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Health Research for Improved Health Care in Nigeria: Matters Arising

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INTRODUCTION

I feel greatly honoured to be considered worthy of being invited by this great university to give its Convocation Lecture for this year. An occasion like this can be used by the lecturer to review his own contribution to society on one or more of his fields of endeavour. It can also be used to assess societal situation in the lecturer's areas of interest and proffer opinions on preferred future directions. I have chosen something in between. Having spent most of my working life in the field of health research, it occurred to me that I might use the opportunity afforded by this occasion to reflect on health research in our country, the successes and failures, the satisfactions and disappointments, the pleasures and problems, the lessons we have learnt and how we might proceed from where we are now.

What is Health Research?

To start with, what do I mean by health research? The term as used in this lecture is as defined by the World Health Organization, that is, "a process for obtaining systematic knowledge and technology which can be used for the improvement of the health of individuals and groups. It provides the basic information on the state of health and disease of the population; it aims to develop tools to prevent and cure illness and mitigate its effects; and it attempts to devise better approaches to health care for the individual and the community".[1]

It follows from this definition that as far as health is concerned, research does not stop with the generation of new knowledge but also covers the use of that new knowledge to develop intervention tools for the disease in question. There are therefore two main types of health research: (a) strategic research; and (b) developmental research or developmental activities.[2]

Strategic Health Research: By strategic health research is meant research for the primary purpose of increasing knowledge and understanding of a significant health problem with a view to eventually solving the problem or reducing its impact through

further development and evaluation. It is now widely recognized that strategic health research has to be multidisciplinary given the now equally recognized multifaceted origin of disease. This last fact has not always been so widely appreciated and ill-health was considered only in terms of the causative factor, which may be a germ or poison, and the pathological process produced by the disease. The current conventional wisdom is that our health status at any given time is a balance between the genes we are born with, the germs and pollutants we are exposed to, our social environment, our everyday individual behavioural choices as well as the availability of appropriate health care in our national health care system. Therefore, in order to have full understanding of a disease, studies might need to be done not only in the biomedical sciences which investigate its pathology and clinical features but also in a variety of other disciplines which are capable of exploring other possible determinants of the disease. These could include epidemiology, demography, behavioural science and health systems research. Each of these disciplines would make essential contributions to our knowledge of the overall picture of the disease and facilitate the process of developing a comprehensive package for its control.

Developmental Research: Developmental research links strategic health research to health care. It aims to develop and evaluate new and improved medical products, health interventions and policy instruments for the prevention, diagnosis, treatment and control of diseases and also to reassess existing ones. The medical products could be vaccines, drugs, diagnostics, prostheses and materials like the insecticide treated bed nets. It is one thing to show in a strategic biomedical study that pyrethroid insecticides kill mosquitoes that transmit malaria parasites from one person to another, it is another to show that: (1) when sprayed on bed nets (product development), the chemical retains its mosquito-killing action, (2) that sleeping under such bed nets (a behavioural change) would prevent transmission of the disease by killing mosquitoes that alight on the nets whilst attempting to

reach and bite the persons sleeping under the nets and (3) that this behavioural change would be acceptable to people.

Health intervention can be in the form of algorithms as in the integrated diagnosis and treatment of the sick child or in the form of information, education and policies that reduce the risk, duration or severity of a disease. Interventions for health can be at the community or at the personal level. Community interventions are directed toward entire populations or subgroups. They can be in the form of (a) change of personal behaviour, (b) control of environmental hazards, (c) immunization, (d) mass chemotherapy and chemoprophylaxis like fluoridation of water and iodization of salt, and (e) screening and referral. For example, it has been shown in a multicentre study in different parts of this country that it is possible to empower rural village dwellers through health education to recognize malaria and chest infection early in their children and treat them with pre-packed drugs. Evaluation of the outcome of the project showed a drastic reduction in the mortality rates from malaria and acute respiratory tract infections in the communities thus confirming the usefulness of this strategy as a tool for improving child health.

Policy instruments are used by governments to encourage or discourage specific health practices or behaviours. For example, increased taxation is used to discourage alcohol consumption and cigarette smoking and user fee charges in public sector health care facilities to ensure that the service would be of good quality and be sustainable. Subsidies can be allowed on baby foods to keep prices down and improve child nutrition. These activities are regarded as components of health research since new knowledge is required to determine the need for the products, interventions and policy instruments and the extent of the need. New knowledge is also generated when they are evaluated for their appropriateness, affordability and acceptability and for their impact on the particular health problem against which they are targeted. In the USA, for example, in the 1990s it was found that all the health warnings about cigarette smoking did not have any

impact on the percentage of adolescents smoking. Since this group of smokers largely depends on their limited pocket money to buy the cigarettes, it was thought that raising the price of cigarettes through taxation would hit them hardest. It did. This was confirmed in the follow-up study that showed that for every 10% increase in cigarette price there was a reduction in smoking rate of about 4%, most of it among adolescents thus providing justification for the health policy regulation.[3] And herein lies a message for us. All too often new government policies are rolled out as they catch the fancies of the authorities without a sound scientific basis for them and they are not subsequently evaluated to see whether they meet the objectives for which they are designed. This should not be so.

