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# Costing of the Basic Health Care Provision Fund (BHCPF) in Nigeria

World Bank Group – Health, Nutrition and Population (HNP)  
Global Practice

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## Executive Summary

**Despite economic gains between 2005 and 2015, Nigeria has made slow progress towards reducing poverty and improving health outcomes.** The National Health Act, passed into law in 2014, sets out to address these shortcomings by providing a legal framework for the regulation, development and management of the health system and entitling all Nigerians to a Basic Minimum Package of Health Services (BMPHS), with financing provided through the Basic Health Care Provision Fund (BHCPF).

**A better understanding of the costs of this guarantee is needed to inform short- and long-term planning for the sector and ensure the viability of the BHCPF as a lever to promote efficiency, accountability and better governance.** As part of its assistance to the Government of Nigeria, the World Bank is providing support to the Federal Ministry of Health (FMOH) and other sector agencies in rationalizing the costing of the BHCPF, developing national and state-level operations manuals, assessing state-level readiness, and monitoring implementation. This costing work feeds directly into the Nigeria Health Financing Program (P162108) and Health Financing System Assessment (P164586). The goals of this report are to:

- Understand the **economic and financial costs of guaranteeing access for all Nigerians to the BMPHS**, in the long-term<sup>1</sup>,
- Build scenarios to consider options for **gradual expansion of the package**, given current fiscal constraints, in the medium-term,
- Inform decisions about the **allocation of resources during the pilot phase**, in the short-term<sup>2</sup>.

## Methodology

**This study takes an activity-based approach to costing with a focus on recurrent costs at the facility level.** The choice was made to focus on recurrent costs – defined as personnel time, drugs, consumables and overhead – in order to best inform the National Health Insurance Scheme (NHIS) Gateway of the BHCPF, which covers the BMPHS. Given the emphasis of the BHCPF on direct service delivery, it considers only facility-level costs and excludes: (a) programmatic costs, (b) local, state and federal level administrative cost and (c) capital costs, which are covered under the second major component of the BHCPF, the National Primary Health Care Development Agency (NPHCDA) Gateway.

**Three principle steps are taken when calculating total cost of the basic minimum package.** First, the package is broken into 57 individual interventions<sup>3</sup>. Second, for each intervention, the share of the target

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<sup>1</sup> Economic cost is understood as full cost of resources required to deliver essential services at the primary level. Financial cost looks at how this burden is shared across system actors and is closely linked with arrangements through which pooled funds are used to purchase health services from providers.

<sup>2</sup> Beginning in 2017, a pilot of the BHCPF will take place in three states (Abia, Niger and Osun). Initial funding for the pilot comes from the Global Financing Facility (GFF) and the Bill and Melinda Gates Foundation (BMGF).

<sup>3</sup> The BMPHS includes intervention packages for antenatal care (16 interventions), delivery (6 interventions), postnatal care (9 interventions), child health (19 interventions), adult malaria (1 intervention), non-communicable diseases (1 intervention), and family planning (5 interventions). Interventions are aligned with the World Health Organization OneHealth Tool (OHT), a software platform that is designed to inform national health strategies in low and middle income countries, based on

population requiring treatment (“population in need”) is multiplied by the annual frequency of use and the estimated unit cost<sup>4</sup>:

$$\text{Intervention cost}_1 = \text{Population-in-need}_1 * \text{Frequency of Use}_1 * \text{Unit Cost}_1$$

Finally, total cost of the package is calculated by taking the sum of the individual intervention costs:

$$\text{Total cost of package} = \text{Intervention cost}_1 + \text{Intervention cost}_2 + \dots + \text{Intervention cost}_{57}$$

Standards of practice – which include delivery channel, provider type and time per average treatment case – and drug and consumable cost are adopted from the World Health Organization – OneHealth Tool (OHT) and aligned with local Federal Ministry of Health service delivery guidelines.

## Results

**Total cost of the BMPHS for all Nigerians at the national level is estimated at USD 1.84 – 2.49 billion, or approximately USD 9.4 – 12.7 per person, taking into account variability in costs of labor, drugs and consumables.** This estimate includes urban and rural populations (estimated at 196 million people), at full coverage (meeting full population in need, e.g. 100 percent of child vaccinations), for the full package of services (personnel, drugs and consumables and overhead). Based on this analysis, current coverage is estimated at approximately 30% of full coverage cost. At present, these costs are shared across system actors: according to the 2014 National Health Accounts, 72% of total health expenditure is out of pocket, while approximately 25% comes from public sources (with state and local governments maintaining most responsibility for primary health care). Full economic cost amounts to 0.53 % of GDP.

Table 1: Total Cost, National level

	Naira	USD	Share of package cost	Per capita (USD)	% of GDP	% of total government expenditure	% of public health expenditure
ANC	89,502,758,470	\$292,810,394	14%	\$1.49		0.87%	7.8%
Delivery	79,105,497,839	\$258,795,510	12%	\$1.32		0.77%	6.9%
PNC	33,955,136,545	\$111,085,033	5%	\$0.57		0.33%	3.0%
Child	350,236,519,416	\$1,145,807,069	53%	\$5.84		3.39%	30.7%
Malaria (over 5)	47,457,307,348	\$155,257,705	7%	\$0.79		0.46%	4.2%
NCD	35,948,127,427	\$117,605,150	5%	\$0.60		0.35%	3.1%
Family planning	25,793,011,400	\$84,382,448	4%	\$0.43		0.25%	2.3%
<b>TOTAL</b>	<b>661,998,358,444</b>	<b>\$2,165,743,310</b>	<b>100%</b>	<b>\$11.04</b>	<b>0.53%</b>	<b>6.40%</b>	<b>57.9%</b>
Immunization	51,727,021,853	\$169,226,177	8%	\$0.86		0.50%	4.5%

international and local standards and costs. See here for more information and a full description of treatment assumptions: [www.who.int/choice/onehealthtool](http://www.who.int/choice/onehealthtool) and <http://avenirhealth.org/Download/Spectrum/Manuals/Treatment%20Assumptions%202016%201%2010.pdf>

<sup>4</sup> This can also be interpreted as the volume of services

	Naira	USD	Share of package cost	Per capita (USD)	% of GDP	% of total government expenditure	% of public health expenditure
Malaria	199,493,020,928	\$652,646,143	30%	\$3.33		1.93%	17.5%
Nutrition	102,645,366,960	\$335,806,749	16%	\$1.71		0.99%	9.0%
NCD	35,948,127,427	\$117,605,150	5%	\$0.60		0.35%	3.1%

**Costs are distributed unevenly across and within service packages.** Child services make up the largest share of total cost at 53 percent, driven by treatment of malaria, severe malnutrition and ORS and zinc for diarrhoea. The next largest service package is maternal care (ANC, delivery, post-natal care and family planning) at 35 percent of the total cost of the BMPHS, followed by malaria over-5 treatment (7 percent) and NCD screening (5 percent). Within these, drugs and consumables make up the largest portion of the cost (57%), followed by personnel (34%) and overhead (9%). Whereas ANC, delivery and post-natal care are more labor intensive (with personnel constituting 50 – 67% of package cost), the costs of child services, malaria, screening for non-communicable diseases and family planning are driven by drugs and consumables (65 – 85% of package cost).

Table 2: Cost Shares, National level (in %)

	TOTAL	Personnel					Drugs / Consumables	Overhead
		[Total]	Doctor	Nurse/ Midwife	CHEW	Lab Tech		
ANC	14%	[50%]	16%	25%	6%	3%	41%	9%
Delivery	12%	[67%]	3%	41%	23%	0%	24%	9%
PNC	5%	[62%]	9%	39%	13%	1%	29%	9%
Child	53%	[26%]	7%	11%	8%	0%	65%	9%
Malaria (over 5)	7%	[11%]	0%	7%	5%	0%	80%	9%
NCD	5%	[18%]	0%	3%	2%	12%	73%	9%
Family planning	4%	[21%]	0%	12%	9%	0%	70%	9%
<b>TOTAL</b>	<b>100%</b>	<b>[34%]</b>	<b>6%</b>	<b>17%</b>	<b>10%</b>	<b>1%</b>	<b>57%</b>	<b>9%</b>
Immunization	8%	[5%]	0%	3%	2%	0%	86%	9%
Malaria	30%	[19%]	1%	11%	7%	0%	72%	9%
Nutrition	16%	[44%]	21%	12%	11%	0%	47%	9%
NCD	5%	[18%]	0%	3%	2%	12%	73%	9%

### *Expansion and payment systems*

**In practice, the BHCPF will cover only a portion of these costs, leveraging its contribution to promote efficiency, increase financial protection for households and gradually expand coverage to basic services.**

This section looks at options for expanding the package in the medium-term given fiscal constraints. To do this, cost estimates for these supplementary payments and expansion of the BHCPF reflect three different levels of ambition – expanding the coverage of services included in the basic minimum package from currently 30% to 50%, 60% and 70% by 2022. Given the current macro-fiscal stance, all three expansion paths assume larger coverage increases in the outer years of the five-year period. Estimates reflect projected population growth as well as expected efficiency gains under the financing arrangements of the BHCPF. Data are expressed as marginal costs, that is, the costs above and beyond current levels of spending.

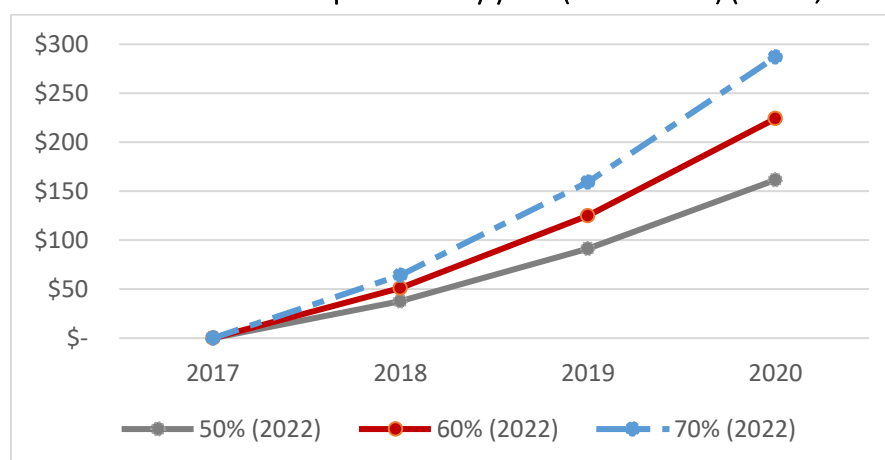
**Expanding service coverage from currently 30% to 50% in 2022 is likely to cost USD 37.8 million in year 1, USD 161.5 million in year 3, and 357.5 million in year 5 (see Table 3 and Figure 1).** In the more ambitious scenario of increasing current coverage to 60% by 2022, the costs of are likely to amount to USD 51.0 million in year 1, USD 224.1 million in year 3 and USD 509.3 million in year 5. In the most ambitious scenario of increasing current coverage to 70% by 2022, the estimated costs are USD 64.2 million in year 1, USD 286.8 million in year 3 and USD 650.8 million in year 5.

Table 3: Marginal cost of BHCPF expansion (in USD, millions,2017)<sup>5</sup>

	2018	2019	2020	2021	2022
<b>50% (by 2022)</b>	37.8 (35.0-40.5)	91.2 (84.5-97.9)	161.5 (149.7-173.3)	249.8 (231.6-268.1)	357.5 (331.4-383.7)
<b>60% (by 2022)</b>	51.0 (47.2-54.7)	125.1 (115.9-134.2)	224.1 (207.7-240.5)	349.7 (324.1-375.3)	503.9 (467.1-540.8)
<b>70% (by 2022)</b>	64.2 (59.5-68.9)	159.1 (147.4-170.7)	286.8 (265.9-307.8)	449.9 (417.0-482.8)	650.8 (603.2-698.4)

The presented estimates suggest that a gradual expansion of the BHCPF is in reach with the prospect that improved health and financial protection become an engine for sustained development and prosperity for all Nigerians. With funding from development partners, a pilot in three states will be shortly underway, benefiting 8 million Nigerians by the end of 2018. This initial investment must be urgently complemented by a financing plan that draws on all stakeholders and sources of financing to make basic health service available to at least half of Nigeria’s population in 2022.

Figure 1: Cost estimates – BHCPF expansion early years (2017 – 2020) (in USD, millions 2017)



<sup>5</sup> Presented ranges reflect different assumptions about possible efficiency gains under BHCPF arrangements.

