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A perspective on field epidemiology in Japan: Insights from human resource development in the Field Epidemiology Training Program

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Abstract: The establishment of the Center for Field Epidemic Intelligence, Research, and Professional Development (CFEIR) within the National Institute of Infectious Diseases (NIID) in 2021 marked a significant advancement in the country's epidemiological training capacity. Japan's Field Epidemiology Training Program (FETP), launched in 1999, has since trained 128 epidemiologists as of 2025, strengthening outbreak response efforts nationwide. The COVID-19 pandemic highlighted the acute shortage of field epidemiologists, emphasizing the need for FETP expansion and regional training initiatives. The introduction of the 1+1 training model and establishment of regional training spots in Osaka and Okinawa have diversified the participant base, increasing local outbreak response capacity. Since 1999, FETP trainees have been deployed to 419 outbreak investigations, including COVID-19, measles, food poisoning, and emerging infectious diseases. With the upcoming launch of the Japan Institute for Health Security (JIHS) in April 2025, efforts will focus on strengthening human resource development using field epidemiology and integrating applied epidemiology approaches such as One Health, disaster epidemiology, and risk communication. Strengthening international collaboration, particularly in the Western Pacific and Southeast Asia, remains a key priority. This paper underscores the evolving role of field epidemiology in Japan and the necessity of sustained investments in epidemiological training, digital tools, and global health partnerships to ensure preparedness for future pandemics.

***Keywords*:** field epidemiology, FETP, infectious diseases, applied epidemiology, health security

Introduction

In April 2021, the Center for Field Epidemic Intelligence, Research, and Professional Development (CFEIR) was established within the National Institute of Infectious Diseases (NIID), marking the first institution in Japan dedicated to "field epidemiology". The concept of "shoe-leather epidemiology" – a core principle of field epidemiology which has been used by Epidemic Intelligence Service (EIS) at the U.S. Centers for Disease Control and Prevention (CDC) since 1951 — had already entered Japan in the 1950s under the term "Waraji-Ekigaku" (straw-sandal epidemiology) (*1*). However, with improved sanitation in the 1970s, infectious diseases declined. In the 1990s, concerns about emerging infectious diseases grew in many countries. In Japan, a large-scale outbreak of enterohemorrhagic *Escherichia coli* O157 occurred in Sakai City (1996) (*2*). Multiple countries had established Field Epidemiology Training Programs (FETPs) modeled after the U.S. EIS at that time. In Japan, the Infectious Diseases Control Law was enacted in April 1999 (*3*). Following this, in September 1999, Japan launched its own FETP within the NIID, modeled on the EIS.

What do Field Epidemiologists do?

Since 1999, FETP has trained field epidemiologists rapidly to detect, assess and respond to infectious disease threats, strengthening response to national outbreaks (*4*). Japan's FETP is a two-year on-the-job training (OJT) program covering six core competencies: surveillance, outbreak investigation, epidemiological research, risk communication, and network strengthening. The work of field epidemiologists is sometimes described as the four Cs: Count (descriptive epidemiology), Compare (analytical epidemiology), Communicate, and Collaborate (*5*).

The COVID-19 pandemic in 2020 exposed a shortage of field epidemiologists, highlighting the FETP's importance. As of March, 2025, 128 trainees had completed FETP, approaching the 157 field epidemiologists needed to cover public health offices, though still below the 600 recommended under the International Health Regulations (one per 200,000 people) (*6*).

Who are the participants in Japan's FETP?

As of 2024, FETP had its highest-ever enrollment (30 trainees), with 22 seconded from local governments and other institutions and eight NIID employees. Since CFEIR's launch in 2021, the number of annual trainees increased from 4.3 to 12.5 per year. Initially dominated by physicians, FETP now includes more public health officials. The 1+1 training model and regional training spots in Osaka and Okinawa have expanded training outside Tokyo. Regional training now accounts for 33% of participants, improving responsiveness to local mass gatherings and health crises such as the FIBA Basketball World Cup (Okinawa), the Noto Peninsula earthquake in 2024, and the Kobayashi red yeast rice scandal (Osaka) (*7*).

