NATIONAL POSTGRADUATE MEDICAL COLLEGE OF NIGERIA

POSTGRADUATE DIPLOMA CURRICULUM FOR EPIDEMIOLOGY AND BIOSTATISTICS

FACULTY OF PUBLIC HEALTH AND COMMUNITY MEDICINE

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FACULTY OF PUBLIC HEALTH AND COMMUNITY MEDICINE

NATIONAL POSTGRADUATE MEDICAL COLLEGE OF NIGERIA (NPMCN)

TRAINING CURRICULUM

FOR POSTGRADUATE DIPLOMA

IN

EPIDEMIOLOGY AND BIOSTATISTICS

2022

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1.0. INTRODUCTION: The National Postgraduate Medical College of Nigeria (NPMCN) was established by the National Postgraduate Medical College Decree No. 67 of 24th September, 1979, now Cap N59 Laws of the Federation 2004. The Faculty of Public Health and Community Medicine, one of the faculties under the National Postgraduate Medical College is responsible for training of specialist public health physicians in Nigeria with skills and competences to practice public health in Nigeria and beyond. Such training has often required very rigorous procedures and involving Primary, Part 1 and Part 2 examinations and spanning a period of at least six years. Since then the College has trained many doctors in the field of public health. Despite this laudable effort there still remains a need for more manpower specialists in public health to take care of the ever challenging health issues in Nigeria.

The NPMCN has encouraged the establishment of a postgraduate diploma program in Faculty of Public Health and Community Medicine (FPHCM) to fill-in this manpower gap and also provide knowledge and competences in certain subspecialties of public health to doctors in other specialties of medical practice. Therefore, this curriculum is a guide to the training of these doctors in Epidemiology and Biostatistics (EPB) subspecialty of Public Health and Community Medicine (PHCM).

1.1 MISSION STATEMENT

The mission of the Faculty of Public Health and Community Medicine, National Postgraduate Medical College is to promote the highest level of academic and professional training of doctors in Public Health and Community Medicine in line with best global standards.

1.1 VISION: To develop human resource for health that meets international standards utilizing global best training standard in the subspecialty of Epidemiology and Biostatistics.
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2.0. EDUCATIONAL OBJECTIVES OF THE FACULTY OF PUBLIC HEALTH AND COMMUNITY MEDICINE

Our educational objectives are to:

i. Strengthen accredited training institutions to ensure that trainees are exposed to the best academic and professional training.
ii. Ensure and maintain the highest standards for learning and practice of Public Health and Community Medicine for continued academic development.
iii. Evaluate and certify trainees using phased, reliable, and valid assessment methods.

iv. Promote academic excellence and professionalism through the inculcation of attitudes of honesty and accountability, with sincerity and precision in academic and professional thoughts, words, and actions.

Despite the focus on Public Health and Community Medicine Physicians, the Faculty also has an obligation to other medical colleagues. This includes the obligation to avail professional colleagues of the opportunity to update their knowledge and skillsets in identifying problems and proffering solutions for improvement through research and efficient data management. It is in the realization of this role that the postgraduate diploma programme in Epidemiology and Biostatistics was created.

3.0. SCOPE OF CURRICULUM

This curriculum defines what is to be learned and how best it should be learned. However, formal learning revolves around four key components, learner, facilitator, curriculum, and milieu. Curriculum, being only one of four distinct components, must be considered holistically, rather than in isolation.

The responsibility for identifying needs, understanding the content, context, and processes of the curriculum, accepting to learn, adapting positively to the prevailing milieu, and recognizing learning opportunities is that of the trainee who is the most important component of this formal education process. The trainer's responsibility is to facilitate learning by appreciating the objectives of the curriculum, ensuring an optimum learning environment, and creating learning opportunities.

Trainees have the challenge of managing their educational programme, while the trainers have the challenge of verifying that the learning that occurs is in the right direction (congruence with the academic and professional expectations of the Faculty). Both trainees and their trainers have obligations to monitor and evaluate progress in learning, using self, peer, as well as formative and summative evaluations. In the light of advances in medical knowledge and technology and the demands for quality assurance and cost-effectiveness, as well as the increasing need for thinking and practice to be based on current best evidence, standards in training and evaluation will necessarily change with time thus necessitating a periodic review of the curriculum and assessment methods

4.0. ADMISSION REQUIREMENTS

To be eligible for enrolment into the programme trainee must be a medical doctor with permanent registration with the medical and dental council and must have completed the

one-year internship and National Youth Service (NYSC) or its exemption. Pass a screening test for admission. In addition, the trainee must be computer literate, have access to the internet, and ready to:

i. Devote 8-10 hours per week to the postgraduate diploma course
ii. Commit to undertaking a project research work

5.0. SPECIFIC PRACTICE, LEARNING, AND EVALUATION DIRECTION

The specific practice, learning, and evaluation directions are defined by group consensus and require collective compliance with the concepts described hereafter

The Faculty's consensus national Community Medicine approach is the Population System Approach, that is, a health system approach to population health that entails a broad knowledge of the community in developing an approach that encompasses all components of the health system as well as stakeholders, and establishes priorities for action. This approach will be applied to the postgraduate diploma in epidemiology and biostatistics programme.