Essential National Health Research: Every country has health problems whose determinants are peculiar to it. Such determinants may be environmental, social or human. These can only be understood through research done locally. It is therefore essential for every country to develop capacity for health research as an indispensable tool for the improvement of its health care and to foster economic development. This country-specific health research is called Essential National Health Research and it is the minimum every country should aim to do.[4]

Health Research in Nigeria Over the Years

Health research is not new in Nigeria. It had been a regular feature of the health services long before the 1914 amalgamation that created the entity we now call Nigeria. In the early part of the twentieth century, formal health care in the country was actually geared to the welfare of the white expatriates comprising mainly missionaries, traders and civil servants. The care of the local population was at best only a secondary concern. The major health problems for whites in those days were yellow fever which occurred in epidemics and malaria which was endemic. These two diseases took so much toll of the lives of Europeans that West Africa came to be dubbed 'the white man's grave'. Between them they contrived to make West Africa inhospitable to whites

and thus prevented them from acquiring our land for themselves and settling on it as they did successfully in South Africa and present day Zimbabwe, and to a less extent, East Africa. It is therefore not surprising that early in the twentieth century, health research in this country was directed principally at solving the problems of yellow fever and malaria.

Yellow Fever

I shall give my reflections on the research on yellow fever in this country in some detail because it illustrates very well some of the important issues in health research for development which this lecture is about and there is a lot we can learn from it even today, 80 years on. Yellow fever has probably plagued mankind in diverse parts of the world for centuries, but the world owes the knowledge of its causation and control to research undertaken in Nigeria in the first half of the 20th century. The activities started with the appointment by the British government of a Yellow Fever Commission following a series of high mortality epidemics characterized by fever, jaundice and haemorrhages that occurred in West Africa in 1910-11. The Commission confirmed this and similar epidemics in the same area to be due to yellow fever and made recommendations which prepared the ground against the next epidemic. At about the same time the Rockefeller Foundation started its programme on the Great Neglected Diseases of the World within which it established a Yellow Fever Commission. So when another yellow fever epidemic occurred in West Africa in 1926, it provided an opportunity for the Commissions to send an International research team to Lagos to undertake a comprehensive investigation of the disease.[5]

This task started with the building of the yellow fever research station in Lagos with a branch in Accra in collaboration with the West African Medical Research Institute which had laboratories in both centres. There, leading scientists in yellow fever research toiled assiduously to solve the problem of the age-old scourge. This concerted international effort soon started to bear fruit when they showed conclusively that yellow fever was caused by a virus

and not by a *spirochaete* as previously thought. The investigators did not call it quits after discovering the cause of the disease. They proceeded further to study how this new knowledge could be used to develop tools for its control. Their opportunity came when a patient contracted the disease and recovered, and the virus was isolated in the blood taken from him during the acute phase of his illness. The virus obtained from this patient (called the Asibi strain) provided the first product for an effective vaccination against yellow fever. This vaccine was widely used to good effect in the 1930s even if by modern standards the vaccine would be regarded as rather crude. The researchers continued in their efforts to improve the vaccine and after series of modifications to the original strain a new strain was developed from which a safer and more effective vaccine was produced. This new strain is the famous 17D strain which is used in the production of yellow fever vaccine till today.

The benefit of these discoveries to the Europeans was immediate. The availability of a reasonably safe and effective yellow fever vaccine meant that they had relief from one of the two principal scourges that made the West African region so inhospitable to them. But what about the local population? The yellow fever story must be the first example of a now familiar fact that the availability of an effective disease control tool does not necessarily translate into impending elimination of the disease. More than 70 years after the development of an effective vaccine for it in our country, we remain one of the few countries in the world where yellow fever is still a health hazard.

Lessons from the Yellow Fever Experience: There is no doubt that the yellow fever research breakthrough was a ground-breaking work which would have earned the principal investigators the Nobel Prize but for the fact that all three succumbed to yellow fever within a year of their epoch-making discovery.[6,7] A similar breakthrough in the discovery of mosquito transmission of malaria was rewarded with a Nobel Prize.[8] We can now examine

some of the characteristics of the study that made it so successful. It was a top priority project not only for Nigeria but also for the various parts of the world where yellow fever occurred in those days. It was a major collaborative study involving top scientists specialized in different disciplines from different parts of the world working in multicentre laboratories specially equipped for the research; it was very well-funded and the results were promptly made available to the health care authorities for incorporation into their yellow fever control actions. The study provided an excellent example of how health care is linked to strategic research through developmental research.

