



Catalyzing Data-to-Action in Western Kenya: A Case Study from the Child Health and Mortality Prevention Surveillance Network

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BACKGROUND AND CONTEXT

Sub-Saharan Africa and Central and Southern Asia accounted for more than 80% of the 5.2 million deaths in 2020, while these regions only account for 52% of the global under-five population [1]. Sub-Saharan Africa remains the region with the highest mortality rate in the world among children under five years of age, with one child in 13 dying before his or her fifth birthday [1]. Incomplete, poor quality or delayed data often limit a complete understanding of what is killing these children [2-4]. Accurate and timely cause of death data are critical for public health experts to design child health programs to save the most lives [5].

The Child Health and Mortality Prevention Surveillance (CHAMPS) network, a multi-country surveillance program, aims to systematically track causes of under-five mortality from seven sites in Kenya, South Africa, Mali, Ethiopia, Sierra Leone, Mozambique and Bangladesh [6, 7]. In Kenya, CHAMPS operates in Kisumu and Siaya counties; however, the majority of county-level staff supporting CHAMPS generally have limited training in data analysis and use of data to develop evidence-informed policies and programs. In May 2017, as part of the CHAMPS data-to-action objective, the Kenya site developed a proposal to build capacity of the counties' Ministry of Health (MOH) staff to use CHAMPS data for decision making. This report will describe the process and outcomes of the first CHAMPS Data-to-Action Training for county-level MOH staff to inform policy development and drive public health action to save lives.

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METHODOLOGY/APPROACH

Training Needs and Curriculum

As a first step, the Kenya CHAMPS site, with support from the Kenya Field Epidemiology and Laboratory Training Program (KFELTP) conducted a training needs assessment to inform curriculum development. This included identifying sample datasets to reference during the training, developing logic models, determining the structure of sessions, and creating evaluation plans. This was followed by development of a CHAMPS data-to-action training framework (Table 1 below) to capture expected competencies, specific training topics, training materials and methods, and assessment of participants' understanding of the training concepts at the end. Quizzes, lectures, case studies, group presentations and course evaluations were used during the training.

The data to action training had two major objectives: 1) to improve the skills of county-level staff to formulate strategic questions that can be answered with surveillance data and 2) analyze data and understand findings to guide policy and program development to reduce under-five child mortality.

Participant Recruitment

The Kisumu and Siaya county health departments were asked to nominate suitable participants for a training made up of the following 3 modules:

1. Designing and conducting operational research
2. Principles of epidemiology, analytical epidemiology, and interpretation of findings
3. Translation of public health data-to-action

Nominated participants were asked to briefly articulate in writing their interest in the course, how they intended to use the skills learned during the training, and how the training would help them to be more effective in their work.

Training Setting

The training was organized as two courses lasting one week each (Table 2 below), followed by a final two-day data analysis presentation workshop. The didactic sessions lasted 8 hours per day and included lectures, practical sessions, case studies, group discussions and presentations. The trainers included epidemiologists from the KFELTP, Kisumu County Department of Health, Kenya Medical Research Institute and U.S. Centers for Disease Control and Prevention in Kenya.

The trainings were interspersed to give time for staff to do homework, such as analyzing their datasets. Each participant arrived at the training with a dataset containing routine service delivery derived from the Ministry of Health that aligned with their selected child health field project. They cleaned and organized the data, developed a data analysis plan, analyzed their data using MS Excel, and delivered a PowerPoint presentation based on their final analysis. They were expected to be in communication with their supervisors as they refined their data and final presentations. Training facilitators used a standard score sheet to assess each field project in the areas of 1) scientific merit and public health importance; 2) speaker style and readiness; and 3) quality of the presentation content and delivery. Course participants were also encouraged to develop abstracts from their field project data for submission to appropriate local conferences. Each participant was given an opportunity to evaluate the CHAMPS training by completing a self-administered paper questionnaire focused on the training process and content using a Likert scale of 1-5.

