



# ACTION

Addressing global inequities in breast cancer genetic testing, counselling, and management among breast cancer patients in Nigeria

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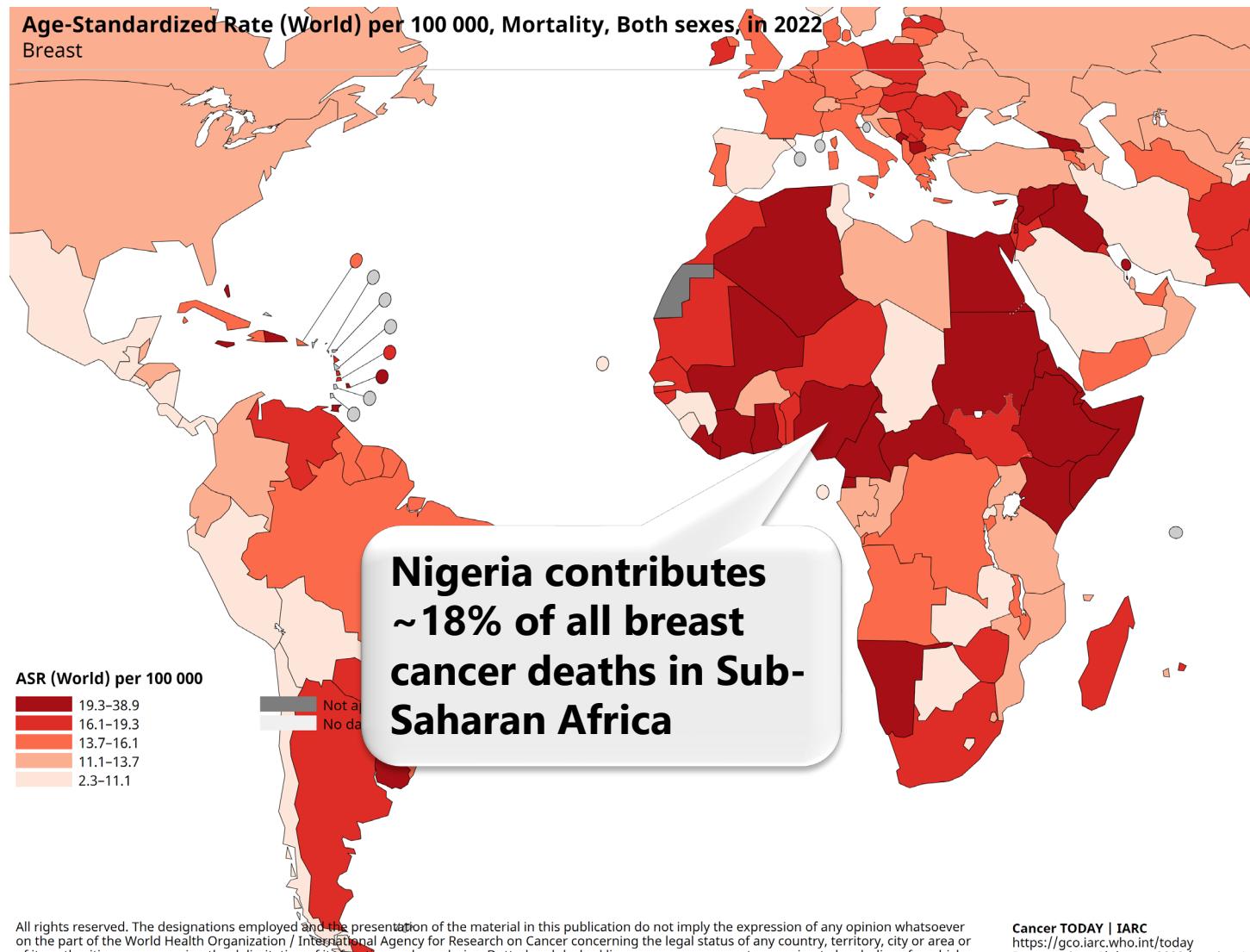
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# BREAST CANCER BURDEN IN SUB-SAHARAN AFRICA

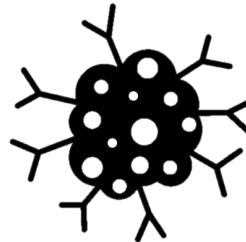


Country	Mortality Rank	Prop of SSA BC Deaths
<b>Nigeria</b>	1	17.9%
<b>Ethiopia</b>	2	10.5%
<b>Egypt</b>	3	10.5%
<b>South Africa</b>	4	5.7%
<b>Algeria</b>	5	5.4%
<b>Democratic Republic of Congo</b>	6	4.7%
<b>Morocco</b>	7	4.4%
<b>Kenya</b>	8	3.7%
<b>Sudan</b>	9	3.5%
<b>Ghana</b>	10	2.6%

