



# Impact of Research Methodology and Scientific Writing Training in Transforming Clinical and Laboratory Personnel to Research Scientists at the East Africa Public Health Laboratory Networking Project Study Sites in Kenya

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*The East Africa Public Health Laboratory Networking Project (EAPHLNP) is a regional project involving five East African countries, Namely: Burundi, Kenya, Rwanda, Uganda and Tanzania and it is supported by the World Bank.*

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## Summary

### INTRODUCTION

The East Africa Public Health Laboratory Networking (EAPHLN) Project which was being implemented in Kenya, Uganda, Tanzania, Burundi and Rwanda had several components which included Operational Research (OR). The OR component had two strategic objectives one was to provide oversight and guidance in carrying out operational research activities under the regional project secondly, was to facilitate local and regional capacity to carry out operational research and evaluation of medical diagnostics. Research Methodology and Scientific writing training sharpens the fundamental skills upon which the conceptual framework of scientific expertise is built. In order to facilitate the local and regional capacity to carry out operational research, there is need to build human capital at the study sites.

### METHODOLOGY

A qualitative study was carried out using a semi-structured questionnaire to determine the research training needs among clinical and laboratory personnel at the World Bank-funded EAPHLNP facilities in Kenya. Based on the findings, a short training in Research Methodology and Scientific Writing training was developed in April 2012 to support the implementation of operational research activities at the health facilities in Kenya and the region. A team of research experts from KEMRI and an external facilitator with vast knowledge on curriculum development was constituted to develop the training. The training content was delivered through lectures, self directed learning, group discussions, individual and group assignments. The participants were instructed to develop concept proposals and were assigned mentors to guide them through the process of document development and approval.

### FINDINGS

The research training needs assessment study revealed that there was limited knowledge in research undertaking and scientific writing. The curriculum was developed and piloted in April 2012. A total of nineteen participants from Kenyan sites were trained in Mombasa for two weeks. Seven concept proposals were developed. The proposals are at different stages of scientific



review process. After undergoing this training, two of the participants were motivated to pursue further studies and enrolled for higher degrees (Masters and Doctoral). The training curriculum was reviewed in October 2012 by the KEMRI OR team and packaged into three manuals namely: - Facilitators, Participant and Exercise. The curriculum was adopted by the East, Central and Southern African Health Community (ECSAHC) to train participants from the region.

## RECOMMENDATIONS

**Strengthen capacity building in operational research at the centres of excellence in order to adequately address public health related issues. Capacity build, other facilities country wide and regionally by rolling out the training and develop structured mentorship programs.**

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## Introduction

In the scientific field, there are fundamental skills upon which the conceptual framework of scientific expertise is built. These science process skills include data interpretation, problem solving, experimental design, scientific writing, oral communication, collaborative work, and critical analysis of primary literature [1]

However, these skills are not taught in a structured manner in the undergraduate degree programs in the life sciences. There are only a few documented programs that formally aim to place a greater emphasis on teaching the process of science as opposed to just delivering content for life science majors [2]. The EAPHLN Project aims to strengthen laboratory service by building state of the art facilities and capacity of the personnel to carry out operational research. The short training in Research Methodology and Scientific Writing was developed to support the implementation of operational research activities at the health facilities in Kenya in 2012. During this training the participant learnt basic principles of operational research and scientific writing. The training content was delivered through lectures, self-directed learning, group discussions, individual and group assignments. The curriculum was adopted by the East, Central and Southern African Health Community (ECSA-HC) to train participants from the region.

At the end of this training, the participant was expected to be able to: develop an acceptable, original operational research proposal concept; demonstrate adequate practical scientific knowledge on the subject of methodological procedures, and logistical capability; describe public health and health research ethical

requirements in project implementation; describe the principles of good clinical/laboratory practice (GLP/ GCP) regulations; develop and describe the Standard Operating Procedures (SOPs); analyse scientific literature, make scientific presentations in conferences and publish scientific manuscript and finally describe the requirements for intellectual property rights (IPR).

## Methodology

A qualitative study using a semi-structured questionnaire was carried out to determine research training needs among healthcare personnel at the World Bank-funded EAPHLNP facilities which are being implemented in Kenya, Rwanda, Tanzania and Uganda in 2011.

In Kenya, a purposive sample of 34 clinical and laboratory personnel was interviewed to determine the research skills. It was established that there was limited knowledge and skills on operational research.

