

Vaccine Lifecycle Management: Becoming Self-Sufficient

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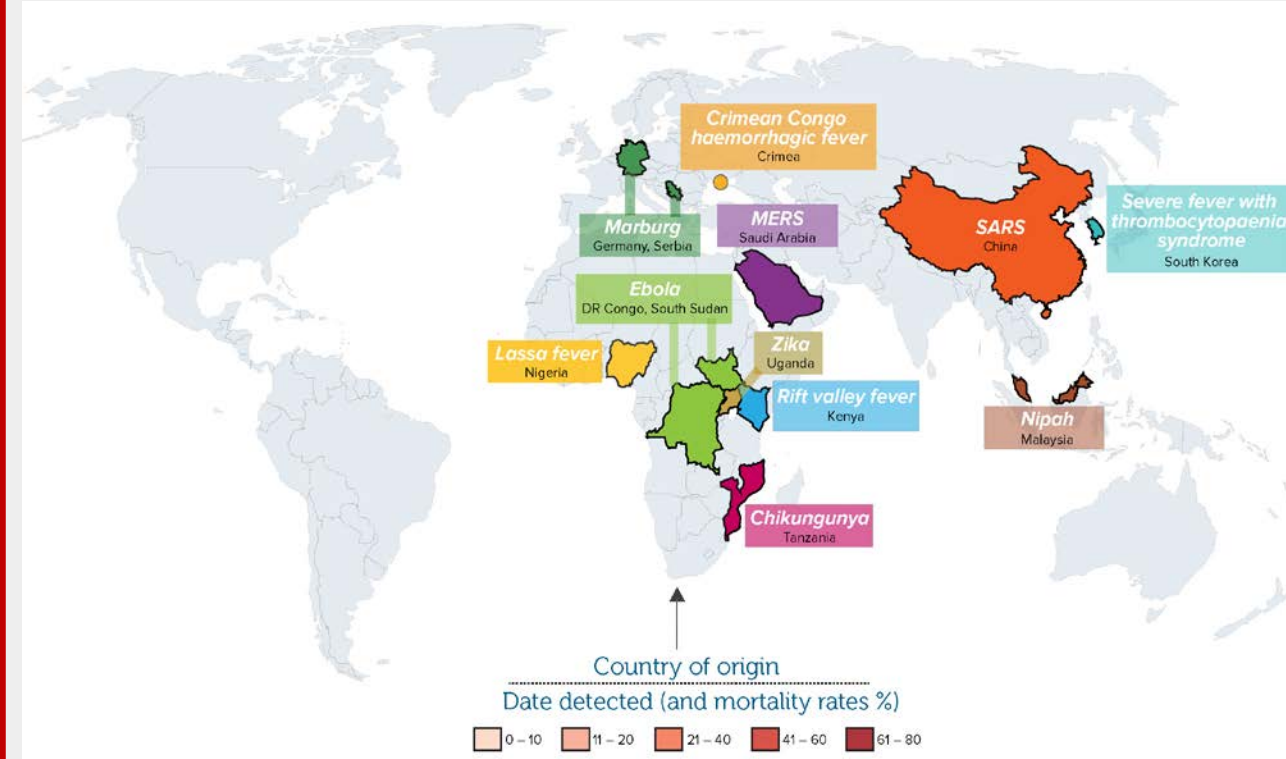
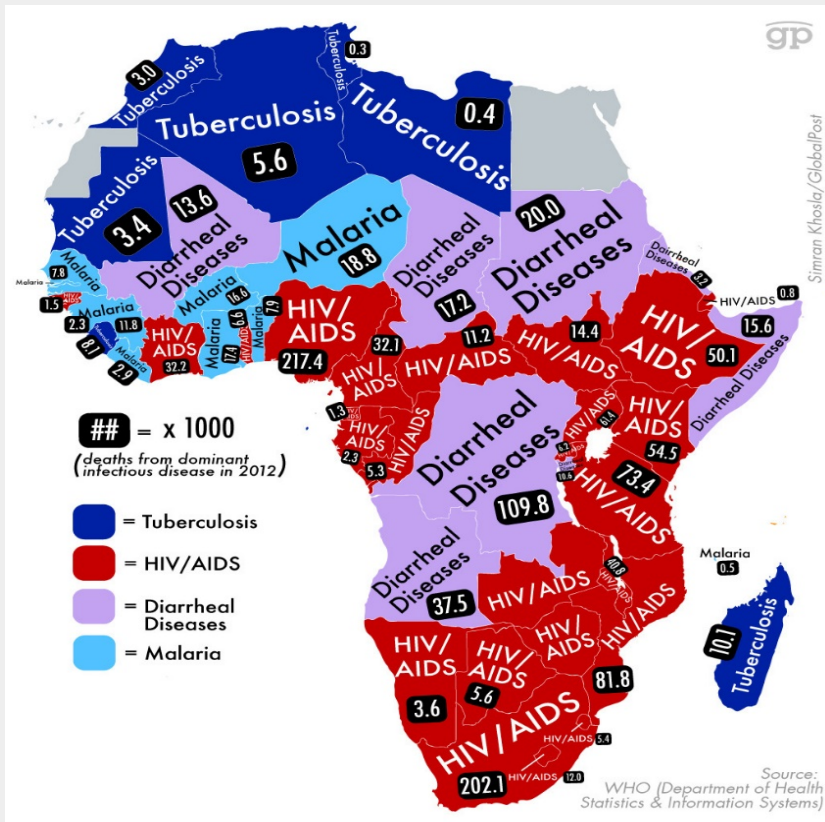
Noguchi Memorial Institute for Medical Research
UNIVERSITY OF GHANA