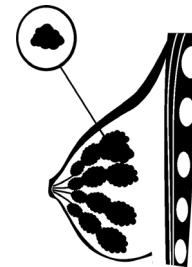
# CHALLENGES OF TREATING BREAST CANCER IN NIGERIA



Early onset  
**15-39**  
years at  
diagnosis



Late stage  
**III/IV**  
diagnosis



About  
**40%**  
aggressive  
TNBC



Overall  
**43.6%**  
survival



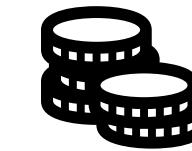
Estimated  
**220M+**  
people



About  
**20%**  
women  
have CBE  
each year



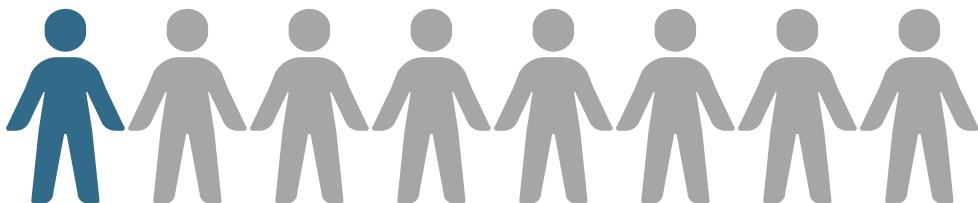
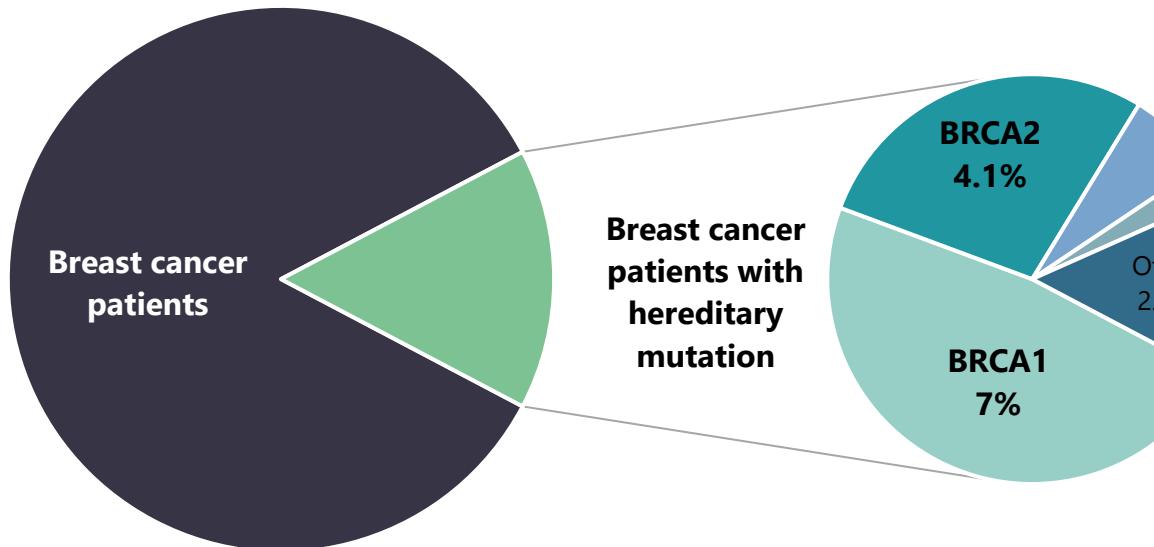
About  
**2.3%**  
women have  
mammograms  
each year



Government  
funded  
**\$\$\$**  
Public Health  
care system

# HEREDITARY PREDISPOSITION IN NIGERIA:

## Findings From Ibadan



- **11.1% (127 of 1,136) were found to have an inherited mutation in *BRCA1*, *BRCA2***
- **Unlike in North America and Europe:**
  - Access to genetic testing + counselling to evaluate the lifetime risk and inform management is extremely limited in Nigeria → **major oncologic health disparity**

# SCREENING HIGH RISK WOMEN

- Population-based screening is impractical in most resource limited settings
- A more feasible approach is to target screening efforts toward women at higher risk

