APPENDIX

1. Examples of field notes which led to tensions to follow up historically
2. Map fo KEMRI in Kisumu and collaborators
3. Malaria Research references KEMRI CDC 1980s
4. Malaria Research references KEMRI CDC 1990s
5. Poster presented at a conference in Kilifi, Kenya 2009
6. Further themes of interest I decided to follow
7. Information sheet
8. Consent form
9. Photo Release form
10. Table of people interviewed
11. Interview Guide
12. Description of data storage and management
13. Time table of data collection and analysis
14. Summary of malaria research conducted at KEMRI KSM in 1980s
15. Footnotes from chapter 8
16. Next footnotes from chapter 8

1. EXAMPLES OF FIELD NOTES WHICH LED TO TENSIONS TO FOLLOW UP HISTORICALLY

Background to a growing interest in collaborations

This comes from reflectsion I noted down in some of the early stages of reading through the archive documents. While looking at an agreement document between the Kenya Medical Research Institutes and the Japan International Collaborating Agency, I was interested in the language used and how this may affect the working relationships. In these documents the Japanese scientists are known as 'experts' while the Kenyan scientists were known as 'counterparts'. There was also interesting discussion regarding the issue of the meaning of scientific training. The Kenyans were requesting that training goes into MPhils or PhDs, while the Japanese said they could not afford long term training, then the Kenyans suggested financing students to go to institutions in Kenyan. The outcome of this discussion wasn't quite clear. I started to think about the process of capacity building when it is 'workshops' and 'training' following the idea of the 'experts' and the 'counterparts' rather than approaches where it is intellectual capacity building.

In line with this it is interesting to think about why Kenya was collaborating with Japan, was it because Japanese scientists were considered 'experts' or because the situation offered money and opportunities for Kenyan scientists. On the other side was Japan collaborating because it wanted to improve the health of Kenyans, or to protect the health of Japanese, or access to data, or a combination?

Another example came from reading letters from the British Council to Kenyan Scientists. I For example support was given in the way of books in the 1980s, it wasn't clear whether the books were being given or whether they were displaying what was for sale. When I thought about it I could not imagine this situation in reverse (where Kenya was announcing publication of books to Britain) and I thought that this was perhaps a way of enforcing the power structures between the two countries and given they were often text books would influence the outcome of research.

The changing epistemologies and technologies of medical research in Kenya with relation to the ethics of research

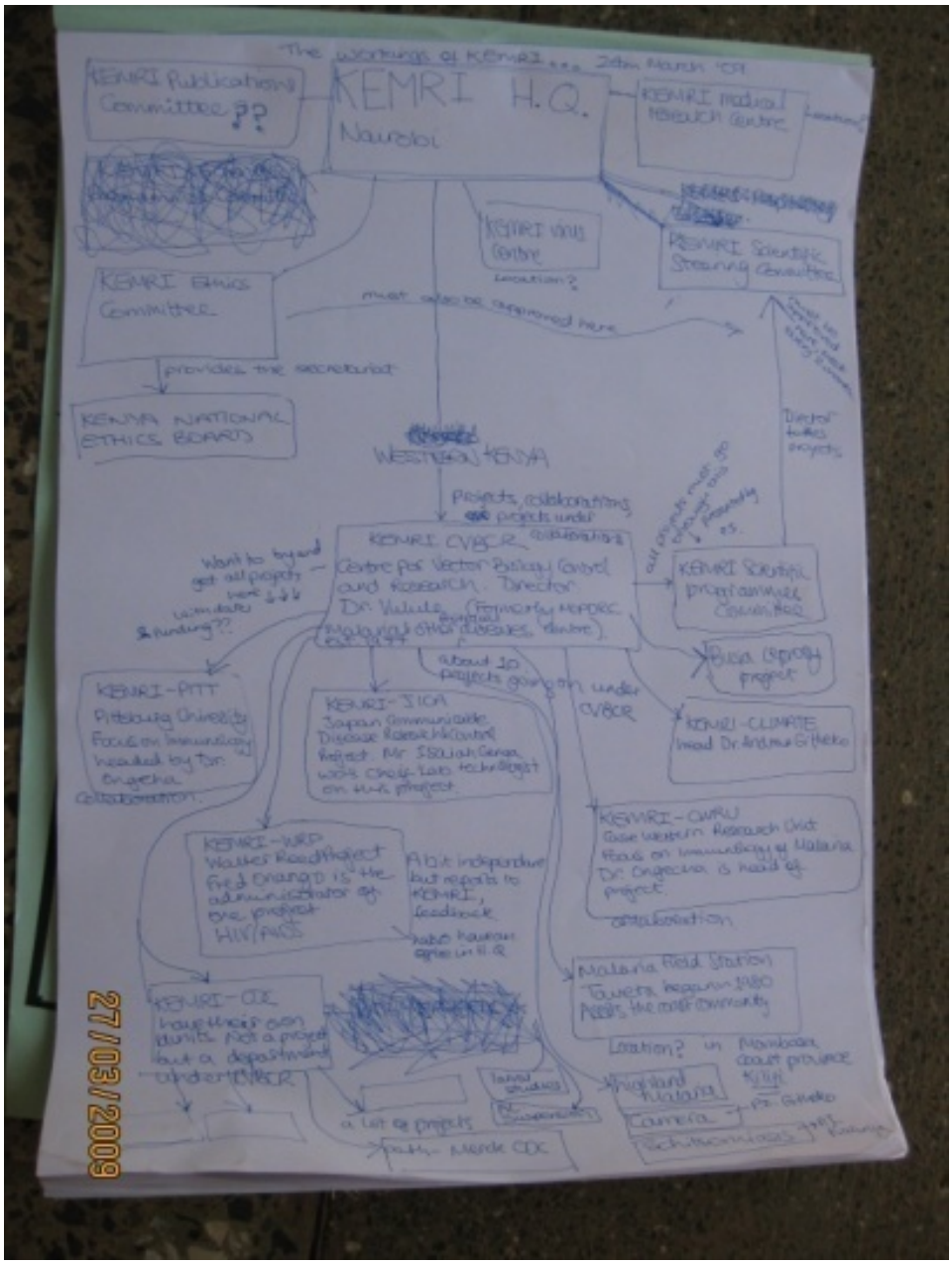
International research brings large amounts of money to research, which often means an increase in technological capacity, resulting in 'ethics of new and emerging technologies' becoming suddenly applicable at sites of extreme poverty. Through being at the research institute I felt that technologies also highlighted the imbalances in power or lack of national research for example when samples arising from trials have to be shipped to other countries for analysis. This raises ethical issues of ownership and care of human materials, but also the more pressing ethical issue of why it is that these technologies do not exist in Kenya, given it is a site of global health research. I became interested in approaches to exchanges of materials/samples between countries. This came up in archive documents and discussions. The changing nature of technology or specifically computers in medical research collaborations is an interesting line of enquiry to follow. Also how people thought about and discussed ethics pre and post the internet.

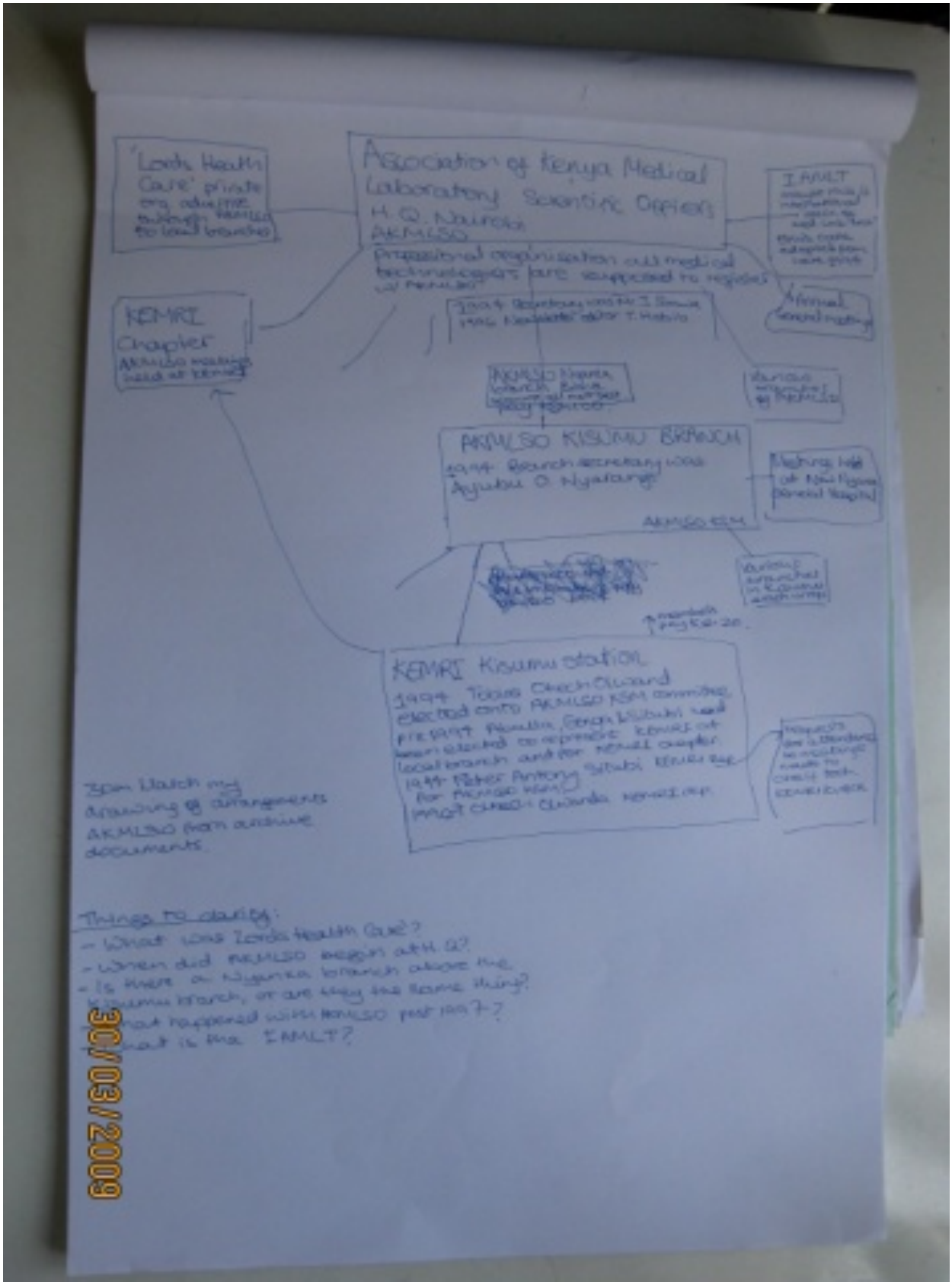
With the ethics committee discussions at KEMRI HQ some people on the board would be external to KEMRI, so at this stage the science would be looked at again. I discussed this with an administrator for ten years and she said that about 20% of the time or less would be discussions over scientific validity. An example she gave of these discussions would be how much blood was being drawn. Scientific calculations would be made to determine an ethically safe amount.

