Analyzing Lessons from TIBA-Rapid Impact projects (Work in progress)

1. Introduction

TIBA funded eleven research projects in nine countries (Botswana, Ghana, Kenya, Rwanda, South Africa, Sudan, Tanzania, Uganda and Zimbabwe). The projects covered nine diseases /conditions (i.e. Schistosomiasis, Malaria, Chikungunya virus, Measles, Trypanosomiasis, Lymphatic Filariasis, Auto-immunity and allergies).

This document presents initial analysis of the eleven RI projects. Further analysis will be conducted together with the teams to confirm and prioritise key lessons for each country. Relevant literature will be reviewed to position some of the lessons in the wider literature. Where relevant, selected lessons will be developed into scientific publications.

The lesson will be analysed targeting the following users:

TIBA program	Learning from the role played by the overall TIBA program in managing the projects; how to interpret and manage the African context
Individual Countries	These are lessons related to the study findings and resulting policy recommendations
Africa	As a continent and its developing context
Research	Lessons related to the methodologies, diseases, partnerships, dissemination and funding
Funders	These are lessons related to funding approaches, what to fund, budgeting, funding decisions, reporting, etc.

2. Preliminary lessons learned

2.1 By diseases

Disease	Country	Focus
Schistosomiasis	*Botswana*	Situational analysis
	South Africa	MDA

Lessons on Lymphatic Filariasis research:

- After a disease is considered officially terminated, its control should be part of a comprehensive health plan for its total elimination (For example the schistosome program in Botswana was terminated more than two decades ago but no strategies were left in place to continue educating and =-09876543 .
- Health care providers can perceive disease risks differently from the traditional authorities and the rest of the public. For example in Botswana, Health care providers did not perceive bilharzia as a serious health problem in their communities while the rest of the community including the traditional authority perceived otherwise.
- What happens after a national disease control program ends? And what should be done? In Botswana, health care givers stopped educating communities about Bilharzia while infections continued.
- Local knowledge is important in controlling Bilharzia in Botswana

- The most effective channels for communicating health messages in Botswana are radio and the clinic. Majority never took part in demonstration talks, workshops, seminars and billboards.

Malaria	*Ghana*	Effects of ACT
	Kenya	Towards a Vaccine
		Impact of e-health in managing severe cases
	Sudan	Prepare of elimination
Measles	*Rwanda*	Epidemiology
Lymphatic Filariasis	*Tanzania*	Monitoring in persistent hotspot transmission zones

Lessons on Lymphatic Filariasis research:

1. Persistent LF hotspots is a problem to LF elimination programs in Africa and different MDA approaches are needed to address them (including increasing drug pressure).
2. The 5 rounds of MDA recommended by the WHO to control transmission of FL may not work in some cases, and alternative approaches are needed.
3. In Tanzania, the recommended5 MDA rounds did not work in some areas and twice-year MDA show reduction on LF infections
4. The study showed that Community Drug Distributors (CDDs) also transfer health knowledge to communities, and the role can be extended beyond LF elimination programs.
5. Supervising and monitoring CDDs in MDA programs is very crucial but still a big challenge in Africa. Capacity building and innovative strategies are needed. Bringing ICT into the picture is necessary.

Chikungunya virus	**Kenya**	Characterizing endemicity and burden of disease
	Lessons on Schistosomiasis research:	
Human Trypanosomiasis	**Uganda**	One Health approach to control diseases
	Lessons on Human Trypanosomiasis research:	
Autoimmune diseases and allergies,	**Zimbabwe**	

Lessons on Autoimmune diseases and allergies:

(Genetic factors influence the clinical profiles which in turn dictate therapeutic approaches)

1. Africa lacks the diagnostic capacity to diagnose auto-immunity and allergies specific to African populations.
2. Diagnostic criteria currently used globally are inappropriate for diagnostics in Zimbabwe and in the rest of Africa

General lessons from the eleven studies:

1. Health research in Africa can make use of patient records kept in clinics and hospitals *(Analyze the Zimbabwe experience and share the experience).*
2. Transmissions continue after National NTD control programs have ended (means Africa needs to come up with proper exit strategies such putting in place mechanisms for continual public awareness, diseases monitoring and treatment. I.e. Control of the diseases should be part of community health plans). *[TIBA has the experience of working with such programs (e.g. LF control program in Tanzania), and of analyzing situation after it was closed (E.g. the Bilharzia control program in Botswana)]*
3. Compile TIBA's experience in choosing whom to involve in the dissemination of research findings [Countries show different choices it will be informative to know the reasons behind their choices].
4. Effective sensitization and mobilization of communities is needed prior to data collection and MDA. [Different approaches were used in different countries. A number of lessons can be learnt from comparing the approaches, successes and the challenges].
5. TIBA's experienced in Africa health research governance *[e.g. comparing ethical approvals, recruiting patients, getting different permits (including to import study materials), data sharing, staff time allocation etc.] For example in Tanzania activities were considered as routine LF control program activities so no ethical review was needed, but permission from MRCC was required to publish.*
6. Ensuring research quality in Africa: Challenges and experiences in maintaining study patient samples where follow-up visits are involved *[in Zimbabwe the location of the recruitment site and the catchment area made it difficult for patients to attend 'research' follow up recalls[.*