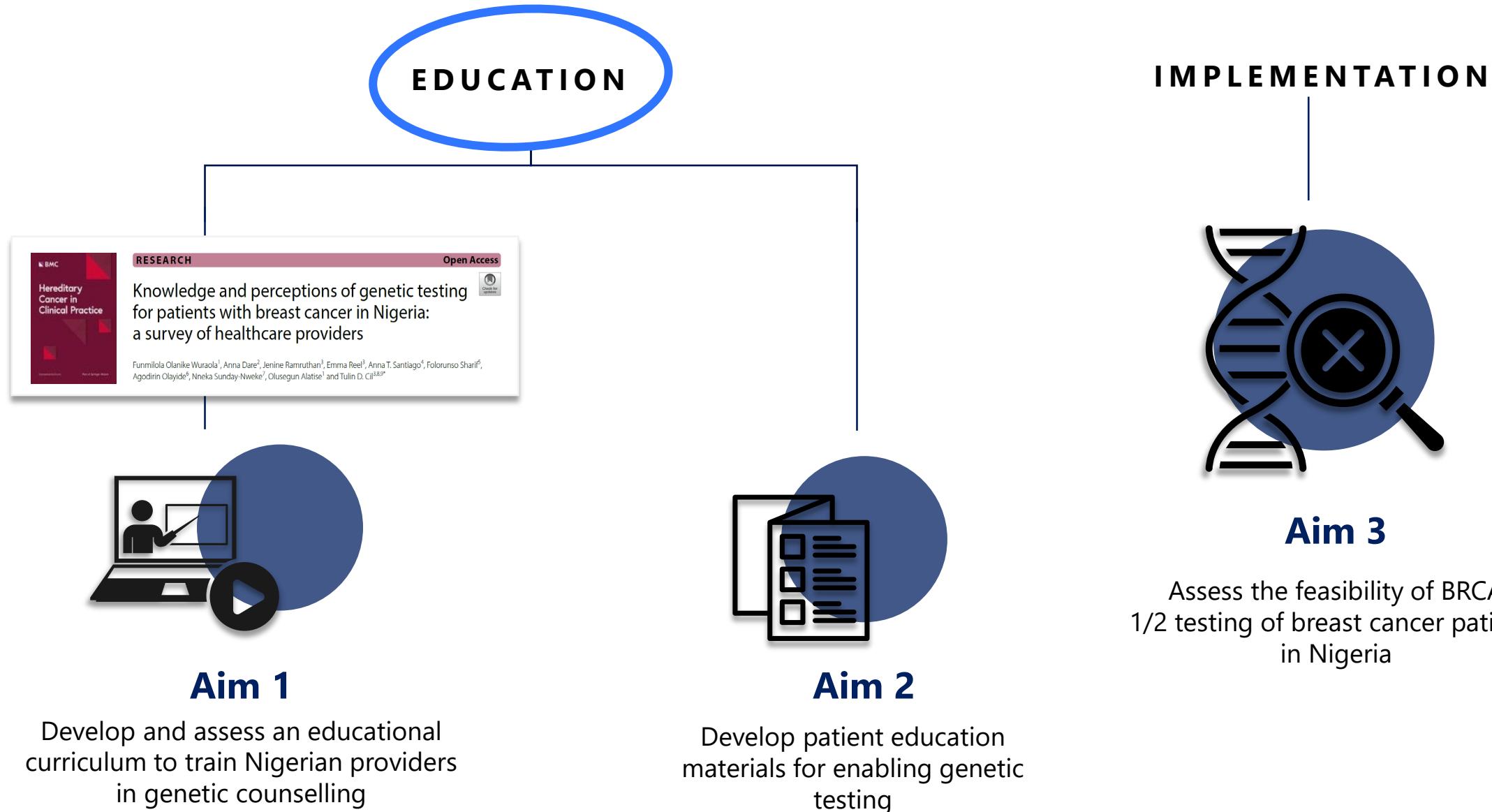


# PURPOSE



**To develop a program to  
enable genetic testing  
for breast cancer patients  
in Nigeria**

# ACTION STUDY OBJECTIVES



# AIM 1: ONLINE COURSE

## HEREDITARY BREAST CANCER GENETIC TESTING

**Princess Margaret Cancer Campus**

**ONLINE COURSE**

**ACTION**

**NCCN** National Comprehensive Cancer Network®

**Genetic/Familial High-Risk Assessment: Breast, Ovarian, and Pancreatic**

**Welcome to The Princess Margaret Cancer Campus**

**A Global Resource for Cancer Education**

Choose from a range of courses

Check back often, new topics are added with your professional needs in mind.

This program is part of the larger ActionN study, jointly run by the Princess Margaret Cancer Centre & Obafemi Awolowo University Teaching Hospital. The results of this study will improve outcomes for Nigerian patients, identify knowledge gaps for providers and add to the growing body of literature on breast cancer patients globally, laying the foundation for breast cancer genetic testing as standard of care in Nigeria.

General

Module 1-4 are now open.

