THE UNIVERSITY OF CHICAGO | Center for Global Health

Cancer Care Delivery and Research Capacity

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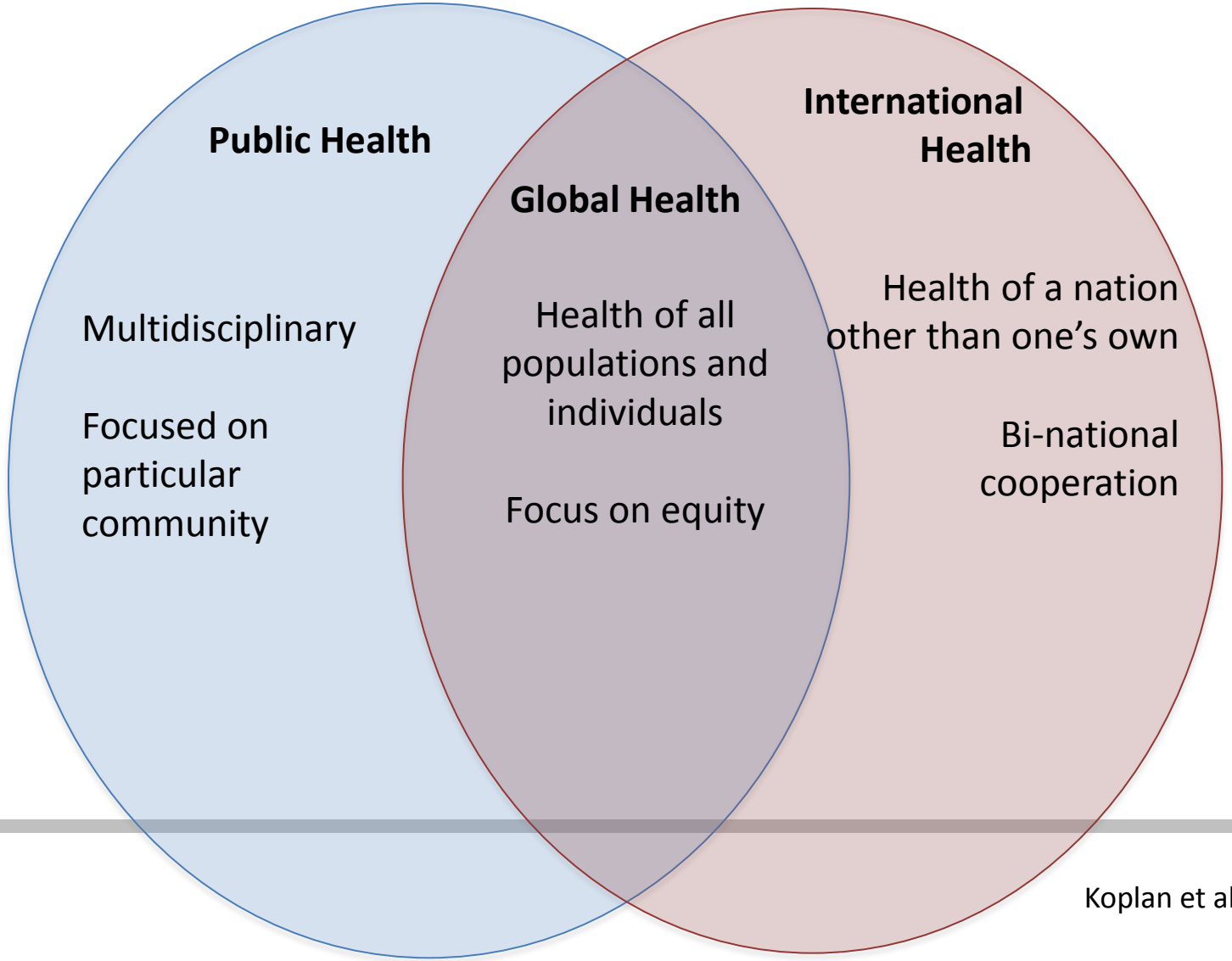
Overview

- Introduction
- Global Burden of Cancer
- Global disparities in breast cancer burden
- Nigerian and African partnerships
- Examples of inadequate health resource allocation
- Recommendations
- Conclusions

Special Needs in Cancer Care

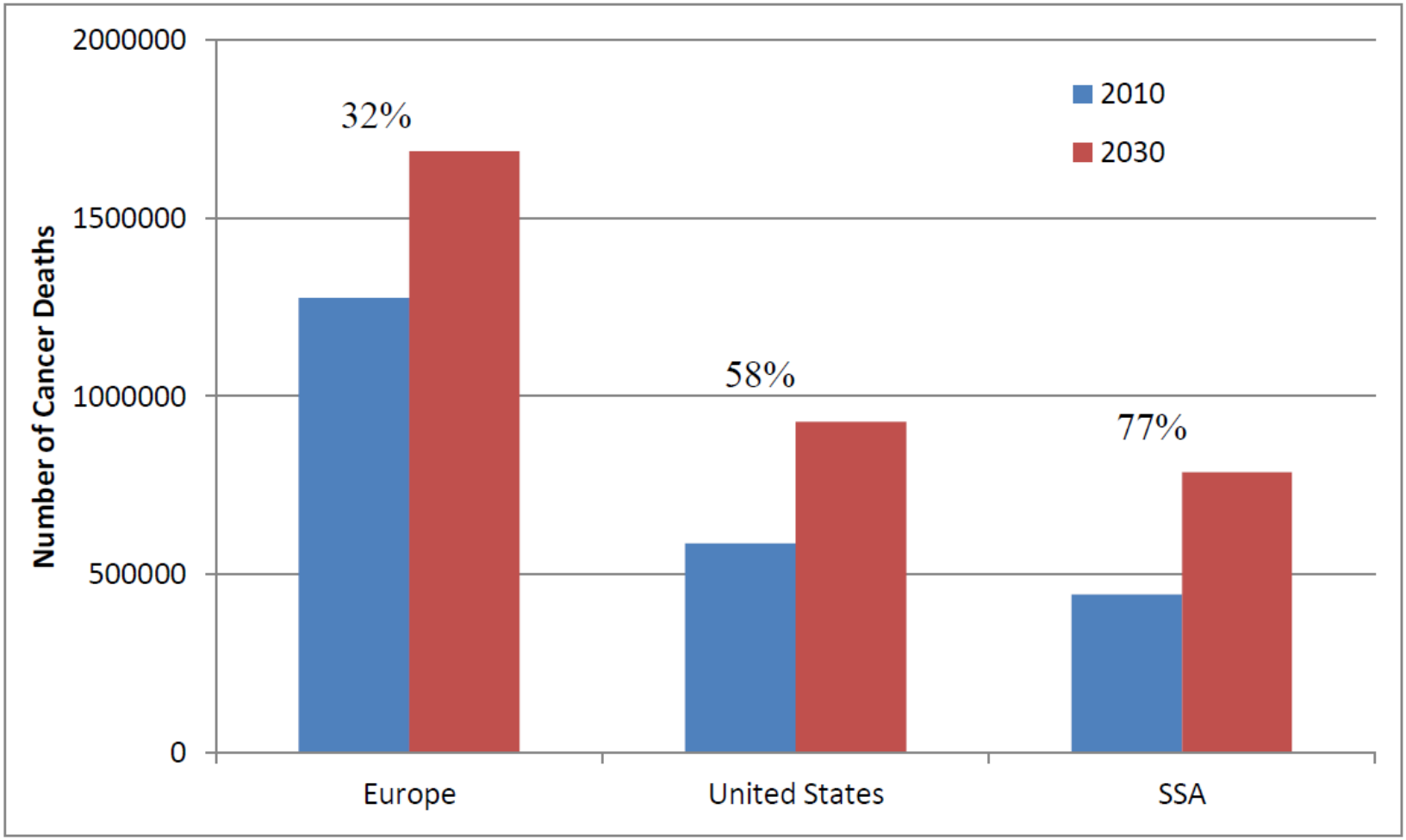
- Cancer literacy is low in general
- Cancer patients are complex
- Cancer patients live in diverse settings
- Cancer Specialists are super busy and in high demand - care is multidisciplinary
- Cancer Care is too expensive
- Cancer research is slow and inequitably resourced
- New models of care informed by research needed

