

## ORIGINAL ARTICLE

# Challenges of implementing sustainable health care delivery in Nigeria under environmental uncertainty

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## Abstract

**Introduction:** The increasing cost of health care in developed and developing economies has called for a change in the way health activities are implemented. Nigeria is faced with fundamental health care related challenges coupled with recent security issues. Uncertainty prevails as health system dynamics unfolds.

**Objectives:** To explore the relationship between environmental uncertainty and health care delivery system in Nigeria. The study aims at reviewing the dynamics of health care delivery in some developed economies and Nigeria with regard to methods of adaptation of health care under uncertainty, and developing a framework for sustainable health care delivery.

**Methods:** Databases were searched for relevant literatures using the following keywords: environmental and health uncertainty, Nigerian health care system, Nigerian primary health care, health care financing and sustainability. Other keywords used include: US, Europe and China health care dynamics, among others. Scientific databases obtained from the Internet were used including online journals, which were sourced mainly from the Google. Relationships if any were established and a framework for sustainability developed.

**Results:** Environmental uncertainty has a multiplicity of interactions with different aspects of health care system, resulting in poor infrastructural development, inadequate government funding, absence of integrated system for disease prevention and surveillance, policy reversals, security challenges, and unimpressive health indicators in Nigeria. A framework for implementing sustainable health care delivery under uncertainty is proposed.

**Discussion and conclusion:** Uncertainty abounds in the Nigerian health care delivery system; causing further distortion in development of the health sector. Effective mobilization of health care professionals, use of sustainable care plans by government, use of integrated medical intelligence and surveillance systems, accountability, commitment, and above all quality leadership - will minimize uncertainty factors and enhance health care performance and sustainability in Nigeria.

## Key words

Health care, Uncertainty, Challenges, Sustainability, Nigeria

## 1 Introduction

The context of health is rapidly changing. In advanced economies, health care systems are deemed financially unstable, while in emerging economies, they are still being shaped<sup>[1]</sup>. These systemic changes result from the government pressure

to contain the cost of health care. These costs have increased due to the growing number of ageing population and sophisticated technological advancement in medicine (in developed countries) and high unemployment rate, population explosion and poor accountability in developing countries. Concerns for affordability of health care are rife and there is a need to operate the health system in a more efficient manner<sup>[2]</sup>. Nigeria is faced with the challenge of ineffective use of past opportunities to develop a vibrant and sustainable health care delivery; so the future of health care seems uncertain.

## 1.1 Statement of problem

The health sector in any economy forms the backbone of its growth and development. Factors affecting the overall Nigerian health system performance include: inadequate health facilities and structures, poor management of human resources, poor motivation and remuneration, inequitable and unsustainable health care financing, skewed economic and political relations, corruption, illiteracy, decreased government spending on health, high user fees, absence of integrated system for disease prevention, surveillance and treatment, inadequate access to health care, shortage of essential drugs and supplies and inadequate health care providers<sup>[3, 4]</sup>. Bilateral and multilateral assistance, and government spending on health (26.40 billion Naira or 26% of total annual budget for 2004) have not translated into enhanced health status of average Nigerians. Policy reversals and other inconsistencies over the years tend to undermine some health reforms of the past<sup>[4]</sup>. Strategies developed for the effective implementation of national health programs in the three tiers of government (federal, state, and local government) are poorly implemented due to the politics of federalism (autonomy and resource control). High disease burden and population explosion have culminated in a vicious cycle of poverty, insecurity and uncertainty.

### 1.1.1 Uncertainty in health care delivery

There is uncertainty in how health care will look in the future. There are multiple meanings and varieties of uncertainty in health care. Uncertainty is not a monolithic phenomenon, but has multiple varieties<sup>[5]</sup>. A new integrated conceptual taxonomy characterizes uncertainty in health care according to its fundamental sources, issues and locus. Han *et al.*<sup>[6]</sup> developed an organizing conceptual framework that categorizes these varieties in a coherent, useful way to add value to clinicians, researchers and health policy makers. The three sources of uncertainty in health care are as follows:

