

Severe Typhoid Fever Surveillance in Africa (SETA) Program: An Overview

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Epidemiology Unit

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Other Invasive Salmonellosis
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International
Vaccine
Institute

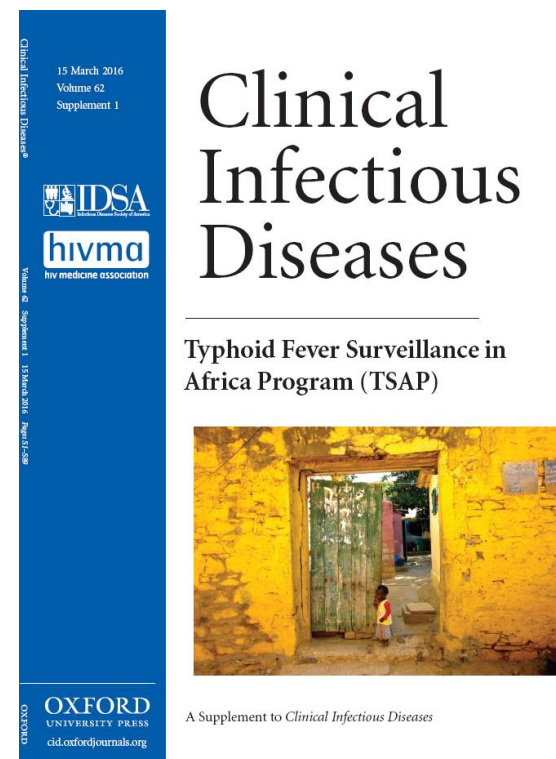
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Incidence of invasive salmonella disease in sub-Saharan Africa: a multicentre population-based surveillance study

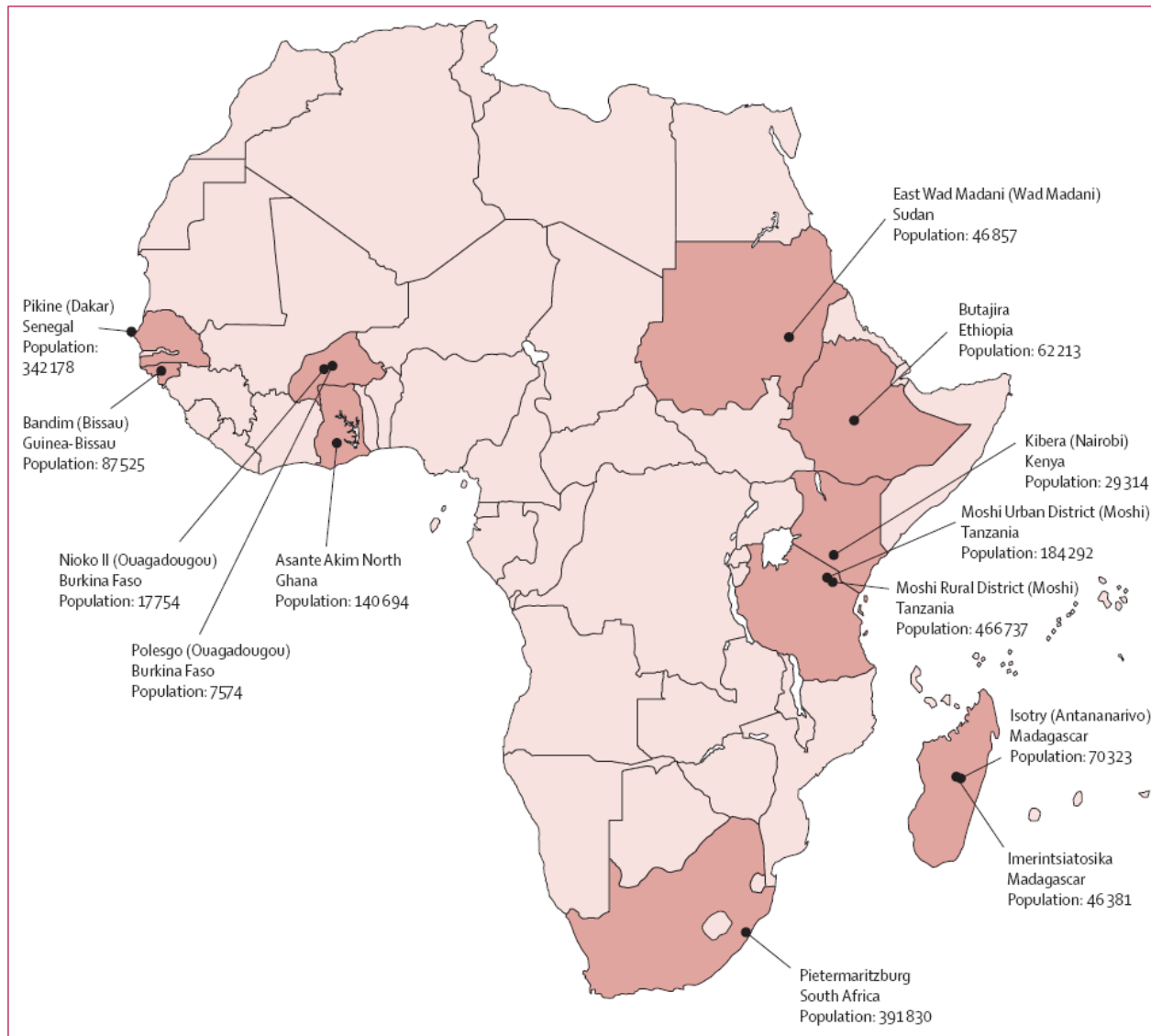
Florian Marks, Vera von Kalkreuth, Peter Aaby, Yaw Adu-Sarkodie, Muna Ahmed El Tayeb, Mohammad Ali, Abraham Aseffa, Stephen Baker, Holly M Biggs, Morten Bjerregaard-Andersen, Robert F Breiman, James I Campbell, Leonard Cosmas, John A Crump, Ligia Maria Cruz Espinoza, Jessica Fung Deerin, Denise Myriam Dekker, Barry S Fields, Nagla Gasmelseed, Julian T Hertz, Nguyen Van Minh Hoang, Justin Im, Anna Jaeger, Hyon Jin Jeon, Leon Parfait Kabore, Karen H Keddy, Frank Konings, Ralf Krumkamp, Benedikt Ley, Sandra Valborg Løfberg, Jürgen May, Christian G Meyer, Eric D Mintz, Joel M Montgomery, Aissatou Ahmet Niang, Chelsea Nichols, Beatrice Olack, Gi Deok Pak, Ursula Panzner, Jin Kyung Park, Se Eun Park, Henintsoa Rabezanaahary, Raphaël Rakotozandrindrainy, Tiana Mirana Raminosoa, Tsiriniaina Jean Luco Razafindrabe, Emmanuel Sampo, Heidi Schütt-Gerowitt, Amy Gassama Sow, Nimako Sarpong, Hye Jin Seo, Arvinda Sooka, Abdramane Bassiahi Soura, Adama Tall, Mekonnen Teferi, Kamala Thriemer, Michelle R Warren, Biruk Yeshitela, John D Clemens, Thomas F Wierzba

