Weill Cornell Medicine-Qatar
Continuing Professional Development

Certificate in the Analysis of Medical Data

Applied Biostatistics for Health Care Professionals

January 11, 2020

February 1, 2020

March 7, 2020

INTRO

Overview

This is a series of three workshops (introductory, intermediate and advanced) aimed at enabling health care professionals (HCP) to organize, manage, and analyze their data and properly interpret and summarize its results. The workshops will be applied in nature and biostatistical concepts will be explained through case studies using a statistical software package such as IBM-SPSS and STATA.

Gap Analysis

Research is the main pillar for the advancement of science and the healthcare for patients. Biostatistics plays a key role in research. Biostatistics is taught to students in many disciplines such as business, engineering, social sciences, nursing, allied health, pharmacy and medicine. Healthcare workers from all disciplines and all levels are expected at some point in their career, to participate in or read about research. A major obstacle for people doing research is the inability to find help with data analysis (DeMets et al, 2006). Moreover, inadequate knowledge of biostatistical methods and interpretations might yield to sub-optimal or incorrect results.

It is thus, important for doctors and healthcare workers to have proper and continuous post university training in biostatistics and its concepts (Okoro et al 2019, Ercan et al 2008). Researchers from different disciplines in Qatar; as represented by the members of the scientific committee of this course, have indicated that training in applied biostatistics is required by students, faculty members and healthcare practitioners in the various health sectors in Qatar. This training will help researchers in Qatar improve their skills in research by enhancing their ability to organize, manage and analyze their data. This could help increase research output in Qatar by increasing the number of healthcare professionals equipped with the ability to analyze their data with minimal help, or none at all, from biostatisticians.

Objectives

Overall Learning Objectives
At the end of the activity, the participants will be able to:

1. Enter and manage data using a statistical software package
2. Perform bivariate analysis for both continuous and dichotomous outcomes
3. Perform multivariate analysis for both continuous and dichotomous outcomes
4. Perform simple analysis for survival data

Target Audience

Physicians, Nurses, Dentists, Pharmacists, Allied Health Professionals, Students, Researchers, Educators.

ACCREDITATION

Disclosure of Relationships/Content Validity

It is the policy of Weill Cornell Medicine-Qatar to adhere to Qatar Council for Healthcare Practitioners (QCHP) and Accreditation Council for Continuing Medical Education (ACCME) Criteria, Policies, and Standards for Commercial Support and content validation in order to ensure fair balance, independence, objectivity, and scientific rigor in all its sponsored programs. All faculty participating in sponsored programs are expected to disclose relevant financial relationships pertaining to their contribution to the activity, and any discussions of off-label or investigational uses of approved commercial products or devices, or of any products or devices not yet approved in the United States and elsewhere. WCM-Q CME/CPD activities are intended to be evidence-based and free of commercial bias.

Course Director

Thurayya Arayssi, MD
Ziyad R Mahfoud, PhD

Course Faculty

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Deema Al-Sheikhly, MEHP
Soha Dargham, MPH
Mark Healy, MSc
Syed Latifi, PhD
Padmakumari Sarada, MSc

Scientific Planning Committee

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Maguy S El Hajj, PharmD
Vahe Kehyayan, PhD
Daniel Rainkie, PharmD

Independent Clinical Reviewer

Ziyad R Mahfoud, PhD

The course director, scientific planning committee members, course faculty and ICR

Have no relevant financial relationships to disclose
Will not be discussing unlabeled/unapproved use of drugs or products

Course Administrator

Safia Rabia

Has disclosed the following: Spouse, employee of Al-Wehda Medical Group
Will not be discussing unlabeled/unapproved use of drugs or products

ACCREDITATION

Evaluation

An evaluation will be conducted online post activity. All participants are required to complete the Evaluation Form in order to qualify for a certificate. The evaluation allows us to assess the degree to which the activity met its objectives. It will also guide the planning of future activities and inform decisions about improving the educational program.

Accreditation and Credit Designation Statements

ACCME

The Weill Cornell Medicine-Qatar is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

Introductory Applied Biostatistics for Health Care Professionals

The Weill Cornell Medicine-Qatar designates this live activity for a maximum of 6.5 *AMA PRA Category 1 Credits*™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Intermediate Applied Biostatistics for Health Care Professionals

The Weill Cornell Medicine-Qatar designates this live activity for a maximum of 6.5 *AMA PRA Category 1 Credits*™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Advanced Applied Biostatistics for Health Care Professionals

The Weill Cornell Medicine-Qatar designates this live activity for a maximum of 7 *AMA PRA Category 1 Credits*™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

QCHP

Weill Cornell Medicine-Qatar is accredited as a provider of Continuing Medical Education (CME) and Continuing Professional Development (CPD) by the Qatar Council for Healthcare. Practitioners (QCHP) of the Ministry of Public Health.