Expand all

Overview

Contributors

Module 1: Epidemiology

Module 2: Principles of Hereditary Breast Cancer and Genetic Testing

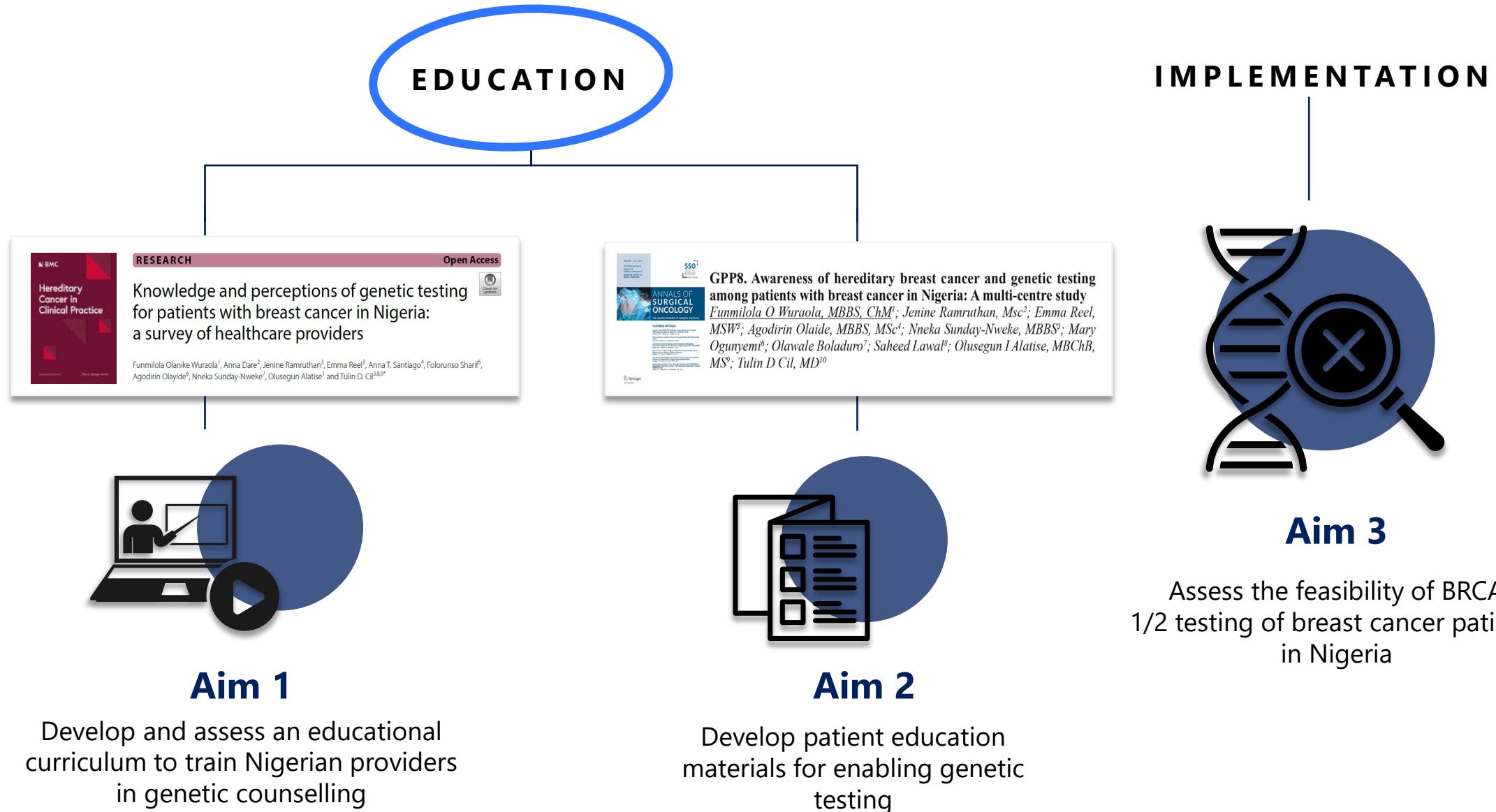
# AIM 1: TRAINING WORKSHOP

- 27th September 2023
- 31 providers from across all geo-political zones in Nigeria attended the training

Ile-Ife, Nigeria



# ACTION STUDY OBJECTIVES



# AIM 2 – PATIENT EDUCATION

**Bawo ni ayewo ajemo-odo-ara se le ran mi lowo?**

Ayewo ajemo-odo-ara le ran o lowo lopo ona. Ayewo ajemo-odo-ara le ran o lowo lati:

1. Mo idi ti o fi ni aisan jejere
2. Pinnu lori itoju aisan jejere ti o fe
3. Mo ewu to wa ninu nini awon irufe aisan jejere miiran
4. Sise ipinnu nipa ayewo aisan jejere ati didin ewu ku.



**Bawo ni ayewo ajemo-odo-ara se le ran idile mi lowo?**

Bi o ba ni ayipada ayewo odo ara, o seese ki awon molebi re naa ni ayipada odo ara. O seese ki o je wi pe lati odo okan ninu awon obi re ni o ti gba odo ara re.



Ayipada yii naa yoo koja sori awon omo re. Awon arakunrin re, awon arabinrin re, awon aunti re, awon aburo baba re, ati awon omo egbon awon obi re naa le ni ayipada odo ara.

Bi o ba ni ayipada odo ara, isayewo ajemo-odo ara le wa fun awon molebi re. Ayewo yii yoo safihan boyo awon molebi re wa ninu ewu nini aisan jejere. Bi awon molebi re ba ni ayipada odo ara, awon iko olutoju won le dabaa ayipada ayipada fun itoju won. Ayipada itoju gbigba won le je mo isayewo aisan jejere ati dindin ewu ku.

**Kin lo seese ko je ayorisi ayewo ajemo-odo-ara ti mo ba se?**

O seese ki ayorisi ayewo ajemo-odo-ara je meta yii.

### 1 Isafihan Ayipada



Eesi ayewo yii tumo si pe o ni ayipada ninu okan lara awon odo ara re ti won yewo. Eesi ayewo ile isayewo le so pe a ti ri "eda ajemo-ajogunba". A le pe ayipada yii ni "eda ajogunba":

- Oni ewu pupo fun awon irufe jejere kan
- Ayipada le de ba ayewo jejere, itoju, ati/tabi eto dindinwo ewu ku
- Awon molebi re le da a ro lati sayewo ajemo-odo-ara

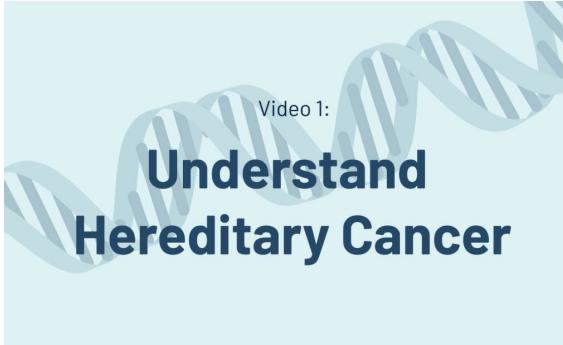
### 2 Won ko ri ayipada kankan



Eesi ayewo yii tumo si pe won ko ri ayipada kankan Eesi yii tumo si:

- O seese ki o ma ni aisan dejere ajogunba
- Aisan dejere re kii se ajogunba ninu idile bi ko se eyi to sadeede wa
- O seese ki won ma so pe ki awon molebi re se ayewo ajemo-odo-ara

