Introduction: Handoffs are a source of potential harm to the safety of patients since the process of transferring information and equipment increases the likelihood for error. Human factors research has found that a lack of protocols, formal guidance and procedural training are associated with inconsistencies in the handoff process and can cause coordination problems and threaten patient safety (Cohen & Hilligoss, 2010). Much of the current literature emphasizes communication breakdowns as the foremost problem that hinders the effectiveness of handoffs (Cohen & Hilligoss, 2010). Breakdowns in communication during handoffs can lead to confusion about the patient’s condition and appropriate care, inconsistent patient monitoring, medication errors, delays in diagnosis, and lack of follow through on referral (Arora et al., 2005; Cohen & Hilligoss, 2010; Greenberg, 2007; Mistry et al., 2008). Therefore, vulnerabilities or threats to patient safety result from the reality that errors or omissions in the information promulgated during the handoff often become a “fact” for the next person or team using the information (Philibert & Leach, 2005). However, much of the published literature on handoffs has focused primarily on preoperative and postoperative handoffs (Arora et al., 2009; Cohen & Hilligoss, 2010; Dracup et al., 2008). Very little is known about intraoperative handoffs and their impacts on the surgical team during cardiac surgery. Intraoperative handoffs are defined as the exchange of surgical staff members in which one person transfers control over, or responsibility for, the performance of specific tasks associated with the surgical care of a patient and then subsequently departs the operating room (OR) for any given period of time (Christian et al., 2006; Cohen & Hilligoss, 2010). A recent incident report of a kidney transplant surgery misfortune highlights the importance of research in intraoperative handoffs (Feehan, 2012). In this particular incident, a nurse unknowingly deposed of a healthy donor’s kidney after an intraoperative handoff occurred during the transplant procedure. This catastrophe was due to the omission of pertinent or no information being relayed during the intraoperative handoff process. Comprehensive intraoperative handoff studies are, therefore, essential to understanding intraoperative handoffs intrinsic ability to impact health care processes and outcomes. Therefore, the present study prospectively examined the characteristics of intraoperative handoffs and their impacts on the surgical team during cardiac surgery.

Method: This was a post-hoc analysis of a prospectively collected dataset obtained through direct, targeted observations using an electronic data collection tool (Blocker et al., 2010). The electronic data collection tool captured the description of the handoffs, the surgical phase that the handoff occurred, the potential and/or actual impact of the handoff, and the surgical team members involved in the handoffs. The observation team collected data over a 6 month period in multiple operating rooms within two midwestern hospitals and across multiple surgical teams. Convenience sampling was used to select the hospitals and the cardiac surgical cases to observe (Malterud, 2001). Descriptive statistics were primarily used to analyze the characteristics of intraoperative handoffs during the cardiac surgical procedures. In addition, each handoff description captured using the data collection tool was examined for classification purposes. As implied for this particular research study, the dependent variable is the intraoperative handoffs and the independent variables are cardiac surgical procedures at the two nonprofit academic hospitals.

Results: There were a total of 90 handoffs identified across 36 surgical cases observed in this study (M = 2.5 per case, SD = 3.28; range: 0-13). Those handoffs were categorized as (1) Initial Handoff—the person will return, (2) Return Handoff, and (3) Initial Handoff—the person never returned. Handoffs occurred most often during surgical repair (53.33%), initiation of by-pass (20.00%), opening (15.56%), closure phase (5.56%), and termination of by-pass (4.44%). The nurses (61.11%) and surgical techs
(26.67%) were more frequently involved. Mean intraoperative handoff process duration was 1 minutes 42 seconds (SD = 00:01:38 min/sec). There were no significant differences in handoffs frequency, duration and categorizations between the two hospitals.

**Discussion:** Examining the characteristics of intraoperative handoffs can assist us with developing methodologies for effectively studying handoffs in order to implement and seamlessly integrate compatible inventions. The results suggest that intraoperative handoffs types could be assessed and explored in order to understand the level of vulnerability or benefit that each affords to the safety of patients (Cooper et al., 1982). In addition, examining when (surgical phase) handoffs occur will provide insights into the most appropriate time to conduct a handoff for each surgical team role (Wadhera et.al., 2010). The results suggest that intraoperative handoffs impacts the surgical team function and knowing the appropriate time to conduct handoffs is critical in reducing distraction-induced errors.

**Keywords:** Intraoperative handoffs, teamwork, cardiac surgery, patient safety
References