The burden of Infectious Diseases in Africa

Africa: The highest diversity of infectious agents

- HIV-1/HIV-2
- *M. africanum*

Africa: The highest threat of emerging and re-emerging diseases



Africa's New Health Challenge: NCDs

NCDs on the rise in Africa:

- Diabetes
- Cancer
- Heart disease

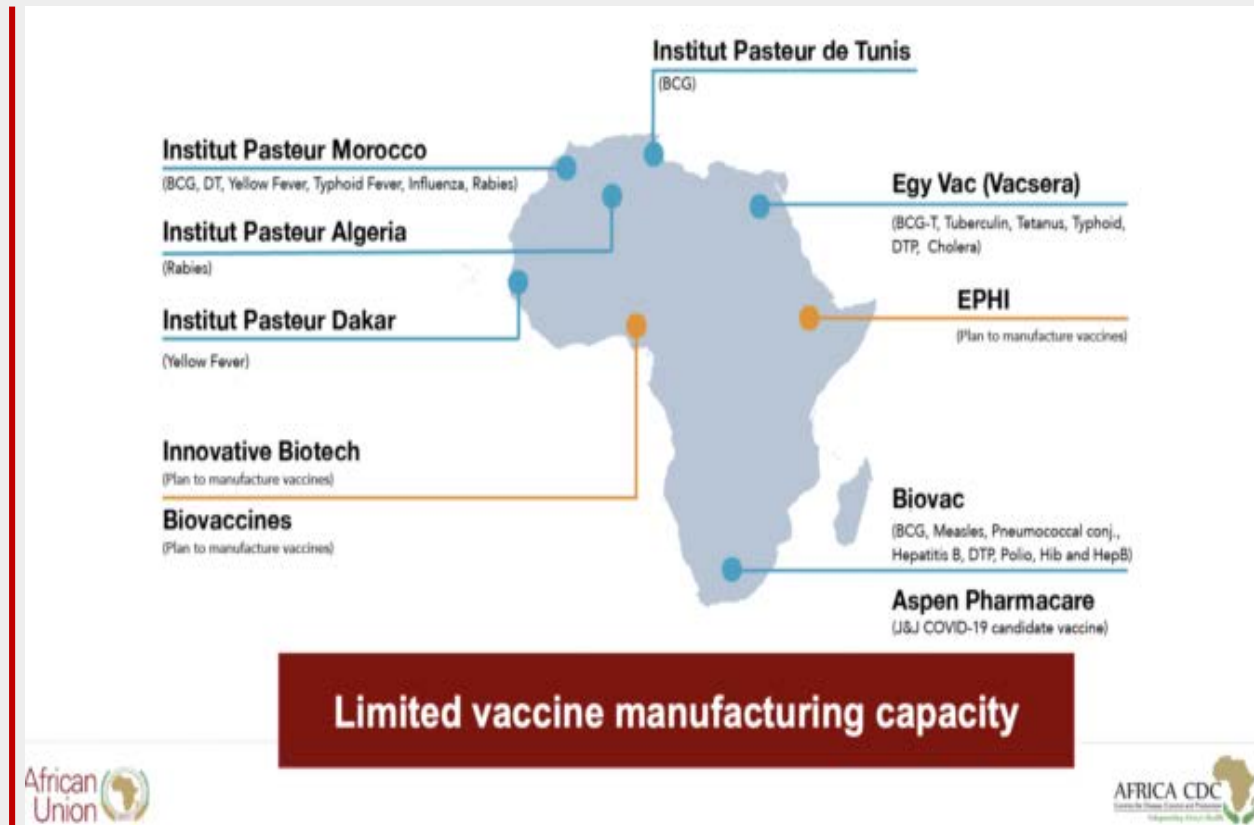


Need for improving capacity for vaccine manufacturing in Africa

- Africa has around ten vaccine manufacturers
 - most do not make a vaccine's active ingredients
 - instead 'fill and finish' imported products
- <1% of all vaccines used on the continent are locally produced
 - reveals the region's intense vulnerability and
 - overdependence on foreign supplies

Limitations

- Technical
- Funding
- Availability of high-income market

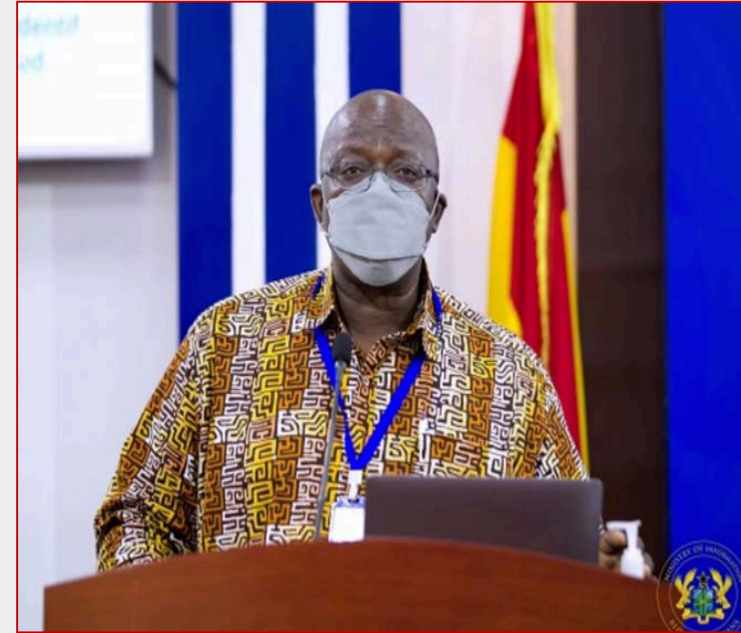


Senegal the only site that exports a WHO pre-qualified (Yellow fever) vaccine outside of Africa



Ghana's Vaccine Initiative

- Many African governments now recognize the need to ramp up vaccine manufacturing to ensure
 - self-sufficiency
 - Improve access
- Ghana is no exception and has established the Presidential Vaccine Manufacturing Committee, expected to metamorphose into the National Vaccine Institute (NVI) through an act of the Parliament of Ghana
- The mandate of NVI include:
 - establishing local vaccine manufacturing plants,
 - deepening research and
 - development for vaccines
- Ghana will start producing its own COVID-19 vaccines in January 2024



