Clinical pathology selected abstracts

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Impact of commercial laboratory testing on a care delivery system

February 2019—Care delivery systems have become increasingly fragmented and complex, which impacts patient care. The amount of health care data generated has also created a problem by reducing the time devoted to direct patient care. The Institute of Medicine has called for streamlined systems to assist in informing caregivers of patient results, interpreting those results, determining a course of therapy, and communicating this information to the patient. However, it can be challenging to meet these charges when samples for outpatient laboratory testing are routed to off-site commercial reference laboratories because of insurance requirements. Children's Healthcare of Atlanta (Georgia) studied the impact of outpatient testing routed to a commercial laboratory based on insurance agreements. The intent of the study was to compare the differences between off-site commercial reference laboratory testing and hospital-based laboratory testing performed at Children's and to identify the costs to the Children's system of supporting the off-site testing. The authors noted that laboratory testing sent to commercial laboratories is often seen as a cost-saving measure by payers. For the purposes of this study, outpatient samples sent to one of the two commercial laboratories used by Children's were analyzed. Orders were placed in the electronic medical record at Children's, and the health care system's phlebotomists drew the blood samples. The samples were sent to the required testing laboratory and the results were posted to the EHR at Children's via an HL7 interface. The study investigators found that the median time from phlebotomy to result was 0.7 hours for testing at the Children's lab and 20.72 hours for the commercial lab. The median time from result posting to caregiver acknowledgement was 5.4 hours for the Children's lab and 18 hours for the commercial lab. The commercial lab cancelled 2.7 percent of the tests, whereas the Children's lab cancelled 0.8 percent. Of interest, the financial cost to Children's of supporting online ordering, collection, and shipment of samples and the reporting of tests performed at commercial labs was approximately $640,000 per year. The study results suggest that there are tangible monetary costs and intangible costs, including delayed result reporting and acknowledgement, when laboratory testing is outsourced to a commercial lab. The authors noted that the "less expensive" test provided to the patient's insurance company by the commercial reference laboratory becomes an expense to the patient, caregiver, and Children's system. These factors need to be taken into consideration when disrupting a hospital-based laboratory care delivery system.

Rogers BB, Adams JL, Carter AB, et al. The impact of disruption of the care delivery system by commercial laboratory testing in a children's health care system. *Arch Pathol Lab Med.* 2019;143:115–121.

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Effect of short-term versus long-term blood storage on mortality after transfusion

Several randomized controlled trials with high-risk patients have demonstrated that transfusing blood that has undergone prolonged storage does not increase the risk of adverse outcomes. However, most of these studies have been restricted to high-risk populations and have not been powered to detect small but clinically significant differences in mortality. Stored blood undergoes biochemical, structural, and functional changes that may reduce oxygen delivery to tissues, and the release of extracellular vesicles and cell-free DNA during storage may create a hypercoagulable state. The authors conducted a study to evaluate the in-hospital death rate of a generalizable population of patients receiving blood following longer-term storage compared to shorter-term storage. The large multicenter pragmatic randomized controlled trial involved six hospitals in four countries and was performed between 2012 and 2015. Patients were randomly assigned blood of short storage duration or long storage duration in a 1:2 ratio. Of 20,858 patients with type A or O blood, 6,936 were assigned to the short-term storage group and

13,922 to the long-term storage group. The mean storage time was 13 days in the short-term group and 23.6 days in the long-term group. The results showed that there were 634 (9.1 percent) deaths in the short-term storage group and 1,213 (8.7 percent) deaths in the long-term storage group. These differences were not significant. When the analysis was expanded to all blood types, the rates of death were similar. The authors concluded that among a general hospital population, there were no significant differences in rates of death between patients given fresh blood and patients who underwent standard practice and received older stored blood. The authors also noted that in a separate exploratory analysis, no association was found between the age of the blood analyzed as a continuous variable and in-hospital mortality rates.

Heddle NM, Cook RJ, Arnold DM, et al. Effect of short-term vs. long-term blood storage on mortality after transfusion. *N Engl J Med.* 2018;375(20):1937–1945.

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