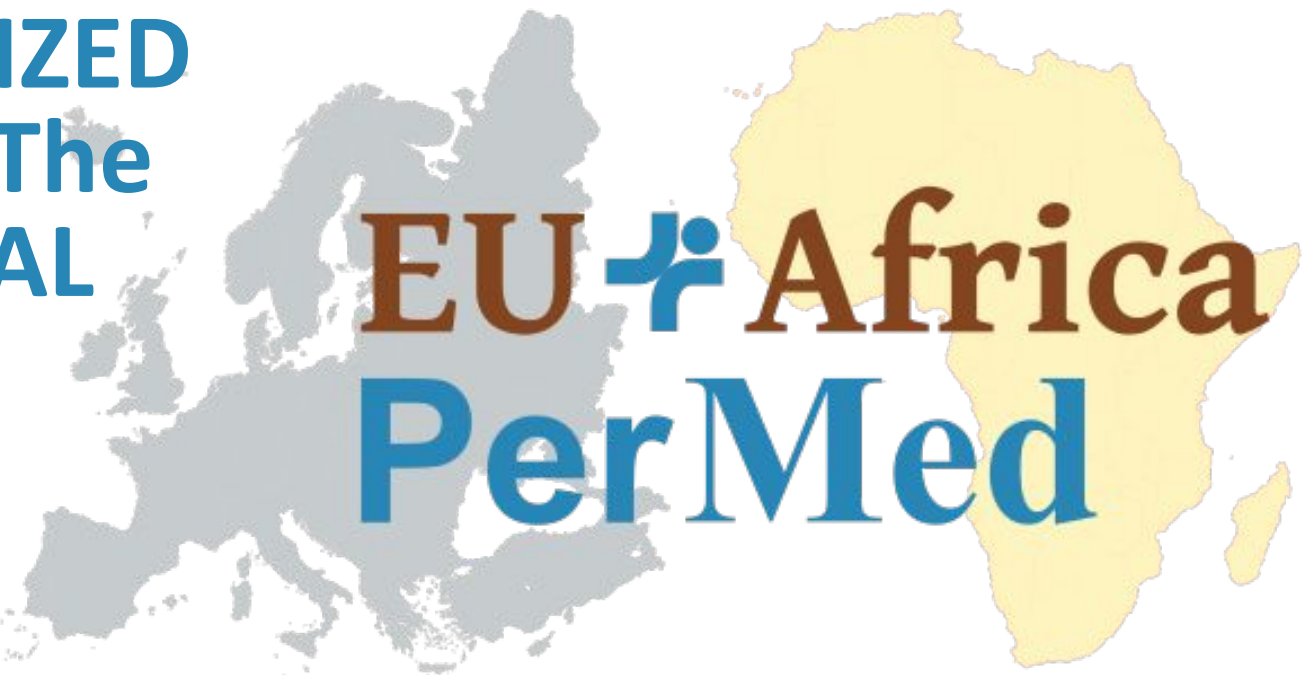


VISION FOR PERSONALIZED MEDICINE IN AFRICA: The NEED FOR A REGIONAL APPROACH

East Africa Regional
Stakeholder Workshop

Rizwana Mia (SAMRC)
Nairobi, Kenya-14 July 2022



**BUILDING LINKS BETWEEN
EUROPE AND AFRICA IN
PERSONALISED MEDICINE**



EU-Africa PerMed has received funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement No 964333