The administrator talked about the use of computers in her work as an administrator at KEMRI for example she was able to set notifications up on her computer so she could make sure that each research project was contacted after a year and also she had began using computers to order each protocol ever submitted to KEMRI into a database. This is an example of the way that computers would have had an effect on the way that protocols are dealt with which will have changed as the technology has changed. This was a reminder of the importance of thinking about medical research in the context with broader changes in technology and the co-constitutive outcomes of this.

2. MAP OF KEMRI IN KISUMU AND COLLABORATORS

Drawn by me, through using archive documents and through discussions with experienced staff members




Association of Kenya Medical Laboratory Scientific Officers
H.Q. Nairobi
AKMLSO
KEMRI Chapter
AKMLSO KISUMU BRANCH
KEMRI Kisumu station
Annual general meeting
30th March my meeting of arrangements AKMLSO from archive documents.
Things to clarify:
- What was Lords Health Care?
- When did AKMLSO begin at H.Q?
- Is there a Nyanza branch above the Kisumu branch, or are they the same thing?
- What happened with AKMLSO post 1997?
- What is the EAMLT?
30/03/2009

3. MALARIA RESEARCH KEMRI CDC PUBLICATIONS FROM WESTERN KENYA 1980S

Barker, R. H., Jr., A. D. Brandling-Bennett, et al. (1989). "Plasmodium falciparum: DNA probe diagnosis of malaria in Kenya." Exp Parasitol 69(3): 226-33.

Beier, M. S., I. K. Schwartz, et al. (1988). "Identification of malaria species by ELISA in sporozoite and oocyst infected Anopheles from western Kenya." Am J Trop Med Hyg 39(4): 323-7.

Brandling-Bennett, A. D., A. J. Oloo, et al. (1988). "Failure of erythromycin to improve chloroquine treatment of Plasmodium falciparum malaria in Kenya." Trans R Soc Trop Med Hyg 82(3): 363-5.

Brandling-Bennett, A. D., A. J. Oloo, et al. (1988). "Chloroquine treatment of falciparum malaria in an area of Kenya of intermediate chloroquine resistance." Trans R Soc Trop Med Hyg 82(6): 833-7.

Campbell, G. H., A. D. Brandling-Bennett, et al. (1987). "Detection of antibodies in human sera to the repeating epitope of the circumsporozoite protein of Plasmodium falciparum using the synthetic peptide (NANP)3 in an enzyme-linked immunosorbent assay (ELISA)." Am J Trop Med Hyg 37(1): 17-21.

Campbell, G. H., F. H. Collins, et al. (1987). "Age-specific prevalence of antibody to a synthetic peptide of the circumsporozoite protein of Plasmodium falciparum in children from three villages in Kenya." Am J Trop Med Hyg 37(2): 220-4.

Collins, F. H., P. C. Mehaffey, et al. (1988). "Comparison of DNA-probe and isoenzyme methods for differentiating Anopheles gambiae and Anopheles arabiensis (Diptera: Culicidae)." J Med Entomol 25(2): 116-20.

Collins, F. H., V. Petrarca, et al. (1988). "Comparison of DNA probe and cytogenetic methods for identifying field collected Anopheles gambiae complex mosquitoes." Am J Trop Med Hyg 39(6): 545-50.

Collins, W. E., H. C. Spencer, et al. (1987). "Malaria chemoprophylaxis to pregnant women provided by community health workers in Saradidi, Kenya. III. Serologic studies." Ann Trop Med Parasitol 81 Suppl 1: 90-7.

Deloron, P., G. H. Campbell, et al. (1989). "Antibodies to Plasmodium falciparum ring-infected erythrocyte surface antigen and P. falciparum and P. malariae circumsporozoite proteins: seasonal prevalence in Kenyan villages." Am J Trop Med Hyg 41(4): 395-9.

Kaseje, D. C., E. K. Sempebwa, et al. (1987). "Malaria chemoprophylaxis to pregnant women provided by community health workers in Saradidi, Kenya. I. Reasons for non-acceptance." Ann Trop Med Parasitol 81 Suppl 1: 77-82.

Kaseje, D. C., H. C. Spencer, et al. (1987). "Usage of community-based chloroquine treatment for malaria in Saradidi, Kenya." Ann Trop Med Parasitol 81 Suppl 1: 111-5.

Masaba, S. C. and H. C. Spencer (1982). "Sensitivity of Plasmodium falciparum to chloroquine in Busia District, Kenya." Trans R Soc Trop Med Hyg 76(3): 314-6.

Mburu, F. M., H. C. Spencer, et al. (1987). "Changes in sources of treatment occurring after inception of a community-based malaria control programme in Saradidi, Kenya." Ann Trop Med Parasitol 81 Suppl 1: 105-10.

McLain, D. K., F. H. Collins, et al. (1989). "Microgeographic variation in rDNA intergenic spacers of Anopheles gambiae in western Kenya." Heredity 62 (Pt 2): 257-64.

McLaughlin, G. L., J. G. Bremen, et al. (1987). "Assessment of a synthetic DNA probe for plasmodium falciparum in African blood specimens " Am J Trop Med Hyg 37(1): 27-36.

Mebrahtu, Y., R. Beach, et al. (1987). "Isozyme variation in simulium (edwardsellum) damnosum S. L. (diptera: simuldae) from Kenya " Journal of the American Mosquito Control Association 3(2): 196-201.

Nguyen-Dinh, P., H. C. Spencer, et al. (1982). "Susceptibility of Plasmodium falciparum to pyrimethamine and sulfadoxine/pyrimethamine in Kisumu, Kenya." Lancet 1(8276): 823-5.

Spencer, H. C. (1985). "Drug-resistant malaria--changing patterns mean difficult decisions." Trans R Soc Trop Med Hyg 79(6): 748-58.

Spencer, H. C., D. M. Kariuki, et al. (1983). "Chloroquine resistance in Plasmodium falciparum from Kenyan infants." Am J Trop Med Hyg 32(5): 922-5.

Spencer, H. C., D. C. Kaseje, et al. (1987). "Changing response to chloroquine of Plasmodium falciparum in Saradidi, Kenya, from 1981 to 1984." Ann Trop Med Parasitol 81 Suppl 1: 98-104.

Spencer, H. C., D. C. Kaseje, et al. (1987). "Epidemiology of chloroquine-associated pruritus in Saradidi, Kenya." Ann Trop Med Parasitol 81 Suppl 1: 124-7.

Spencer, H. C., D. C. Kaseje, et al. (1987). "Community-based malaria control in Saradidi, Kenya: description of the programme and impact on parasitaemia rates and antimalarial antibodies." Ann Trop Med Parasitol 81 Suppl 1: 13-23.

Spencer, H. C., D. C. Kaseje, et al. (1983). "The Kenyan Saradidi community malaria project: I. Response of Plasmodium falciparum isolates to chloroquine in 1981 and 1982." Trans R Soc Trop Med Hyg 77(5): 689-92.

Spencer, H. C., D. C. Kaseje, et al. (1987). "Impact on mortality and fertility of a community-based malaria control programme in Saradidi, Kenya." Ann Trop Med Parasitol 81 Suppl 1: 36-45.

Spencer, H. C., D. C. Kaseje, et al. (1987). "Consumption of chloroquine phosphate provided for treatment of malaria by volunteer village health workers in Saradidi, Kenya." Ann Trop Med Parasitol 81 Suppl 1: 116-23.

Spencer, H. C., D. C. Kaseje, et al. (1987). "Symptoms associated with common diseases in Saradidi, Kenya." Ann Trop Med Parasitol 81 Suppl 1: 128-34.

Spencer, H. C., D. C. Kaseje, et al. (1987). "Malaria chemoprophylaxis to pregnant women provided by community health workers in Saradidi, Kenya. II. Effect on parasitaemia and haemoglobin levels." Ann Trop Med Parasitol 81 Suppl 1: 83-9.

Spencer, H. C., T. Kipingor, et al. (1983). "Plasmodium falciparum in Kisumu, Kenya: differences in sensitivity to amodiaquine and chloroquine in vitro." J Infect Dis 148(4): 732-6.

Spencer, H. C., S. C. Masaba, et al. (1983). "Field evaluation in Kenya of a 48-hour in vitro test for Plasmodium falciparum sensitivity to chloroquine." Am J Trop Med Hyg 32(5): 916-21.

Spencer, H. C., S. C. Masaba, et al. (1982). "Sensitivity of Plasmodium falciparum isolates to chloroquine in Kisumu and Malindi, Kenya." Am J Trop Med Hyg 31(5): 902-6.

Spencer, H. C., A. J. Oloo, et al. (1984). "Amodiaquine more effective than chloroquine against Plasmodium falciparum malaria on Kenya coast." Lancet 1(8383): 956-7.

Spencer, H. C., N. R. Poulter, et al. (1982). "Chloroquine-associated pruritus in a European." Br Med J (Clin Res Ed) 285(6356): 1703-4.

Spencer, H. C., W. M. Watkins, et al. (1984). "A new in vitro test for pyrimethamine/sulfadoxine susceptibility of Plasmodium falciparum and its correlation with in vivo resistance in Kenya." Bull World Health Organ 62(4): 615-21.

Steketee, R., A. D. Brandling-Bennett, et al. (1987). "In vivo response of Plasmodium falciparum to chloroquine in pregnant and non-pregnant women in Saiya District, Kenya " Bull World Health Organ 65(6): 885-890.

Watkins, W. M., A. D. Brandling-Bennett, et al. (1988). "Chlorproguanil/dapsone for the treatment of non-severe Plasmodium falciparum malaria in Kenya: a pilot study." Trans R Soc Trop Med Hyg 82(3): 398-403.