### *Pilot states*

The initial pilot of the BHCPF will take place over two years in the three pilot states: Abia, Niger and Osun. Current funds – USD 20 million from the NSHIP Additional Financing – are sufficient to cover the marginal cost of expanding the benefits package from the baseline to “target” level, estimated at USD 6.8 million per year<sup>6</sup>. This allows the remainder to be invested in infrastructure upgrades under the NPHCDA Gateway at roughly the same ratio as the National Health Act. The pilot will initially focus on rural areas.

Table 4: Comparison of total and marginal costs, national and pilot states

	TOTAL COST			MARGINAL COST		
	Baseline	Target	Full	Baseline-Target	Target-Full	Baseline-Full
<b>National</b>	\$395,230,414	\$485,651,971	\$1,299,445,986	\$90,421,557	\$813,794,015	\$904,215,573
<b>Abia</b>	\$7,944,475	\$9,760,581	\$26,105,537	\$1,816,106	\$16,344,956	\$18,161,062
<b>Niger</b>	\$11,932,763	\$14,660,592	\$39,211,049	\$2,727,829	\$24,550,457	\$27,278,286
<b>Osun</b>	\$10,123,765	\$12,438,057	\$33,266,683	\$2,314,292	\$20,828,626	\$23,142,918
<b>PILOT TOTAL</b>	\$30,001,003	\$36,859,230	\$98,583,269	\$6,858,227	\$61,724,039	\$68,582,266

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<sup>6</sup> Target coverage is defined as a decrease in the gap between full and current coverage by 10 percent.



## I. Background

**Despite average growth of nearly 7 percent per year between 2005 and 2015, Nigeria has made slow progress towards reducing poverty and improving health outcomes.** The economic slowdown in 2015 and subsequent deterioration of macro-fiscal conditions have compounded the challenges facing the social sectors. This is particularly true for health, where public expenditure stands close to 0.92 percent of GDP and 8.2 percent of all government spending, amounting to just US\$29 per capita. Out-of-pocket expenditures are among the highest in the world, accounting for nearly 72 percent of total health expenditures<sup>7</sup>.

**To improve health outcomes, the sector requires both greater investment and more efficient use of existing funds through a focus on cost-effective services, governance and transparency.** Two-thirds of the burden of disease falls on mothers and children, with a maternal mortality rate of 576 deaths per 100,000 live births and one in eight children dying before the age of five. Coverage of critical services is low, often falling below 40 percent of the target population. Given these conditions, significant gains can be made by investing in essential, highly cost-effective interventions in reproductive and child health, family planning, nutrition and malaria. Doing so under current fiscal constraints, however, will require more efficient use of resources through improvements in governance and accountability.

**In recognition of these challenges, the Government of Nigeria (GON) passed the National Health Act in 2014. The Act provides a legal framework for the regulation, development and management of the health system and entitles all Nigerians to a Basic Minimum Package of Health Services (BMPHS).** To finance this step towards universal health coverage, the Act established the Basic Health Care Provision Fund (BHCPF) through which contributions from the Federal Government (expected as a grant of no less than 1 percent of the Consolidated Revenue Fund), development partners and other sources are channelled to three operational “gateways”:

- (i) 50 percent to the National Health Insurance Scheme (NHIS) to ensure universal access to the minimum package of services,
- (ii) 45 percent to the National Primary Health Care Development Agency (NPHCDA) for capital expenses, essential drugs, and deployment of human resources, and
- (iii) 5 percent to the Federal Ministry of Health (FMOH) for national emergencies and epidemic response.

In 2016, the National Health Council – the highest health related policy-making body in Nigeria – approved guidelines for the implementation of the BHCPF and outlined the services to be covered under the BMPHS, guaranteeing access for all Nigerians.

**A better understanding of the costs of this guarantee is needed to inform short- and long-term planning for the sector and ensure the viability of the BHCPF as a lever to promote efficiency, accountability and better governance.** As part of its assistance to the Government of Nigeria, the World Bank is providing support to the FMOH and other sector agencies in rationalizing the costing for the BMPHS, developing

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<sup>7</sup> In 2014, total health spending amounted to 3.7 percent of GDP, or \$117 per capita. Of this, 71.7 percent (\$84 per capita) was out-of-pocket, while 25.1 percent (\$29.4 per capita) came from public sources. Total government spending was estimated at 5.9 percent of GDP, of which 8.9 percent was spent on public health.

manuals for national and state-level processes under the NHIS and NPHCDA gateways, assessing state-level readiness, and monitoring implementation. The costing work feeds directly into the Nigeria Health Financing Program (P162108) and Health Financing System Assessment (P164586).

## II. Objective

The goals of this report are to:

- Understand the ***economic and financial costs of guaranteeing access for all Nigerians to the BMPHS***, in the long-term,
- Build scenarios to consider options for ***gradual expansion of the package***, given current fiscal constraints, in the medium-term,
- Inform decisions about the ***allocation of resources during the pilot phase***, in the short-term.

**Economic cost is understood as full cost of resources required to deliver essential services at the primary care level. Financial cost looks at how this burden is shared across system actors and is closely linked with arrangements through which pooled funds are used to purchase health services from providers<sup>8</sup>.**

This distinction is particularly relevant in Nigeria, where state and local governments assume the responsibility for primary health care and the Federal Ministry of Health sets policy, procures essential medicines and provides tertiary care. The National Health Act changes this dynamic by asking the Federal Government to guarantee access to basic services, establishing the BHCPF as the tool for doing so, and using it to promote efficiency and accountability through the purchase of primary care services.

**This report sets out to estimate the cost of this guarantee to the purchaser and consider, in the medium- and short- term, how the BHCPF may be used to incentivize greater coverage and quality at the primary care level.** Based on current revenue projections, the resource envelope, which amounts to less than 1 USD per capita annually, is insufficient to provide universal basic benefits to the entire population. For this reason, scenarios are developed to look at how costs change by location, target population, cost center and depth of the benefits package.

**Recent costing studies for Nigeria exist, but are limited in their fit for this purpose.** In many cases, small sample sizes, low quality data at the facility level, and the limited availability of administrative data contribute to a large variation in outcomes (see Table 5). Given low levels of productivity, estimates based on actual utilization levels potentially lead to higher than optimal unit costs, a problem that is compounded by the difficulty of aggregating input costs in a decentralized system with poor financial management (e.g. personnel salaries paid by the local or state government, or essential medicines like vaccines delivered from a central procurement agency). One final limitation is that service standards and the composition of service packages are not always explicit in these reports (e.g. “antenatal care” without a listing of what is included in this package, or expectations for quality, which is important in a setting with

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<sup>8</sup> For example, NHIS tariffs may be set at a higher rate to cover long-term capital costs, or a lower rate if they are meant to function as incentive payments, as is the case with NSHIP fees.

low service delivery indicators), making projections across the broader population or modification to the benefits package unreliable. A complete summary of these studies is included in Annex 1.

Table 5: Summary of cost estimates from available costing studies in Nigeria

Unit costs by care package	Study	Year	Package cost	Package cost (2017 prices)	
			Naira	Naira	USD
Maternal	1. Health Policy Research Group	2015	13,010	17,668	57.74
	2. UNICEF	2015	46,491	63,135	206.32
	3a. USAID / MDG Program	2009	7,710	21,535	70.38
	4. DFID / Lagos State	2014	27,925	41,357	135.15
Child	1. Health Policy Research Group	2015	5,263	7,147	23.36
	2. UNICEF	2015	1,783	2,421	7.91
	3a. USAID / MDG Program	2009	4,020	11,228	36.69
Maternal & child	3a. USAID (micro approach)	2009	5,076	14,178	46.33
	3b. USAID (macro approach)	2009	4,440	12,401	40.53

Section III of this paper presents the methodology for costing that is applied in this study. Section IV provides a description and analysis of costing scenarios. Section V discusses these results in the context of expansion and piloting of the BHCPF. Section VI looks at the results relative to other costing studies.

### III. Methodology for costing the BMPHS

**This study takes an activity-based approach to costing with a focus on recurrent costs at the facility level.** The choice was made to focus on recurrent costs – defined as personnel time, drugs, consumables and overhead – in order to best inform the NHIS Gateway of the BHCPF, which covers the BMPHS. Given the emphasis of the BHCPF on direct service delivery, we consider only facility-level costs and exclude: (a) programmatic costs, (b) local, state and federal level administrative costs and (c) capital costs, which are covered under the NPHCDA Gateway (see Section V for discussion). In assessing unit cost, a bottom-up approach was chosen as it outweighs shortcomings of a top-down approach in an environment like Nigeria where sub-optimal use of available resources (e.g. human resources, infrastructure) means that labor and consumable costs are expected to form a large portion of the total cost, and there are significant variations in efficiency across facilities and regions. In addition, using expected standards of care rather than current practice is more appropriate, given the emphasis of these reforms on quality of care.

**Three principle steps are taken when calculating total cost of the basic minimum package.** First, the package is broken down into 57 individual interventions. Second, for each intervention, the share of the

target population *requiring* treatment (“population in need”) is multiplied by the annual frequency of use and the estimated unit cost. This can also be interpreted as the volume of services:

$$\text{Intervention cost}_1 = \text{Population-in-need}_1 * \text{Frequency of Use}_1 * \text{Unit Cost}_1$$

Finally, total cost of the package is calculated by taking the sum of the individual intervention costs:

$$\text{Total cost of package} = \text{Intervention cost}_1 + \text{Intervention cost}_2 + \dots + \text{Intervention cost}_{57}$$

Standards of practice (which include delivery channel, provider type and time per average treatment) and drug and consumable cost are adopted from the *World Health Organization – OneHealth Tool (OHT)* and aligned with local FMOH service delivery guidelines<sup>9</sup>. OHT standards are based on international guidelines and expert panel decisions and have been extensively tested and vetted at the country level. A complete explanation of the inputs is provided below.

#### *a. Intervention mapping*

As a first step, service packages defined by the BMPHS (see Figure 2) were separated into individual interventions and compared to *standard interventions recommended by WHO/OHT*. Most of the interventions listed in the BMPHS exist in OHT, with the exception of ultrasound and Hepatitis B screening for pregnant women. This intervention mapping was discussed with and approved by FMOH. At the instruction of the FMOH, we added common family planning and nutrition interventions, though they are not explicitly part of the BMPHS. Although it is not shown in this figure, the Guidelines make clear that vaccines for children are also included in the package. Missing interventions (e.g. ultrasound) were estimated using the logic and existing inputs in OHT using the tariffs from the NHIS as a target for the total cost of the intervention. A complete cost list for the 57 interventions is included in Annex 2.

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<sup>9</sup> The World Health Organization OneHealth Tool uses an ingredients or bottom-up approach to estimate total and incremental costs for 205 different interventions using standard WHO protocols and expert opinion to specify type and amount of drugs, supplies and personnel time required for treatment of an average case. To calculate the total and incremental cost of the interventions, the costing model first calculates the average cost per case for each of the interventions, then costs these inputs using international drug prices (supplied by the UNICEF supply catalogue and MSH International Drug Price Indicator Guide) across a population in need of specific interventions. See here for more information and a full description of treatment assumptions: [www.who.int/choice/onehealthtool](http://www.who.int/choice/onehealthtool) and <http://avenirhealth.org/Download/Spectrum/Manuals/Treatment%20Assumptions%202016%201%2010.pdf>

Figure 2: Content of the BMPHS according to 2016 BHCPF Guidelines (excluding emergency medical treatment)<sup>10</sup>