- Probability (indeterminacy of future outcome) - clinical uncertainty could arise from an individual clinician's limitations in medical knowledge or policy and/or in cognitive and affective functioning. It can also apply to other health professionals who could face uncertainty in the course of carrying out their professional roles.
- Ambiguity (lack of evidence, contested evidence or imprecision in estimates) - uncertainty could arise from how individuals interact and form relationships. These include clinician-patient, clinician-clinician, or clinician-non-clinician staff. Other members of the health team face similar problems at work, and could be classified the same way.
- Complexity (multiplicity of causal factors and interpretive cues)<sup>[6]</sup>. Uncertainty could also be a problem resulting from living within complex adaptive systems where varying mixes of natural and man-made systems interact and resist control<sup>[5]</sup>. Collaborative engagement with case-based uncertainty in small groups of clinicians, and other health professionals are faced with initial trial and error process of false starts and blind alleys during investigation of a disease condition. Over time and repeated effort, the investigating clinicians finally gain better understanding that inform their subsequent decisions on the disease management<sup>[6, 7]</sup>.

Langham *et al.*<sup>[8]</sup> challenged the wide spread notion that multi-professional care is best supported by the rational approach of standardized protocols, strictly delineated roles and an electronic record system that assures quality through coded entries, templates, *etc.* When uncertainty is high in primary health care, quality emerges through adaptive relationships, collective sense-making and on-the-job learning from one another<sup>[5]</sup>. Plsek and Greenhalgh<sup>[9]</sup> also emphasized limitations in reductionist thinking and the clockwork universe metaphor for solving clinical and organizational problems. They posit

that coping with complexity involves abandonment of linear models, acceptance of unpredictability, respect (and use) of autonomy and creativity, and flexible response to emerging patterns and opportunities - to enhance sustainability. Unlike the management thinking of machine metaphor, complexity thinking suggests that relationships between parts are more important than the parts themselves, that minimum specifications generate more creativity than detailed plans. Treating health care organizations as complex adaptive systems allows a new and more productive management style to emerge<sup>[10]</sup>.

Moral issues play a significant role in the way health and pharmaceutical businesses are executed. The expectations that physicians would always put the interests of their patients and clients above their own self-interests, the role of not-for-profit organizations, professional licensing and many other forms of government regulation – could be viewed as adaptations to the existence of uncertainty in the incidence of disease condition and its management<sup>[11]</sup>.

### 1.1.2 Health system sustainability

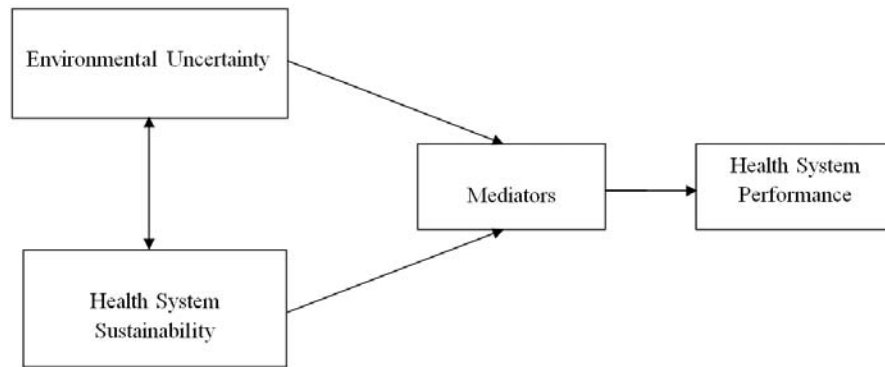
A health care system comprises all medical care services involved in the prevention, diagnosis, treatment, and rehabilitation (services for the restoration of function and independence); the institutions and work force that provide the services, and the government, public and private organizations and agencies that fund the service delivery<sup>[12]</sup>. A four-level model of the health care system comprises: the individual patient, the care team, the organization, and the political and economic environment of operation<sup>[12]</sup>. Sustainable health care is a complex system of interacting approaches to the restoration, management and optimization of human health that has an ecological base, that is environmentally, economically, and socially viable indefinitely. It should function harmoniously both with the human body and the non-human environment and should not result in unfair or disproportionate impacts on any significant contributory element of the health care system<sup>[13, 14]</sup>.

Sustainable health care stems from well articulated and implemented health plans based on the National Health Policy. Evaluation of all operations is paramount to ensure effectiveness and efficiency of the programs. The federal government of Nigeria provides directly or indirectly over 90% of the funds for health services, and allows states and local governments some freedom in the way they disburse the allocated funds<sup>[15]</sup>. Availability of funds and timely disbursement are therefore closely tied to health care performance and sustainability. Achieving successful health financing system in Nigeria is challenging due to limited institutional capacity, corruption, and unstable political and economic context<sup>[16]</sup>.