A research methodology and scientific writing training was developed in April 2012. The training was structured into five interlinked modules to be covered in ten days. Module 1 focused on operational research designs. This ensured that the participants were taken through the methodological procedures and logistical capability. Module 2 dealt with principles of bioethics in project implementation. Module 3 focused on good research practices including good laboratory practice (GLP) / good clinical practice (GCP) regulations, standard operating procedures (SOPs), electronic quality-assured data collection and analysis, monitoring and evaluation. Module 4 covered library information and scientific writing. Module 5 dealt with intellectual property rights.



The training content was delivered through lectures, group work discussions, and problem based learning techniques. Learning resources included internet based material and published papers. The training was assessed using oral presentations and assignments during the training. The training was further evaluated using a questionnaire at the closure, performance in their respective workstations and number of proposals developed.

At the closure of training, the participants were instructed to develop concepts and were assigned mentors to work together in the development and approval of the proposal. A follow up workshop was organized for the participants who had developed concepts to present the proposals to the mentors before being submitted for review by scientific and ethical boards. The

mentorship process was face-to-face discussion, email and telephone consultations. Further discussions were done during the field visits and workshops organized to review the project implementation progress. The training curriculum was reviewed in October 2012 and packaged into three manuals namely: - Facilitators, Participant and Exercise. The curriculum was adopted by the East, Central and Southern African Health Community (ECSA-HC) to train participants from the region.

## Findings

The results from the qualitative study established that there were limited research skills. In Kenya, 34 laboratory managers and technologists/technicians were interviewed and it was established that there were limited research skills (*Table 1*).

**Table 1:** Responses from The Laboratory Managers and Technologists/Technicians

Broad Topics	n=34	% (95% CI*)
1. Received training in bio-safety procedures	12	35.3 (19.2-51.4)
2. Participated in research related activities	11	32.4 (16.7-48.1)
3. Attended scientific conferences / workshop	10	29.4 (14.1-44.7)
4. Received training on Good Laboratory Practices (GLP)	10	29.4 (14.1-44.7)
5. Exposure to data handling & management	8	23.5 (9.3-37.8)
6. Received training on ethical issues	8	23.5 (9.3-37.8)
7. Received training on lab equipment maintenance	8	23.5 (9.3-37.8)
8. Received training on Good Clinical Practices (GCP)	7	20.6 (7.0-34.2)
9. Received training in research undertaking	3	8.8 (0.0-18.3)
10. Participation in writing research proposal	3	8.8 (0.0-18.3)
11. Contribution to research publication as author or co-author	0	(0.0)

### \*95% Confidence interval

In order to build capacity in operational research at the study sites, the research methodology and scientific writing curriculum was developed and piloted in April 2012. A total of nineteen participants from Kenyan sites were trained in Mombasa for two weeks. Seven concept proposals were developed. The proposals are at different stages of scientific review process. Two of the participants enrolled for graduate

degree trainings (Masters and doctoral) at the Institute of Tropical Medicine and Infectious Diseases (ITROMID) which was a joint program between Jomo Kenyatta University of Agriculture and Technology and Kenya Medical Research Institute (KEMRI). The developed proposals during this training was to be used to write a thesis which is a mandatory requirement to be awarded the degree.



## Discussion

Interest in evidence-based treatment has increased dramatically in the recent past. However, the medical schools of medicine and other life science institutions do not emphasize research and is expected that the graduates will learn the skills at the postgraduate training

Furthermore, in our hospital settings, the laboratory services are under-utilized. This training offered a rare opportunity to bring together clinical and laboratory personnel. It came out clearly that completing a research project in an unfamiliar setting is challenging, and there are no structured programs to guide careers of new researchers interested in health research. This has been reported in other studies [2, 3].

Through the mentorship program implemented, six proposals were developed. This was supported by other programs which had shown that mentorship is a very important determinant of academic medicine and research [4, 5].

It has also been shown that research has been flawed due to wrong interpretation of data which results from confounded experimental designs and misuse of statistics [6]. This leads to wastage of financial and non-financial resources. This training training will go a long in mitigating such problems.

## Recommendations

Strengthen capacity building in operational research at the centres of excellence in order to adequately address public health related issues. Capacity build other facilities country wide and regionally by rolling out the training. Enhance monitoring and evaluation of the graduates performance. Develop structured mentorship programs in the facilities. Empower implementation of research through provision of necessary resources.

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