

New York City Department of Health and Mental Hygiene Syndromic Surveillance Systems

Overview

The primary purpose of the New York City Department of Health and Mental Hygiene's (DOHMH) syndromic surveillance systems is to monitor trends in non-specific symptoms of illness at the community level for early detection of disease outbreaks. Whether a disease occurs naturally, as in the case of annual influenza epidemics, or is due to the intentional release of a biological agent, syndromic surveillance systems may provide the first indication that a medium to large sized outbreak is occurring. Early recognition would allow more rapid mobilization of the public health and medical response. Syndromic data may also be useful in determining the place and time of exposures which would help target preventive measures and assist epidemiologic investigations. Syndromic surveillance systems complement, but do not replace, traditional disease surveillance and reporting of suspect cases by alert health care providers and laboratory professionals.

The DOHMH's earliest efforts to conduct syndromic surveillance for symptoms, rather than specific disease diagnoses, began in the 1990s as part of the city's waterborne disease monitoring systems. In collaboration with the NYC Department of Environmental Protection, the DOHMH began tracking gastrointestinal illness in sentinel nursing homes, submission of stool specimens at three reference laboratories, and sales of over-the-counter anti-diarrhea medications at a large pharmacy chain.

In March 1998, the DOHMH, in collaboration with the Mayors Office of Emergency Management and the New York City Fire Department, began monitoring the overall volume of 911 ambulance dispatch calls as a surveillance tool for large-scale disease outbreaks. The following year, to improve the sensitivity of this system, daily transmission of the specific call-type (eg. difficulty breathing) and the zip code of pick-up was established for each of the more than 3,000 ambulance calls processed daily by the city's 911 system. Statistical analyses were carried out each day to identify significant temporal increases or spatial clustering in call-types consistent with influenza-like illness. During the 1999-2000 and 2000-2001 influenza seasons this system provided evidence of widespread influenza activity 2-4 weeks earlier than traditional surveillance methods which include monitoring positive influenza isolates at WHO Reference Laboratories.

The events of September 11th and the intentional transmission of anthrax through the postal system gave a new urgency to the development and implementation of syndromic surveillance. Two days after the attacks, the DOHMH and Centers for Disease Control and Prevention (CDC) implemented a surveillance system at 15 New York City hospital emergency rooms by deploying CDC field-staff to conduct 24-hour surveillance for bioterrorism-related illness. Patients were classified into syndrome categories (eg. respiratory syndrome) and daily analyses were carried out using techniques that had been developed for the ambulance dispatch system. When CDC staff departed in early October, this system rapidly transitioned to an electronic system in which hospitals transmit electronic files each morning containing chief complaint and basic demographic information for patient visits during the previous 24 hours. The system currently receives data from 40 (61%) of New York City's 66 emergency departments which report on average 7,000 visits per day, or approximately 75% of emergency department visits citywide.

Prior to September 11th the DOHMH had begun planning for a more comprehensive system for monitoring prescription and non-prescription drugstore sales. In August 2002 daily electronic transmission began for approximately 6000 prescription and 32,000 non-prescription daily medication sales at one large pharmacy chain in the city. Drugs are categorized into key syndromes and trends are analyzed for citywide increases in sales of anti-diarrhea and cold medications. In May 2003, DOHMH also began receiving daily transmissions of pharmacy data from the National Retail Data Monitor (NRDM) based at the University of Pittsburgh. These data are currently being evaluated for daily syndromic analysis.

Other syndromic surveillance activities at the DOHMH include daily monitoring of absenteeism at a large city agency, a retrospective analysis of one year of school absenteeism data to evaluate its usefulness for syndromic surveillance, and an evaluation of the usefulness of monitoring calls into the NYC Poison Control Center. DOHMH continues to work on improvements in statistical methodologies, criteria for investigating signals, and field methods that will determine with greater accuracy when a signal represents a disease outbreak requiring a public health response.