In Nigeria health care is financed by a combination of tax revenue, donor funding, user fees, and health insurance (social and community)<sup>[17]</sup>. Most economies adopt a mixture of various methods. The success of these financing methods is measured by the overall impact on equity of access and health outcomes, revenue generation and efficiency, and the effects on the provider and user behavior<sup>[18]</sup>. Since launching National Health Insurance Scheme (NHIS) in 1999 till mid 2012 the scheme still covered only about 3% of the Nigerian population (five million people) with mixed success, while the recent launch for rural community-based social health insurance program to cover more Nigerians recorded low up-take<sup>[19]</sup>. Health systems vary widely in performance, and countries with similar levels of education, income and health expenditure differ in their ability to attain key health goals<sup>[20]</sup>.

### 1.1.3 Health system performance

Health system performance (efficiency) centers on: improving health, responsiveness to the expectation of the public and assuring fairness of financial contribution. The components of assessment of health system goals include distribution, level, quality and equity. There is always a maximum attainable and minimum possible performance within the boundaries of goal achievement and health system resources<sup>[21]</sup>. In measuring the overall health system performance (efficiency), Nigeria was ranked 187 out of 191 WHO member countries in 1997<sup>[22]</sup>. Performance of the entire health system must be associated with the performance of various sub-components or even organizations like hospitals within the health system<sup>[21]</sup>. Omoleke<sup>[22]</sup> observed that primary health care (PHC) services in Nigeria were constrained by a low level of interaction and coordination among the three tiers of government, which resulted in poor performance of primary health care facilities. It is therefore necessary to examine how different forms of uncertainty impact on different aspects of health care performance and sustainability (see Figure 1).



**Figure 1.** Generating a mechanism of health system sustainability under environmental uncertainty

### 1.1.4 Uncertainty and health care performance

Uncertainty impacts on the health care delivery system in a number of ways. The challenges of uncertainty and inter-professional collaboration in palliative care for non-cancer patients in the community from patients, carers and health care professionals' views were systemically reviewed by Oishi and Murtagh<sup>[23]</sup>. Kostopoulou and Wildman<sup>[24]</sup> studied sources of variability in uncertain medical decisions in the intensive care unit using a process tracing method. Xiong W *et al.*<sup>[25]</sup> explored uncertainty and operational considerations in mass prophylaxis workforce planning. Coping with uncertainty during health-seeking was studied in Lao PDR<sup>[26]</sup>. Result showed that care-seekers had more preference for local providers than for outsiders irrespective of the latter's legitimacy. A comparative study of coping strategies to medication errors and uncertainty among young and experienced general practitioners (GPs) in a primary health care was carried out by Nevalainen *et al.*<sup>[27]</sup> Kai *et al.*<sup>[28]</sup> carried out a qualitative study of professional uncertainty and disempowerment in responding to ethnic diversity in health care. Results suggest the potential mechanisms by which health professionals may inadvertently contribute to ethnic diversity.

Simonsson *et al.*<sup>[29]</sup> illustrated a methodology of reducing uncertainty in health-care resource allocation. The calculations revealed that optimal drug pricing could generate all situations that improve drug availability to patients, optimize public expenditure on drugs and increase pharmaceutical company gross profits. Stern and Agha<sup>[30]</sup> showed the effect of regulatory uncertainty on innovation as evidenced from medical technology. Uncertainties in measuring populations potentially impacted by sea level rise and coastal flooding were investigated by Mondal and Tatem<sup>[31]</sup> while Wardekker *et al.*<sup>[32]</sup> carried out an assessment of uncertainties in health risks of climate change and its implication for adaptation policies. Murray *et al.*<sup>[33]</sup> carried out a comparative quantification of health risks from conceptual framework and methodological issues perspective.

Van der Geer *et al.*<sup>[34]</sup> observed that performance indicators were increasingly used to measure and control quality and efficiency of care-providing teams. Results showed that teams higher on task uncertainty developed relatively more process indicators compared to outcome indicators and vice versa.

## 1.2 Objectives of the study

The objectives of the study are: To explore various literatures on environmental/health uncertainty and the health care delivery in Nigeria and other countries, and link the relationship with health care performance and sustainability in the Nigerian context. Second is to develop a framework for sustainable health care delivery under uncertainty.

