A FAIR PREMIUM FOR ENROLLMENT IN SOKOTO STATE CONTRIBUTORY HEALTH SCHEME

1.0 Introduction

According to the state ministry of planning, the population of Sokoto state was predicted to be 5.1 million in 2017, growing at a pace of 3% per year, with roughly 4.5 million people without health insurance. The Health Finance and Governance (HFG) Project, funded by the United States Agency for International Development (USAID), supported the mobilization of domestic resources, the reduction of financial barriers, the expansion of health insurance, and the implementation of provider payment systems in efforts to ensure the realization of universal health coverage for the indigent, poor, and vulnerable residents of Sokoto state.

Governor Alhaji Aminu Tambuwal established the Sokoto State Contributory Health Care Management Agency (SOCHEMA) plan bill as a result of this support in 2016. The project used workshops and campaigning visits to gain state-wide stakeholder support prior to the implementation of the scheme bill. The Sokoto State House of Assembly held a public hearing on the SOCHEMA bill, which was attended by key stakeholders from various sectors, including community leaders, religious leaders, trade unions, labor unions, professionals, and business owners.

An increase from 1% to 2% of the state consolidated revenue fund (CRF), a 1% contribution from local government associations (LGAs), 240 million NGN monthly from the Zakat fund (funds coll ected from obligatory annual payments under Islamic law on certain types of property and used for charitable and religious purposes), and 0.5 percent of contract funds were among the provisi ons for additional sources of funding. A conference for journalists and media practitioners was also held to educate the public about the components of the health contributory system in order to effectively communicate the scheme's benefits to the public. HFG contributed to the creation of a draft Health Financing Policy Framework document that would guide all health financing

mechanisms in the state across the three health financing functions and is consistent with the National Health Financing Policy. SOCHEMA also received organizational development support from HFG, which included staff capacity building training and coordination assistance to promote increased efficiency and alignment of financial targets.

The House of Assembly voted the SOCHEMA bill into law in February 2018, and the Governor will launch it in July 2018. "Establishment of SOCHEMA Agency with a legally binded Bill is the greatest success under this present administration led by Rt. Hon. Aminu Waziri Tambuwal CFR," said Dr. Shehu Balarabe Kakale, the Honorable Commissioner of Health. As Commissioner of Health, I am happy to carry on this tradition. I believe it is a machine for reforming and revolutionizing healthcare services in order to reduce out-of-pocket spending to the bare minimum in order to achieve sound Universal Health Coverage in our communities." As evidenced by Sokoto state, there are grounds to expect improvements in health financing in Nigeria as a whole, as both the administrative and legislative arms of the federal and state governments are now addressing the challenges (HFG, 2015).

1.1 Aim

The goal of this work is to estimate actuarially fair premiums/contributions for enrolment in the Sokoto State Contributory Health Scheme enrolment.

1.2 Source of Data

The claim data provided consists of facility attendance data for various ailments from Health Management Information Systems (HMIS) across Sokoto State's twenty-three local government areas (LGAs). However, given the paucity of the HMIS data, overseas national statistics claim data from the National Health Service (NHS) England 2016-2017 was used to estimate claim counts of relative cares in Sokoto; other data sources include ResearchGate, expert opinions, and so on.

The costs of general services, drugs, professional services, laboratory investigations, radiographic and ultra-sonographic investigations were obtained from the National Health Insurance Scheme (NHIS) 2013.

The utilization rate of women with primary level care insurance was found to be 56% from Demographic and Health Survey (DHS) 2013, which was later adjusted to be 60% to cover up for pediatrics. The utilization rate of secondary level care was estimated to be one-third of the primary level of care.

2.0 Benefit Package

There are 171 healthcare services included in the benefits package. Primary level care includes 77 services, while secondary level care includes 94 services.

