Staff	No. of Staff/100,000 population
Doctors	39,210	30
Nurses	124,629	100
Midwives	88796	68
Dentists	2,773	2
Pharmacists	12,072	11
Medical Lab. Scientists	12,860	12
Community Health Practitioners	117,568	19
Physiotherapists	769	0.62
Radiographers	519	0.42
Health Record Officers	820	0.66
Environmental Health Officers	3441	3
Dental Therapists	872	0.69

The indices showed we are worse than Ghana, and not far from Afghanistan, a country that has been in social upheaval for over 30 years. The leading causes of death in the country have remained the same in spite of the huge investment. There is also the double jeopardy of non-communicable diseases which are now as prevalent as communicable diseases.

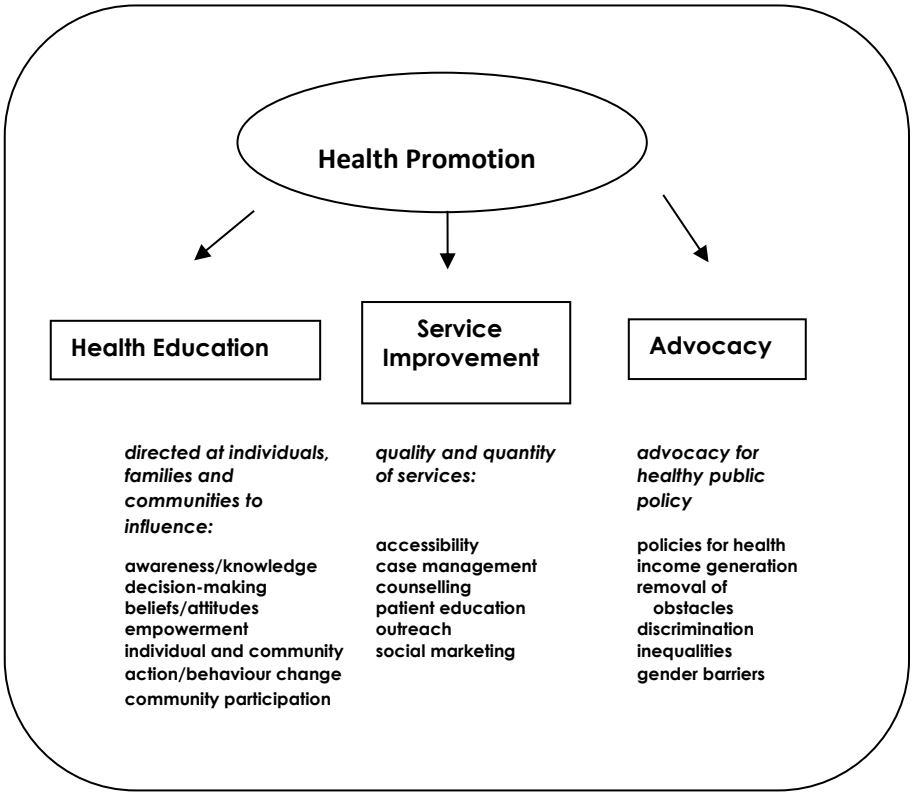
The answer to both questions is no. The health of the public can only improve if indeed all members of the public and the health system truly understand their roles in the promotion, prevention and restoration of the health of the public.

II. Promoting the Health of the Public

Health promotion was defined at the First International Conference on Health Promotion as "the process of enabling people to increase control over and to improve their health".[4] This definition was further improved upon at the Bangkok (4th) International Conference on Health Promotion. Health promotion is the process of enabling people to increase control over their health and its determinants, and thereby improve their health. It is a core function of public health and contributes to the work of treating communicable and non-communicable diseases and other threats to health.[14]

Three key strategies for successful health promotion are advocacy, mediation and enablement. Health promotion is a first level strategy of prevention. It is not the same as health education but includes the latter, service improvement and advocacy. This is clearly shown in the Nigerian National Health Promotion Policy (Figure 3).[15]

Figure 3. The Three Components of Health Promotion



In realization of the central role health promotion plays in improving the health of the public, the WHO has organized seven international conferences on health promotion starting from Ottawa, Canada (1986) to Nairobi, Kenya (2009).[16]

The Ottawa Conference brought to the fore, action areas for health promotion.[4]

(a) Build healthy public policy through the identification and removal of obstacles to the adoption of healthy policy.

(b) Create supportive environments by the protection and conservation of national resources and promoting living and working conditions that are safe, stimulating, satisfying and enjoyable.

(c) Strengthen community action by enhancement of self help and social support through access to information, learning opportunities and funding support.

(d) Develop personal skills of people to prepare for all stages of life and to cope with chronic illness through home, school, work and community setting.

(e) Reorient health services and facilitate changes in professional educational and training to move towards health promotion.

The areas for action from the seven conferences are presented on Table 5.

Table 5. Summary of key recommendations of International Conferences on Health Promotion

S/n	Venue/Year	Theme	Key Recommendations/Call for Action
1	Ottawa, Canada 17-21 November 1996.	The move towards a new public health.	• Build healthy public policy. • Create supportive environment. • Strengthen community action. • Develop personal skills. • Re-orient health services.
2	Adelaide, Australia 5-9 April 1988.	Healthy public policy.	• Supporting the health of women. • Food and nutrition. • Tobacco and alcohol. • Creating supportive environments.
3	Sundsvall Sweden 9-15 June 1991.	Supportive environment for health.	• Strengthening advocacy through community action. • Enabling communities and individuals. • Building alliances for health and supportive environment. • Mediating between conflicting interests.
4	Jakarta, Indonesia 21-25 July 1997.	New players for a new era-leading- health promotion into the 21st Century.	Formulation of a global alliance on health with priorities which include: • Raising awareness about the changing determinants of health. • Supporting the development of collaboration and network for health. • Mobilizing resources for health promotion.

			• Accumulating knowledge an best practices. • Enabling shared learning. • Promoting solidarity on action. • Fostering transparency and public accountability in health promotion.
5	Mexico City, Mexico 5-9 June 2000.	Health promotion: Bridging the equity gap.	• To position health promotion as a priority at all levels of government and internationally. • To lead in the implementation of necessary action to expand and promote partnership for health. • Support the preparation of country wide plans of action on health promotion.
6	Bangkok, Thailand 7-11 August 2005.	Health promotion in a globalised World.	Health promotion should be: • Central to the global development agenda. • A core responsibility for all levels of government. • A key focus of communities and civil society. • A requirement for good corporate practice.
7	Nairobi, Kenya 26-30 October 2009.	Promoting health and development: Closing the implementation gap.	• Community empowerment. • Health literacy and behavior. • Strengthening health systems. • Partnership and intersectoral action. • Building capacity for health promotion.

These conferences, especially the 6th and 7th, clearly highlight the role of the public (community) and the social determinants of health and disease. The social determinants are often the important risk factors and significantly alter disease outcomes. Health promotion is a major area the public can play a large role by making the right choices of what they eat, drink, life style and in the utilization of health services.

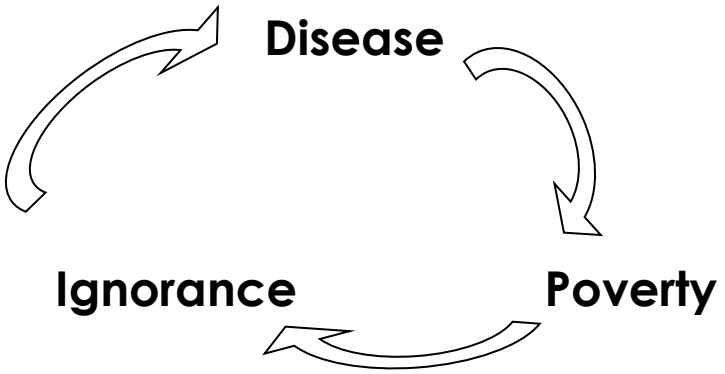
Social Determinants of Health

The environment of human beings is divided into three major components, the physical (abiotic), the biological (living component) and the social environment. The social environment consists of the culture, life style, social services, beliefs and attitudes and habits. These factors are the major social determinants of health and include the social gradient, early life, transport, food, addiction. Others are education, poverty and access to health services. It is known that life expectancy is shorter and most disease are more common lower down the social ladder in each society.[17] The social risk factors for cardiovascular disease as summarized by Oyediran include smoking, obesity, alcohol intake, poverty and physical inactivity. [18]

Education, Ignorance, Poverty and Disease

The role of Ignorance and poverty in the transmission of disease is well known. We may consider a woman in a rural part of Lagos with little or no formal education, whose six month old child has simple watery diarrhea (probably of viral origin). All the child needs is oral rehydration solution (ORS) as the disease is self limiting and the child will improve once dehydration is avoided. The action or inaction of the woman will alter the progress of the disease if she due to her limited level of knowledge (ignorance) is not aware of ORS but administers a native anti-diarrhoeal medicine; a number of things would happen. The native medicine is likely to be hypertonic and worsen the diarrhoea. In addition, its sterility is not assured, may contain bacteria which may cause super infection and sepsis in the child. Thus, a simple problem is complicated and the child may be brought to hospital in a poor state needing to have antibiotics and intravenous fluids for rehydration. The relationship between disease, ignorance and poverty is shown in Figure 4.