#1. LETS GET ORIENTATED



KNOWN OR REFERRED TO AS

Personalized
Medicine

A Rose



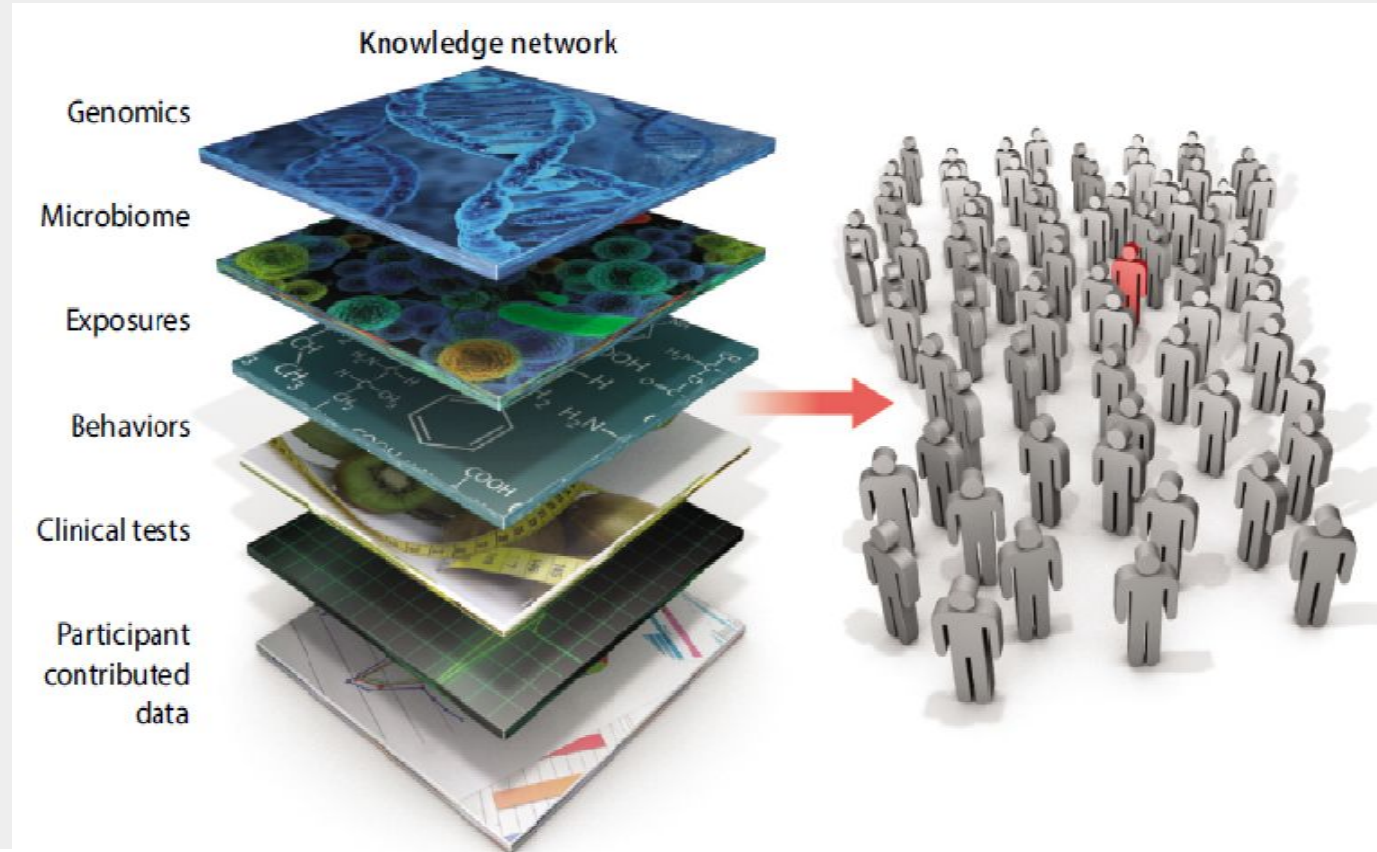
by any other
name would
smell as
Sweet ...