Malaria

Malaria was yellow fever's partner in making West Africa uninhabitable by Europeans. It is not surprising therefore that research to know more about malaria and develop interventions to reduce morbidity and mortality from it also engaged the attention of the colonial health authorities in Nigeria. Although malaria has been known to man for centuries its causation and mode of transmission were not known until the closing years of the 19th Century.[8] Following his discovery of the mosquito transmission of the disease, Ross, a British army surgeon working in India was sent in 1901 by the British Government to Nigeria (that is, Lagos) to advise on the problem of malaria which was still killing Europeans there. The following recommendations for the elimination of malaria in the area, made by Ross at the end of his visit are as appropriate today as they were then, more than a hundred years ago[9]:

1. The most permanent and satisfactory measure is the obliteration of the breeding pools of mosquitoes by drainage.
2. Failing this, the employment of an agent to destroy the mosquito larvae is likely to be very useful if it was efficiently done.

3. When the mosquitoes cannot be exterminated, wire screens to the windows and mosquito nets should be employed.

These were the same techniques that were used for the eradication of malaria from most of the temperate countries of Europe and North America with low malaria endemicity between 1900 and 1945 and they formed the basis for our malaria control actions for many decades. However, we did not apply them with the intensity the situation required except in the Lagos Swamp Drainage Scheme of 1942-45.[10] During the Second World War Lagos was a staging post for European troops on their way to the battle fronts of South-East Asia. The barracks in Apapa held thousands of troops at any given time but Apapa was surrounded by swamps and marshes and malaria soon turned the barracks into death camps. To stem the tide, the colonial authorities decided to undertake a major swamp drainage scheme covering the whole of Apapa and the swampy parts of Lagos. It took two years to complete but at the end malaria mortality was practically eliminated among the troops. Unfortunately the project was not continued after the end of the war, again confirming my earlier assertion that the health of Europeans and not that of Nigerians was the driving force behind the Government's health programmes in the first half of the 20th century. The success of the Lagos swamp drainage Scheme shows what can be achieved if the right intervention based on sound scientific research evidence is efficiently implemented no matter the magnitude of the problem.

Child Health

The seed of evidence-based child health care in Nigeria was sown in Lagos in 1925 with the appointment by the Colony of Lagos health authorities of three health visitors charged with the responsibility of visiting the homes of recently delivered mothers to urge them to take their babies to government dispensaries or properly qualified doctors for good medical care. This was

followed by the establishment of the first infant welfare clinic in Lagos in 1928 with emphasis on educating mothers on preventive medical actions. The ground was thus set for the accurate recording of trends in childhood morbidity and mortality the harvest of which would be the development of rational approaches to child care based on new knowledge and understanding of childhood illnesses obtained from these records.[11,12]

In 1929 the infant mortality rate in Lagos was 134 per thousand live births with 45.3% of the deaths occurring in the first four weeks of life. The four commonest causes of death were respiratory tract infections 14%, convulsions 10%, malaria 5.9% and diarrhoea 4.8%. In the second year of life the child mortality rate was 35.5 per thousand live births with the four commonest causes of death again being malaria 23.5%, diarrhoea 21.9%, convulsions 16.2% and respiratory tract infections 15.4%. It is quite striking that, except for absence of measles in the 1929 figures, the infant and child mortality statistics have changed little in the nearly 80 years since these statistics were first recorded. What I want to direct attention to here now is the condition termed convulsion which was responsible for l0% of deaths in the first and l6.2% in the second year of life. This term is a symptom but it was not possible at that time to identify any disease as its cause. So, for the next several years it remained as febrile convulsion of unknown origin. Fever associated with convulsion is considered in rural and poor communities to be supernatural in origin and outside the competence of the western system of health care to diagnose and treat correctly. The patients are therefore initially treated traditionally.[13] In spite of this treatment many of these children would still end up in hospital severely ill with fever, deep coma, repeated convulsions, severe neurological dysfunction, pulmonary oedema, acidosis and hypoglycaemia. They always had malaria parasites in their blood if carefully looked for. In the recent past this syndrome was thought to arise from adverse effects of the treatment given at home for convulsion.[14]

In the course of our comprehensive study of malaria, the condition came to our attention. It occurred to us that all its manifestations were typical of cerebral malaria. When the patients were aggressively treated for cerebral malaria, mortality rate went down immediately from almost 100% to less than 15% and falling. Now cerebral malaria is widely recognized and correctly treated leading to the saving of thousands of lives.[15]

