Earthquake!

Is your hospital prepared?

By

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Earthquake preparedness is not generally perceived as a pressing concern by Canadian hospitals (with the exception of those on the west coast). But it should be given some consideration because of several factors that complicate the response to such an incident

First, there is no warning of an impending earthquake, unlike there is in many other emergencies (e.g., warnings from meteorological services about tornadoes, hurricanes and blizzards). Second, an earthquake can simultaneously be an internal and an external disaster. A seismic incident that disrupts the hospital's internal functions may also generate casualties in the surrounding community who present at the affected hospital for care. Third, most areas of Canada have been identified as having some potential — ranging from slight to major — for earthquake activity. Historically, however, Canadian hospitals have been almost untouched by the effects of earthquakes (although two Quebec City hospitals did suffer some minor nonstructural damage during the Saguenay earthquake of November 25, 1988). Thus, a certain degree of complacency about earthquake preparedness has developed, especially in contrast to concerns about more commonly perceived hazards and daily operational pressures and constraints.

Hazard/risk analysis

Any disaster preparedness endeavor should include a hazard/risk analysis, which determines the time, resources and funds to be committed commensurate with the risk potential identified. However, this perceived potential should be validated by a thorough assessment. Risk of seismic activity and damage varies by geographic area. The federal government has identified zones of varying earthquake hazard across the country (see Figure 1).

It should be emphasized that not all earthquakes produce the tremendous forces experienced in Mexico City (1985), Armenia (1988), California (1971 and 1989) and Australia (1989), where whole buildings and, in some cases, entire city blocks collapsed. But many earthquakes that are significantly less dramatic and destructive cause minor damage as objects shift position, vibrate loose or tip over. While costly and damaging in a residential environment, such minor occurrences may have significant repercussions on the delivery of health care services in the hospital setting. In fact, the cost of nonstructural damage, coupled with loss or interruption of function, often significantly exceeds the cost of structural damage to the hospital.

Earthquake severity

Two methods are commonly used to measure earthquakes. The Richter scale (developed in 1935 by Charles F. Richter) measures the energy released by the earthquake at its origin within the earth. In whole numbers, and decimal fractions from 1 to 10, the scale represents a tenfold increase in amplitude of ground vibrations between each whole number — for example, a magnitude of 6 is 10 times greater than a magnitude of 5 and 100 times greater than a magnitude of 4. However, the energy released is closer to a multiple of 30 for each whole number on the scale.

The modified Mercalli scale assesses observable damage at a given location and categorizes the level of damage in Roman numerals on a scale of I to XII. A severe earthquake in an uninhabited area such as a desert would have a low Mercalli rating, while one of lesser magnitude in a built-up area would have a significantly higher rating.

Damage does not vary directly according to the severity of the earthquake. Rather, it depends on the engineering of the building, as well as the properties of the underlying soil or rock Well-engineered structures can resist significant earthquakes and only suffer minor damage, while less structurally sound buildings may suffer extensive damage or collapse.