

Syndromic Surveillance in San Mateo County

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On November 15, 2004, as part of the bioterrorism initiative, the San Mateo County health department began real-time *syndromic surveillance* when the FirstWatch

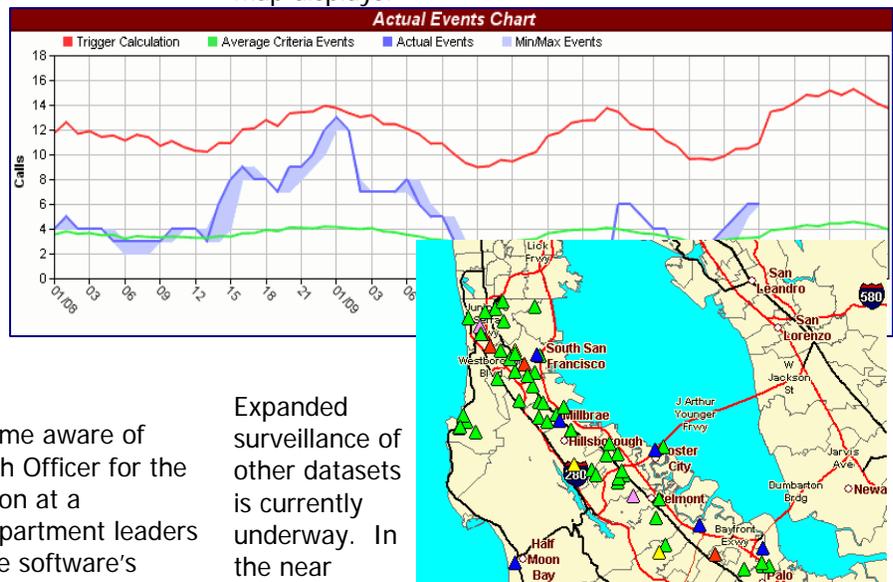
early warning system went "live". According to the CDC's website, "*syndromic surveillance* applies to surveillance using health-related data that precede diagnosis and signal a sufficient probability of [a] case or an outbreak to warrant further public health response." San Mateo County is the first Northern California county to implement FirstWatch and the second county in California to implement FirstWatch after San Diego County.

The SMC health department initially became aware of FirstWatch after Scott Morrow, MD, Health Officer for the County, attended a software demonstration at a conference. In February 2004, health department leaders were given a WebEx demonstration of the software's functionality, and interest in the program was sealed. Work began in earnest in mid-May to finalize the technical details of data transfer and hardware set up.

FirstWatch imports information from the County's Public Safety Communications' computer-aided dispatch (CAD) database at the conclusion of each 911 medical event. Using the Medical Priority Dispatch System of emergency medical dispatch, the reason for medical calls to 911 are identified and categorized by communications center dispatchers. Sixty-four specific determinants for breathing problems, cardiac or respiratory arrest, chest pain, sick person, or unconscious/fainting episode are then monitored. Dr. Morrow chose five determinants as most likely to signal an impending bioterror or natural infectious disease threat.

The FirstWatch database establishes a baseline of requests by determinant within the same day of the week over the past 52 weeks. The number of calls for that determinant, the ratio of determinant requests to all requests of any type, and the cumulative summary (CUSUM) statistic is calculated for each running 12-hour period. When each of these three measures exceeds two and a half standard deviations (2.5 sigma) above the mean for a determinant, an email and/or text page message is sent to various personnel within the Public Health and Emergency Medical Services divisions. The Health Officer, EMS Administrator, epidemiologist or public health nurse then investigates the cause of the alert to determine if an outbreak or other threat is imminent. FirstWatch uses tabular, graphic and spatial

data displays to optimize evaluation and analysis of alert information. Figure 1 provides examples of the chart and map displays.



Expanded surveillance of other datasets is currently underway. In the near future, we will

Fig. 1: FirstWatch data displays

be monitoring and graphing hospital emergency department status and hospital census levels with FirstWatch. We will also be importing and monitoring 911 patients' paramedic impressions and treatment via connections to the MEDS electronic pre-hospital care record database. Eventually, the Health Department would like to have emergency department assessment and diagnosis information from all local hospitals monitored in real-time. Ambulance and EMS contacts represent a relatively small subset of patients with any given condition. The inclusion of clinical information from emergency departments would substantially increase the sensitivity of FirstWatch surveillance.

Broadened beyond bioterrorism surveillance, this analytical tool provides exciting opportunities in other areas of epidemiology, such as motor vehicle injury prevention or childhood respiratory disease prevalence monitoring.

The Centers for Disease Control and Prevention maintains a repository of information on syndromic surveillance at www.cdc.gov/epo/dphsi/syndromic/index.htm. Further information about FirstWatch, is available at www.firstwatch.net. Additional information about the Medical Priority Dispatch System and emergency medical dispatch is available at www.emergencydispatch.org.