Figure 4. The Cycle of Ignorance, Poverty and Disease.[10]



The role of social factors is further seen in the proportion of births attended by skilled health personnel in Nigeria.[13] Sixty-five percent of births in urban places were delivered by skilled personnel compared to 28% in the rural areas. Among those in the highest wealth quintile, 86% were attended to by skilled personnel to 8% in the lowest quintile. The figure for those with secondary education was 77% compared to 12% among those with no formal education. Education was also found to influence uptake of immunization. The coverage for the third dose of diphtheria, pertussis, tetanus vaccine, (DPT_3) was 69% among those with secondary level of education and 11% in the uneducated group.

A large global study on maternal and perinatal health investigating the relationship between maternal education and mortality among women giving birth in health care institutions showed that women with no education had 2.7 times and those with between one and six years of education had twice the risk of maternal mortality of those with more than 12 years of education.[19] If we do not want our women to die at child birth, offer them at least secondary school education. It becomes imperative that a reduction in maternal mortality requires focused efforts in getting women to be well informed enough to access health services.

Education has an inverse relationship with stunting in children. Among uneducated mothers, 51% of children under-5 years were stunted compared

with 27% among those with secondary level of education.[13] A study by Sebanjo, Oshikoya, Odusanya and Njokanma reported that, 17% of children in Abeokuta were found to be stunted. Low maternal education (odds ratio of 2.4, 95% confidence 1.20-4.9, P=0.015) was the major contributing factor to stunting.[20]

The issues of addressing the social determinants could not be better emphasized than the United Nations Children's Fund (UNICEF) 2012 State of the World's Children Report for 2012 entitled "Children in an Urban World".[21] The call for action in that report indicated that we ensure that urban planning, infrastructure development, service delivery and broader efforts to reduce poverty and inequality meet the particular needs and priorities of children. Furthermore, concerted efforts must be made to pool the resources and energies of international, national, municipal and community actors in support of efforts to ensure that marginalized and impoverished children enjoy their full rights.

In the area of health promotion with other colleagues, I teach health promotion as part of the health education course in our Master of Public Health (MPH) programme. In addition, I have served on the Health Advisory Implementation Committee of the Lagos State. Ministry of Health and played a major role in establishing it. This Committee was a platform for health promotion and was involved in the forefront of health advocacy. It should be clear that health promotion like public health is multi-disciplinary. Many professionals such as sociologists, health economists, nutritionists, town planners, information and communication experts and behavioural change specialists have roles to play if the health of the public is to improve.

III. Protecting the Health of the Public

Specific promotion is the second strategy at the primary level of prevention. It consists of two components, chemoprophylaxis and immunization. Chemoprophylaxis is a useful strategy where drugs are administered to persons who are exposed to the risk of infection. It is an important strategy to prevent opportunistic infections in HIV-positive subjects. It is also used in children under six years who are contacts of sputum positive tuberculosis patients.

Immunization remains a potent strategy to eliminate childhood killer diseases. It is one of the most powerful and cost-effective of all health interventions. It prevents debilitating illness, disability and saves millions of lives every year. It has had one of the most important effects on mortality reduction. It is a major contributor to reducing deaths among children under five years old (Millennium Development Goal 4).[22] Vaccines prevent more than 2.5 million child deaths a year and over 100 million children are immunized every year before their first birthday.

Immunization may be passive or active, naturally or artificially acquired. The emphasis on a public health scale is artificially acquired active immunization where the vaccinee receives an antigen which stimulates the immune system leading to the production of antibodies which protect the subject from the disease. In any community we are in interested in the proportion of persons who are immunized and therefore sufficiently protected to serve as a barrier against disease outbreaks even though there may be some persons who are not vaccinated. This is referred to as herd immunity and needs to be as high as 90% for effective break in the transmission of diseases.

Immunization in Nigeria

The Nigerian National Programme on Immunization (NPI) programme commenced in 1984. The coverage at the beginning was 2.4% but by 1990 rose to 80%. [23] The coverage substantially fell for many years [23] but has kept increasing at least between 2005 and 2010 (Figure 5).[23]

The Nigerian NPI programme vaccines are Bacille Calmette Guerin (BCG), oral polio (OPV), diphtheria, pertussis, tetanus (DPT), measles, yellow fever and Hepatitis B (HB). When compared with other nations in Africa the vaccine coverage in Nigeria is lower than in Ghana but much lower than in the United States of America (Table 5).[22] A recent survey of immunization coverage in southwest Nigeria showed that only 32% of children had completed the immunization schedule. Determinants of complete immunization status included maternal age less than 30 years, completion of secondary school education and availability of immunization card at the first contact.[24]

Figure 5. Vaccination Coverage in Nigeria (2005-2010)[22]

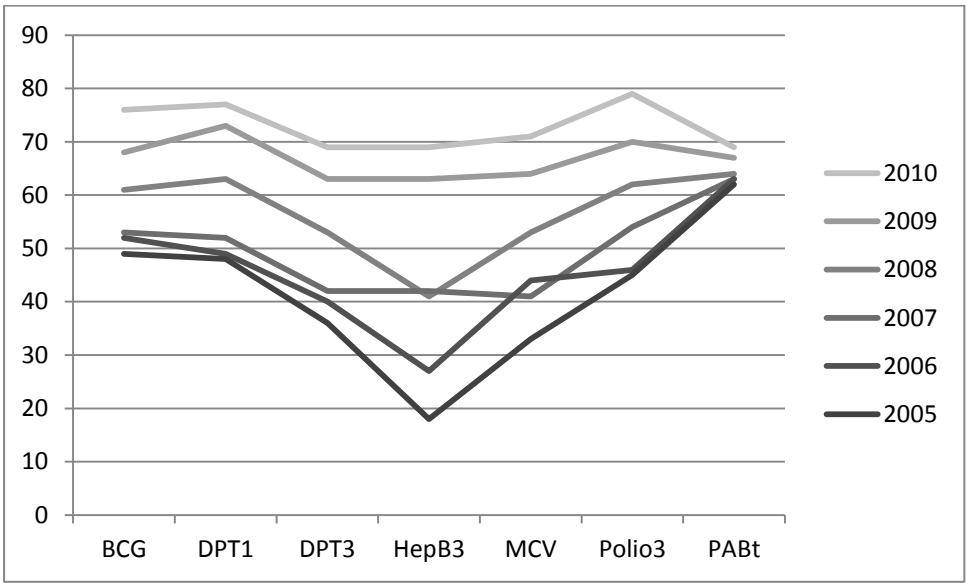
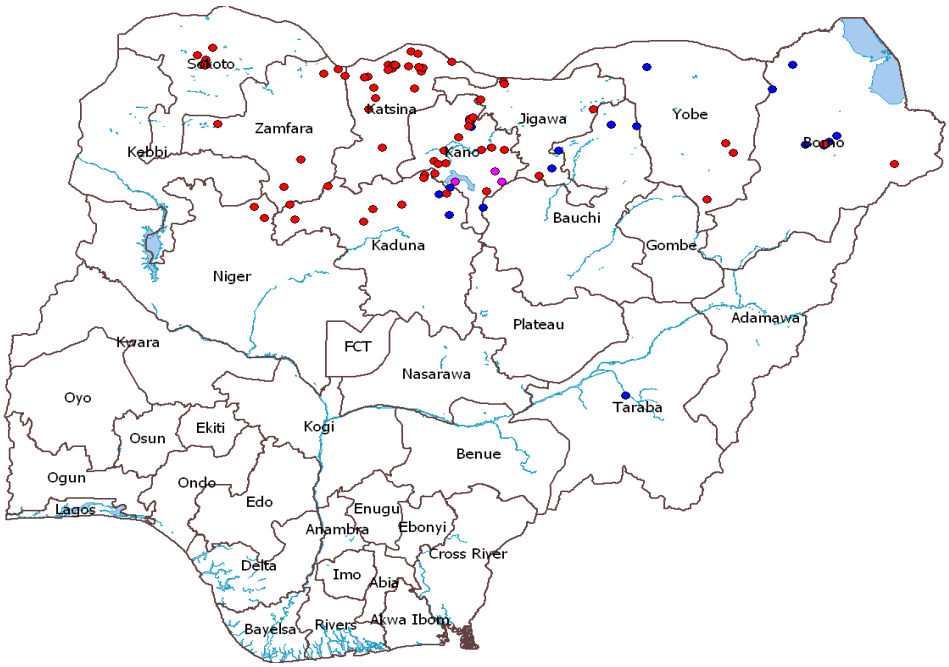


Table 5. Immunization Coverage in One year old Children in selected Countries.[22]

Vaccines	Nigeria	Ghana	South Africa	Afghanistan	USA
BCG	76	99	86	68	Not given
DPT_1	77	96	73	86	99
DPT_3	69	94	63	66	95
$Polio_3$	79	94	67	66	93
Measles	71	93	65	62	92
$HepB_3$	66	94	56	66	92
Hib_3	Not given	94	45	66	93
Proportion of new born at birth protected against tetanus	69	86	77	79	Not given

The progress made in Nigeria has a dark spot: that of continuous transmission of poliomyelitis. The beginnings of the rejection of polio vaccine and of its unintended consequences are well known to health workers such that Nigeria exported the polio virus to several parts of Africa and the rest of the world. In 2012, Afghanistan, Nigeria and Pakistan are the only countries that remain endemic for poliomyelitis. Nigeria is the only country that is endemic for types I and III strains of the wild polio virus (WPV). As at September 2012, Nigeria had recorded 84 cases of wild polio in 11 states (all in the north, Figure 6) accounting for 94% of the polio burden in the African region of WHO.[25]

Figure 6. Nigeria Polio cases as at September 21, 2012.[25]



W1 (n=71)

W3 (n=17)

cVDPV2 (n=3)

The age analysis of the poliomyelitis cases shows that 74% were less than three years and over half received less than three doses of the oral polio vaccine and were susceptible to the infection (Figures 7 and 8, data from WHO Nigeria). The cooperation of all is needed if Nigeria is to become polio-free. This may be the time to focus on sanitary disposal of faeces as an additional control measure. If more sanitary facilities were to be provided, could this intervention persuade more communities to accept the vaccine?