Hypertension

I have included the next disease entity, hypertension, in this review of health research in Nigeria over the years as an example of how we can be easily led astray by conclusions drawn in the absence of adequate knowledge and understanding of a situation. Up till the beginning of the Second World War it was widely believed that hypertension either did not occur or was very rare in Africans. This myth was blown open during the Second World War when raised blood pressure was found frequently in Kenyan Africans enlisting in the colonial army.[16] It would thus appear that if the colonial medical practitioners in Africa in the pre-Second World War period had sphygmomanometers, they did not use them. They therefore failed to detect hypertension in their patients and instead concluded wrongly that the condition did not exist in Africans. It is not surprising that, after the Second World War, hypertension became a common diagnosis in Africa and the pendulum began swinging in the opposite direction with a new set of fallacies arising from inadequate observations. It was then that we heard statements like hypertension was more common in the African than in other races, it occurred at a younger age, was more severe in the African, pursued a rapidly fatal course and did not respond to treatment as well as in other races. While these fallacies held sway, medical researchers in our universities and teaching hospitals began a systematic study of the disease and came up with findings which refuted or explained the obviously wrong earlier conclusions.[17,18] Initially, the studies in hypertension were devoted only to the biomedical, epidemiological and therapeutic aspects but recently the studies

have widened to include the social, economic, cultural and behavioural aspects. The latter studies have enabled us develop a comprehensive picture of the disease and made it possible for us to explain some of the puzzling findings from biomedical studies. Thus, for example, we now know that hypertension is not more common in Africans than in other races. The non-communicable disease survey undertaken in this country in the early 1990s and sponsored by the Federal Ministry of Health showed that the frequency of raised blood pressure in Nigerians is comparable to that in most other populations. As to whether hypertension occurred more frequently in the younger age group in Africans, this was not supported by the Nigerian survey which found blood pressure to rise with age as in most other populations with the highest frequency amongst the over 80 year olds who had a frequency of over 35% whereas in the under 40 year olds the frequency was less than 5%.[19]

Most of the information comparing black hypertensives with whites came originally from South Africa during the apartheid era and from the USA where blacks are socially and economically disadvantaged and the socioeconomic and behavioural stress factors combine to push up the blood pressure in all age groups and all social classes. The apparently more rapid course is due to socioeconomic factors like non-availability of treatment facilities, and if available, might not be accessible or affordable. It is also partly due to the fact that most of the patients are first seen at a relatively late stage of the disease when symptoms from complications have arisen. In the Nigerian survey high blood pressure was found to be more common among the urban poor than among the urban rich and rural poor. This can be explained by the enormous social stress to which poor rural-to-urban immigrants are exposed especially with respect to housing, transportation and employment. Another often quoted characteristic of hypertension in the black population is that black hypertensives respond poorly to treatment. If anything the reverse is the truth. Biomedical studies in black hypertensives have

shown some biological peculiarities which can respond to specific pharmacological manipulations. For example, it has been shown that hypertension in blacks, particularly in the early stages, has a large salt and water retention component which makes it highly responsive to treatment with diuretics which are the cheapest and safest of the antihypertensive drugs in current use. The response to other treatment modalities is similarly satisfactory but can be distorted by the social environment in which the patients live, particularly by inability to pay for treatment which is life-long. The disease is for most of the time symptomless and the requirement for continuing treatment in the absence of symptoms runs counter to the culture of many of our communities. Therefore, many patients with mild hypertension stop treatment only to return later with severe hypertension or life-threatening complication like stroke, heart failure or renal failure. Also, until recently, most of the effective antihypertensive drugs had side effects which, like the ones on reproductive function, are culturally unacceptable to most patients. As a result, these patients would deliberately choose not to comply with treatment without letting their doctors know thus leaving the doctors to make the erroneous conclusion that the treatment was ineffective.

The rationale behind this discussion on hypertension research is to show how much we have been led astray in the past by our failure to look at the hypertension situation in depth and in totality. What we concentrated on, which was what we saw in the hospital, was only the tip of the iceberg. On the basis of the evidence from our recent in-depth studies and population surveys we can now conclude confidently that hypertension is not worse in Nigeria than in other places. If we can successfully deal with the confounding social, cultural, behavioural and economic factors especially at the community level we should be able to reduce the burden of this disease on the people significantly.

Issues in Health Research

The four medical conditions I have just described illustrate some of the main issues in health research which I will now turn my attention to.