5.1. Learning outcomes

At the end of the diploma course, it is expected that trainees will acquire knowledge and skillsets in the following practice and learning areas:

i. Assessing and synthesizing information on health status and health service utilization data, in identifying desired outcomes and developing evidence-based strategies to reach these outcomes.
ii. Using basic epidemiological tools and software in analyzing and managing health-related events
iii. Applying epidemiological reasoning and methodology in identifying and analyzing patterns of health-related events and problems.
iv. Deploying sound epidemiological methods in designing studies, interventions, and evaluation programmes.
v. Generating, synthesizing, appraising, analyzing, interpreting, and communicating epidemiologic intelligence that measures the health status, risks, needs, and health outcomes of defined populations.
vi. Sourcing, writing and managing research grants

5.2. Scope of assessment

When assessing trainees, skills, and competencies to be assessed include the ability to:

i. Apply epidemiological reasoning to the description and identification of health problems as well as inferences made thereof;
ii. Carry out a rapid epidemiological assessment, including the investigation of a disease outbreak;
iii. Design, implement, and report on the conduct of an epidemiological study;
iv. Describe the burden of a disease or group of diseases, in economic and medical terms: for the individual, the community, and society;
v. Formulate and prioritize appropriate public health and clinical research questions and interpret one's own data, as well as the data and findings of other investigators, including publications in the scientific literature

5.3. Outcome assessment.

Components of outcome assessment shall include the ability to:

i. critically appraise the state of current knowledge with respect to important public health issues;
ii. demonstrate good analytical skills;
iii. demonstrate an appropriate level of professional knowledge;
iv. communicate effectively using written and oral methods;
v. apply basic principles of epidemiology in understanding and solving public health and clinical issues
vi. use science and technology responsibly and ethically;
vii. demonstrate good interpretative skills as well as good epidemiological reasoning;
viii. act consistently within levels of competence and professional norms

6.0. TRAINING MODE

Part Time program

The diploma programme in epidemiology and biostatistics is a hybrid programme with online and onsite components. The online component consists of didactic lectures, skills laboratory for learning epidemiological tools, and software and seminars organized in the form of modules.

6.1 COURSE DURATION: Minimum of 12months.

6.2 CREDIT UNIT: 28 (20 Credit Units Course work and 8 Credit Units Project)

6.3 LECTURE SCHEDULE:

The online component will run for 30 weeks. The schedule is as in modules as follows;

i. Didactic pre-recorded lectures (with question-and-answer sessions) for 30 weeks (two hours lecture on two days of the week)
ii. Skills laboratory (three hours weekly) for 15 weeks per module as appropriate
iii. Seminars (three hours weekly) for 15 weeks per module as appropriate
iv. Reading and practical assignments

6.4 COURSE CREDIT UNITS

i. One hour lecture/tutorial weekly for fifteen weeks (15wks) is 15 hours and equals 1 credit unit
ii. Three hours skills workshop for fifteen weeks (15 wks) is 45 hours and equals 1 credit unit
iii. Three hours of seminar weekly for fifteen weeks is 45 hours and equals 1 credit unit

6.2. COURSE TOPICS

6.2.1. EPB 801: Principles of Epidemiology (4 credit units)

Course	Specific topics/ skills	Weighting (%) of course coverage
A. Introduction to epidemiology	Definition, Meanings and Purpose of Epidemiology Scope of Epidemiology	10
B. Introduction epidemiological reasoning	Sequence and methods of epidemiological reasoning. Decision making in Epidemiology	10
C. Inductive and deductive reasoning	Epidemiological Methods	10
D. Descriptive epidemiology	Incidence and Prevalence Studies Case Studies and Case Series Descriptive Cross-sectional Studies, Pattern of Diseases: Person, Place and Time. Secular and Cyclical trends in disease occurrences Mortality studies, mortality statistics and death notification	20
E. Analytical Epidemiology	Introduction to analytical cross-sectional studies, Before and after studies Proportional mortality studies Case control studies Historical cohort studies, Prospective and retrospective cohort studies Odds ratio; relative risk/ risk ratio; attributable risk; proportional mortality ratio; standardized mortality ratios	25
F. Experimental Epidemiology	Types of Intervention Studies - Experimental and Quasi-Experimental	25

	studies; Introduction to Clinical Trials: Randomized Controlled Trials and Non-Randomized trials. Blinding, matching and other methods of bias control; Randomization Ethical considerations in Medical Research Community trials Survival/ actuarial studies Meta-analysis	