1. Maternal Health Services	
<p><b>Antenatal Care (ANC)</b></p> <p><b>Minimum of 4 ANC visits</b></p> <ol style="list-style-type: none"> <li>1 Malaria prevention with Intermittent Preventive Treatment (IPT): Sulpha-doxine and Pyrimethamine; PMTCT (HIV/AIDS)</li> <li>2 ITN, Folic Acid, Iron, Doctor must see at one of the first two visits visit</li> <li>3 Ultrasound Scan (Max 3), Urinalysis, Haemoglobin, HIV, Hep B</li> </ol>	<p><b>Labour &amp; Delivery Care</b></p> <p><b>Skilled Birth Attendants (SBAs) at all facilities</b></p> <ol style="list-style-type: none"> <li>1 Partograph Monitoring</li> <li>2 Episiotomy &amp; Repair</li> <li>3 Post-Natal care including mother and baby care, from first visit within 48 hours of delivery to second visit 6 weeks post-partum.</li> </ol>
<p><b>Emergency Obstetric and Neonatal Care (EmONC)</b></p> <p><b>Basic &amp; Comprehensive Emergency Obstetric and Neonatal Care</b></p> <ol style="list-style-type: none"> <li>1 IV/IM Antibiotics, IV/IM Oxytocics, IV/IM Anti-convulsants, Manual removal of placenta, Assisted vaginal delivery, Removal of conception retained products; Essential Newborn care</li> <li>2 All seven BEmONC functions plus Emergency Caesarean Section, Blood Transfusion</li> </ol>	<p><b>Clinically-indicated Elective Caesarean Section, Instrument delivery (forceps delivery, vacuum extraction)</b></p> <p><b>Chorio-amnionitis, Gestational Diabetes, Hypertension, Multiple pregnancy, Placenta Praevia, Pre-eclampsia and Eclampsia, IUGR</b></p>
2. Prevention and Treatment of Non-Communicable Diseases (NCDS), Other services covered	
<p><b>Hypertension</b></p> <p><b>Primary Care Blood Pressure Monitoring;</b></p> <p><b>Secondary Prevention Education</b></p> <p><b>Malaria</b></p> <p><b>Under five curative illnesses</b></p>	<ol style="list-style-type: none"> <li>1 Lifestyle interventions for preventing Hypertension</li> <li>2 Advice on Blood pressure control in people with pressure higher than 140/90 mmHg</li> </ol>

*b. Standards of practice*

The BMPHS does not specify delivery channel or provider type, so we used the WHO/OHT approach as a starting point, designating three delivery channels (outreach, primary health clinic and hospital) and four provider types (community health extension worker (CHEW), nurse/midwife, lab technician and primary care doctor) (see Table 6):

<sup>10</sup> “Harmonized Guidelines for the Administration, Disbursement, Monitoring and Fund Management of the Basic Healthcare Provision Fund,” Federal Ministry of Health (FMOH), National Health Insurance Scheme (NHIS) and the National Primary Health Care Development Agency (NPHCDA). December 2016.

Table 6: Delivery channel and provider type

Delivery channel	Provider type
Outreach	<ul style="list-style-type: none"> <li>Community health extension worker (CHEW)</li> </ul>
Primary health clinic	<ul style="list-style-type: none"> <li>Nurse/midwife,</li> <li>Community health extension worker (CHEW)</li> <li>Lab technician</li> </ul>
Hospital	<ul style="list-style-type: none"> <li>Primary care doctor,</li> <li>Nurse/midwife,</li> <li>Community health extension worker (CHEW)</li> <li>Lab technician</li> </ul>

A working group established by the FMOH in June 2017 reviewed and revised OHT standards to align with FMOH guidelines. Time estimates based on treatment time for an average case were adopted from OHT and aligned with FMOH guidelines. Most interventions are provided by nurses, midwives and community health workers in primary health facilities, along with a doctor when needed in the hospital setting (for referred cases)<sup>11</sup>. In addition, the lab technician is added to the selected services based on the OHT standards of practice. Interventions can be administered through more than one delivery channel and are defined for each intervention, assuming that in some cases the intervention could be delivered in multiple settings.

*c. Population in need*

The **population in need** is defined as the *share of the target population requiring the intervention annually*. When multiplied by the annual frequency, this provides an estimate of the volume of services required (e.g. the number of tetanus treatment required to cover all pregnant women, or the number of diarrhoea treatments for young children). In reality, current coverage falls far short of full coverage. For this reason, our model considers three coverage scenarios: i) baseline (or current) coverage, ii) target coverage (defined as a 10% decrease in the gap between full and baseline coverage), and iii) full coverage. The specific steps for calculating the population in need are outlined below.

*i. Target population*

First, the **target population** is defined for each intervention based on 2017 population projections (see **Table 7**). Population shares are derived from the demographic profile in the 2006 Census.

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<sup>11</sup> According to the Minimum Standards to Primary Health Care in Nigeria, Junior Community Extended Workers are also part of the primary health care team. In our study, we treat all community health workers as one health professional category as there is no explicit national-level division of tasks between junior and non-junior community health workers.

Table 7: Target population estimates (2017)

	%	NATIONAL	PILOT STATES		
			Abia	Niger	Osun
<b>TOTAL</b>	100	196,220,549	3,799,046	5,706,245	4,841,182
Births	4	8,143,153	157,660	236,809	200,909
Children under-5	16	31,571,177	611,253	918,114	778,929
Pregnant women	5	9,811,027	189,952	285,312	242,059
All over-5	84	164,649,373	3,187,793	4,788,131	4,062,254
Adults over-40	17	34,023,810	658,738	989,439	839,440
Women of reproductive age (15-49)	25	48,849,962	945,789	1,420,595	1,205,233
<b>RURAL</b>	60	117,732,329	2,279,428	3,423,747	2,904,709
Births	4	4,885,892	94,596	142,085	120,545
Children under-5	16	18,942,706	366,752	550,868	467,357
Pregnant women	5	5,886,616	113,971	171,187	145,235
All over-5	84	98,789,624	1,912,676	2,872,878	2,437,352
Adults over-40	17	20,414,286	395,243	593,663	503,664
Women of reproductive age (15-49)	25	29,309,977	567,473	852,357	723,140

*ii. Population in need*

For each intervention, the **population in need** is calculated by multiplying the target population by the incidence or prevalence rate. We follow the OHT methodology whereby for most preventive care interventions the share is 100 percent (e.g. antenatal care will be required for all pregnant women). For curative care, population in need is determined by incidence or prevalence of the condition in question (OHT provides country or region-specific estimates) and treatment guidelines. In some cases, we take into account country-specific adjustments provided by the FMOH (e.g. two ultrasound scans per pregnancy). Additionally, some interventions are needed more than once per year and therefore we estimate the annual frequency of use. For most of interventions frequency is equal to 1. In some cases, it is greater than 1, as is the case for the management of diarrhoea with oral rehydration salts (ORS). The incidence of diarrhoea in children is estimated at 3.5 episodes per year, so the annual frequency of use is 3.5, while the annual frequency of utilization for two family planning interventions is lower than 1, since both IUDs and implants last 4 to 5 years. A full list of interventions is shown in Annex 2.

*iii. Current coverage level*

Third, for each intervention, the **current coverage level** (the share of the target population *currently receiving the intervention*) is used to estimate service volume. Our primary reference is the 2013 Demographic Health Survey with secondary estimates from OHT<sup>12</sup>. *If no data was available, we assumed that current coverage was 30 percent of the population in need.* This was found to be more accurate than

<sup>12</sup> One advantage of DHS is that it offers rural and state-level coverage rates, as opposed to the national figures found in OHT, which explains some of the difference between the two.

simply using the population in need, given the lower service coverage in Nigeria, particularly in rural areas. See Annex 2 for coverage rates.

#### *d. Unit cost*

**Infrastructure aside, personnel and consumables are the main cost categories at the primary care level. We also include a margin for overhead costs<sup>13</sup>.** We use cost information from different years depending on the availability. All costs are converted to 2017 Naira using a consistent method throughout the report. For internationally traded commodities, we inflate from base year in dollars using inflation rates from the United States Federal Reserve, then convert into Naira at the 2017 first quarter average rate of 306 naira / 1 USD (Central Bank of Nigeria). For locally priced goods, we use the official inflation rate for Nigeria from the IMF (e.g. 48 percent from 2014-2017, or 36 percent from 2015-2017).

#### *i. Labor*

**For each intervention, labor cost is calculated based on type of professional and treatment time (in minutes) per average case.** Standards were initially adopted from OHT, then adapted in consultation with the FMOH. Most of the interventions are assumed to be delivered by two types of professional: a nurse/midwife (the salaries are typically the same and the OHT does not differentiate between these professional categories) and community health workers. Doctors are available only at hospitals. The most substantial change from the OHT is that, per FMOH guidelines, certain tasks are shifted from nurse/midwife to CHEW<sup>14</sup>. A lab technician is included for a limited number of procedures in line with the OHT standards, at the request of the FMOH.

It is assumed that the average provider works 8 hours per day, 240 days (or 48 weeks) per year. The average of salary scales from three states are used alongside the OHT expert panel estimate to calculate per-minute cost. Scales from Niger and Osun are incomplete so they are not included in the average, but displayed below for reference<sup>15</sup>. All figures are updated to 2017 Naira. For national estimates, we provide estimates for the sensitivity of increasing or decreasing salaries in line with what is observed across this sample.

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<sup>13</sup> We are aware that at the hospital level the costs of delivering same interventions is usually higher but the main channel for the BMPHS is the primary care facility and therefore we do not differentiate cost components for the same interventions depending on the delivery channel. Usually, more complex interventions are delivered at the hospital level (referral cases), which partly takes the cost differences into account.

<sup>14</sup> Long discussions were held about whether, given low standards of care observed in many facilities in rural Nigeria, provider type and time should represent this “reality” rather than international norms. The decision was to take a normative approach to present “expected standards” rather than “real situation”. Some standards have been adapted to align with local guidelines (e.g. task shifting towards CHEWs).

<sup>15</sup> Federal, state and local governments all employ health care workers using different salary scales. Many tertiary personnel are employed by the Federal government, while primary care is usually covered by LGAs. However, some states are in the process of converting staff to a federal level equivalency (CONMESS / CONHESS). Abia provides an interesting example, as we were able to generate range and average estimates from more than 1,000 current employees by category from payroll records.



Table 8: Salary scales, per minute (in 2017 Naira)

	Doctor	Nurse / Midwife	CHEW	Lab Tech	Source
1. Unicef	53.8	27.9	9.1	11.3	2015 Federal
2. OneHealth Tool	22.3	13.8			2015 WHO CHOICE
3. Kaduna State Salary Scale	37.5	13.8	9.3		2015 State
4. Nasarawa State Salary Scale	-	14.0	9.2		2017 State
5. Niger State Salary Scale	23.5	11.4	9.3		2017 State (incomplete)
6. Osun State Salary Scale	58.9				2017 State (incomplete)
7. Abia State Salary Scale	26.2	11.9	9.9	8.7	2017 State
Proposed (based on Fed. scale)	49.3	17.2	12.6	-	Proposed revision
Range	22-59	11-28	9	11.3	
Low	-23%	-18%	-5%		
High (Federal Scale)	72%	29%	34%		
<b>Average (2, 3, 4, 7)</b>	<b>28.7</b>	<b>13.4</b>	<b>9.4</b>	<b>8.7</b>	

Salaries for primary care doctors show the greatest range, varying from 22-59 Naira per minute, while the nurse/midwife category typically falls between 11-17 Naira. CHEW includes the average across grades, including junior and senior classifications. For each classification, the model uses an average of what were considered the four most reliable estimates (Kaduna, Nasarawa, Abia and OneHealth Tool).

*ii. Drugs and consumables*

**For each intervention, drug and consumable costs are calculated as a package cost.** OHT provides the annual cost of drug and consumable packages by intervention weighted for prevalence (e.g. if only a portion of cases require a certain drug, or multiple rounds of treatment are required), which we use as the default input<sup>16</sup>. We chose this approach because drug prices vary enormously in Nigeria as a result of decentralized supply chains, difficult accessibility and fluctuation in the exchange rate. Additionally, some of the more complex interventions (e.g. sepsis) require a large number of specific medicines and it would have been difficult to accurately predict requirements. In all cases, we control for inflation and exchange rate so that prices are displayed in 2017 dollars and/or Naira. For vaccines, we use the prices from the most recent UNICEF Vaccine Price list<sup>17</sup>. For ultrasound and hepatitis B screening, which are not included in OHT, the NHIS tariff is broken into shares for labor and consumables (the initial capital investment is not taken into account).

*iii. Overhead costs*

<sup>16</sup> For example, PMTCT drug cost is the weighted sum of two parts. All pregnant women are expected to receive testing, which requires gloves, a blood collecting tube, syringe and HIV rapid test. HIV+ women and children (estimated at 5 percent) are placed on treatment (nevirapine / zidovudine). Similarly, screening for CVD/diabetes includes an annual urine sugar analysis for all adults over 40 years and, for 30 percent of high-risk cases, additional tests for blood glucose level, cholesterol, and urine.

