

# Career Spotlight

## Epidemiologist

*An epidemiologist investigates and describes the causes and spread of disease and develops the means for prevention or control. They may study many different illnesses, often focusing on major infectious diseases such as influenza or cholera.*



### EDUCATION

Undergraduate students should have a solid background in mathematics, chemistry, and computer science. Once a student is prepared for graduate studies, he or she can choose a specialty within epidemiology (e.g., water pollution, air pollution, pesticide use, toxicology, molecular biology, or outbreak investigation). Some jobs may require a Ph.D. or medical degree.

### WHEN MATH IS USED

Epidemiologists use mathematical models in order to track the progress of most infectious diseases. They may also discover the likely outcome of an epidemic or help manage them by vaccination.

Some specific areas that epidemiologists may track include:

- transmission, spread, and control of infection
- persistence of pathogens within hosts
- immuno-epidemiology
- virulence
- strain structure and interactions
- evolution and spread of resistance

One specific type of mathematical model used for many infectious diseases, such as measles, mumps, and rubella, is the SIR model. This model consists of three variables: S (susceptible), I (infectious), and R (recovered).

### POTENTIAL EMPLOYERS

There are many opportunities for employment when you are an Epidemiologist. Employers include:

- Federal, state, and local government
- State, local, and private hospitals
- Colleges, universities, and professional schools
- Scientific research and developmental service facilities
- Pharmaceutical and medicine manufacturing companies

### FACTS

Epidemiology has made a major contribution to understanding the AIDS pandemic. Epidemiologists have played a vital role in determining the pattern of its spread, identifying risk factors and social determinants, and evaluation interventions for prevention, treatment and control.

### CITATIONS

<http://www.bls.gov/oes/current/oes191041.htm>

<http://www.mast.queensu.ca/graduate/biostatsprogram.php>

[http://en.wikipedia.org/wiki/Compartmental\\_models\\_in\\_epidemiology](http://en.wikipedia.org/wiki/Compartmental_models_in_epidemiology)

### MATH REQUIRED

- College Algebra
- Trigonometry
- Calculus I and II
- Applied Data Analysis
- Survey and Research Methods
- Mathematical Statistics
- Biostatistics

Low-end Salary: \$46,130/yr

Median Salary: \$69,450/yr

High-end Salary: \$114,550/yr