Watkins, W. M., A. D. Brandling-Bennett, et al. (1987). "Inadequacy of chlorproguanil 20 mg per week as chemoprophylaxis for falciparum malaria in Kenya." Lancet 1(8525): 125-8.

Watkins, W. M., D. G. Sixsmith, et al. (1984). "Effectiveness of amodiaquine as treatment for chloroquine-resistant Plasmodium falciparum infections in Kenya." Lancet 1(8373): 357-9.

4. MALARIA RESEARCH KEMRI CDC PUBLICATIONS FROM WESTERN KENYA 1990S

Beach, R. F., T. K. Ruebush, 2nd, et al. (1993). "Effectiveness of permethrin-impregnated bed nets and curtains for malaria control in a holoendemic area of western Kenya." Am J Trop Med Hyg **49**(3): 290-300.

Bloland, P. B., D. A. Boriga, et al. (1999). "Longitudinal cohort study of the epidemiology of malaria infections in an area of intense malaria transmission II. Descriptive epidemiology of malaria infection and disease among children." Am J Trop Med Hyg **60**(4): 641-8.

Bloland, P. B., P. N. Kazembe, et al. (1998). "Chloroquine in Africa: critical assessment and recommendations for monitoring and evaluating chloroquine therapy efficacy in sub-Saharan Africa." Trop Med Int Health **3**(7): 543-52.

Bloland, P. B., E. M. Lackritz, et al. (1993). "Beyond chloroquine: implications of drug resistance for evaluating malaria therapy efficacy and treatment policy in Africa." J Infect Dis **167**(4): 932-7.

Bloland, P. B., T. K. Ruebush, et al. (1999). "Longitudinal cohort study of the epidemiology of malaria infections in an area of intense malaria transmission I. Description of study site, general methodology, and study population." Am J Trop Med Hyg **60**(4): 635-40.

Githeko, A. K., N. I. Adungo, et al. (1996). "Some observations on the biting behavior of Anopheles gambiae s.s., Anopheles arabiensis, and Anopheles funestus and their implications for malaria control." Exp Parasitol **82**(3): 306-15.

Githeko, A. K., A. D. Brandling-Bennett, et al. (1992). "The reservoir of Plasmodium Falciparum malaria in a holoendemic area of western Kenya " Trans. Roy. Soc. Trop. Med. Hyg. **86**: 355-8.

Githeko, A. K., A. D. Brandling-Bennett, et al. (1993). "Confirmation that Plasmodium falciparum has aperiodic infectivity to Anopheles gambiae." Med Vet Entomol **7**(4): 373-6.

Hightower, A. W., M. Ombok, et al. (1998). "A geographic information system applied to a malaria field study in western Kenya." Am J Trop Med Hyg **58**(3): 266-72.

Kachur, S. P., P. A. Phillips-Howard, et al. (1999). "Maintenance and sustained use of insecticide-treated bednets and curtains three years after a controlled trial in western Kenya." Trop Med Int Health **4**(11): 728-35.

Karanja, D. M., J. Alaii, et al. (1999). "Knowledge and attitudes to malaria control and acceptability of permethrin impregnated sisal curtains." East Afr Med J **76**(1): 42-6.

Keuter, M., J. Sanders, et al. (1992). "Parasitological, clinical and haematological response of children with Plasmodium falciparum to 4-aminoquinolines and to pyrimethamine-sulfadoxine with quinine in western Kenya." Trop Geogr Med **44**(1-2): 1-8.

Keuter, M., A. van Eijk, et al. (1990). "Comparison of chloroquine, pyrimethamine and sulfadoxine, and chlorproguanil and dapsone as treatment for falciparum

malaria in pregnant and non-pregnant women, Kakamega District, Kenya." BMJ **301**(6750): 466-70.

Lackritz, E. M., A. W. Hightower, et al. (1997). "Longitudinal evaluation of severely anemic children in Kenya: the effect of transfusion on mortality and hematologic recovery." AIDS **11**(12): 1487-94.

Lehmann, T., W. A. Hawley, et al. (1999). "The Rift Valley complex as a barrier to gene flow for Anopheles gambiae in Kenya." J Hered **90**(6): 613-21.

Lobel, H. O., P. A. Phillips-Howard, et al. (1990). "Malaria incidence and prevention among European and North American travellers to Kenya." Bull World Health Organ **68**(2): 209-15.

Oloo, A., A. Githeko, et al. (1996). "Field trial of permethrin impregnated sisal curtains in malaria control in western Kenya." East Afr Med J **73**(11): 735-40.

Oloo, A. J., J. M. Vulule, et al. (1996). "Some emerging issues on the malaria problem in Kenya." East Afr Med J **73**(1): 50-3.

Parise, M. E., J. G. Ayisi, et al. (1998). "Efficacy of sulfadoxine-pyrimethamine for prevention of placental malaria in an area of Kenya with a high prevalence of malaria and human immunodeficiency virus infection." Am J Trop Med Hyg **59**(5): 813-22.

Paxton, L. A., S. C. Redd, et al. (1996). "An evaluation of clinical indicators for severe paediatric illness." Bull World Health Organ **74**(6): 613-8.

Perkins, B. A., J. R. Zucker, et al. (1997). "Evaluation of an algorithm for integrated management of childhood illness in an area of Kenya with high malaria transmission." Bull World Health Organ **75 Suppl 1**: 33-42.

Ruebush, T. K., M. K. Kern, et al. (1995). "Self-treatment of malaria in a rural area of western Kenya." Bull World Health Organ **73**(2): 229-36.

Sexton, J. D., T. K. Ruebush, 2nd, et al. (1990). "Permethrin-impregnated curtains and bed-nets prevent malaria in western Kenya." Am J Trop Med Hyg **43**(1): 11-8.

Sherwood, J. A., C. N. Oster, et al. (1991). "Safety and immunogenicity of a Plasmodium falciparum sporozoite vaccine: boosting of antibody response in a population with prior natural exposure to malaria." Trans R Soc Trop Med Hyg **85**(3): 336-40.

Shi, Y. P., U. Sayed, et al. (1996). "Natural immune response to the C-terminal 19-kilodalton domain of Plasmodium falciparum merozoite surface protein 1." Infect Immun **64**(7): 2716-23.

Shi, Y. P., V. Udhayakumar, et al. (1993). "Natural antibody responses against the non-repeat-sequence-based B-cell epitopes of the Plasmodium falciparum circumsporozoite protein." Infect Immun **61**(6): 2425-33.

Shi, Y. P., V. Udhayakumar, et al. (1999). "Differential effect and interaction of monocytes, hyperimmune sera, and immunoglobulin G on the growth of asexual stage Plasmodium falciparum parasites." Am J Trop Med Hyg **60**(1): 135-41.

Snow, R. W., B. Nahlen, et al. (1998). "Risk of severe malaria among African infants: direct evidence of clinical protection during early infancy." J Infect Dis **177**(3): 819-22.

Snow, R. W., J. A. Omumbo, et al. (1997). "Relation between severe malaria morbidity in children and level of Plasmodium falciparum transmission in Africa." Lancet **349**(9066): 1650-4.

Taylor, K. A., J. K. Koros, et al. (1990). "Plasmodium falciparum infection rates in Anopheles gambiae, An. arabiensis, and An. funestus in western Kenya." Am J Trop Med Hyg **43**(2): 124-9.

Udhayakumar, V., D. Anyona, et al. (1995). "Identification of T and B cell epitopes recognized by humans in the C-terminal 42-kDa domain of the Plasmodium falciparum merozoite surface protein (MSP)-1." J Immunol **154**(11): 6022-30.

Udhayakumar, V., J. M. Ongecha, et al. (1997). "Cytotoxic T cell reactivity and HLA-B35 binding of the variant Plasmodium falciparum circumsporozoite protein CD8+ CTL epitope in naturally exposed Kenyan adults." Eur J Immunol **27**(8): 1952-7.

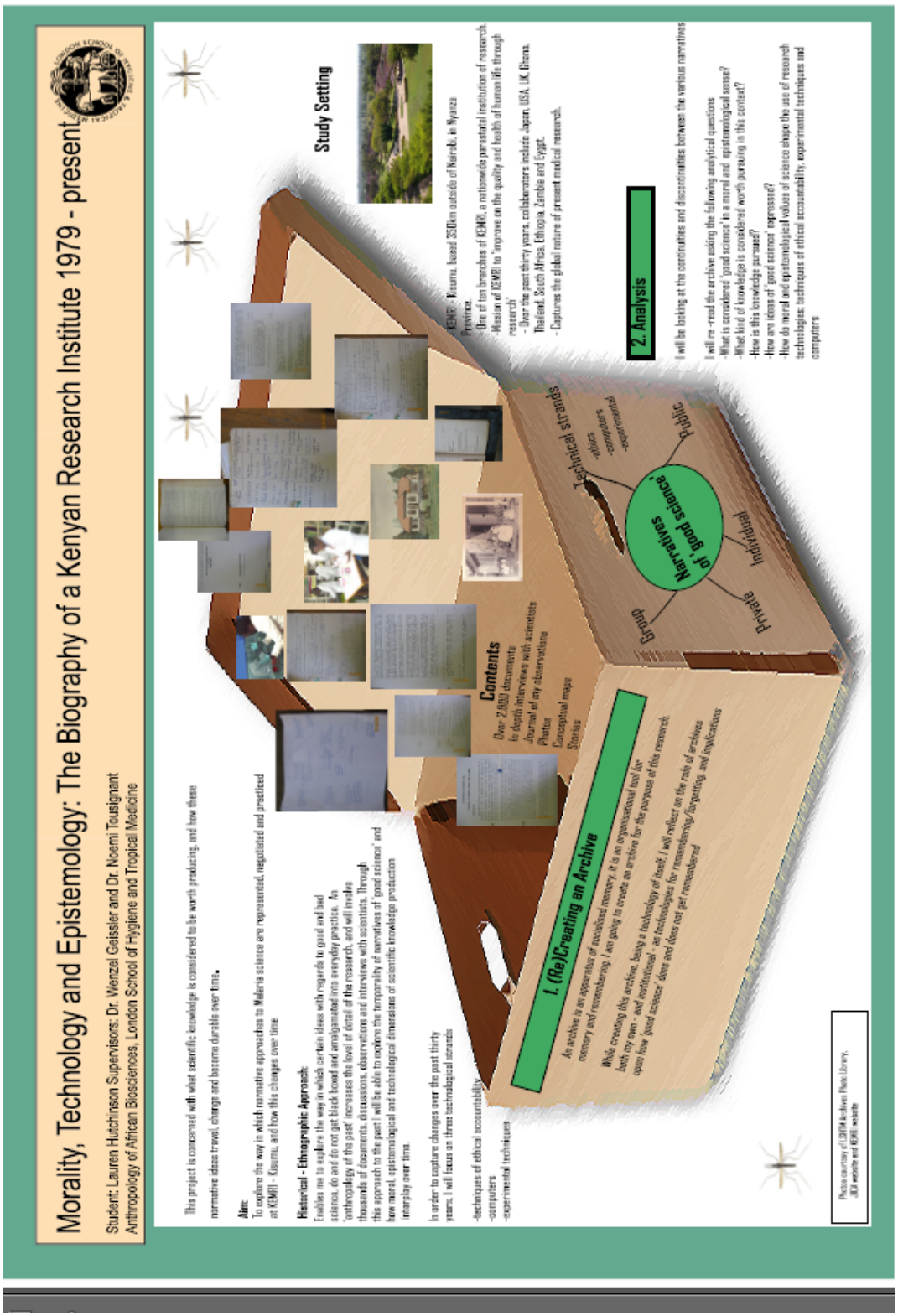
Vulule, J. M., R. F. Beach, et al. (1999). "Elevated oxidase and esterase levels associated with permethrin tolerance in Anopheles gambiae from Kenyan villages using permethrin-impregnated nets." Med Vet Entomol **13**(3): 239-44.