March 2017



March 2016

Typhoid Fever Surveillance in Africa Program (TSAP): 2010-2014



What is known about Severe Typhoid Fever?



RESEARCH ARTICLE

Open Access

Risk factors for the development of severe typhoid fever in Vietnam

Christopher M Parry^{1,2*}, Corinne Thompson^{1,3}, Ha Vinh⁴, Nguyen Tran Chinh⁴, Le Thi Phuong⁵, Vo Anh Ho⁵, Tran Tinh Hien^{1,4}, John Wain^{1,6}, Jeremy J Farrar^{1,3} and Stephen Baker^{1,3,7}

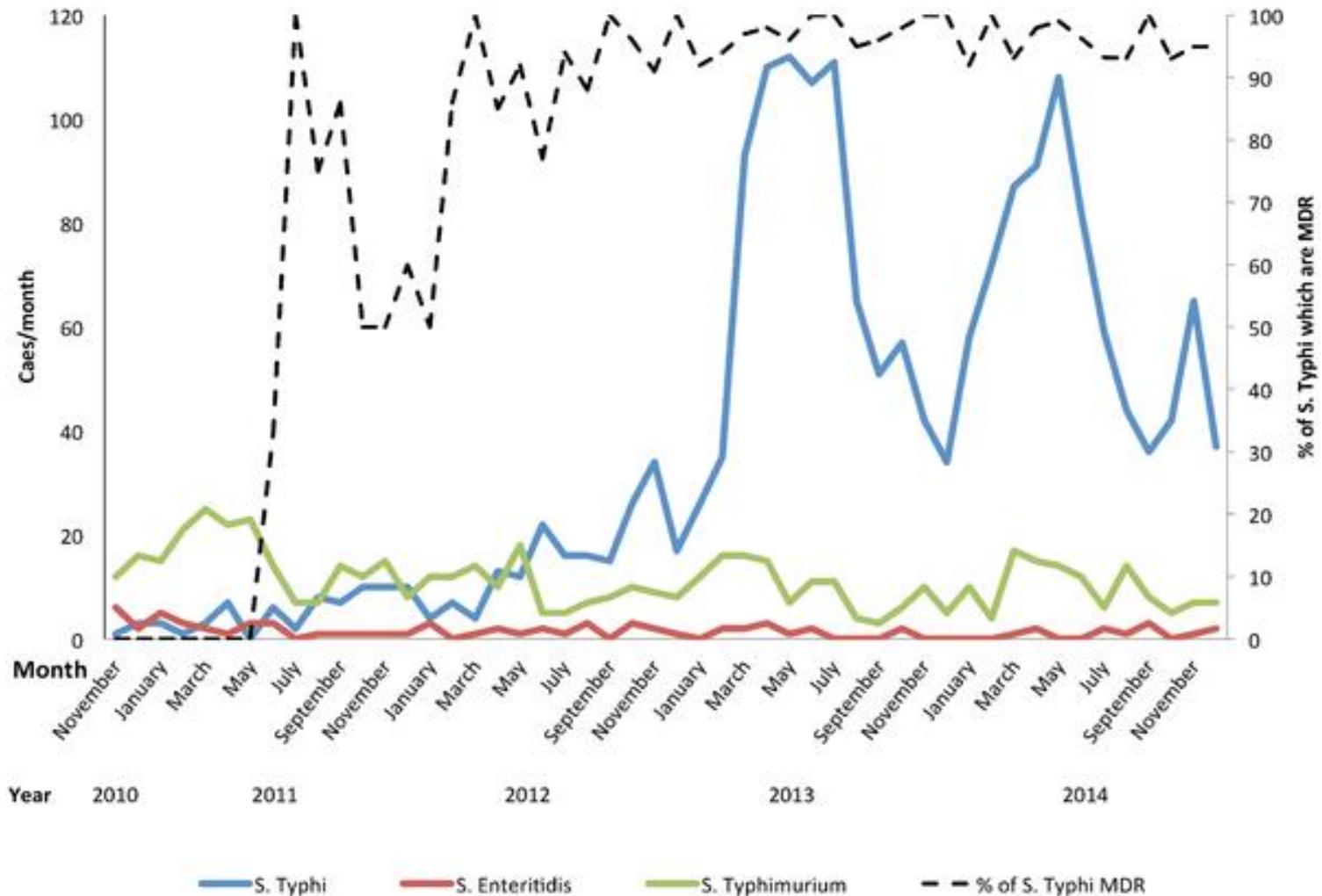
Severe disease in 15.5% 90/581 of TF patients

