

New study finds 34 percent of severely injured patients undertriaged in the US

22 September 2014

According to the American College of Surgeons' Committee on Trauma, patients with severe injuries should be treated at level I or level II trauma centers. Those centers have the resources to provide the best care for those patients.

But 1 out of 3 [major trauma](#) patients in 2010 actually received their treatment at lower-level [trauma centers](#) or nontrauma centers, according to a new study from the Center for Pediatric Trauma Research and the Center for Injury Research and Policy at Nationwide Children's Hospital. Those patients are "undertriaged." The ACS' Committee on Trauma has set an undertriage goal of 5%. The new study found that, in fact, 34% of major [trauma patients](#) are undertriaged.

The study, available online now and in the September issue of the *American Journal of Emergency Medicine*, found that older patients were particularly likely to be undertriaged. More than 54% of seriously injured patients who were 85 years old or older were treated at level III trauma centers or nontrauma centers. Nearly 47% of major trauma patients between 75-84 years old were undertriaged.

More than 40% of undertriaged patients were diagnosed with traumatic brain injury, making that the most common diagnosis.

"Previous studies have found that patients treated at level I trauma centers have a 25% lower risk of death than those treated at nontrauma centers," said Huiyun Xiang, MD, PhD, MPH, director of the Center for Pediatric Trauma Research at Nationwide Children's Hospital, principal investigator at the hospital's Center for Injury Research and Policy, and senior author of the study. "However, we didn't know how many seriously injured people in the United States were not receiving definitive care at higher level trauma centers until now."

A major trauma patient is commonly defined as one with an injury severity score of 16 or above on a scale of 1 (minor) to 75 (unsurvivable). There were an estimated 169,523 major trauma patients in 2010 whose level of care was known, and 57,609 were undertriaged. Adults ages 18-54 were the least likely to be undertriaged – about 22% of major trauma patients in that group were treated at level III trauma or nontrauma centers. Nearly 32% of major trauma patients ages 55-64 were undertriaged. Almost 35% of seriously injured children 5 years and younger were undertriaged, and 25% of children 6-17 years old were undertriaged.

Dr. Xiang said that a number of factors may explain the high numbers of undertriaged patients. Nearly 43 million Americans live more than an hour's drive from a level I or level II trauma center, making it difficult for many to reach the higher level centers. Of those people who are injured, only 18% are transported to a medical facility by emergency medical services (EMS). That means many trauma patients – or their family members and friends – make the decisions about where to seek care, not trained medical professionals. Traumatic brain injury, the most common diagnosis for undertriaged major trauma patients, can be difficult to detect without proper training.

Other factors, including weather conditions and end-of-life directives, may also play a role. When EMS providers and trauma center personnel were surveyed about undertriage of the elderly in an earlier study, they listed inadequate training, lack of familiarity with triage protocols, and age bias as possible explanations.

Solutions to the issue of undertriage are difficult, according to Dr. Xiang. Level I and level II trauma centers do not have the capacity now to care for every patient who experiences major trauma. In fact, the study estimated that trauma centers in the U.S. would need to increase their major trauma

patient treatment capacity by 51% in order to accommodate all undertriaged major trauma patients.

More research is needed to better understand the problem of undertriage and develop solutions to it, Dr. Xiang said. For example, this study is the first to find that traumatic brain injury makes up such a large percentage of diagnoses for undertriaged patients, but no study has been completed to compare the outcomes of undertriaged TBI patients with appropriately triaged TBI patients. And more research into undertriage among elderly patients is important as the population of the United States ages.

"There are no easy solutions to the issue of undertriage," Dr. Xiang said.

Provided by Nationwide Children's Hospital

APA citation: New study finds 34 percent of severely injured patients undertriaged in the US (2014, September 22) retrieved 7 December 2022 from <https://medicalxpress.com/news/2014-09-percent-severely-patients-undertriaged.html>

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