Vulule, J. M., R. F. Beach, et al. (1996). "Long-term use of permethrin-impregnated nets does not increase Anopheles gambiae permethrin tolerance." Med Vet Entomol **10**(1): 71-9.

Vulule, J. M., R. F. Beach, et al. (1994). "Reduced susceptibility of Anopheles gambiae to permethrin associated with the use of permethrin-impregnated bednets and curtains in Kenya." Med Vet Entomol **8**(1): 71-5.

Zucker, J. R., E. M. Lackritz, et al. (1996). "Childhood mortality during and after hospitalization in western Kenya: effect of malaria treatment regimens." Am J Trop Med Hyg **55**(6): 655-60.

5. Poster presented at a conference in Kilifi Kenya, December 2009



6. FURTHER THEMES OF INTEREST I DECIDED TO FOLLOW

Through time spend reading the documents and also just being based at the institute various themes of interest began to emerge. In line with the aim of this thesis, there were productive tracers for exploring what kind of science is produced in the international, yet geographically specific socio-cultural context of Kisumu and how this did and did not change over time.

Malariology

Following changes in approaches to the scientific study of malaria will capture epistemological changes and also epidemiological changes in the incidence and prevalence of disease in humans, and also environmental changes.

The name changed in 1983 to DVV… due to a change in the ethos of research at KEMRI, where it was decided that the focus was to be on scientific expertise rather than disease specifics.

Malaria was the main mandate of MOPDRC since it was set up in 1979, as the centre was originally named Malaria and Other Protozoal Diseases Research Centre. I began to realist that using the narrative malaria and how this changed over time made visible many changes in approaches to tackling disease. By paying attention to malaria I realised I would be able to capture the complex interplay between the negotiations between prevalence levels of disease, vectors and epistemologies of disease, with the politics of technologies of disease, such as the use of DDT locally and internationally. For example, in 1986, research mandates affected the functions of the biochemical section at Kisian in light of views that it was worthwhile examining the chemical controls of mosquitoes in Kenya, rather than other approaches. I was interested in the way in which this national level change then changed the day to day roles of the scientists involved, and the material ouputs of the science produced.

Data

Following that way that data was both collected and analysed proved helpful in order to be able to trace the spatial and technological changes occurring over time. I found

that this could be broken down into three aspects of data, the collection, analysis and roles of scientists.

Collection – with the advent of computers at Kisian and PDAs local production events in the field become connected, through hardware condensed in spatial and temporal form, to anywhere in the world, deemed the correct place for data storage.

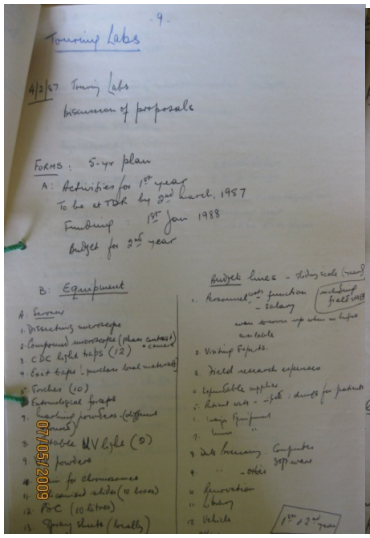
Analysis – The location of analysis of data, in the numerical or material specimen form appeared to lead to new questions with regards to ethics and structural inequalities. As technical requirements increase, the location of analysis becomes more specific. In the case of Kisumu, this has led to samples being shipped across national, or continental borders for analysis. In doing so raises traditional bioethical issues such as, what happens to the specimens wants analysis has been completed. However, for me it also raised wider issues such as why are the specimens being collected in the location of Kisumu, when the equipment is in other locations.

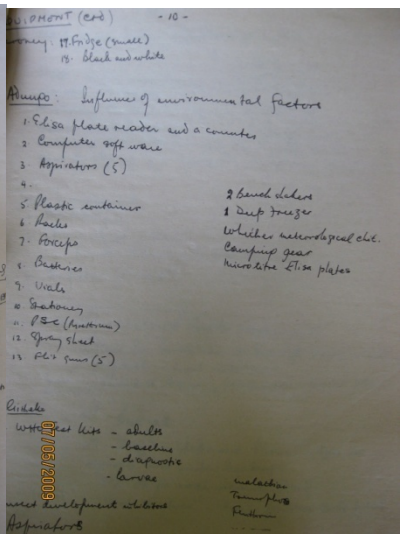
Roles - as the data collection and analysis methods change this changes the role of scientists in the field as job descriptions due to the changes in the technology.

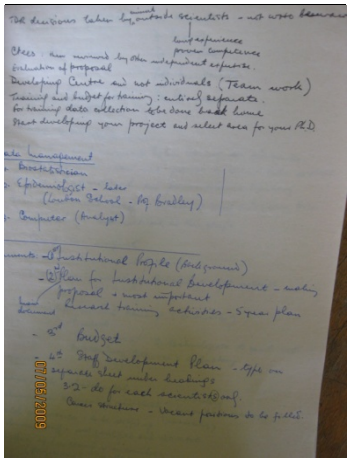
Funding

Through reading funding applications, both successful and not, I realised that it would be possible to further explore the justifications of science. These are interesting as they are a combination of both, what is deemed relevant to be conducted and also what is considered to be 'convincing' the organisation being applied to.

Through looking at the archive there are hundreds of documents pertaining to funding applications. These include not only the applications themselves but also visits to the centre and scoping reports from potential donors. For example there are these hand written notes in preparation of a WHO/TDR visit.



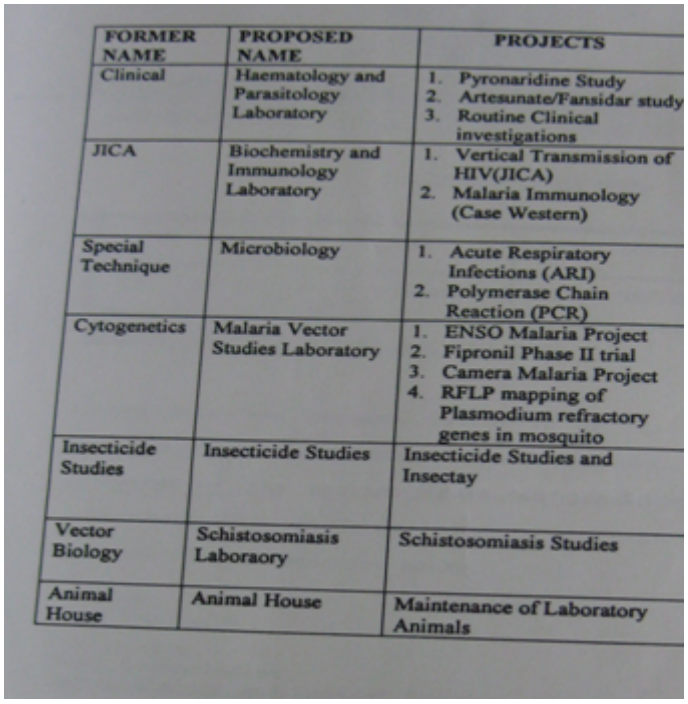




Physical Structures and Departments

It became apparent that the physical structure of the scientific institutute was indicative of the practice and knowledge of science globally and locally. Through archive documents it becomes clear that the laboratory structures strong in their materiality, change due to a variety of factors both global and local. Which in effect change structures of hierarchy in work and experience of doing science; technical staff become re-deployed. For example in April 1999, the re-deployments were made in the following table: [6] (photo 31st march folder f, 25.) Which outlines the changes in scientific specialisations and funding structures.[1]

This entry point will enable me to explore the transnational collaborations in their material, structural form.



FORMER NAME	PROPOSED NAME	PROJECTS
Clinical	Haematology and Parasitology Laboratory	1. Pyronaridine Study 2. Artesunate/Fansidar study 3. Routine Clinical investigations
JICA	Biochemistry and Immunology Laboratory	1. Vertical Transmission of HIV(JICA) 2. Malaria Immunology (Case Western)
Special Technique	Microbiology	1. Acute Respiratory Infections (ARI) 2. Polymerase Chain Reaction (PCR)
Cytogenetics	Malaria Vector Studies Laboratory	1. ENSO Malaria Project 2. Fipronil Phase II trial 3. Camera Malaria Project 4. RFLP mapping of Plasmodium refractory genes in mosquito
Insecticide Studies	Insecticide Studies	Insecticide Studies and Insectay
Vector Biology	Schistosomiasis Laboraory	Schistosomiasis Studies
Animal House	Animal House	Maintenance of Laboratory Animals

Summary

While I have outlined each of these themes separately, what I am sure of is that these traces will converge. For example, funding applications will be guided by novel approaches in malariology, and data collection and analysis will depend on the contemporary theories of malariology. The value of each of these themes is that they will enable me to shift back and forth between morality, technology, epistemology and epidemiology, following what I find in the archives and through talking to those who have been involved. The convergence of these themes is what will enable me to tell the story of research in a place from 1978-present.