Defining Global Health



Koplan et al., *Lancet*

Figure 1: Predicted cancer deaths for 2010 and 2030 as a share of total deaths



Cancer incidence and mortality are vastly underreported in sub-Saharan Africa

Rebbeck et al. Handbook for Cancer Research in Africa

Breast cancer incidence and mortality

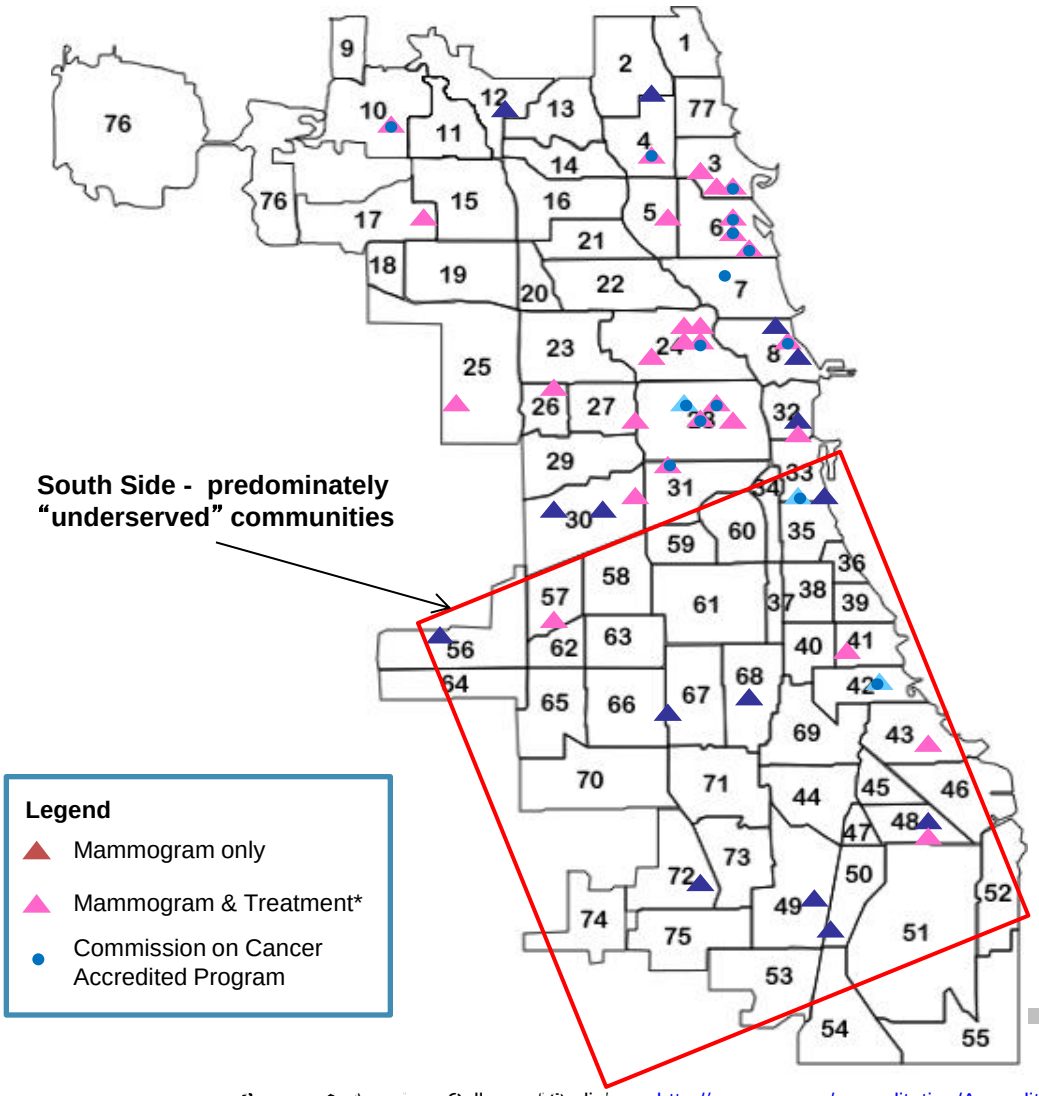
Breast cancer is the most common cancer among women both in the United States and in the world.

	Incidence		Mortality		
	No.	Rate	No.	Rate	MR:IR
North America	229,631	99.4	48,239	19.2	0.19
Oceania	13,507	84.6	3,338	19.4	0.23
Europe	360,746	62.3	129,010	19.7	0.32
C/South America	90,147	41.0	30,361	14.0	0.34
Asia	385,853	22.1	152,967	8.8	0.40
Africa	65,197	23.4	44,399	16.2	0.69

Rates standardized to world popularization and expressed per 100,000 person-years

Kamangar, Dores, & Anderson. JCO 2006: GLOBOCAN

Large healthcare disparities in breast cancer care have been identified in the underserved communities of South Side Chicago.



Identified Healthcare Gaps

***Situation*:** Low number of and scattered service and treatment facilities on the south side

***Result*:** Low screening rates, late stage diagnoses and higher mortality rates in minority populations

(e.g. 2003 breast cancer death rate: 68% higher for black vs. white women, age of death:19.5% for black women under 50 compared to 9.1% for white women)*

Situation: Large concentration of resources in central and north Chicago

***Result*:** Strain on resources available to south Chicago resulting in a backlog of patients in need of care

(e.g. only 13% of certified cancer treatment centers are in the South Side)

***Situation*:** Last mammography survey of Chicago identified ~500,000 screening eligible women and only ~200,000 were screened

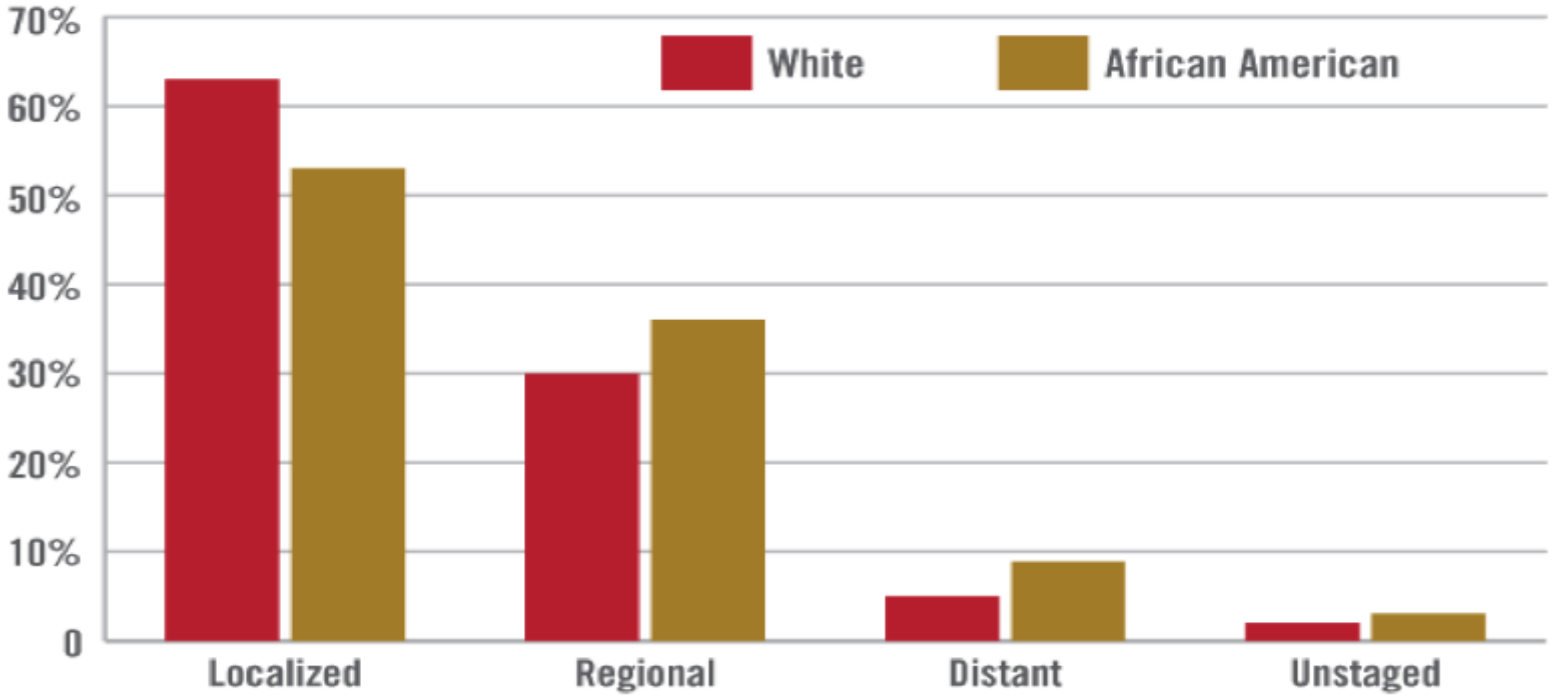
***Result*:** 300,000 women unscreened due to improper management of resources

Source: 1. American College of Radiology, http://www.acr.org/accreditation/AccreditedFacilitySearch.aspx
2. American College of Surgeons: Commission on Cancer, http://datalinks.facs.org/cpm/CPMApprovedHospitals_Search.htm

Mobile Mammography for Africa --- Where is the Evidence?

