

## Field Epidemiology Training Programs

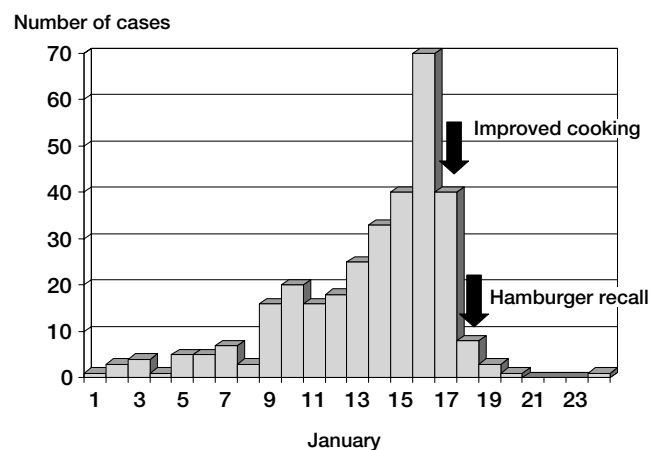
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### Introduction

Field epidemiology training programs (FETPs) first began in the United States over 50 years ago as the Epidemic Intelligence Service (EIS) at the Centers for Disease Control (CDC). I was an EIS Officer from 1979-1981, and from 1982-2001, at the Washington State Health Department in Seattle, I helped train over 25 current or former EIS officers assigned from the CDC. Since 2001, I have been the foreign advisor for the Field Epidemiology Training Program of Japan.

The value of field epidemiology training programs can be illustrated by the following outbreak<sup>1)</sup>. On January 12, 1993, as the Washington State Epidemiologist, I received a telephone call from a physician in Seattle's main pediatric hospital. In less than 36 hours, eleven children were seen with confirmed or suspected *E. coli* O157:H7 infections. Epidemiologists then found a widespread O157 outbreak. Five days later, we identified the outbreak source: contaminated hamburgers served by a company chain of 66 restaurants. About 250,000 contaminated hamburgers were quarantined.

Over 600 people were ill with O157 infections. While this was a public health disaster, the epidemic could have been much worse if the investigation and control measures had been delayed by only a few days (see figure). The speed and accuracy of this investigation was possible because of almost 10 years of preparation, through epidemiologic studies and improved O157 surveillance. As I will describe in the section, "Epidemiology in Action," a major part of the preparation, as well as the



E.Coli O157:H7, Washington State, 1993  
by Date of Hamburger Consumption

1993 outbreak investigation, was done by trainees in field epidemiology.

### What is epidemiology?

Epidemiologists study the distribution and determinants of diseases and conditions. While physicians generally diagnose and treat diseases in individuals, epidemiologists study these same diseases, but consider groups of people, when they became ill, where they live, whether they are young or old, male or female, whether they are of a particular racial or ethnic background, or occupation, and so forth. Thus, epidemiology investigates diseases using an ecological perspective. The word "epidemiology" is made from three Greek words, "epi," (meaning "upon,") "demos," (meaning "people"), and "logy" (meaning "study of")<sup>2)</sup>.

Epidemiology not only investigates infectious disease epidemics. It can also be used on non-infectious agents (such as toxins and carcinogens), natural disasters (such as earthquakes), behavioral risk factors (such as smoking

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and alcohol use), as well as homicides, suicides and social problems.

### **What is field epidemiology?**

Field epidemiology is the application of epidemiology under the following circumstances:

1. The problem is unexpected.
2. An immediate response may be demanded.
3. Epidemiologists may need to travel to the problem location (the field) to perform the investigation.
4. The investigation extent is usually limited because results, conclusions, and control measures are needed quickly.

Field epidemiology and research epidemiology differ in several ways. Field investigations often begin without clear hypotheses. Descriptive studies may be needed first to generate hypotheses before analytic studies are done. In field investigations, there is a greater pressure to protect a community's health and address its concerns. Therefore, field epidemiology is more quickly involved in public health action.

### **Epidemic Intelligence Service**

The first FETP was the Epidemic Intelligence Services (EIS) in the United States. The EIS was established in 1951, during the Korean War, as an early warning system against biological warfare and man-made epidemics. The program is comprised of medical doctors, researchers, and scientists in 2-year assignments as EIS Officers. These are assigned to surveillance and response units for all types of infectious and non-infectious diseases and conditions.

Over 2,000 epidemiologists have been trained in this program. Currently about 130 trainees are in the program at a time. Since 1951, 10,000 epidemics have been investigated. About 70% of the trainees have continued work in public health as lifelong careers, with about 10% working permanently in academic institutions.