Video 1:  
**Understand Hereditary Cancer**



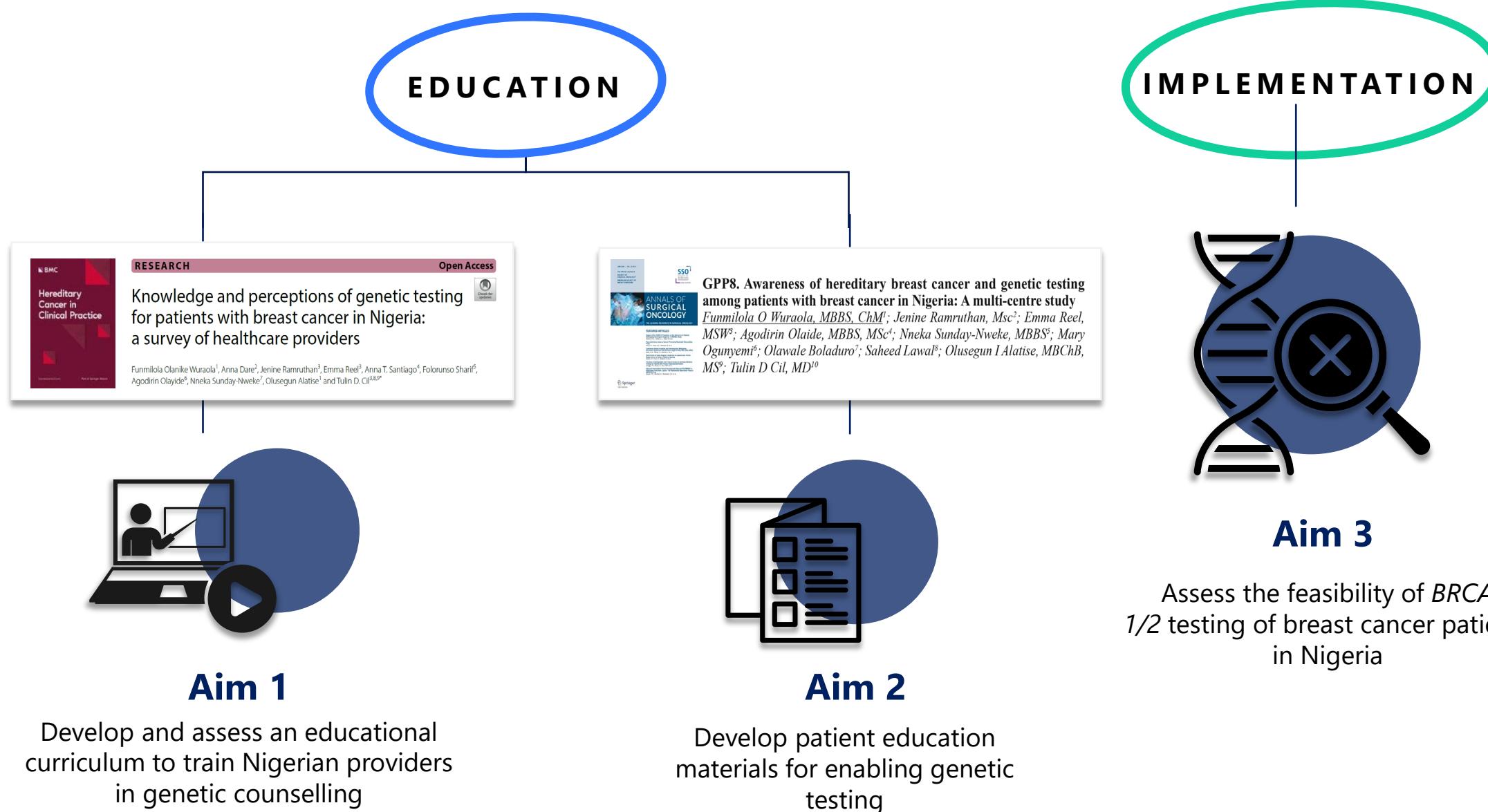
Video 2:  
**Understand Genetic Testing**



