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## Emergency Department Visits Following the November 30, 2018 Earthquake

### Background

On November 30, 2018, a magnitude 7.0 earthquake struck Southcentral Alaska. Substantial damage to roads and structures occurred, and many businesses and schools closed to assess damage and clean up. Emergency departments (EDs) at all three Anchorage hospitals and Mat-Su Regional Medical Center remained open. The Section of Epidemiology (SOE) operates a statewide [syndromic surveillance system](#), which collects near real-time patient encounter data from participating hospital EDs to rapidly detect changes in illness or injury occurrences in Alaska.<sup>1</sup> This *Bulletin* describes earthquake-related ED visits identified through syndromic surveillance.

### Methods

Earthquake-related ED visits were reviewed using syndromic surveillance data from Alaska Native Medical Center (ANMC), Providence Alaska Medical Center (PAMC), Mat-Su Regional Medical Center (MSRMC), Central Peninsula Hospital (CPH), and Providence Seward Medical Center (PSMC). While Alaska Regional Hospital (ARH) does not currently participate in SOE's syndromic surveillance system, ARH staff provided earthquake-related ED visit information to SOE.

Visits were identified as being earthquake-related if they a) included the word 'earthquake' in one of the syndromic text fields; b) included another relevant keyword combination, such as 'disaster charting'; or c) had an ICD-10-CM X34 earthquake code. Identified visits were categorized by the patients' health concern(s) based on text fields in chief complaint and triage notes and assigned ICD-10-CM codes. Patient demographics were compared to all ED visits from participating syndromic hospitals for the previous year (11/1/17–11/29/18; n=198,680). Gender comparisons were performed using a two-proportion z test. For syndromic surveillance-participating hospitals, visit volumes were compared to expected normal levels using exponentially-weighted moving averages and t-tests.

Visits were categorized based on text fields and ICD-10-CM codes. "Chest Pain" includes all mentions of chest pain or cardiac issues. "Gastrointestinal" includes visits involving symptoms such as nausea, diarrhea, and abdominal pain. "Health Care Services" includes visits where the patient was using the ED to access services they usually seek elsewhere but could not due to clinic closures (e.g., medication refills, methadone clinics, and scheduled laboratory work). "Injury" includes visits involving falls, having been impacted by a falling object, or musculoskeletal damage. "Mental Health" includes visits involving acute or chronic mental health problems and visits involving substance use. "Neurologic" includes visits involving head injury or altered mental status. "Other" includes visits that were not otherwise matched.

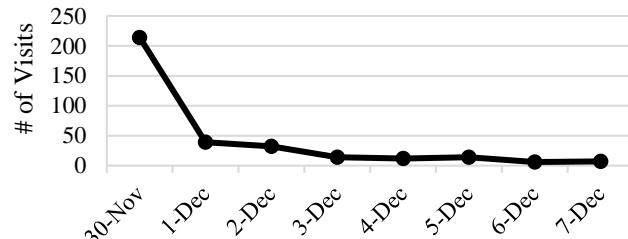
### Results

During November 30 through December 10, the overall daily ED census was similar to normal volume for PAMC, CPH, and PSMC ( $p=0.73$ ,  $p=0.30$ , and  $p=0.63$ , respectively); however, ANMC, and MSRMC had higher ED volume than usual on the day of the earthquake ( $p=0.02$  and  $p<0.01$ , respectively).

From November 30 through December 7, 361 visits were identified as being related to the earthquake. The majority (59%) of earthquake-related visits occurred on the day of the event, though patients continued to present days later (Figure). Most (63%) of earthquake-related ED patients were female, which is higher than the average proportion of ED visits by women (54%;  $p<0.01$ ); 5 (1%) of these visits were pregnancy-related. Compared to baseline ED visits, earthquake-related visits were more frequent among middle-aged adults (Table 1).

The most common reason for seeking ED care was an injury (45%; Table 2). One earthquake-related hospitalization was identified. No earthquake-related deaths were identified.

**Figure. Earthquake-related ED Visits — Alaska, November 30–December 7, 2018**



**Table 1. Earthquake-Related and Baseline ED Visits, by Age — Alaska, November 30–December 7, 2018**

Emergency Department Visits	Age Group (Years)				
	0–4	5–17	18–44	45–64	65+
Earthquake-Related	5%	6%	44%	30%	16%
Prior Year Baseline (11/1/17–11/29/18)	8%	10%	40%	25%	16%

**Table 2. Earthquake-associated ED Visits, by Reason for Visit — Alaska, November 30–December 7, 2018**

Reason for Earthquake-associated ED Visit*						
Chest Pain	Gastro-intestinal	Health Care Services	Injury	Mental Health	Neuro-logic	Other
9%	7%	14%	45%	14%	10%	15%

\*See Methods for information about what 'reason for visit' categories represent. Some patients had multiple concerns, so the total is >100%.

### Discussion

This analysis identified 361 earthquake-related ED visits at the participating hospitals during November 30 through December 7. The most common reason for visit was injury. Other common reasons for ED visits included mental health concerns (e.g., anxiety), neurological symptoms, and people seeking assistance with pre-existing medical issues because their care was interrupted by the earthquake.

Reasons for the higher proportion of earthquake-related ED visits among women are unclear; only 5 visits were identified as pregnancy-related. The distribution of ED visits by age may be related to differences in where people were at the time of the earthquake (e.g., at work, school, or home).

This analysis is subject to some important limitations. First, syndromic surveillance data are nonspecific and strongly reliant on free-text fields; therefore, a single patient visit can be variably classified depending on a hospital's electronic medical records system and the use of certain key words by providers. Second, ARH data were collected by a different method than the SOE syndromic-participating hospitals. Third, the SOE syndromic surveillance system does not currently include data from Joint Base Elmendorf-Richardson Hospital. Finally, this report only accounts for earthquake-related medical problems that involved an ED visit.

### Recommendations

1. All Alaskans should take steps to prepare for earthquakes. Tips are available at: <https://www.ready.gov/earthquakes>.
2. We encourage all Alaska hospitals to participate in syndromic surveillance to support emergency preparedness and to promote rapid identification of disease outbreaks.

### Reference

1. SOE Syndromic Surveillance webpage. Available at: [http://dhss.alaska.gov/dph/Epi/id/Pages/synd\\_surv/default.aspx](http://dhss.alaska.gov/dph/Epi/id/Pages/synd_surv/default.aspx)