Risk factors associated with severe typhoid infections:

- Infection with an organism with intermediate resistance to ciprofloxacin [AOR 1.90; 95% CI 1.18-3.07; $p = 0.009$]
- Male sex [AOR 1.04; (95% CI 1.00-2.57; $p = 0.048$)] (?)
- Adults (?)
- Children (?)
- Multi-drug resistance phenotype (?)

Ciprofloxacin intermediate phenotype and IncH1 MDR plasmid associated with **H58 haplotype**

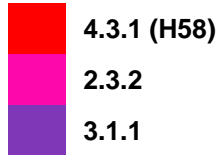
Fig 1. Monthly trends in bloodstream invasive Salmonella diagnosed at QECH from November 2010-October 2014.



Feasey NA, Gaskell K, Wong V, Msefula C, Selemani G, et al. (2015) Rapid Emergence of Multidrug Resistant, H58-Lineage Salmonella Typhi in Blantyre, Malawi. PLOS Neglected Tropical Diseases 9(4): e0003748. doi:10.1371/journal.pntd.0003748
<http://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0003748>

Emergence of H85 S. Typhi haplotype in Africa

Genotype (Inner Circle)



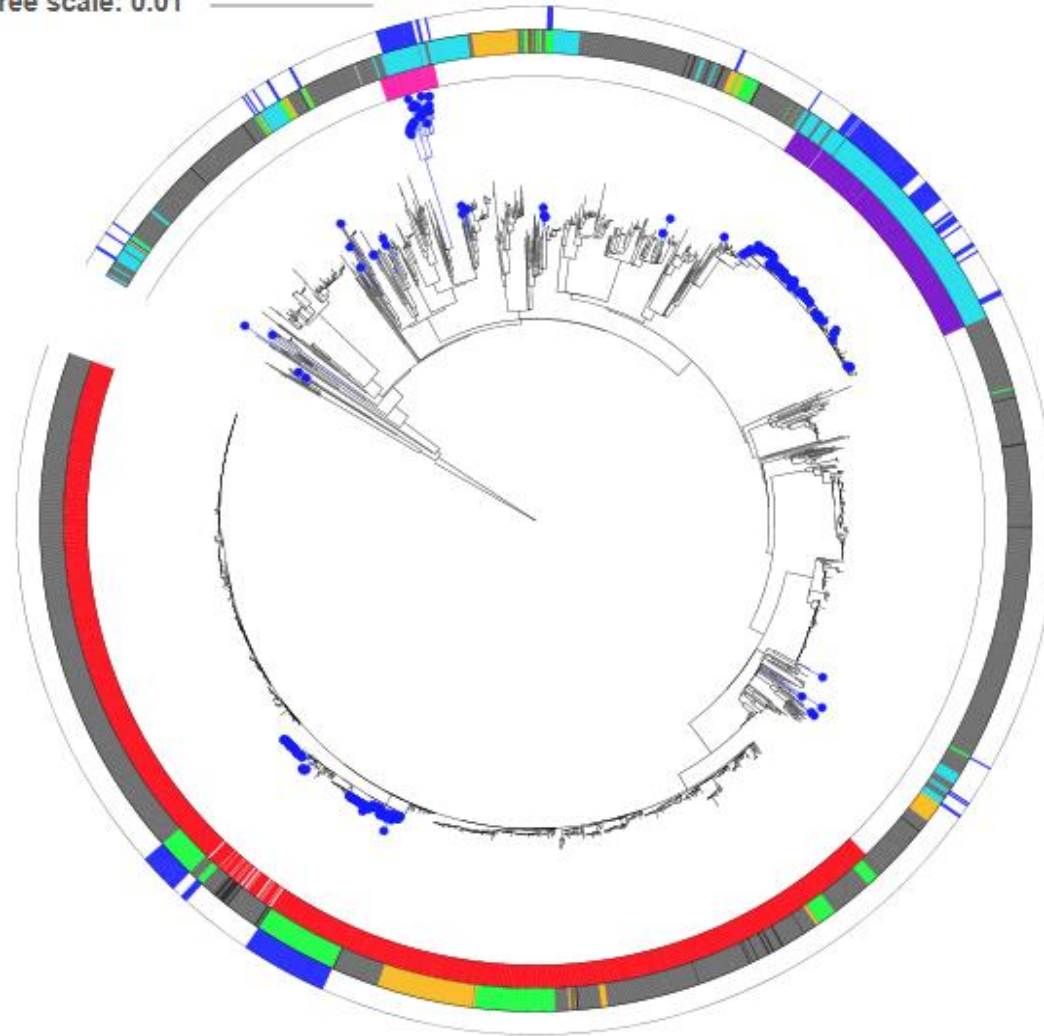
Region (Middle Circle)



