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Study Finds Tracking Method Used in Air Traffic Control Reduces Errors in Trauma Management

Bethesda, MD -- New research published in the June issue of the *Journal of the American College of Surgeons* shows a method used by air traffic controllers may be more effective in tracking patient data and lead to fewer errors compared with current methods used in similar medical settings, primarily in military trauma.

At present, the most prevalent method to track patients in these settings is with simple clipboards.

“For decades, air traffic controllers have managed the complexities of airspace and aircraft handoff with a simple, manual method that has evolved to an efficient and nearly flawless system,” said Air Force 2nd Lt. Jason D. Hoskins, MA, a second-year student at the F. Edward Hébert School of Medicine at the Uniformed Services University of the Health Sciences, or USU. Hoskins is the lead author on the study.

Prior to enrolling at USU, Hoskins was an air traffic control officer. “Our study successfully demonstrates that this method translates to trauma management, and results in increased accuracy and awareness of patient recording, tracking and throughput management. We are currently in discussions to test a more mature version of the system in a major trauma center,” he said.

Currently, there is no standard practice for tracking the movement of patients from emergency rooms to the radiology suite, operating rooms, the intensive care unit, inpatient rooms or the discharge area. Additionally, basic errors – such as misidentifying which extremity needs to be amputated – have resulted in increased mortality that could be prevented with basic safety measures. Both of these situations underscore that patient safety has become a more visible vulnerability of modern medicine.

When Col. Les Folio, an Air Force radiologist and flight surgeon, returned from a combat hospital in Iraq, he presented his ideas of using air traffic control to more effectively and safely triage casualties. Hoskins, along with two of his USU classmates and another faculty member, recognized similarities from their own backgrounds and decided to investigate further.

The students include 2nd Lt. Ross Graham, who was trained as an Air Force T-37 pilot and 2nd Lt. Duane Robinson, an Air Force medical services corpsman. The team also includes faculty member Army Lt. Col. Clifford Lutz, an emergency physician.

“This concept came about because the right people were in the room together and we were fortunate that the students took the initiative to put extra time in to bring the study to fruition,” said Folio. “It was a situation where the experiences of our unique student and faculty population melded to design what potentially could substantially improve emergency and disaster preparedness response efforts and outcomes.”

Air traffic controllers use a method in which each aircraft is represented by a flight progress strip. Multiple strips are stacked in order of priority within a bay representing a unique stage of flight. Reprioritization

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regularly occurs for faster aircraft or those that require expedited throughput for emergency or other reasons such as low fuel or weather. Flight progress strips are moved from bay to bay as aircraft move from one stage of flight to another.

Researchers compared the air traffic control model and the traditional casualty tracking method of paper and clipboard in 18 four-hour casualty scenarios with six groups of senior medical students, each with five to 30 mock casualties as part of a training session at the Emergency Medical Support Level II facility at USU's Operation Bushmaster exercise at Fort Indiantown Gap, Penn. The experimental control groups were alternated to maximize exposure and minimize training effects. Results were compiled into performance indices for each scenario, ranging from 0 to 100 percent to represent the number of information items recorded correctly, divided by the number of information items sampled in the scenario.

When compared with the control group, the air traffic control method had fewer errors than the traditional method in critical patient data (99 percent correct versus 87 percent correct). Additionally, the air traffic control method better tracked mechanism of injury (100 percent versus 88 percent), working diagnosis (100 percent versus 93 percent) and disposition of patients through hospital (100 percent versus 93 percent).

The air traffic control method was able to track where patients were at given times, even after each scenario was finished. By keeping data in "air traffic control" bays, information was available in one location as opposed to a roving clipboard. This system provided medical site administrators with knowledge of current capacity and throughput efficiency so resources could be redirected in real-time and a dynamic re-triage process could be maintained.

Post-scenario surveys were provided to key student leadership positions after each cycle. Three times the number of responders preferred the data bays to standard clipboard tracking.

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About the Uniformed Services University of the Health Sciences

Located on the grounds of Bethesda's National Naval Medical Center and across from the National Institutes of Health, USU is the nation's federal school of medicine and graduate school of nursing. The university educates health care professionals dedicated to career service in the Department of Defense and the U.S. Public Health Service. Students are active-duty uniformed officers in the Army, Navy, Air Force and Public Health Service, who are being educated to deal with wartime casualties, natural disasters, emerging infectious diseases, and other public health emergencies. Of the university's nearly 4,400 physician alumni and more than 400 advance practice nurses, the vast majority serve on active duty and are supporting operations in Iraq, Afghanistan, and elsewhere, offering their leadership and expertise. The University also has graduated more than 600 public health professionals.

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About the American College of Surgeons

The American College of Surgeons is a scientific and educational organization of surgeons that was founded in 1913 to raise the standards of surgical practice and to improve the care of the surgical patient. The College is dedicated to the ethical and competent practice of surgery. Its achievements have significantly influenced the course of scientific surgery in America and have established it as an important advocate for all surgical patients. The College has more than 74,000 members and is the largest organization of surgeons in the world. For more information, visit www.facs.org.