

# EPIDEMIOLOGY OF MICROBIAL DISEASES DEPARTMENT

Michael Cappello, M.D., Chair

Microbial disease epidemiology is the science of the cause, distribution, frequency of, and resistance to infections caused by viruses, parasites, and bacteria, and of the distribution, transmission, and control of these agents.

The M.P.H. curriculum for the Department of Epidemiology of Microbial Diseases (EMD) is designed to train the student to understand the epidemiology of the major infectious agents, the diseases they cause, and the host response to those diseases. The interaction of the agent (parasite, bacterium, or virus) with the host and the influence of the environment on both agent and host are studied. The curriculum considers the role of age, immunological response, genetics, natural history of vectors, geographical distribution, and transmission and transport of agents. In addition to epidemiology courses, the department's faculty teach microbiology courses relating to bacteria, viruses, and parasites—including classification, replication, biochemistry, genetics, immunology, and pathogenesis—essential to the understanding of the epidemiology of microbial disease. Through these experiences the student gains a clear understanding of the quantitative and qualitative biological spectrum of microbial diseases.

Using a problem-solving approach the student learns about surveillance through collection and analysis of data followed by synthesis of information as a basis for public health decisions. The same approach is used to investigate epidemics and to study basic biologic problems.

Emphasis is placed on the application of epidemiological concepts to intervention in transmission cycles and disease progression. Intervention may be accomplished through such measures as vaccination, antimicrobial therapy, vector control, or behavior modification. The student is encouraged to obtain a solid laboratory foundation for diagnosis, for population-based serologic surveys, and for understanding the molecular basis of the disease process and intervention strategies. The problem of, and solutions for, infectious diseases in low- and middle-income countries are considered extensively.

Nearly half of EMD graduates in the M.P.H. program enter public health practice at the local, state, or national level, and a portion of the remainder enter hospital, medical center, or industrial programs. Many students continue graduate and professional education beyond the M.P.H. degree.

## DEPARTMENTAL REQUIREMENTS

EMD 517	Principles of Infectious Diseases I	1
EMD 518	Principles of Infectious Diseases II	1
EMD 525	Seminar in Epidemiology of Microbial Diseases	0
EMD 526	Seminar in Epidemiology of Microbial Diseases	0
EPH 525	Thesis	2

One of the following:

BIS 505	Biostatistics in Public Health II	1
CDE 534	Applied Analytic Methods in Epidemiology	1

One of the following:

CDE 516	Principles of Epidemiology II	1
EMD 553	Transmission Dynamic Models for Understanding Infectious Diseases	1

Students are required to choose at least three additional EMD courses from the list of approved EMD electives (<https://ysph.yale.edu/myysph/curriculum/mph/emd/electives>) in collaboration with their adviser.

## COMPETENCIES

Upon receiving an M.P.H. with a concentration in Epidemiology of Microbial Diseases, the student will be able to:

- Describe the epidemiology and burden of major infectious diseases of humans worldwide
- Describe host-related factors, including behavioral, genetic, and immunologic factors, that affect transmission and maintenance of pathogens in human populations
- Describe pathogen-related factors that affect transmission and disease progression
- Describe environmental and ecological factors that affect the emergence and transmission of zoonoses into human populations
- Interpret and apply quantitative data to identify factors that influence infectious disease transmission and project disease risk in the future
- Discuss approaches for the prevention and control of infectious diseases
- Evaluate data and studies on the etiology, detection, prevention, or control of infectious diseases