Study Sites (Outer Circle)



Tree scale: 0.01



H58 haplotype found in TSAP isolates from Kenya and Tanzania

Other TSAP isolates clustered under genotype subclades 2.3.2 and 3.1.1. (includes Ghana, Burkina Faso and other Western African isolates)

in collaboration with



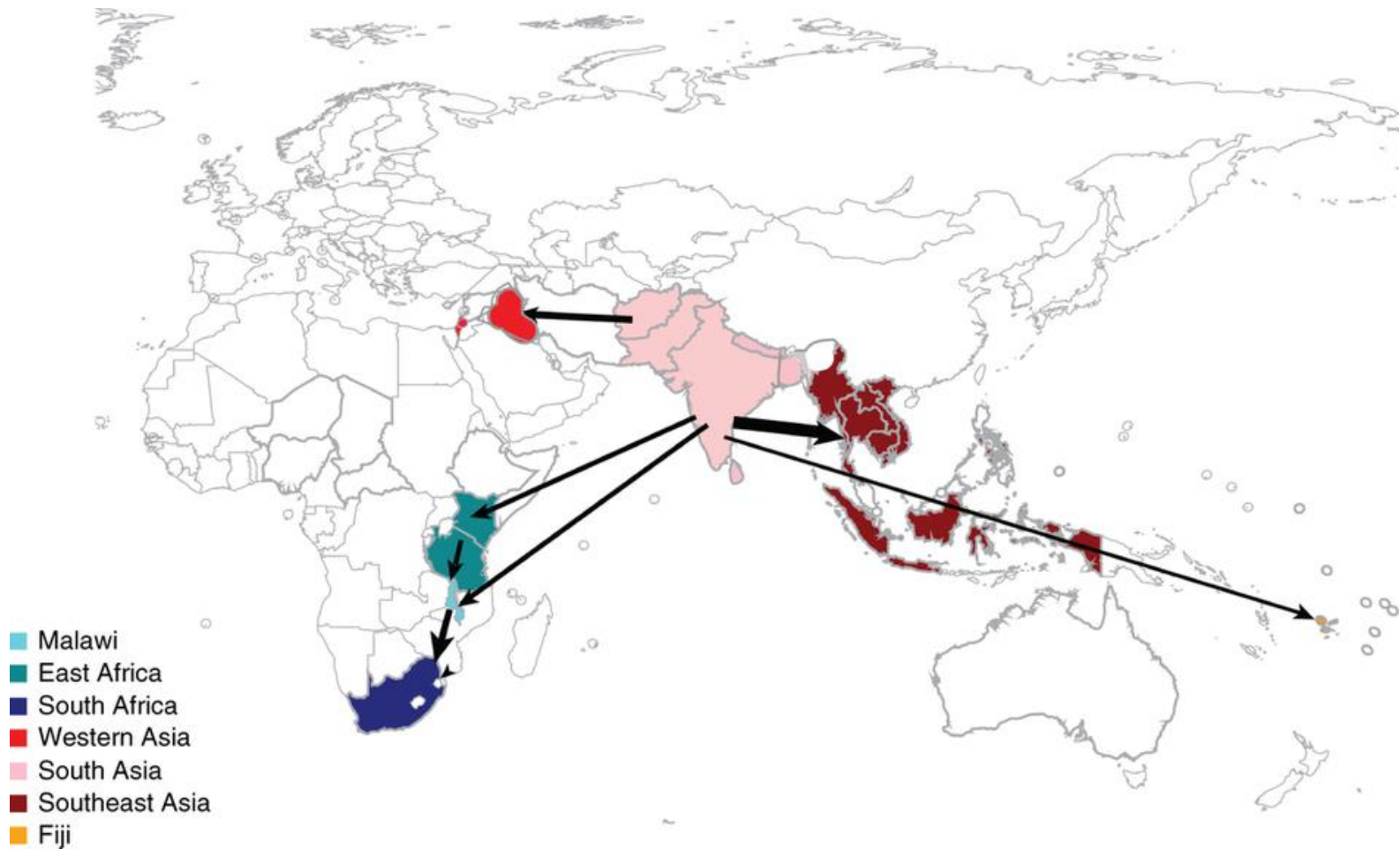
- Stephen Baker
- Duy Pham Thanh
- Christine Boinett
- James Campbell