Overview of outbreak response by Japan's FETP

Since 1999, Japan's FETP has supported 419 outbreaks as of November 2024, including COVID-19, measles, food poisoning, Antimicrobial Resistance and emerging infectious diseases (Figure 1) (*8*). The median number of outbreak investigations per year was 7.5, with the lowest recorded in 1999 (1 event) and the highest in 2020 (138 events). FETP trainees provide technical assistance in active case-finding, contact tracing, database development, descriptive and analytical epidemiology and coordination with other municipalities and relevant organizations. During the COVID-19 pandemic, FETP alumni collaborated to support outbreak investigations.

Notable outbreak response activities over the past decade

In 2014, Japan's first domestically transmitted dengue fever case since the 1950s led to an epidemiological investigation (*9*), resulting in updated mosquito-borne diseases guidelines (*10*). The 2014 Ebola virus disease epidemic in West Africa prompted the World Health Organization (WHO) to declare a Public Health Emergency of International Concern (PHEIC), and Japan sent a team including FETP staff members and alumni to Sierra Leone (*11*). This experience contributed to the establishment of Japan's Infectious Disease Response Team under the Japan Disaster Relief (JDR) framework.

During the early period of COVID-19, FETP provided assistance primarily in epidemiological investigations, and occasionally in infection control and maintenance of facility function. In the case of the Delta variant, analysis of transmission routes identified seven major outbreak origins, six of which were successfully contained (*12*). FETP played a key role in supporting field responses in many of these events. Similarly, the Omicron (BA.1) spread was mitigated through public health efforts, with FETP providing essential technical support (*13*).

These experiences highlighted that while viral influx can overwhelm containment and mitigation measures, effective border controls, national consensus, and technical collaboration between NIID, national and local governments can help slow transmission.

Perspectives on applied epidemiology with a focus on field epidemiology

Field epidemiology has evolved as a practical discipline to guide public health actions. CFEIR's three divisions enhance field epidemiology through training (FETP), data analysis and dissemination, and global health workforce development.

With the launch of the Japan Institute for Health Security (JIHS) in April 2025, CFEIR will continue its

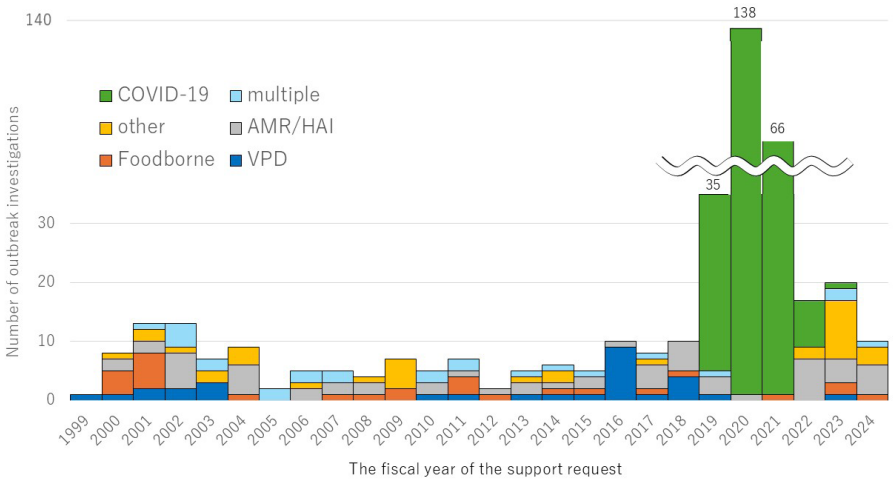

Figure 1. Yearly trend of FETP outbreak response deployments as of November 2024 (*n* = 419). *Note: Figure based on publicly available data from the NIID website as cited in reference (8). Website currently being migrated; new version forthcoming.*

core mission of training and developing highly skilled field epidemiologists, strengthening domestic public health networks, and expanding training programs to better address emerging infectious diseases. While preserving the fundamental principles of "Shoe-leather Epidemiology" through rigorous descriptive epidemiology, efforts will also focus on actively integrating digital technologies into training and outbreak response strategies. The program aims to standardize in-house local government training, expand continuing education for alumni, and strengthen regional collaboration frameworks.

Japan's FETP has historically focused on epidemic intelligence and outbreak investigations, with an emphasis on capacity building. JIHS will broaden efforts within Applied Epidemiology, integrating One Health (a multisectoral approach that addresses health threats at the interface of humans, animals, and ecosystems), disaster epidemiology, infectious disease policy, and risk communication. Strengthening international collaboration remains a priority, particularly in the Western Pacific and Southeast Asia.

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