6.2.2. EPB 802: Communicable Disease Epidemiology and Control (3 credit units)

Course	**Specific topics and skills**	**Weighting (%) of course coverage**
A. Introduction	Terms and concepts used in Communicable Disease Epidemiology	15
B. The natural history of Diseases	The cycle of Health and Disease	10
C. Human Immunity	Factors affecting Immunity against Diseases; Herd Immunity	15
D. Nosocomial infections/ Hospital Acquired Infections	Epidemiology of Nosocomial Infections: Definition, Agents, Sites, Sources, and predispositions. Principle of infection control and Disease Exposure Control, Prevention and Control (Surveillance) of Nosocomial infections.	15
E. Disease Surveillance and Notification	Definition; Objectives; types of Surveillance; National Notification: routine monthly notification and emergency notification; Internationally notifiable diseases; Integrated	15

	Disease Surveillance and Response; Problems of Disease Notification in Nigeria.	
F. Outbreak investigation	Epidemic intelligence (including indicator-based surveillance and event-based surveillance), digital epidemiology, epidemic preparedness and response, international agencies and networks involved with epidemic response	15
G. Critical appraisal of medical literature	Methods approach to appraisal of medical literature, introduction to critical appraisal checklists e.g., stard, consort, strobe etc, checklist approach to critical appraisal and manuscript writing	15

6.2.3. EPB 803: Non- Communicable Disease Epidemiology and Control (3 credit units)

Course	**Specific topics and skills**	**Weighting (%) of course coverage**
A. Non-Communicable Diseases epidemiology and burden of disease	NCD epidemiology, NCD burden of disease and related risk factors, multi- factorial causation of diseases, surveillance sources and data for NCDs	25
B. Cancer epidemiology	Descriptive epidemiology of cancers, measures of cancer risk and burden, principles of cancer prevention, screening programmes	25
C. Epidemiology and control of cardiovascular	Epidemiology and control of Hypertension and common cardiovascular diseases; Cardiovascular risk assessment	25

disease		
D. Epidemiology and control of chronic diseases	Epidemiology and control of other chronic diseases	25

6.2.4. EPB 804: Biostatistics (3 credit units)

Course	**Specific topics and skills**	**Weighting (%) of course coverage**
A. Introduction	Importance of numeracy in medicine and health care, scales of measurement and their implications for statistical methodologies	10
B. Frequency distribution and tables	Frequency distributions and tables	10
C. Graphic presentation of data	Basic principles of data representation on graphs. Bar charts, pie charts, histograms, frequency polygons etc	10
D. Summarization of data	Measures of central tendency and location; measures of spread or variation, calculations of mean, median, mode; variance, standard variation	10
E. Measurement errors	Sampling theory, validity and repeatability, sampling and non-sampling errors, non-systematic and systematic errors	10
F. Vital Statistics	Vital rates, crude and specific, adjusted rates, population life tables, mortality statistics, classification of the causes of death	15

G. Burden of disease measurement	Measures of morbidity, hospitalization, and mortality. Sources of disease, hospitalization, and mortality data. Record linkage, health information systems. Summary measures of disease burden.	10
H. Probability	Fundamental concepts of probability and distributions	10
I. Inferential Statistics	Sampling distribution, Likelihood-based inference, point estimation, interval estimation, statistical errors (type I & II), sample size determination, hypothesis testing, non-parametric and parametric methods, basic statistical models, confounding and effect modifiers	15

6.2.5. EPB 805: Data organization and analysis (4 credit units)

Course	**Specific topics and Skills**	**Weighting (%) of course coverage**
A. Introduction	Introduction to computers in medicine, introduction to data classification and organization	10
B. Databases	Types of databases and their features	10
C. Introduction to data analysis tools	Analytical softwares and their peculiarities. Basic features of Excel, Epid info, SPSS, and Stata	20
D. Practical sessions on data analysis	Use of common analytical tools for basic analysis	20
E. Explanatory data visualization	Introduction to data visualization, data visualization theory, stages of data visualization, processing in data visualization, dashboard, introduction to data visualization	10

	tools, and dashboard	
F. Practical sessions on data visualization	Use of common data visualization tools for case studies i.e., excel, power BI, tableau	20
G. Data stewardship	Data governance and relevant laws, information sharing, data use agreements, data storage issues	10