## 2 Methods

Databases were explored to elicit information on different aspects of health care delivery system, environmental and health uncertainty and the impact of the uncertainty factors on health care delivery in Nigeria. Extensive search of Google Scholar, PubMed and Medline was carried out to retrieve literature on health uncertainty, primary health care services,

health care performance and sustainability, health care financing, health care dynamics in some western developed countries, China and Nigeria. Peer-reviewed publications and abstracts of journal articles in English were also used. Separate search on the websites of National Primary Health Care Development Agency and Access to Health Care Services in Nigeria was also carried out. Non-indexed literature and reports from international organizations were also accessed through Google website. Also e-books available online were used as sources of information. The time period covered by the search was from 1994 to 2014. The selected literature was organized to address the stated objectives. The Nigerian health system and health uncertainty factors apparent in the Nigerian context are discussed, with a view to identifying possible impact on the health system performance and sustainability.

## 3 Results

### 3.1 The Nigerian health system

The organization of health care services in Nigeria is complex and includes numerous providers in both the private (private for profit providers, not-for-profit and community-based organizations, religious and traditional care providers), and public sectors<sup>[35]</sup>. In the public sectors, Nigeria operates a decentralized health system in the three tiers of government namely: Federal Ministry of Health (FMOH), State Ministry of Health (SMOH), and Local Government Health Department (LGHD). The FMOH is responsible for the co-ordination and implementation of national health policy. It oversees health activities in the 36 States of the Federation, Abuja (Federal Capital Territory) and 774 Local Government Areas (LGAs). FMOH also provides tertiary care through the teaching hospitals and federal medical centers.

The SMOHs provide secondary health care through the state hospitals and comprehensive health centers, while the LGAs provide PHC services through the primary health care centers. However all the three tiers of government and agencies also participate in the management of the PHC; resulting sometimes in duplication and overlap of responsibilities, conflict and waste<sup>[36]</sup>. Several small communities have evolved primary health care services, with active community participation<sup>[37]</sup>. The capacities of facilities installed years back were overstretched and infrastructure in various states of disrepair. The common man seems to be reverting to the traditional care providers, because of problems of access and affordability<sup>[15, 38, 39]</sup>. Moreover the demography of Nigeria shows that about 55% of the total population live in the rural areas while about 45% live in urban areas<sup>[40]</sup>. Primary health care is currently catering for less than 20% of the potential patients<sup>[41]</sup>. The goal of National Health Policy (1987) later revised in 2004<sup>[42]</sup> was to actualize a comprehensive health care system based on primary health care that is preventive, protective, restorative and rehabilitative to all Nigerian citizens, as well as ensuring health promotion within the available resources, so that individuals and communities are assured to productivity, social well-being and quality of life<sup>[38, 43]</sup>.

### 3.2 Health financing mechanisms in Nigeria

The NHIS established in 2005 by Decree 35 of 1999 of the Federal Government of Nigeria<sup>[44]</sup> was targeted at improving health care financing, by reducing the health care cost borne by individuals. Health financing mechanisms used in Nigeria are mainly user fees and social health insurance schemes. The schemes benefit mainly people in the formal sector (civil servants and those in organized private sector), with a vast majority of the people in the informal sector (farmers, traders, other self-employed and the unemployed) left out<sup>[18]</sup>.

Donor agencies like the WHO, UNICEF and USAID played active role in health financing in Nigeria. For comparison, China overall achieved its articulated goals for 2009-2011; extending basic health insurance coverage to 90% of the population, among others<sup>[45]</sup>.

### 3.3 Some population health data for Nigeria

Some parameters were used to assess the population health of Nigeria, which are measured by the health status indicators<sup>[46]</sup>. Some of these include secondary data on total health expenditure, infrastructure, surveillance systems, life expectancy, efficiency ranking of Nigerian health system and other indicators.

Table 1 shows variability in the total health expenditures in the three tiers of government over a five-year period. These uncertainty factors have negative impact on health care planning and implementation, with consequent adverse effect on the health status of Nigerians.

**Table 1.** Distribution of Nigeria's total health expenditures and by source (%)

Source	1998	1999	2000	2001	2002	5-year average
General Govt. Health Expenditure	15.0	16.6	18.8	27.2	21.6	20.6
Federal	9.7	9.4	10.6	17.6	12.4	12.4
State	3.9	3.6	6.3	8.0	7.4	6.2
Local	1.4	3.6	1.9	1.7	1.8	2.0
Private expenditure	72.0	69.5	65.0	67.2	72.3	69.1
Firms	2.7	3.5	4.7	5.7	6.4	4.9
Household	69.2	66.0	60.3	61.5	65.9	64.3
Donors	13.1	13.8	16.2	5.6	6.1	10.3

Source: Obansa & Orimisan <sup>[4]</sup>

Table 2 shows the state of disrepair of infrastructural facilities in four states of the federation by ownership.