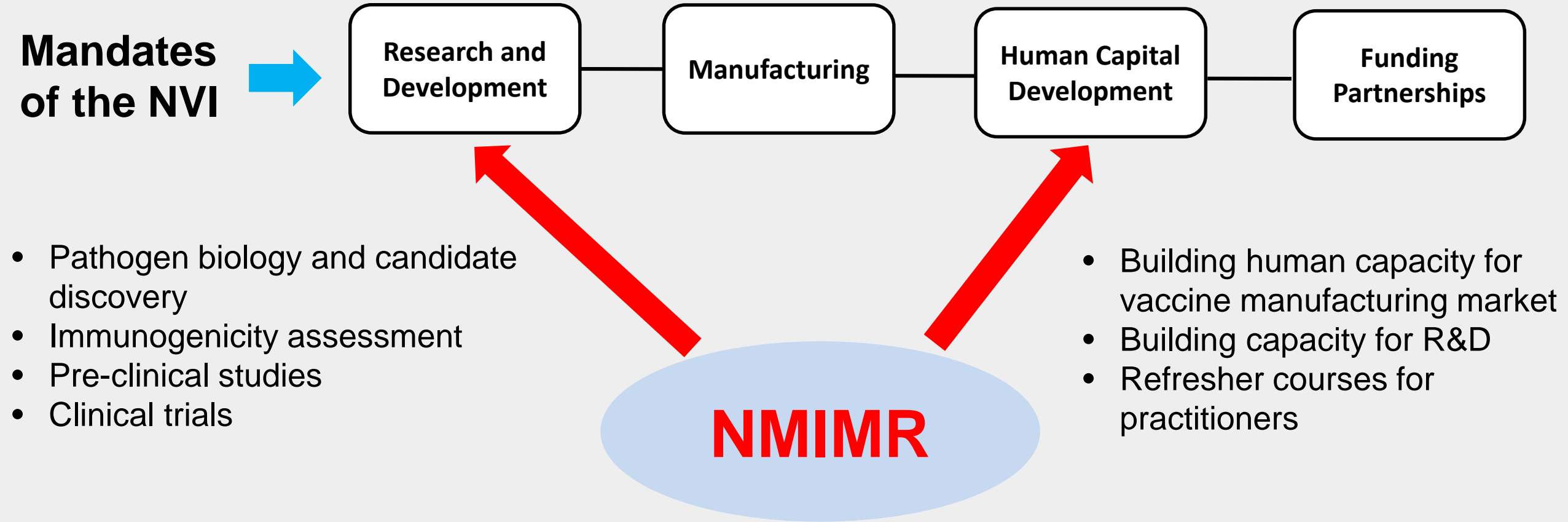
Prof William Ampofo,
The secretary of the committee:
Ghana needs **US\$200 million**
to establish NVI



Enhancing Vaccine Research ,Development and Production Capacity – Public-Private Partnership



NMIMR's role with the National Vaccine Institute (NVI)



THE NMIMR and JICA Cooperation-1

PATHOGEN BIOLOGY

- Virus isolation and cultures
 - Polio, Flu, HIV, some VHF, SARS-CoV-2
 - Currently isolated wild-type, Beta, Eta, Delta and Omicron variants
- Parasites: *Plasmodium*, *Schistosoma*, *Filaria*
- Bacteria: Mycobacterium, Vibrio, AMR

PRE-CLINICAL STUDIES

CLINICAL TRIALS

- ❖ On-going trials for
 - Lassa fever (phase 1b)
 - COVID-19/measles interaction trial
 - Rotavirus (phase 3)