Two Unusable Mobile Vans in Kampala, Uganda

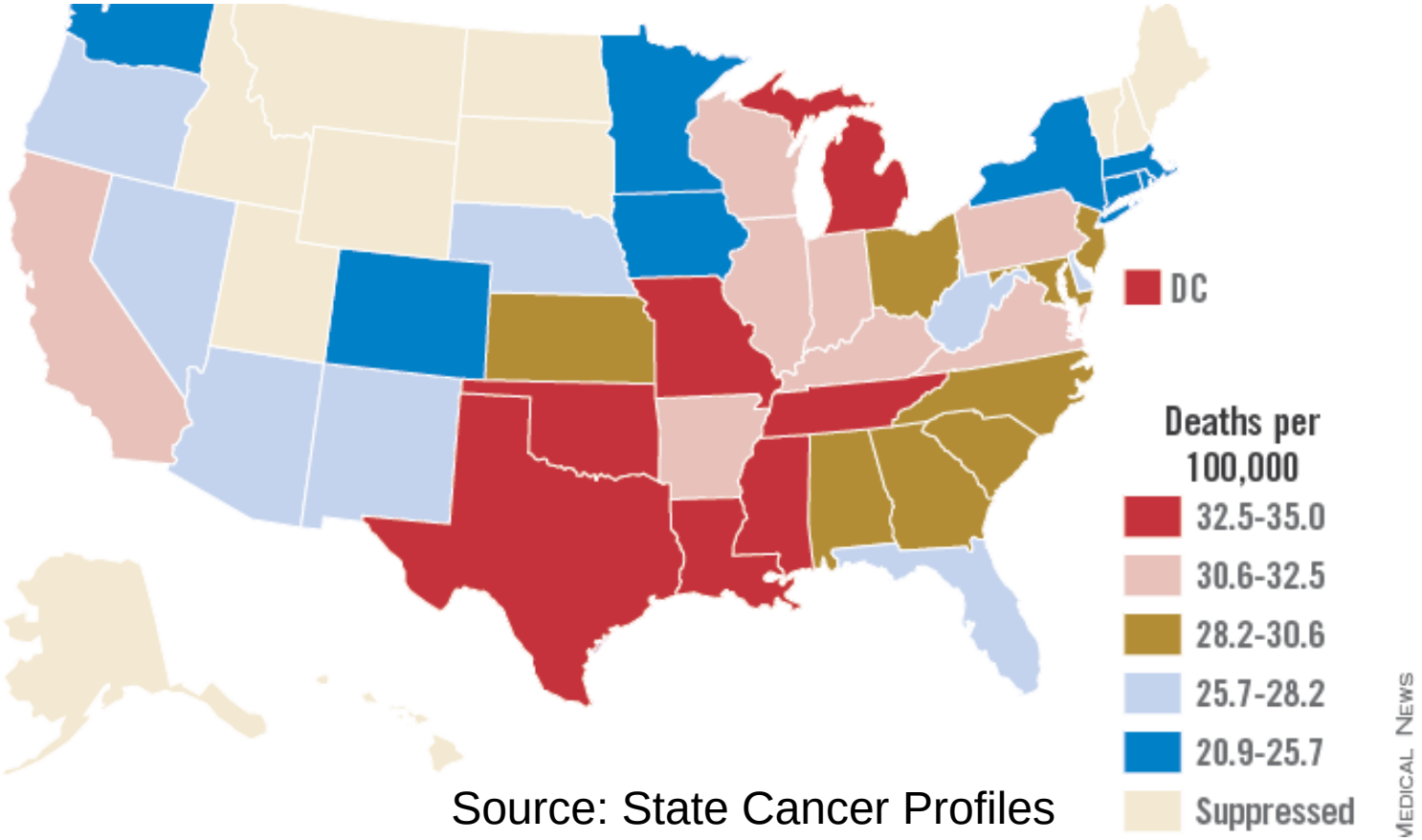
Breast cancer stage distribution by race, 2005-2011



Source: Surveillance, Epidemiology, and End Results Program

Where you live determines whether you live

Age adjusted African American Mortality 2008-2012



Source: State Cancer Profiles

Adapted from Frontline Medical News

Breast Cancer in the African Diaspora

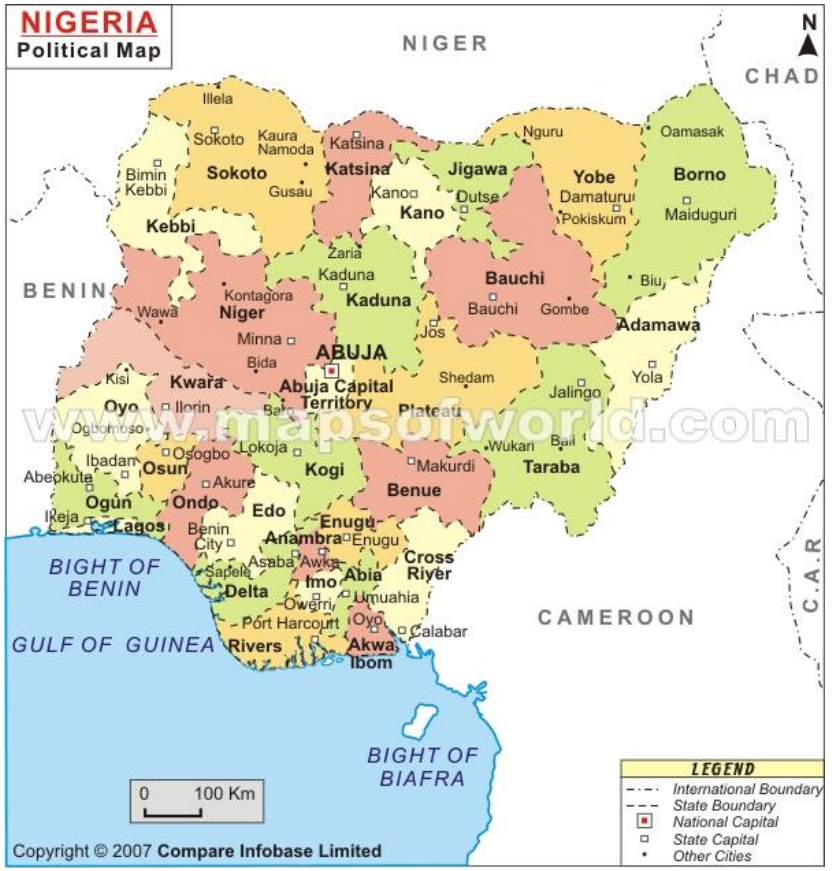
University of Chicago Medicine, Chicago, Illinois

University College Hospital, Ibadan

Unanswered Questions

- Are there population differences in prevalence of inherited susceptibility genes?
  - YES, nearly 1 in 5 AA women screened in Chicago and Nigeria have mutations in BRCA1/2 and DNA repair pathways
- What is the burden of breast cancer in the population?
  - Early onset and aggressive ER negative
- Do they explain disparities in outcomes?
  - In part