Who Does Research and Where?: There has always been a myth about scientific research to the extent that it is widely considered to be the exclusive preserve of a few people with jaw-breaking academic degrees working on esoteric subjects in awe-inspiring laboratories. This myth has probably been started, propagated and perpetuated by scientists themselves who want to be seen as being intellectually superior to their fellow human beings. This picture is very far from the truth. Health research, in particular, can and should be done by everyone involved in any aspect of health from the village health worker to the merit award or Nobel Prize winning molecular biologist. A primary health care worker carefully documenting the case histories of patients seen in his facility can, over time, provide enormous new information on the risk factors and clinical course of a disease in a particular locality. This is new knowledge and the primary health worker has done research to obtain it. All that is needed is meticulous and conscientious performance of one's work and painstakingly thorough recording of information. On the part of the health authorities provision of paper, pen and other items of stationery for completing the record may be all that is required, yet new knowledge of far-reaching importance might be obtained from such ordinary effort.

The resources required become more complex as one goes up the health care ladder until one gets to the tertiary health care institutions, the universities and the health research institutes where special facilities would need to be provided to enable researchers operate at the frontiers of advancing knowledge especially in the area of biomedical research. It should be clear from the foregoing that health research can be done by anyone, practically anywhere as long as there is interest and commitment

for research. The common excuse by some university staff that they are not able to do research because state-of-the-art facilities are not provided for them by the authorities has some merit but a knowledgeable scholar well-trained in the process of problem-solving through scientific enquiries should be able to identify what is feasible within the limits of the available resources and design studies capable of being executed with those resources.

Training for Research: Health research covers the usual range of activities from basic observations in the natural sciences to operational research focused on well-defined aspects of specific diseases. It spans a wide range of disciplines from the precision of the physical sciences to the qualitative and subjective measurements of the behavioural sciences. In spite of its diverse characteristics and procedures health research is governed by the same principles that govern other scientific inquiries, an important one of which is that the research is conducted strictly in accordance with the well-known scientific concept that measurements are made and their significances evaluated using adequate controls. The first requirement in a health researcher at whatever level he might be operating is the possession of the knowledge and skills to perform satisfactorily at his level. The next requirement is to be well-informed in the principles of what may be termed 'good research practice' comparable to 'good clinical practice', 'good manufacturing practice', etc in other endeavours The training activities to acquire these skills can take place on the job and can be through separate individual or group training programmes. Researchers should, in addition, be exposed to refresher courses periodically so as not to miss out on advances in their fields of endeavour. A reward system for increasing knowledge and skill will keep the motivation of the researcher high and improve the quality of performance. Quality should not be equated with the level of sophistication and complexity. Research data collected at a primary health care facility can be of good quality and high relevance whereas a study using an electron microscope might be not so good in quality and have little relevance to the health problem under study.

Funding of Health Research: Health research at any level can be quite expensive and so adequate financial provision has to be made for it to make it sustainable. There are four main sources for health research funding. These are: (1) public sector, i.e. government, (2) private for-profit sector, (3) private not-for-profit sector and (4) international development agencies. In most developed countries the public sector is the biggest funder of health research and, this, no doubt, gives government a decisive say in the setting of research agenda and priorities. Funding is usually channeled through organizations set up by government for that purpose, for example, the British Medical Research Council. In low income countries, government funding of health research is at a low level because research is not given a high priority, it being considered a luxury to be engaged in by rich countries that have enough to spend and to spare. This of course is a mistaken belief since it is more important for a poor country to obtain sound evidence on which to base its health actions so as not to waste its scant resources on irrelevant actions. The most important effect of government not funding health research is that they have little say in the setting of the research agenda and priorities. Research in such a situation depends on the interest of the investigators or their sponsors rather than on the needs of the country. This is why in spite of the enormous amount of health research going on in this country, their impact on the health of the population is still minimal.

The next major sponsor of health research is the private-for-profit sector. These organizations are in health research for the profit that can accrue to them from the marketing of products that are developed from the research. They are, therefore, only interested in research that has prospects for high future financial returns. Since such returns are unlikely from products of interest only to poor countries, research on the health problems of poor countries holds no attraction for these organizations. Their research funding is therefore directed mainly at developed country projects. The most important members of the group of private

for-profit health research funders are the research-based multinational pharmaceutical companies. They have large research divisions where they do all types of research and also give grants to support studies in other research institutions. Their contribution to health research in this country is not significant.

The third group is the private not-for-profit sector. These are philanthropic organizations like the Rockefeller Foundation, the Ford Foundation, the Wellcome Trust and the Melinda and Bill Gates Foundation. Their spectrum of support includes the kinds of research that would ordinarily be unattractive to the private for-profit sector. They have been a major source of funding for all types of research in this country and their support of research capacity strengthening has made it possible for many institutions in low income countries, which would otherwise be unable to participate in high level research, to become major participants in that field.