P3 Facility



P2 facility



P2 facility



The search for HLA restricted T cell epitopes for malaria vaccine design

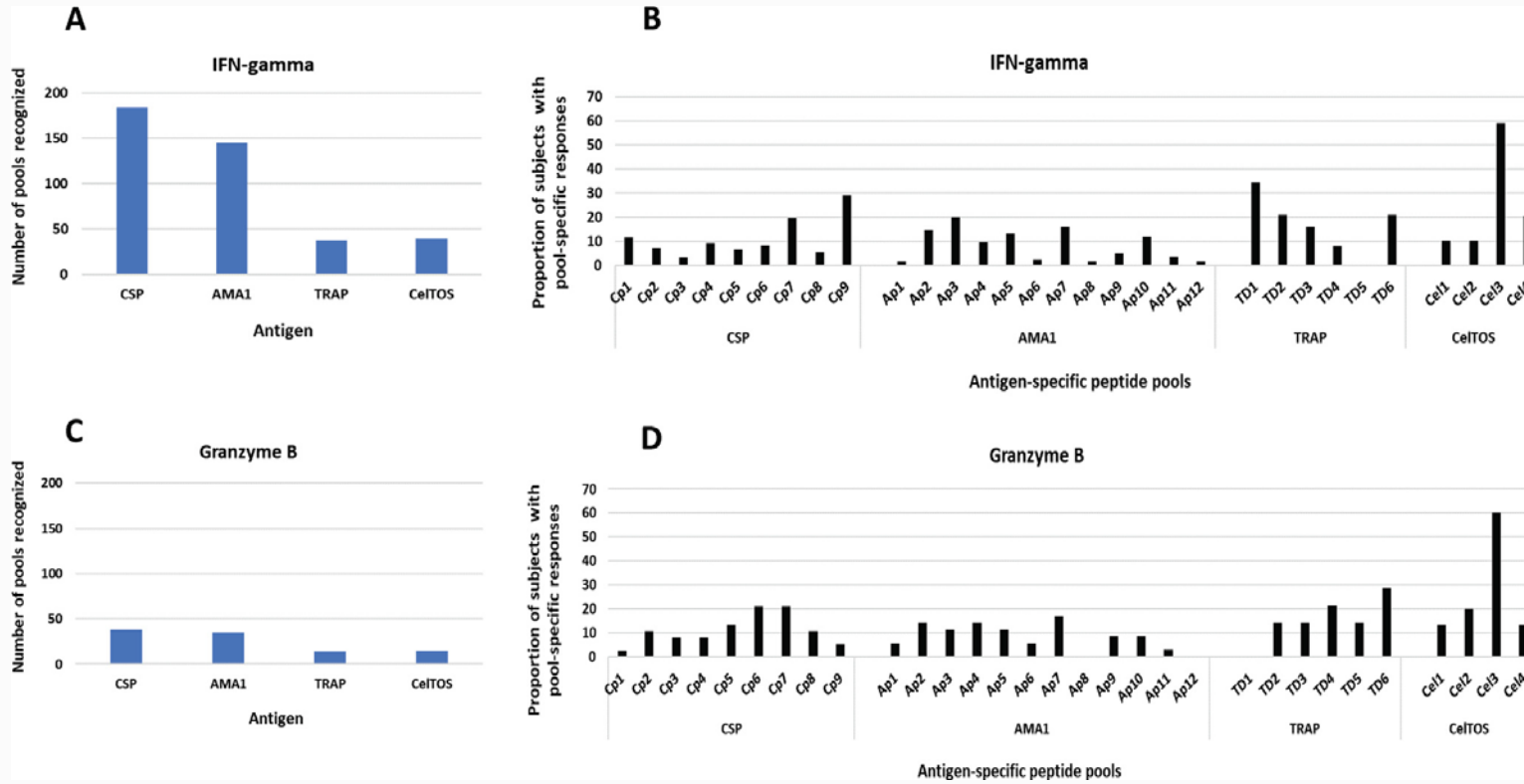


Fig. A. Frequency and proportion of subjects with peptide pool-specific positive responses in FluoroSpot assays.

Currently, 135 epitopes identified (unpublished data)

