

**MAKERERE UNIVERSITY SCHOOL OF PUBLIC HEALTH**

**Department of Epidemiology and Biostatistics**

**Timetable for Applied Biostatistics I – Basic Data Analysis (Short Course) (Sub-Course Coordinator: Dr. Roy William Mayega)**

**Week: Monday 15<sup>th</sup> – Friday 19<sup>th</sup> July 2024**

Time	Monday 15 <sup>th</sup> July 2024	Tuesday 16 <sup>th</sup> July 2024	Wednesday 17 <sup>th</sup> July 2024	Thursday 18 <sup>th</sup> July 2024	Friday 19 <sup>th</sup> July 2024
08.00-10.00	<b>DA11: Overview of data analysis and Univariate analysis</b> -Objectives of the course -Variables; levels of analysis -Measures of central tendency & dispersion -Counts, Proportions, Risk, Rates <b>Dr. Roy W. Mayega</b>	<b>DA21: Overview of Bivariate analysis: Comparing continuous outcomes in categories</b> -T-tests -Anova/F-test <b>Dr. Roy W. Mayega</b> <b>DA22: Overview: Simple Linear regression and Correlation</b> <b>Dr. Simon Kasasa</b>	<b>DA31: Overview of Bivariate analysis: Comparing Categorical outcomes in categories:</b> -Chi-square tests -Odds Ratios -Rate Ratios <b>Dr. Victoria Nankabirwa</b>	<b>DA41: Logistic Regression &amp; overview of multivariate analysis</b> <b>Prof. Nazarius Mbona</b>	<b>DA15: Presentation of data:</b> -Tables -Graphs -Narratives, -Making a good presentation and write up <b>Prof. Makumbi</b>
<b>10.00-10.30</b>	<b>B</b>	<b>R</b>	<b>E</b>	<b>A</b>	<b>K</b>
10.30-12.00	<b>DA12: Practical: Analysis planning and Univariate analysis</b> -Introduction to Stata -Approaches to continuous variables -Approaches to categorical variables <b>Dr. Roy W. Mayega/Mary Nakafeero</b>	<b>DA23: Practical: t-tests/ANOVA</b> - T-tests for independent samples - Paired t-tests - ANOVA <b>Dr. Roy William Mayega/Mary Nakafeero</b>	<b>DA32: Practical: Comparing categorical variables</b> Chi-square test, categorizing continuous variables, Crude MH OR and RR <b>Dr. Victoria Nankabirwa/Ronald Ssenyonga</b>	<b>DA42: Practical: Logistic Regression</b> <b>Prof. Nazarius Mbona/Ronald Ssenyonga</b>	<b>DA16: Practical: Presentation of data</b> -Tables -Graphs -Narrative <b>Prof. Makumbi/ Mary Nakafeero</b>
12.00-01.00	<b>DA13: Data analysis clinic 1</b>	<b>DA24: Practical: Simple Linear Regression &amp; Correlation</b> <b>Dr. Simon Kasasa/ Ronald Ssenyonga</b>	<b>DA33: Data analysis clinic 2</b>	<b>DA43: Data analysis clinic 3</b>	
<b>01.00-02.00</b>	<b>L</b>	<b>U</b>	<b>N</b>	<b>C</b>	<b>H</b>
02.00-03.30					
<b>03.30-03.45</b>	<b>B</b>	<b>R</b>		<b>A</b>	<b>K</b>
03.45-05.00					

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#### Course Objectives

**General Objective:** By the end of this course, participants should be able to conduct basic analysis of data, given a set of health data

**Specific Objectives:** By the end of this course, the participant, given a dataset from an epidemiological assessment should be able to:

1. Develop an analysis plan to answer specific research questions of interest to them
2. Conduct univariate analysis for both numerical and categorical variables
3. Select appropriate statistical tests and conduct bivariate analysis for different combinations of variables
4. Interpret and present results from data analysis using appropriate figures and narrative

#### Mode of Delivery

- A blended learning approach will be used where sessions will be delivered both online (using Zoom) and Face-to-face
- Face-to-face sessions will be held at the MakSPH Annex in Kololo, at the RAN Lower Lab
- A zoom link will be shared for the online participants
- Participants will have to indicate before hand which mode they will use
- Face-to-face participants will have the added advantage of access to instant facilitator support especially when navigating Stata