The fourth group of funders consists of the International Development Agencies. They may be non-governmental like WHO, UNICEF, UNDP and World Bank all of which are United Nations Agencies or they may be governmental like USAID, DFID, CIDA and SAREC. Like the private not-for-profit sector, these organizations support research of local, national or global interest and also expend huge resources on research capacity strengthening. Health research in Nigeria has benefited enormously from this funding source. A welcome development in recent years is partnership between some of these funding organizations for some major research projects. The best known is public-private partnership in which the private organization provides a grant which is then matched by government. Partnership can also be set up between two or more of the private sectors.

The public sector has a responsibility to support health research however poor the country may be. This is especially true for Essential National Health Research which is necessary for

obtaining greater understanding of the country's health problems and developing interventions for their control. The alleviation of poverty in this country depends to a great extent on the reduction of disease and economic burden produced by diseases like malaria and tuberculosis, and purposeful, sustained research on these diseases is neglected at our own peril. In order to enhance public sector support of health research it has been recommended that at least 2% of the health budget should be devoted to research.[20] Implementation of this recommendation would be a good beginning towards increasing our support for health research.

Prioritization of Research: With limited funds being available for health research, it is important for countries to prioritize their needs so that the most pressing needs are attended to first. In Nigeria, health research prioritization has been talked about frequently but it has never been done. Every country should be able to develop a system for determining its health research priorities bearing the following considerations in mind:

1. Identification of the various diseases that constitute a burden to the people.
2. Determination of the magnitude of the burden of these diseases.
3. Determination of the appropriate research for the solving of the problems posed by the disease, the probability of success and the cost.
4. Feasibility of the needed research, with regard to the available human and material resources and available funding.
5. Possibility of collaboration with researchers in complementary areas of research which can lead to reduction in overall cost.
6. Ethical and cultural acceptability of the research and the resulting intervention.
7. Potential of the research for capacity strengthening.

Prioritization by its nature would have political undertones alongside the scientific considerations. To get national support for it all stakeholders (the research community, the health providers, health care consumers, research funding organizations, etc) should be represented at forums where the prioritization is to be discussed and agreed. The priority list should be an agreed consensus not something forced down the throat of one group by another. Where it exists, the National Medical Research Council usually provides the platform for this kind of deliberation.

Research Information: Research is not completed until its findings have been published. Without publication it cannot be of use to those who might need it. The commonest outlet for the dissemination of health research information in this country is the medical or scientific journal which can be local or international. The local journals are mostly based in the universities even if they are published by health professional associations. They are mostly peer-reviewed journals and have varying degrees of international recognition. The need for a local journal in the country for the dissemination of scientific information was recognized early leading to the establishment of the West African Medical Journal by the West African Medical Research Institute in 1927. This journal remained the only one of its kind in the country until the university era began in the early 1950s. Other avenues for dissemination of research information include reading of papers at scientific conferences, publication of books and monographs, technical reports and public lectures like this one. But these are not enough in today's fast moving world. Every college of medicine, health research institute and ministry of health should have a website in which research and other new information pertaining to health which arise from work done in the various institutions are posted regularly and can then be accessed at any time by anyone interested in the subject. The federal and state governments should also set up health research information systems which will collect, collate, evaluate and store research

information in their research data banks and disseminate appropriate information through widely circulated newsletters or other types of publication. Even with the limited amount of research going on in the country at the present time there is a great deal of duplication, and a large percentage of work done does not get published. This leads to waste of resources. An efficient health information system would remove most of the duplications and make more funds available for new original studies.

Social, Economic and Behavioural Factors in Health: It is now widely recognized that a disease cannot be fully understood until its study has included the social and cultural environment in which those affected by the disease live as well as the factors that determine their individual and group behaviours. To be effective a control intervention for these diseases would have to factor in findings from these investigations. It would indeed be right to say that one of the most important reasons why many of the communicable diseases persist in our country even though we have the tools for their control is that until recently we have not taken into consideration the social, economic and behavioural factors prevalent in the area and have given attention only to the causative organisms and the pathological changes they produce. We have to take into consideration the fact that a treatment would be of little use if it is not available, accessible, affordable or acceptable to the people it is meant for. At the same time that we are studying the pathology of the disease, we have to study these socio-economic aspects and interventions should be targeted towards ameliorating them. The rejection of the polio vaccine in parts of the north some months ago is still fresh in everybody's mind and should convince everyone about the importance of studying the contribution of the social environment to disease.