7. INFORMATION SHEET

INFORMATION SHEET

Pasts, Presents and Futures of Malaria Research in Kenya

Miss Lauren Hutchinson
Anthropology of African Biosciences, Public Health and Policy, London School of Hygiene and Tropical Medicine, Keppel Street, London, WC1E 7HT
Phone number .....

Introduction

We ask you to take part in a study. This study is about the history of Malaria Research at The Kenya Medical Research Institute in Kisumu (KEMRI - KSM). Our study is done by the London School of Hygiene and Tropical Medicine (LSHTM) and The Kenya Medical Research Institute (KEMRI). It has been approved by the LSHTM Ethics Committee.

Purpose of the research

This study is about the practice of malaria research and changes over time – 1977 to present. We will only talk with people and observe what they do and look at past documents. We will not examine or treat people. You have worked with KEMRI in medical research and/or health programmes on Malaria and you have seen other research projects and programmes going on, or heard about them. Therefore, we can learn from you about the past, present and future of Malaria research in Kenya.

This information will help you to decide whether you want to be part of this study. You are free to say no without explanations. This is your choice. It will not be reported

to anybody in KEMRI or CDC. It will have no influence on your present or future involvement with KEMRI and CDC, or on your employment prospects.

If you choose to take part

If you choose to participate, we would like to do one or more interviews with you. Each interview will take between 1-3 hours. We can do the interview at work, in your home or another place of your choosing. We will tape record the interview, if you allow us. If, at any point, you would like the recorder turned off, we will do so.

During the interview, we will ask you about:

- your experiences working on KEMRI Malaria research or programmes
- your past experiences of working on KEMRI Malaria research programes;
- what research should be done in the future, and how it should be done.

Our discussion will be open, and it is important for us to hear your personal views. Anything you find interesting or of concern about your work with research or research in general will be interesting to us. If you do not feel like talking about certain issues, you are free not to do so. If you want to say things we did not ask about, feel free to do so.

If you choose not to take part

If you chose not to take part, you will not have any disadvantage from this, and your name and your decision will not be taken forward to your employers or anybody else.

Your decision not to take part in this study will not influence your present or future career prospects or employment status with KEMRI/CDC research or programmes.

Risks

Taking part in this study does not expose you to any risk. Some discussions may have to do with pasts which you do not want to remember; if this makes you uneasy, you can skip questions or stop the conversation. You can choose to stop taking part at any time.

Benefits

You may find taking part in this study useful, because it gives you a chance to share your views about malaria research and, and to raise issues that you think should be changed or improved, as well as things that you liked and would like to see more of. You have contributed to the study of malaria and it is your chance to let us know about your's and your colleagues' input to Malaria research in order for them to be remembered. This will potentially lead to better health research and programmes and better working conditions and training in the future.

Confidentiality

This is a history project, so the extent to which you want your input to be confidential is up to you. In the consent form you will see a range of options which you can choose from. Your participation and what you say will not affect your ongoing and future participation in KEMRI/CDC activities. If you agree for your name to be used then it is important to remember that this will be included in reports, publications and presentations available to the public. It is essential to make this decision carefully. You may contact us and change your mind at any point, until the reports/publications

have been written. All tapes and reports will be kept safely and nobody except us will have access to them.

Cost to you

Taking part in this study will be of no cost to you. It will only require some hours of your time during the next year, and we will avoid disturbing your work schedules. If you have to use public transport to meet with us, your expenses will be refunded, based on standard public transport rates.

Rights to refuse or withdraw

Participation in this study is voluntary. You are not obliged to participate in this study, and even if you agree to participate today, you can change your mind later. If you do so, you will not have disadvantage from this, and your name and your decision will not be taken forward. If you refuse or withdraw, you will not suffer any negative results in your work or in other relations with KEMRI/CDC in the future.

Persons to contact if you have questions

If you would like to ask questions related to this study, you can always call the leader of this study, Lauren Hutchinson, personally, on this telephone number or through a letter [particulars to be added]. You can also contact any of the other study team members instead [names and contact details to be added]. If you would rather speak to another person from KEMRI/CDC who is not part of this study, please contact [name and details to be added].

If you have any questions about the study right away, please ask them now. If you should have questions later, please telephone or send us a text message [numbers and names to be added]. If you send a message, we will call you back.

8. CONSENT FORM

CONSENT FORM

Pasts, Presents and Futures of Malaria Research in Kenya

Miss Lauren Hutchinson
Anthropology of African Biosciences, Public Health and Policy, London School of Hygiene and Tropical Medicine, Keppel Street, London, WC1E 7HT
Phone number ...

Do you agree to join the interview?

Yes/No

STATEMENT OF CONSENT

I have read the information sheet concerning this study and I understand what will be required of me and what will happen to me if I take part in it. I was told the reasons for the interviews. I am

aware of risks and benefits. My questions concerning this study have been answered by .....

I understand that:

1. I can choose whether I want to be part of this study or not.

2. I can drop out at any time without giving reasons and without any negative results.

3. Regarding confidentiality:

I permit the use of my name with quotations from the interview
[ ]

I wish to be consulted before publication of named quotes [ ]

I wish quotes to be used anonymously and in such a way that I cannot be identified
[ ]

I do not want to be quoted at all, even anonymously [ ]

By signing below, I agree to take part in the study.

_____	_____	_____
Participant's name	Date	Signature or thumbprint
_____	_____	_____
Witness' name	Date	Signature or thumbprint

IF NO, WHAT ARE THE REASONS FOR REFUSING?

---

9. PHOTO RELEASE FORM

PHOTO RELEASE FORM

Pasts, Presents and Futures of Malaria Research in Kenya

Miss Lauren Hutchinson
Anthropology of African Biosciences, Public Health and Policy, London School of Hygiene and Tropical Medicine, Keppel Street, London, WC1E 7HT
Phone number .....

Place, date and location of photo:

I permit the use of the photo with my name in publications [ ]

I wish to be consulted before publication of this photo [ ]

My photo may be taken but not used in research outputs [ ]

By signing below, I agree to have my photo taken.

_____	_____	_____
Participant's name	Date	Signature or thumbprint
_____	_____	_____
Witness' name	Date	Signature or thumbprint

IF NO, WHAT ARE THE REASONS FOR REFUSING?

---

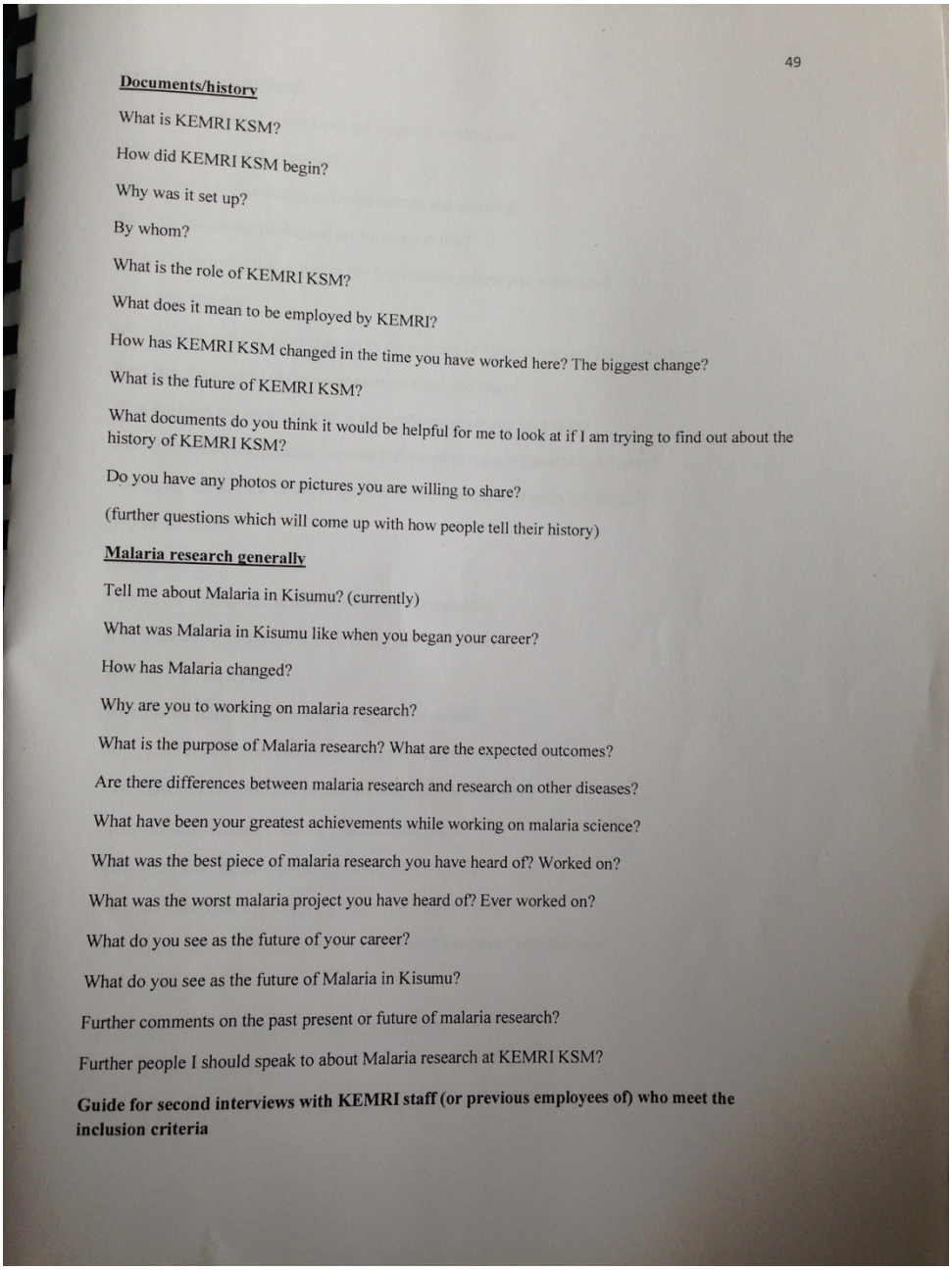
10. TABLE OF PEOPLE INTERVIEWED

	POSITION	Gender	RELEVANT YEARS	DATE INTERVIEWED	LENGTH
1	Senior Researcher and on occasion acting director	Male	19 years	30th August 2010	1hr 15
2	Longstanding secretary of Kisian Land Committee	Male	1979 - present	2nd September 2010	1hr 07 mins
3	Resident of Kisian, messenger to Director since 1991, worked with KEMRI since 1988, helped contractors build site from 1985	Male	1985-present, also involved before that	6th September 2010	1 hr 30mins, also walked around grounds with him and many meetings
4	Principle research officer, acting as director for one week/occasional acting director	Male	1998 as masters stud. 2002 as PhD and 2006 as post doc	7th September 2010	30 mins
5	Senior Lab. Technician	Male	1979 - present	7th September 2010 28th September	1st 30 mins 2nd 40 mines