2.2 At Program level

Table #1: Overview of themes and general lessons for the TIBA program

LESSON AREA /THEME	POSSIBLE QUESTIONS AND ISSUES	THE LESSONS /GENERATING THEM
Managing a RI projects as a research fund	Selecting themes, manage the call, selection process, etc. Slow starts (e.g. Botswana); what happened and what can be learned?	
Working with and within different contexts	**Multi-countries:** Botswana, Ghana, Kenya, Rwanda, South Africa, Sudan, Tanzania, Uganda, Zimbabwe **Many institutions:** WACCB Centres, universities, national medical research institutes, national diseases control programs, **Multiple-diseases:** Malaria, Measles, Human Trypanosomiasis, Schistosomiasis, Autoimmune diseases and allergies,	"NTDs are re-emerging and that it was important to profile these conditions to determine the extent of prevalence; as this would further inform the policy on NTDs".
Grounding the projects	• How to select entry points, build relationships, trust and creating ownership • What partnerships worked well? (university and Ministries of health? Project teams and community leaders? Etc. • Synchronizing timelines with local calendars e.g. with school calendars if you want to work with children and youths; farming calendars etc.	Start with existing partnership (people you know). E.g. Researchers should create networks in Africa before projects come; Project Teams should include African scientists who can navigate systems in Africa
Communication	• How best to communicate in a multi-site (country), multi project (teams), multi-disease project? • Does simple reporting work? Both for program and funder purposes? How to arrive at a good template? • Some country team members were far apart but kept the team spirit and worked well together (e.g. Botswana); how did they do it? Regular meetings through skype, calls etc.?	TIBA vs Funder; TIBA vs country Teams; Within country Teams; Across Teams in different countries; Teams and country level partners, police makers, communities, health systems.
Access to patients	• How to reach out hospital facility owners – both public and private (Ghana worked with GHS and CHSAG) and create a win-win situation	1. Empower communities to recruit study individuals (Ghana example) 2. Challenges of keeping patients to the end of the study (Ghana had serious challenges with drop-outs)

		3. The concept of disease hot-spots: Interpretations and their roles in health research and health service delivery (Ghana, Tanzania, Botswana)
Implementation challenges	• Timeframe issues: Delays where study materials have to be imported (The team in Kilifi were not able to obtain the reagents for the last assay of objective two on time due to delays in receiving ordered materials). They use tax exemptions, and getting exemptions may take time.	"Structural" problems researchers face while undertaking research in Africa (Which vary within country and cannot necessarily be solved by having grants. Interpreting 'indirect benefits' from health research (any lessons, challenges or guidance/framework emerging from the 11 studies?)
Capacity building programs	Training postgraduate, Training lab technicians, Training health care givers on how to communicate with researchers during the study Training staff for data collection	1. Some capacity building is necessary even before the study starts (e.g. communities, lab technicians, health care givers, etc.) hence should be planned and budgeted for; 2. Twin impacts of funding health research in Africa: Informing policy and building local capacities (Ghana has good examples on diagnosis capacity building, raising awareness of participating nurses, doctors and communities)
Dissemination of results	How best to do that; what was the general experience? Compare different approaches used by different country teams; What continues beyond the program?	1. Disseminating research findings through open forums and public engagements: Approaches and benefits 2. Sharing preliminary findings (data) locally at country level before publication: Any risks to the overall multi country program?
Influencing policy	**Geo-level:** Country, Continental, Global **Diseases:** Malaria, Schistosomiasis, Human Trypanosomiasis, Measles, Autoimmune diseases & allergies, **Research**: Managing a multi-country program, engaging with the field, capacity building, building partnerships, governance, dissemination etc. **Funders:**	
Budgeting	• What funders must budget (pay) for in health research projects in Africa cover? Postdoctoral, postgraduate students, administrative cost (what did it entail?); • Flexibility is required: For example, there are delays and costs of importing study materials (e.g. lab reagents)	• How **budget ceilings** influence health research designs; Lessons from eleven rapid impact projects implemented in Africa (All countries budgeted 100k, I wonder how that determined the sample size, kind of tests to do, some tests were not done, etc. it would be good to know) • Analysing **local contributions** in implementing donor-funded health research projects in Africa: A case of eleven RI projects (Local TIBA partners contributed salaries, hospital space, staff time, etc. these can be calculated) • **Funding beyond the health research project**: Addressing sustainability concerns in a health research project
Publications	Involving non academics	

2.3 By projects (countries)

This section shows examples of how country projects will be analysed.