**Table 2.** Primary health care facilities infrastructure across state and facility ownership (in %) in Nigeria

	Bauchi	Cross River	Kaduna	Lagos	Private	Government
<b>Infrastructure</b>						
Taps with running water	22	26	27	80	78	16
Safe water	66	70	65	91	95	57
Electricity	44	60	31	95	94	38
<b>Condition</b>						
Leaking roof	65	43	51	11	15	57
Broken doors/ windows	61	40	56	12	15	57
Cracked floor	73	44	57	16	23	60
Clean	86	97	66	86	87	83

Source: Health Facility Survey (EPOS, CISH, CHESTRAD, 2007); in The World Bank <sup>[36]</sup>

Table 3 shows the estimated figures of some selected health indicators for Nigeria, with all the indices on the high side or unfavorable.

**Table 3.** Some health indicators for Nigeria

Health Indicator	Estimated Figure	Reference Year
Birth rate	36.1/1000 population	2010
Death rate	16.3/1000 population	2010
Infant mortality rate	93.0/1000 live births	2010
HIV Prevalence	2.6 million	2007
HIV Deaths	170,000	2007
Life expectancy	47years	2010

Source: The Library of Congress Country Studies. CIA World Factbook. In Welcome <sup>[3]</sup>

Table 4 presents the life expectancy history of Nigerians over a period of five decades. The figures give an impression that no health gains were made even during the era of oil boom and economic prosperity in Nigeria.

**Table 4.** Nigeria - life expectancy history

Year	Male	Female	Total	World Rank
1960	37.2	40.3	38.7	153
1970	40.6	43.7	42.1	158
1980	43.8	46.9	45.3	159
1990	46.0	48.6	47.2	170
2000	46.1	47.8	46.9	169
2010	46.5	48.1	47.2	184

Source: The World Bank <sup>[47]</sup>

Table 5 shows the disease burden and trauma in the Nigerian population for the selected years. Most of the figures seemed to have risen significantly, with the exception of disease conditions where immunization was on-going.

**Table 5.** Main health problems (%)

	1960	1990	2000
Malnutrition	10-15	40-50	50-60
Malaria	20-30	50-60	50-60
Measles *	20-25	15-20	20-30
Tetanus *	0.5-1	1-2	2-4
Pertussis *	NA	1-2	3-5
Polio	NA	1-2	1-2
Hypertension *	NA	20	30-35
Road Traffic Accidents	NA	6-8	15-20
Other Trauma	NA	3-5	10-12
Homicides	NA	1-2	4-5
HIV/AIDS	NA	NA	10-15
Cancer	NA	0.5-1	1.5-2.8

Note. Source: Scott-Emuakpor <sup>[15]</sup>; \*Age-specific diseases

Table 6 shows Nigeria's placement on the overall efficiency rating of all 191 WHO member States, with France, Italy and San Marino respectively being the top three in ranking. Efficiency index ranges from a maximum of 0.994 for France and 0 (zero) for Sierra Leone for 1993-1997.

**Table 6.** Overall efficiency in all WHO member states

Overall Efficiency				
Rank	Uncertainty Interval	Member State	Index	Uncertainty Interval
186	180 – 189	Liberia	0.200	0.117 – 0.282
187	183 – 189	Nigeria	0.176	0.094 – 0.251
188	185 – 189	D.R. Congo	0.171	0.100 – 0.232
189	179 – 190	Central African Republic	0.156	0.000 – 0.306
190	175 – 191	Myanmar	0.138	0.000 – 0.311
191	190 – 191	Sierra Leone	0.000	0.000 – 0.079

Source: Tandon *et al.* <sup>[21]</sup>

Inadequate tracking techniques in the public health sector can lead to huge health insecurity, and by extension endangering national security <sup>[48]</sup>. To achieve success in public health, a system well grounded in routine surveillance and medical intelligence as the backbone of health sector is of necessity.