~ SHAKESPEARE

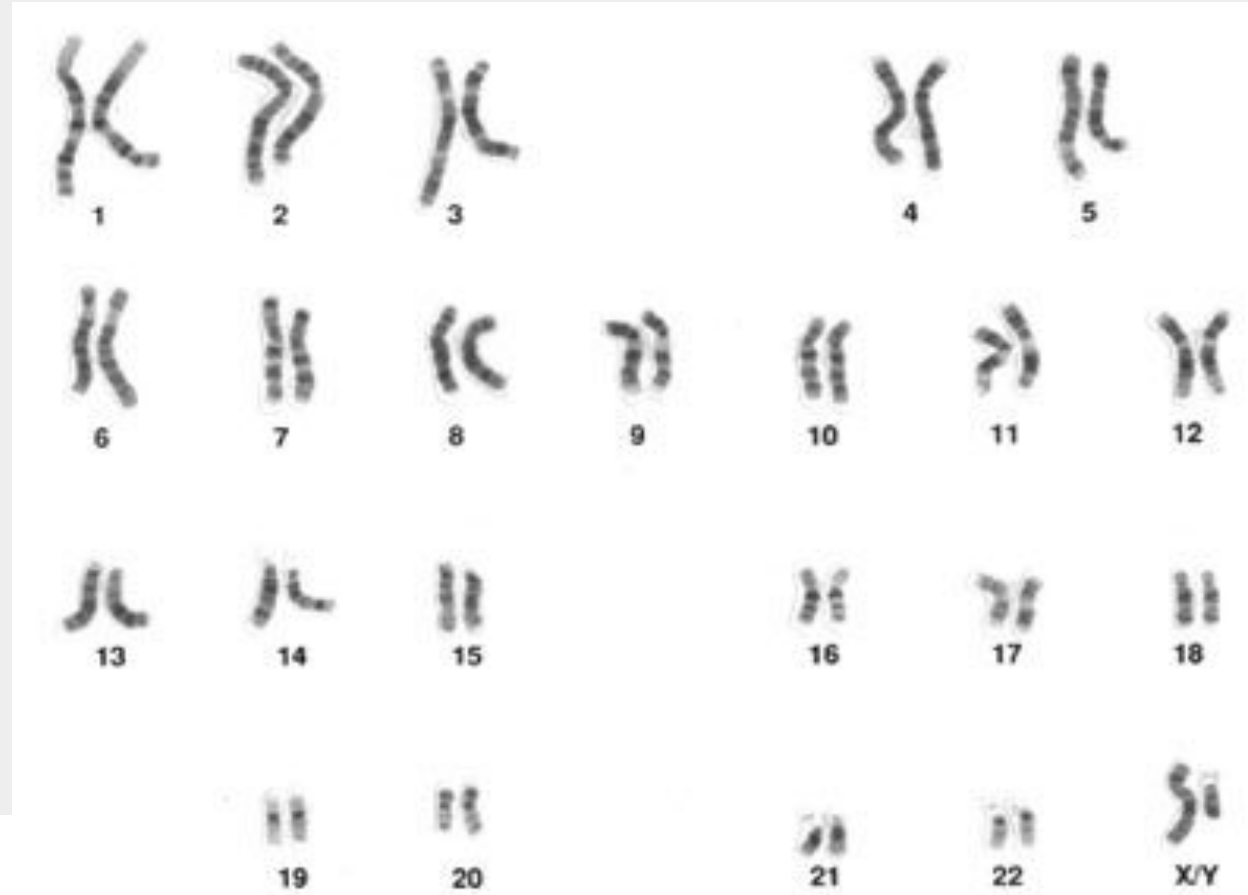
PERSONALIZED MEDICINE DEFINED

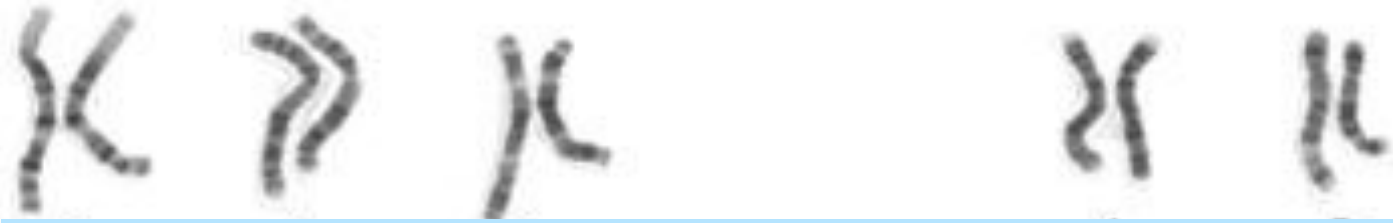
Personalised Medicine is a medical model using characterization of individuals' phenotypes and genotypes (e.g. molecular profiling, medical imaging, lifestyle data) for tailoring the right therapeutic strategy for the right person at the right time, and/or to determine the predisposition to disease and/or to deliver timely and targeted prevention.

Essentially it is a combination of biological, physical, engineering, computer, and health sciences to set the stage for a transformative leap towards a targeted, data-driven, healthcare mechanism for patients.



