Advanced Epidemiology Methods Training Course

Professional Development Training Course Outline

Category	Public Health	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Advanced Epidemiology Methods is a cutting-edge, data-driven training course designed to equip public health professionals, researchers, and analysts with advanced statistical epidemiology, causal inference, outbreak analytics, and predictive modeling skills. The course integrates modern biostatistics, machine learning in epidemiology, disease surveillance systems, and real-world evidence (RWE) approaches to strengthen decision-making in global health contexts. Participants will gain mastery in epidemic intelligence, spatial epidemiology, time-series disease modeling, and health data analytics, enabling them to respond effectively to emerging and re-emerging infectious diseases.

In an era of global pandemics, antimicrobial resistance (AMR), climate-sensitive diseases, and digital health transformation, this training provides a robust foundation in advanced epidemiologic study designs, cohort and case-control optimization, Bayesian modeling, and causal pathways analysis. Advanced Epidemiology Methods Training Course emphasizes practical application using real datasets, empowering learners to transform raw health data into actionable insights for policy formulation, outbreak control, and population health improvement.

Programme Curriculum

Advanced Epidemiology Methods Training Course

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Course Objectives

1. Master advanced epidemiologic study designs and causal inference frameworks
2. Apply biostatistical modeling and regression techniques in health research
3. Develop expertise in infectious disease modeling and outbreak forecasting
4. Utilize machine learning for epidemiological prediction and risk stratification
5. Conduct spatial and geographic disease mapping (GIS epidemiology)
6. Strengthen skills in real-world evidence (RWE) generation and analysis
7. Implement time-series analysis for epidemic trend detection
8. Analyze health surveillance and early warning systems
9. Apply Bayesian statistics in public health decision-making
10. Evaluate confounding, bias, and effect modification in studies
11. Design clinical and population-based epidemiological studies
12. Integrate big data analytics in digital epidemiology
13. Translate epidemiological evidence into health policy and interventions

Target Audience

- Public Health Officers and Epidemiologists
- Medical Researchers and Biostatisticians
- Disease Surveillance Officers
- Clinical Research Associates
- Health Data Analysts and Data Scientists
- WHO/NGO Health Program Managers
- Graduate Students in Epidemiology or Public Health
- Government Health Policy Makers

Course Modules

Module 1: Foundations of Advanced Epidemiology

- Epidemiologic principles and frameworks
- Measures of disease frequency and association
- Study validity and reliability
- Advanced research ethics
- Data interpretation techniques
- **Case Study:** COVID-19 transmission dynamics analysis

Module 2: Causal Inference in Epidemiology

- Counterfactual reasoning
- Directed acyclic graphs (DAGs)
- Confounding control strategies
- Mediation analysis
- Effect estimation methods
- **Case Study:** Smoking and lung cancer causal pathways

Module 3: Advanced Biostatistics

- Multivariate regression models
- Survival analysis techniques
- Logistic regression optimization
- Hazard ratios interpretation
- Model diagnostics
- **Case Study:** Cancer survival prediction modeling

Module 4: Infectious Disease Modeling

- SIR and SEIR models
- Reproduction number (R0) estimation
- Transmission dynamics
- Vaccination impact modeling
- Scenario simulations
- **Case Study:** Ebola outbreak modeling in West Africa

Module 5: Outbreak Investigation Methods

- Case definition development
- Epidemic curve construction
- Field investigation protocols
- Hypothesis testing
- Source tracing methods
- **Case Study:** Cholera outbreak investigation

Module 6: Spatial Epidemiology (GIS)

- Disease mapping techniques
- Hotspot detection
- Spatial autocorrelation
- Geo-statistical modeling
- Environmental health linkage
- **Case Study:** Malaria mapping in endemic regions

Module 7: Time-Series Epidemiology

- Trend analysis methods
- Seasonal variation modeling
- Forecasting techniques
- ARIMA models
- Signal detection
- **Case Study:** Influenza seasonal prediction

Module 8: Machine Learning in Epidemiology

- Supervised learning models
- Classification algorithms
- Feature engineering
- Model validation
- Predictive analytics
- **Case Study:** Diabetes risk prediction system

Module 9: Public Health Surveillance Systems

- Indicator-based surveillance
- Event-based surveillance
- Real-time reporting systems
- Data quality assurance
- Alert thresholds
- **Case Study:** COVID-19 surveillance dashboards

Module 10: Bayesian Epidemiology

- Prior and posterior distributions
- Bayesian inference models
- Markov Chain Monte Carlo (MCMC)
- Probabilistic reasoning
- Decision uncertainty modeling
- **Case Study:** Vaccine effectiveness estimation

Module 11: Health Data Science & Big Data

- Electronic health records (EHRs)
- Data integration techniques
- Data cleaning pipelines
- Cloud-based analytics
- Data governance
- **Case Study:** Hospital admissions data analytics

Module 12: Bias, Confounding & Errors

- Selection bias
- Information bias
- Confounding adjustment
- Measurement errors
- Sensitivity analysis
- **Case Study:** Drug effectiveness misinterpretation

Module 13: Clinical Epidemiology

- Diagnostic test evaluation
- Prognostic modeling
- Clinical trial design
- Evidence synthesis
- Treatment outcomes

- **Case Study:** HIV treatment effectiveness study

Module 14: Environmental & Climate Epidemiology

- Climate-health interactions
- Exposure assessment
- Pollution impact modeling
- Risk attribution
- Sustainability health linkages
- **Case Study:** Air pollution and respiratory disease

Module 15: Translational Epidemiology & Policy

- Evidence-to-policy translation
- Health impact assessment
- Policy modeling tools
- Intervention evaluation
- Global health frameworks
- **Case Study:** Malaria elimination policy design

Training Methodology

This course employs a participatory and hands-on approach to ensure practical learning, including:

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

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