Table 1: Primary Level Care

CARE CATEGORIES	CARES
PRIMARY INTERNAL MEDICINE	
MALARIA (UNCOMPLICATED)	
RESPIRATORY TRACT INFECTIONS	Common Cold
	Pneumonia (Uncomplicated)
	Asthma
	Bronchitis
URINARY TRACT INFECTIONS	Pyelonephritis
	Cystitis
GASTROENTERITIS/DIARRHOEAL DISEASES/ENTERITIS	Amoebiasis
	Giardiasis
EAR INFECTIONS	Otitis Externa
	Otitis Media
	Otomycosis
	Foreign body removal
NOSE INFECTIONS	Rhinitis
	Sinusitis
	Foreign body in the nose
THROAT INFECTIONS	Pharyngitis
	Tonsillitis
	Foreign body
SCHISTOSOMIASIS	Bladder Fluke
	Liver Fluke
HELMINTHIASIS	Roundworm
	Hookworm
	Tapeworm
SKIN INFECTION/INFESTATION	Chickenpox
	Taeniasis
	Scabies
BEE AND SCORPION STING	
SNAKE BITE	
SCREENINGS AND REFERRAL FOR DIABETES MELLITUS, HYPERTENSION, AND OTHER CHRONIC DISEASES	
TREATMENT OF PEPTIC ULCER DISEASE, PELVIC INFLAMMATORY DISEASES, ENTERIC FEVER	

TREATMENT OF SIMPLE ARTHRITIS AND OTHER MINOR MUSCULOSKELETAL DISEASES	
MANAGEMENT OF SICKLE CELL ANEMIA	
MINOR ALLERGIC CONDITIONS	
PRIMARY SURGERY	
MINOR SURGICAL PROCEDURES	Incision and Drainage
	Suturing of Laceration
	Minor Burns
MINOR WOUND DEBRIDEMENT	
EVACUATION OF IMPACTED FAECES	
CORRECTION OF CASES OF SIMPLE POLYDACTYL	
PASSAGE OF URETHRAL CATHETER	
MALE CIRCUMCISION	
PRIMARY EYE CARE	
TREATMENT OF CONJUNCTIVITIS	
TREATMENT OF ALLERGIC AILMENTS	
TREATMENT OF SIMPLE CONTUSION, ABRASIONS, etc.	
PRIMARY PAEDIATRICS	
CHILD WELFARE SERVICES	Growth Monitoring
	Immunization
	Vitamin A Supplementation
NUTRITIONAL ADVICE AND HEALTH EDUCATION	
MANAGEMENT OF UNCOMPLICATED MALNUTRITION	
TREATMENT OF HELMINTHIASIS	
TREATMENT OF COMMON CHILDHOOD ILLNESSES	Malaria
	Diarrhea Diseases
	Schistosomiasis
	Upper Respiratory Tract Infections
	Uncomplicated Pneumonia
	Simple Otitis media
	Childhood exanthemas
	Simple Skin Diseases/Infestations
	Viral illnesses such as mumps
TREATMENT OF MILD ANEMIA WITH HEMATINIC	
HIV/AIDS/SEXUALLY TRANSMITTED DISEASES	
HIV COUNSELLING AND TESTING (HCT) AND REFERRAL	
MATERNAL, NEONATAL AND CHILD HEALTH SERVICES (MNCH)	
Routine Antenatal Care (at least 4 visits during pregnancy) and referral services for complicated cases	
Ultrasound scans during the lifetime of a pregnancy	
Delivery services - spontaneous vaginal delivery by skilled attendant and repair of minor birth injuries and episiotomy	
Magnesium Sulphate for management of eclampsia (before referral)	
Postnatal services	

Maternal sepsis	
Secondary Postpartum Hemorrhage	
Matitis	
Newborn care up to including umbilical cord infection, eye care, and other uncomplicated neonatal infections	
BASIC LABORATORY SERVICES	
Malaria parasite using a rapid diagnostic test	
Widal test	
Urinalysis	
Packed cell volume (PCV)	
Random blood sugar/Fasting blood sugar (RBS/FBS)	
Pregnancy test	