6	Kisian Land committee since 1990 (father was on it before)	Male	1990 – present also involved before then	7th September 2010 30th September	1st 2 hours 2nd 1:30mins
7	Deputy Entomology Section Head KEMRI/CDC, also from Kisian	Male	21 years	8th October	1:20 minutes
8	Librarian	Female	16 years	11th October	33 minutes
9	Laboratory Technician	Female	31 years	15th October 20th October	1st 2.54 minutes 2nd Spent day with her
10	Retired secretary of current director	Female	30 years	20th October	Spent day with her
11	Illustrator at KEMRI now, was technician at the beginning	Male	31 years	22rd October	1 hour interview and many meetings
12	Senior Technologist	Male	27 years	25th October	89 minutes
13	Senior Scientist	Male	20 years	25th October	About one hour in total
14	Section Head Entomology	Male	Seven years	26th October	About one hour

15	Senior Scientist	Male	Since 1984	26th October	About four hours also looking at videos
16	Director	Male	15 years	29th October	1hr 20 mins
17	Librarian	Male	About 20 years	29th October	22 mins
18	Technologist, retired from KEMRI in 1993 but works on contract currently with CDC	Male	Since 1957 EA Amani Tanzania then KEMRI KSM	31st October	Ihr 15 mins

11. INTERVIEW GUIDE



Documents/history

What is KEMRI KSM?

How did KEMRI KSM begin?

Why was it set up?

By whom?

What is the role of KEMRI KSM?

What does it mean to be employed by KEMRI?

How has KEMRI KSM changed in the time you have worked here? The biggest change?

What is the future of KEMRI KSM?

What documents do you think it would be helpful for me to look at if I am trying to find out about the history of KEMRI KSM?

Do you have any photos or pictures you are willing to share?

(further questions which will come up with how people tell their history)

Malaria research generally

Tell me about Malaria in Kisumu? (currently)

What was Malaria in Kisumu like when you began your career?

How has Malaria changed?

Why are you to working on malaria research?

What is the purpose of Malaria research? What are the expected outcomes?

Are there differences between malaria research and research on other diseases?

What have been your greatest achievements while working on malaria science?

What was the best piece of malaria research you have heard of? Worked on?

What was the worst malaria project you have heard of? Ever worked on?

What do you see as the future of your career?

What do you see as the future of Malaria in Kisumu?

Further comments on the past present or future of malaria research?

Further people I should speak to about Malaria research at KEMRI KSM?

Guide for second interviews with KEMRI staff (or previous employees of) who meet the inclusion criteria

Experimental techniques

Describe the research project you are currently working on

What is your role in the project?

Explain the way that data is collected entered and analysed?

What equipment (technologies) are involved in this?

Could you describe the above for the first Malaria project you worked on?

What date was this?

What have been the biggest changes in the practice of Malaria research since you began?

What have been some of the worst changes since you began?

What has been the most impressive piece of equipment you have used?

What equipment would make the most difference to malaria research in Kisumu?

Could you describe the future of the techniques of malaria research in Kisumu?

Further comments?

Computers

Do you use a computer as part of your malaria research?

If so describe what role the computer has in the research?

What do you use it for?

Were there computers at the beginning of your career?

Do you remember when computers were introduced to KEMRI?

Have computers contributed to malaria research? In what way?

Could malaria research continue without computers?

What is the best impact computers have had on research?

Have computers had any negative impact on malaria research?

How have computers impacted communications? Learning? Employment?

Further comments?

Techniques of ethical accountability (discussion)

What are research ethics?

What are the ethical issues of research in Kisumu?

12. DESCRIPTION OF DATA STORAGE AND MANAGEMENT

Storage: all electronic data will be stored on my pass-word protected computer, also backed up on a hard drive which will be locked away. Any hard documents will be stored in a lockable drawer and office.

Type of data	Storage before analysis
Interviews	Format: Recorded using an Olympus voice recorder. Electronic audio files stored as WAP files. Also stored as written transcripts in word documents.
Documents	Format: Digitised using cannon and Nickon camera, stored as JPEG files. Catalogued in excel with a database created in endnote. Creates new copies of the images. Photocopies will be stored from documents held in official archives. These will be catalogued in the endnote data base but not digitised.

13. TIME TABLE OF DATA COLLECTION AND ANALYSIS IN 2010

Month	Activity
April	In Nairobi and Kisumu reading documents and preparing for the interviews,
May	Continued document analysis and collection
June	Continued document analysis and collection and preparing interviews
July	Continued document analysis and first phase of interviews
August	Continued document analysis, finishing first phase of interviews, analysis of these interviews – spend time back in Nairobi at National archives (take stock, consider the various themes arising) formulate further interview questions
September	Continued document analysis and second phase of interviews
October	Clarifying issues, feeding back initial concerns to staff, finalise interviews and document collection

14. Summary of Malaria research conducted and planned at KEMRI in Kisumu during the eighties

Project	Time frame[1]	Researchers and Institutions	Background	Focus	Location
Survey of Malaria Vectors in Agricultural Industries	Duration three years	One research officer (to be recruited) Two assistant research officers (to be recruited) Khamala, C. P. M.	Agricultural practices and human settlement problems in Kenya are changing rapidly. For example, large-scale irrigation projects or large-scale sugarcane plantation programmes may alter ecological conditions for vectors of human disease, in addition to attracting a new population of susceptible persons. It is therefore necessary to give priority to the study of vectors in such areas in order to identify and incriminate the particular species involved in disease transmission.	Malaria vector Mosquitoes and agricultural pracitces	Awendo sugar industry in South Nyanza, Mumias sugar industry, Kakamega District, Ramisi Sugar Industry, Kwale District and sisal estates in Taita-Taveta District have been selected for these studies in the first instance.

Biochemistry of Anopheles Mosquitoes and Vectors of Malaria in Kenya	Duration three years	Adungo, N. I. Githeko, A. K. Cooperating institutions: Dept. Of physiology, University of Nairobi, Prof. X. Thairu Dept. Of Biochemistry, University of Nairobi.	The present control measures for malaria: Chaemotherapy and use of insecticide are both being rendered increasingly ineffective by increased resistance of parasites and the mosquito vectors. It is necessary to investigate the feasibility of immunotherapy as a control. Preceding this should be a study on biochemical factors which sustain the sporozites in the mosquitoes.	Malaria vector Immunotherapy	
The Bionomics of Malaria Vectors in Kenya: Study of Anopheles gambiae at Huma Hills Hot Water Springs and Lake Simbi Salt Lake, South Nyanza District, Kenya.[1]		Kamunvi, F. Adungo, N. I. Githeko, A. K. Khamala, C. P. M.	Some species of Anopheles Gambiae species D is known to live only in hot mineral springs in Uganda. Two species A. Melas from West Coast and A. Merus from the east coast of Africa, retrospectively breed in salt water. It is deemed necessary to conduct a study of the Anopheles Gambiae species found in some	Malaria vector Mosquioto behaviour	Huma Hills Hot Water Springs and Lake Simbi Salt Lake, South Nyanza District, Kenya.

			mineral and hot water springs and salt lakes in Kenya to establish their role in the transmission of malaria.		
Laboratory Colonization of Anopheles Mosquitoes	Scheduled to start March 1983, continuous	One Research Officer (Principal) to be recruited Khamala, C. P. M.	Interest in mosquitoes as disease vectors, their susceptibility and resistance to insecticides and repellents, their nutrition, basic physiological reactions, and even the new systematics demand increased production of large captive colonies of mosquitoes suitable for experimental work. So the entomology division of MOPDRC will attempt to rear in the laboratory the commonly occurring Anopheles mosquitoes in Kenya which have so far not been reared before. The species to be reared under this project are Anopheles funestus, An pharoensis and other Anopheles	Malaria vector Growing of mosquitoes	

			other than An. Gambiae.		
Studies of T. Brevipalpis Larvae as Predators of Other Mosquito Larvae in the Field		Research Officer (To be recruited) (Principal) Assistant Research Officer (To be recruited) Khamala, C. P. M.	Because of the growing concern worldwide about the use of pesticides and the consequent pollution problems, more ecologically sound control methods for disease vectors and crop pests are being constantly sought. Search for natural predators and or pathogens that can be used in the control of malaria vectors in Kenya is necessary, e.g. the larvae of T. Brevipalpis which in nature have been known to feed on the larvae of other mosquitoes breeding in the same habitats, e.g. Aedes aegypti; and several fish species which have been recorded to be natural enemies of mosquito larvae.	Biological control of malaria vectors Search for natural predators of mosquitoes	
Observations on the Bionomics of T. Brevipalpis in	The project will start September 1982 colonisati	One research officer (to be recruited)	T. brevipalpis normally breeds in tree-holes or containers. Both male and female mosquitoes do not	Biological control of malaria vectors	

different climatic conditions in Kenya	on of t. Brevipalpis and their use for control experiments will be continuous.	Two Assistant Research Officers (to be recruited) Khamala C. P. M.	bite man, but feed on juices. The larvae of T. Brevipalpis have been shown to be effectively larvorous against larvae of other mosquitoes. These characteristics make T. Brevipalpis idea for malaria control studies and it is the main for this project.		
The study of the relationship of Malaria infection to human blood group G-6-PD and haemoglobin types	Duration: three years	Kamunvi, F. (Principle) Adungo, N. I. Githeko, A. K. Khamala, C. P. M.	Attempts have been made to establish the relationship between A, B, and O blood groups and diseases such as hysteria, leprosy small pox, chicken pox, and cholera. No such similar works has been done in Kenya on malaria, or between malaria vectors and human blood groups.	Epidemiology and clinical studies Relationship between blood groups and malaria	
A study of the sensitivity of Plasmodium falciparum to Chloroquin and other	Duration: Three years	Kamunvi, F. Githeko, A. K. One medical research officer (to be recruited)	The drug in common use for the treatment of malaria is Chloroquin. In recent years there have been a number of reports of resistance by p. Falciparum to Chloroquin in	Epidemiology and clinical studies Resistance of p. Falciparum to chloroquine	