Country # 1:	BOTSWANA
Applicant institution	University of Botswana
Disease	Schistosomiasis
Title	A Situational Analysis of Schistosomiasis among communities in the Okavango Delta
Problem	Since the National Schistosomiasis Control Program was terminated in 1993, Botswana needed a systematic situational analysis based on reliable data on the prevalence of the diseases especially among different social groups.
Outputs /Outcomes	• Development of schistosomiasis surveillance system • Development of capacity of health care professionals **in** diagnosis, treatment and prevention of Schistosomiasis • Have health professionals trained in new diagnostic techniques, treatment and prevention of the disease • Determine the prevalence, intensity and incidence of Schistosomiasis in the Okavango Delta and advise the Ministry of Health and Wellness on the prevention and treatment of the disease. • Influence policy on neglected tropical diseases and ensure that data generated from this study is incorporated in the Ministry's ehealth data managementsystemstoallowforeffectivemonitoringandevaluationofschistosomiasis.
Methodology	• Conducted in three communities (Navrongo, Kintampo and Ho) • Quantitative and qualitative methods • Collected data were collected through socio-economic surveys, key informant interviews, school survey and parasitology data from primary school learners. • Snail scooping • GIS mapping • Administers health care interview guide to collect data among health care providers (doctors, laboratory technicians, pharmacists/pharmacy technicians, nurses and midwives; district health management officials) • Administered key informants interview guide to Chiefs, traditional leaders, traditional healers, community leaders, religious leaders, School Heads, village development committee chairpersons and their secretaries and village health committee chairpersons and thei*r* secretaries. • Used school Survey tool to assess knowledge level of Schistosomiasis among school going children 7-13 years who had assented and had consent form signed by their parent/legal guardian.
Capacity building /Training	• Trained 20 community research assistants in research methods – data collection, GIS for household listing and snail scooping. • Co-investigator trained in snail scooping in SA and ARTIC Sequencing workshop in Ghana. • 3 Post graduates trained in research methods • 3 Filed Technicians trained in snail scooping
Dissemination	• Community awareness and feedback workshop. • Stakeholder dissemination meeting • Policy makers meeting
Lessons	• After a disease is considered officially terminated, its control should be part of a comprehensive health plan for its total elimination (For example the schistosome program in Botswana was terminated more than two decades ago but no strategies were left in place to continue educating and =-09876543 . • Health care providers can perceive disease risks differently from the traditional authorities and the rest of the public. For example in Botswana, Health care

	providers did not perceive bilharzia as a serious health problem in their communities while the rest of the community including the traditional authority perceived otherwise. • What happens after a national disease control program ends? And what should be done? In Botswana, health care givers stopped educating communities about Bilharzia while infections continued. • Local knowledge is important in controlling Bilharzia in Botswana • The most effective channels for communicating health messages in Botswana are radio and the clinic. Majority never took part in demonstration talks, workshops, seminars and billboards.

Country # 2:	**GHANA**
Applicant institution	West African Centre for Cell Biology of Infectious Pathogens (WACCBIP) University of Ghana
Disease	Malaria
Title	The effects of artemisinin-based combination threapy (ACT) on the Dynamics of *plasmodium falciparum p.malariae* and *p.ovale* infections in Ghana
Problem	Less common species could emerge as a major threat in sub-Sharan Africa on the back of the overwhelming focus of chemotherapy on *P. falciparum* and neglect of the other species. **The project sought to address a gap in knowledge on the dynamics of *P. malariae* and *P. ovale* during the treatment of *P. falciparum* malaria.**
Outputs /Outcomes	• Inform policy on the antimalarial drug regimens (i.e. informed on the impact of the ACT treatment policy on the different Plasmodium species); • Provide the platform for species surveillance whenever there is a change in treatment policy. • Build capacity at the community level for detecting the less common Plasmodium species. • Shared the findings with the Ghana Health Service; • Technical paper to guide decisions on malaria treatment policies. • Publications for the global community to benefit.
Methodology	• Conducted in three communities (Navrongo, Kintampo and Ho) • Collected samples (recruited at hospital and from the community). • Lab work (microscopy, serological and nested PCR). • Followed Participants for two weeks to determine clearance rates after treatment.
Capacity building /Training	• Trained lad technicians – to identify the different *Plasmodium* species by microscopy • Master's student – Molecular Cell Biology of Infectious Diseases • Nurses, Physicians assistants and medical doctors – effective communication between care givers and researchers on the project.
Dissemination	• Study findings were shared in: WACCBIP research conference; Several medical review meetings organized by the project Team; radio programs; Public engagement meetings (open forum); WACCBIP-departmental weekly seminars; Crick African Network Meeting; Malaria conference
Lessons	• **Community engagement**, i.e. how to get volunteers for the study. Ghana achieved this through: educating the opinion leaders in the communities on the importance of doing the research; conducting community durbars and youth engagement session (in schools); and using major health service agencies in the country i.e. GHS and CHSAG. These engagements turned to be awareness raising and public education sessions • **Clarifying the role of laboratory scientists** to make them feel part of health research and delivery processes. • **How to effectively engage with other stakeholders** in the health sector especially those involved with making and implementing health policies

