

Development of a Sustainable Diagnostic Toolbox for Detection of West African Infectious Diseases

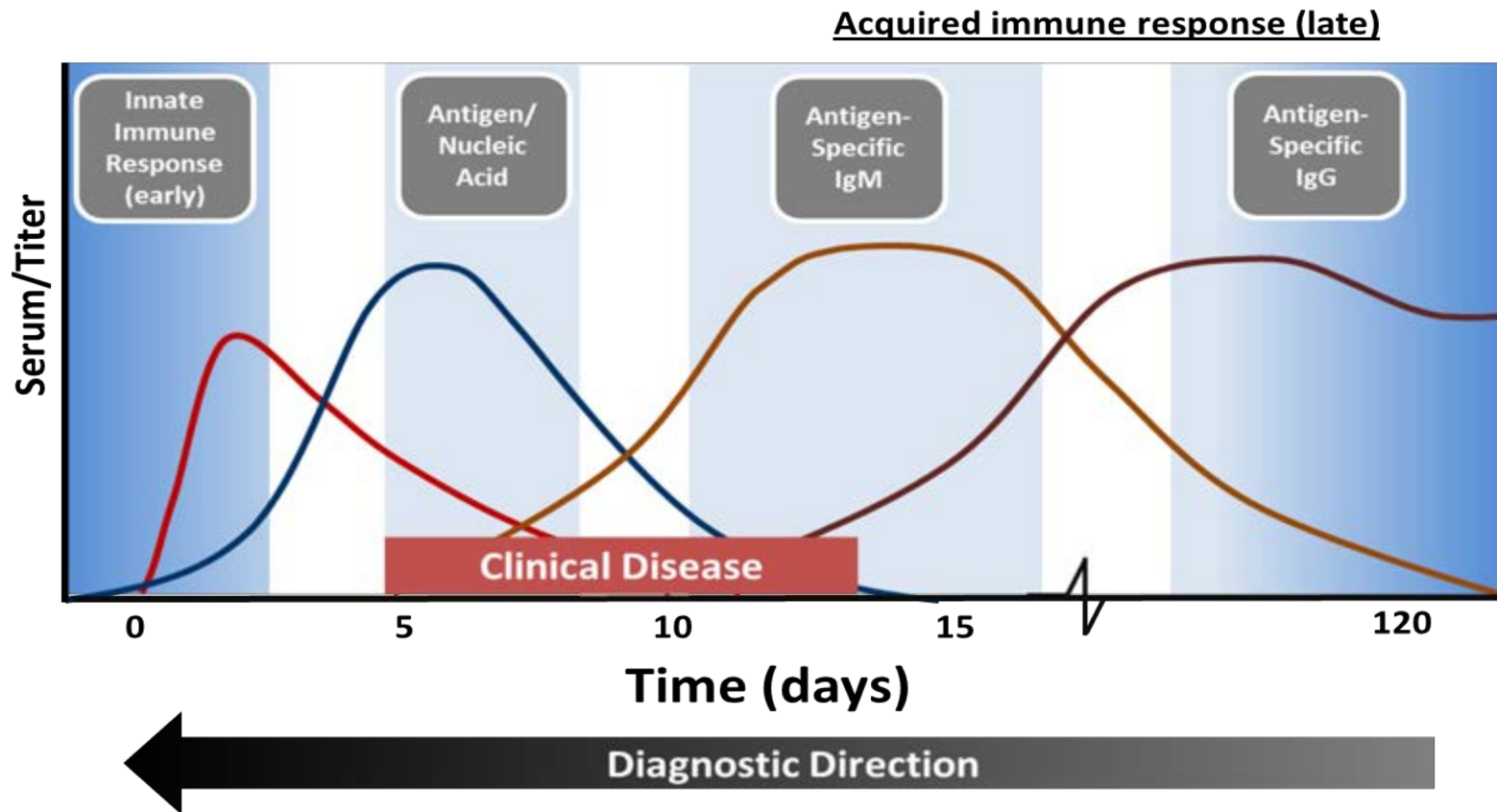
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Diagnostic Window



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Diagnostic Toolbox

Technique	Biomolecule Detected	Expertise Needed	Cost	Time Needed	Limit of Detection	Multiplex?
Pathogen Isolation	Whole Pathogen	Yes	\$\$\$	1-2 weeks	+++	N/A
PCR	Nucleic Acid	Yes	\$\$\$	1 day	+++	Yes
ELISA	Antigen/IgG/IgM	Yes	\$\$	1-2 days	++	No
RDT	Antigen/IgG/IgM	No	\$	10-30 minutes	+	Yes (3-4 plex)
Magpix	Antigen/IgG/IgM	Yes	\$\$	120-240 minutes	++/+++	Yes (10+ plex)



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Integrated and Sustainable Diagnostics

Integrated: Tests are statistically independent or non-overlapping but, in combination, provide a higher degree of certainty of the final result.

Sustainable: All assay components are easily produced, stable, and safe to use (monoclonal antibodies, recombinant antigens, synthetic primers and probes).