Antimalarials in Kenya		One assistant research officer (to be recruited)	Africa. But these reports of resistance have been substantiated. Further investigations are required to establish a more scientific evaluation of malaria parasites resistant to Chloroquin and other antimalarials in Kenya.		
A comparative analysis of Clinical Malaria and Laboratory Diagnosed Malaria by Ordinary Microscopy.		Kamunvi, F. Muniu, E. M. One medical research officer (to be recruited)	Malaria treatment is most often carried out in rural health centres lacking laboratory facilities and personnel with adequate training. Diagnosis is often carried out clinically and is bound to be inaccurate at times. It is necessary to monitor clinical diagnosis against the more reliable laboratory diagnosis in order to avoid over diagnosis which is expensive and of no use to the patient.	Epidemiology and clinical studies Monitoring of diagnosis	
A possible Model for Malaria	Duration: continuous	Kamunvi, F.	Knowledge of the magnitude of the disease among	Epidemiology and	Kisumu

Surveillance in Urban Areas: The Kisumu Municipality Case Study		Muniu, E. M. Olel, O. One research officer (to be recruited)	different groups in communities is an important contribution. In the past malaria was kept in check in towns and over large rural zones where Governments and agricultural or industrial enterprises recognised the importance of this infection and its consequences for the community. In some countries the eradication programs were fraustrated by technical constraints such as resistance of mosquitoes to insecticides. But more often the obstacles were administrative, financial or of organisational nature. Some countries experienced serious reverses.	clinical studies Qualitative study of behaviour and malaria	
A country wide study of the problem of diagnosis of malaria in rural	Proposed at conference in 1982[1]	Dr F. Kamunvi, Dr. S. Kanani (MoH), Mr. E. Munia, Mr. M. L. Owaga			

health units in Kenya					
Current national and practical procedures for malaria control	Continuous	Kamunvi, F. One research officer (to be recruited) One assistant research officer (to be recruited)	The Kisumu Municipality it has been reported that in 1979 the Council provided £23,677 for malaria control, out of which £21,835 were spent of staff salaries leaving only £1,842 for actual antimalarial activities. Expenditure on malaria control ranges from 9 to 10% out of the total health expenditure of the council of which only 7% is spent on chemicals. Furthermore, it is interesting to note that for instance out of £100,000 provided by one urban authority for malaria control, £80,000 is spent on staff salaries and allowances and only £20,000 is spent for actual antimalarial activities annually. It has also been observed that local authorities are not usually	Epidemiology and clinical studies Planning of malaria control activities	

			interested in training their health personnel even when training facilities have been locally availed.		
A study of the Social and Cultural Determinants of Malaria Among Rural Communities in Kenya	Duration: five years	Kamunvi, F. One Sociologist (to be recruited) Prof. Banguero	The close relationship between disease and socio-economic advance of developing tropical countries had been abundantly proved. The study of the mosquito and parasite has occupied a proportionately gibber share of study over the decades. Today the world is faced with an expanding problem of resistance. The mosquito is increasingly becoming resistant to known insecticides, while the parasite is becoming resistant to the known antimalarial. The World Health Organisation in the "Report of the First meeting of the Scientific Workshop Group on Social	Social, cultural and economic research in protozoal diseases in Kenya Man's role in malaria	

			Economic Research" on the UNDP/WorldBank /WHO Special Programme for Research and Training in Tropical Diseases pinpointed the importance of developing methods for social and economic research and their application in the control of tropical diseases. Therefore man's position in the problem of malaria needs emphasis in the light of these events. Such knowledge could be applied in the establishment of feasible intervention measures. Indeed if the above problems surrounding the vector and parasite continue, the latter approach may well become the only measure at our hands.		
Socio and cultural determinants of Malaria in Kenya	Proposed at conference in 1982[1]	Dr. F. Kaunvi, Mr. O. Nyaoke (Kisumu Municipal			

		Council) Mr. E. N. Muniu			
Bionomics of malaria vectors: a survey of malaria vectors in Awendo sugar factory, outgrowers and un-disturbed areas[1]	Proposed at conference in 1982	Dr. Kamunvi Mr. W. Obundo			
Programme on vector mosquito egg desiccation experiments	1986. All publications below comes from.[1]	Marangalla, G. M. Principle investigator Serony, I. K. Co-investigator Obala, A. A.	Investigation into the conditioning mechanisms by which mosquitoes survive adverse conditions in nature is pertinent with those vector control measures that aim to suppressing vectors during their low population phases to minimum numbers as an eradication measure. Cost: Ksh 1,100	Biological control of mosquitoes	
The functional response of toxorynchites brevipalis in the predation of vector		Marangalla, G. M. Serony, I. K. Obodhu, W. O. Obala, A. A.	Cost: all materials employed in this study were available at the centre, hence no purchases were experienced. The materials involved larvae available in the Centre's larvae	Biological control of larvae	

mosquito larvae			rooms, perti dishes and water.		
Programme of field trials of toxoynchites control of malaria vectors	Duration: The experiments are set to run for at least six months starting October 1986 through March 1987.	Marangalla, G. M. Principle Investigator Serony, I. K. Co-investigator Obodho, W. O. Obala, A. A.	Objective: It is the principle objective of this study to release toxorhynchites b. Brevipalpis in the breeding sites of anopheles gambiae species complex and an. Funestus with the anopheles as prey and note both the physical and biological factors that affect the survival of this larvivorous fish in the field. Cost: Ksh 23, 180	Biological control of larvae	

14. FOOTNOTES FROM CHAPTER 8

Deloron, P., Campbell, G. H., Brandling-Bennett, D., Roberts, J. M., Schwartz, I. K., Odera, J. S., Lal, A. A., Osanga, C. O., de la Cruz, V. and McCutchan, T. M. (1989) Antibodies to Plasmodium falciparum ring-infected erythrocyte surface antigen and P. falciparum and P. malariae circumsporozoite proteins: seasonal prevalence in Kenyan villages. Am J Trop Med Hyg. **41**, 395-399 Githeko, A. K., Brandling-Bennett, A. D., Beier, M., Atieli, F., Owanga, M. and Collins, F. H. (1992) The reservoir of Plasmodium Falciparum malaria in a holoendemic area of western Kenya Trans. Roy. Soc. Trop. Med. Hyg. . **86**, 355-358, Githeko, A. K., Brandling-Bennett, A. D., Beier, M., Mbogo, C. M., Atieli, F. K., Owaga, M. L., Juma, F. and Collins, F. H. (1993) Confirmation that Plasmodium falciparum has aperiodic infectivity to Anopheles gambiae. Med Vet Entomol. **7**, 373-376, Shi, Y. P., Udhayakumar, V., Alpers, M. P., Povoa, M. M., Oloo, A. J., Ruebush, T. K., 2nd and Lal, A. A. (1993) Natural antibody responses against the non-repeat-sequence-based B-cell epitopes of the Plasmodium falciparum circumsporozoite protein. Infect Immun. **61**, 2425-2433, Udhayakumar, V., Anyona, D., Kariuki, S., Shi, Y. P., Bloland, P. B., Branch, O. H., Weiss, W., Nahlen, B. L., Kaslow, D. C. and Lal, A. A. (1995) Identification of T and B cell epitopes recognized by humans in the C-terminal 42-kDa domain of the Plasmodium falciparum merozoite surface protein (MSP)-1. J Immunol. **154**, 6022-6030, Shi, Y. P., Sayed, U., Qari, S. H., Roberts, J. M., Udhayakumar, V., Oloo, A. J., Hawley, W. A., Kaslow, D. C., Nahlen, B. L. and Lal, A. A. (1996) Natural immune response to the C-terminal 19-kilodalton domain of Plasmodium falciparum merozoite surface protein 1. Infect Immun. **64**, 2716-2723, Udhayakumar, V., Ongecha, J. M., Shi, Y. P., Aidoo, M., Orago, A. S., Oloo, A. J., Hawley, W. A., Nahlen, B. L., Hoffman, S. L., Weiss, W. R. and Lal, A. A. (1997) Cytotoxic T cell reactivity and HLA-B35 binding of the variant Plasmodium falciparum circumsporozoite protein CD8+ CTL epitope in naturally exposed Kenyan adults. Eur J Immunol. **27**, 1952-1957, Shi, Y. P., Udhayakumar, V., Oloo, A. J., Nahlen, B. L. and Lal, A. A. (1999) Differential effect and interaction of monocytes, hyperimmune sera, and immunoglobulin G on the growth of asexual stage Plasmodium falciparum parasites. Am J Trop Med Hyg. **60**, 135-141, John, C. C., Sumba, P. O., Ouma, J. H., Nahlen, B. L., King, C. L. and Kazura, J. W. (2000) Cytokine responses to Plasmodium falciparum liver-stage antigen 1 vary in rainy and dry seasons in highland Kenya. Infect Immun. **68**, 5198-5204, Branch, O. H., Oloo, A. J., Nahlen, B. L., Kaslow, D. and Lal, A. A. (2000) Anti-merozoite surface protein-1 19-kDa IgG in mother-infant pairs naturally exposed to Plasmodium falciparum: subclass analysis with age, exposure to asexual parasitemia, and protection against malaria. V. The Asembo Bay Cohort Project. J Infect Dis. **181**, 1746-1752

Udhayakumar, V., Kariuki, S., Kolczack, M., Girma, M., Roberts, J. M., Oloo, A. J., Nahlen, B. L. and Lal, A. A. (2001) Longitudinal study of natural immune responses to the Plasmodium falciparum apical membrane antigen (AMA-1) in a holoendemic region of malaria in western Kenya: Asembo Bay Cohort Project VIII. Am J Trop Med Hyg. **65**, 100-107

Shi, Y. P., Nahlen, B. L., Kariuki, S., Urdahl, K. B., McElroy, P. D., Roberts, J. M. and Lal, A. A. (2001) Fcgamma receptor IIa (CD32) polymorphism is associated with protection of infants against high-density Plasmodium falciparum infection. VII. Asembo Bay Cohort Project. J Infect Dis. **184**, 107-111

Branch, O. H., Takala, S., Kariuki, S., Nahlen, B. L., Kolczak, M., Hawley, W. and Lal, A. A. (2001) Plasmodium falciparum genotypes, low complexity of infection, and resistance to subsequent malaria in participants in the Asembo Bay Cohort Project. Infect Immun. **69**, 7783-7792