<sup>17</sup> UNICEF Vaccine Price List ([https://www.unicef.org/supply/index\\_57476.html](https://www.unicef.org/supply/index_57476.html)) average price per vaccine across all suppliers for 2016

**Overhead is also included to account for all costs that cannot be directly connected to services of individual patients.** In terms of primary care at the facility level, this includes administration, reporting, training, travel and other such activities. Literature shows that the proportion of these costs vary largely by setting and that cost allocation may be costly and require complex information and accounting systems. In some cases, predetermined overhead rates are used to allocate overhead costs instead of using the actual overhead costs. There are numerous advantages of choosing this methodology: (a) it is easy to use, (b) it enables comparability over time and between interventions, and (c) it is less time and resource consuming. However, this methodology could be misleading if overhead forms a large share of the total costs<sup>18</sup>.

Existing costing studies show an overhead range from 1.7 to 17.0 percent of total costs for primary care (see Table 9), which is not a large proportion. Therefore, we have adopted a simple mark-up based overhead rate of 10% of combined labour, drug and consumables costs. No distinction is made between overhead at primary care level and hospital levels since the main focus is on the interventions delivered at the primary health care facility. However, hospital services are more complex and costly, the overhead cost will be larger (though the same percentage).

Table 9: Proportions of different cost categories by care packages in comparable studies

Care packages	Study	Personnel	Drug and consumables	Capital	Overhead
Maternal	HPRG (average)	57.6%	36.8%	4.0%	1.7%
	UNICEF	55.1%	14.4%	13.5%	17.0%
Child	HPRG (average)	83.0%	10.0%	4.9%	2.1%
Malaria	UNICEF	51.6%	20.0%	12.6%	15.9%

#### IV. Costing scenarios

**The objective of this study is to provide estimates for the total and per capita cost of guaranteeing access to the BMPHS for all Nigerians, as defined in the National Health Act, along with the fiscal impact given current budget conditions.** Given these resources constraints, we also consider a variety of scenarios whereby the BHCPF is made to focus on priority population groups (e.g. rural areas), certain cost items (e.g. drugs and consumables only, given that state and local governments are expected to continue paying salaries), or the marginal cost of expanding coverage (to provide an incentive to expand coverage using existing resources). Expanding on this, we look at different pathways through which the BMPHS could gradually be expanded to reach a greater share of the population over the next five years, beginning with current coverage levels. Finally, similar scenarios are considered for the three pilot states, with the objective of informing resource allocation of the pilot grant in the coming year.

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<sup>18</sup> Mogyorosy, Zsolt and Peter Smith, "The main methodological issues in costing health care services: A literature review," CHE Research Paper 7, University of York, 2005.

In terms of fiscal space, total government expenditures in 2016 were approximately USD 33 billion, or 8.35 percent of GDP. While total health spending has risen steadily to USD 117 per capita in 2014, public expenditures remains low at 8.2 percent of total expenditure, or 0.92 percent of GDP. More than 70 percent of total health spending is out-of-pocket, while the public sector contributes just over 25 percent. This analysis also includes sensitivity analysis for changes in salary (for example, due to inflation or cross-state differences), or changes in drug and consumable cost (for example, as a result of fluctuation in the exchange rate). It is estimated that these two factors can influence total cost by +/- 15 percent. See Annexes 3 and 4 for information about fiscal conditions and sensitivity analysis.

*a. National level*

The following scenarios were constructed based on national level population estimates.

*i. Urban / rural population*

**Total cost of the “ideal” scenario, where the BMPHS is made available to all Nigerians, is estimated at USD 1.84 – 2.49 billion, or approximately USD 9.4 – 12.7 per person, using the sensitivity bounds described above.** This estimate includes urban and rural populations (estimated at 196 million people), at full coverage (meeting full population need, e.g. 100 percent of child vaccinations) for the full package of services (personnel, drugs and consumables, and overhead). The cost amounts to 0.53 % of GDP, 6.4% of total government expenditure, or 57.9% of public health expenditure. Alone, it is more than double the budget of the FMOH, suggesting that it is unattainable in the short- and likely medium- term.

Child services make up the largest share of total cost at 53 percent, driven by treatment of: malaria (USD 87 million); severe malnutrition (USD 52 million); and diarrhoea, with zinc and ORS (USD 25 million). The next-largest service package is maternal care (antenatal care, delivery, postnatal care and family planning) at 35 percent of the total cost of the BMPHS, followed by malaria treatment for children over the age of 5 (7 percent) and NCD screening (5 percent). Within these seven services packages, immunization constitutes 8 percent of costs, malaria (all ages) 30 percent, nutrition 16 percent and NCD screening 5 percent.

Table 10: Total annual cost for urban/rural population at national level, full coverage

TOTAL COST - NATIONAL, URBAN/RURAL, FULL COVERAGE, FULL PACKAGE							
Service package	Naira	USD	Share of package cost	Per capita (USD)	% of GDP	% of total government expenditure	% of public health expenditure
ANC	89,502,758,470	\$292,810,394	14%	\$1.49		0.87%	7.8%
Delivery	79,105,497,839	\$258,795,510	12%	\$1.32		0.77%	6.9%
PNC	33,955,136,545	\$111,085,033	5%	\$0.57		0.33%	3.0%
Child	350,236,519,416	\$1,145,807,069	53%	\$5.84		3.39%	30.7%
Malaria (over 5)	47,457,307,348	\$155,257,705	7%	\$0.79		0.46%	4.2%
NCD	35,948,127,427	\$117,605,150	5%	\$0.60		0.35%	3.1%
Family planning	25,793,011,400	\$84,382,448	4%	\$0.43		0.25%	2.3%
<b>TOTAL</b>	<b>661,998,358,444</b>	<b>\$2,165,743,310</b>	<b>100%</b>	<b>\$11.04</b>	<b>0.53%</b>	<b>6.40%</b>	<b>57.9%</b>
Immunization	51,727,021,853	\$169,226,177	8%	\$0.86		0.50%	4.5%
Malaria	199,493,020,928	\$652,646,143	30%	\$3.33		1.93%	17.5%
Nutrition	102,645,366,960	\$335,806,749	16%	\$1.71		0.99%	9.0%

TOTAL COST - NATIONAL, URBAN/RURAL, FULL COVERAGE, FULL PACKAGE							
Service package	Naira	USD	Share of package cost	Per capita (USD)	% of GDP	% of total government expenditure	% of public health expenditure
NCD	35,948,127,427	\$117,605,150	5%	\$0.60		0.35%	3.1%

*ii. Rural population only*

**Focusing on the rural population (60 percent of Nigeria’s population) would reduce total costs by 40 percent to USD 1.29 billion.** A limitation of the model is that it treats urban and rural areas equally, when in fact efficiencies may differ due to cost of accessibility and low demand. Due to this assumption, however, the share of individual service packages and the total per capita cost do not change. Fiscally, providing the full package to exclusively to rural population at the national level is estimated to amount to 35 percent of current public health expenditure, which is still significant in the short term.

Table 11: Total annual cost for rural population at national level, full coverage

NATIONAL, RURAL, FULL COVERAGE, FULL PACKAGE							
Service package	Naira	USD	Share of package cost	Per capita (USD)	% of GDP	% of total government expenditure	% of public health expenditure
ANC	53,701,655,082	\$175,686,237	14%	\$1.49		0.52%	4.7%
Delivery	47,463,298,703	\$155,277,306	12%	\$1.32		0.46%	4.2%
PNC	20,373,081,927	\$66,651,020	5%	\$0.57		0.20%	1.8%
Child	210,141,911,650	\$687,484,242	53%	\$5.84		2.03%	18.4%
Adult malaria	28,474,384,409	\$93,154,623	7%	\$0.79		0.28%	2.5%
NCD	21,568,876,456	\$70,563,090	5%	\$0.60		0.21%	1.9%
Family planning	15,475,806,840	\$50,629,469	4%	\$0.43		0.15%	1.4%
<b>TOTAL</b>	<b>397,199,015,067</b>	<b>\$1,299,445,986</b>	<b>100%</b>	<b>\$11.04</b>	<b>0.32%</b>	<b>3.84%</b>	<b>34.8%</b>
Immunization	31,036,213,112	\$101,535,706	8%	\$0.86		0.30%	2.7%
Malaria	119,695,812,557	\$391,587,686	30%	\$3.33		1.16%	10.5%
Nutrition	61,587,220,176	\$201,484,050	16%	\$1.71		0.60%	5.4%
NCD	21,568,876,456	\$70,563,090	5%	\$0.60		0.21%	1.9%

*iii. Drugs and consumables*

**Given that state and local governments cover personnel salaries, another option to increase the affordability of the BHCPF is to use it to cover drug and consumable costs, much of which is currently borne directly by consumers.** To understand the implications, we look at cost shares for the three cost categories (see Table 12). Overall, drugs and consumables constitute 57 percent of cost, versus 34 percent for personnel (and 9 percent overhead). However, these shares are unevenly distributed across the services packages, with maternal services being more labor intensive, while child services require a greater share of drugs and consumables (65 percent).

Table 12: Cost shares for rural population at national level, full coverage (USD)

COST SHARE - NATIONAL, RURAL, FULL COVERAGE, FULL PACKAGE							
Service package	TOTAL (USD)	Personnel		Drugs and consumables		Overhead	
		Cost	Share	Cost	Share	Cost	Share
ANC	175,686,237	87,973,540	50%	71,741,220	41%	15,971,476	9%
Delivery	155,277,306	103,395,026	67%	37,766,161	24%	14,116,119	9%
PNC	66,651,020	41,434,087	62%	19,157,749	29%	6,059,184	9%
Child	687,484,242	180,735,029	26%	444,250,645	65%	62,498,567	9%
Adult malaria	93,154,623	10,392,187	11%	74,293,834	80%	8,468,602	9%
NCD	70,563,090	12,526,644	18%	51,621,619	73%	6,414,826	9%
Family planning	50,629,469	10,589,981	21%	35,436,808	70%	4,602,679	9%
<b>TOTAL</b>	<b>1,299,445,986</b>	<b>447,046,496</b>	<b>34%</b>	<b>734,268,037</b>	<b>57%</b>	<b>118,131,453</b>	<b>9%</b>
Immunization	101,535,706	4,736,670	5%	87,568,518	86%	9,230,519	9%
Malaria	391,587,686	72,778,075	19%	283,210,731	72%	35,598,881	9%
Nutrition	201,484,050	87,817,321	44%	95,349,997	47%	18,316,732	9%
NCD	70,563,090	12,526,644	18%	51,621,619	73%	6,414,826	9%

In terms of fiscal space, focusing on drugs and consumables reduces the package cost for the rural population to USD 734 million, or 2.17 percent of government spending. Of this, 61 percent is needed for drugs and consumables related to child services.

Table 13: Total annual cost for rural population at national level, drugs and consumables only

NATIONAL, RURAL, FULL COVERAGE, DRUGS AND CONSUMABLES							
Service package	Naira	USD	Share of package cost	Per capita (USD)	% of GDP	% of total government expenditure	% of public health expenditure
ANC	21,928,993,093	\$71,741,220	10%	0.61		0.21%	1.9%
Delivery	11,543,905,798	\$37,766,161	5%	0.32		0.11%	1.0%
PNC	5,855,910,318	\$19,157,749	3%	0.16		0.06%	0.5%
Child	135,793,192,208	\$444,250,645	61%	3.77		1.31%	11.9%
Adult malaria	22,709,245,236	\$74,293,834	10%	0.63		0.22%	2.0%
NCD	15,779,075,554	\$51,621,619	7%	0.44		0.15%	1.4%
Family planning	10,831,897,216	\$35,436,808	5%	0.30		0.10%	0.9%
<b>TOTAL</b>	<b>224,442,219,423</b>	<b>\$734,268,037</b>	<b>100%</b>	<b>6.24</b>	<b>0.18%</b>	<b>2.17%</b>	<b>19.6%</b>
Immunization	26,766,890,926	\$87,568,518	12%	0.74		0.26%	2.3%
Malaria	86,568,448,802	\$283,210,731	39%	2.41		0.84%	7.6%
Nutrition	29,145,439,962	\$95,349,997	13%	0.81		0.28%	2.6%
NCD	15,779,075,554	\$51,621,619	7%	0.44		0.15%	1.4%

*iv. Baseline and target coverage*

Coverage in Nigeria is below 40 percent for many essential services. As a result, current expenditures on primary care are considerably lower than the full coverage scenarios reported previously. The total cost at current coverage levels (the baseline scenario) is USD 395 million (USD 3.36 per capita), or 0.10 percent of GDP. This is only a fraction of the estimated USD 14 billion total health spending (3.67 percent of GDP, or USD 117 per capita), suggesting that much of the current consumption of takes place at the tertiary level. Another explanation is that urban coverage rates are higher, producing greater spending.