Health Systems Research: Over the past several years in this country every new minister of health has had cause to comment adversely on the state of health care in the country in spite of the

huge sums of money expended on health in the preceding administration. This state of affairs suggests that there is a fundamental fault in our health care system which can only be identified through in-depth health systems research followed by reforms that would correct deficiencies detected. In health systems research we study the health systems within which health services are provided, the people who use the health system and the interaction between the systems and the people. The research techniques used in health systems research are mostly those of the social, economic and behavioural sciences. Health systems research has the potential to provide new knowledge on the efficiency, cost-effectiveness, equity and acceptability of the health system in use in any particular country. In recent years in this country with the decline in our public sector health care system, several informal systems (e.g. faith healing, traditional practice, divination, etc) have begun to flourish side by side with the declining formal system. In this situation people have had to assume almost total responsibility for their health care system choices, selecting which system to patronize without the benefit of any reasonable information on the merits of the options available to them. In a recent study of four rural communities in different geopolitical zones of this country it was found that mothers of under-five-year-old children try home remedies first when their children are ill, then they try local traditional healers and then the patent medicine dealer. It is only when these fail that the public or private sector formal care facility is consulted.[13] In the course of trying the unconventional systems, useful time is lost and a mild illness might have progressed to a severe complicated form. Any wonder then that our infant and child mortality rates have changed little over the last few decades. Carefully designed and conducted health systems research would determine the basis for this kind of behaviour, evaluate its impact on child survival and proffer suggestions for improving the situation.

One of the most striking health systems reforms in this country in recent years is the introduction of cost recovery measures in

the public sector health care facilities. This has clearly increased the cost of health care to the people. Health systems research studies can be designed to determine how this new dispensation has affected compliance with drug prescription, acceptability of other recommended treatments like surgical operations and health care facility patronage in general. The results of such studies would be useful as a guide to health authorities in understanding what impositions people are willing to accept and consequently to organize health services that provide affordable, acceptable and sustainable good quality care efficiently and equitably. So far, health systems research constitutes only a small percentage of health research undertaken in this country and there is plenty of room for increasing our contributions in this field.

Collaboration and Linkages: The kinds of research that would be expected these days to generate significant new knowledge on a disease problem and lead to the development of significant interventions, will, with a few exceptions be multidisciplinary and might be multicentre as well. Collaboration between individual researchers is now the rule while linkages between research institutions are also a common occurrence. This is an area of comparative advantage for universities and partly explains why universities are dominant as centres of research. A biomedical study might require the skills of diverse basic and clinical science disciplines which could all be available in one university. A large behavioural or risk factor study or a field evaluation of a new product may require thousands of subjects which is possible only in a multicentre study. In this country at the present time, true collaborative and multicentre studies are rare reflecting the limited objectives of the studies and the comparatively low level of the funding. This is different from the multiple author studies, common among our researchers, in which five or more authors possessing the same skills do the same work that could have been done by one or two persons. Also, large epidemiological studies are rare and this also in part explains why truly ground

breaking research is uncommon in this country these days in spite of the hundreds of scientific papers produced by our researchers annually. Interestingly, collaboration and linkages are the best and cheapest ways of acquiring new skills in research and are particularly encouraged by private not-for-profit and international agencies that fund research. This is one area we should look into and correct if we want to be major contributors to ground breaking research and not just producing postscripts to what has been done and dusted elsewhere. The story of the yellow fever research I described earlier with collaboration and linkages between Rockefeller Foundation scientists, British scientists and Nigerians from the Medical Research Institute is an example of what can be achieved through collaboration and linkages. A more recent one was the large multicentre study called the AIDS Prevention Initiative for Nigeria generously funded by the Melinda and Bill Gates Foundation which linked Nigerian researchers in several centres (including the universities, research institutes, teaching hospitals, numerous small NGOs and state and federal AIDS control programmes) with the Harvard School of Public Health.[21] This group undertook very thorough, in-depth biomedical, epidemiological, behavioural, socio-economic, preventive and therapeutic studies of HIV/AIDS in Nigeria and pioneered the production of data on HIV/AIDS for this country which we would never have been able to obtain otherwise. Because government was party to the agreement for the studies in the first instance, the findings were immediately available for use by government in its HIV/AIDS control programmes. Another example was the multicentre study on the empowerment of rural mothers in this country to recognize and treat febrile illness. This study which required a large number of study subjects for validity was possible because of funding from the WHO.[13,22] Similarly, the multicentre study that finally showed unacceptable degree of resistance to Chloroquine and Fansidar in this country was also possible because of joint funding by the WHO and government and collaboration between researchers in different centres. (Federal Ministry of Health, Unpublished Report).