Figure 7. Age group of WPV cases Jan-Sep 2012 as at Week 38

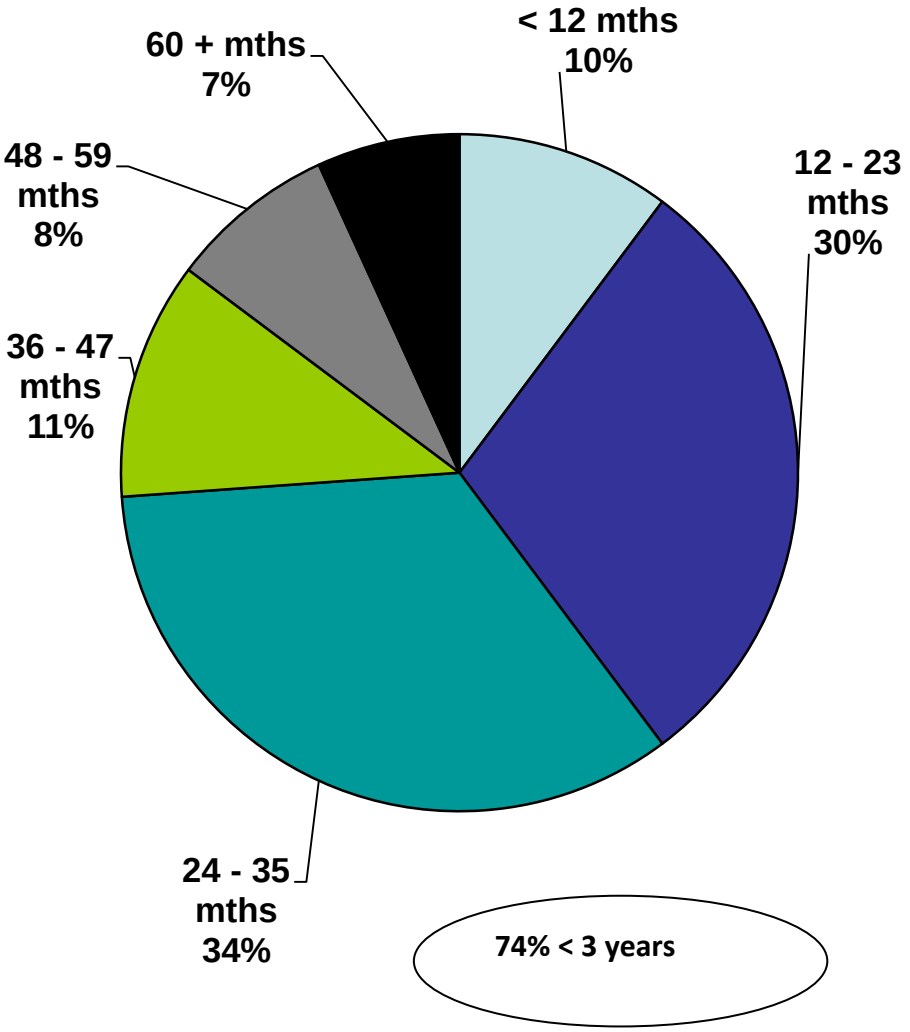
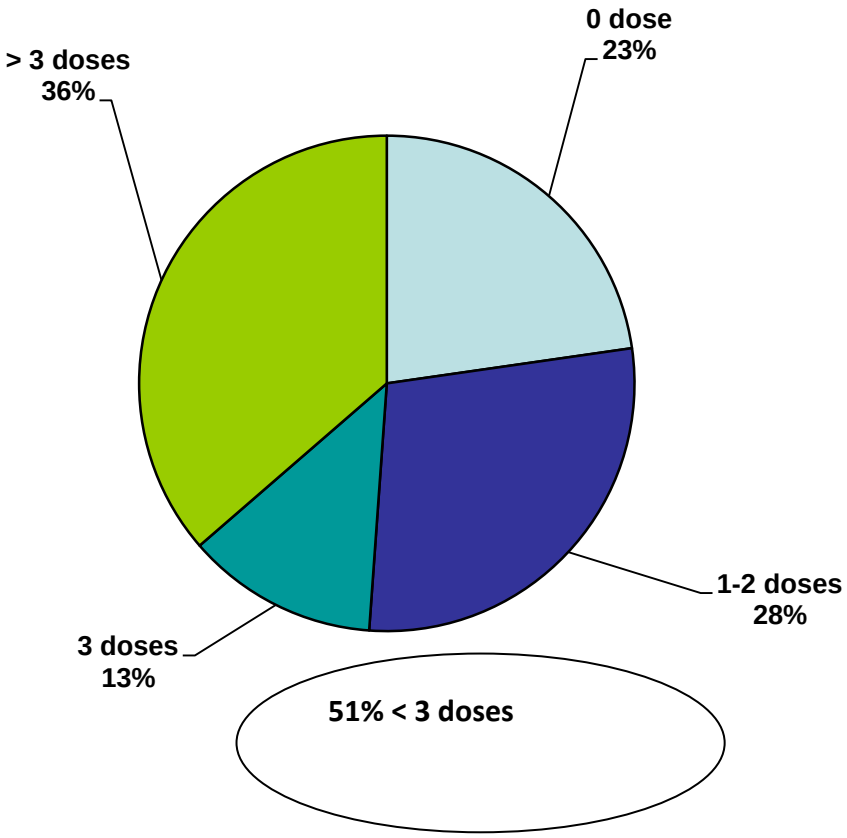


Figure 8. OPV status of WPV cases Jan-Sept 2012 as at Week 38.



My Contributions to Immunization

Sabonggida-Ora Vaccination Project

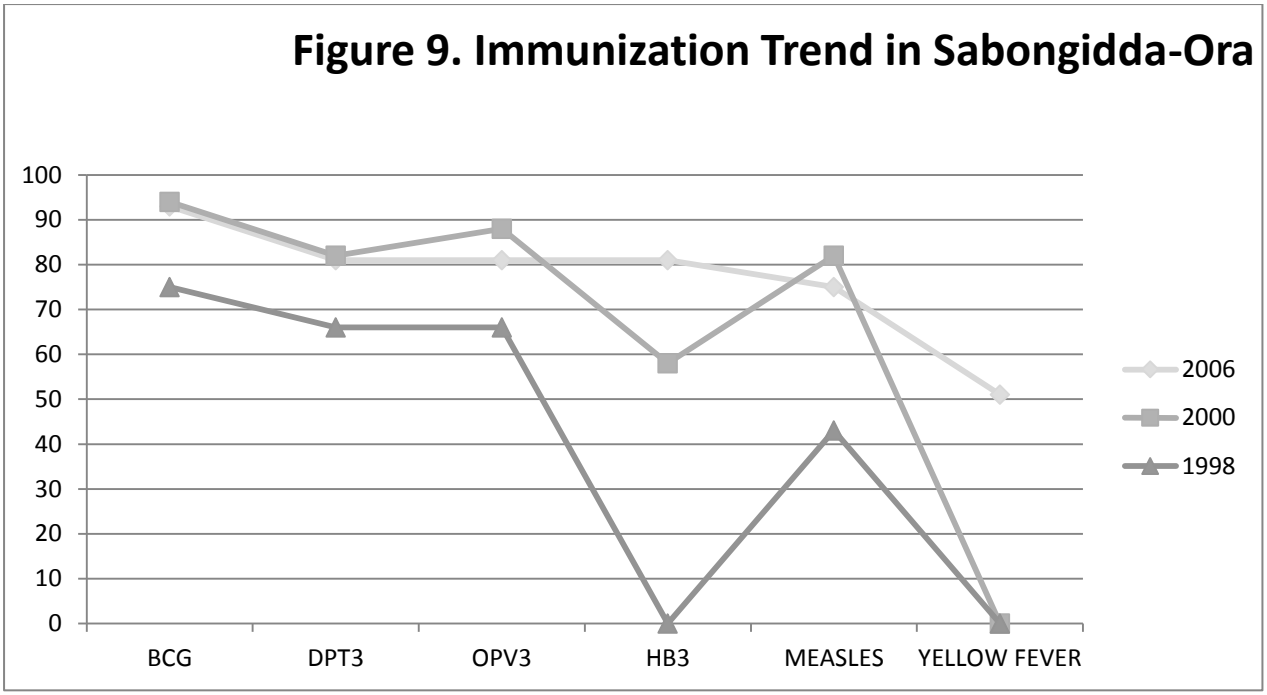
I was privileged to commence from inception a privately sponsored community-based immunization project in Sabonggida-Ora, the headquarters of Owan West LGA, Edo State in 1997. The project was sponsored by Smithkline Beecham Biologicals as a corporate social responsibility. I had the support of two Senior Management staff, Dr. Vincent Ahonkhai in the USA operations and Dr. François Meurice in GSK Biologicals in Belgium. Equally important was the role of a surgeon in the area, Prof. Ewan Alufohai who was our link person on a

day-to-day basis. It was my lot to gain acceptance into a hitherto unknown community to me, obtain community approval, employ staff, arrange logistics and get the programme started.