	• Any lessons on how they got permission to collect samples? (by the hospital administration and patent consents, etc.?) • Dissemination of study findings – WACCBIP research conference; Several medical review meetings organized by the project Team; radio programs; Public engagement meetings (open forum); WACCBIP-departmental weekly seminars; Crick African Network Meeting; Malaria conference

Country # 3:	**KENYA**
Applicant institution	KEMRI-Wellcome Trust Research Programme
Disease	Malaria
Title	Validation of novel merozoite targets for new vaccines against *Plasmodium falciparum* malaria
Problem	Validating novel *Plasmodium falciparum* (*P. falciparum)* merozoite antigens as potential new candidates for the malaria vaccine development pipeline and to enhance the capacity of trainees to bridge the gap between antigen discovery and validation of potential vaccine targets using animal models. The overall objective was to characterize antigen specific antibody responses to two novel proteins namely PF3D7_0206200 and PF3D7_1401600.
Outputs /Outcomes	• Validated novel *Plasmodium falciparum* (*P. falciparum)* merozoite antigens as potential new candidates for the malaria vaccine development pipeline; • Enhanced capacity of trainees to bridge the gap between antigen discovery and validation of potential vaccine targets using animal models. • Characterized antigen specific antibody responses to two novel proteins namely PF3D7_0206200 and PF3D7_1401600. • Generated antigen-specific antibodies to test using multiple platforms that include localization through immunofluorescence assays, Western blots and ELISAs. • Demonstration of antibody functional activity in vitro using established assays such as the growth inhibitory assay (GIA), opsonic-phagocytosis assay (OPA), antibody dependent respiratory burst (ADRB) and antibody dependent complement recruitment. • Utilization of high-density peptide microarrays to identify conserved and linear epitopes within these proteins that are the targets of protective antibodies
Methodology	• Generated antigen-specific antibodies from commercial sources (specific aim 1) • Carried out functional assays to establish their mechanisms of action against malaria parasites in vitro; • Conducted multiple experiments (specific aim 2) and found that their antigen-specific antibodies were not active in GIA assays, in ADRB assays using soluble antigens and antigens fixed on ELISA plates; • Designed and received custom high-density peptide microarrays (specific aim 3) to better define the epitopes that antibodies against these parasite antigens target.
Capacity building /Training	• Trained students to carry out the assays required from the project, i.e. on parasite culture, antibody assays including immunofluorescence assays. • Three Masters
Dissemination	• Presentation at the American Society for Tropical Medicine and Hygiene
Lessons	**Getting lab reagents is a challenge and importing them delays activities:** According to Kilifi team, "There are "structural" problems facing researcher while undertaking research in Africa, that vary within country and cannot necessarily be solved by having grants. For example: The inability to import laboratory research reagents/consumables into Kenya in a timely fashion and the down-time experienced when waiting for service engineers to come from Europe to service equipment e.g. the microarrayer or the flow cytometer.

	At the KEMRI-Wellcome Programme, the institution has a specific policy on importation of research reagents which relies on tax-exemptions that have to be approved but government. In this reporting period that approval has not been obtained for over six months at the time of writing of this report meaning that lab-based projects are practically grinding to a standstill and our researchers cannot be internationally competitive without tools with which to work. The second issue is the complicated "work-permit" approval system in Kenya also means that service engineers have a lengthy online application system has caused significant delays.

3. Way Forward

1. Finalize the analysis
2. Discussion with country teams to agree on key lessons
3. Expand the selected lessons including literature review
4. At TIBA program level: Agree on how to write the lessons (i.e. publications and/or TIBA program lessons learned report)
5. Writing