Real-time PCR



ELISA/MAGPIX[®]

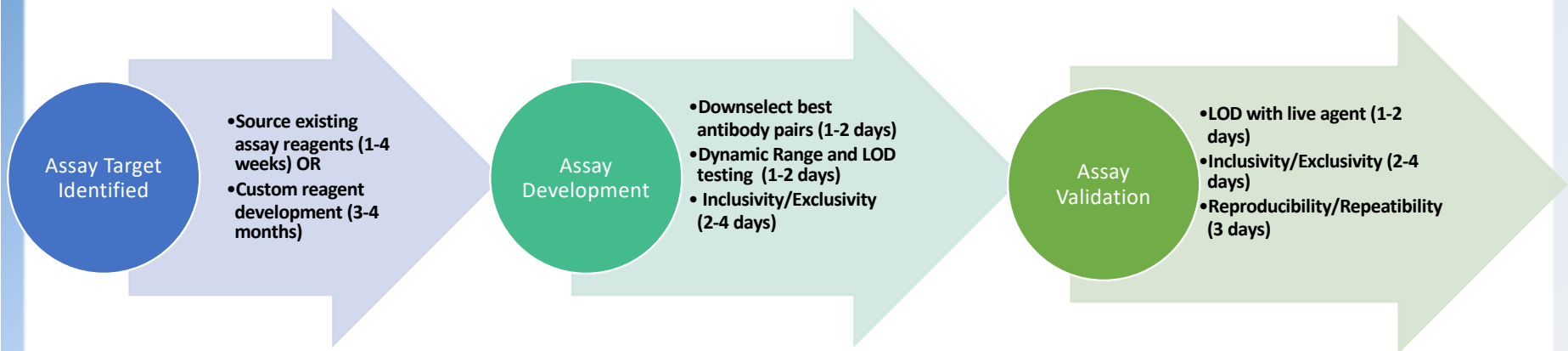
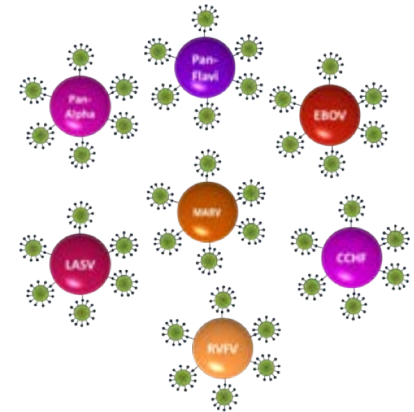


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Customizable Multiplex Panels

- Individual assays are developed, optimized, and validated
- Panels are established based on regional or syndromic needs
- All assays designed using sustainable reagents



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Joint West Africa Research Group (JWARG)

- Consortium to build surveillance capability
 - MHRP, NMRC, NAMRU-3, and USAMRIID
 - Nigeria, Ghana, and Liberia
- Integrated approach
 - MAGPIX Multiplex immunoassays
 - Real-time RT-PCR
- Acute febrile illness study

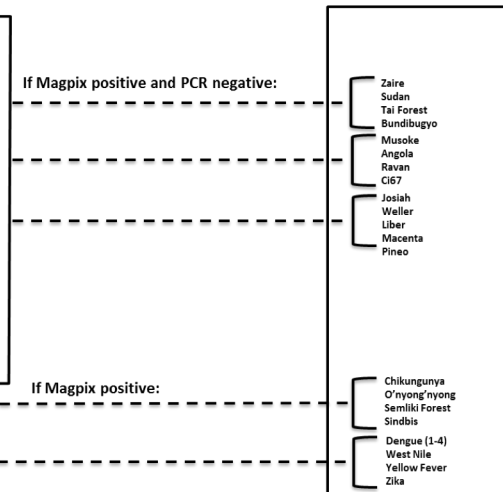
Tier 1: West African Panel

Magpix and PCR T1 assays to be run on all Day 0 samples

Magpix	PCR
• EBOV GP and VP40	• EBOV (pan)
• MARV GP and VP40	• MARV (pan)
• LASV GP and NP	• LASV (pan)
• CCHF NP	• CCHF (pan)
• RVFV NP	• RVFV (pan)
• pan-alpha E	
• pan-flavi E	

Tier 2: Species/Strain specific PCR

Given results of T1 assays, proceed to T2 assays for confirmation



Tier 3: Virus Isolation, IgM/IgG detection, Sequencing at USAMRIID



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Have MAGPIX. Will Travel.

Lagos, Nigeria



Accra, Ghana



Nigeria Serosurveillance

Target	% Positive
RVFV	43%
Alphavirus	43%
Flavivirus	72%
MARV	2%
EBOV	9%
LASV	30%
CCHFV	62%



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aceso
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Disclaimers

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Disclaimer

Opinions, interpretations, conclusions, and recommendations are those of the author and are not necessarily endorsed by the U.S. Army.

Human Use

Research on human subjects was conducted in compliance with DoD, federal, and state statutes and regulations relating to the protection of human subjects, and adheres to principles identified in the Belmont Report (1979). All data and human subjects research were gathered and conducted for this publication under IRB approved protocols, number HP-09-32 and FY12-15 NHR.



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