The programme emphasis was purely service but it became a priority project and research unit for me. Using skills expected of a public health physician, I was able to get the programme commenced on March 27, 1998 and commissioned by the then Permanent Secretary of Edo State Ministry of Health, Dr. S. Okpaise. The programme is still running actively 14 years after. To my knowledge, the programme was the first to vaccinate children against DPT and Hepatitis using a combined DPT/HB vaccine with an advantage of fewer injections for the children. Since 2009, the programme has commenced administering a combined measles, mumps and rubella vaccine. The programme managers had been committed to surveillance, data collection and conducting epidemiological surveys. The programme had received visits from the National NPI office and submits data monthly to the Local Government.

Vaccination Coverage

At the programme onset, the full immunization coverage (measles vaccine uptake) was 43% [22] but after two years this was raised to 78%.[26] The coverage of Hepatitis B (3rd dose) was 58% from a situation where it was not being administered. After eight years of service, a third survey was conducted and 61% of the children were fully immunized and yellow fever vaccine coverage was 51%.[27] The significant determinants of full vaccination (measles vaccine uptake) were knowledge of mothers on immunization and the place (facility) where vaccination was administered. The trend on immunization coverage in Sabongidda-Ora is shown on Figure 9.



In addition we have conducted immunological studies in the community. A study by Odusanya et al showed that vaccinated subjects had a significantly lower rate (P = 0.04) of Hepatitis B surface antigen (HBsAg, 1.3%) compared to the unimmunized group (4.6%).[28] Furthermore, we conducted another study to investigate the efficacy of Hepatitis B Vaccine five to seven years after vaccination. The markers of infection (antibody to the hepatitis B Core antigen [anti-HBC], and HBsAg) were significantly reduced in the vaccinated group (Table 6). The vaccine efficacy against exposure (anti-HBc) was 84.6% (95% confidence interval 77.8, 89.3%) and against infection (HBsAg) was 84.7% (95% confidence interval 68.2, 92.6%). The results showed persistence of antibodies to the surface antigen (anti-HBS) which indicates adequate protection of the vaccinated subjects. [29]

Table 6. Hepatitis B Vaccine Markers in Study Subjects.[29]

Study group	HBV Markers		
	Anti-HBc	**HBsAg**	**Anti-HBS ≥ 10 ELU/ml**
Vaccinated (n=449)	47 (10.5%)	9 (2.0%)	275 (61.2%)
Unvaccinated (n=373)	161 (43.2%)	44 (11.8%)	68 (18.2%)

Pneumococcal vaccine trials.

Pneumonia is the leading cause of deaths in children worldwide and kills an estimated 1.4 million children under the age of five years annually more than AIDS, malaria and tuberculosis combined.[30] Streptococcus pneumonia is the most common cause of bacterial pneumonia. Key strategies for treating, preventing and protecting from pneumonia include case management at all levels, vaccination and control of indoor pollution.[31]

The 23-valent polysaccharide pneumococcal vaccine was the first vaccine against the organism but it was poorly immunogenic in infants less than 24 months of age and failed to induce an anamnestic antibody response. [32] The 7-valent pneumococcal vaccine was efficacious but did not contain serotypes 1 and 5, the major causes of invasive pneumococcal disease in Africa.[33] The 10-valent pneumococcal non-typeable Haemophilus influenza protein D conjugate vaccine contains serotypes 1,5, and 7F in addition to the serotypes 4, 6B, 9V, 14, 18C , 19F and 23F available in the 7-valent vaccine.

In conjunction with colleagues in Mali, we conducted a randomised open vaccine trial of the 10-valent conjugate vaccine when administered with other NPI vaccines to assess its immunogenicity and safety. The report showed that 97% of vaccinated subjects had antibody concentration ≥ 0.2ug/ml for the

pneumococcal serotypes except for 6B (82%) and 23F (87%), see Table 7.[34] At least 85% of subjects had opsonophagocytic activity against all serotypes. The main adverse events were fever, pain and redness. The vaccine was found to be safe, immunogenic and compatible with NPI vaccines.[34] The results are consistent with results by other researchers.[35]

Table 7. IgG antibody responses (22F-ELISA) against individual pneumococcal vaccine serotypes and cross-reactive serotypes 6A and 19A (ATP immunogenicity cohort)

		PHiD-CV group					Control group				
PHiD-CV serotypes		N	% ≥ 0.2 µg/mL (95% CI)		GMC, µg/mL (95% CI)		N	% ≥ 0.2 µg/mL (95% CI)		GMC, µg/mL (95% CI)	
1	Pre-vaccine	204	19.6	(14.4-25.7)	0.07	(0.06-0.09)	110	18.2	(11.5-26.7)	0.07	(0.06-0.09)
	Post-dose 3	217	100	(98.3-100)	2.69	(2.42-2.99)	108	1.9 (0.2-6.5)		0.03	(0.03-0.03)
4	Pre-vaccine	209	14.8	(10.3-20.4)	0.07	(0.06-0.08)	112	16.1 (9.8-24.2)		0.07	(0.06-0.08)
	Post-dose 3	217	100	(98.3-100)	3.44	(3.06-3.87)	112	2.7 (0.6-7.6)		0.03	(0.03-0.03)
5	Pre-vaccine	210	17.6	(12.7-23.5)	0.07	(0.06-0.08)	111	19.8	(12.9-28.5)	0.07	(0.05-0.08)
	Post-dose 3	217	100	(98.3-100)	4.17	(3.75-4.63)	109	3.7 (1.0-9.1)		0.03	(0.03-0.04)
6B	Pre-vaccine	205	21.0	(15.6-27.2)	0.09	(0.07-0.10)	111	31.5	(23.0-41.0)	0.10	(0.08-0.12)
	Post-dose 3	217	82.0	(76.3-86.9)	0.95	(0.76-1.20)	112	1.8 (0.2-6.3)		0.03	(0.03-0.03)
7F	Pre-vaccine	207	27.1	(21.1-33.6)	0.09	(0.08-0.11)	111	23.4	(15.9-32.4)	0.08	(0.07-0.10)
	Post-dose 3	217	99.5 (97.5-100)		3.33	(2.99-3.71)	110	1.8 (0.2-6.4)		0.03	(0.03-0.04)
9V	Pre-vaccine	208	38.5	(31.8-45.4)	0.13	(0.11-0.16)	110	39.1	(29.9-48.9)	0.15	(0.11-0.19)
	Post-dose 3	217	97.2	(94.1-99.0)	2.39	(2.06-2.76)	112	9.8	(5.0-16.9)	0.04	(0.03-0.05)
14	Pre-vaccine	206	87.9	(82.6-92.0)	0.75	(0.64-0.89)	110	84.5	(76.4-90.7)	0.76	(0.60-0.97)
	Post-dose 3	217	99.1	(96.7-99.9)	3.80	(3.24-4.46)	112	35.7	(26.9-45.3)	0.14	(0.11-0.17)
18C	Pre-vaccine	204	36.3	(29.7-43.3)	0.12	(0.10-0.15)	110	34.5	(25.7-44.2)	0.12	(0.09-0.15)
	Post-dose 3	217	99.5 (97.5-100)		10.01	(8.49-11.80)	112	3.6 (1.0-8.9)		0.03	(0.03-0.04)
19F	Pre-vaccine	208	68.3	(61.5-74.5)	0.33	(0.28-0.40)	111	68.5	(59.0-77.0)	0.36	(0.29-0.45)
	Post-dose 3	217	98.6	(96.0-99.7)	7.65	(6.55-8.93)	111	22.5	(15.1-31.4)	0.08	(0.07-0.10)
23F	Pre-vaccine	202	29.2	(23.0-36.0)	0.08	(0.07-0.10)	108	31.5	(22.9-41.1)	0.10	(0.07-0.12)
	Post-dose 3	217	87.6	(82.4-91.6)	1.10	(0.91-1.33)	112	2.7 (0.6-7.6)		0.03	(0.03-0.04)
Cross-reactive serotypes											
6A	Pre-vaccine	208	34.1	(27.7-41.0)	0.13	(0.11-0.15)	112	35.7	(26.9-45.3)	0.14	(0.11-0.18)
	Post-dose 3	217	25.8	(20.1-32.2)	0.09	(0.08-0.11)	108	7.4	(3.3-14.1)	0.04	(0.04-0.05)
19A	Pre-vaccine	205	48.3	(41.3-55.4)	0.18	(0.15-0.22)	110	44.5	(35.1-54.3)	0.20	(0.15-0.26)
	Post-dose 3	217	43.8	(37.1-50.7)	0.15	(0.13-0.18)	108	13.9 (8.0-21.9)		0.06	(0.05-0.07)

NOTE. GMC, geometric mean antibody concentration; pre-vaccine, before the first vaccine dose; post-dose 3, 1 month after vaccine dose 3; N, number of subjects with available results (this number varies per time point and per serotype depending on the amount of serum available for testing).

