New technology links patient records between hospitals, medical flight crews

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Although trauma, heart and stroke patients benefit from being transferred from a local hospital to a higher-level care facility, it's unclear why patients transferred with non-urgent medical conditions show at least a 30 percent higher death rate than had they stayed put, according to researchers from Case Western Reserve University's nursing school.

"We think the answer is somewhere in the medical records," said Andrew Reimer, PhD, RN, KL2 Scholar instructor at the Dorothy Ebersbach Academic Center for Flight Nursing at Case Western Reserve University's Frances Payne Bolton School of Nursing.

But accessing information in electronic medical records (EMRs) at different hospitals and from the flight crew transporting the patient is difficult because their operating systems organize information differently and don't always speak the same computer language.

Reimer, working with Case Western Reserve engineering and biostatistics experts, is developing technology that overcomes the communication problems and mines information from patient charts.

That's critical, Reimer said, because each hospital and the flight crew generate a new patient record.

All three charts must be reviewed for a complete picture of the patient's situation and to determine when to move the patient, what conditions

warrant moving and what might impact the patient's health in the transfer, he said.

"Families also need the information to determine what's best for their loved ones—move the patient or stay," he said.

Such information could impact the 400,000 patients nationally transported annually by helicopter, another 150,000 by jet and an unknown number by land, according to Reimer, based on analyses performed by the Case Western Reserve biostatics and epidemiology department.

To mine medical information, such as patient demographics, medical and surgical histories, procedures, laboratory, pharmacy, vital signs, billing data and patient outcome, is difficult.

Because of the different types of patients transported (neonatal, pediatric and adult), Reimer said the researchers spent considerable time developing a digital template that creates a uniform table with 42 areas of information for consistent data reporting.

The streamlined process now enables researchers or clinicians to identify each necessary piece of data, request the information from the individual EMR in the particular information system and then download that information to a local data warehouse that acts like a collection center on an individual patient.

As more patients have their information stored in the warehouse, researchers and clinicians can begin to track patterns in how patients who are transferred fare, from admitting to discharge.

The researchers report that this can eventually tell them when to move or keep patients where they are.

Reimer, with Elizabeth Madigan, professor of nursing and associate dean for academic affairs, explains the process, elements necessary to create the integrated system of records and rationale behind having access to EMRs in the article, "Developing a Fully Integrated Medical Transport Record to Support Comparative Effectiveness Research for Patients Undergoing Medical Transport," in the *eGEMs* (*Generating Evidence & Methods to improve patient outcomes*).

Searching a patient's chart for appropriate health information at a single hospital can take days. But the new interface technologies allow information to be mined from 42 different data points in minutes, Reimer said.

The researchers reported having some success with the Cleveland Clinic Hospital System by linking the flight and hospital [information](link) from which patients were transported to the Clinic's 1,300-bed main campus in Cleveland, 10 community hospitals and 14 family health and ambulatory surgery centers in the Clinic's system. They also hope to eventually include the records of approximately 350 patients who are annually transported to the Cleveland Clinic from hospitals outside the system.

In addition to teaching, Reimer holds a special interest in the topic as a flight nurse for the Cleveland Clinic Health System. As a National Institute of Health-funded KL2 Scholar, he studies and translates science into quality health-care practices.

For his research project, Reimer has focused on access to patient records, which offers the potential to build toward a national EMR system.

Connecting hospitals and flight data in a single hospital system shows the enormous challenges ahead for building a national EMRs infrastructure.

"We've made progress and can now build and expand on it," he said.

The next step in Reimer's research is to link records for the 350 patients annually transported between the Cleveland Clinic and non-system hospitals.

Provided by Case Western Reserve University

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