Introductory Applied Biostatistics for Health Care Professionals

This activity is an Accredited Group Learning Activity (Category 1) as defined by the Qatar Council for Healthcare Practitioners-Accreditation Department and is approved for a maximum of 6.5 hours.

Intermediate Applied Biostatistics for Health Care Professionals

This activity is an Accredited Group Learning Activity (Category 1) as defined by the Qatar Council for Healthcare Practitioners-Accreditation Department and is approved for a maximum of 6.5 hours.

Advanced Applied Biostatistics for Health Care Professionals

This activity is an Accredited Group Learning Activity (Category 1) as defined by the Qatar Council for Healthcare Practitioners-Accreditation Department and is approved for a maximum of 7 hours.

SCIENTIFIC PLANNING COMMITTEE

Chairs

Thurayya Arayssi, MD
Senior Associate Dean for Medical Education and CPD
Professor of Clinical Medicine

Weill Cornell Medicine-Qatar

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Stella Major, MD
Associate Professor of Family Medicine in Clinical Medicine

Weill Cornell Medicine-Qatar

Daniel Rainkie, PharmD
Clinical Lecturer

College of Pharmacy, Qatar University

Introductory Applied Biostatistics for Healthcare Professionals

Learning Objectives:

At the end of this activity, participants will be able to:

1. Use IBM SPSS to enter, code and manage data
2. Summarize variables both in numbers and graphs
3. Use IBM SPSS to apply basic analysis of numeric outcomes and categorical outcomes.

TIME	TOPIC
8:30 am - 9:00 am	Complete Registration and Ensure that the Statistical Software Works
9:00 am - 9:15 am	Pre-test
9:15 am - 10:15 am	Creating a Database in IBM-SPSS
10:15 am - 11:15 am	Descriptive Statistics in IBM-SPSS
11:15 am | 11:45 am	**Coffee Break**
11:45 am - 1:15 pm	Basic Data Management and Graphical Display of your Data in IBM-SPSS
1:15 pm | 2:15 pm	**Lunch Break**
2:15 pm - 3:45 pm	Analysis of Numeric Outcomes in IBM-SPSS
3:45 pm | 4:15 pm	**Coffee Break**
4:15 pm - 5:15 pm	Analysis of Dichotomous or Categorical Outcomes in IBM-SPSS
5:15 pm - 5:30 pm	Post-test

END

	LEARNING OBJECTIVES	PRESENTER
	• Identify current knowledge pertaining to basics of applied biostatistics	
	At the end of this session, participants will be able to: • Demonstrate an understanding of IBM-SPSS software interface • Create a data base in IBM-SPSS • Produce data for different types of variables	Dr. Ziyad Mahfoud Facilitators: • Ms. Deema Al-Sheikhly • Ms. Soha Dargham • Ms. Padmakumari Sarada
	At the end of this session, participants will be able to: • Compute descriptive statistics • Demonstrate how to stratify analysis • Demonstrate how to select a certain group of patients from a data base	Dr. Ziyad Mahfoud Facilitators: • Ms. Deema Al-Sheikhly • Ms. Soha Dargham • Ms. Padmakumari Sarada
	At the end of this session, participants will be able to: • Manage data by creating new variables, recoding variables, and do data arithmetic • Illustrate data using appropriate graphs	Dr. Ziyad Mahfoud Facilitators: • Ms. Deema Al-Sheikhly • Ms. Soha Dargham • Ms. Padmakumari Sarada
	At the end of this session, participants will be able to: • Compute confidence interval for one mean and difference between two independent means • Analyze data using one sample t-test, paired t-test and independent t-test	Dr. Ziyad Mahfoud Facilitators: • Ms. Deema Al-Sheikhly • Ms. Soha Dargham • Ms. Padmakumari Sarada
	At the end of this session, participants will be able to: • Compute the confidence interval for a proportion and difference between two independent proportions • Analyze data using binomial test, Chi-squared test, Fisher's exact test, McNemar's test	Dr. Ziyad Mahfoud Facilitators: • Ms. Deema Al-Sheikhly • Ms. Soha Dargham • Ms. Padmakumari Sarada
	• Evaluate to which extent the learning objectives were met • Summarize the key learning points	
END		

Intermediate Applied Biostatistics for Healthcare Professionals

Overall Learning Objectives:

At the end of this activity, participants will be able to:

1. Fit a linear regression to examine the relationship between a numeric dependent variable and one or more independent variables
2. Fit a logistic regression to examine the relationship between a dichotomous dependent variable and one or more independent variables.