#### Course Pre-requisites

For students to undertake this course, they must meet the following pre-requisites

- They must have undertaken a basic/foundational course in biostatistics; **without knowledge of the basic principles of biostatistics, they cannot appreciate the data analysis approaches**
- They must have undertaken a basic/foundational course in epidemiology
- They must have a personal computer and conversant with basic use of Windows
- They must have Stata (Version 10 or above) and they must have used it before

#### Detailed course content

##### DA11: Overview of data analysis

- Objectives of the data analysis course
- Variables

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- Levels of data analysis (Univariate, Bivariate, Multivariate)
- Developing an analysis plan
- Univariate analysis for numerical variables (Measures of central tendency; measures of dispersion)
- Univariate analysis for categorical variables (Frequency counts, Rates, Ratios, Proportions)

**DA12: Practical: Analysis plan and Univariate analysis**

- Introduction to Stata
- Familiarizing yourself with the data and outlining an analysis plan
- Approaches to continuous variables: Measures of central tendency; Measures of dispersion
- Approaches to categorical variables: Frequency counts, proportions
- Interpretation of results

**DA21: Overview of Bivariate analysis: Comparing continuous outcomes in categories**

- Outline of the bivariate analysis approaches
- T-tests
  - o When two independent samples are compared
  - o When two dependent samples are compared (Paired t-test)
- Interpretation of results
- Anova and the F-test (When more than two independent samples are compared)

**D22: Practical: Bivariate analysis for Continuous outcomes in categories**

- T-tests for independent samples
- Paired t-tests
- One way ANOVA

**D23: Overview: Simple Linear regression**

- What is simple linear regression and when is it used?
- Assumptions in Simple Linear regression
- The simple linear regression model
- Testing hypotheses using simple linear regression

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**DA24: Practical: Simple Linear Regression**

- Variables that fit a linear regression approach
- Testing hypotheses using simple linear regression
- Evaluating model fit to the data

**DA31: Bivariate analysis for Categorical variables**

- Overview of the methods used
  - o Chi-square tests
  - o Mantel-Haenszel Odds and Rate Ratios
- Overview of confounding and interaction
- Using stratified analysis to deal with confounding

**DA32: Practical: Comparing categorical variables**

- Chi-square test
- Generating new categorical variables from other variables
  - o Categorizing numerical variables to create categorical variables
  - o Re-categorizing categorical variables
- Crude MH Odds/Crude MH Rate Ratios
- Stratified analysis for dealing with confounding and interaction
- Using stratified analysis to deal with interaction

**DA41: Simple logistic regression and overview of multi-variate analysis**

- What is logistic regression?
- Methods of logistic regression

**DA42: Practical: Simple logistic regression**

- Using the Logit function to compare two variables (the dependent variable being a binary outcome)
- Using logistic regression to identify interaction
- Using logistic regression to adjust for confounding

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**DA51: Presentation of data:**

- Tables, Graphs
- Narratives
- Making a good presentation/scientific write up of the results section

**DA52: Practical: Presentation of data**

- Tables, Graphs
- Narratives

**DA13: Data Clinic 1 (Univariate analysis)**

The data clinics are meant for participants to get help with their own data. Participants who have come with their own datasets will be helped to navigate how to go about analyzing their data.

- The first data clinic focuses on helping participants on how to go about developing a data analysis plan for their own data and doing univariate analysis with their own data. Face-to-face Participants get one-on-one consultation with the facilitators

**DA33: Data Clinic 2 (Bivariate analysis for continuous variables and for categorical variables)**

The data clinics are meant for participants to get help with their own data. Participants who have come with their own datasets will be helped to navigate how to go about analyzing their data.

- The second data clinic focuses on helping participants on how to go about doing bivariate analysis for continuous and categorical variables Participants get one-on-one help with the facilitators

**DA43: Data Clinic 3 (Logistic regression)**

- The third data clinic focuses on helping participants on how to go about doing multivariate analysis using their data; this particular course focuses on logistic regression; Note: Other Generalized Linear Models are handled in the advanced data analysis course

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**Celebrating 100 years of Makerere University!**