Video 3:  
**Possible Results of Genetic Testing**

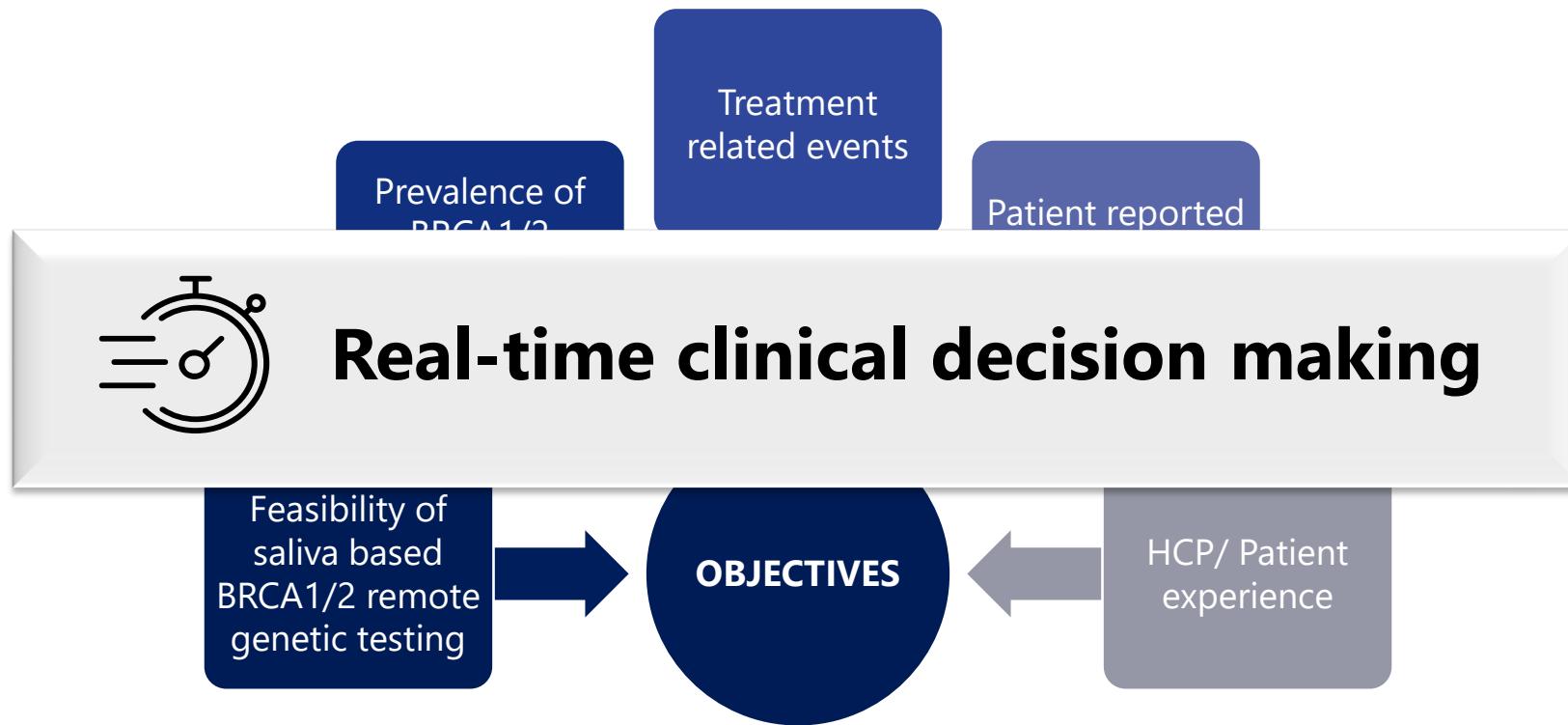


# ACTION STUDY OBJECTIVES

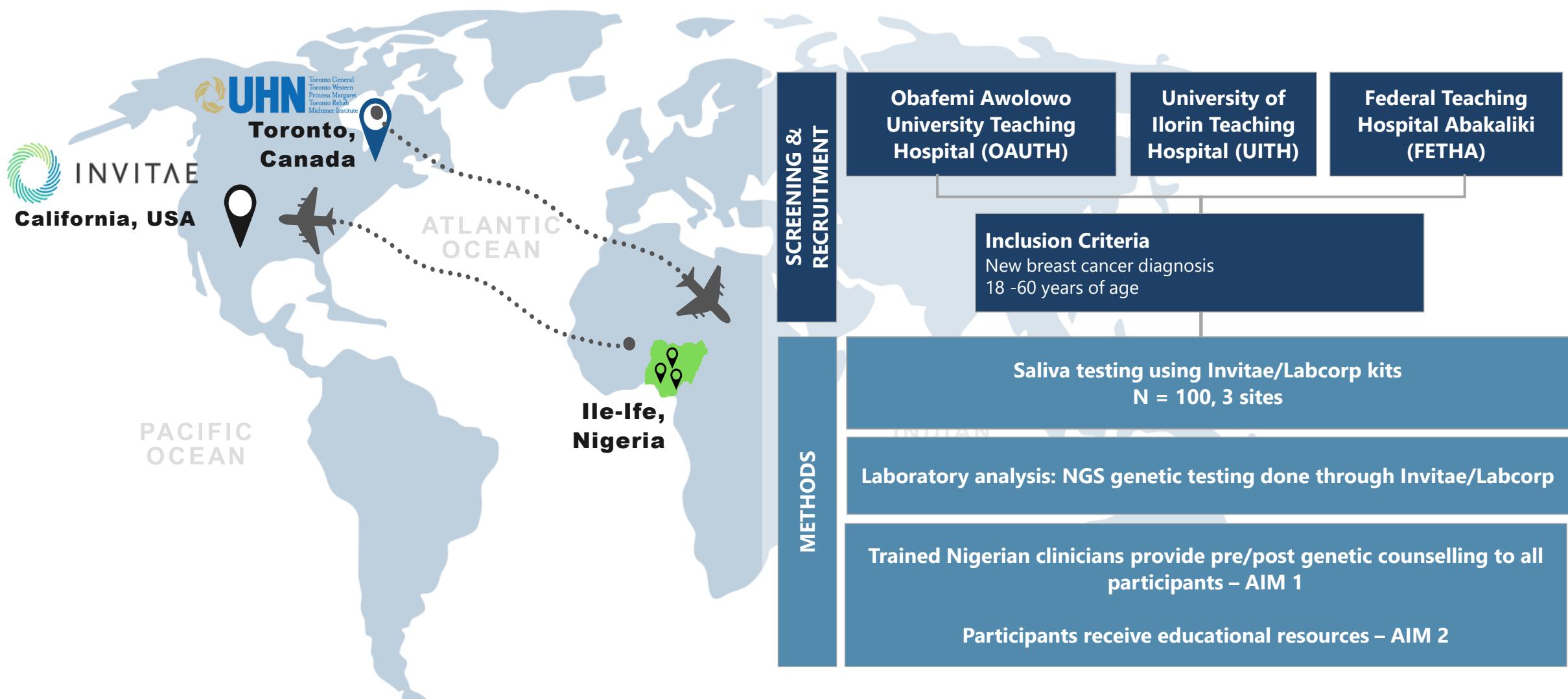


# PILOT STUDY

- Aim: Assess the feasibility of *BRCA 1/2* testing among Nigerian women with breast cancer
- First ever multi-center study, serving as the largest pilot study for *BRCA* clinical testing in Nigeria, which will investigate treatment & patient outcomes