The “target” scenario looks at changes that accompany a ten percent reduction in the coverage gap<sup>19</sup>. Given this increase, total cost rises to USD 485 million (USD 4.13 per capita).

Table 14: Total annual cost for rural population at national level, baseline and target coverage (in USD)

NATIONAL, RURAL, BASELINE/TARGET COST, FULL PACKAGE						
	Baseline Coverage			Target Coverage		
	TOTAL	% of GDP	% of total government expenditures	TOTAL	% of GDP	% of total government expenditures
ANC	\$54,964,623		0.16%	\$67,036,784		0.20%
Delivery	\$42,353,788		0.13%	\$53,646,140		0.16%
PNC	\$19,789,815		0.06%	\$24,475,936		0.07%
Child	\$205,692,112		0.61%	\$253,871,325		0.75%
Adult malaria	\$27,946,387		0.08%	\$34,467,211		0.10%
NCD	\$21,168,927		0.06%	\$26,108,343		0.08%
Family planning	\$23,314,761		0.07%	\$26,046,232		0.08%
<b>TOTAL</b>	<b>\$395,230,414</b>	<b>0.10%</b>	<b>1.17%</b>	<b>\$485,651,971</b>	<b>0.12%</b>	<b>1.44%</b>
Immunization	\$25,381,553		0.08%	\$32,996,968		0.10%
Malaria	\$114,151,779		0.34%	\$141,895,370		0.42%
Nutrition	\$64,892,789		0.19%	\$78,551,915		0.23%
NCD	\$21,168,927		0.06%	\$26,108,343		0.08%

Another alternative is that the BHCPF could be focused on paying marginal cost between current coverage and target coverage – and beyond, as coverage grows. The logic for this is that current funds for primary care – mostly from state and local governments, but also the FMOH via central procurement and donors, are already sufficient to achieve baseline coverage. Like the NSHIP and other pay-for-

<sup>19</sup> The target increase is defined as the number of services provided at full coverage, minus the number of services at baseline, times 10 percent. For example, if baseline coverage is 100 interventions and full coverage 150 interventions, the target would be  $(150 - 100) * 10\%$ , or 5. Added to the baseline, this becomes 105 interventions. This method was chosen to allow for convergence across interventions with low and high baseline coverage rates.

performance initiatives, the BHCPF is structured as an incentive payment to help overcome financial constraints on both the supply and demand sides. Nationally, the marginal cost of moving between baseline and target scenarios is USD 150 million for the urban/rural population, or USD 90 million for rural areas. This cost rises to USD 1.5 billion to achieve full coverage for the entire population, or USD 904 million for rural areas.

Table 15: Marginal costs across scenarios (in USD)

MARGINAL COST						
	Baseline	Target	Full	Baseline-Target	Target-Full	Baseline-Full
Urban/rural	\$658,717,356	\$809,419,951	\$2,165,743,310	\$150,702,595	\$1,356,323,359	\$1,507,025,954
Rural	\$395,230,414	\$485,651,971	\$1,299,445,986	\$90,421,557	\$813,794,015	\$904,215,573

*b. Pilot States*

The pilot will take place in three states (Abia, Niger and Osun) with a focus on rural areas. The per capita and distribution of costs remain the same from the national estimates since no adjustment was made for differences in coverage or efficiency across states.

*i. Rural population*

Niger is the most populated pilot state at 5.7 million people (3.4 million in rural areas) followed by Osun (4.8 million total / 2.9 million rural) and Abia (3.8 million total / 2.3 million rural). Total cost at current coverage rates is estimated at USD 30 million per year for the three states.

Table 16: Baseline coverage, pilot states

BASELINE COVERAGE					
	National	Abia	Niger	Osun	TOTAL
ANC	\$54,964,623	\$1,064,176	1,598,414	\$1,356,095	\$4,018,685
Delivery	\$42,353,788	\$820,016	1,231,681	\$1,044,959	\$3,096,656
PNC	\$19,789,815	\$383,153	575,503	\$488,257	\$1,446,913
Child	\$205,692,112	\$4,274,804	6,420,843	\$5,447,448	\$16,143,096
Adult malaria	\$27,946,387	\$541,073	812,702	\$689,497	\$2,043,273
NCD	\$21,168,927	\$409,854	615,609	\$522,283	\$1,547,745
FP	\$23,314,761	\$451,399	\$678,011	\$575,225	\$1,704,636
<b>TOTAL</b>	<b>\$395,230,414</b>	<b>\$7,944,475</b>	<b>\$11,932,763</b>	<b>\$10,123,765</b>	<b>\$30,001,003</b>
Immunization	\$25,381,553	\$491,415	\$738,115	\$626,217	\$1,855,747
Malaria	\$114,151,779	\$2,210,104	\$3,319,622	\$2,816,370	\$8,346,096
Nutrition	\$64,892,789	\$1,548,774	\$2,326,290	\$1,973,626	\$5,848,691
Nutrition	\$21,168,927	\$409,854	\$615,609	\$522,283	\$1,547,745

Under the target scenario, this increases to USD 36.9 million per year (Table 17). As was the case with the national scenarios, drugs and consumables make up 57 percent of the total cost, or USD 21 million per year.

Table 17: Target coverage, pilot states (in USD)

TARGET COVERAGE					
	National	Abia	Niger	Osun	TOTAL
ANC	\$67,036,784	\$1,297,906	1,949,481	\$1,653,941	\$4,901,329
Delivery	\$53,646,140	\$1,038,648	1,560,071	\$1,323,565	\$3,922,285
PNC	\$24,475,936	\$473,881	711,779	\$603,874	\$1,789,534
Child	\$253,871,325	\$5,273,052	7,920,232	\$6,719,531	\$19,912,815
Adult malaria	\$34,467,211	\$667,323	1,002,333	\$850,380	\$2,520,036
NCD	\$26,108,343	\$505,486	759,251	\$644,149	\$1,908,886
FP	\$26,046,232	\$504,284	\$757,444	\$642,616	\$1,904,345
<b>TOTAL</b>	<b>\$485,651,971</b>	<b>\$9,760,581</b>	<b>\$14,660,592</b>	<b>\$12,438,057</b>	<b>\$36,859,230</b>
Immunization	\$32,996,968	\$638,858	\$959,577	\$814,106	\$2,412,541
Malaria	\$141,895,370	\$2,747,251	\$4,126,427	\$3,500,864	\$10,374,541
Nutrition	\$78,551,915	\$1,878,675	\$2,821,808	\$2,394,024	\$7,094,508
Nutrition	\$26,108,343	\$505,486	\$759,251	\$644,149	\$1,908,886

*ii. Resource allocation*

Current funds for the two-year pilot are limited to USD 20 million from the NSHIP Additional Financing. At the projected amounts, this is insufficient to pay the entire cost of the BMPHS or even the drug and consumable cost alone. However, it is enough to cover marginal cost for the pilot states, which is anticipated to be USD 6.8 million per year.

Table 18: Comparison of total and marginal costs (in USD)

	TOTAL COST			MARGINAL COST		
	Baseline	Target	Full	Baseline-Target	Target-Full	Baseline-Full
<b>National</b>	\$395,230,414	\$485,651,971	\$1,299,445,986	\$90,421,557	\$813,794,015	\$904,215,573
<b>Abia</b>	\$7,944,475	\$9,760,581	\$26,105,537	\$1,816,106	\$16,344,956	\$18,161,062
<b>Niger</b>	\$11,932,763	\$14,660,592	\$39,211,049	\$2,727,829	\$24,550,457	\$27,278,286
<b>Osun</b>	\$10,123,765	\$12,438,057	\$33,266,683	\$2,314,292	\$20,828,626	\$23,142,918
<b>PILOT TOTAL</b>	\$30,001,003	\$36,859,230	\$98,583,269	\$6,858,227	\$61,724,039	\$68,582,266

The pilot is expected to follow the National Health Act design, with gateways for both the basic minimum package (via the NHIS) and facility upgrades (via the NPHCDA). At the facility level, this amounts to a payment tied directly to service provision, as well as a lump sum for equipment, operating expenses, etc. (see Table 19). For reference, the NSHIP program provided facilities with approximately USD 5,000 over two payments in the first year in the program.

Table 19: BHCPF Gateways

	NHIS	NPHCDA	Emergency Fund
<b>Purpose</b>	Basic Minimum Package of Health Services (BMPHS)	Facility upgrade for PHCs	EMT and public health emergencies
<b>Covers</b>	Payments from NHIS to facilities for provision of the basic services	Incentive fund provided by SPHCDA to facilities for equipment, purchase of medicines, personnel	
<b>% of BHCPF</b>	50%	45%	5%



<b>Amount</b>	Covered in this costing work (e.g. \$11.04 / per capita)	= Total NPHCDA Gateway / number of HFs (e.g. NSHIP provides around \$5,000 / HF)	
<b>Facilities</b>	1 PHC / ward = 1 PHC / 15,000 people (estimated 574 rural PHCs in pilot states)		

At an average of 15,000 people covered per health facility, there are around 574 rural facilities in the three states. Administrative and start-up costs aside, covering marginal cost for the benefits package would amount to just under USD 12,000 per year, or USD 0.79 per capital, and leave approximately USD 6.3 million for capital improvements, which amounts to over USD 5,000 per facility per year (NSHIP provided this amount for just the first year).

Table 20: Resource allocation for marginal cost and facility upgrades (in USD)

PILOT STATES, RURAL, FULL PACKAGE					
	Year 1	Year 2	TOTAL	Per HF (est. 574 PHCs)	Per capita (15,000 / HF)
PILOT BUDGET			\$ 20,000,000		
NHIS	\$ 6,858,227	\$ 6,858,227	\$ 13,716,454	\$ 11,948 / year	\$ 0.79
			\$ 6,283,546		
NPHCDA	\$ 3,141,773	\$ 3,141,773	\$ 6,283,546	\$ 5,473 / year	
			\$0		

It is important to keep in mind the difference between economic cost and payment system. Economic cost refers to the sum of the recurrent costs; depending on the intention, the payment amount and system can vary considerable, especially in a case like this, where the payment is meant to act as an incentive, but not necessarily cover all costs (since fixed and personnel costs are already covered, for example).

**IV. Payment and expansion path**

Whereas the previous section looks at the full economic cost of the package, the discussion about payments reflects the distribution of this burden across actors in the system and structuring of the BHCPF to promote efficiency and provide an incentive for facilities to expand coverage in the near term<sup>20</sup>. Payment estimates for the expansion of the BHCPF reflect three different levels of ambition - expanding the coverage of services included in the basic minimum package from currently 30% to 50%, 60% and 70% by 2022. Given the current macro-fiscal stance, all three expansion paths assume larger

<sup>20</sup> The costing scenarios attempt to show the full economic cost of the package for different coverage rates and localities, without discussing payment shares. For example, state and local government contributions to personnel salaries; central purchases of vaccines and essential medicines, and; most significantly, private, out of pocket payments. The discussion on payment systems looks at how, in a broad sense, payments from the BHCPF may be structured to promote efficiency and provide an incentive for facilities to expand coverage, given existing administrative arrangements.

coverage increases in the outer years of the five-year period. Estimates reflect projected population growth as well as expected efficiency gains under the financing arrangements of the BHCPF. Data are expressed as marginal costs, that is, the costs above and beyond current levels of spending<sup>21</sup>.

**Expanding service coverage from currently 30% to 50% in 2022 is likely to cost USD 37.8 million in year 1, USD 161.5 million in year 3, and 357.5 million in year 5 (see Table 21 and Figure 3).** In the more ambitious scenario of increasing current coverage to 60% by 2022, the costs of are likely to amount to USD 51.0 million in year 1, USD 224.1 million in year 3 and USD 509.3 million in year 5. In the most ambitious scenario of increasing current coverage to 70% by 2022, the estimated costs are USD 64.2 million in year 1, USD 286.8 million in year 3 and USD 650.8 million in year 5.