Results

Twenty-two participants were nominated and 21 (95%) completed the training. The majority (62%) were female and 57% were from Kisumu County. Cadres

trained included nurses (28%), clinical officers (24%), nutritionists (19%), public health officers (19%) and medical officers (10%). On the first day of Course 1 (see course schedules and topics in Table 2), participants took a pre-test quiz on epidemiological concepts in maternal and child health, study design and data entry and scored a median of 63% (Range 44-75%). At the end of Course 1 week, participants took a post-test quiz and scored a median of 81% (Range 56-91%), indicating an improvement of 18%.

The training cohort reconvened for Course 2 the following month for a deeper dive on surveillance data analysis and interpretation. Similar to the previous course, participants took a pre-test quiz and scored a median of 55% (Range 35-100%). The post-test quiz results showed a median of 85% (Range 56-100%), indicating an improvement of 28%.

Trained participants analyzed existing datasets from their workplace, and the final topics were presented during the final Course 3 by participants focused on HIV/AIDS (19%), malaria (14%), skilled delivery and prematurity (14%), and other childhood and maternal conditions (52%), such as anemia in pregnancy, malnutrition, essential immunizations, integrated health services and family planning). The median score of the final presentation was 78% (IQR=15). The overall mean course evaluation score by the participants was 4.7 (on a 5-point scale). Their feedback included recommendations for more time for future courses, more sessions on scientific communication, and more time for group work as ways to improve similar trainings in the future. Three participants submitted their abstracts to a local scientific conference within Siaya county [8], and one participant successfully presented at the National HIV conference within the same year of training. HIV/AIDS, malnutrition and malaria presentations have informed community dialogues and stakeholders' data-to-action discussions at the county level.

Discussion

Frontline healthcare workers (HCWs) in Kenya, though competent in their areas of specialization, have been noted to have minimal operational research and data analytic skills [9]. Although our analysis of training needs found that these skills existed, there was a need to strengthen the skills among HCWs from Kisumu and Siaya counties.

In the past, the Kenya FELTP has sought to build epidemiologic capacity through a two-week basic epidemiology training program; however, due to vastness of the country, only a small proportion of Kenyan HCWs have been able to benefit from the basic epidemiology training. Topics also focused more heavily on outbreak management and lacked contents on maternal and child health. To our knowledge, the CHAMPS Data-to-Action training was the first of its kind that focused specifically on maternal and child health interventions.

Kenya has a robust health information system which collects data from patients using electronic and paper registers. These data are summarized monthly and reported to the MOH using the District Health Information System (DHIS 2). Due to limited analytic capacity, health data are rarely analyzed and used for decision making by frontline HCWs or health management teams. These trainings are needed to catalyze data use at the local level to improve health outcomes. In our training, there was a substantial increase in the knowledge of study participants as demonstrated by post-quiz results. Ongoing mentorship of the graduates would ensure knowledge retention and promote data use. Most participants completed the course successfully, rated the course as useful and demonstrated acquisition of the data-to-action training competencies. Regular trainings to increase the number of HCWs with data-to-action skills, coupled with ongoing long-term support, may improve the application of acquired skills and increase timely utilization of public health data for decision making and action. The Kenya CHAMPS site is currently working with Kenya MOH on the utilization of accrued data for programming and decision making.

Table 1: CHAMPS Data-To-Action Training Framework

I. Data management

Focus	Teaching resources/method of delivery	What will participants learn?	How will you measure learning?
<ul style="list-style-type: none"> • Statistics • Collection • Analysis • Interpretation • Dissemination • Data Quality 	<ul style="list-style-type: none"> • MS Excel • Data Quality • Assessment exercise • Data Consistency assessment • Lectures on statistics • Case studies 	Data cleaning, descriptive statistics, basic data analysis using MS Excel, how to audit data for quality and consistency, and how to present findings	<ul style="list-style-type: none"> • Daily evaluations • Pre-test and post test • Quizzes (daily) • Graded PowerPoint presentation

II. Designing and conducting operational research

Focus	Teaching resources/method of delivery	What will participants learn?	How will you measure learning?
<ul style="list-style-type: none"> • Formulate clear research/evaluation questions 	<ul style="list-style-type: none"> • Lectures on statistics • Case studies • Quizzes 	How to design appropriate studies to answer research questions, and/or how to test hypothesis and how to conduct literature review	Homework and assignments