# METHODS



# RESULTS: FEASIBILITY OF BRCA1/2 TESTING

## Logistics

- ❖ 23 days (3-week) turnaround from sample collection to result receipt
- ❖ Saliva samples shipped from Nigeria to California using DHL
- ❖ No additional duties were incurred

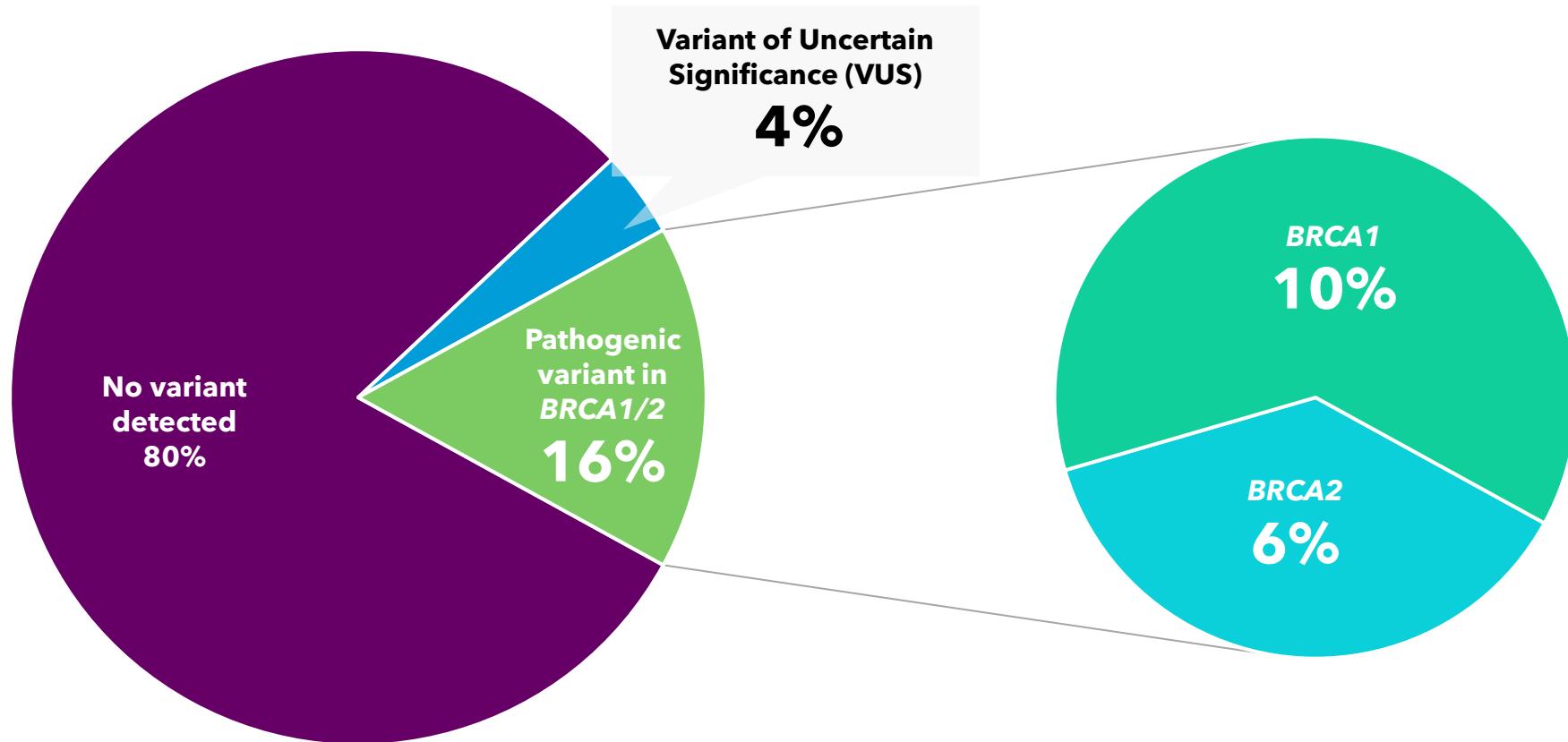


## Quality Control

- ❖ 15% sample failure rate due to low DNA concentration or sample quality
- ❖ Retesting was successful

**Our findings show genetic testing is feasible and practical in Nigeria, with a reliable logistic pathway**

# RESULTS: PREVALENCE OF *BRCA1/2*



In this study cohort ~1 in every 6 breast cancer patients carried a pathogenic *BRCA1/2* variant, confirming substantial inherited risk in this population

# DEMOGRAPHICS

Characteristic	Non-Carrier N = 84 <sup>1</sup>	Carrier N = 16 <sup>1</sup>	p-value <sup>2</sup>
<b>Hospital, Site</b>			0.7
OAU, Ile-Ife	56 (67%)	11 (69%)	
AEFUTHA, Abakaliki	17 (20%)	2 (13%)	
UIITH, Ilorin	11 (13%)	3 (19%)	
<b>Ethnicity</b>			>0.9
Yoruba	63 (75%)	13 (81%)	
Igbo	17 (20%)	3 (19%)	
Cross River	4 (4.8%)	0 (0%)	
<b>Religion</b>			>0.9
Christianity	64 (76%)	13 (81%)	
Islam	20 (24%)	3 (19%)	