Political, Social, and Cultural Challenges



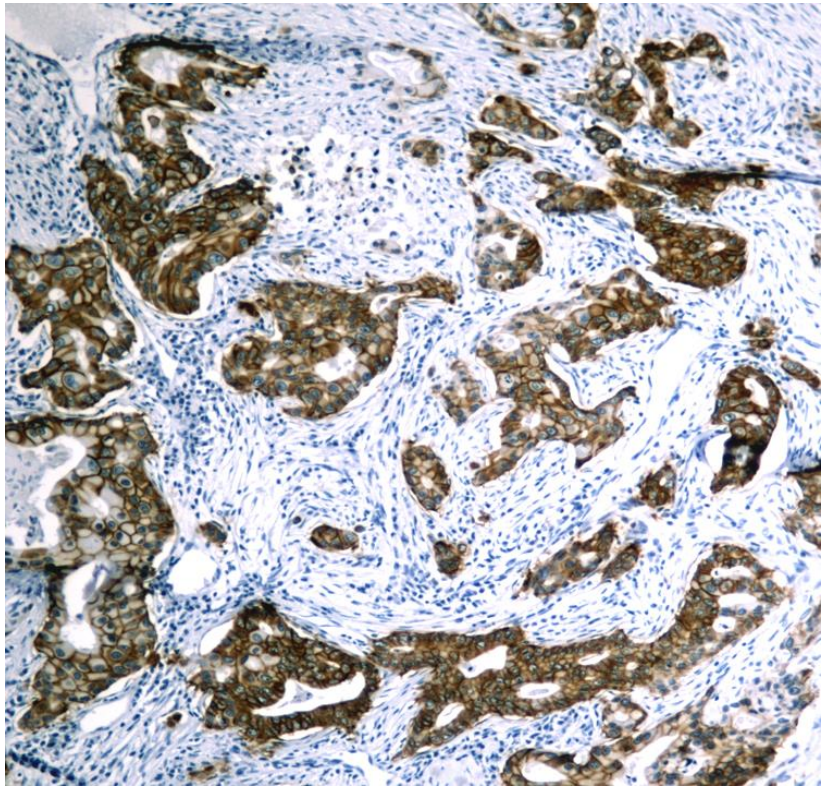
Infrastructure Challenges

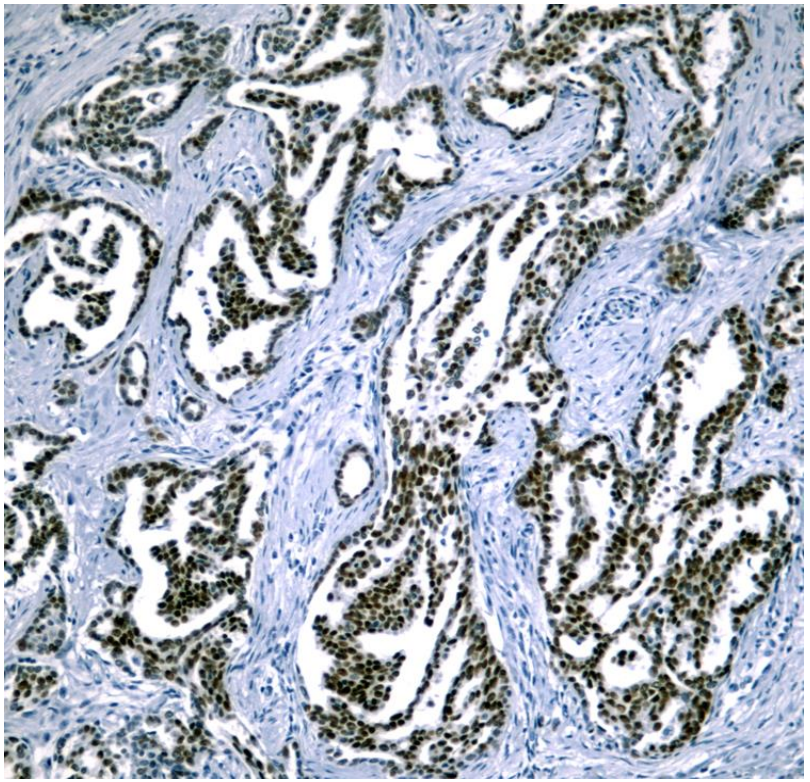
Strong Institutional Commitment

Restructuring of UI/UCH IRB

Commissioning of the UI/UCH IRC Secretariat in IMRAT

Established 1st Immunohistochemistry Laboratory in SSA in Ibadan in 2006

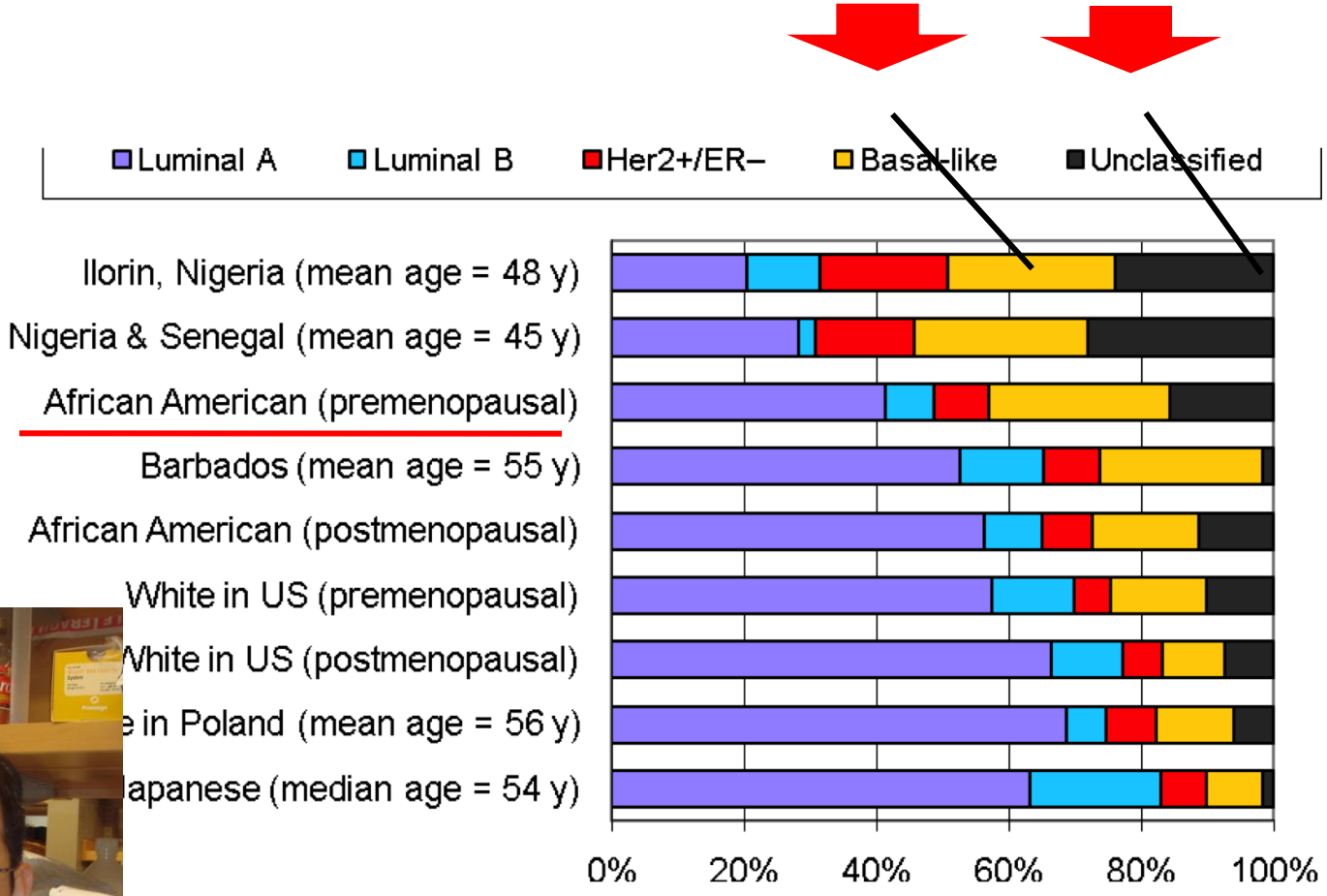


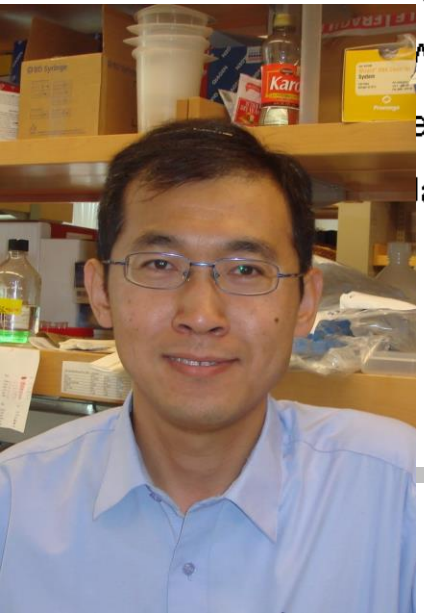


IMRAT Breast Cancer Research Laboratory


Canary Islands
ALGERIA
WESTERN SAHARA
MAURITANIA
Nouakchott
MALI
NIGER
Dakar
SENEGAL
Banjul
GAMBIA
Bissau
GUINEA BISSAU
Bamako
Niger R.
Ouagadougou
Niamey
BURKINA
GUINEA
BENIN
NIGERIA
Abuja
Conakry
Freetown
SIERRA LEONE
IVORY COAST
TOGO
Porto Novo
Lome
GHANA
Accra
Monrovia
LIBERIA
Abidjan
CAMEROON
Yaounde
Malabo
Gulf of Guinea
EQUATORIAL GUINEA
L. Chad