Utilizing Health Research Results: The ultimate goal of health research is to improve the health of the people. Therefore, apart from its scientific quality requirement, health research has to be relevant to the health needs of the people. But this is not always so. The people who mostly do the research are different from the people who provide health care, that is, the government health authorities. The university scientists who mostly do the research all too often work on subjects that interest them which may not necessarily coincide with the needs of the health authorities. This is where prioritization of health research and drawing up of a health research agenda discussed earlier come in. Even where there is prioritization it might not be possible to get researchers to comply with it if it differs from their own interests as long as the health authorities are not responsible for funding the research. The only way to ensure that health research is tailored to the needs of the country is if the funding is largely from the public sector. Fortunately, the private not-for-profit donors and the international development agencies, who are the biggest health research sponsors in this country include relevance to national needs among the criteria for supporting any research project. This is why many of our research studies still have some measure of relevance even though they are not funded by the government. In any case, the health authorities have to develop regular interaction with the researchers to familiarize themselves with advances in knowledge generated from their work that could be useful in disease control programmes.

The universities are, however, not the only places where health research is done. Government health research institutes, health care facilities and disease control programmes also undertake research. Since these institutions are mostly under the direct control of the health authorities, their research is usually more relevant to the needs of the country and their findings get readily incorporated into policy and disease control measures. An example of this occurred recently when it appeared that malaria infection was no longer responding satisfactorily to the then drugs of choice. The ministry of health in collaboration with the WHO

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commissioned a multicentre study in all six geopolitical zones of the country to determine the truth or otherwise of this impression. The studies showed that the degree of treatment failure to the drugs of choice was no longer acceptable and recommendations were made for their replacement.(Federal Ministry of Health, Unpublished Report) These recommendations were promptly accepted by the health authorities and formed the basis of a new national malaria treatment policy. More of this kind of research-policy linkage is needed for us to take maximum advantage of research going on in the country.

Conclusion

I have tried in this lecture to give my personal reflections on some of the main issues in health research in this country which started about a hundred years ago with the establishment of the West African Medical Research Institute. I have tried to give a balanced view of our journey so far giving credit where it is due and pointing out deficiencies where they exist. I have tried to avoid just making it a criticism of everything we have done neither have I engaged in an exercise of undeserved adulation. I have, as much as possible, tried to avoid personalizing issues.

It is important for us to take maximum advantage of the contributions that research can make to the achievement of the goal of our national health policy. To that end we have to pursue a programme of health research that is based on clearly defined health research policy and the strategies for achieving the objectives and goal of the policy. A health research policy would, apart from setting out our research objectives, describe specific activities for policy implementation. It would also make provision for adequate health research funding.

For the proper execution of the provisions of the National Health Research Policy it would be helpful to set up a National Health Research Council which would have the status of a Commission charged with the task of discharging governments' responsibilities

with respect to the National Health Research Policy. Among its tasks would be facilitating the production, regular review and updating of health research priorities, budgeting for health research and disbursing research funds to researchers on a competitive basis. The Council would also be responsible for strengthening research capacity in the country through research training and resource acquisition grants and will submit regular reports to government on research going on in the country.

In this way our health research would have focus and purpose and we would be making health research contribute to improved health of the people and their enhanced economic development. It is only left for me Mr. Chairman, Ladies and Gentlemen to thank all of you for your kind attention.

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BRIEF CITATION OF PROFESSOR LATEEF SALAKO GUEST LECTURER UNILAG 2007 CONVOCATION LECTURE

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Professor Lateef Salako was educated at the Methodist Boys' High School, Lagos and the University College, Ibadan. He graduated MB,BS (London) in 1961 with honours winning the Sir Samuel Manuwa Gold Medal for the best graduating student in his year. He later specialized in internal medicine obtaining the MRCP (London) in 1964 and FRCP in 1977. He also did laboratory research leading to the Ph.D. and D.Sc. Degrees of the University of Sheffield in 1979 and 1994 respectively. He is a foundation Fellow of the Nigerian and West African Postgraduate Medical Colleges in Internal Medicine. He was elected Fellow of the Nigerian Academy of Science in 1981 and served as its president in 1998 and 1999.

His entire medical working career was spent at the University of Ibadan where he became a Professor in 1973. On his retirement in 1991, he was honoured by the University with appointment as Emeritus Professor and recently with an Honorary Fellowship of the University. After retiring from Ibadan he was appointed the first Director General of the Nigerian Institute of Medical Research, 1993-99 and later, Chief Executive of the Federal Vaccine Production Laboratories, 1999-2002. He served as Special Assistant to the Federal Minister of Health from 1989 to 1992.

His contributions to knowledge and world health are mainly in the fields of Hypertension, Drug Use and Malaria in all of which he is one of the leading authorities globally. He served as Expert and Special Adviser to the World Health Organization for several years in all three fields. He has about 200 publications to his credit not counting several technical reports, coauthored, mostly for the World Health Organization.

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