



Epidemiology education: classification of courses

Enseñanza de la epidemiología: clasificación de las asignaturas

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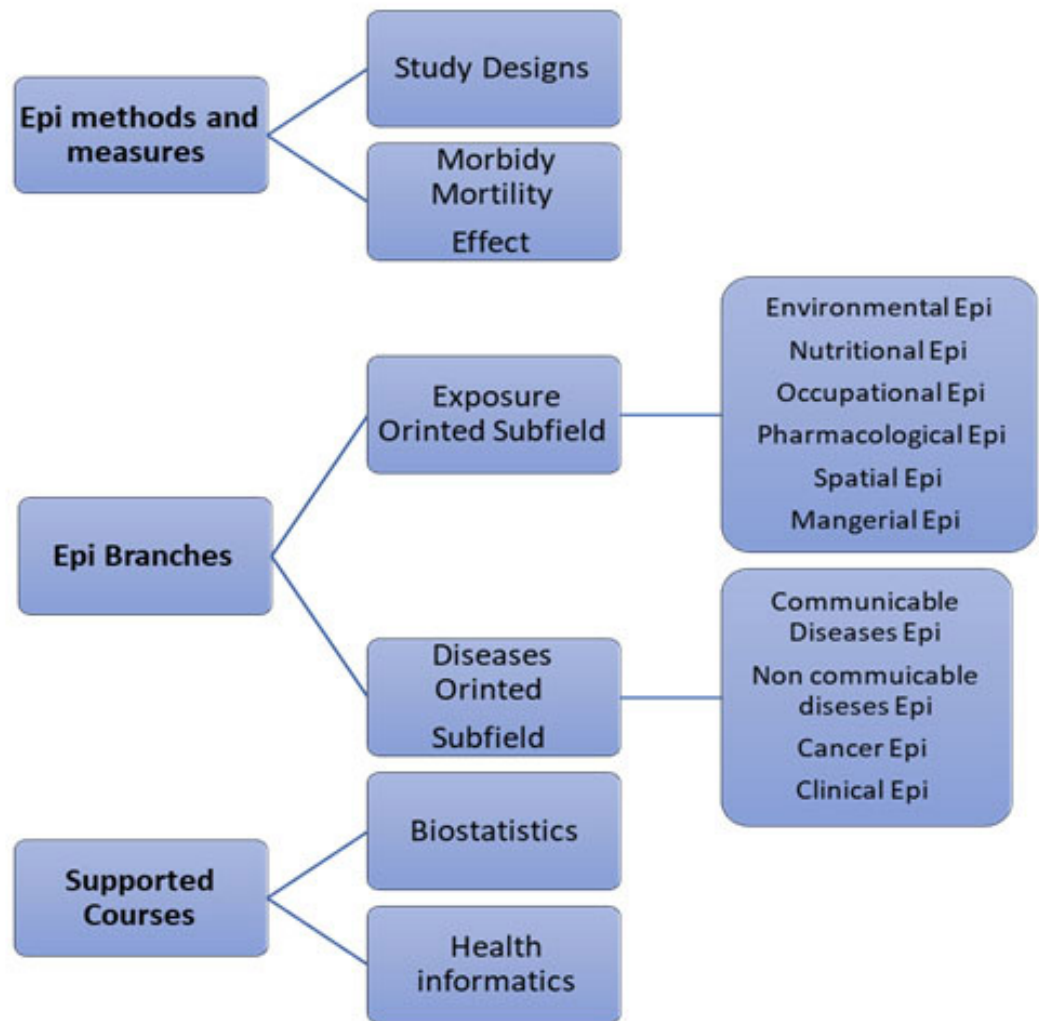
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Epidemiology is the basic science of public health and preventive medicine. It is defined as the study of the distribution and determinants of health-related states among specified populations and the application of that study to control health problems (1). Public Health is the science and art of preventing disease, prolonging life, and promoting health through the organized efforts of society (2). Accordingly, the ultimate aim of epidemiology is the prevention of diseases and the promotion of health. To achieve this aim, it focuses on four areas, including disease causation, natural history of diseases, population health status, and intervention evaluation. According to the epidemiologic assumption, human disease does not occur randomly; there are patterns of occurrence in which some behavioral and environmental factors (exposures) increase the risk of acquiring or developing a particular disease among a group of individuals.

Additionally, human disease has causal and preventive factors. These factors can be identified through systematic investigation of populations or groups of individuals within a population in different places or at different times. Therefore, the epidemiological approach is based on asking questions and making comparisons. Epidemiologists study populations' health phenomena and disease patterns to determine risk profiles and potential health improvement targets. More importantly, they collaborate with other healthcare workers to implement population-level, health-related interventions (1).

Public health sectors worldwide are facing substantial health challenges every day. There is a crucial need to develop education and training programs in epidemiology to meet the professional gap in health fields and address real-world public health problems. By revising several existing undergraduate programs in epidemiology worldwide, an overlap was observed in some courses related to the core public health courses and epidemiology. Figure 1 below presents a proposed conceptual framework of curriculum design for undergraduate epidemiology education.



The importance of each discipline in the epidemiology curriculum is widely described elsewhere (3,4,5). However, most schools still overlap on how these courses are classified and organized for better learning outcomes. I believe effective epidemiology education programs are based on building knowledge of core competencies for epidemiology in three sections. First, the study designs include descriptive, analytic, and experimental. In addition, epidemiologic measures include measures of morbidity, mortality, and measures of effects. Second, the epidemiology course branches are classified into exposure-oriented and disease-oriented subfields. The former focuses on learning the effect of external factors on health, such as the environment, studied by environmental epidemiology; the effect of occupation on health is studied by occupational epidemiology, and so on. The latter covers selected domains in medical practices, including communicable and non-communicable diseases; further divisions may be organized to focus on special health problems, for example, cancer epidemiology or cardiovascular epidemiology. More subfields could be added, such as maternal child health epidemiology and social epidemiology, depending on the course providers' vision and mission. By studying branches of epidemiology, the learners apply the basic knowledge they gained from the epidemiologic methods and measures. Third, biostatistics and health informatics are integrated as supported competencies, covering essential biostatistics methods and data management, essential for effective curriculum design in epidemiology education programs. Precise

classification of courses, either at the undergraduate or postgraduate level, can enhance curriculum design. In addition, different teaching methods and ongoing evaluation of the program are highly recommended.

Therefore, effective epidemiology education programs require a carefully designed curriculum that integrates epidemiologic methodology and measures and their applications in different branches of epidemiology supported by biostatistics and health informatics skills.

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