Table 21: Marginal cost of BHCPF expansion (USD, millions,2017)<sup>22</sup>

	2018	2019	2020	2021	2022
<b>50% (by 2022)</b>	37.8 (35.0-40.5)	91.2 (84.5-97.9)	161.5 (149.7-173.3)	249.8 (231.6-268.1)	357.5 (331.4-383.7)
<b>60% (by 2022)</b>	51.0 (47.2-54.7)	125.1 (115.9-134.2)	224.1 (207.7-240.5)	349.7 (324.1-375.3)	503.9 (467.1-540.8)
<b>70% (by 2022)</b>	64.2 (59.5-68.9)	159.1 (147.4-170.7)	286.8 (265.9-307.8)	449.9 (417.0-482.8)	650.8 (603.2-698.4)

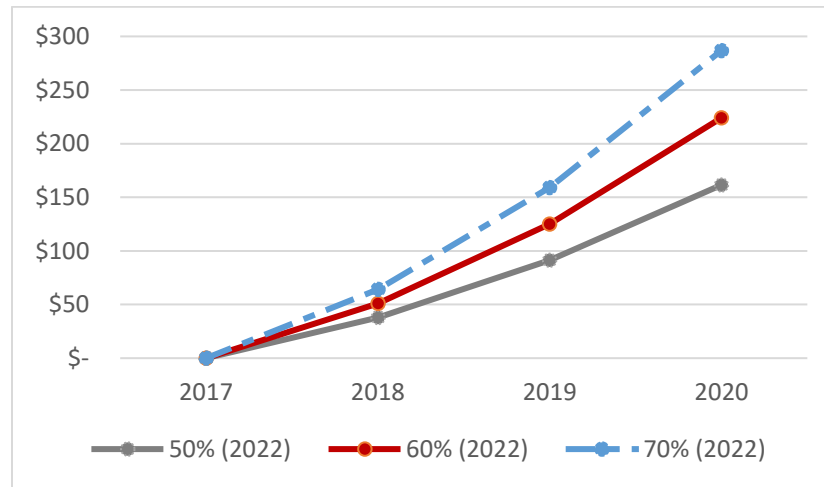
**The presented estimates suggest that a gradual expansion of the BHCPF is in reach with the prospect that improved health and financial protection become an engine for sustained development and prosperity for all Nigerians.** With funding from development partners, a pilot in three states will be shortly underway, benefiting 8 million Nigerians by the end of 2018. This initial investment must be urgently complemented by a financing plan that draws on all stakeholders and sources of financing to make basic health service available to at least half of Nigeria’s population in 2022.

<sup>21</sup> Methodology: Marginal costs are considered to be non-labor recurrent costs (drugs and consumables) + 50% of overhead (assuming significant efficiency gains, specifically for labor, which is currently paid for by the state and local governments). Investment is backloaded (assuming that current macro-fiscal situation improves over the next five years). Relative coverage gap reduction (gap = target coverage minus baseline):

- Year 1: 10%
- Year 2: 15%
- Year 3: 20%
- Year 4: 25%
- Year 5: 30%

<sup>22</sup> Presented ranges reflect different assumptions about possible efficiency gains under BHCPF arrangements.

Figure 3: Cost estimates – BHCPF expansion early years (2017 – 2020) [USD, millions 2017]



*a. NPHCDA Gateway*

In addition to what is provided to the NHIS for the basic benefits package, the National Health Act allocates funds to the National Primary Health Care Development Agency (NPHCDA) to maintain primary health care facilities, provide essential drugs, and deploy human resources. The split defined in the Act is 50 percent for the NHIS, 45 percent for NPHCDA and 5 percent for emergency services. Rather than estimating revenues and divided across these shares, as was done in the original analysis for the BHCPF, this work has tried to answer the question of how much it would actually cost to deliver on the promise of the BHCPF to provide basic benefits for all Nigerians. The method provides for facility-level overhead and drug and consumables, which overlap with the NPHCDA mandate. Due to an absence of data and other limitations, no substantial attempt has been made to estimate the resource gap required to upgrade infrastructure or meet programmatic needs (for example, vaccine supply chains).

Applying the split to the payment amount above, yields per capita and per facilities estimates. Dividing the total payment amount for each for the three scenarios yields per capita amounts ranging from \$1.82 to \$3.32. Assuming 15,000 people per PHC facility – or 13,081 facilities nationally – this amounts to approximately \$27,329 per facility at the 50% coverage rate, or \$13,664 for the NHIS Gateway, and \$12,298 for the NPHCDA gateway.

Table 22: Marginal cost of BHCPF expansion, in 2022, by coverage achieved

	50%	60%	70%
Total payment amount	\$357,500,000	\$503,900,000	\$650,800,000
Per capita (196 million)	\$1.82	\$2.57	\$3.32
Per capita (% coverage * 196 million)	\$3.64	\$4.28	\$4.73
Per facility (est. 13,081 HF)	\$27,329	\$38,520	\$49,750
50% NHIS	\$13,664	\$19,260	\$24,875
45% NPHCDA	\$12,298	\$17,334	\$22,388
5% Emergency	\$13,664	\$19,260	\$24,875

## V. Discussion

The following section looks in greater details at the cost drivers and compares estimates to other costing studies.

### a. Key cost drivers

Of the key cost drivers at the national level, four (malaria for children under 5, malaria for population over 5, diarrhea and NCD screening) have a low unit cost, but a large target population. Another three (malnutrition, labor and deliver management and obstructed labor) have a modest to high unit cost, but low volume.

Table 23: Top ten cost drivers, urban/rural population, target coverage (USD)

Intervention	Total cost	Unit Cost	Target population
Malaria Treatment (children)	170,646,163	1,147	27,285,074
Treatment of severe acute malnutrition	105,553,696	35,275	548,789
Malaria treatment (population over 5)	57,445,351	1,022	10,312,234
ORS and zinc for diarrhea treatment	54,533,446	397	25,210,658
Labor and Delivery Management	51,841,341	5,308	1,791,297
Screen for risk of cardiovascular disease and diabetes	43,513,906	1,057	7,553,286
PMTCT	24,248,674	2,093	2,125,069
Condom	23,791,110	3,201	1,362,914
Ultrasound	23,748,480	1,000	4,356,096
Obstructed Labor	21,460,067	13,987	281,380

### b. Comparison with NSHIP program

Mapping between NSHIP program fee list and BMPHS provides an estimate of the comparative total cost of the NSHIP program fees relevant in the BMPHS context. It is important to keep in mind that not all BMPHS services are included in the NSHIP program (e.g. malaria treatment for all population) or are not explicitly identifiable (e.g. several ANC and PNC services in BMPHS). However, it is instructive to compare the NSHIP, which is explicitly a “top up” or incentive payment, with these full cost estimates.

Table 24: Comparison of NSHIP incentives applied to BMPHS service (where applicable) and BMPHS unit costs

#	Service (NSHIP)	Fee (USD) (NSHIP)	Target population – rural (BMPHS)		Unit Cost Estimate (USD) (BMPHS)
1	New outpatient consultation	0.40			-
2	New outpatient consultation by an indigent patient	1.20			-
3	Minor Surgery	4.00			-
4	Referred patient arrived at the Cottage Hospital	4.00			-
5	Completely vaccinated Child	6.00	Birth	4,885,892	20.76
6	Growth monitoring visit Child	0.28			

#	Service (NSHIP)	Fee (USD) (NSHIP)	Target population – rural (BMPHS)		Unit Cost Estimate (USD) (BMPHS)
7	2-5 Tetanus Vaccination of Pregnant Women	0.80	Pregnant women	5,886,616	0.46
8	Postnatal Consultation	1.60	Birth	4885,892	3.49
9	First ANC visit before 4 <sup>th</sup> month of pregnancy	2.00	Pregnant women	5,886,616	1.64
10	ANC standard visit (2-4)	1.20			
11	Second dose of SP provided to a pregnant woman	2.00	Pregnant women	5,886,6516	0.27
12	Normal delivery	12.00	Pregnant women	5,886,616	17.35
13	FP: total of new and existing users of modern FP methods	4.00			
14	FP: implants and IUDs	6.00	4% of women of reproductive age (15-49)	1,120,756	7.32
15	VCT/PMTCT/PIT test	0.80	Pregnant women	294,331	6.84
16	PMTCT: HIV+ mothers and children treated according to protocol	16.00			
17	STD treated	4.00			-
18	New AAFB+ PTB patient	30.00			-
19	PTB patient completed treatment and cured	80.00			-
20	Household visit per protocol	4.00			-

### c. Comparison with other costing studies

It is also helpful to compare the total cost estimate to those from the other costing studies, as is done below:

- **Health Policy Research Group:** Provides two estimates for maternal and child services in Niger state. Drugs/consumables and overhead are predicted to cost 3.1 billion Naira (\$10.1 million); adding personnel and capital cost increases the total cost to 7.4 billion Naira (\$32.7 million). The first is based on current coverage level and is roughly comparable with our baseline coverage scenario (\$11,932,763 for drugs/consumables, personnel and overhead), however, it does not include NCD screening and malaria treatment for the broader population, which are significant cost drivers, nor does it include labor, which in our work is about one-third of cost (perhaps less in clinics, which are driven by nurse/midwife and CHEW rather than doctors).
- **UNICEF:** Total primary care costs (excluding hospitals) at the national level were 671.8 billion Naira (912.3 billion Naira at 2017 prices), which is about fifty-percent more than the total cost of our full coverage model at 661 billion Naira. However, this sum includes funding for additional capital, personnel and infrastructure to meet NPHCDA standards. In addition, the service package is not fully comparable with the BMPHS.
- **USAID evaluation of the NHIS/MDG Project:** Beginning in 2008, the NHIS/MDG Maternal and Child Health Project was designed to provide free primary care to 600,000 pregnant women and children (along with limited secondary care for those women). The project provided a capitation payment of 550 Naira per enrollee per month for primary care. Using two methods in two different states, the USAID evaluation found a weighted average cost per enrollee per month of

333 – 512 Naira (534 – 751 Naira for women alone). Adjusted for inflation, this translates into 12,400 – 14,100 Naira per enrollee per year in 2017 (\$40.5 – 46.3 in 2017 dollars). Using the average from this range and multiplying by the target population for the BHCPF leads to a total cost of \$1.01 billion. This cost does not include referrals, which were paid as fee-for-service.

Table 25: Comparison of total cost across studies (in 2017 prices)

Study	WB		Description
	USD	USD	
HPRG (Niger State)	\$ 10,065,993	\$ 11,932,763	Drugs / consumables and overhead. Baseline coverage.
	\$ 32,680,918	\$ 39,211,049	Drugs / consumables, overhead, labor, capital. Full coverage.
UNICEF (National)	\$ 2,981,272,994	\$ 2,165,743,310	Includes additional capital, personnel and infrastructure to meet NPHCDA standards. Full coverage.
MDG Program	\$ 1,013,722,803	\$ 399,030,185	Capitation payment for primary care, does not include hospital referrals. Women and children only.

*d. Full time-equivalent health workers need estimation*

The advantage of a bottom-up, ingredient-based costing model is that it enables an estimate of the total need of resources at national as well as facility level to provide costed interventions. Assuming one primary care facility per 15,000 inhabitants (per the one PHC per ward policy) results in 7,472 facilities nationally to cover the rural population. We assume that the optimal number of working hours per one health worker is 115,200 minutes per year and that all interventions are provided by the PHC facility. Our results show that to provide the BMPHS interventions at the current coverage level requires 1.5 full-time equivalent (FTE) nurses/midwives, 1.1 FTE community health workers, 0.17 FTE lab technicians and 0.2 FTE doctor per 15,000 inhabitants.

Table 26: Need for health workers based on different coverage scenarios

	Doctor	Nurse / Midwife	CHEW	Lab Tech
Baseline	0.2	1.5	1.1	0.2
Target	0.2	1.9	1.3	0.2
Full	0.5	5.1	3.7	0.6

According to the Minimum Standards for Primary Health Care in Nigeria, the primary health care centre has to cover 10,000-20,000 inhabitants (average 15,000) and should have 4 nurses or midwives, 3 community extended health workers, 6 junior community health workers and 1 lab technician. These staffing norms exceed our estimates for what is needed to achieve full coverage with the BMPHS interventions.