Table 2: Secondary Level Care

CARE CATEGORIES	CARES
HIV/AIDS	
TREATMENT OF OPPORTUNISTIC INFECTIONS REQUIRING ADMISSION	
PAEDIATRICS	
TREATMENT OF SEVERE INFECTIONS/INFESTATIONS	Respiratory Infections
	Urinary Tract Infections
	Diarrheal Disease with moderate to severe dehydration
	Enteric Fever/Typhoid Fever
	Severe Malaria
	Septicemia
	Meningitis
	Severe Measles
Management of childhood noncommunicable diseases such as nephritis	
Management of severe anemia requiring blood transfusion (patient provides blood)	
Management of common neonatal conditions	Neonatal Sepsis
	Birth Asphyxia
	Neonatal jaundice
PRIMARY INTERNAL MEDICINE	
Treatment of moderate to severe infections and infestations	Management of severe malaria
	Management of meningitis and septicemia
	Management of complicated respiratory tract infections
	Management of typhoid fever
TREATMENT OF NONCOMMUNICABLE DISEASES	Management of Diabetes
	Management of Hypertension
	Treatment of cardiovascular conditions like arrhythmias, heart failures, and rheumatic heart diseases
	Renal diseases such as nephritis and nephrotic syndrome

	Liver diseases such as hepatitis, amoebic liver abscess, and chronic liver disease
	Management of severe anemia
	Hemodialysis
COMPREHENSIVE EMERGENCY OBSTETRIC CARE	
Management of preterm labor and premature rupture of membranes	
Detection and management of hypertensive diseases in pregnancy including eclampsia	
Management of antepartum and postpartum hemorrhage	
Cesarean section	
Management of intrauterine fetal death	
Management of puerperal sepsis	
Instrumental deliveries	
High-risk Deliveries	
GYNAECOLOGICAL INTERVENTION	
Manual Vacuum Aspiration/Uterine Evacuations	
Bartholin cystectomy	
Hysterectomy	
Myomectomies	
Ovarian cystectomy	
Management of ectopic gestation	
Pap smear	
DENTAL CARE	
Amalgam filling	
Simple tooth extraction	
SURGERIES	
Laparotomy for any cause	
Intestinal resection and anastomosis	
Appendectomy	
Male Circumcision	
Hernia repair	
Hydrocelectomy	
Management of testicular torsion	
Thyroidectomy	
Management of fractures	
Fine needle/excisional biopsy	
EAR NOSE AND THROAT (ENT)	
Antral wash-out	
Foreign body removal	
Surgical operations	
Tonsillectomy	
Polypectomy	
Tracheostomy	
Adenoidectomy	
Other noncomplex ENT procedures	
OPHTHALMOLOGY	
Eye problems	
Removal of foreign bodies	
Refraction	

PHYSIOTHERAPHY	
Management of palsies	
Post cerebrovascular accident therapy	
physiotherapy session	
LABORATORY INVESTIGATIONS	
Genotype	
Urea/Electrolyte/Creatinine	
Bilirubin (total and conjugated)	
Microscopy/Culture/Sensitivity Urine, Blood, Stool, Sputum, Wound, Urethral, Ear, Eye, Throat, Aspartate, Cerebrospinal Fluid, Endoscopy, Cervical Swab, High Vaginal Swab	
Occult blood in the stool	
Gram stain	
Blood groupings/Cross-matching	
Hepatitis B surface antigen, Hepatitis C Virus antibody screening	
Screening for HIV/AIDS	
Blood transfusion services including blood bag	
Lipid profile	
Liver function test	
Postprandial blood sugar	
Thyroid function test	
PSYCHIATRY	
Diagnoses, Counselling, and Treatment for mood disorders (mild to moderate depression and anxiety)	
Diagnoses, Counselling, and Treatment for post-traumatic stress disorder	
Diagnoses, Counselling, and Treatment for puerperal psychosis	
RADIOLOGY	
X-ray of chest, abdomen, skull, extremities	
Dental x-rays and other plain x-rays	
Mammography	
Abdominopelvic USS	
Obstetric and Gynecological USS	
Small parts e.g. thyroid, scrotal sac, etc.	
Doppler USS	
CT Scan/MRI	
Upper and lower GI endoscopy	
Fluoroscopy	
Barium meal/Barium enema	