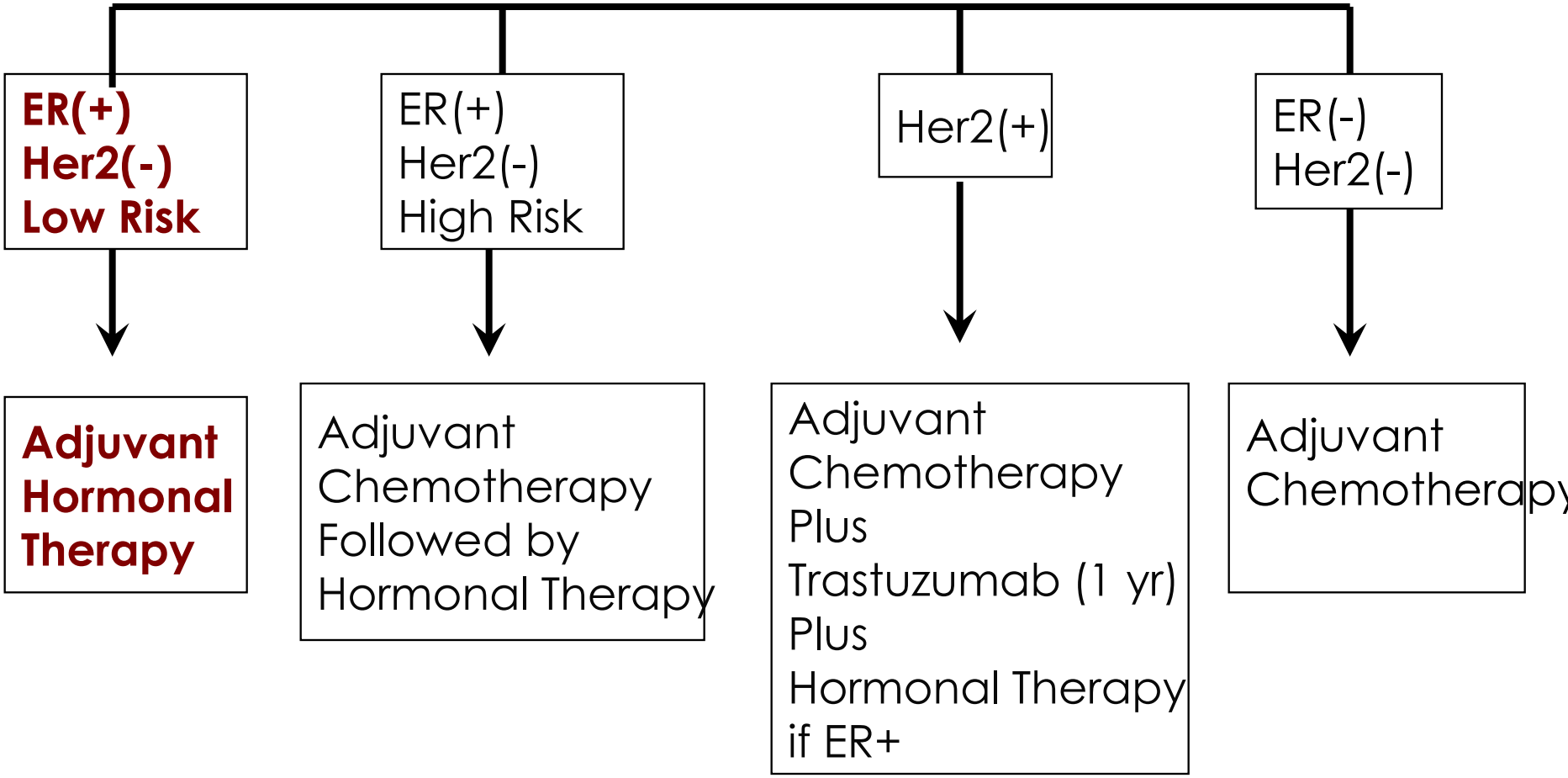
Population Differences in Breast Cancer: Survey in Indigenous African Women Reveal Overrepresentation of Triple Negative Breast Cancer.





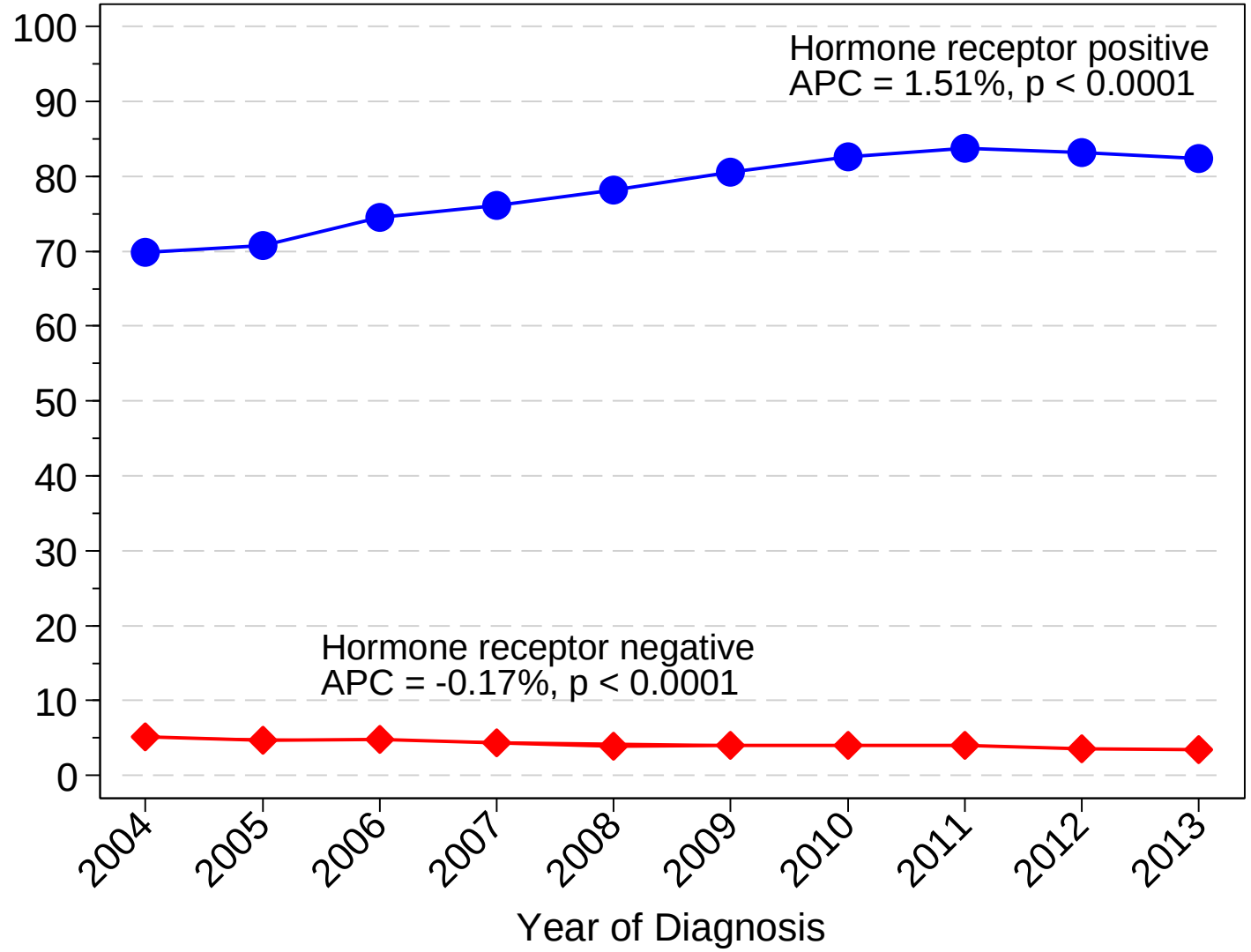
Huo D, Ikpatt OFK et al. JCO 27:4515-21, 2009
Data abstracted from Adeniji et al. 2010, Yang et al 2007, Kurebayashi et al. 2007