6.2.6. EPB 806: Grants writing and management (3 credit units)

Course	**Specific topics and Skills**	**Weighting (%) of course coverage**
A. Introduction to grant writing	Types and purpose of grants, scope of grants, terminologies in grant writing, parts of grant applications	10
B. Grant sourcing	Types of funding organizations and databases, funding announcements, understanding funders and their requirements, sources of information	15
C. Application process	Choosing an appropriate topic, matching funder to topic, assembling a research team, space and timing for grant writing, collaboration tools	15
D. The writing process	Background, problem statement, justification, objectives, innovation, methods, outcomes and research impact, ethical considerations, personnel and research environment	20
E. Budgeting	Budget format, budget summary, budget detail, fringe benefits, budgeting for personnel and effort, budget checklist, and justification. Allowable and non-allowable costs	15
F. Peer review and	Internal review process, coherence checking,	15

submission	submission requirements (letters of support, curriculum vitae, resources summary), submission deadlines, external review process	
G. Introduction to grant management	Letters of award, terms of award, institutional review boards and ethical reviews, data use agreement, materials transfer agreements, research progress reports, personnel management, information management policies, financial management, grant close out	10

6.2.7: EPB 807 PROJECT

In addition to passing the assessment at the end of each online module, trainees must complete a project for the award of postgraduate Diploma in Epidemiology and Biostatistics.

The project may include:

I. Operations research addressing a work-related issue
II. Secondary research of public health, clinical, or managerial importance. This may include a review of current understanding about a topic or area or secondary data analysis of existing datasets.

The project shall have the following format and structure.

Title page: The title is to be written as **"Project for Final Examination."** This is then followed by the name of the candidate, his/her training institution's address; followed by statement: **"submitted to the Faculty of Public Health and Community Medicine, in partial fulfilment of the requirements for the award of postgraduate diploma in Epidemiology and Biostatistics in Faculty of Public Health and Community Medicine, of the National Postgraduate Medical College of Nigeria".** Finally, the month and year of the examination at which the book is presented, for example "November 2022".

The student project shall consist of the following opening pages and chapters

Certification page *(Should contain Name, Signature, Date and Address of Supervisor)*
Dedication (optional)
Acknowledgements (optional)
Table of contents

Chapter One. Introduction

Chapter Two. Literature Review

Chapter Three. Methodology

Chapter Four. Results/Findings

Chapter Five. Discussion, Conclusions and Recommendations

- The conclusions and recommendations for all stakeholders including the faculty, the training institution, the department, as well as, for colleagues and future diplomats

Referencing style should be Harvard applying Vancouver Referencing in the text and listing the references at the end of the report.

7.0. EVALUATION/ASSESSMENT

Evaluation and assessment will be formative and summative.

7.1 FORMATIVE ASSESSMENT (30%): The formative assessment will be based on timely and completed assignments and presentations during attendance at the online component. In addition is the assessment as recorded in the training Logbook.

8.2 SUMMATIVE ASSESSMENT (70%): Summative assessment will be in two parts

I. Theory examination on the principles and practice of Epidemiology and applied Biostatistics
II. Oral defense of a completed project (8 Credit Units).

Total number of credits for the Diploma course is 28 credit units which trainee must have accumulated and be assessed on before the Diploma in Epidemiology and Biostatistics is awarded.

7.3 Final Examination Format

Components	Assessment type	How will it be assessed	Resources	Time
Theory	**MCQ**	**Standard Setting Method (Angoff)**	CBT	60 minutes
Project defense/ Orals	Candidate will be examined on theory and Practice of Epidemiology and Biostatistics	60% on Principles and practice of EPB and 40% defense of Field Posting Report	Examiners	30 minutes 60 minutes

7.4 SCORING AND GRADING OF PERFORMANCE

Scoring of the different components of the assessment shall be as follows:

Scores	Level of Pass	Grade	Grade Level
≥ 70	Very Good Pass	A	P+1
60 – 69	Good Pass	B	P+
50 – 59	Pass	C	P
40 – 49	Borderline	D	P -
< 39	Fail	E	P -1

8.0 AWARDING THE POSTGRADUATE DIPLOMA DEGREE

Any student whose CGPA falls below 2.50 in any semester shall withdraw from the programme. Students must complete the course work before being allowed to defend project. Any student who fails to complete course work and defend project within the stipulated maximum period of stay (18 months) will be considered to have abandoned the programme.