### ANNEX 1: Summary of the costing studies

Study	Using the Basic Health Care Provision Fund to provide Maternal and Child Health Services in Nigeria: program costing and financial feasibility analysis (HPRG)	Costing of the Free Health Scheme: Lagos State, Nigeria. Partnership for Transforming Health Systems II (DFID)	Costing of Primary Health Care as part of Health Systems Strengthening in Nigeria: Methodology and Assumptions (UNICEF)	The Costs and Benefits of a Maternal and Child Health Project in Nigeria (USAID)
<b>Authors</b>	Authors: Obinna Onwujekwe, Chima Onoka, Ifeoma Nwakoby Health Policy Research Group, University of Nigeria Enugu Campus  Funded by Bill and Melinda Gates Foundation (BMGF)	Dr Adesoji Ologun, Olajide Sobande and Olumuyiwa Oke	UNICEF Nigeria Country Office Team: Aboubacar Kampo, Kennedy Ongwae	Briscombe, Brian and William McGreevey Funded by USAID
<b>Publishing year</b>	2016	2014	2015	2010
<b>Data sources</b>	3 states (Imo, Kaduna, Niger), 2 local government areas (LGA) in each state, 2 primary health care (PHC) facilities in each LGA. In total 12 PHC facilities.  Year: 2015	Service utilization data: collected from the public health facilities providing the free health scheme in the state.  Registration, admission and laboratory services, operation fees: tariffs developed by the Lagos state Health service commission (HSC)  Drugs and consumable price data: Lagos State Ministry of Health Directorate of Pharmaceutical Services (DPS) and Central Medical Store	Multiple data sources used. The basis for the estimations is the minimum standards for PHC in Nigeria.  The personnel costs are based on current Government of Nigeria federal salary scale for the different cadre of staff.  The drug and supply costs are validated against the MBB tool that was used to develop the NSHDP (2010-2015) and UNICEF Supply Division supply catalogue for international market price comparisons.	One urban facility (Ibadan South East LGA, Oyo State) and one rural facility (Agwarra LGA, Niger State), October 2009
<b>Level of care</b>	Primary health care (PHC), facility type not defined.  Referral to the hospital seems to be excluded	Primary health care (PHC)	Primary health care: primary health care posts, clinics, centres and hospitals	Primary health care: referral to the hospital seems to be excluded
<b>Services</b>	Maternal and under 5 child services including antenatal care (ANC), delivery, post-natal care (PNC), family planning (FP), treatment of malaria, pneumonia, diarrhoea, and routine immunization.	Child Health Services (0-12 years): common newborn, infant and childhood conditions as management of low birth weight, birth asphyxia, neonatal jaundice, neonatal sepsis, neonatal tetanus, malnutrition,	List of interventions costed at the primary care facility level:	NHIS/MDG Maternal and Child Health Project design is followed.  Primary care for all enrolled children (birth until five) and primary plus secondary care for all enrolled pregnant women. Secondary care for

Study	Using the Basic Health Care Provision Fund to provide Maternal and Child Health Services in Nigeria: program costing and financial feasibility analysis (HPRG)	Costing of the Free Health Scheme: Lagos State, Nigeria. Partnership for Transforming Health Systems II (DFID)	Costing of Primary Health Care as part of Health Systems Strengthening in Nigeria: Methodology and Assumptions (UNICEF)	The Costs and Benefits of a Maternal and Child Health Project in Nigeria (USAID)
	<p><b>Maternal care:</b> average 4 visits per year, normal delivery, postnatal care and family planning</p> <p><b>Child care:</b> average 3 visits per year</p> <p>Both weighted based on the utilization pattern of various services used in facilities</p>	<p>malaria, respiratory tract infection, diarrheal diseases, measles, asthma, sickle cell disease and diabetes mellitus</p> <p>Maternal Health Services: antenatal care, normal deliveries, postnatal care and family planning</p> <p>Screening: prostate cancer (Prostate Specific Antigen), breast cancer (self breast examination, clinical breast examination, mammogram), colon cancer, cervical cancer (pap smear), hypertension and diabetes mellitus</p> <p>Primary Health Care Services</p> <p>Free services for all age groups: HIV screening, antiretroviral therapy for HIV/AIDS and tuberculosis treatment, free malaria treatment, Emergency Medical Services for the first 24hrs including the cost of screening blood and blood products and the use of medical gases.</p>	<p>Basic Pregnancy care: Antenatal check up, TT vaccination, Antenatal care lab test, PMTCT/HTC/HIV-no cost ARV</p> <p>Nutrition: Provide Iron /folate, 2 doses IPT to pregnant woman, Provide Vit A to postpartum woman, Diagnose/treat severe anaemia</p> <p>Delivery Care Basic obstetric care (Normal Delivery)+TEO, Emergency obstetric care: Abortion complications, Eclampsia, Haemorrhage, Neonatal Complications, Obstructed Labour, Sepsis</p> <p>Post natal care: Post abortion care, Post-partum care</p> <p>Family planning; Provide Condoms; Provide Oral Contraceptives; Provide Injectables; Provide IUDs; Provide Norplant; Manage/refer problems</p> <p>HIV/AIDS prevention &amp; Management: BCC on safe sex, Distribute condom, HIV/HTC, no cost ARV</p> <p>RTI/STIs control and management: Treatment of syphilis (Symptomatic screening and treatment); Treatment of STIs other than syphilis (symptomatic screening &amp; treatment)</p> <p>Management of Childhood illness (IMCI): Monitor ORT/ feeding for diarrhea; Treat ARI with antibiotics; Antimalarial drugs for fever in malaria areas; Community Management of Acute Malnutrition (CMAM); Immunization (EPI Plus)</p>	<p>pregnant women covers complications from pregnancy and operations such as caesarean sections.</p>



Study	Using the Basic Health Care Provision Fund to provide Maternal and Child Health Services in Nigeria: program costing and financial feasibility analysis (HPRG)	Costing of the Free Health Scheme: Lagos State, Nigeria. Partnership for Transforming Health Systems II (DFID)	Costing of Primary Health Care as part of Health Systems Strengthening in Nigeria: Methodology and Assumptions (UNICEF)	The Costs and Benefits of a Maternal and Child Health Project in Nigeria (USAID)
			<p>Provide immunization services (EPI plus)</p> <p>Tuberculosis control: Confirm diagnosis through laboratory; Provide DOTs to cases</p> <p>Malaria Control: Malaria laboratory support; Manage malaria cases; Manage severe malaria cases (secondary drugs, inpatient)</p> <p>Limited Curative Care                      Other surgery</p>	
Standards of services	<p>Cost of drugs and consumables was estimated based on treatment standards in the SURE-P MCH services (<i>Source: USAID / DELIVER PROJECT, Task Order 4. 2014. Nigeria: 2014-2015 SURE-P Maternal and Child Health Commodity Requirements and Financing Needs. Arlington, VA.: USAID / DELIVER PROJECT, Task Order 4.</i>)</p> <p>Other standards are not explicitly mentioned.</p>	<p>Nigeria's standard treatment guideline (2008 edition) and treatment guideline developed by specialist at Massey street children hospital.</p> <p>Both guidelines were reviewed at a meeting with the Medical Directors. Details not available in the study.</p>	<p>Standard of service bases on the open source costing tool developed by the World Bank (Yazbeck, et al). The assumptions were validated against data from the Marginal Budgeting for the Bottlenecks (MBB) tool that was used to cost the National Strategic Health Strengthening PHC in Nigeria.</p>	Standards are not explicitly mentioned.
Perspective	Purchaser and provider.	Purchaser	Purchaser and provider.	Purchaser and provider.
Units of Analysis	Maternity care and child care annual costs per capita by cost categories.	Cost per interventions.	Cost per interventions.	Average per capita cost per maternity care and per child care per one year.
Cost Categories and Items	<p><b>Capital cost:</b> building, transport, medical equipment if available and if listed in the NPHCDA's Minimum Standards for Primary Health Care in Nigeria requirements for a standard PHC facility. Details not available.</p>	<p>Cost categories determined by tariff list structure: registration, admission, laboratory services, operations, drugs and consumables.</p>	<p>Costs are divided fixed and variable costs.</p> <p>Fixed costs:</p> <p>Personnel: staffing level based on the minimum standards for PHC, personnel costs are based on current Government</p>	<p>Labour and non-labour costs are distinguished. Details not available.</p>

Study	Using the Basic Health Care Provision Fund to provide Maternal and Child Health Services in Nigeria: program costing and financial feasibility analysis (HPRG)	Costing of the Free Health Scheme: Lagos State, Nigeria. Partnership for Transforming Health Systems II (DFID)	Costing of Primary Health Care as part of Health Systems Strengthening in Nigeria: Methodology and Assumptions (UNICEF)	The Costs and Benefits of a Maternal and Child Health Project in Nigeria (USAID)
	<p><b>Overhead costs:</b> total annual expenditure on administration and overheads including travels, transport, utility, printing, stationery, maintenance, fuel, lubricant, staff training, and financial charges. Details not available.</p> <p><b>Personnel costs:</b> total annual salary expenditures of staff, including short term informal employees paid by the facility. Number of staff and salary scales not available.</p> <p><b>Drugs and consumables:</b> cost of drugs and consumables based on treatment standards in the SURE-P MCH services. Where different drugs or commodities could be used, the costs were adjusted based on actual utilization patterns according to the facility utilisation records. Enugu State’s drug revolving fund systems was used to define the unit costs. See table 1.1.</p>		<p>of Nigeria federal salary scale for the different cadre of staff. Personnel cost is allocated to the interventions based on the estimated staff time per intervention (probably relative time, not actual minutes/hours). See table 3.1.</p> <p>The capital costs, maintenance costs, IEC and SPHCDA-SMOH management team costs estimates were guided by the minimum standards for PHC in Nigeria and revised based on building, construction and maintenance practice in Nigeria. See table 3.2.</p> <p>Variable costs:</p> <p>Drug and supply costs are validated against the MBB tool that was used to develop the NSHDP (2010-2015) and UNICEF Supply Division supply catalogue for international market price comparisons.</p>	
Unit cost estimation	<p>Capital, overhead and personnel costs by top-down approach: the share of the respective costs for MCH services was determined by allocating the total costs of the facility to the MCH services based on the utilization weight (based on visits) of MCH services.</p> <p>Drug and supply costs by bottom-up approach: items and amount based on treatment standards of the SURE-P MCH services adjusted to the actual utilization,</p>	Unit costs per intervention are estimated based on service standards and tariffs.	Unit costs per intervention are estimated based on total estimated PHC facility costs by cost categories. Total cost by categories are allocated to the interventions based on relative personnel time intensity of each intervention and expected target coverage (see table 3.3).	<p>Macro costing: the share of total costs allocated as the share of pregnant women and children under 5 of total enrolees divided by number of pregnant women and children under 5.</p> <p>Micro costing: details not available.</p>

Study	Using the Basic Health Care Provision Fund to provide Maternal and Child Health Services in Nigeria: program costing and financial feasibility analysis (HPRG)	Costing of the Free Health Scheme: Lagos State, Nigeria. Partnership for Transforming Health Systems II (DFID)	Costing of Primary Health Care as part of Health Systems Strengthening in Nigeria: Methodology and Assumptions (UNICEF)	The Costs and Benefits of a Maternal and Child Health Project in Nigeria (USAID)
	prices based on Enugu State's drug revolving fund.			
Utilization weights	The utilization weights for MCH services in facilities in each state were 0.83 (Imo), 0.85 (Kaduna) and 0.9 (Niger). Details not available.	Utilization weights (without age distribution) by interventions in table 2.1.	Relative time intensity weights per each intervention are used.	Pregnant women and children under 5 form 60% and 40% of total enrollees in studied two PHC facilities.
Demographic assumptions	Under 5-year-old Children (20%) and Pregnant Women (5%) out of a projected population of the state for 2015, based on 2006 Census figures and a growth rate of 3.2 (Imo), 3.0 (Kaduna), and 3.4 (Niger) (Federal Republic of Nigeria: 2006 Population Census, <a href="http://www.nigerianstat.gov.ng">http://www.nigerianstat.gov.ng</a> )	Not available	Several demographic and epidemiological assumptions which source is not explicitly mentioned are used.	Total fertility rate (TFR) of 5.2 children per woman in 2009 is assumed to gradually fall to 4.6 by 2015. The number of pregnant women in Nigeria at any one point in time is estimated to reach 4.2 million during this time period. Using the same TFR assumptions, the United Nations projects the total population under age five to be 25.3 million in 2009 and 27.5 million by 2015.

