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## ICU Volume 9 - Issue 3 - Autumn 2009 - Cover Story

### Impact of Hospital-related Disturbances on Disaster Preparedness

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**In response to the current economic constraints within the healthcare systems, different action plans and reforms, including tax increases, have been deployed to decrease the costs and to increase healthcare's effectiveness. It is, however, the time to realise that these measures are not enough and prioritisation might be the only way to cure this chronic condition.**

There is a need for adaptation and expansion of healthcare systems to mobilise its resources at the time of disasters. Therefore, every country should have or create its own regional, national, as well as, international plans to use all necessary resources to cope with qualitative and quantitative outcomes of a disaster. Such a plan should not only provide the theoretical background, but also physical facilities needed to combat a disaster. In this context the capacity and preparedness of prehospital services, emergency departments, intensive care units, radiological institutions and operation theatres are of special importance (Arnold 2002; Wenzel 2007).

In a recent publication we could show that hospital-related incidents might jeopardise the regional preparedness due to insufficient capacities within the emergency institutions (Khorram-Manesh et al. 2009). The lack of hospital beds and overcrowding of emergency departments were the major causes of such a shortcoming in this study. However, it also pointed out the shortage of hospital beds and respirators in intensive care units along with ambulance diversions as other important sources of failure. Even though the regional healthcare coverage in this study was well enough to take care of the public's healthcare needs (around 150 primary healthcare centres and ten emergency hospitals), hospital-related incidents created such regional disturbances that resulted in a shortcoming of the ordinary healthcare system, questioning its ability to cope with an extraordinary event or disaster. Regarding intensive care units, the lack of capacity for adaptation, and expansion was obvious. Closure of an emergency department or lack of operation theatres at another hospital led to overloading of the nearest hospital, which in addition received even more patients at its emergency department. Bed shortage in intensive care units could either be due to high inflow of operated patients or high admission of critically ill patients in need of assisted ventilation. The higher rate of operated patients was directly related to higher number of planned operations and simultaneous increasing in amount of emergency cases. These numbers changed in 2008 to 35% and 65% for bed and respirators shortage, respectively. In such a situation a regional coordinating centre to assume command and control on a regional ("gold") level was inevitable (Khorram-Manesh et al. 2009).

The current economic crisis within most healthcare systems has resulted in local, regional and national plans to reduce economic deficits, mostly by increasing the healthcare systems effectiveness through reduction of hospital beds and staff numbers, minimising reserve materials, increasing inter-institutional cooperation and expansion of out-patients departments. Although these measures have proven to result in shorter length of hospital stay, higher number of out-patient treatments and temporary cost reductions, they also challenge the mode of operation at other emergency institutions by causing overcrowded emergency departments, and intensive care units, ambulance diversions, increased morbidity and mortality (Wenzel 2007; Epley et al. 2006; Lee et al. 2006; Fatovich et al 2003; Sun et al 2006).

Although these measures might be comprehended as logical steps taken to improve healthcare effectiveness and reduce costs, they also influence our disaster preparedness in a negative way. Hospitals surge capacity is influenced by three essential elements: staff; supplies/equipment; and structure (Guss et al. 1989; West et al. 1979). Structure refers to both locations for patients and the organisational infrastructure. ED (emergency department) overcrowding is associated with both space and staff shortage. Hospital beds occupancy of > 90% is correlated with a blocked access to the wards, defined as patients waiting in the ED for more than 8 hours when the decision has been made to admit them. For severely ill patients this consequently leads to initiation of extra measures e.g. multiple testing, interventions and administration of drugs during their prolonged stay in the ED (Kleine et al. 2007; Fatovitch et al. 2003; Sun et al. 2006; Khorram-Manesh et al. 2009). This even includes patients in need of beds in the intensive care units. In such situations, the ED serves as a holding area for admitted patients, sometimes remaining for more than 24 hours, which may also result in establishing observation areas in the ED (Klein et al. 2007). Earlier reports show that the average waiting time for an inpatient acute or critical care bed in American EDs has nearly doubled (> 6 hr) in hospitals with consistently overcrowded EDs. Delays of > 6 hours in bringing ED patients in critical condition to intensive care units has also shown to increase hospital LOS (length of stay) and result in higher ICU and hospital mortality (Sun et al. 2006). The results, besides missed diagnoses, poor outcomes, prolonged pain and suffering, long waiting times, patient dissatisfaction, more ambulance diversions, lower physician and staff productivity and higher levels of frustration among medical staffs, are higher hospital costs and longer LOS (Wenzel 2007; Lee et al. 2006; Khorram-Manesh et al. 2009).

Disasters seldom occur, but if they do strike, a fast and effective response from healthcare services is expected. There are an increasing number of reports of incidents when emergency hospitals, for different reasons, cannot operate at their normal capacity. This is a serious matter of concern for patient safety as well as disaster response preparedness.

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