THE EVOLUTION OF GENOMIC SCIENCE HAS ENABLED THE UNDERSTANDING OF A PERSONS GENETIC BLUEPRINT

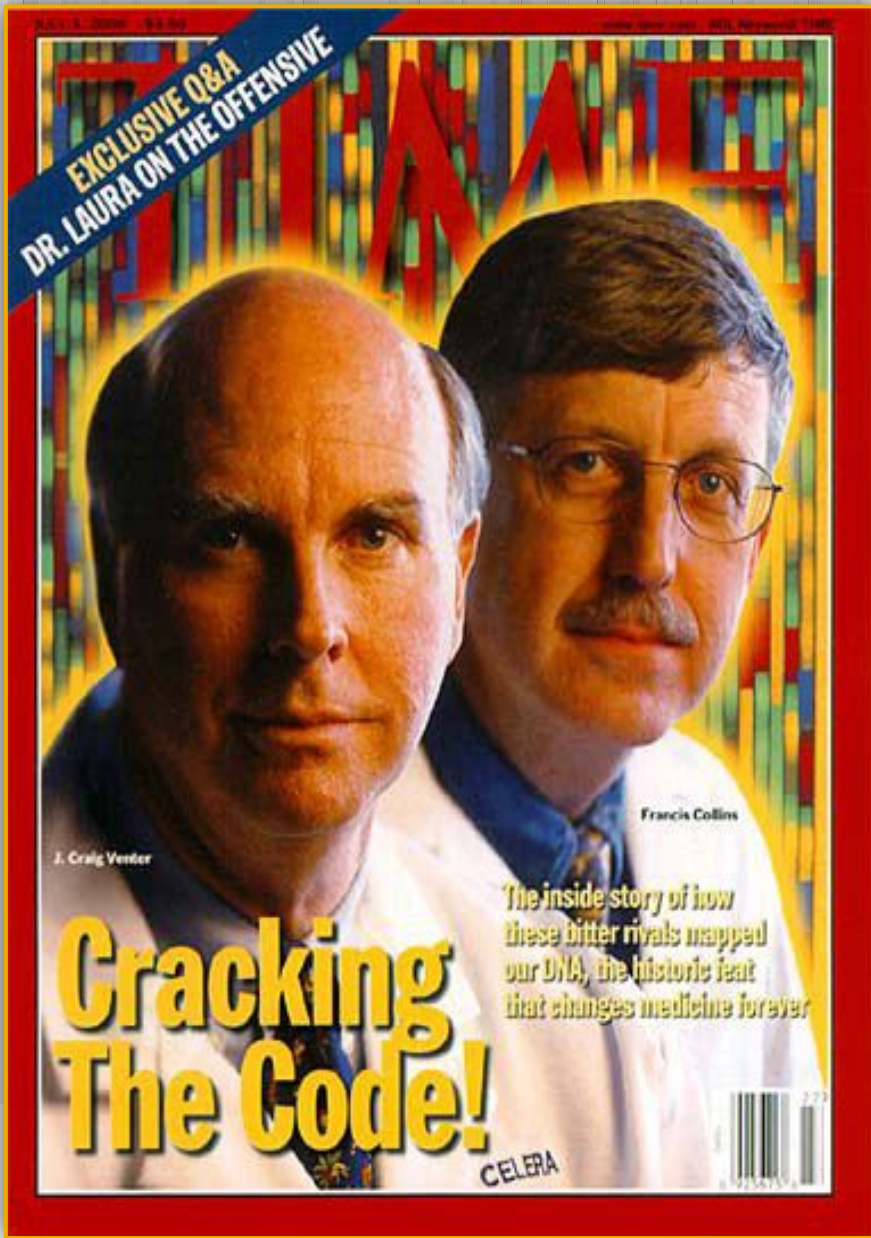




Why do some people develop a particular disease and others don't?