3.0 Actuarial Assumptions and Methodology

3.1 Assumptions

The HMIS claim data would not on its own lead to a reasonable result, also insufficient budget to conduct detailed market research on the target population left us with no other option than to source for overseas national statistics claim data, from National Health Service (NHS) England 2016-2017, the NHS data was only used to determine claim counts of some related cares in Sokoto. Other sources of data include; ResearchGate, expert's opinions, etc.

The utilization rate of primary and secondary level care was assumed to be 60% and 20% respectively.

3.2 Methodology

The amount of money (premium) that any policyholder will pay an insurer equals the expected claim payments plus an amount to cover the insurer's expenses for selling and servicing the policy, including some profit, can be divided into two;

i. Net premium
ii. Gross premium

3.2.0 NET PREMIUM

The expected amount of claim payments called the net premium was calculated using loss distribution function, which comprises;

i. Frequency distribution.
ii. Severity distribution.

Frequency distribution

The random variable for the number of losses is referred to as the frequency of loss and its probability distribution is called the frequency distribution.

The claim frequency was modeled with a normal classical probability model. Since the scheme is new, the number of persons insured will not be known, as such the utilization rate of such schemes in the target population was used, to estimate the number of persons insured.

Severity Distribution

This is the random variable for the cost (amount) of a loss, given that it has occurred. The amount of loss is often referred to as the severity and the probability distribution for the amount of loss is called the severity distribution. Four classical continuous distributions were used in modeling the claim severity namely; exponential, gamma, Weibull, and lognormal distributions.

3.2.1 GROSS PREMIUM

The gross premium is the total net premium and the amount to cover the insurer's expenses, including some profit. The main items of expense are staff salaries, property costs or overheads, information technology costs and investment costs.

The administrative expenses were estimated to be 10% of the net premium in each care category.

4.0 Results

The table below shows the premium to be paid by a policyholder per annum to be insured for each level of care.

Table 3: Premium

PRIMARY LEVEL CARE (PLC)			
CARE CATEGORIES	**NET PREMIUM**	**EXPENSES @ 10%**	**GROSS PREMIUM**
PRIMARY INTERNAL MEDICINE	1,269	127	1,396
PRIMARY SURGERY	66	7	73
PRIMARY EYE CARE	5	0	5
PRIMARY PAEDIATRICS	772	77	849
HIV/AIDS/SEXUALLY TRANSMITTED DISEASES	12	1	13
MATERNAL, NEONATAL AND CHILD HEALTH SERVICES	167	17	184
BASIC LABORATORY SERVICES	43	4	47
		PREMIUM	**2,567**
SECONDARY LEVEL CARE (SLC)			
CARE CATEGORIES	**NET PREMIUM**	**EXPENSES @ 10%**	**GROSS PREMIUM**
HIV/AIDS	8	1	9
PAEDIATRICS	102	10	112
PRIMARY INTERNAL MEDICINE	435	43	478
COMPREHENSIVE EMERGENCY OBSTETRIC CARE	350	35	385
GYNAECOLOGICAL INTERVENTION	64	6	71
DENTAL CARE	0.17	0.02	0.19
SURGERIES	1,274	127	1,401
EAR NOSE AND THROAT (ENT)	19	2	21
OPHTHALMOLOGY	1	0.1	1
PHYSIOTHERAPHY	0.22	0.02	0.25
LABORATORY INVESTIGATIONS	165	17	182
PSYCHIATRY	0.1	0.01	0.10
RADIOLOGY	2	0.2	2
		PREMIUM	**2,662**
		TOTAL PREMIUM	**5,229**