Non –Metastatic Breast Cancer



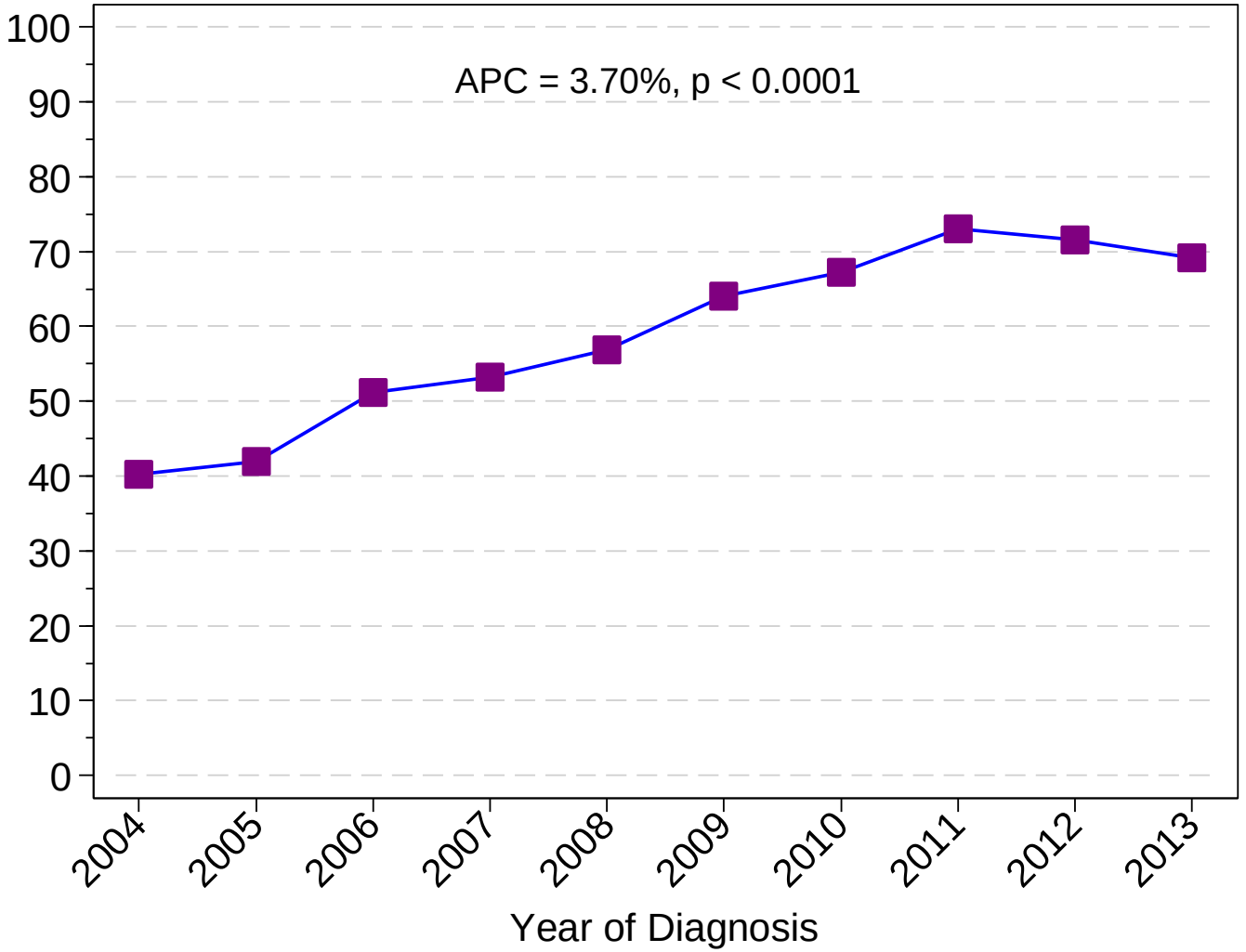
Breast Cancer is treatable . . . . .must diagnose and treat to save lives or improve length of life with good quality

Evaluating the Quality of Breast Cancer Care Delivery: Under- and Mis-Use of Adjuvant Endocrine Therapy in Breast Cancer Patients in the United States, 2004-2013