**ANNEX 2: List of interventions and delivery channel**

#	Service package	INTERVENTION	POPULATION AND EPIDEMIOLOGY							DELIVERY CHANNEL			UNIT COST
			Target population	Epidemiology		Coverage	Population in need (PIN)			Out-reach	PHC	Hosp-ital	Average case (Total)
			Group	% of target population requiring treatment	Frequency (annual)	%, target population receiving treatment	A. Baseline	B. Target (+10%)	C. Full				
1	ANC	ANC visits (4 visits)	Pregnant women	100	1	47	2,737,277	3,052,211	5,886,616		100		501
2	ANC	Tetanus toxoid (2 injections)	Pregnant women	100	1	36	2,136,842	2,511,819	5,886,616		100		140
3	ANC	Syphilis detection and treatment	Pregnant women	100	1	26	1,501,087	1,939,640	5,886,616		100		383
4	ANC	Management of hypertension without proteinuria	Pregnant women	17	1	5.1	300,217	370,268	1,000,725		100		788
5	ANC	Management of pre-eclampsia	Pregnant women	2.8	1	0.8	49,448	60,985	164,825			100	26,063
6	ANC	Anemia treatment	Pregnant women	60	1	18	1,059,591	1,306,829	3,531,970		95	5	591
7	ANC	Deworming	Pregnant women	29	1	12	688,734	790,573	1,707,119		100		69
8	ANC	Antenatal corticosteroids	Pregnant women	12	1	3.6	211,918	261,366	706,394			100	2,519
9	ANC	Antibiotics for pPRom	Pregnant women	4.7	1	1.4	83,001	102,368	276,671		50	50	1,009
10	ANC	Intermittent presumptive treatment of malaria (IPT)	Pregnant women	100	1	18	1,047,818	1,531,698	5,886,616		100		84
11	ANC	Case management of malaria	Pregnant women	30	1	9.0	529,795	653,414	1,765,985		100		960
12	ANC	PMTCT	Pregnant women	100	1	29	1,707,119	2,125,069	5,886,616		70	30	2,093
13	ANC	Daily iron and folic acid supplementation in pregnant women	Pregnant women	100	1	52	3,061,041	3,343,598	5,886,616		100		126
14	ANC	Blood test / haemoglobin screening / urinalysis	Pregnant women	100	1	34	1,998,212	2,387,052	5,886,616		100		1,120

#	Service package	INTERVENTION	POPULATION AND EPIDEMIOLOGY							DELIVERY CHANNEL			UNIT COST
			Target population	Epidemiology		Coverage	Population in need (PIN)			Out-reach	PHC	Hosp-ital	Average case (Total)
			Group	% of target population requiring treatment	Frequency (annual)	%, target population receiving treatment	A. Baseline	B. Target (+10%)	C. Full				
15	ANC	Hepatitis B screening	Pregnant women	100	1	30	1,765,985	2,178,048	5,886,616		100		800
16	ANC	Ultrasound	Pregnant women	100	2	30	3,531,970	4,356,096	11,773,233			100	1,000
17	Delivery	Induction of Labor (beyond 41 weeks)	Pregnant women	5	1	1.5	88,299	108,902	294,331			100	1,220
18	Delivery	Labor and Delivery Management	Pregnant women	100	1	23	1,336,262	1,791,297	5,886,616		100		5,308
19	Delivery	Active management of third stage of labour (AMTSL)	Pregnant women	100	1	30	1,765,985	2,178,048	5,886,616		100		131
20	Delivery	Pre-Referral Management of Labor Complications	Pregnant women	5	1	1.5	88,299	108,902	294,331		100		18,074
21	Delivery	Obstructed Labor	Pregnant women	10	1	4	247,238	281,380	588,662		25	75	13,987
22	Delivery	Management of eclampsia	Pregnant women	1	1	0	17,660	21,780	58,866		10	90	26,063
23	PNC	Newborn resuscitation	Pregnant women	1	1	0	17,660	21,780	58,866		100		635
24	PNC	Newborn – Treatment of local infections	Pregnant women	10	1	3.0	176,598	217,805	588,662		100		415
25	PNC	Kangaroo Mother Care	Pregnant women	12.2	1	4	215,450	265,722	718,167		100		376
26	PNC	Postnatal preventive care	Pregnant women	100	1	29	1,707,119	2,125,069	5,886,616	50	50		1,067
27	PNC	Mastitis	Pregnant women	10	1	3.0	176,598	217,805	588,662			100	1,025
28	PNC	Postpartum Hemorrhage	Pregnant women	9.7	1	3	171,301	211,271	571,002		60	40	8,869
29	PNC	Maternal sepsis management	Pregnant women	4.1	1	1	72,405	89,300	241,351		50	50	18,019
30	PNC	Newborn Sepsis - Injectable Antibiotics	Pregnant women	9	1	2.7	158,939	196,024	529,795		100		2,511

#	Service package	INTERVENTION	POPULATION AND EPIDEMIOLOGY							DELIVERY CHANNEL			UNIT COST
			Target population	Epidemiology		Coverage	Population in need (PIN)			Out-reach	PHC	Hosp-ital	Average case (Total)
			Group	% of target population requiring treatment	Frequency (annual)	%, target population receiving treatment	A. Baseline	B. Target (+10%)	C. Full				
31	PNC	Newborn Sepsis - Full Supportive Care	Pregnant women	1	1	0	17,660	21,780	58,866			100	37,260
32	Child	Vitamin A supplementation for treatment of xerophthalmia	Children Under-5	2	1	1	113,656	140,176	378,854		100		324
33	Child	ORS and zinc for diarrhea treatment	Children Under-5	100	3.3	33.7	21,066,183	25,210,658	62,510,930	50	50		397
34	Child	Antibiotics for dysentery	Children Under-5	16.5	1	6	1,078,314	1,283,037	3,125,546		50	50	97
35	Child	Treatment of severe diarrhea (children)	Children Under-5	3.3	1	1	215,663	256,607	625,109			100	2,857
36	Child	Pneumonia treatment (children)	Children Under-5	3.2	1	1	207,546	246,972	601,810		50	50	651
37	Child	Treatment of severe pneumonia (children)	Children Under-5	0.08	1	0.0	4,546	5,607	15,154			100	7,914
38	Child	Malaria Treatment (children)	Children Under-5	100	4	29	21,897,768	27,285,074	75,770,824		100		1,147
39	Child	Treatment of severe malaria (children)	Children Under-5	4	1	1.2	227,312	280,352	757,708			100	5,038
40	Child	Vitamin A for measles treatment (children)	Children Under-5	5.3	1	4	803,171	823,250	1,003,963		100		233
41	Child	Treatment of severe measles	Children Under-5	0.05	1	0	7,577	7,767	9,471			100	2,094
42	Child	Multiple micronutrient powders	Children 6-23 months	64	1	19	1,454,800	1,794,253	4,849,333	60	35	5	1,220
43	Child	Vitamin A supplementation	Children 6-59 months	100	1	80	13,638,748	13,979,717	17,048,435	80	20		139
44	Child	Treatment of severe acute malnutrition	Children 6-59 months	8.7	1	3	444,964	548,789	1,483,214		80	20	35,275
45	Child	Vaccination_Measles (2 doses)	Births	100	1	31	1,514,626	1,851,753	4,885,892	50	50		314
46	Child	Vaccination_Pneumococcal (3 doses)	Births	100	1	13	635,166	1,060,238	4,885,892		100		3,415

#	Service package	INTERVENTION	POPULATION AND EPIDEMIOLOGY							DELIVERY CHANNEL			UNIT COST
			Target population	Epidemiology		Coverage	Population in need (PIN)			Out-reach	PHC	Hosp-ital	Average case (Total)
			Group	% of target population requiring treatment	Frequency (annual)	%, target population receiving treatment	A. Baseline	B. Target (+10%)	C. Full				
47	Child	Vaccination_Polio (3 doses)	Births	100	1	51	2,491,805	2,731,213	4,885,892	50	50		1,082
48	Child	Vaccination_BCG (1 dose)	Births	100	1	37	1,807,780	2,115,591	4,885,892		100		78
49	Child	Vaccination_Pentavent (3 doses)	Births	100	1	25	1,221,473	1,587,915	4,885,892		100		1,078
50	Child	Vaccination_Yellow_Feaver	Births	100	1	51	2,491,805	2,731,213	4,885,892		100		385
51	All	Malaria treatment (population over 5)	All over age 5 (except pregnant)	30	1	9	8,361,271	10,312,234	27,870,902		100		1,022
52	Adults	Screen for risk of cardiovascular disease and diabetes	All adults over age 40	100	1	30	6,124,286	7,553,286	20,414,286		100		1,057
53	FP	Pill	All women 15-49	4	1	2	556,890	618,441	1,172,399	75	25		2,663
54	FP	Condom	All women 15-49	6	1	5	1,318,949	1,362,914	1,758,599	75	25		3,201
55	FP	Injectable	All women 15-49	12	1	3	732,749	1,011,194	3,517,197	50	50		1,766
56	FP	IUD	All women 15-49	4	0.2	1	46,896	65,654	234,480		100		1,136
57	FP	Implant	All women 15-49	1	0.25	0	21,982	27,112	73,275		100		3,343

**ANNEX 3: Sensitivity analysis (% change in total cost)**

Salary	
A. Salary (-10 %)	-3.31
B. Baseline	-
C. Salary (+10 %)	3.31
D. Salary (+30 %)	9.92
Drugs and consumables	
A. Drugs (-20 %)	-11.32
B. Baseline	-
C. Drugs (+20 %)	11.32
Minimum-maximum bounds (+/- 10%)	
Minimum	-14.63
Maximum	+14.63



#### ANNEX 4: Fiscal analysis

Growth and expenditures	USD	Year	Source
GDP	\$405,000,000,000	2016	WBG - national accounts data - <a href="https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=NG">https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=NG</a>
Total revenue	\$20,473,195,231	2017	WBG MFM projections
Total expenditure	\$33,827,554,919	2017	WBG MFM projections
Total expenditure / GDP	8.35%	-	calculation (total expenditure / GDP = \$33b / \$405b)
<b>Health expenditure</b>			
Total	\$14,863,500,000	-	calculation (GDP * total health expenditure as a % of GDP = \$405b * 3.67%)
Total, per capita	\$117.52	2014	WBG - WHO Global Health Expenditure database - <a href="https://data.worldbank.org/indicator/SH.XPD.PCAP?locations=NG">https://data.worldbank.org/indicator/SH.XPD.PCAP?locations=NG</a>
Total, % of GDP	3.67%	2014	WBG - WHO Global Health Expenditure database - <a href="https://data.worldbank.org/indicator/SH.XPD.TOTL.ZS?locations=NG">https://data.worldbank.org/indicator/SH.XPD.TOTL.ZS?locations=NG</a>
Public	\$3,738,150,000	-	calculation (GDP * total public health expenditure as a % of GDP = \$405b * 0.92%)
Public, % of GDP	0.92%	2014	WBG - WHO Global Health Expenditure database - <a href="https://data.worldbank.org/indicator/SH.XPD.PUBL.ZS?locations=NG">https://data.worldbank.org/indicator/SH.XPD.PUBL.ZS?locations=NG</a>
Public, % of gov't expenditure	8.20%	2014	WBG - WHO Global Health Expenditure database - <a href="https://data.worldbank.org/indicator/SH.XPD.PUBL.GX.ZS?locations=NG">https://data.worldbank.org/indicator/SH.XPD.PUBL.GX.ZS?locations=NG</a>
FMOH (2016)	\$817,000,000	2016	Federal Budget Office of Nigeria

**ANNEX 5: Summary of costing scenarios**

Scenario	Location	Population	Package	Coverage	Annual Cost
1	National	Urban and rural	Full	Full	\$ 2,165,743,310
2	National	Rural	Full	Full	\$ 1,299,445,986
3	National	Rural	Drugs/ consumables/ overhead	Full	\$ 734,268,037
4	National	Rural	Full	Baseline	\$ 395,230,414
	National	Rural	Full	Baseline +10%	\$ 485,651,971
5	Pilot	Rural	Full	Full	\$ 98,583,269
6	Pilot	Rural	Full	Baseline	\$ 30,001,003
	Pilot	Rural	Full	Baseline +10%	\$ 36,859,230
	Pilot	Rural	Drugs/ consumables	Baseline +10%	\$ 17,100,572
6a	Pilot	Rural	Full	Marginal cost (Baseline +10) – (Baseline)	\$ 6,858,227

## ANNEX 7: Guide to Excel model (by tab)

1. Summary
2. Total Revenue
3. Total Cost
4. Cost\_personnel
5. Cost\_drugs
6. Cost\_vaccines
7. Assumptions\_salary
8. Assumptions\_time (OneHealth Tool personnel time cost by intervention)
9. Assumptions\_drugs (OneHealth Tool drug and consumable package cost by intervention)
10. Assumptions\_coverage (OneHealth Tool target population, population and need and current coverage by intervention)
11. Demographics
12. Exchange rate
13. Inflation
14. Fiscal space
15. Package shares
16. Comparison of studies
17. NSHIP\_scenario
18. FTE\_healthworkers (estimate of full time equivalent health workers)