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THE ROLE AND PROSPECTS OF EPIDEMIOLOGY IN MEDICINE

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Abstract. This article analyzes the current challenges in the field of epidemiology in the study of diseases. In modern conditions, emerging and re-emerging infections, antibiotic resistance, the spread of parenteral infections, issues related to vaccination, and the increasing prevalence of non-communicable diseases are considered as the main problems of epidemiology. The article also highlights the importance of improving epidemiological surveillance systems and implementing digital technologies and modern information systems. It emphasizes the need to strengthen preventive measures and improve the effectiveness of epidemiological monitoring in protectingpublic health.

Key words: epidemiology, medicine, epidemiological control, prevention, infectious diseases, monitoring, digital technologies, molecular epidemiology.

Introduction. Epidemiology is an important medical-scientific field that studies the spread of diseases among the population, their causes, risk factors, and preventive measures. Today, globalization, increasing migration processes, urbanization, environmental changes, and the emergence of new infections are placing new challenges on epidemiology. In particular, the COVID-19 pandemic has further increased the importance of epidemiological surveillance systems worldwide.

Modern epidemiology not only analyzes infectious diseases, but also deeply studies non-communicable diseases such as cardiovascular diseases, diabetes mellitus, oncological diseases, HIV/AIDS, and chronic respiratory diseases. Therefore, studying current pressing problems in epidemiology and finding solutions to them is considered one of the main tasks of medicine.

The achievements of epidemiology and physicians in this field in the fight against infectious diseases and in reducing them among the population are well known. However, even today, in the era when humanity has entered the 21st century, some infectious diseases are still frequently recorded among the population, and some have not been completely eradicated.

The elimination or further reduction of infectious diseases among the population is directly related to the level of knowledge and professional competence of physicians working in the field of sanitary-epidemiological services, as well as their practical activities. This, in turn, requires future general practitioners to have a deep understanding of epidemiology and to fully apply the theoretical knowledge of this discipline in practice [1, 3, 7].

Over the past 20 years, significant creative changes have taken place in epidemiology and, accordingly, in medical education. Nowadays, epidemiology is considered not only as a doctrine of the epidemic process, but also as an essential element of knowledge in all fields of medicine. In this context, modern medical science uses population-based epidemiological methods not only for infectious diseases, but also to identify the causes of the occurrence and development of any pathology (disease) in nature. Epidemiology has become one of the fundamental bases of the modern direction of “evidence-based medicine” [2, 4, 8]

Epidemiology is the study of how diseases spread and occur among populations, and how they can be controlled or prevented.Hippocrates is considered the founder of epidemiology. His works

"Seven Books on Epidemics" and "On Airs, Waters, and Places" have survived to this day. In V.A. Bashenin's textbook on general epidemiology, it is stated: "For almost 2000 years, no unique scientific ideas surpassing Hippocrates' views have been presented in epidemiology textbooks." Since the time of Hippocrates, approximately 2400 years ago, the term "epidemic" has been understood as mass diseases among people, which may include both infectious and non-infectious diseases that spread within populations. [5,6]

The role of epidemiology in medicine. Early detection and control of diseases. Medical workers of the former Soviet Union and our country made a significant contribution to the study of epidemics and the fight against them. This was connected with the historical conditions of the country's development: frequent wars, a low economic level of a large part of the population, and even poverty, which led to the inevitable emergence and spread of many infectious diseases (paratyphoid infections, smallpox, intestinal infections including cholera, so-called "childhood infections," trachoma, etc.).

In such conditions, in 1920 in Odessa (Novorossiysky University), the world's first Department of Epidemiology was established. Its founder was the renowned scientist and active practitioner D.K. Zabolotny (1866–1929), who, long before the war, successfully carried out several epidemiological investigations in plague foci. His important contribution was the discovery of the natural focality of this disease. D.K. Zabolotny created the first textbook on epidemiology and established a school of Soviet epidemiologists. His students, L.V. Gromashevsky, M.N. Solovyov, and others, later made a major contribution to the development of epidemiology. D.K. Zabolotny is rightfully considered the founder of Soviet epidemiology

During that period, the epidemiological situation that had developed in the country required a fundamental theoretical foundation for both scientific research and practical work. One of its main contributors was L.V. Gromashevsky (1887–1980), who formulated the doctrine of the epidemic process, in particular the concept of the mechanism of transmission. Later, many scientists and researchers made significant contributions to the development of both science and practice [7,8,9].

In Uzbekistan, an independent Department of Epidemiology was established in 1935 as part of the Tashkent State Medical Institute. In the years 1930–1935, epidemiology was taught as a course within the Departments of Microbiology and Infectious Diseases. The Department of Epidemiology was headed by Professor A.V. Georgievsky (1935–1952), Associate Professor L.I. Matsina (1952–1954), Professor M.N. Soshnikova (1954–1972), Professor M.K. Usmonov (1972–1993), Professor O.M. Mirtazaev (1993–2010), Associate Professor S.E. Umirov (2011–2012), and Associate Professor G.S. Matnazarova (2013–present). They all made significant contributions to the study of epidemiology and the prevention of infectious diseases that are particularly relevant to Uzbekistan.

If in earlier periods the main focus was on the prevention of acute infectious diseases, in recent years it has shifted toward chronic infectious diseases (chronic viral hepatitis, tuberculosis, HIV infection, etc.), because the above-mentioned chronic conditions negatively affect people's health, cause suffering in their lives, and lead to significant social and economic damage to society.

At the same time, in recent decades a population-based approach has been rapidly developing in the study of many medical sciences (population – from Latin *populatio*, *populus* meaning people, population). The population-based approach refers to the study of diseases (pathological conditions) among groups of people. It is precisely epidemiological population studies that have identified associations between ionizing radiation exposure and certain forms of cancer, between exposure to chemical substances and specific forms of malignant tumors, between excessive coffee consumption and the development of ischemic heart disease, and between smoking and the development of lung cancer. The combination of these approaches has come to be called non-infectious epidemiology. Numerous debates about the appropriateness of using the term "epidemiology" in any population-

based studies have led to the recognition of the necessity of using this field to address any medical problems at the population level [1,3,6,8].

Prospects of epidemiology. Introduction of digital technologies. Modern information technologies play a major role in the development of epidemiology. Electronic databases, online monitoring systems, and artificial intelligence enable rapid analysis of diseases. Development of molecular epidemiology. Molecular epidemiology is based on the study of the genetic characteristics of microorganisms. This field allows the identification of sources of infection and the monitoring of viral mutations. Modern genetic research makes it possible to: identify virus strains; study infection transmission chains; and assess new infections. Epidemiological education and workforce training. Training highly qualified specialists in epidemiology is one of the key tasks for the future. A modern epidemiologist should have skills in statistics, bioinformatics, and digital technologies. Strengthening international cooperation. Infections do not recognize national borders. Therefore, international epidemiological cooperation is of great importance.

Conclusion. In the future, epidemiology will become a high-technology field focused not only on studying diseases but also on predicting and preventing them in advance. This will play a crucial role in maintaining public health.

Epidemiology holds an important place in the healthcare system in protecting population health. It serves as the main scientific basis for studying the patterns of disease spread, organizing preventive measures, and controlling epidemics. In modern conditions, digital technologies, molecular research, and international cooperation are defining the development prospects of epidemiology. In the future, epidemiology will become even more important in improving public health, early disease detection, and the development of effective preventive measures.

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