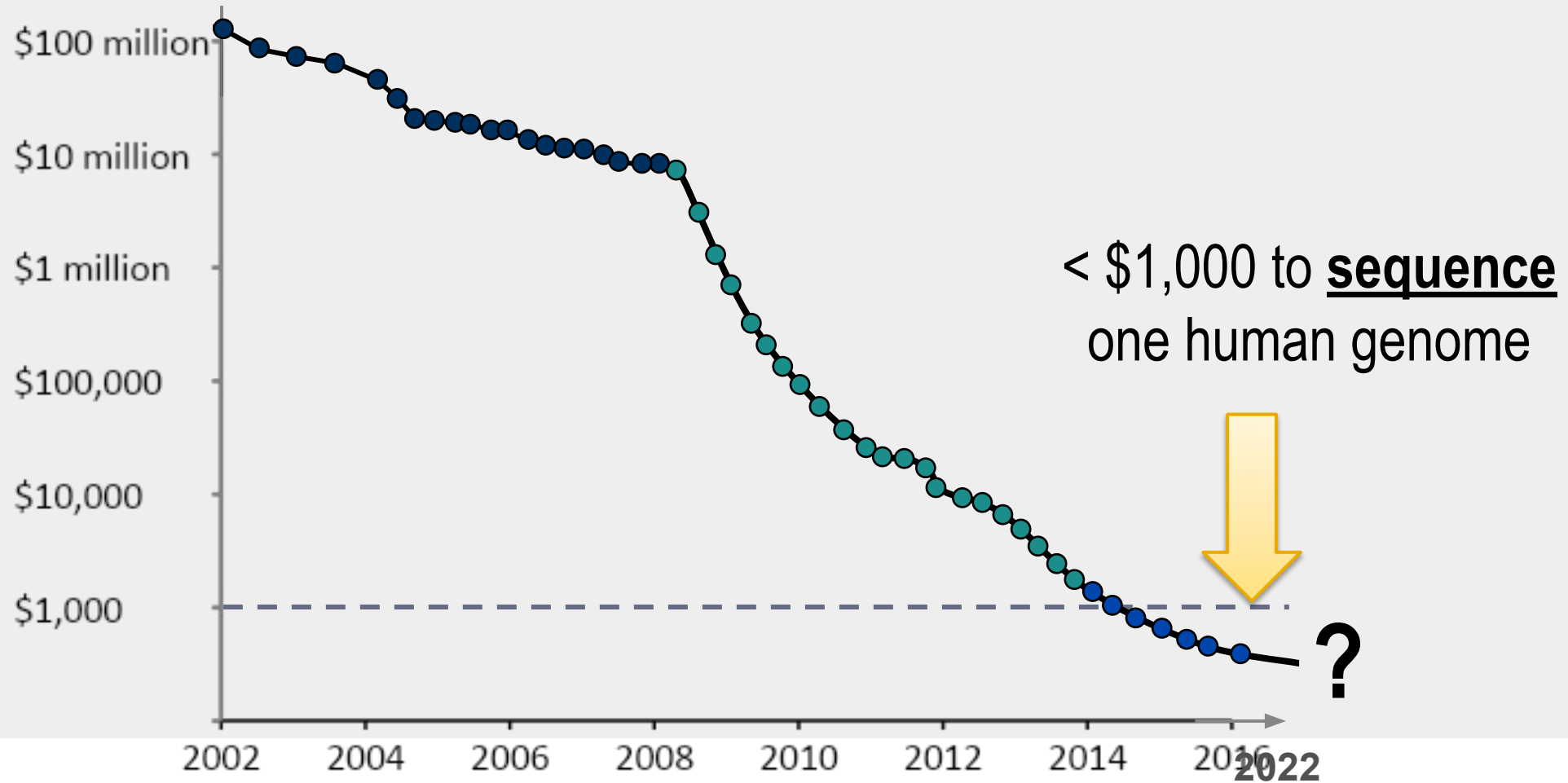
Why do some people respond to a particular treatment and others don't?



“This will revolutionize the diagnosis, prevention and treatment of most , if not all, human diseases.”

-Bill Clinton, June 2000

COST OF WHOLE GENOME SEQUENCING



- Even though the costs are steep its good to note we really are forging a great pathway

