

Concurrent Session C5-3

Development of a Syndromic Surveillance System in Central Wisconsin

JG Donahue DVM PhD¹, BA Kieke MS¹, NR Berger BS¹, LR Will²,
EA Belongia MD¹

¹Marshfield Clinic Research Foundation, Marshfield, WI; ²Wisconsin
Department of Health and Family Services, Division of Public Health

Background: The need to respond rapidly to threats of bioterrorism and emerging infectious diseases has underscored known flaws in traditional public health surveillance. The goal of syndromic surveillance is to detect outbreaks quickly, efficiently, and accurately. We describe an automated syndromic surveillance system in a multi-specialty regional health care network serving 28 counties in Wisconsin.

Methods: Using provider-coded diagnoses, we identified within 24 hours ambulatory encounters with a diagnosis corresponding to one of 6 syndromes derived from the Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE): gastrointestinal (total, lower, upper), respiratory, rash, and neurologic. Transformed daily syndrome counts were regressed on day of the week, month, holidays, and visits in the preceding week. The predicted value was subtracted from the observed to yield a residual, which was fed into a Cumulative Sum (CUSUM) procedure. An alarm was signaled if the value exceeded a predefined threshold. A report with graphical and tabular information was transmitted daily to the WI Division of Public Health (DPH). Patient-level data was automatically provided for each alarm. We evaluated system performance by superimposing multiple simulated outbreaks, including actual outbreak data for norovirus and *Campylobacter jejuni*.

Results: Of the 24 genuine alarms between 4/04 and 9/05, 8 were GI-related and 6 were for respiratory and rash syndromes; 71% lasted <2 days. The longest alarm (9 days) was for seasonal influenza. Each event was examined, but none were investigated by DPH. Of the 600+ simulated outbreaks, the proportion detected and time to detection varied markedly. 100% of explosive outbreaks (e.g. norovirus) were detected within 1-2 days of onset, while smaller outbreaks or those with a more protracted course (e.g., *C. jejuni*) were detected within 3-5 days, but 33% went undetected. Outbreaks were more likely to be detected if they peaked on a weekend, (e.g., 75% vs. 60%) but the effect of month was minimal.

Conclusions: Syndromic surveillance is feasible in a large multispecialty practice using an electronic medical record. Further evaluation and investigation of alarms is needed to determine the overall value and cost-effectiveness of syndromic surveillance for public health.