We have then conducted a follow up study to administer booster doses of the pneumococcal vaccine in the study group 12 months after the primary study. Vaccinated (primed) subjects received one dose while previously unvaccinated (unprimed) subjects received two doses. The results showed immunogenicity in both the primed and unprimed subjects and the adverse events were as observed in the primary study.[36] These are very major contributions in the area of vaccines and immunology. Nigeria has now licensed both the 10 and 13-valent pneumococcal vaccines.

IV. A Functional Health System for the Public (Restoring the Health of the Public)

The six building blocks of the health system have a common goal: that of improving health.[8] Health systems particularly health facilities play a central role at the secondary level of prevention; that of early diagnosis and prompt treatment. Table 8 shows the list of core indicators for each of the six building blocks.[37]

Table 8. List of Recommended Core Indicators for Building Blocks of the Health System.[37]

Building blocks and indicators	Data collection methods / Data sources
1. Health Service Delivery	
• Number and distribution of health facilities per 10,000 population • Number and distribution of inpatient beds per 10,000 population	District and national databases of health facilities. Special efforts - notably facility censuses – are often required to obtain the number of private facilities, especially if no registration system is enforced.
• Number of outpatient department visits per 10,000 population per year	Routine health facility reporting system Population based surveys
• General service readiness score for health facilities • Proportion of health facilities offering specific services	Health facility assessments

• Number and distribution of health facilities offering specific services per 10,000 population • Specific-services readiness score for health facilities	
2. Health Workforce	
• Number of health workers per 10,000 population • Distribution of health workers by occupation / specialization , region, place of work and sex • Annual number of graduates of health professions, educational institutions per 10,000 population, by level and field of education	Routine administrative records, periodically validated and adjusted against data from national population census or facility-based assessments Routine administrative records from individual training institutions. In some cases, data may be validated against registries of professional regulatory bodies where certification or licensure is required for practice.
3. Health Information	
• Health information system performance index	Review of national health information systems
4. Essential Medicines	
• Average availability of 14 selected essential medicines in public and private health facilities • Median consumer price ratio of 14 selected essential medicines in public and private health facilities	National (or sub-national when necessary) surveys of medicine price and availability conducted using a standard methodology developed by WHO and Health Action International
5. Health Financing	
• Total expenditure on health • General government expenditure on health as a proportion of general government expenditure (GGHE/GGE) • The ratio of household out-of-pocket payment for health to total expenditure on health	National Health Accounts (NHA) Household expenditure and utilization surveys
6. Leadership and Governance	

• Policy index	Review of national health policies in respective domains (such as essential medicines and pharmaceutical, TB, malaria, HIV/AIDS, maternal health, child health/immunization

Service Quality

The quality of service of a health system has a major impact on the health outcome of the population served and is crucial to the achievement of the health related millennium development goals. A well functional health service should have the following key characteristics.[37]

Box 1.: Key characteristics of good service delivery

Good service delivery is a vital element of any health system. Service delivery is **a fundamental input to population health status**, along with other factors, including social determinants of health. The precise organization and content of health services will differ from one country to another, but in any well-functioning health system, the network of service delivery should have the following ***key characteristics:***

1. **Comprehensiveness:** A **comprehensive range** of health services is provided, appropriate to the needs of the target population, including **preventative, curative, palliative** and **rehabilitative** services and **health promotion** activities.

2. **Accessibility:** Services are directly and permanently accessible with no undue barriers of cost, language, culture, or geography. Health services are **close to the people, with a routine point of entry to the service network at primary care level** (not at the specialist or hospital level). Services may be provided in the home, the community, the workplace, or health facilities as appropriate.

3. **Coverage:** Service delivery is designed so that all people in a **defined target population** are covered, i.e. the sick and the healthy, all income groups and all social groups.

4. **Continuity:** Service delivery is organized to provide an individual with **continuity of care across the network of services, health conditions, levels of care, and over the life-cycle.**

5. **Quality:** Health services are of high quality, i.e. they are **effective, safe, centred on the patient's needs** and given in a **timely** fashion.

6. **Person-centredness:** Services are **organized around the person, not the disease** or the financing. Users perceive health services to be responsive and acceptable to them. There is **participation** from the target population in service delivery design and assessment. People are partners in their own health care.

7. **Coordination: Local area health service networks are actively coordinated**, across types of provider, types of care, levels of service delivery, and for both routine and emergency preparedness. The patient's primary care provider facilitates the route through the needed services, and works in collaboration with other levels and types of provider. Coordination also takes place with other sectors (e.g. social services) and partners (e.g. community organizations).

8. **Accountability and efficiency:** Health services are **well managed** so as to achieve the core elements described above with a **minimum wastage** of resources. Managers are allocated the necessary authority to achieve planned objectives and held **accountable for overall**

performance and results. Assessment includes appropriate mechanisms for the participation of the target population and civil society.

If one was to assess the quality of the Nigerian health system on these criteria, it will be found wanting. A cross sectional study of health systems of UN member countries revealed that significant protective health system determinants related to mortality in infants children and maternal rates were improving access to water and sanitation and reducing corruption.[38] Many health systems and facilities in Nigeria will fail the test on these three grounds. Water does not freely flow in several of our facilities and sanitation standards are deplorable while money tends to be given either to shunt the system or in gratification to health workers.

Up to 38% of users at primary health care facilities in Niger State were dissatisfied with the quality of services received. Many of the patients were not examined and spent a long time to receive services.[39] Health workers need to be conscious of the opportunity costs to patients when accessing services. To postpone surgery on account of lack of theatre gowns, anaesthetic gases or to limit the number of patients to be seen after arrival at the facility is not right. Osibogun has put forward an equation summarising the many parts to the cost of illness.

Cost of illness= cost of treatment + cost of treatment seeking activities+ cost of opportunities forgone + hidden social and personal costs + "cost" of misery and pain.[40]

This should serve as a reminder in providing care in the interest of the public.

Establishing a Model Primary Health Care Centre

In 1996, I had the privilege of coordinating a public private partnership (PPP) that led to the establishment of a model Primary Health Care (PHC) facility in an underserved area (Mafowoku, Shomolu LGA) in Lagos State.

The Partners were the Lagos State Government through the Family Support Programme which built the facility, the host community (Mafowoku) that provided the land for the building, the Local Government (Shomolu) that provided staff and the private company, SmithKline Beecham.[41] The facility was commissioned by the then Governor of Lagos State, Col. B. Marwa on August 11, 1997. The facility was linked to a bigger PHC facility at the LGA headquarters particularly for deliveries after closing hours (4.00pm). The facility had a drug revolving fund (DRF) which was started with ₦250,000.00 and within 12 months had increased to ₦600,000.00. A community-based assessment of the facility showed that the community perceived the services to be of good quality and acceptable and made health services more accessible.[42]

Rational Drug Use

Drugs are often the most visible item in the health care chain and for many patients obtaining a prescription and collecting drugs at the pharmacy represents a major output of the visit to the facility. The prescribing of a drug represents the culmination of a deliberative process between a physician or health worker and a patient aimed at the prevention, amelioration or elimination of a disease or disorder. This deliberation requires that the health worker understands a broad spectrum of scientific and psychological issues germane to the success of treatment. The drug selection process is determined by the knowledge of the health worker, the severity and duration of the health problem, exogenous factors such as dietary intake and anticipated individual variation.

Rational drug therapy implies that the efficacy and safety of all potentially useful drug classes be reviewed for their relevance to the disease or disorder present and that the most appropriate or optimum drug be chosen. Other important aspects of the drug choice include the dose, timing of administration, route of administration and formulation of the drug. The goal is to improve the patient's state of health in a safe manner while optimizing the use of drugs. Deviations from this logical process may then result in irrational drug prescribing.

Rational drug use is the prescription of the right drug for the right indication for the right duration in the appropriate dosage form and dosing interval. Empirical evidence abounds that drugs are not used rationally; thus, exposing patients to potential harm. Irrational drug use may manifest in poly pharmacy, over use of injections and the use of antibiotics where not indicated. Examples of irrational drug use include the use of antibiotics for common cold or non-bloody diarrhoea, use of diclofenac where paracetamol will suffice and the use of parenteral therapy where oral medications are indicated. The benefits of rational drug use to the health system include patient satisfaction, efficient

use of resources, shorter treatment period, less therapeutic future and reduction in antibiotic resistance.

Both the WHO and International Network for the Rational Use of Drugs (INRUD) have developed a set of indicators, prescribing indicators to assess rational drug use.[43]

The prescribing indicators include:

(a) Average number of medicines (drugs) prescribed per patient encounter.
(b) Percentage of patient encounters with an antibiotic prescribed.
(c) Percentage of patient encounter with an injection prescribed.
(d) Percentage of medicines prescribed by generic name.
(e) Percentage of medicines prescribed from essential drug list.

The first three tend to be the more commonly assessed in studies of rational drug use and can provide information on rationality of use of drugs by health workers.