### 3.4 Specific forms of uncertainty in Nigeria

(1) Incessant strike actions by doctors, nurses and other health professionals over one demand or the other at the state and national levels, and government's slow response to conflict management create uncertainties that sometimes take months to resolve<sup>[11]</sup>. The health system is worse for it and care-seekers suffer a great deal during such industrial actions. For example the Federal Government of Nigeria was recently considering banning the Nigerian Medical Association (NMA) and Joint Health Sector Unions (JOHESU) over incessant strikes. The NMA embarked on indefinite strike action from 1st July 2014 demanding among other things, reserving the position of Chief Medical Director to only medical doctors, appointment of Surgeon General of the Federation, and reserving the title of "consultant" to only medical doctors<sup>[49]</sup>. It took weeks to resolve one out of such previous disputes. (2) Public hospitals experience uncertainty problems in the selection or appointment of chief executive officers; the outcome of which may be dependent on how connected the candidate is, and not necessarily based on the most experienced or one with best leadership qualities<sup>[49]</sup>. (3) Private practitioners may have limited experience in the management of certain disease conditions. Decision uncertainty may occur about referral or retention of patients. It is advocated that the government should develop primary and secondary health facilities and organize short postgraduate training programs in general practice to make GPs function better<sup>[50]</sup>. (4) The operational costs of private and public hospitals are high because hospitals perform of mission critical tasks 24hours a day, and need constant supply of water and electricity to say the least. Cost of healthcare is therefore high where basic amenities for hospital operations are luxury due to constant electric power outages<sup>[51]</sup>. In a population with low income per capita, majority will not be able to afford quality health care, or may end up incurring catastrophic health expenditure<sup>[52]</sup>. (5) Infrastructure in many public health care institutions is either obsolete or dilapidated<sup>[4]</sup>. Uncertainty arises on how the procured drugs and vaccines would be stored at appropriate temperatures in health settings without constant electricity supply. (6) Supply chain in public health facilities is poor and has resulted in out-of-stock syndrome for medicines and supplies, chaotic drug distribution system, erratic drugs and vaccines supply, and drug resistance<sup>[4]</sup>. Creative implementation and management of supply chain under environmental uncertainty are vital<sup>[53]</sup>. (7) Corruption, unstable economy and ignorance generate uncertainty factors, which impact negatively on the Nigerian health system. Ogbeyi<sup>[54]</sup> reported that unparalleled and unrivalled corruption in Nigeria made the health care delivery system and education sector comatose and nearing total collapse. It also gave room for counterfeit and adulterated drugs to find easy passage into Nigeria<sup>[54]</sup>. The Transparency International Corruption Perception Index (CPI) ranked Nigeria as one of the ten most corrupt countries of all the nations listed between 1998 and 2003<sup>[55]</sup>.

## 4 The framework

**Environmental Uncertainty.** Different aspects of environmental uncertainty and their interrelationships in health care were explored to develop a framework for sustainable health care delivery; with health care consumers at the center.

**Health Care Uncertainty** is an aspect of environmental uncertainty that focuses on the health care delivery system. In environmental uncertainty, the three taxonomic classifications are location, issues and level of uncertainty while health uncertainty could originate from intrapersonal, interpersonal or from living within complex adaptive systems where varying mixes of natural and man-made systems interact and resist control<sup>[5]</sup>.

**Operation Uncertainty** arises when a complex health program to be implemented requires: adequate planning, funding, logistics, target population estimation, human resources assessment, stakeholder support, social mobilization, vaccines, drugs and supplies estimates, among others.

**Private Health Care Practitioners.** They are mostly GPs involved at the PHC level for effective coverage of health care programs. They also attend to the health needs of about 40% of the Nigerian population<sup>[50]</sup>. Inter-professional collaboration is highly encouraged to minimize uncertainty factors associated with inter-professional conflict at work.



**Public Health Care System in the Three Tiers of Government.** Variability in uncertain medical decisions may occur among health practitioners. Uncertainty could take the form of whether referral should be made from a private to a public health care system and the modality of such referrals. Akande <sup>[56]</sup> reported that poor referral system between the various tiers of health care probably reflected the poor managerial functions of the health care delivery system in Nigeria. Uncertainty variations could also result from the politics of federalism, resource control and autonomy, which should be minimized by encouraging health professionals to be client- (patient-) focused.