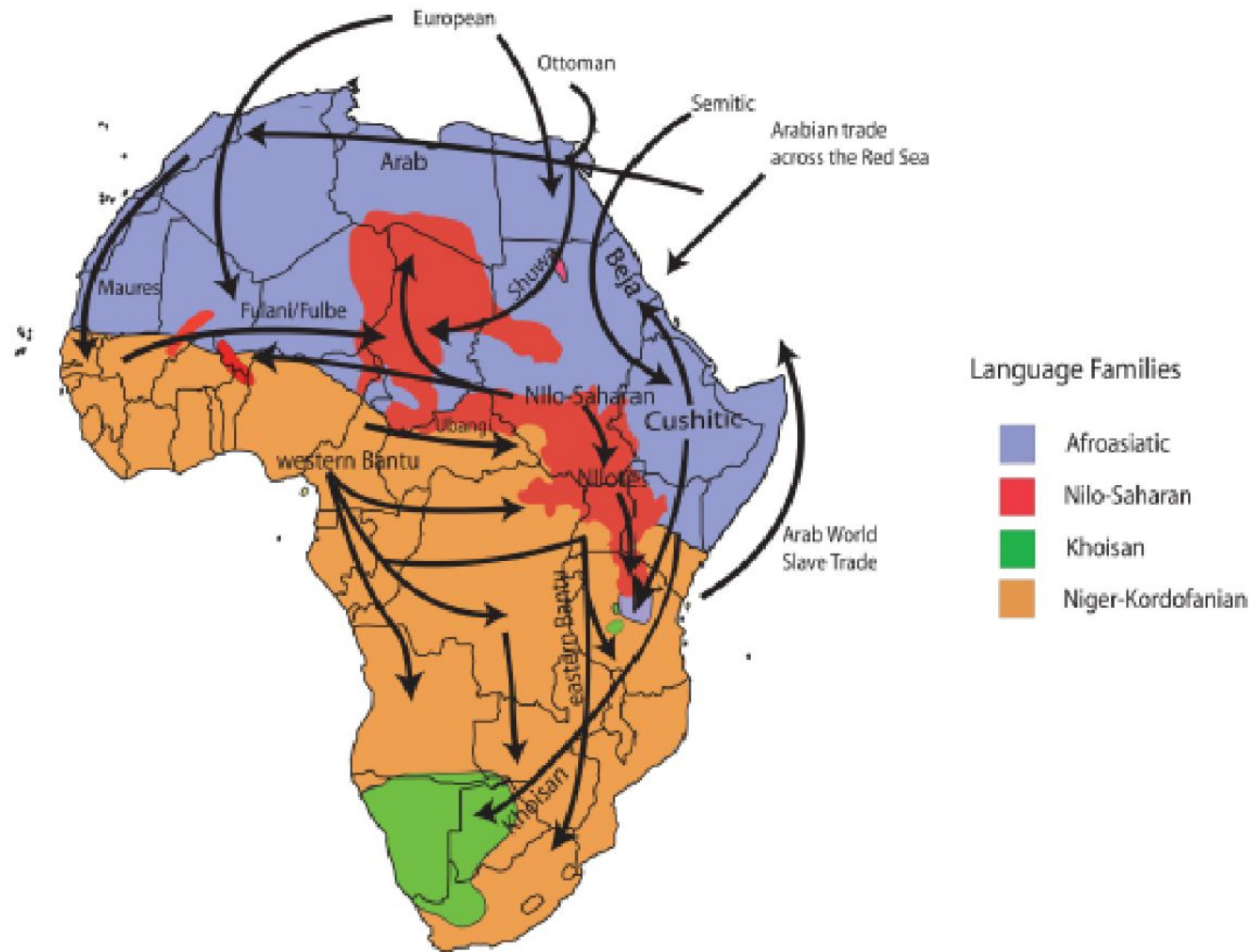


Today the practice of medicine is changing

- The advent of technology advancement in Omics research has shifted the paradigm of modern medicine
- 21st century technology gives us the means to enable precise healthcare. We are seeing healthcare systems evolve across the first world to create a patient centric approach.
- As Africa we need to move a step further –to address our disease burden more sustainably.
- One of the greatest lessons learned by the African continent through the current COVID 19 pandemic is the urgent need to invest our healthcare systems.³



3. Nkengasong, J.N., and Tessema, S.K. (2020). Africa Needs a New Public Health Order to Tackle Infectious Disease Threats. *Cell* 183(2), 296-300. doi: <https://doi.org/10.1016/j.cell.2020.09.041>



- A map of African language family distributions and hypothesized migration events within and out of Africa.



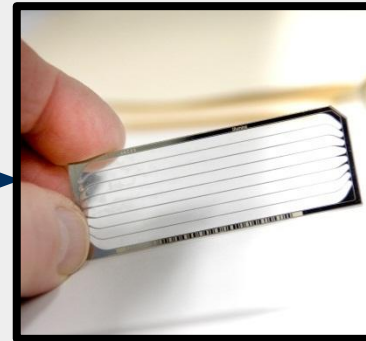
MOST 1ST WORLD COUNTRIES APPLY THIS MODEL



Patient Consultation



**Sample Collection
(Blood and/or Tissue)**



Next Generation Sequencing



Data Storage/Analysis



**precision
Medicine Consult**



**Expert Review and
Consultation**

Gene	Variant Status	Clinical Significance	Associated Diseases	Other Info
APC Faulty Gene	Variant known to be pathogenic Advanced Info	High	FAP - Family Adenomatous Polyposis	Genetic Counseling Family Testing Clinical Trials
SMAD4 Probably Faulty	Unknown variant predicted to be pathogenic Advanced Info	High	JPS - Juvenile Polyposis Syndrome Juvenile polyposis / hereditary hemorrhagic telangiectasia syndrome	Genetic Counseling Family Testing Clinical Trials
14 More Genes	Safe	Unknown	Other Associated Diseases	

**Interpretive Report
Generated**

1. Referral-based

2. Starts and Ends with Patient

CHALLENGES

Technology ready?

Skills/Capacity?

Ethical and Legal Issues?

