# THE PUBLIC HEALTH VALUE OF EMERGENCY DEPARTMENT SYNDROMIC SURVEILLANCE FOLLOWING A NATURAL DISASTER

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## Abstract

During a recent natural disaster public health staff required timely and comprehensive surveillance of priority health conditions, including injury, mental health disorders and selected infectious diseases, to inform response and recovery activities. Although traditional surveillance is of value in such settings it is constrained by a focus on notifiable conditions and delays in reporting. The application of an electronic emergency department syndromic surveillance system proved valuable and timely in informing public health activities following a natural disaster in New South Wales. *Commun Dis Intell* 2008;32:92–94.

Keywords: syndromic surveillance, natural disaster, disease surveillance

## Introduction

The coastal region of Newcastle, north of Sydney in New South Wales, Australia, experienced severe storms over a two day period from 7 June 2007. Wind gusts exceeding 120 km/hour and rainfall of 209 mm in one day[1,2] fell in Newcastle and the inland Hunter region resulting in extensive damage, power failures and flooding to houses, businesses, schools, aged care facilities, hospitals and local infrastructure, severely affecting roads, power, water supplies and sewage systems. Over 200,000 homes were without power for up to seven days, resulting in loss of heating and considerable food spoilage. Seven evacuation centres were established for displaced residents. The storm also resulted in the grounding of a coal ship, the Pasha Bulker, storing over 700 tonnes of fuel oil,[2] on a Newcastle beach.

Hunter New England Population Health (HNEPH) contributed to the acute disaster response and was the lead health agency during the recovery phase. While maintaining core public health services, additional responsibilities included: environmental health field assessments, oversight of water quality, enhanced surveillance for health events, and maintaining communication systems by providing daily situation reports to relevant agencies, and preparing information for the public and media.

Natural disasters of a similar type and magnitude internationally have underlined the importance of timely surveillance systems for early identification of infectious disease outbreaks. In developed countries gastrointestinal and respiratory illnesses following flooding events are common.[3,4] Early identification allows appropriate resource allocation and preventative measures to be implemented to prevent further illness and to minimise the impact on the hospital/medical system and the community in general. Early identification is also vital in ensuring timely and accurate messages to the community.

Traditional surveillance focuses on notifiable infectious diseases with significant time delays while awaiting laboratory confirmation. Thus, new information sources were required to obtain a timely and comprehensive picture of priority health related events including infectious disease clusters, injury and mental health issues. Emergency Department (ED) data were regarded as the most reliable and timely source for this health intelligence.

## Method

The NSW Department of Health had previously established syndromic surveillance using a database of data routinely entered into computerised ED patient management information systems of 30 EDs in New South Wales; but this database did not cover the Hunter storm-affected region at the time of the storm. Following intense advocacy in the immediate period following the storm event, the network was extended to include 11 EDs in the disaster area from 16 June. From this time, standard reports from the New South Wales ED syndromic surveillance system were available, listing presentations for 37 syndromes based on ED provisional diagnosis. These syndromes included gastrointestinal, influenza, pneumonia, other/unspecified respiratory infections, all injury and mental health presentations. The reports were updated four times per day using data extracted from the ED surveillance database six times per day.

The New South Wales ED surveillance system standard reports are described elsewhere.[5] Briefly, statistical control charts are used to automatically detect increases in syndrome activity, using Poisson z-scores of observed versus expected day-of-week

and weekly counts, and a modified cumulative sum (cusum) method for counts. Expected syndrome incidence is determined using a baseline of the previous 51 weeks.[5]

Prior to these reports being available, ED data were manually extracted from the computerised patient management information system of all EDs in storm-affected areas, and stored in an Excel spreadsheet. The data extracted provided information on all gastroenteritis using ICD-10 codes and a summary of all visits that were identified as related to the storm event. Triage staff were requested to flag all storm-related presentations using a specific incident flag available in the standard computerised patient management software. In addition, further storm-related presentations were identified retrospectively using keyword searches in the nursing assessment field.

## Results

Prior to 16 June, the initial manual extraction of data required a hospital staff member to set aside their normal tasks and extract the information separately for each hospital each day. Due to the time required to extract data, we were obliged to limit syndromic surveillance to only one syndrome, gastroenteritis. Once the electronic ED-based syndromic surveillance system was implemented it provided reports on 37 syndromes. These reports were updated four times daily and were also run retrospectively for the period immediately following the storm to ensure that no post-storm presentation increases had been missed.

No gastroenteritis outbreaks were identified during the recovery phase. The New South Wales syndromic surveillance system detected increases in presentations of respiratory syndromes. However, these increases were within seasonally expected levels given the onset of winter when compared with ED data for the previous five years.

In the first two days following the storm event, 60% of the storm-related ED visits were due to hypothermia and the majority of the remainder resulted from traumatic injuries, including fractures and lacerations. The incident flag was poorly utilised by triage staff and the bulk of storm-related visits were identified retrospectively.

## Discussion

The initial manual extraction of ED data was time consuming and this limited the range of data that could be realistically obtained. The actual prevalence of hypothermia was not realised until after retrospective coding had occurred. In addition, as coding was conducted using keywords in the triage nursing assessment text, it is possible that additional presentations related to the storm were missed.

Once implemented the electronic ED-based syndromic surveillance system provided easily accessible and timely reports on a wide range of indicator syndromes. A hypothermia syndrome, based on ICD-10 codes can be made available through the electronic ED-based system for future incidents. If required a syndrome can also be made available for incident related presentations using key word searches in the nursing assessment field, negating the need for staff to manually flag presentations.

ED syndromic data proved a valuable source of information for public health staff and complemented existing surveillance. The data informed response planning, while also reassuring the public that measures taken were successfully mitigating the threat of infectious disease outbreaks.

The use of ED data during this natural disaster has shown that the timeliness and coverage of ED data captured through the New South Wales syndromic surveillance system makes it a valuable surveillance tool for the response and recovery phases following natural emergencies.

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