TIME	TOPIC
8:30 am - 9:00 am	Complete Registration and Ensure that the Statistical Software Works
9:00 am - 9:15 am	Pre-test
9:15 am - 10:15 am	Review Material from First Training a. Descriptive Statistics b. Analysis of Numeric Variables c. Analysis of Categorical Variables
10:15 am - 11:45 am	Introduction to Regression a. Simple Linear Regression b. Simple Logistic Regression
11:45 am | 12:15 pm	**Coffee Break**
12:15 pm - 1:15 pm	Important concepts in Regression a. Confounding b. Interaction c. Overfitting or Underfitting in Regression
1:15 pm | 2:15 pm	**Lunch Break**
2:15 pm - 3:30 pm	Multiple Linear Regression a. Analysis of the Full Model b. Confounding Interaction and Collinearity in Linear Regression
3:30 pm | 4:00 pm	**Coffee Break**
4:00 pm - 5:15 pm	Multiple logistic regression a. Analysis of the Full Model b. Confounding Interaction and Collinearity in Logistic Regression
5:15 pm - 5:30 pm	Post-test

END

3. Test for interaction in regression
4. Assess confounding in regression

	LEARNING OBJECTIVES	PRESENTER
	• Identify current knowledge pertaining to basics of applied biostatistics	
	At the end of this session, participants will be able to: • Compute descriptive statistics • Demonstrate an understanding of analysis of numeric and categorical variables	Dr. Ziyad Mahfoud Facilitators: • Dr. Syed Latifi • Ms. Soha Dargham • Mr. Mark Healy
	At the end of this session, participants will be able to: • Apply a simple linear regression and simple logistic regression to analyze their data	Dr. Ziyad Mahfoud Facilitators: • Dr. Syed Latifi • Ms. Soha Dargham • Mr. Mark Healy
	At the end of this session, participants will be able to: • Demonstrate an understanding of how to account for confounding variables in regression • Demonstrate an understanding of interaction and how to test for it in regression • Demonstrate an understanding of overfitting and underfitting in regression	Dr. Ziyad Mahfoud Facilitators: • Dr. Syed Latifi • Ms. Soha Dargham • Mr. Mark Healy
	At the end of this session, participants will be able to: • Employ multiple linear regression to analyze a full model • Demonstrate an understanding of confounding, interaction and collinearity in linear regression	Dr. Ziyad Mahfoud Facilitators: • Dr. Syed Latifi • Ms. Soha Dargham • Mr. Mark Healy
	At the end of this session, participants will be able to: • Employ multiple logistic regression for the analysis of the full model • Demonstrate an understanding of confounding, interaction and collinearity in logistic regression	Dr. Ziyad Mahfoud Facilitators: • Dr. Syed Latifi • Ms. Soha Dargham • Mr. Mark Healy
	• Evaluate to which extent the learning objectives were met • Summarize the key learning points	
	END	

Advanced Applied Biostatistics for Healthcare Professionals

Overall Learning Objectives:

At the end of this activity, participants will be able to:

1. Generate a multiple linear regression
2. Generate a multiple logistic regression

TIME	TOPIC
8:30 am - 9:00 am	Complete Registration and Ensure that the Statistical Software Works
9:00 am - 9:30 am	Pre-test
9:30 am - 10:45 am	Review Material from First and Second Training a. Descriptive Statistics b. Analysis of Numeric Variables c. Analysis of Categorical Variables
10:45 am - 12:15 pm	Selecting Variables for Multiple Regression a. Computer Based Methods b. Other Methods c. Application
12:15 pm | 12:30 pm	**Coffee Break**
12:30 pm - 1:30 pm	One way ANOVA a. Understanding the ANOVA Table b. Multiple Testing Model c. How Does it Work with Categorical Variables
1:30 pm | 2:30 pm	**Lunch Break**
2:30 pm - 3:45 pm	Nonparametric Tests a. For Bivariate Analysis b. For One Way ANOVA
3:45 pm | 4:00 pm	**Coffee Break**
4:00 pm - 5:15 pm	Introduction to Survival Analysis a. Kaplan Meier Method and Curve b. Log Rank Test and Hazard Ratio
5:15 pm - 5:30 pm	Post-test