**Government and Donor Funding.** Funding of health care in Nigeria is vital for the operation and sustainability of the entire health system. Reduction of uncertainty in health care resource allocation and disbursements would restore confidence in the health system, enhance strategic planning, and make funds available for capital and recurrent expenditures. A revamped health system could change Nigerians' health seeking behavior of travelling abroad.

**Policy Uncertainty.** It is an important factor in the model. Health policy reversals took place in Nigeria at different points in the past seven decades: during the colonial, military and civilian regimes <sup>[15]</sup>, with seven national short- to medium-term development plans witnessed from 1945 to date. Budget allocation continues to fluctuate: from 2.7% in 1985 to 26% in 2004 <sup>[15]</sup> (see Table 1). These uncertainties affect program planning and implementation. National health policy should therefore be consistent irrespective of change.

**Regulatory Uncertainty.** Uncertainty in drug registration could lead to market related problems if companies delay before their products enter the market. Also regulatory bodies derive their scope of activities in part from the environmental challenges which differ in many countries. Excessive deregulation or excessive registration of generic pharmaceutical products by the regulatory Agency in Nigeria could compromise the drug formulary system. Policy consistency and minimization of regulatory uncertainty would enhance health system performance.

**Leadership.** Health leaders determine the strategic direction of any health system. Visionary leaders maximize the opportunities in the environment, minimize uncertainty factors and their impacts, and mobilize human, financial and material resources to achieve unprecedented quality services in PHC. Constant monitoring and evaluation of different components of the framework is necessary to ensure the efficient operation of the system. The model or framework could be applied in the three tiers of government.

**Health Care Consumers.** Patients and clients are central to all the health system activities generally and in the model. Reduction in government and/or donor allocation to health will have impact on the care-seekers, with resultant increase in user fees for those not covered by care plans. Access to health facilities, availability of health professionals, medicines, supplies and functional infrastructure are some of the requirements for patronage.

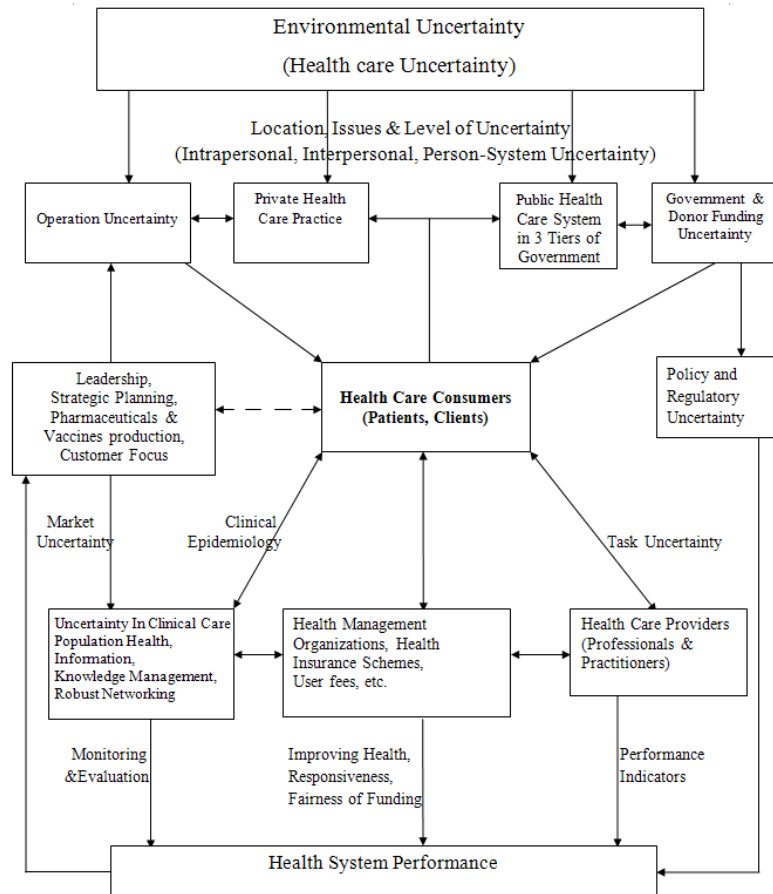
**Health Professionals and Task Uncertainty.** Health care professionals may have issues with clinical uncertainty at the intrapersonal and interpersonal domains. Collaborative learning, skills acquisition, willingness to learn policy-related skills and inter-personal communication would improve professional skills and reduce uncertainty in the "uncertainty work". Pressure of work could lead to prescribing and dispensing errors among health professionals. Collaboration of the physicians, pharmacists, nurses and other members of the health team - reduces errors and uncertainties to the barest minimum.