**No significant differences were observed between BRCA carriers and non-carriers across site, ethnicity, or religious background within this cohort.**

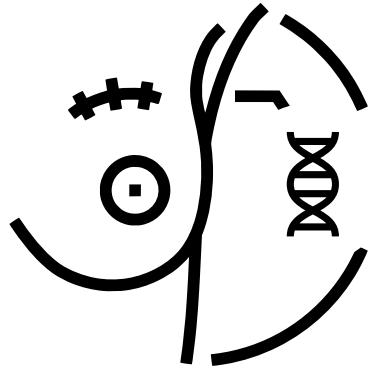
# CLINICOPATHOLOGICAL OUTCOMES

Characteristic	Non-Carrier N = 84 <sup>1</sup>	Carrier N = 16 <sup>1</sup>	p-value <sup>2</sup>
Age (median, IQR)	52 (38,49)	52 (38,49)	0.6
Premenopausal	50 %	50 %	0.8
Metastasis	10 %	10 %	0.2
Clinical stage (III-IV)	40 %	40 %	0.4
Histologic type (Invasive ductal carcinoma)	46 %	46 %	0.15
<b>Subtype</b>			> 0.9
ER-/HER2-	11 %	7.7 %	
ER-/HER2+	46 %	46 %	
ER+/HER2-	46 %	46 %	
ER+/HER2+	11 %	7.7 %	
<b>Family history of cancer</b>	3.6 %	25 %	<b>0.012</b>

<sup>1</sup>n (%); Median (Q1, Q3)

<sup>2</sup>Fisher's exact test; Wilcoxon rank sum test; Pearson's Chi-squared test

Carriers and noncarriers were clinicopathologically similar - except for **family history of cancer**, which was markedly higher in carriers ( $p=0.012$ )



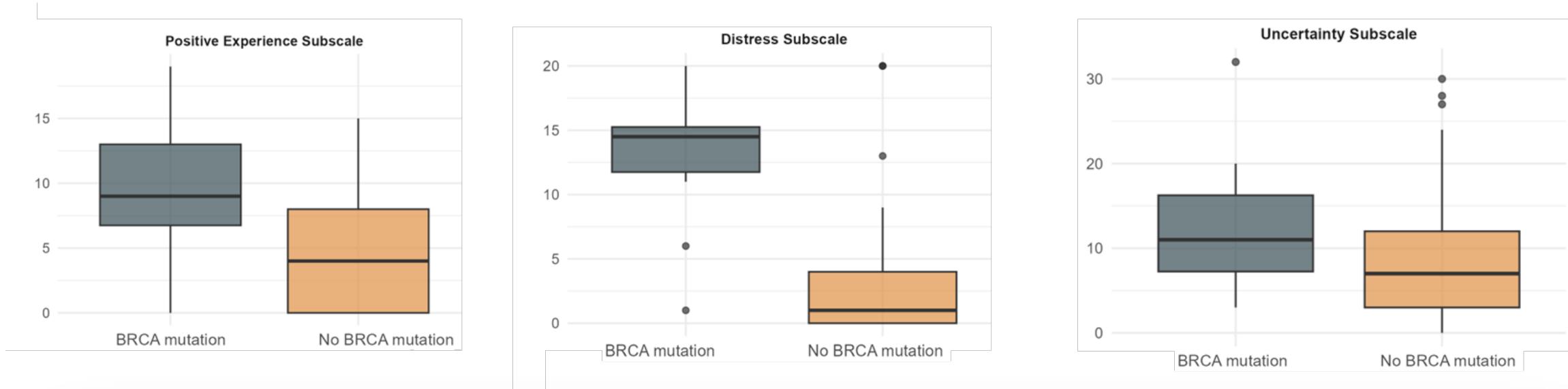
# TREATMENT OUTCOMES

Treatment Summary (n=16 carriers)	n (%)
<b>Final Surgery</b>	
└ Bilateral mastectomy	4 (25%)
└ Unilateral mastectomy	4 (25%)
└ Bilateral salpingo-oophorectomy	4 (25%)
└ Metastatic Disease -not offered	6 (38%)
└ Declined Surgery	2 (13%)
<b>Adjuvant Treatment</b>	
└ Received Chemotherapy	11 (69%)
└ No Chemotherapy	2 (13%)
└ Declined Treatment	3 (19%)

First trial showing *BRCA* test results directly guided **treatment decisions & prophylactic surgery** in Nigeria

# MULTIDIMENSIONAL IMPACT OF CANCER RISK ASSESSMENT (MICRA)

**Patient Outcomes:** MICRA tool measures impact of genetic testing



**BRCA carriers reported higher distress and uncertainty, suggesting a greater emotional impact, although they also reported higher positive experience scores, indicating some benefit from knowing their results**

# CONCLUSION

- ❖ This study is the **first of its kind in Nigeria** which demonstrates that real-time *BRCA1/2* testing is feasible and directly informs patient care.
- ❖ In this cohort, **16% of patients harbored a pathogenic *BRCA1/2* variant**, and disclosure of results influenced uptake of surgery.
- ❖ **Family history was significantly higher among carriers**, underscoring the **potential for cascade testing** to identify asymptomatic high-risk relatives carrying the same variant as a strategy for community-level prevention.

**Our findings provide early evidence that hereditary testing can be integrated into practice within resource-limited settings in sub-Saharan Africa**

# THANK YOU

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