III. Translation of public health data to action

Focus	Teaching resources/method of delivery	What will participants learn?	How will you measure learning?
<ul style="list-style-type: none"> • Communication to different audiences • Different media of communication • Problem identification and prioritization 	<ul style="list-style-type: none"> • Problem solving exercises • Lectures • Case Study • Group discussions 	Different communication media, identification of relevant public health gaps and recommendations on how to address them	<ul style="list-style-type: none"> • Evaluation • Quizzes

Table 2

Kenya Field Epidemiology CHAMPS Training: Course 1 schedule					
May 21 – 25, 2018					
Time	Monday	Tuesday	Wednesday	Thursday	Friday
8:30	Introductions and Welcome	Quiz #1	Quiz #2	Quiz #3	Post-Test
9:00	Pre-test	Operational Research: Formulating research questions	Operational Research: Study Designs	Conducting Literature Review	Finalize work plans with supervisors
10:00	Overview of CHAMPS & Course Expectations				
10:30	Morning Tea Break	Morning Tea Break	Morning Tea Break	Morning Tea Break	Morning Tea Break
11:00	Overview of epidemiology with focus on maternal child health	Case Study 1:	Questionnaire Design	Computer Lab: part 4	Closing Ceremony
12:00	Measures of disease frequency, morbidity and mortality	Computer Lab: Part 2	Computer Lab: Part 3		Departures and/or additional meetings with supervisors and/or administrative matters
13:00	Lunch	Lunch	Lunch	Lunch	Lunch
14:00	Computer Lab: MS-Excel in Public Health: Introduction, part 1	Case Study 1:	Case Study 2:	Case Study 3:	
15:30		Group Presentations	Group Presentations	Group Presentations	
16:30	Afternoon Tea Break	Afternoon Tea Break	Afternoon Tea Break	Afternoon Tea Break	
17:00	The Field Project	Field Project: the work plan and other outputs	Finalize work plans with supervisors	Finalize work plans with supervisors	
17:30	Evaluations/Close	Evaluations/Close	Evaluations/Close	Evaluations/Close	

Kenya Field Epidemiology CHAMPS Training: Course 2 Schedule

June 11 -15, 2018

Time	Monday	Tuesday	Wednesday	Thursday	Friday
8:30	Introductions and Welcome	Quiz #1	Quiz #2	Quiz #3	Post-Test
9:00	Pre-test	Measures of association	Organizing/summarizing Data	DQA and Data Consistency	Next Steps & Course 1 evaluation
10:00	Analysis and interpretation of surveillance data				
10:30	Morning Tea Break	Morning Tea Break	Morning Tea Break	Morning Tea Break	Morning Tea Break
11:00	Analysis and Interpretation of surveillance data	Measures of association	Scientific Communication	Computer Lab: MS Excel	Closing Ceremony
12:00	Operations Research	Computer Lab: MS Excel	Scientific Communication		Departures and/or additional meetings with supervisors and/or administrative matters
13:00	Lunch	Lunch	Lunch	Lunch	Lunch
14:00	Computer Lab: Advanced Analysis in MS-Excel in	Case Study 1:	Case Study 2:	Case Study 3:	
15:30		Group Presentations	Group Presentations	Group Presentations	
16:30	Afternoon Tea Break	Afternoon Tea Break	Afternoon Tea Break	Afternoon Tea Break	
17:00	The Field Project	Field Project: the analysis plan	Finalize analysis plan with supervisors	Submit analysis plans	
17:30	Evaluations/Close	Evaluations/Close	Evaluations/Close	Evaluations/Close	

Kenya Field Epidemiology CHAMPS Training: Course 3 Schedule

June 25 - 27, 2018

Time	Monday	Tuesday	Wednesday
8:30	Overview and Welcome	Presentations	Presentations
10:30	Morning Tea Break	Morning Tea Break	Next Steps & Graduation Ceremony
11:00	Presentations	Presentations	
13:00	Lunch	Lunch	Administrative Issues and Departure
14:30	Presentations	Next Steps & Graduation Ceremony	
17:30	Evening Tea Break & Close	Evening Tea Break & Close	

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