Prescribing Practices of Health Workers

In Nigeria Army facilities, the average number of drugs per encounter was 2.8, and antibiotic prescribing was 28%.[44] Another study at outpatient clinic of a tertiary hospital in southwestern Nigeria showed that the average number of drugs was 3.2.[45] In Tanzania, the average number of drugs per encounter was 2.3, antibiotic use was 30.5%, and injection use was 26.6%.[46] In Ghana, the average number of drugs was 4.8, antibiotic use was 60% and injection use was 80%.[47]

Odusanya and Oyediran in their study of drug use at primary health care centres in Lagos Nigeria reported an average drug use of 7.27 and 4.99 in

Mushin and Ikeja LGAs respectively. The antibiotic use rates were 48.3% in Mushin and 39.7% in Ikeja LGAs. Injection use rates were 77.4% and 48% respectively. In Mushin LGA 18% of patients were judged to have been managed properly compared to 33% in Ikeja LGA.[48] A second paper analyzing antibiotic use in the same area reported that over 50% of prescribed antibiotics were in injectable forms, written for a variety of conditions for which they were not indicated for.[49] A third study of drug use indicators at a secondary health care facility reported an average number of drugs of 3.5; antibiotic use rate of 55% and injection use rate of 14%.[50]

In another study, I investigated the role of adjunct therapies in the rational treatment of uncomplicated malaria in Lagos and found that there adjunct therapies constituted about 50% of the prescribed drugs; mainly multivitamins, antihistamines and antibiotics. The average number of drugs was 4.0, antibiotic use was 25%, and injection use was 27.4%. A positively significant relationship was found between the numbers of complaints given by patients and the number of drugs prescribed by the physician ($r = 0.2$, $p < 0.001$) indicating symptomatic treatment.[51] Perhaps, if you want more drugs, give many complaints to the doctor.

A study of antibiotic prescribing at a secondary health facility showed that patients received an average of 1.6 antibiotics per visit, 40% received two or three antibiotics; up to 40% of the antibiotics were not indicated and antibiotic sensitivity tests was done in only 6% of cases.[52] We conducted a study of antibiotics susceptibility at the general hospital and reported that many of the organism were resistant to the older generation of antibiotics but sensitive to the newer generation The susceptibility pattern mirrored the pattern at tertiary hospitals indicating similar prescribing pattern and high antibiotic pressure.[53] It would appear that health workers have a challenge with selecting the right drugs or using drugs rationally. What factors are responsible for irrational prescribing practices and how can they be improved?

Factors influencing prescribing practices of health workers

Many factors are known to influence prescribing practices. These factors act in an interwoven manner. They include the knowledge, training and skills of health workers, demand for drugs by patients, availability of diagnostic facilities and the work environment.

In Lagos, we found that inadequate knowledge of primary health care workers factors along with absence of treatment guidelines, and training on rational drug use were important factors militating against rational drug use.[54] Furthermore, inadequate skills in history taking may be another factor as a survey in Lagos revealed that doctors often left out many important areas in the history taking process. History taking is a painstaking process and is often the first step in making a right diagnosis and rational drug use.[55] In Italy, factors found to influence inappropriate antibiotic use included diagnostic uncertainty, perceived parental expectation (or patient pressure), for injections and inadequate parental knowledge.[56]

Another study showed that general practitioners prescribed more new drugs and for a wider range of conditions. Company representatives were an important source of information for general practitioners whereas consultants usually prescribed new drugs within their specialty, used fewer new drugs and used scientific evidence to inform their decisions.[57] Other factors influencing prescribing practices include practice sustainability and financial considerations, Influence from medical representatives, inadequate knowledge and laxity in regulations of prescribing and dispensing antibiotics.[58] In South Korea, factors found to influence over prescribing of injection including treating younger populations, living in urban areas, the number of hospital beds and the competitive medical environment.[58]

Improving prescribing practices of health workers

Prescribing practices can be improved through regulatory, managerial and educational approaches. A Cochrane collaboration systematic review of interventions to improve antibiotic prescribing concluded that multi faceted

interventions combining physician, patient and public education in a variety of venues and formats were the most successful in reducing antibiotic prescribing for inappropriate indications.[60]

Randomized trials of educational interventions have been shown to improve prescribing practices.[61-64] A randomized controlled trial of training had in South Africa revealed an improvement in the prescribing practices of nurses one month and three months post training. The nurses retained knowledge gained and were able to apply their knowledge not only to the indicator condition but to other common illness.[61]

Using a similar approach, Odusanya and Oyediran were able to achieve a 30% increase in the proportion of health workers with improved knowledge in the experimental group two weeks post training and 25% three months post training ($P<0.005$) while control gap had further decline in their knowledge.[62] The training was found to significantly decrease the average number of drugs per patient and improve the proportion of patients managed accurately in accordance with treatment guidelines.[63] A randomized trial of multi-component interventions including educational outreach visits to discuss clinical practice guidelines, audit and feedback on current adherence to guidelines and computerized reminders to doctors during patient consultations led to a significant improvement in the prescribing of antihypertensive drugs.[64]

In Australia, a computerized decision support system was associated with an early improvement in antibiotic prescribing practice more than the changes seen with academic detailing alone.[65] In Kenya, a study reported that in-service training led to an increase in the proportion of children with fevers with uncomplicated Malaria treated with artesunate-lumefantrine but the improvement was not significant.[66]

Vice Chancellor Sir, the challenge to training health workers on improving prescribing practices is to develop out an appropriate model. I suggest a continuous training on the job perhaps on a quarterly basis coupled with

academic detailing. For lower cadre of health workers, a more user friendly "Standing Orders" (physician written guidelines) perhaps in an electronic form that may be available on smart phones may help.

In Tanzania, the availability of malaria Rapid Diagnostic Test (RDT) and official policy led to a more rational use of anti-malaria drugs, and a decline in the proportion of parasite-negative individuals who received anti-malaria drugs.[67] Although in Nigeria, health workers continued to prescribe anti-malaria drugs to patients who had RDT-negative results suggesting that availability of test kits may not be enough to improve prescribing practice.[68]

Contributions to Medical Education

Medical education is a growing field with experts from different medical specialties contributing to it. At the inception of the Lagos State University College of Medicine, Odusanya, Alakija and Akesode studied the career aspirations of the pioneer medical students and found that up to 67% even at that early stage of the course desired to specialize. Obstetrics and Gynaecology was the most frequently mentioned field. Altruistic reasons were given for the choice and no socio-demographic characteristics of the students had a significant influence on the desire to specialize.[69]

Another study by Odusanya and Nwawolo on the career aspiration of house officers in Lagos showed that up to 97% of them desired to specialize while they were undergraduates. Surgery, obstetrics and gynaecology were attractive to these young doctors to the detriment of other specialties. Financial consideration was a key determinant of the place of future practice.[70] Training on good clinical practice (GCP) is a necessary foundation for clinical trials. Odusanya found that up to one third of doctors attending a research methodology course in Lagos did not have adequate knowledge on the subject.[71] I have taught the subject at research methodology workshops of the National Postgraduate Medical College of Nigeria for the last ten years.

Contributions to Occupational Safety of Medical Students and Health Workers

Health workers in the course of their work are exposed to potentially infections body fluids. The common pathogen includes HIV, HB, hepatitis C, and Lassa fever. A common method of transmission is percutaneous needle stick injury. These infections can be minimized if health workers adhere to standard precautions (infection control guidelines) which include among others avoiding recapping of needles, hand washing, hepatitis B vaccination, wearing of gloves and reporting of needle stick injuries to hospital management.

Odusanya in a study among health workers at an emergency medical service in Lagos reported that only 40% of staff wore gloves for all listed procedures, 88% practised recapping of needle, 14% had sustained needle stick injuries and none (0%) had been vaccinated against hepatitis B.[72] The rate of needle stick injury found in our Lagos study is lower than the 58% reported among nurses in Benin City[73] and 63% among surgical residents in Enugu.[74]

Among our medical students at the Lagos State University College of Medicine, the prevalence of needle stick injury was 28.8% within six months preceding the study. It should be pointed out and as early as the first year a sizable number of medical students had sustained needle stick/scalpel while hepatitis B vaccination was low (2.6%).[75]

A serologic investigation of HB status among these medical students revealed that 26% were positive for anti-HBC, 3.2% were positive for HB_SAg while 72% were susceptible to HB infection and required vaccination.[76] May I suggest Vice Chancellor Sir, that we routinely screen our medical students for hepatitis B, vaccinate those who are susceptible and treat those who are carriers. This measure will be needed for another 10 years by which time the cohort Nigerian children who received HB vaccine in infancy will be entering the medical school.

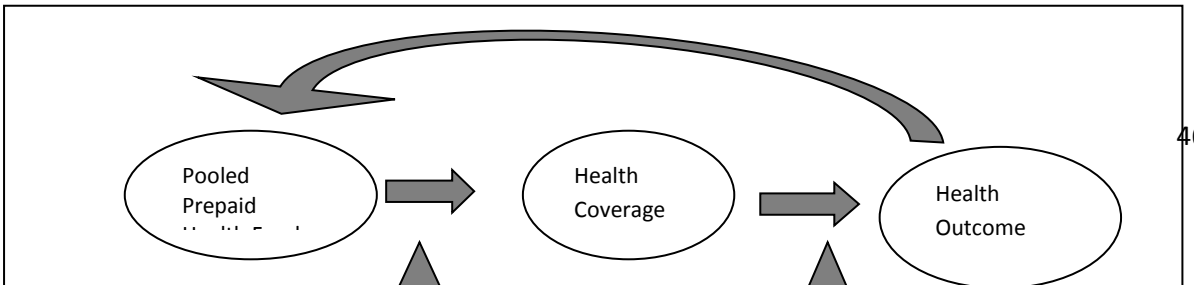
Universal Health Coverage

Universal Health Coverage (UHC) refers to a system in which everyone in a society can get health-care services they need without incurring financial hardship.[77] The concept implies that each one is able to get required health service when needed without suffering or having to sell personal belongings. Equity of access to health services of all types is key to a universal health coverage policy.[78] The current Director General of the World Health Organization (WHO), Margaret Chan asserts that universal health coverage is "the single most powerful concept that public health has to offer".[79]

The three dimensions of universal health coverage are the proportion or types of persons in a population, the services covered and what proportion of costs are covered. Health issues, especially emergencies, do not give advance warning yet they must be attended to. In this audience, if any of the well-to-do persons has a son requiring appendectomy in the middle of the night, where will she/he readily find the money to pay or buy required drugs without cash at home, especially in this era of cashless policy? Would not it be easier if the person has prepaid insurance or other forms of advance payments in order to readily access the required services? May I ask: how many of us here have a health insurance?