- Gordon Dougan
- Vanessa Wong
- David Aanensen
- Silvia Argimon

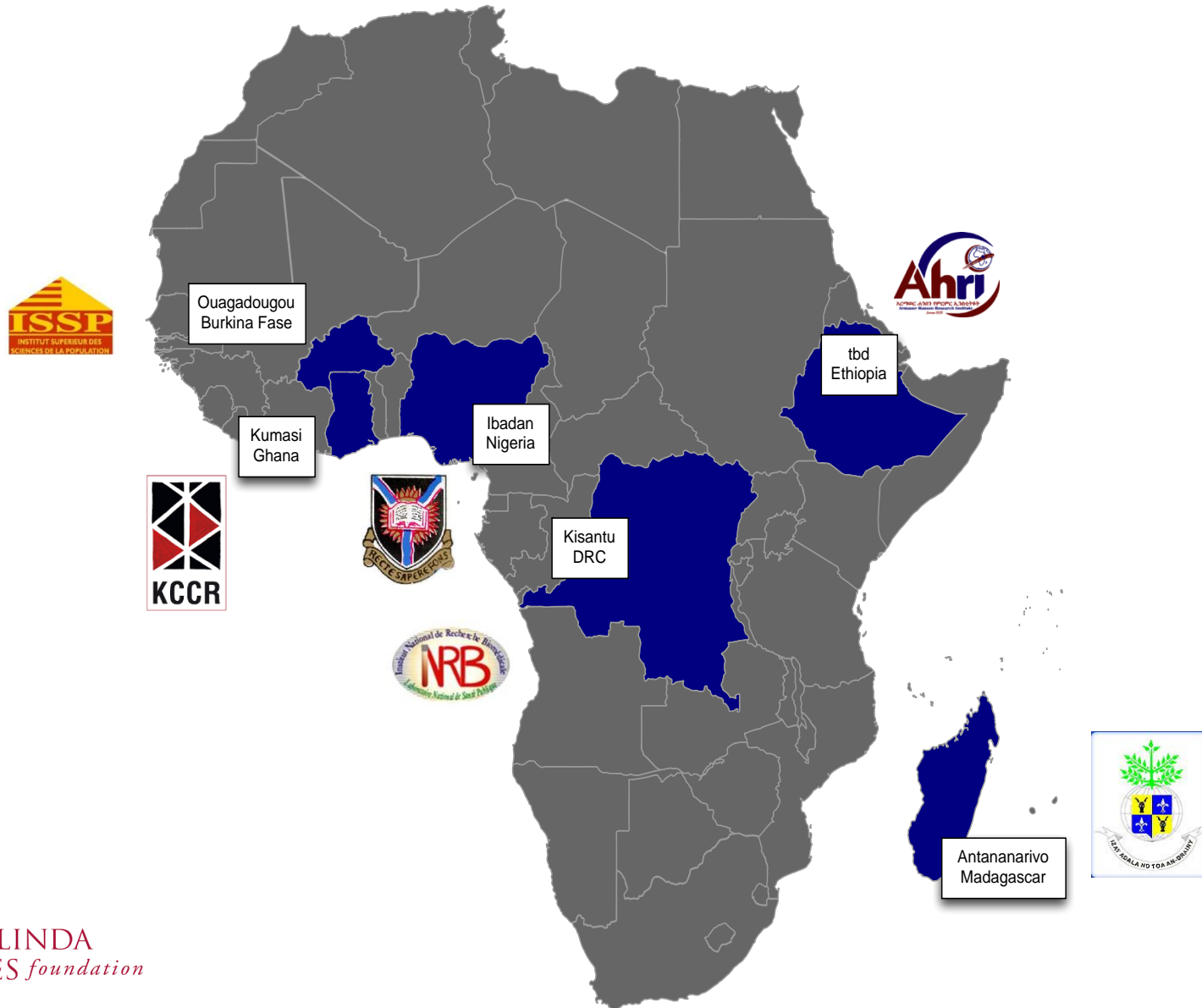


Geographical transfer within H58 lineage


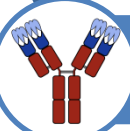






Wong V, et al. Nature Genetics 2015

Severe Typhoid Fever in Africa (SETA) Program: 2016-2018



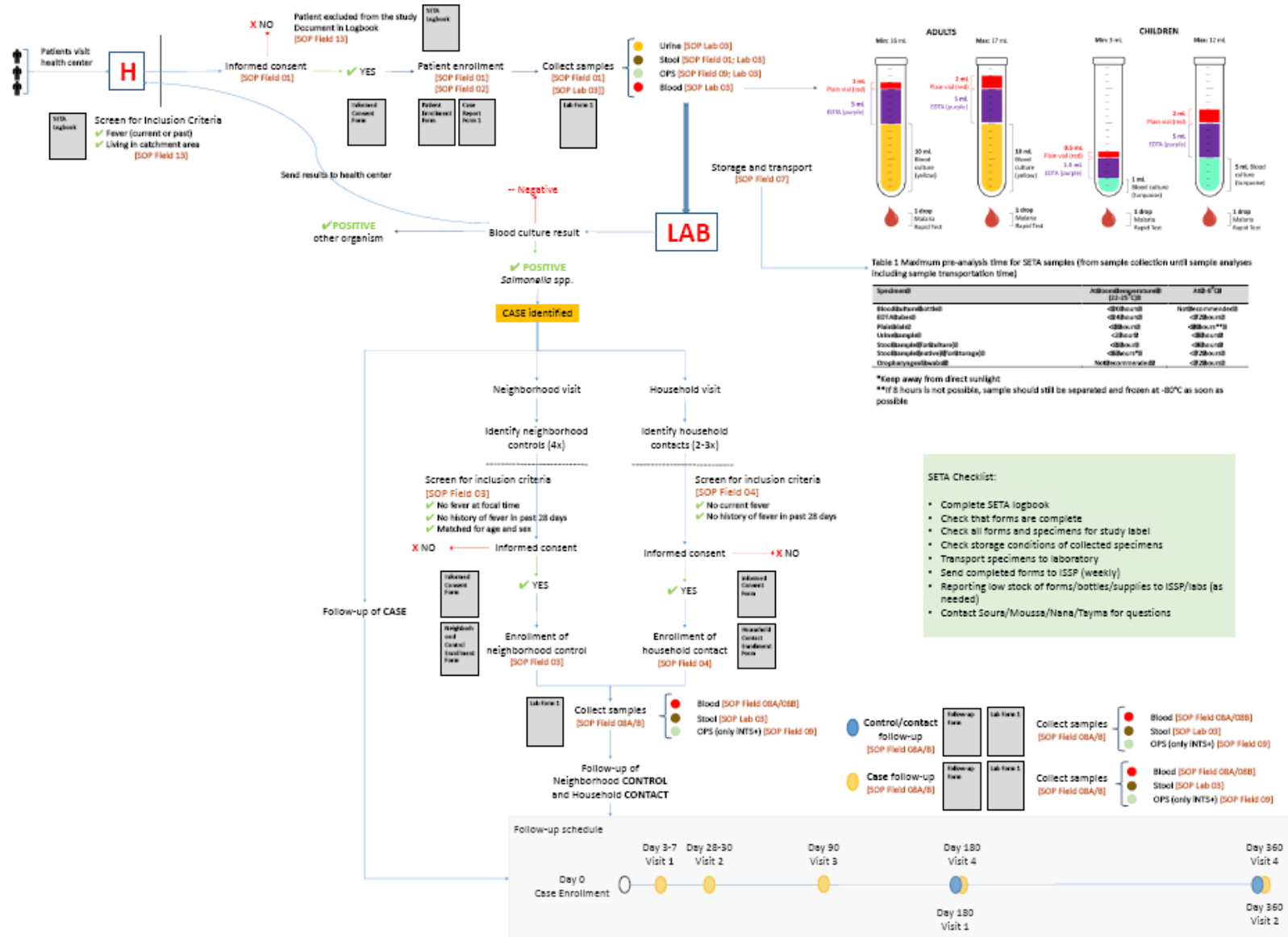
SETA Objectives

-  To estimate the burden and severity of invasive *Salmonella* infections including characterization of antimicrobial resistance profiles
-  To assess the immune response to natural TF, PF and iNTS infection over a 1-year follow-up period
-  To estimate the prevalence of *S. Typhi*, *S. Paratyphi* and NTS carriers among immediate household members of positive *Salmonella* cases
-  To estimate public and private expenditures for treatment and productivity loss associated with illness due to TF, PF and iNTS infections
-  To estimate the effects of invasive salmonellosis on the quality of life of patients and the subsequent disease-related family and societal burdens over a 1-year follow-up period
-  To validate a new rt-PCR assay for the diagnosis of invasive *Salmonella* infections in selected SETA sites