3. Analyze data from a one-way ANOVA
4. Analyze data using nonparametric statistics
5. Fit a Kaplan Meier Curve and compute median survival
6. Interpret Hazard Ratios and their confidence intervals

	LEARNING OBJECTIVES	PRESENTER
	• Identify current knowledge pertaining to biostatistical concepts that will be covered in the current training	
	At the end of this session, participants will be able to: • Compute descriptive statistics • Demonstrate an understanding of analysis of numeric and categorical variables • Employ multiple linear regression to analyze a full model • Employ multiple logistic regression to analyze a full model	Dr. Ziyad Mahfoud Facilitators: • Dr. Syed Latifi • Ms. Soha Dargham • Mr. Mark Healy
	At the end of this session, participants will be able to: • Employ forward, backward and stepwise methods of variables selection for linear and logistic regression models • Employ other methods of variables selection for linear and logistic regression	Dr. Ziyad Mahfoud Facilitators: • Dr. Syed Latifi • Ms. Soha Dargham • Mr. Mark Healy
	At the end of this session, participants will be able to: • Employ one-way ANOVA and multiple testing procedures for numeric variables • Employ Chi-squared test for multiple groups with pairwise comparison procedures	Dr. Ziyad Mahfoud Facilitators: • Dr. Syed Latifi • Ms. Soha Dargham • Mr. Mark Healy
	At the end of this session, participants will be able to: • Demonstrate an understanding of the difference between parametric and non-parametric tests • Apply nonparametric tests such as Wilcoxon's signed rank test, rank sum test, and the Kruskal Wallis test	Dr. Ziyad Mahfoud Facilitators: • Dr. Syed Latifi • Ms. Soha Dargham • Mr. Mark Healy
	At the end of this session, participants will be able to: • Demonstrate an understanding of the concept of time to event and censoring • Apply Kaplan Meier method to obtain survival estimates and curves • Employ the log rank test • Demonstrate an understanding of the concept of hazard ratio	Dr. Ziyad Mahfoud Facilitators: • Dr. Syed Latifi • Ms. Soha Dargham • Mr. Mark Healy
	• Evaluate to which extent the learning objectives were met • Summarize the key learning points	
END		

Ziyad R Mahfoud, PhD
Associate Professor
of Healthcare Policy and Research

Weill Cornell Medicine-Qatar

BIO-graphy

Dr. Mahfoud is an Associate Professor of Biostatistics and Healthcare Policy and Research at Weill Cornell Medicine - Qatar (WCM-Q). Prior to coming to WCM-Q in September 2010, he served as an Assistant Professor in the Department of Statistics and School of Public Health of the University of Kentucky (2001 – 2004) and an Assistant and Associate Professor in the Department of Epidemiology and Population Health at the American University in Beirut (2004-2010). Dr. Mahfoud holds a PhD in Statistics from the University of Florida.

Dr. Mahfoud's research interests focus mainly on tobacco use, mental health, and medical education. He is particularly interested in youth and tobacco, pregnancy and tobacco, and validation of mental health scales. He has also published in the area of HIV among most at-risk populations. He is currently the principal investigator and co-principal investigator on several grants looking at epidemiology of epilepsy in Qatar, finding alternatives to informed consent in Qatar, and evaluating school interventions for prevention and cessation of shisha smoking. He also supports several faculty members in the design, conduct, and analysis of research projects. Dr. Mahfoud initiated and participated in several training workshops for medical students, research assistants and associates, residents, and fellows on topics such as epidemiology, biostatistics, evaluating published medical articles and evidence-based medicine.

Deema Al-Sheikhly, MEHP
Director, Continuing Professional Development

Weill Cornell Medicine-Qatar

BIO-graphy

Ms. Al-Sheikhly is the Director of the division of Continuing Professional Development at Weill Cornell Medicine - Qatar (WCM-Q). In this position, she is responsible for directing the overall educational program and maintaining the division's mission and strategic plan as well as providing strategic oversight for the development and maintenance of the infrastructure of the division. She co-led the division in attaining local recognition of WCM-Q as a provider of Continuing Medical Education (CME) and Continuing Professional Development (CPD) as well as International recognition by the Accreditation Council for Continuing Medical Education (ACCME) as a provider of continuing medical education for physicians. Thereby, WCM-Q became amongst the first institutions in the world, outside of the US, to be recognized as an accredited provider by the ACCME and to have the rights and responsibility to designate *AMA PRA Category 1 Credit(s)*™.