The inability of having a ready source of payment often delays presentation to hospital or delays payment for services and hinders timely interventions among the poor. Evidence suggests that broader health coverage generally leads to better access to necessary and improved population health, particularly for poor people.[80] The relationship between prepaid health financing, health coverage and health outcomes is shown in Figure 10.

Figure 10.Causal pathway between pooled prepaid health financing, health coverage and outcomes.[80]



At the heart of UHC is health financing. The funds may be raised from a variety of sources; direct and indirect taxes, social insurance and community funds. Available funds must be raised and pooled in a way that allows cross-subsidization across the income groups and financial risks of illness to be shared between the sick and the healthy. In the absence of universal health coverage, the various forms of paying for health include out of pocket payment and selling of property. A review of coping strategies for health care services in 15 African countries revealed that borrowing and selling of assets ranged from 23% of households in Zambia to 68% in Burkina Faso, and that the highest income groups were less likely to borrow.[81] Selling of assets and borrowing were more profound for households with higher inpatient expenses than those with outpatient care or outpatient medical expenses. Payment of user fees is often a critical obstacle to access to health care.

Sixty-nine (69%) percent of government employees in Abakaliki, Ebonyi State relied on out-of-pocket payment to pay for health services, 28% claimed to use

Nigerian Health Insurance Scheme (NHIS) and 2.6% borrowed money.[82] The use of out-of-pocket mechanism was associated with difficulty in accessing quality health care services and most of the employees resorted to self medication, delayed seeking health care, patronized herbalists or ignored the illness.[82] The state of health of such population can be best imagined.

Another group of researchers from the same area found that the poorest households were more likely to utilize informal care providers such as traditional healers, whereas the higher socio-economic groups used out of pocket payments. Decreasing socio-economic status was associated with sale of livelihood assets while exemptions and subsidies were non-existent.[83] in many countries, removing or reducing user fees was found to increase the utilization of curative services and perhaps preventive services as well but may have negatively impacted service quality.[84]

The Nigeria Health Insurance Scheme (NHIS)

The NHIS was launched on 6th June, 2005 and commencement of services started in September 2005. It is a voluntary insurance scheme and has focused on the formal sector. It covers mainly employees of the Federal Government and only a few states Enugu and Cross River States have enrolled. The contributions are earnings-related, fixed currently at 15% of basic salary. The employer pays 10% while the employee contributes 5% of basic salary.

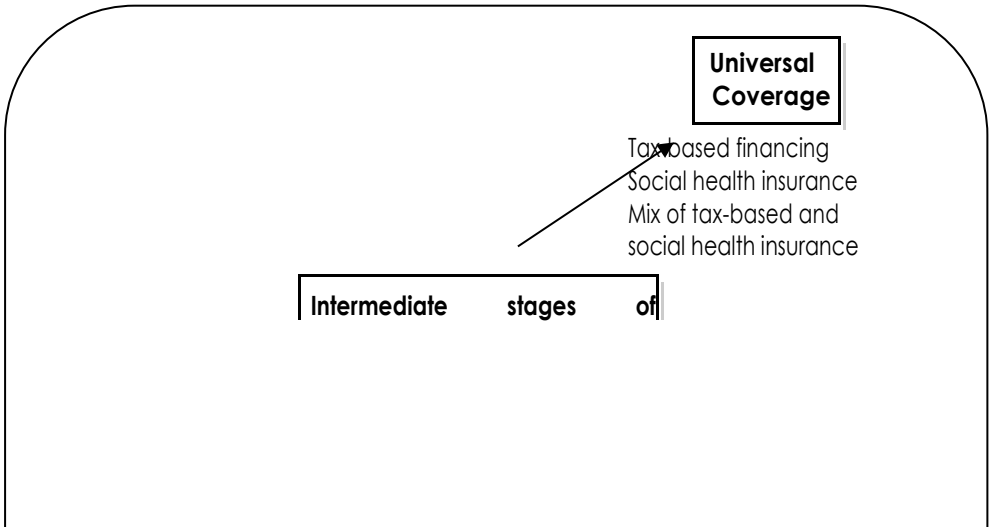
Health benefits under the NHIS include out-patient care, prescribed drugs in the NHIS essential drug list, antenatal, postnatal and maternity care for up to four (4) live births for every insured woman to mention a few. The scheme does not cover special treatments including occupational injuries. The system works through appointment of health maintenance organizations (HMOs) who receive capitation fees, and health care providers who receive fee for service from the HMOs.[85]

One of the major challenges faced by the NHIS is the low coverage; thus, it has not been the path to UHC for Nigeria. In addition, other problems include conflict of interests about financial payment among the many stakeholders, long waiting period to access service, bureaucracy, antagonism of labour unions and the voluntary nature of the scheme with workers in many states and private sector not enrolling. The impact of the NHIS will improve if it expands its scope to cater for the informal sector (being piloted in a few places), facilitates integration of the private sector as well as aggressive advocacy and education of the populace.

Achieving Universal Health Coverage (UHC)

There is no one common pathway to achieving UHC. The trajectory towards UHC has three common features; a political process driven by a variety of social forces to create public programmes or regulations that expand access to care, improve equity and pool financial risk; growth in incomes and a concomitant rise in health spending which buys more health services for more people; and an increase in the share of health spending that is pooled rather than paid out-of pocket by household.[86] All countries that have achieved universal health coverage have done so with extensive government involvement (policy) in the financing, regulation and sometimes direct provision of health services.[87] The key health financing options at different stages of the evolution of UHC is shown in Figure 11.[86]

Fig. 11. Key health financing options at different stages of the evolution towards universal coverage.[87]



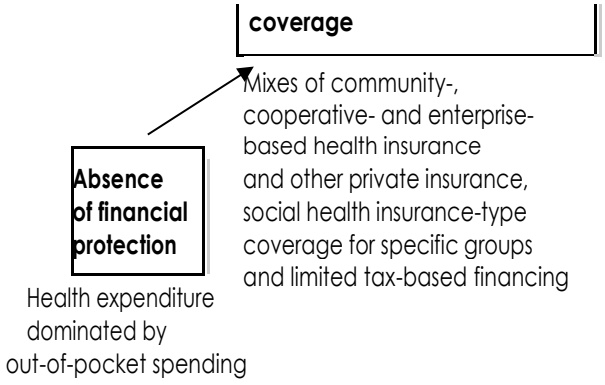


Table 9 shows health financing of selected countries and progress made towards UHC.

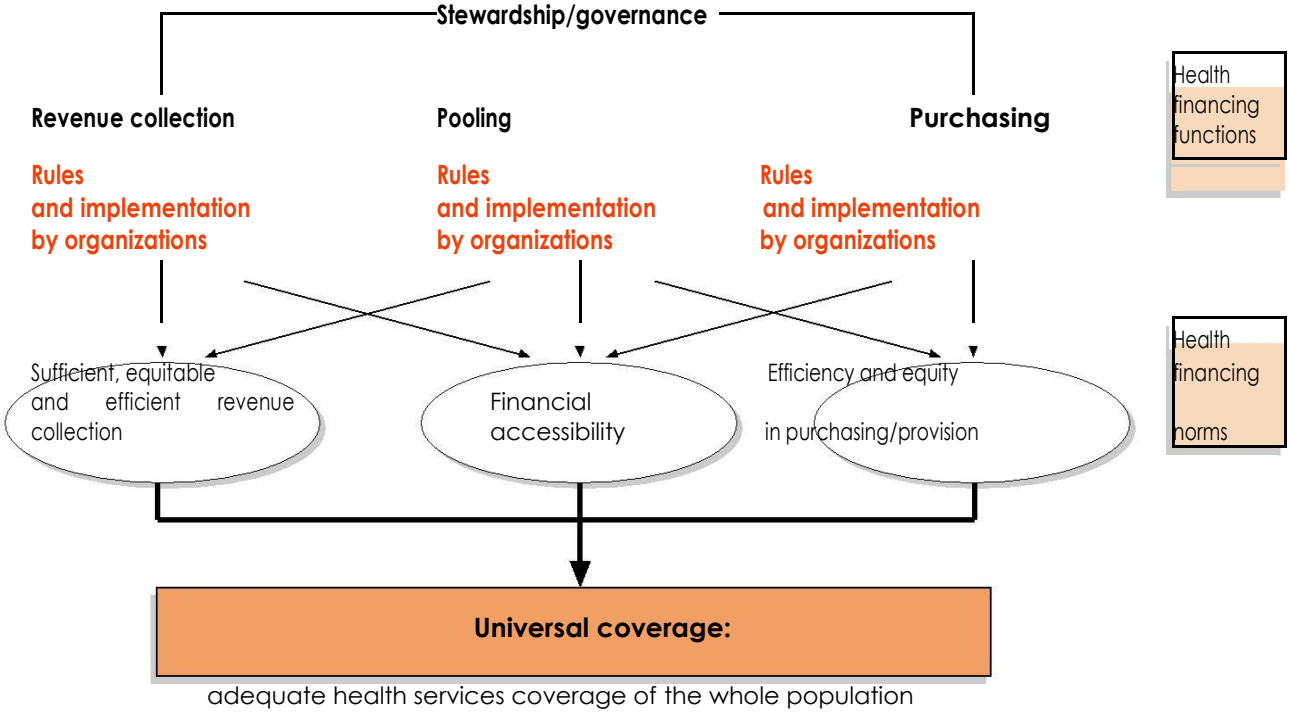
Table 9. Health Financing for Selected Countries by Income and Progress toward Universal Health Care, 2009.[86]

