



**AFROMED ACADEMY OF MEDICAL RESEARCH AND
INNOVATION**

**PHASE II MEDICAL RESEARCH FELLOWSHIP DRAFT
PROGRAM OUTLINE**

2024/2025

Program Overview

The Afromed Medical Research Fellowship Program is a transformative, interdisciplinary initiative aimed at cultivating the next generation of clinical and biomedical researchers in Africa and globally. This program integrates online learning with practical, hands-on activities, empowering fellows with cutting-edge research skills to tackle real-world healthcare challenges.

This program emphasizes excellence in study design, data handling, scientific writing, and publication processes, while instilling a commitment to ethical and innovative research practices. Participants will receive mentorship from leading experts and engage in activities that simulate authentic research environments.

Program Objectives

By the conclusion of this program, fellows will:

1. Master the principles and methodologies of robust research design and protocol development.
2. Gain expertise in advanced data collection, management, and analysis using industry-standard tools.
3. Uphold the highest ethical standards and regulatory compliance in all research activities.
4. Communicate scientific findings effectively through high-impact publications and presentations.
5. Navigate the peer review and editorial process as both authors and reviewers.
6. Build collaborative networks that promote research innovation and community impact.

Program Outline

Module 1: Research Design and Protocol Development

Objective: Equip fellows with the skills to design high-quality studies and prepare research protocols that address critical knowledge gaps in health sciences.

Didactic Lectures

1. Foundations of Research Design: Quantitative vs. Qualitative Approaches.
2. Translating Clinical Questions into Research Objectives and Hypotheses.
3. Systematic Literature Reviews: Evidence Synthesis for Protocol Development.
4. Grant Writing Essentials: Crafting Competitive Proposals.
5. Sampling Strategies and Statistical Power in Health Research.
6. Choosing the Right Study Design for Complex Research Questions.

Practical Activities

1. Develop a research proposal on a selected public health, biomedical or clinical topic.
2. Conduct a systematic review and present findings.
3. Design mock grant applications with peer feedback sessions.
4. Prepare a detailed research protocol, including objectives, methodology, and budget, etc.

Module 2: Data Collection and Management

Objective: Train fellows in efficient, accurate, and ethical data collection, handling, and storage techniques.

Didactic Lectures

1. Best Practices for Designing Surveys, Questionnaires, and Interview Guides.
2. Technology in Data Collection: Leveraging REDCap, KoboToolbox, and ODK, Google Forms etc.
3. Data Quality Management: Validation, Error Detection, and Data Cleaning.

4. Ethical Challenges in Data Collection and Participant Privacy.
5. Integrating Multimodal Data Sources in Research Studies.

Practical Activities

1. Deploy surveys and collect data using electronic tools (e.g., REDCap, etc).
2. Analyze and clean mock datasets with real-world complexities.
3. Simulate data collection with interviews or focus groups.
4. Conduct exercises on ensuring compliance with GDPR and other data protection laws.

Module 3: Data Analysis and Interpretation

Objective: Build advanced data analysis skills and statistical literacy for interpreting complex datasets.

Didactic Lectures

1. Fundamentals of Biostatistics: From Descriptive to Inferential Analysis.
2. Advanced Regression Techniques: Logistic, Linear, and Survival Analysis.
3. Machine Learning in Health Research: An Introduction.
4. Data Visualization: Creating Impactful Figures, Graphs, and Dashboards.
5. Addressing Missing Data and Conducting Sensitivity Analysis.
6. Statistical Pitfalls: Avoiding Errors and Misinterpretations.

Practical Activities

1. Conduct data analyses using SPSS, STATA, or R.
2. Generate and critique visualizations for publication and presentation.
3. Perform regression analyses on health datasets.
4. Write a statistical analysis plan (SAP) for a research project.

Module 4: Research Ethics and Regulatory Compliance

Objective: Ensure fellows internalize the principles of ethical research conduct and meet regulatory requirements.

Didactic Lectures

1. The Evolution of Research Ethics: Historical Perspectives and Current Standards.
2. Navigating the Institutional Review Board (IRB) Process.
3. Ethical Dilemmas in Multinational and Collaborative Research.
4. Special Considerations for Vulnerable Populations in Research.
5. Research Integrity: Addressing Plagiarism and Data Fabrication.

Practical Activities

1. Prepare mock IRB applications for proposed studies.
2. Analyze ethical dilemmas through case study discussions.
3. Role-play obtaining informed consent from vulnerable populations.

Module 5: Scientific Writing and Dissemination

Objective: Train fellows to communicate research findings through scientific writing and presentations effectively.

Didactic Lectures

1. Structuring a Scientific Manuscript: Introduction, Methods, Results, and Discussion (IMRAD).
2. Writing Persuasive Abstracts and Titles for Maximum Impact.
3. Tips for Revising and Editing Manuscripts.
4. Navigating the Open Access vs. Subscription-Based Publishing Debate.
5. Preparing for Conferences: Oral Presentations and Poster Design.

Practical Activities

1. Draft and revise a full-length manuscript.
2. Create and present a conference poster using research data.
3. Conduct mock journal submissions and address peer review feedback.

Module 6: Peer Review and Editorial Process

Objective: Demystify the peer review and publication process to enable fellows to participate as both authors and reviewers.

Didactic Lectures

1. Understanding the Peer Review Process: Single-Blind, Double-Blind, and Open Review.
2. Writing Constructive Peer Review Reports: A Step-by-Step Guide.
3. The Role of Journal Editors: Decision-Making and Editorial Ethics.
4. Challenges in Peer Review: Bias, Conflicts of Interest, and Misconduct.
5. Emerging Trends in Scientific Publishing: Preprints and Post-Publication Reviews.

Practical Activities

1. Conduct mock peer reviews for anonymized manuscripts.
2. Role-play as journal editors to evaluate manuscript submissions.
3. Draft response letters to reviewer comments with detailed justifications.

Program Pedagogy

- Mentorship: Each fellow will be paired with a mentor who provides personalized guidance.
- Interactive Webinars: Weekly sessions with domain experts to discuss real-world research challenges.
- Collaborative Projects: Fellows will work in teams to develop and present research outputs.
- Capstone Project: Fellows will design, execute, and present a research project at the end of the program.

Evaluation and Certification

Fellows will be assessed through:

1. Research protocol submission and defense.
2. Written assignments (e.g., literature reviews, manuscripts, critical appraisals etc).
3. Peer review performance and participation.
4. Oral presentations and poster sessions.

Successful completion will culminate in certification as a graduate Fellow of the Aframed Academy of Medical Research and Innovation.