In her previous role as Manager for Graduate Medical Education (GME) at WCM-Q, she provided academic and administrative support to WCM-Q's Associate Dean for GME. This included support of the affiliate hospital in restructuring the residency programs to meet the ACGME-I accreditation standards. She was instrumental in developing an Internal Review process, which was highly commended by ACGME-I.

Ms. Al-Sheikhly joined WCM-Q in 2006 as Clinical Curriculum Administrator, Office of Curriculum Support. In this position, she was instrumental in setting up the clinical clerkships and providing administrative and organizational support to the course and clerkship directors. In that period of time, she took the opportunity to complete a certificate in Management Essentials: Managing Performance from Cornell University through eCornell. She also obtained a Clerkship Administrator Certificate from the AAMC Central Group on Educational Affairs and submitted a project report to the same association on clerkship time of year bias at WCM-Q.

Ms. Al-Sheikhly earned her Bachelor of Science (Hons) in Biotechnology from Kings College London, Master of Research in Bioprocessing from University College London and Master of Education in the Health Professions from Johns Hopkins University, USA. Prior to joining WCM-Q, she was working as a research assistant in a biopharmaceutical company (GroPep PTY Ltd) in Adelaide, South Australia, while pursuing her PhD on detection of Flaviviruses.

Soha Dargham, MPH
Senior Research Specialist

Weill Cornell Medicine-Qatar

BIO-graphy

Soha Dargham is currently a Senior Research Specialist working in the Biostatistics, Epidemiology and Biomathematics Research Core at Weill Cornell Medicine-Qatar. In this role she is the lead statistician for several ongoing projects. Soha has also presented several introductory biostatistics workshops for research staff and medical interns. She enjoys translating the numbers and data statistics into stories and identifying research priorities, which in turn can be used by clinicians, health policy makers, and the public to make evidence-based decisions on public health. Soha earned her BSc from the University of Wisconsin-Madison, USA, and her MPH from the American University of Beirut, Lebanon. She is fluent in English, Arabic and French.

Mark Healy, MSc
Education Assessment Analyst

Weill Cornell Medicine-Qatar

BIO-graphy

Mr. Healy is an Education Assessment Analyst at WCM-Q. He holds an MSc in Statistics with Medical Applications from the University of Sheffield and a BSc in Financial Mathematics from the University of Limerick.

He has experienced in applying statistics in both academia and industry, with a career spanning consultancy-based roles, financial services, aviation and academia.
Mr. Healy's research interests include program assessment and evaluation, as well as the application of statistics in industry.

Syed Latifi, PhD
Education Assessment Manager,
Division of Medical Education

Weill Cornell Medicine-Qatar

BIO-graphy

Dr. Syed Latifi, PhD, is a computer scientist and psychometrician by training, with more than ten years of national and international experience in assessment, evaluation, educational innovations, data sciences, and training.

Dr. Latifi joined WCM-Q in 2016 and is currently responsible for overseeing programmatic evaluation and CQI (Continuous Quality Improvement) processes. Prior to joining WCM-Q he worked for the University of Alberta with Tier-I Canada Research Chair in Educational Measurement, where he also completed his doctoral program, and the Aga Khan University-Examination board where he led testing and operations of national assessments.

His current research interests include evaluation and big-data analytics, educational data mining, and statistical modeling using the R programming language. His professional interests include regulation, accreditation, and educational development. He is a member of, and regular presenter at the American Evaluation Association, American Educational Research Association, and National Council on Measurement in Education.

Padmakumari Sarada, MSc
Teaching Specialist in Math and Statistics

Weill Cornell Medicine-Qatar

BIO-graphy

Ms. Sarada is a Teaching Specialist in Math and Statistics at Weill Cornell Medicine-Qatar. She previously served as Learning Lab Specialist in the science program at Texas A&M-Qatar. She holds a Master's in Statistics, a Master's in Mathematics, and a Bachelor's degree in Education from Kerala University, India.

Ms. Sarada is currently pursuing PhD in Education at Richard W Riley College of Education & Leadership, USA.

CONTACT US

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