### **Epidemiology in Action**

Field epidemiology training programs involve learning while doing work under supervision. Work of great value can be accomplished, that may not have been possible with existing resources. For example, in the 1980's work done by EIS officers in Washington State was essential in improving knowledge of and surveillance for *E. coli* O157:H7. This enabled a rapid response to the 1993 epidemic. From 1984-86, two EIS officers (MJO and

KLM), performed a year-long special investigation verifying that *E. coli* O157:H7 was a common cause of diarrhea in Washington State, and that eating poorly cooked hamburger meat was a risk factor for illness<sup>3</sup>. In 1986, two other EIS officers (SMO, and PMG) investigated the first large O157 outbreak in Washington State<sup>4</sup>. A fifth CDC epidemiologist began revising the Washington State reportable disease regulations, which added O157 infection reporting. Washington State was the first to require O157 reporting in the US.

### **Other Field Epidemiology Training Programs**

Over the past 28 years, the number of Field Epidemiology Training Programs around the world has gradually increased. In 1975, an FETP was established in Canada, followed by FETPs in Thailand (1980), Indonesia (1982), Taiwan (1984), and the Philippines (1987). More recently in Asia, FETPs have been established in Japan (1999), South Korea (1999), China, and India (both 2001). Now, about 20 FETPs exist worldwide. These are members of an association "Training Programs in Epidemiology and Public Health Interventions Network," or TEPHINET ([www.tephinet.org](http://www.tephinet.org)). Global and regional meetings are held on alternating years.

### **Japan's experience**

In 1996, Japan experienced a large and widespread epidemic of *E. coli* O157:H7, with an estimated 10,000 illnesses due to contamination in a school lunch system<sup>5</sup>. The need for improved training in field epidemiology was recognized. In 1997, two physicians were sent to Europe and the United States for training, and in 1999, the Field Epidemiology Program of Japan (FETP-J) was begun.

Although FETP-J is still small, with only 16 physicians trained or in training, the impact has already been large. Outbreaks throughout Japan have been investigated. These have included investigations of food borne disease, hospital infections, and vaccine preventable diseases such as measles, and hepatitis. In addition FETP-J performed disease surveillance during the G-8 conference in Kyushu in the year 2000<sup>6</sup>, and during the FIFA World Cup Soccer Tournament in 2002.

Finally FETP-J has performed important international work. This has included a cholera investigation in Laos, and polio investigations and vaccination work in China and the Philippines. Most recently, two former and three current FETP-J trainees have assisted in investigations and surveillance for the Severe Acute Respiratory

Disease Syndrome (SARS) in Hong Kong, and at the World Health Organization Regional Office for the Western Pacific in Manila.

### Establishing a network

Perhaps the greatest accomplishment of the CDC EIS program has been to create a strong network of public health professionals trained in epidemiology. Public health work, especially outbreak investigations, requires teamwork involving many people with various types of professional training from different agencies. In outbreaks, investigators work together under stressful situations for long hours. From this, they can develop long-lasting professional relationships. These relationships make future collaboration in other areas easier. Former EIS officers are now working in almost all state health departments and academic medical and public health institutions in the United States. These may be the greatest long term benefits of FETP-J.

Major public health decisions must frequently be made with incomplete information. However, if you must use incomplete information, it is better to use information from someone that you trust. Field epidemiology training programs can not only develop highly trained

epidemiologists, but also a network of professionals who trust and work with each other well.

### References

- 1) Bell BP, Goldoft M, Griffin PM, Davis MA, Gordon DC, Tarr PI, Bartleson CA, Lewis JH, Barrett TJ, Wells JG, Baron R, Kobayashi J. A multistate outbreak of *Escherichia coli* O157:H7 - Associated bloody diarrhea and hemolytic syndrome from hamburgers: The Washington State experience. JAMA 1994 November 2 ; 272: 1349.
- 2) Gregg MB, editor. Field Epidemiology. 2<sup>nd</sup> Edition. New York: Oxford University Press; 2002.
- 3) MacDonald KL, O'Leary MJ, Cohen ML, Norris P, Wells JG, Noll E, Kobayashi JM, Blake PA. *Escherichia coli* O157:H7, an emerging gastrointestinal pathogen: results of a one-year prospective population-based study. JAMA 1988 Jun 24; 259: 3567-70.
- 4) Ostroff SM, Griffin PM, Tauxe RV, Shipman LD, Greene KD, Wells JG, Lewis JH, Blake PA, Kobayashi JM. A statewide outbreak of *Escherichia coli* O157:H7 in Washington State. Am J Epidemiol 1990; 132: 239.
- 5) [www.city.sakai.osaka.jp/city/info/o157rprt/2\\_2.html](http://www.city.sakai.osaka.jp/city/info/o157rprt/2_2.html)
- 6) Matsui T, Takahashi H, Ohyama T, Tanaka T, Kaku K, Osaka K, Chinjiwa K, Iwaki U, Okabe N. An evaluation of syndromic surveillance for the G8 Summit in Miyazaki and Fukuoka, 2000. Kansenshogaku Zasshi 2002; 76(3): 161-6. (Japanese)