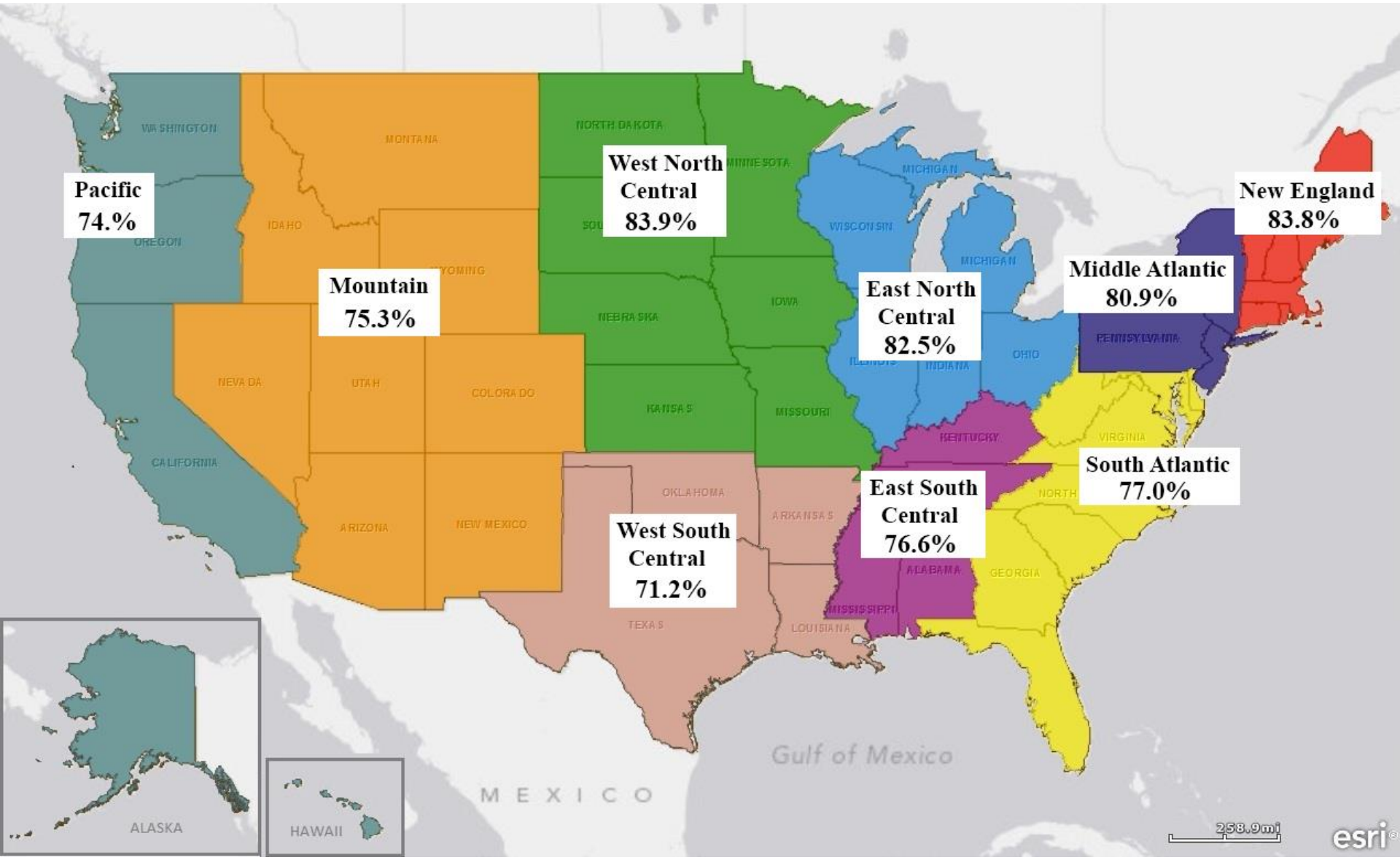
Daly et al. in press

Hospital-level AET concordance to guidelines among HR+ breast cancer



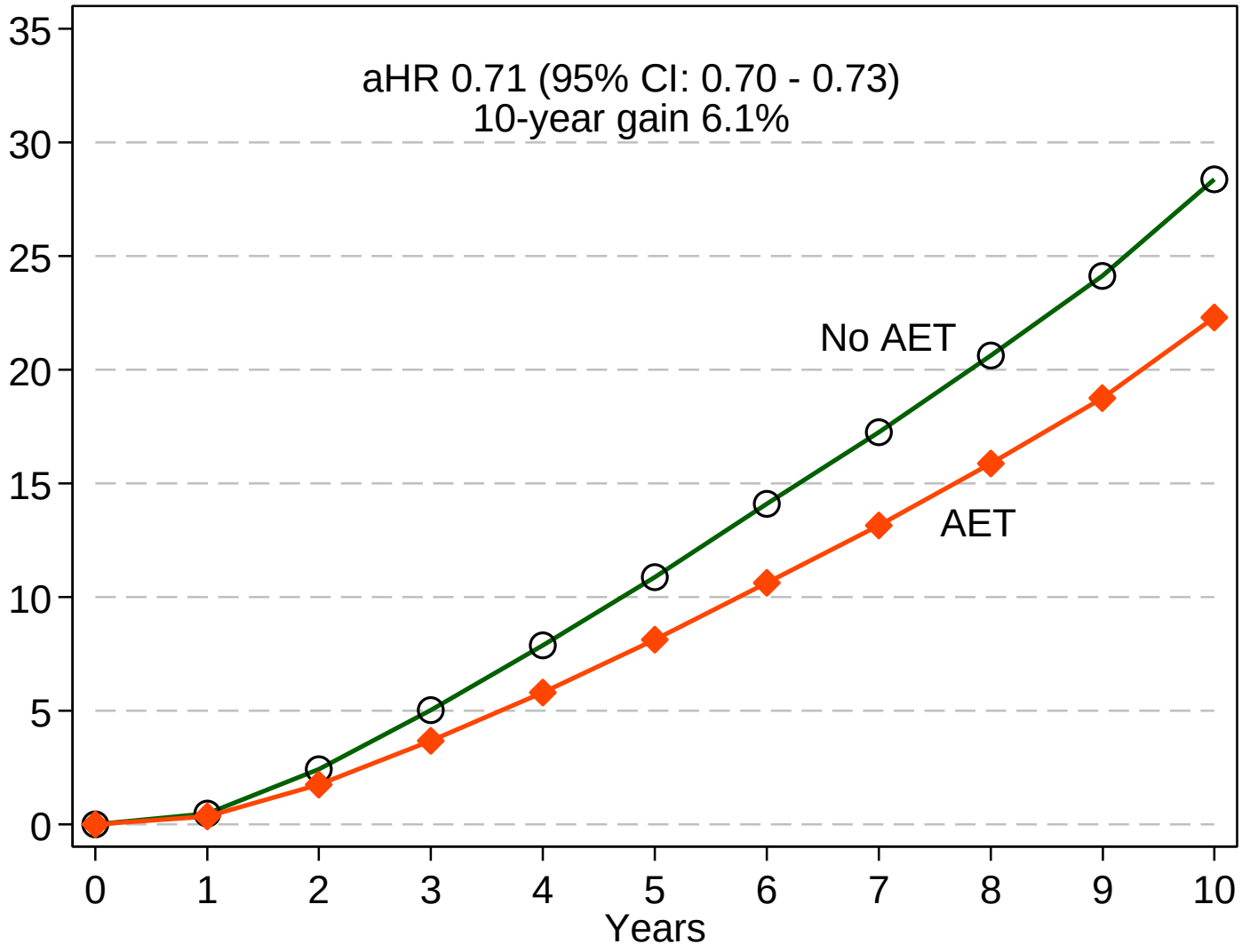
Daly et al. in press

State-level AET concordance to guidelines among HR+ breast cancer



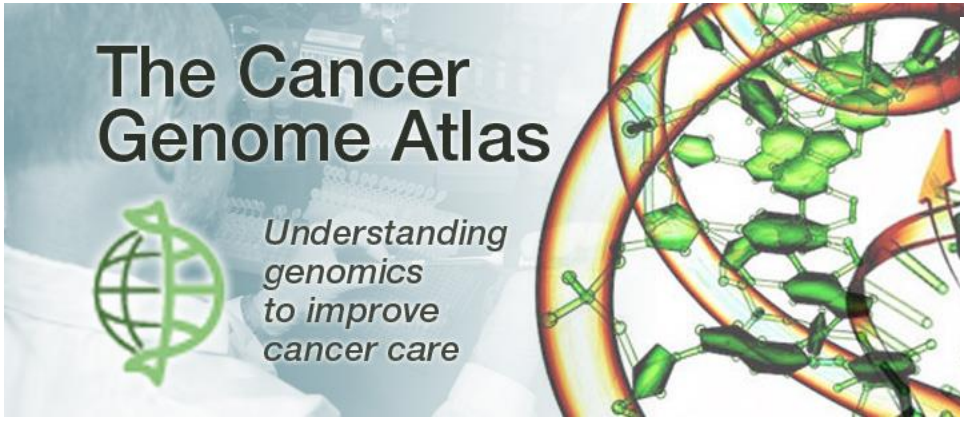
Daly et al. in press

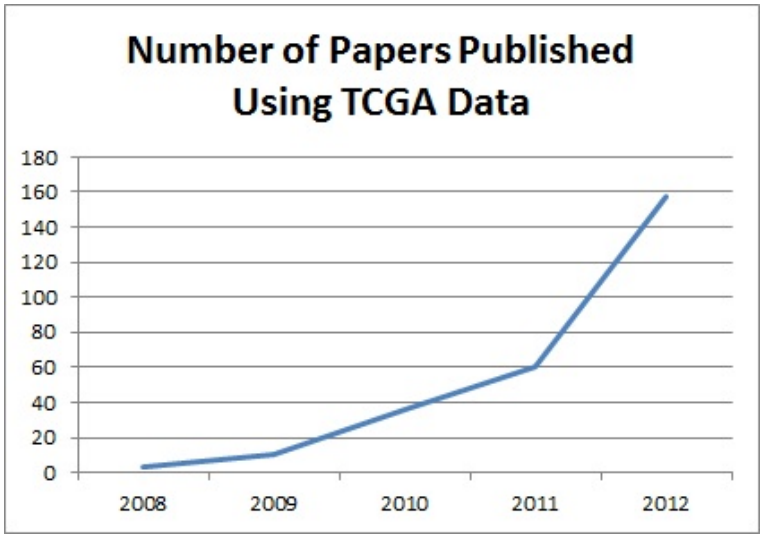
Effect of AET on overall survival

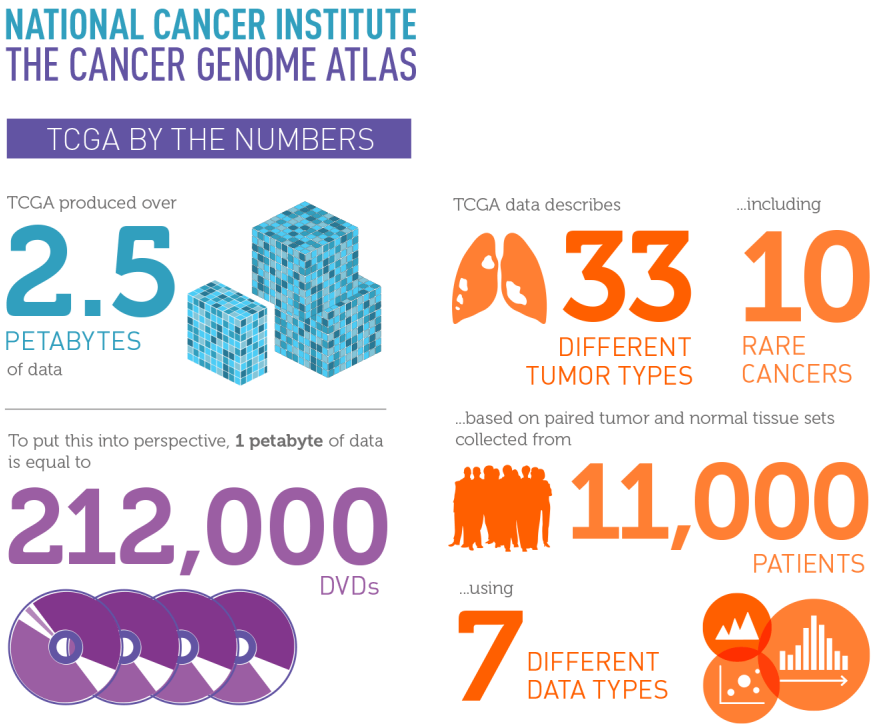


Daly et al. in press

Translational Genomics: Discovery







Large-scale genomics data can be used as an important discovery tool

Somatic Signatures in whole exome data

ARTICLE

doi:10.1038/nature12477

Signatures of mutational processes in human cancer

A list of authors and their affiliations appears at the end of the paper

All cancers are caused by somatic mutations; however, understanding of the biological processes generating these mutations is limited. The catalogue of somatic mutations from a cancer genome bears the signatures of the mutational processes that have been operative. Here we analysed 4,938,362 mutations from 7,042 cancers and extracted more than 20 distinct mutational signatures. Some are present in many cancer types, notably a signature attributed to the APOBEC family of cytidine deaminases, whereas others are confined to a single cancer class. Certain signatures are associated with age of the patient at cancer diagnosis, known mutagenic exposures or defects in DNA maintenance, but many are of cryptic origin. In addition to these genome–wide mutational signatures, hypermutation localized to small genomic regions, 'kataegis', is found in many cancer types. The results reveal the diversity of mutational processes underlying the development of cancer, with potential implications for understanding of cancer aetiology, prevention and therapy.