	Health spending (% of gross domestic product)	Pooled Health spending (% of total health spending	Tax-based health spending (% of total public spending	Gross domestic product per person (US$)
High-income countries with universal health coverage				
Germany	11%	89%	52%	40275
UK	9%	90%	100%	35163
Sweden	10%	85%	100%	43472
Middle-income countries with universal health coverage				
Chile	8%	66%	87%	9487
South Korea	7%	65%	56%	17110
Malaysia	5%	60%	99%	8373
Middle-income countries making rapid progress toward universal health coverage				
Brazil	9%	69%	100%	8251
Mexico	7%	52%	65%	7852
Thailand	4%	84%	92%	4608

Calculations made with data from WHO's Global Health Expenditure database

The basic components of the frame work to guide health financing schemes include revenue collection, pooling and purchasing are shown in Figure 11.[87]

Fig.11. Basic components of the framework to guide health financing system reform.



The political will to exercise stewardship for UHC must exist. A decision must be made on the type of health insurance whether it would be tax-based or social health insurance. There is also the place of external funding at least at the initial phase. A systematic review of the impact of health insurance in Africa and Asia showed that community-based health insurance and social health insurance improved service utilization, protected members financially by reducing their out-of-pocket expenditure but weakly impacted on quality of care and social inclusion.[88] A study from southeastern Nigeria revealed that respondents in rural areas and those in the lower socio-economic classes wanted comprehensive benefits from community based health insurance whereas those in urban areas and the richer showed a preference for basic disease control interventions.[89]

Table 10 shows the structure of health financing in nine developing countries. In most of them risk pooling is through multiple sources and service delivery is through a variety of sources.[90] The dimensions of UHC in those countries is shown in Table 11. The coverage in Nigeria remains low.[90] Whatever the form of payment, mechanisms for exemption and subsidies must be put in place to protect the poor.

In Ghana, South Africa and Tanzania, health-care financing was progressive (groups with higher income contributed a higher percentage of income) but the overall distribution of service benefits favoured richer people more than the lower-income groups suggesting the need for equity.[91]

Table10. Structure of Health Financing Reforms in Nine Developing Countries.[90]

	Risk pooling		**Service delivery**		
Year of Revenue generation (Sources of Revenue ordered by proportion of Reform contribution)	**Single**	**Multiple**	**Primary**	**Mixed**	**Primary**

					Public		Private
Intermediate-stage reform countries							
Ghana (NHIS)	2003	Value-added tax, investment income, formal-sector payroll contributions, household premiums	x			x	
Indonesia* (BPJS)	2004	General government revenues, formal-sector payroll contributions		x		x	
Philippines (PhilHealth)	1995	General government revenues, formal- sector payroll contributions household premiums	x			x	
Rwanda (Mutuelles)	2000	Donor funding, general government revenue, household premiums, formal-sector payroll contributions		x	x		
Vietnam (VSS)	2000	General government revenues, formal-sector payroll contributions	x		x		
Early-stage reform countries							
India (RSBY)	2008	General government revenues		X			x
Kenya* (NHIF)	2002	Formal-sector payroll contributions, household premiums		X		X	
Mail* (Mutuelles))	2009	General government revenues, household premiums		X	X		
Nigeria (NHIS)	2009	Formal-sector payroll contributions, general government revenues, household premiums, donor funding		X		x	

NHIS=National Health Insurance Scheme. BPJS=Badan Penyelenggara Jaminan Sosial (Social Security Administrative Body). PhilHealth = Philippine Health Insurance Corporation Scheme. Mutuelles=Community-Based Health-Insurance Schemes. VSS= Vietnam Social Security. RSBY=Rashtriya Swasthya Bima Yojna (National Health Insurance Programme). NHIF=National Hospital

Insurance Fund. * Countries that are working to expand existing pools to include new populations, or are merging existing pools to create one pool.

Table 11. Three Dimensions of Coverage in Nine Developing Countries Health Insurance Reforms.[90]

	Who is covered		**What is covered?**	**How much is covered?**		
	Population(s) targeted by health insurance	**Population enrolled (% of total)**	**Scope of services**	**Births Attended by skilled Health staff (% of total)***	**Out-of-pocket Expenditure as % of THE in 2010†**	**Decrease in Out-of-pocket Expenditure as % of THE since Reform[21] †**
Intermediate-stage reform countries						
Ghana (NHIS)	Entire population targeted	54%	Comprehensive	57%	27%	4%
Indonesia‡ (BPJS)	Entire population targeted	63%	Comprehensive	75%	38%	2%
Philippines (PhilHealth)	Entire population targeted	76%	Inpatient, with outpatient for poor people	62%	54%	-4%
Rwanda (Mutuelles, RAMA,MMI))	Entire population targeted	92%	Comprehensive	52%	22%	3%
Vietnam (VSS)	Entire population targeted	42%	Comprehensive	88%	58%	6%
Early –stage reform countries						

India§ (RSBY)	People below the poverty line	8%	Inpatient (with pilot outpatient)	53%	61%	2%
Keyan (NHIF)	Formal sector, expanding to informal sector	20%	Inpatient (with pilot outpatient)	44%	43%	2%
Mali ‡ (Mutuelles, RAMED, AMO)	Entire population target	3%	Comprehensive	49%	53%	-1%
Nigeria(NHIS)	Civil servants, expanding to informal sector	3%	Comprehensive	39%	59%	3%

THE=total health expenditure, NHIS=National Health Insurance Scheme, BPJS=Badan Penyelenggara Jaminan Sosial (Social Security Administrative Body). PhilHealth=Philippine Health Insurance Corporation. Mutuelles=Community-Based Health-Insurance Schemes. RAMA= La Rwandaise d'Assurance Maladie (Rwanda Health Insurance Scheme). MMI=Military Medical Insurance. VSS=Vietnam Social Security. RSBY=Rashtriya Swasthya Bima Yojna (National Health Insurance Programme). NHIF=National Hospital Insurance Fund. RAMED=Regime d'Assistance Medicale (Non-Contribution Medical Assistance System). AMO=Assurance Maladie Obligatoir (Mandatory Health Insurance). *Data retrieved from World Bank world development indicators database. †Data retrieved from WHO global health expenditure database. ‡Legislation to create the programmes in Indonesia and Mali has recently been passed and implementation is at an early stage.

Private sector health provision for public financing may be thought of as the best way to achieving universal health coverage. However, there are some caveats to be noted: the issues of profit, the orientation of services for the middle class and the challenge of providing services that show benefit only if

large enough proportions of the community are covered e.g. immunization.[92] Undoubtedly, the private sector has a role to play in achieving UHC.

Evidence suggests that health coverage that increases in funding, especially through donor aid, has helped to reduce mortality from malaria, maternal mortality and child mortality, especially in developing countries. Political commitment through sustainable public funding is the preferred option. It is argued that addition to aid for health could bring the world to universal coverage whereas cuts in aid at the present time could undo the great progress of the past decade. "Universal coverage for health" is within our reach if we persist.[92]

Conclusion

Public health medicine and public health actions hold the key to improving the complete physical, mental and social well being of individuals, communities and nations. Health actions and services should be customer (public) focused. Key areas for action include social determinants of health, immunization, quality of health services, and rational use of drugs.

The Way Forward to Improving the Health of the Public (Recommendations)

If indeed the health of the public would improve, a paradigm shift is inevitable. The health system and services must stop to focus on themselves but make the public the centre of all its activities. There is the need to actively engage the community through community participation. The health workers must become advocates of healthy public policy and put the health agenda on the front burner of government decisions. There is the need to increase awareness on the social determinants of health and adoption of healthy behaviours by the community. We all need to advocate better funding for education.

Immunization coverage must be vigorously sustained, especially to ensure that poliomyelitis is eradicated from Nigeria. Government funding for immunization must increase, routine immunization services strengthened and complimentary control measures e.g. improved sanitation need to be aggressively pursued. The health system in the country should be strengthened especially with regards to quality of service. Rational use of drugs remains a challenge but continuous training holds the best promise of improving drug use. The issue of universal health coverage must be properly addressed. Perhaps, now is the time for Nigeria to move into some form of compulsory insurance. Universal health coverage is one of the most important determinants of health status. The present coverage of the National Health Insurance Scheme cannot lead to improvement in the health indices of the Nigerian public.

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