

mHealth, AI, Genomics Technologies and Cancer in LMIC

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Nigeria Today

The current population of Nigeria is **197,147,158** as of Monday, October 8, 2018

• Nigeria is the 7th most populous country in the world and its population is equivalent to 2.57% of the total world population.

• **51.0%** of the population is **urban**

• The **median age** in Nigeria is **17.9 years**.

The population of Nigeria in 1960 was 45,137,812

 Nigeria was the 13th most populous country in the world and its population was equivalent to 1.49% of the total world population.

- **15.4%** of the population was **urban**
- The **median age** in Nigeria was **19.1 years**.

The population of Nigeria will be
410,637,868 by 2050

• Nigeria will be the **3**rd most populous country in the world and its population will be equivalent to **4.2%** of the total world population.

• **72.0 %** of the population will be **urban**

• The **median age** will be **22.4 years**.

Nigeria Yesterday Nigeria Tomorrow

Recommendatio ns from Leaders in Cancer Research and Policy from 15 countries meeting at the NIH, Nov 2012

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Reliable, population-based registries that define the incidence, mortality, and survival rates of different types of cancers are fundamental to the design of local, regional and national plans



Implementation of prevention measures to mitigate factors now known to promote cancer—tobacco, certain infectious agents, ultraviolet radiation, alcohol, obesity, lack of exercise, and diet



Screening individuals for certain cancers (of the cervix, breast, prostate, and colorectum, in particular)

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Optimal cancer treatment



Basic and preclinical cancer research



Addressing the Growing International Challenge of Cancer: A Multinational Perspective Varmus, Harold and Kumar, Harpal S. Science Translational Medicine 2013; 5 (175) 175cm2: March 6, 2013

mHealth technologies

• Cell phone technologies have revolutionized modern life and medical care









My Projects

NIGERIAN NATIONAL SYSTEM OF CANCER REGISTRIES CASE Last Download: 2019-05-14 02:11 PM 1 Records (1 new; 0 modified)

> AFBRECANE Last Full Sync: 2019-05-16 01:34 PM 1 Records (0 new; 0 modified)

NIGERIAN NATIONAL SYSTEM OF CANCER REGISTRIES CASE

Instrument - NOTIFICATION FORM

UNMOD = Unmodified | MOD = Modified | NEW = New | [BLANK] = Empty • Incomplete | • Unverified | • Complete | • No data saved

Select Record

Croate New Pecord



Application of mHealth to cancer registration in Nigeria

Send Emergency Data Dump

Mother and Child Hospital Akure

Ore

Digitizing Street Networks

State Specialist

For this project we had to digitize many roads in order to locate patients seeking care, and undertake spatial modeling of this region.

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Number of roads digitized:

- Okitipupa Ondo City: 1621
 - Akure: 2970
 - Ore: 632
 - Okitipupa: 392

State Specialist Hospital Okitipupa

Mother and Child Hospital On

Specialist Hospital Ondo

Legend

Hospital

LGA Boundary

Primary Road

Tertiary Road

Residential Road

Residential Area

16,919 - 42,644

6,618 - 16,918

2,688 - 6,617

Population (2015)

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Preliminary Results

- Patient data corresponds to the Mother and Child Hospital in Ondo City
- % of patients that reside in each of the accessibility zones:
 - highest access: 74%
 - . 7.5%
 . 15.5%
 . 0%
 - lowest access: 0.25%
 - beyond access catchments (>10 miles): 2.5%



Cepheid GeneXpert



Xpert HPV test

- Xpert[®] HPV is the simplest, easy to use and extensively demonstrated molecular platform for the full range of near patient and central laboratory environments
 - Easy to train. Easy to use.
 - Load the sample and hit "start"
 - 1 ml, 1 hour, 14 HPV types
 - Technology is "mobile" and ready for On-demand use
- The Xpert Menu in addition to Xpert HPV has the power to transform the standard of patient care



How will the rising number of Breast cancer cases be diagnosed



Molecular analysis of breast cancer subtypes

- Immunocytochemistry based biomarker detection in collaboration with Cornell University, NY
 - Assay development for multiplex detection ER, PRG and HER2 on a lateral flow strip.
 - Use existing imaging system for quantitative analysis.





Lateral flow strip

New Cervical and Breast Cancer diagnosis

- Liquid biopsy for diagnosis and prognosis of breast cancer
- Germline methylation biomarkers for breast cancer diagnosis. We explored methylation in 3 genes



MobileODT, EVA, EVAPlus, AVE

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Mobile Optical Detection Technologies	
ENTER APP	ADD USER
Your user name:	
pathologist+ncidem	· ·
Your PIN:	Forgot
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AVE system for cervical cancer screening



HPV Primary Screen, AVE Secondary



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