**Health Management Organizations.** HMOs, NHIS, other care plans and user fees are the sources of health financing available to care users. Only about 5% out of the estimated 150 million Nigerians are covered by NHIS. The rest are financed through out-of-pocket expenditure. The Chinese health reform program, which would be effective for resource-poor countries with high population like Nigeria should be adapted to enhance coverage.

**Clinical Epidemiology.** It is useful in generating data that inform decisions in disease prevention, diagnosis, treatment and surveillance <sup>[5]</sup>. Leadership has an important role to play in the overall success of the health system. It has the

responsibility of carrying out strategic planning on the type of surveillance system required, procurement of pharmaceuticals, vaccines, other supplies, and human capital. It also provides a robust network for handling complex issues related to health risks of the population.

**Market Uncertainty.** Demand and supply uncertainties coupled with products quality, price variations, distribution and promotional uncertainties are issues that the health leader(s) should keep in perspective when working out the logistics, drug supplies management, prevailing and potential disease out-breaks and surveillance systems (see Figure 2).



**Figure 2.** A framework for implementing sustainable health care delivery under environmental uncertainty

### Limitations and strengths of the study

Limitations – the study made use of secondary data to arrive at some conclusions – which are limited because of the variations in the contents of the data. Also the current situation on the ground may be different from the retrospective data, which could be biased. The Nigerian health system lacks the use of evidence for policy formulation, planning, implementation and evaluation as well as lack of timely data.

Strengths – the study discussed different aspects of health care delivery in Nigeria and tried to use a theoretical framework (uncertainty) to illustrate health care and health services inequity in Nigeria. A framework was proposed to illustrate major actions and components needed to improve the consistency and performance of the health care delivery system.

## 5 Discussion and conclusion

Health uncertainty has multiple impacts on the Nigerian health system. Different uncertainty factors have been identified. Government spending on health and donor funding have reduced, which caused uncertainties in resource allocation and

spending in the three tiers of government. Tighter control of available funds and operations should be used to enhance the quality of services. Health policy should be in line with the changing environment, aimed at achieving health for the vast majority of the people. Abandoned immunization programs in many health centers across the federation should be resumed with vigor. Problems of access, poor community participation, and underfunding, should be given top priority in the best interest of the people. Supply of solar-powered refrigerators in rural communities without electricity would enhance vaccines potency. Massive national and community mobilization/participation, and the adaptation of Chinese model<sup>[45, 57]</sup> would help in ensuring that health care gets to the grassroots. However fiscal discipline, social mobilization, substantial government investment on health, and high sense of nationalism are required to make a land-mark success. The core of Chinese 2009-2011 reform program includes: establishment of the basic medical insurance coverage; establishment of national essential drug system at all local levels; upgrading the primary healthcare services at the grass-roots level; expanding the coverage of basic public health services; and facilitating pilot reform programs in public hospitals<sup>[45]</sup>.

Government should put policies in place and back them up with legal muscle to ensure that the earlier target of 90% coverage is kept in focus through high performance and quality improvements<sup>[56]</sup>.

The federal Government should plough more money into health care, knowing that the health of the population is a measure of the country's wealth. Donor funding towards enhanced PHC activities in Nigeria should be put to the best use, to minimize the multiplicity of uncertainties that accompany poor resource utilization. Many Nigerians embark on medical tourism to India, South Africa and other foreign countries<sup>[58]</sup>. Government and entrepreneurs should take advantage of the growing demand, to develop top class healthcare institutions to serve this niche of health seekers. The US model that emphasizes safety, effectiveness, timeliness, efficiency, equity and patient-focus, with a number of care plans, should be adapted in combination with the Chinese health reform model. Regulatory agencies have vital roles to play in ensuring that standards are met in various aspects of the health system.

It is therefore important to develop an integrated health system that will be accessible to the vast majority of the people, at affordable costs, and a disease surveillance and information system that monitors out-breaks, with a view to providing early response. Given the problems of numerous uncertainty factors, the federal and state governments should channel their energy to the grassroots (LGAs) and evolve a new, workable health system in the face of shrinking global economy. Since the trouble with Nigeria was identified as simply and squarely a failure of leadership<sup>[59]</sup>, committed and proactive health leaders are the imperatives to turn rhetoric into action.

## Competing interests

The author declares that there are no competing interests.

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