Zhou, Z., Xiao, L., Branch, O. H., Kariuki, S., Nahlen, B. L. and Lal, A. A. (2002) Antibody responses to repetitive epitopes of the circumsporozoite protein, liver stage antigen-1, and merozoite surface protein-2 in infants residing in a Plasmodium falciparum-hyperendemic area of western Kenya. XIII. Asembo Bay Cohort Project. Am J Trop Med Hyg. **66**, 7-12

Takala, S., Branch, O., Escalante, A. A., Kariuki, S., Wootton, J. and Lal, A. A. (2002) Evidence for intragenic recombination in Plasmodium falciparum: identification of a novel allele family in block 2 of merozoite surface protein-1: Asembo Bay Area Cohort Project XIV. Mol Biochem Parasitol. **125**, 163-171

Singer, L. M., Mirel, L. B., ter Kuile, F. O., Branch, O. H., Vulule, J. M., Kolczak, M. S., Hawley, W. A., Kariuki, S. K., Kaslow, D. C., Lanar, D. E. and Lal, A. A. (2003) The effects of varying exposure to malaria transmission on

development of antimalarial antibody responses in preschool children. XVI. Asembo Bay Cohort Project. J Infect Dis. **187**, 1756-1764

Ong'echa, J. M., Lal, A. A., Terlouw, D. J., Ter Kuile, F. O., Kariuki, S. K., Udhayakumar, V., Orago, A. S., Hightower, A. W., Nahlen, B. L. and Shi, Y. P. (2003) Association of interferon-gamma responses to pre-erythrocytic stage vaccine candidate antigens of Plasmodium falciparum in young Kenyan children with improved hemoglobin levels: XV. Asembo Bay Cohort Project. Am J Trop Med Hyg. **68**, 590-597

Leenstra, T., ter Kuile, F. O., Kariuki, S. K., Nixon, C. P., Oloo, A. J., Kager, P. A. and Kurtis, J. D. (2003) Dehydroepiandrosterone sulfate levels associated with decreased malaria parasite density and increased hemoglobin concentration in pubertal girls from western Kenya. J Infect Dis. **188**, 297-304

Chaisavaneeyakorn, S., Othoro, C., Shi, Y. P., Otieno, J., Chaiyaroj, S. C., Lal, A. A. and Udhayakumar, V. (2003) Relationship between plasma Interleukin-12 (IL-12) and IL-18 levels and severe malarial anemia in an area of holoendemicity in western Kenya. Clin Diagn Lab Immunol. **10**, 362-366

Bonner, P. C., Zhou, Z., Mirel, L. B., Ayisi, J. G., Shi, Y. P., van Eijk, A. M., Otieno, J. A., Nahlen, B. L., Steketee, R. W. and Udhayakumar, V. (2005) Placental malaria diminishes development of antibody responses to Plasmodium falciparum epitopes in infants residing in an area of western Kenya where P. falciparum is endemic. Clin Diagn Lab Immunol. **12**, 375-379

Takala, S. L., Escalante, A. A., Branch, O. H., Kariuki, S., Biswas, S., Chaiyaroj, S. C. and Lal, A. A. (2006) Genetic diversity in the Block 2 region of the merozoite surface protein 1 (MSP-1) of Plasmodium falciparum: additional complexity and selection and convergence in fragment size polymorphism. Infect Genet Evol. **6**, 417-424

Othoro, C., Moore, J. M., Wannemuehler, K., Nahlen, B. L., Otieno, J., Slutsker, L., Lal, A. A. and Shi, Y. P. (2006) Evaluation of various methods of maternal placental blood collection for immunology studies. Clin Vaccine Immunol. **13**, 568-574

15. NEXT FOOTNOTES FROM CHAPTER 8

Mathenge, E. M., Gimnig, J. E., Kolczak, M., Ombok, M., Irungu, L. W. and Hawley, W. A. (2001) Effect of permethrin-impregnated nets on exiting behavior, blood feeding success, and time of feeding of malaria mosquitoes (Diptera: Culicidae) in western Kenya. J Med Entomol. **38**, 531-536

Hamel, M. J., Odhacha, A., Roberts, J. M. and Deming, M. S. (2001) Malaria control in Bungoma District, Kenya: a survey of home treatment of children with fever, bednet use and attendance at antenatal clinics. Bull World Health Organ. **79**, 1014-1023

Wiseman, V., Hawley, W. A., ter Kuile, F. O., Phillips-Howard, P. A., Vulule, J. M., Nahlen, B. L. and Mills, A. J. (2003) The cost-effectiveness of permethrin-treated bed nets in an area of intense malaria transmission in western Kenya. Am J Trop Med Hyg. **68**, 161-167

Friedman, J. F., Phillips-Howard, P. A., Hawley, W. A., Terlouw, D. J., Kolczak, M. S., Barber, M., Okello, N., Vulule, J. M., Duggan, C., Nahlen, B. L. and ter Kuile, F. O. (2003) Impact of permethrin-treated bed nets on growth, nutritional status, and body composition of primary school children in western Kenya. Am J Trop Med Hyg. **68**, 78-85

Hawley, W. A., Phillips-Howard, P. A., ter Kuile, F. O., Terlouw, D. J., Vulule, J. M., Ombok, M., Nahlen, B. L., Gimnig, J. E., Kariuki, S. K., Kolczak, M. S. and Hightower, A. W. (2003) Community-wide effects of permethrin-treated bed nets on child mortality and malaria morbidity in western Kenya. Am J Trop Med Hyg. **68**, 121-127

Kariuki, S. K., Lal, A. A., Terlouw, D. J., ter Kuile, F. O., Ong'echa, J. M., Phillips-Howard, P. A., Orago, A. S., Kolczak, M. S., Hawley, W. A., Nahlen, B. L. and Shi, Y. P. (2003) Effects of permethrin-treated bed nets on immunity to malaria in western Kenya II. Antibody responses in young children in an area of intense malaria transmission. Am J Trop Med Hyg. **68**, 108-114

Kariuki, S. K., ter Kuile, F. O., Wannemuehler, K., Terlouw, D. J., Kolczak, M. S., Hawley, W. A., Phillips-Howard, P. A., Orago, A. S., Nahlen, B. L., Lal, A. A. and Shi, Y. P. (2003) Effects of permethrin-treated bed nets on immunity to malaria in western Kenya I. Antibody responses in pregnant women and cord blood in an area of intense malaria transmission. Am J Trop Med Hyg. **68**, 61-67

Meltzer, M. I., Terlouw, D. J., Kolczak, M. S., Odhacha, A., ter Kuile, F. O., Vulule, J. M., Alaii, J. A., Nahlen, B. L., Hawley, W. A. and Phillips-Howard, P. A. (2003) The household-level economics of using permethrin-treated bed nets to prevent malaria in children less than five years of age. Am J Trop Med Hyg. **68**, 149-160

Phillips-Howard, P. A., Nahlen, B. L., Alaii, J. A., ter Kuile, F. O., Gimnig, J. E., Terlouw, D. J., Kachur, S. P., Hightower, A. W., Lal, A. A., Schoute, E., Oloo, A. J. and Hawley, W. A. (2003) The efficacy of permethrin-treated bed nets on child mortality and morbidity in western Kenya I. Development of infrastructure and description of study site. Am J Trop Med Hyg. **68**, 3-9

Phillips-Howard, P. A., ter Kuile, F. O., Nahlen, B. L., Alaii, J. A., Gimnig, J. E., Kolczak, M. S., Terlouw, D. J., Kariuki, S. K., Shi, Y. P., Kachur, S. P., Hightower, A. W., Vulule, J. M. and Hawley, W. A. (2003) The efficacy of permethrin-treated bed nets on child mortality and morbidity in western Kenya II. Study design and methods. Am J Trop Med Hyg. **68**, 10-15

ter Kuile, F. O., Terlouw, D. J., Phillips-Howard, P. A., Hawley, W. A., Friedman, J. F., Kariuki, S. K., Shi, Y. P., Kolczak, M. S., Lal, A. A., Vulule, J. M. and Nahlen, B. L. (2003) Reduction of malaria during pregnancy by permethrin-treated bed nets in an area of intense perennial malaria transmission in western Kenya. Am J Trop Med Hyg. **68**, 50-60

Lindblade, K. A., Eisele, T. P., Gimnig, J. E., Alaii, J. A., Odhiambo, F., ter Kuile, F. O., Hawley, W. A., Wannemuehler, K. A., Phillips-Howard, P. A., Rosen, D. H., Nahlen, B. L., Terlouw, D. J., Adazu, K., Vulule, J. M. and Slutsker, L.

(2004) Sustainability of reductions in malaria transmission and infant mortality in western Kenya with use of insecticide-treated bednets: 4 to 6 years of follow-up. JAMA. **291**, 2571-2580

van Eijk, A. M., Blokland, I. E., Slutsker, L., Odhiambo, F., Ayisi, J. G., Bles, H. M., Rosen, D. H., Adazu, K. and Lindblade, K. A. (2005) Use of intermittent preventive treatment for malaria in pregnancy in a rural area of western Kenya with high coverage of insecticide-treated bed nets. Trop Med Int Health. **10**, 1134-1140

Lindblade, K. A., Dotson, E., Hawley, W. A., Bayoh, N., Williamson, J., Mount, D., Olang, G., Vulule, J., Slutsker, L. and Gimnig, J. (2005) Evaluation of long-lasting insecticidal nets after 2 years of household use. Trop Med Int Health. **10**, 1141-1150

Eisele, T. P., Lindblade, K. A., Wannemuehler, K. A., Gimnig, J. E., Odhiambo, F., Hawley, W. A., Ter Kuile, F. O., Phillips-Howard, P., Rosen, D. H., Nahlen, B. L., Vulule, J. M. and Slutsker, L. (2005) Effect of sustained insecticide-treated bed net use on all-cause child mortality in an area of intense perennial malaria transmission in western Kenya. Am J Trop Med Hyg. **73**, 149-156

Lindblade, K. A., Gimnig, J. E., Kamau, L., Hawley, W. A., Odhiambo, F., Olang, G., Ter Kuile, F. O., Vulule, J. M. and Slutsker, L. (2006) Impact of sustained use of insecticide-treated bednets on malaria vector species distribution and culicine mosquitoes. J Med Entomol. **43**, 428-432