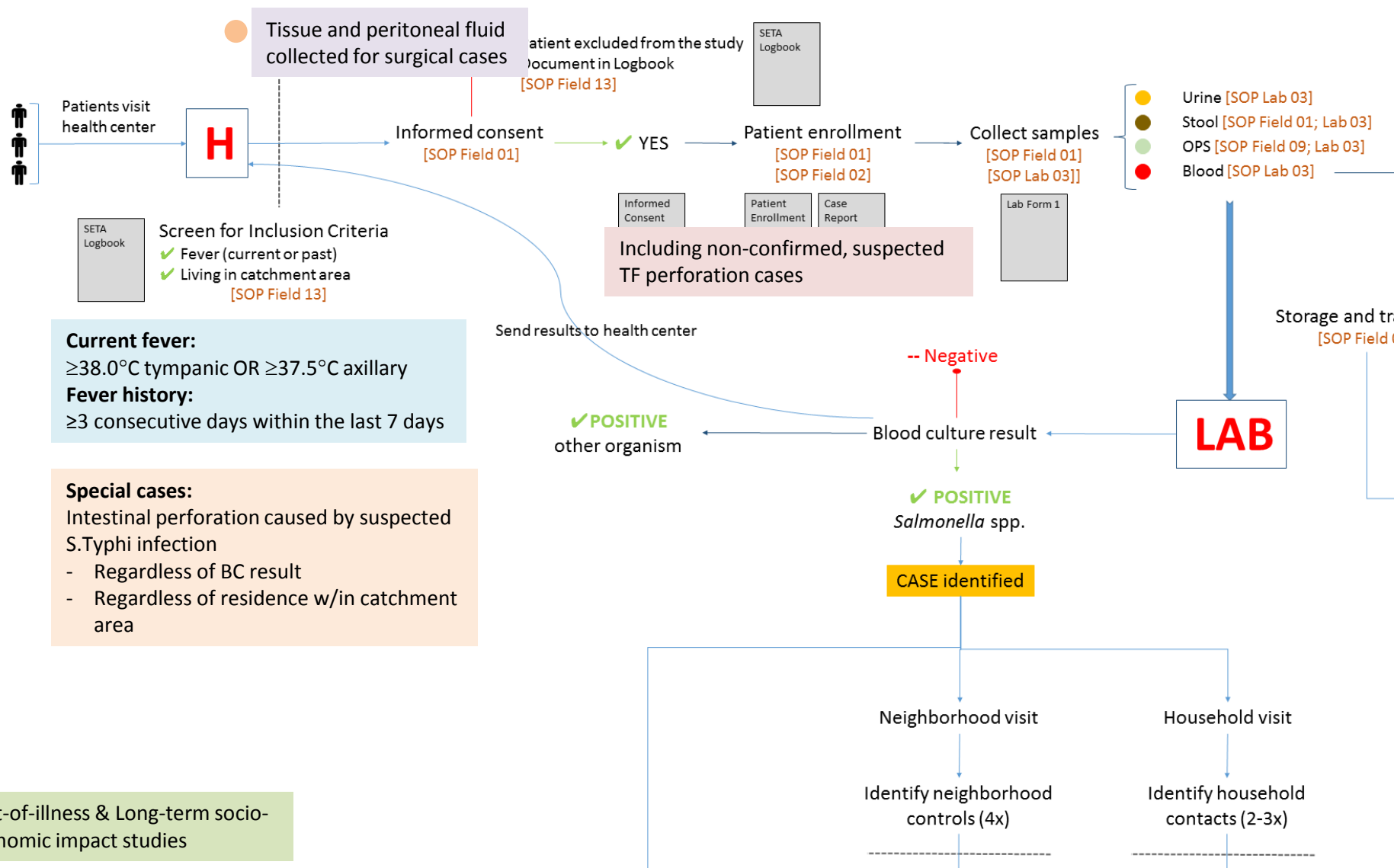
SETA Implementation Overview

Severe Typhoid in Africa (SETA): CSPS Polesgo

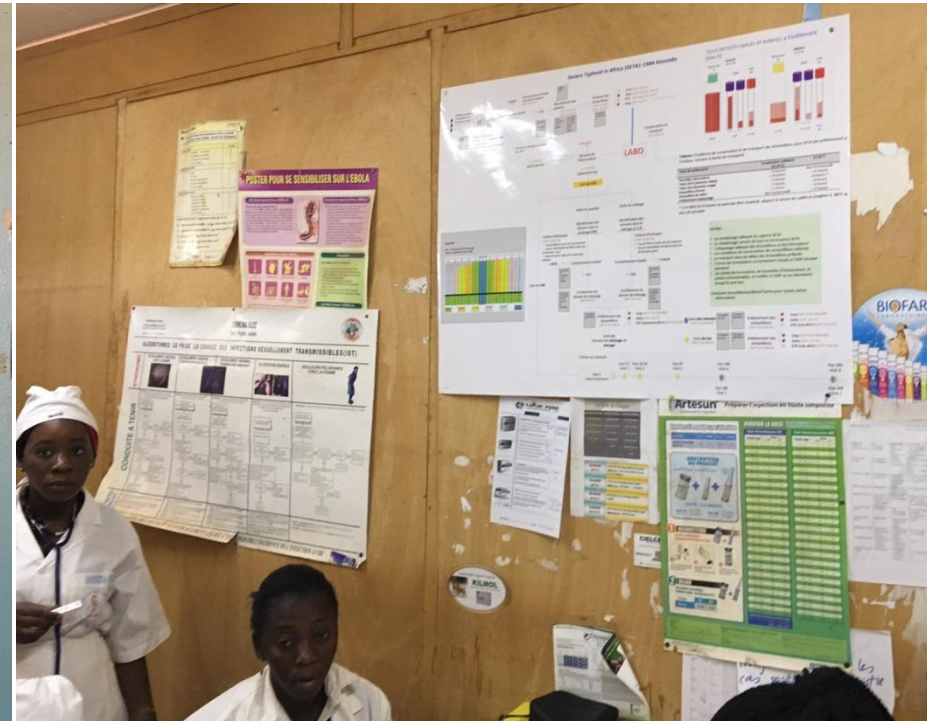
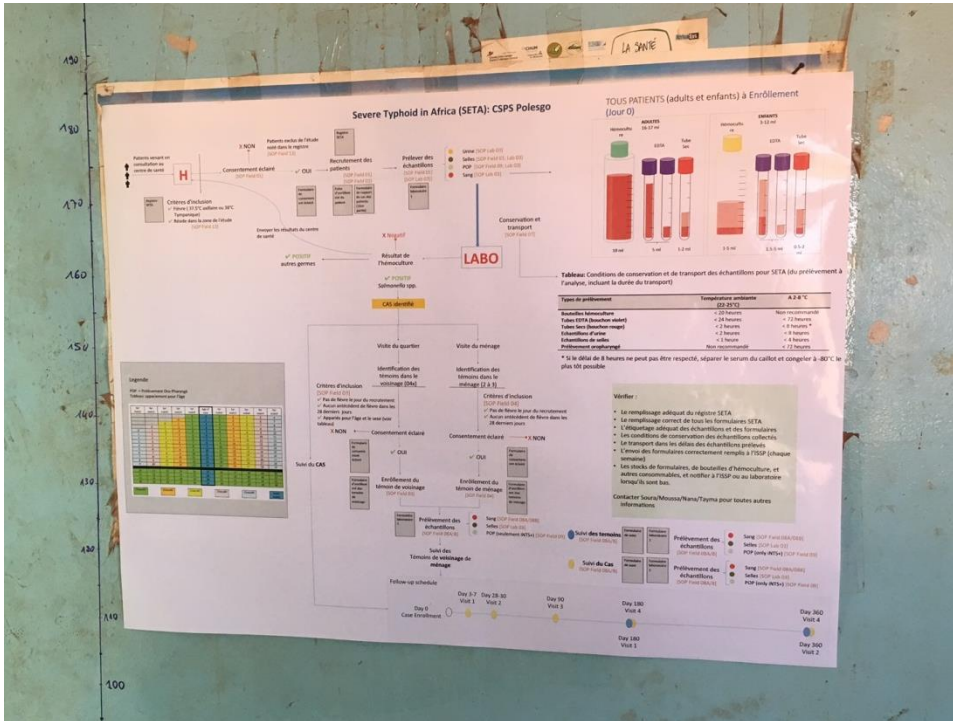


SETA Implementation Overview

Severe Typhoid in Africa (SETA): CSPS Protocol



Cost-of-illness & Long-term socio-economic impact studies



Health Care Utilization Survey (HCUS)



Health Care Utilization Survey (HCUS)




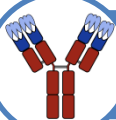




Health Care Utilization Survey (HCUS)