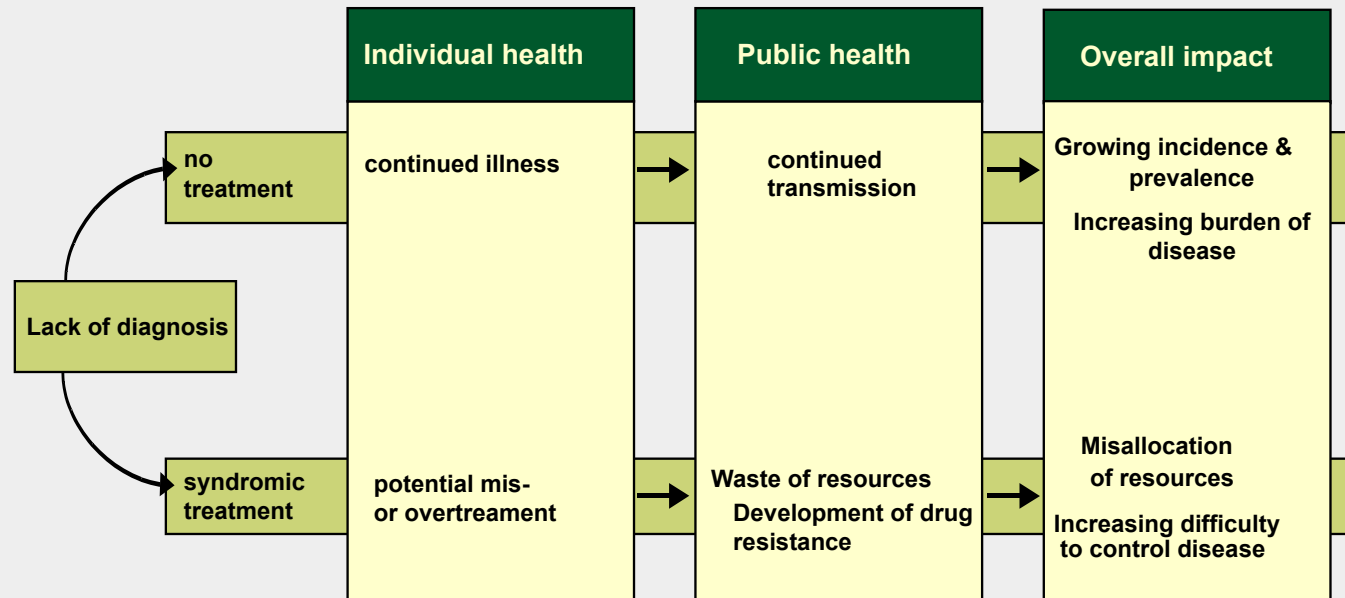
Health System Readiness?

Direct to Consumer Testing?

Cost? Insurance?

