

The 21st Century ED: Past Predictions and Current Trends



In the October 2006 editorial, “A Design for the 21st Century,” I suggested that the first consideration in designing a new ED should be how long it is likely to remain in service before being replaced or substantially renovated, and then to consider which conditions are most likely to continue to present or increase in importance during the first several decades of the 21st century (*Emerg Med.* 2006;37[10]:7). I envisioned “increasing patient volume, an aging population, new and emerging viral infections, an even higher incidence of bacterial resistance, and more immunocompromised patients resulting from organ transplants and greater use of chemotherapy.” A decade after these predictions were made, how are they holding up?

Since 2006, there have been over 40 epidemics worldwide and although most have not affected this country, easy travel and global emergency medicine missions have brought several distant viral illnesses to US EDs as well. In 2009, EDs throughout the country had to deal with a potentially disastrous epidemic of H1N1 influenza, and in the years since we have been challenged by MERS (2012), dengue fever (2013-), Ebola (2014), and now Zika and chikungunya—not to mention outbreaks of “older” viral illnesses such as pertussis (2012), and measles (2014-2015). Though several of the newer viruses mentioned are mosquito borne, pathogens transmitted from human to human, or human to surface to human, along with the increasing incidence of antibiotic resistance (MRSA, *Clostridium difficile*, Carbapenem-resistant Enterobacteriaceae,

etc) make the need for greater numbers of ED negative-pressure rooms undeniable.

One important design feature not specifically considered in 2006, but made apparent by the Ebola experience in 2014, is a need for the shortest possible route between the ambulance and non-ambulance ED entry points/triage and isolation facilities. As noted in 2006, a separate entrance and air handling for a designated infection-control unit in the ED is essential if it must be sealed off from the rest of the hospital and/or main ED.

The second major ED design issue considered in 2006 was the increasing numbers of elderly patients who will present to our EDs during the first half of this century. Isolation rooms and private rooms in the ED will help manage the rapidly rising number of elderly patients with contagious diseases, along with other conditions such as dementia and delirium. Significant needs of the elderly also include measures to prevent or mitigate falls, catheter-related UTIs, and bedsores.

One epidemic in the elderly that we are already facing is a significant increase in the number of trauma cases. In some Level I trauma centers, over 34% of trauma activations are for patients 55 years old and older. The *2003-2012 Oregon Trauma Registry Report* containing data on 84,099 patients from 44 trauma hospitals, notes that the rate of trauma increased from 200.7 to 244.6 per 100,000 during that period, almost exclusively occurring in patients 55 years old or older who represented 21% of cases in 2003 and 34% by 2012—a rise largely attributed to a 159% increase in trauma due to falls ([\[public.health.oregon.gov/providerpartnerresources/emstraumasystems/traumasystems/documents/reports/otr-report.pdf\]\(http://public.health.oregon.gov/providerpartnerresources/emstraumasystems/traumasystems/documents/reports/otr-report.pdf\)\). In another study, Hsia et al reported that 27% of 430,081 patients admitted to California acute care hospitals for trauma-related diagnoses between January 1, 1999 and December 31, 2008 were older than 65 years \(<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3121677/>\), and in Houston, Texas, 13% of 15,223 trauma patients admitted to one of its two level I trauma centers between January 2005 and December 2008 were 65 years old or older, according to Adams et al \(<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3836632/>\). The Adams paper noted that trauma centers were originally designed to care for seriously ill patients without age-specific guidelines, but in patients 65 years or older there was a negligible amount of penetrating trauma, and a marked increase in blunt trauma, especially falls, while fatality rates, organ failure, and thromboembolic complications correlated with increasing age. Clearly EDs designed for the 21st century must be built not only to handle increasing numbers of trauma cases in the elderly, but for changing etiologies, characteristics, and comorbidities.](http://</p></div><div data-bbox=)

When I wrote “A Design for the 21st Century” in 2006, I was in the midst of actually designing an expansion to our (circa 1997) ED to increase capacity by 1/3. Readers who would like to see how the considerations presented here (and others) shaped the unit we opened in 2009, can access a short video at <http://www.emed-journal.com/>. ■