**Carnegie African Diaspora Fellowship in Collaboration with Virginia Tech and College of Veterinary Medicine Animal Resources and Biosecurity**

**Presents**

**Topics in Research Methods, Experimental Design and Data Analysis**

Patrick Pithua, BVM, MSc, PhD, DLSHTM

ppithua@vt.edu

Lawrence Mugisha, BVM, MSc. PhD

lawrence.mugisha@mak.ac.ug

**Learning Objective**

Upon completion students will be able to adequately conceive a research idea/question through synthesis of findings in the context of existing knowledge, design experiments to answer research questions using appropriate methods, implement their experiments through data collection, collation and analysis and author study reports and manuscripts for publications.

**Schedule**

**April 01-April 30,2022**

|  |  |  |
| --- | --- | --- |
| **Week 1** | **Topic**  | **Learning Aims** |
|  | Overview of the Research Process | * Explain the steps in the research process.
* Describe the basic components of each step.
* Use the steps as an organizing mechanism for a research project.
 |
|  | Research Goals in Epidemiology  | * Use the research goal as the organizing principle of a study design.
* Distinguish between general research goals.
* Explain the requirements for causality.
* Realize the practical limitations of a research goal.
 |
|  | Overview of Epidemiologic Designs | * Name the elements of a study design (HUIT – Hypothesis tested or not, Unit of observation, Intervention, Timing of exposure and outcome measures).
* Link study designs to appropriate research goals.
* Distinguish between study designs in terms of how the HUIT elements are treated.
* Determine the appropriate use of each study design.
 |
| **Week 2** |  |  |
|  | Research Ethics\* | * Trace the history of human and animal subjects’ protection.
* Utilize the components of current protection regulations.
* Adapt study procedures to the special needs of vulnerable populations
 |
|  | Formulating a Research Question | * Distinguish between types of research questions based on different study designs.
* Generate ideas for research questions.
* Formulate an operationalizable research question.
 |
|  | Reviewing the Literature | * Explain the purposes of the literature review.
* Describe the elements of the review.
* Conduct a literature search.
* Write a literature review.
 |
| **Week 3** |  |  |
|  | Sampling/Obtaining Sampling Subjects  | * Determine the valid connection between the study sample, study population, and theoretical population.
* Identify and assemble appropriate sampling frames.
* Select samples using appropriate sampling methods.
* Recruit and retain study participants.
* Maximize internal and external validity.
* Calculate the required sample sizes.
 |
|  | Measuring Concepts/Data Collection | * Explain the processes of measuring concepts and collecting data.
* Distinguish between different types of measurement techniques.
* Measure concepts and collect data using different data collection techniques.
 |
|  | Analyzing Data | * Process raw data into variables.
* Gain a preliminary understanding of various statistics computer packages.
* Examine and transform variables into analyzable units.
* Describe the data with appropriate descriptive statistics.
* Answer the research question using appropriate inferential statistics.
 |
|  | Interpreting Results | * Interpret the results of basic computer printout correctly.
* Translate computer printout into reportable results.
* Address unanticipated results.
* Interpret study results correctly.
* Interpret study results ethically.
 |
| **Week 4** |  |  |
|  | Reporting Results | * Summarize research results.
* Distinguish statements that are and are not supported by the results.
* Draft all sections of a research report.
* Prepare correct citations and references.
* Create meaningful data tables and graphs.
* Write with brevity as the goal.
 |
|  | Getting Accepted: Funding, Presentation, Publication | * Distinguish between different forums for data dissemination.
* Draft a research proposal.
* Draft posters and oral presentations for a professional meeting.
* Explain the steps for publishing a manuscript
 |