HCUS: Madagascar



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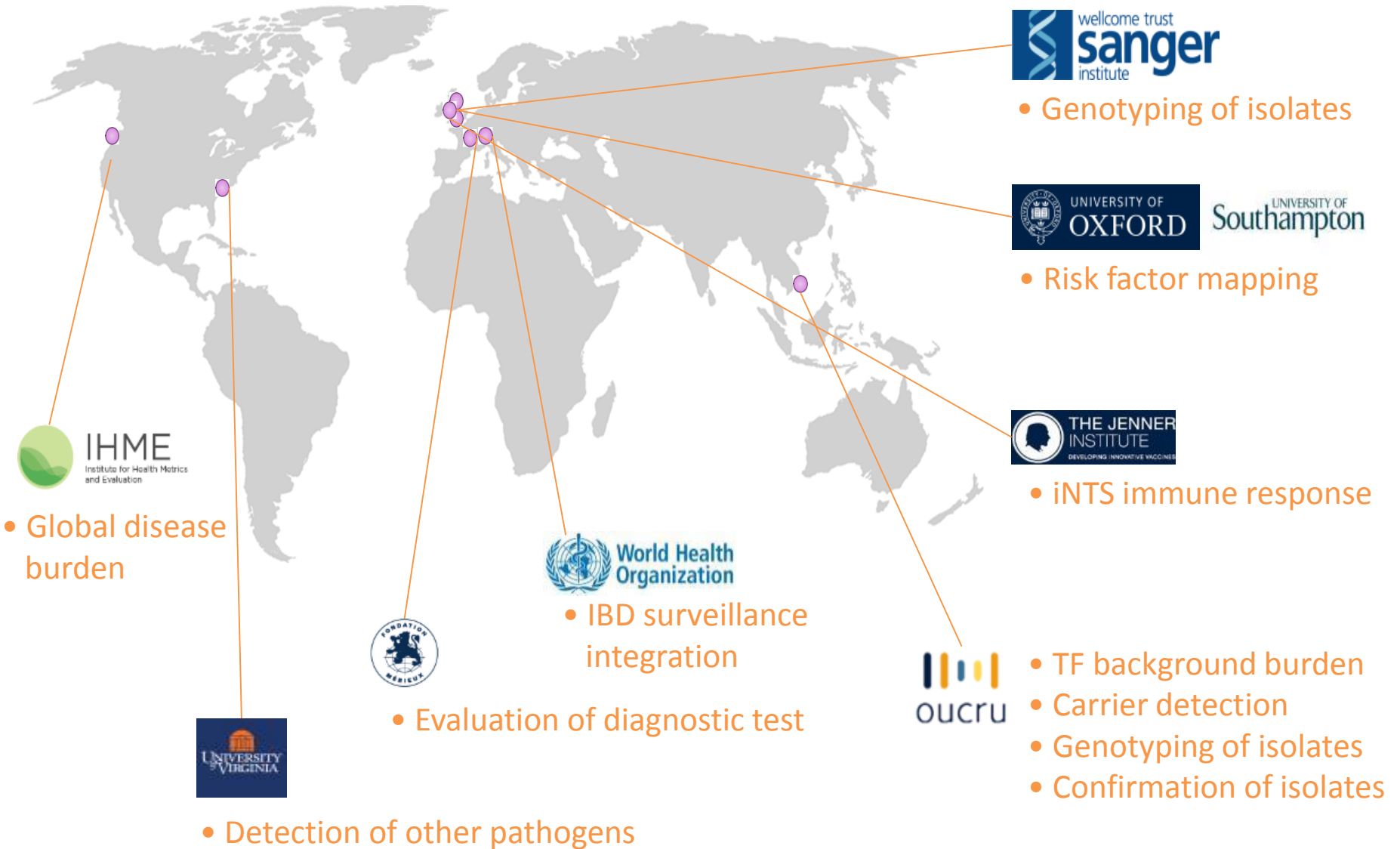




To develop and validate a *S. Typhi* risk and disease burden prediction model for sub-Saharan Africa

-> Presentation by Dr. Jong-Hoon Kim

SETA collaborative network



Acknowledgements

IVI project team

- EPI - Ligia Cruz Espinoza
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- EPI - Ji Hyun Han
- PER - Vittal Mogasale
- PER - Enusa Ramani
- BDM - Gi Deok Pak
- BDM - Hyeongwon Seo
- LAB - Ayan Dey
- LAB - Julien Park
- PMU - Sooyoung Kwon

Country collaborators

- Yaw Adu-Sarkodie (Ghana)
- Abraham Aseffa (Ethiopia)
- Mekonnen Terferi (Ethiopia)
- Raphael Rakotozaindrainy (Madagascar)
- Ellis Owusu-Dabo (Ghana)
- Octavie Lunguya (DR Congo)
- Nimako Sarpong (Ghana)
- Abdramane Soura (Burkina Faso)
- Mekonnen Teferi (Ethiopia)
- Jennifer Verani (Kenya)
- Iruka Okeke (Nigeria)

SAPORT committee/SAP



Other



• Calman Maclennan



• Valentina Picot
• Hubert Endtz



• Andy Tatem



• John D. Clemens



• Stephen Baker
• James Campbell



• Simon Hay



• Jan Jacobs
• Ann-Sophie Heroes



• Heidi Schütt-Gerowitt



• Gordon Dougan
• Vanessa Wong
• David Aanensen
• Silvia Argimon

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