WHY ? PRECISION/PERSONALIZED DIAGNOSTICS

DIAGNOSTICS ARE CRITICAL FOR INDIVIDUAL
AND FOR PUBLIC HEALTH



- This is a starting point be it for infectious or Non-Communicable diseases

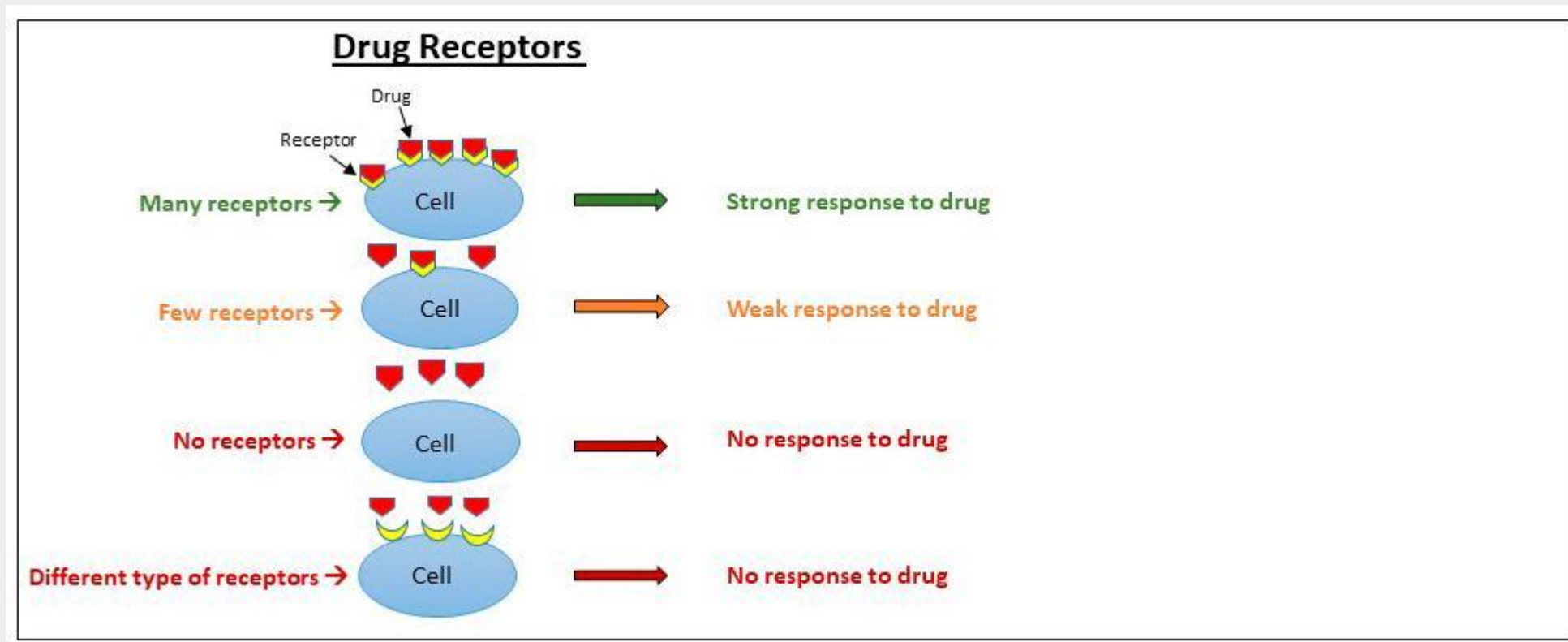
The African Health Context

- The continent has 54 countries and globally it is the second-most populous continent, with an area of approximately 30 million km² and a population of 1.2 billion people. It is known as the cradle of humankind.
- Africa's underlying burden of disease is the largest in the world.
- Infectious diseases play a particularly severe role on the continent with a burgeoning non-communicable disease burden, that is highly under reported¹.
- An annual productivity loss of over \$800 billion².

1. World Health Organization Regional Office for Africa . WHO Regional Office for Africa; 2019. A Heavy Burden: The Productivity Cost of Illness in Africa. [[Google Scholar](#)]

2. World Bank . The World Bank; 2020. Global Economic Prospects, June 2020. [[Google Scholar](#)]

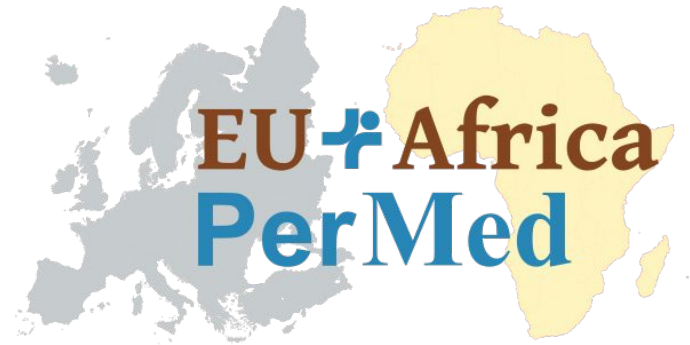
PHARMACOGENOMICS



- Pharmacogenomics is the study of how genes affect a person's response to drugs.
- It is a relatively new field which combines pharmacology (the science of drugs) and genomics (the study of genes and their functions) to develop effective, safe medications and doses relevant to a particular patient population
- It attempts to eliminate the trial-and-error method of prescribing drugs deviating from the normal "one-dose-fits-all" approach

WHY DO WE NEED TO STUDY PHARMACOGENOMICS IN SOUTH AFRICA?

- Currently, the cost of pharmaceuticals to our government is estimated to be in excess of ZAR 18 billion per annum.
- There are several current treatments in South Africa which appear to be clinically ineffective resulting in treatment failure. The way a person responds to a drug- is influenced by many different genes. These treatments are mainly trialed in western populations. Therefore, treatments may not work on our population, and this is due to the inherent genetic diversity seen on the continent.
- Therefore, scientists need to study all the genes involved in drug responses, in order to develop genetic tests that could predict a person's response to a particular drug. We started off with the Essentials Drug List utilized in our country



Closing slide

Text



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South African Medical Research Council

BUILDING A HEALTHY NATION THROUGH RESEARCH