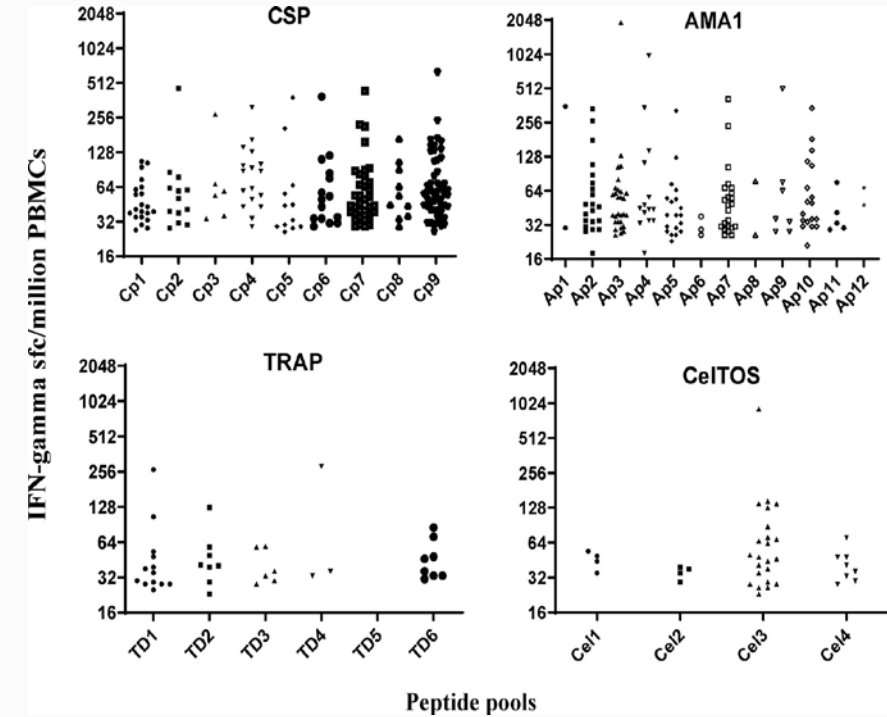
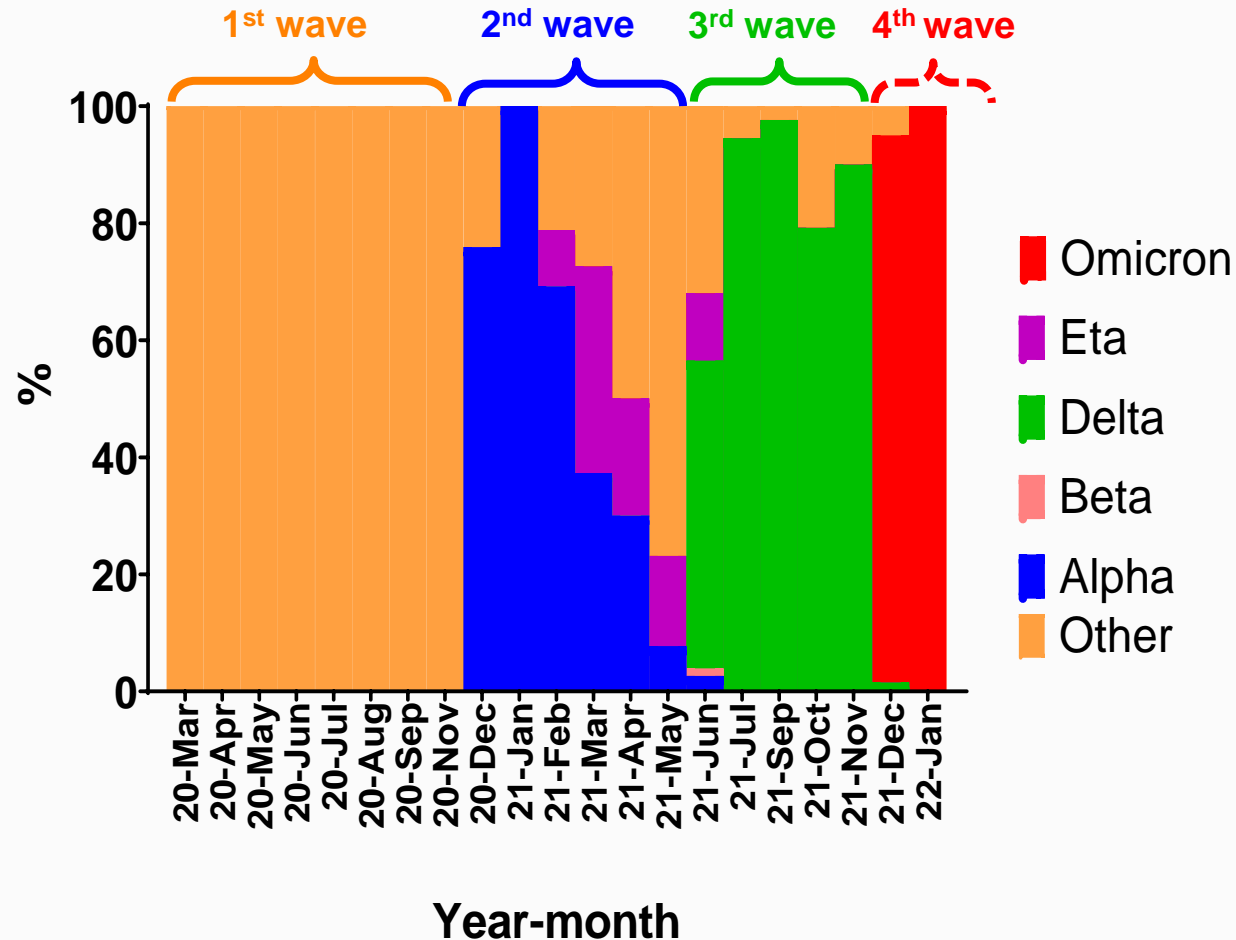


Fig. 4. Magnitude of IFN-g responses elicited against peptide pools by 125 subject PBMCs



Trend of Ghana Community Spread (Mar. 2020 -Jan. 2022)



- Overall, 1034 genomes from March 2020 to Jan 2022
- **1st wave**, no single dominant variant
- **Alpha wave** succeeded by the **Delta wave** which has now been displaced by the **omicron wave**
- **Omicron (>99% currently)**



IMPACT

- **Human Capacity building**
 - Several Masters and PhD training scholarships
- **Advanced Research Laboratory and equipment**
 - National reference lab for COVID-19, Tuberculosis and many other infectious diseases.
 - Capacity building center on Laboratory Skills for Infectious Diseases - Third Country Training Program
- **Disease surveillance projects**

FUTURE

Research and development (R&D)

- Drug discovery
- Biotech Centre
- Pre-clinical studies and clinical trials
- Industry partners

THANK YOU