Institute for Genomics & Systems Biology

THE UNIVERSITY OF CHICAGO
CENTER FOR CLINICAL CANCER GENETICS AND GLOBAL HEALTH

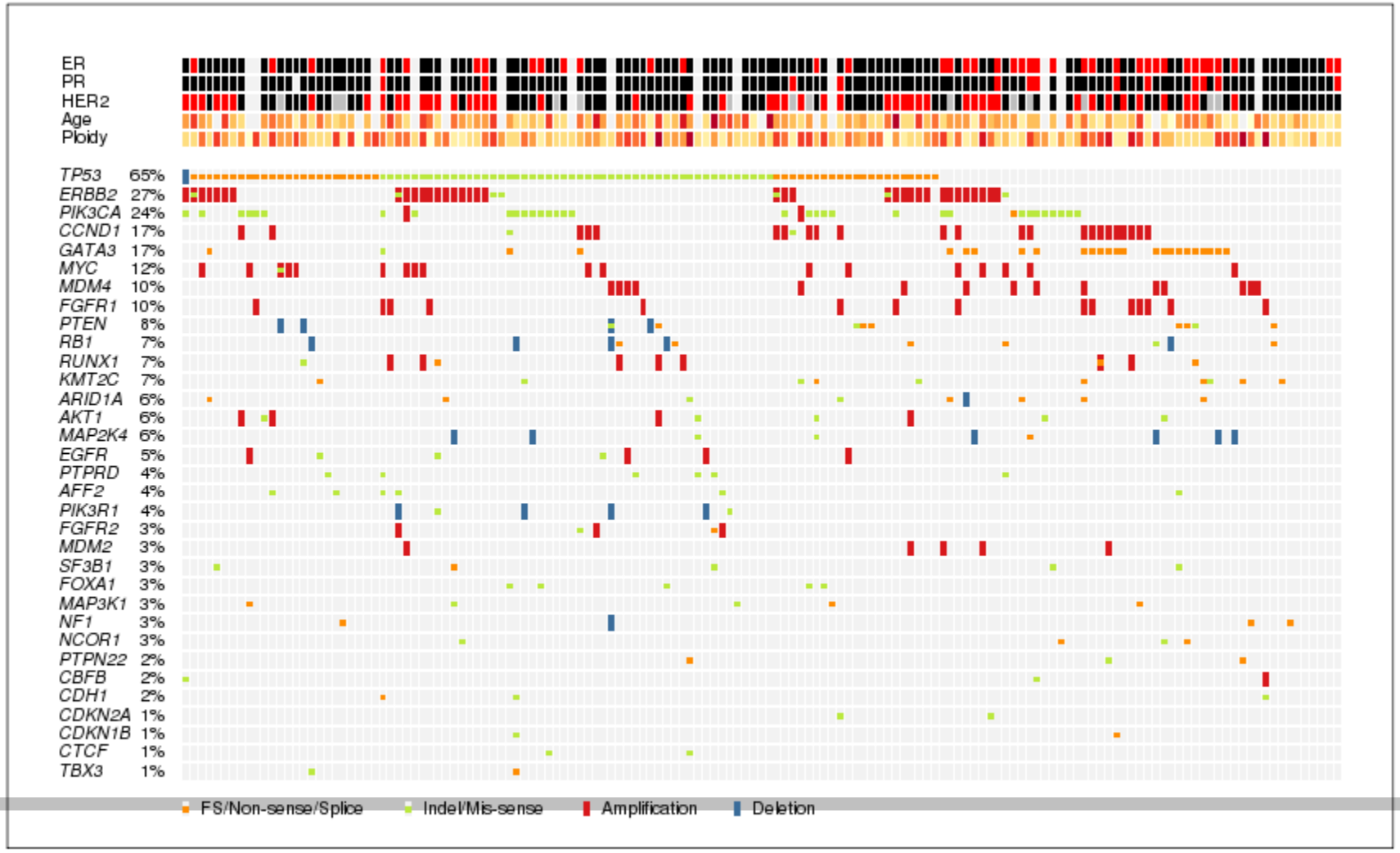
Using Genomics to Reduce Breast Cancer Disparities in the African Diaspora

PI: Funmi Olopade

Co-PIs: Kevin White and Dezheng Huo

Sequencing of Nigerian Tumor/Normal Pairs

Mutation Landscape: Oncoprint Known Breast Cancer Genes



WHO Criteria For Population Screening for Genetic Predisposition To Disease

- Disease is an important public health burden in the target population
- Risk of disease due to mutations in the screened genes is known
- Effective interventions to reduce morbidity and mortality among genetically susceptible exists
- Cancer as a rising epidemic in LMIC
- Population genomics to screen for inherited cancers

Conclusion

- Global inequities exist in cancer care
- Inadequate resource allocation fueling health disparities and inequities
- Disparities can be addressed when understanding of health and wellness is advanced by collaborative research
  - potential for optimal use of available therapies
  - local capacity building
  - identify future research needs

Recommendations

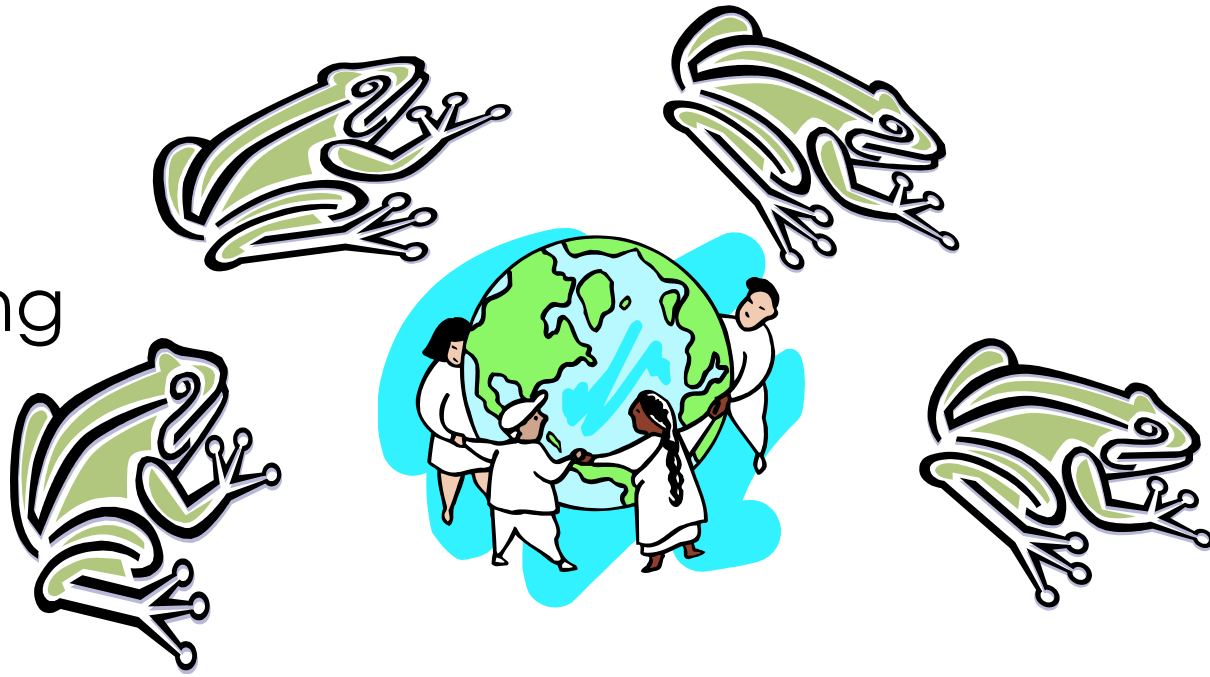
- Heightened international and domestic efforts to advocate for increased health care resource allocation and capacity building

- More trans-national & international collaborative research activity

Opportunity

Skip Inefficiencies of Western Experience

Leverage emerging technology in IT



Laura Esserman & Funmi Olopade