**Cover Page**

a. T1

b. Mitigating Conflict and Error in the Operating Room

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**Abstract**

As part of an international imperative toward decreasing medical error, hospitals are adopting teamwork training curricula from other high risk industries, such as aviation. Although these curricula are beginning to find measurable success in medicine, they are not perfectly suited for the operating room (OR). The OR is a highly social and hierarchical setting where historically estranged interprofessional team members must work interdependently under pressure. Unresolved conflicts upset team cohesion, reduce team effectiveness, and potentially lead to adverse patient outcomes. Borrowing methods from primatology, this project will document the interpersonal interactions of OR team members. Partnering with environmental psychologists from the Georgia Institute of Technology, the project will also investigate the environmental factors correlated with these interactions. The PI and other interested parties from Emory Healthcare will later use this documentation to lay the groundwork for the design of a novel reconciliation protocol. Ultimately, the proposed research will help minimize distraction, staff turnover, and medical error, and it will help maximize the amount of time available for patient care. OR patients are the ultimate beneficiaries of this important research initiative.

## I. Introduction

Medical errors are responsible for at least 98,000 avoidable deaths annually, which is the equivalent of a Boeing 767 crashing every day of the year [1]. In the operating room (OR), an average of 4 conflicts erupt per surgical procedure [2]. Gossip, exclusion, threats, and unjustified criticism of work often instigate the conflict [8]. Emotional abuse can result and be detrimental to workers' mental and physical health [9, 10]. Moreover, conflicts can cause errors that increase patients' morbidity and mortality [3-5]. The Joint Commission affirms that conflict and distractions are hazardous to the wellbeing of patients and to their care teams [6, 7].

In business, the more stratified a workplace, the more likely a conflict resolution will favor the interests of high-ranking individuals rather than the integrated interests of all stakeholders [13]. Although negotiation is what most Americans consider to be the ideal solution for workplace conflict, resolution usually occurs through coercion, or when one party submits to another [14]. The observer has witnessed the same phenomenon occurring in the OR among team members from surgery, anesthesia, and nursing. Although every organization from Emory Healthcare to WHO demands reform, specifically an increase in teamwork [15, 16], the current engagement is weak, especially for senior clinicians [17].

Because teamwork training has successfully reduced error in aviation, many health care researchers have sought to replicate its approach [2-6]. The Cockpit Resource Management (CRM) model has revolutionized decision making and conflict resolution among aviation crews, changing flying from a relatively dangerous endeavor 30 years ago to one of today's safest modes of travel.

Although CRM and other aviation-style teambuilding strategies seem applicable to health care, they are not designed for crews as interdependent yet historically estranged as are the members of hospital teams. Emory Healthcare tried aviation-style team training in 2011. Clinicians and administrators from a confrontation-prone intensive care unit (ICU) attended an Air Force-themed teambuilding retreat led by former fighter pilots. After this retreat, the ICU leaders, who were working with Drs. Zivot and Jones, deemed the event a failure. The ICU leaders concluded that the pilots' approach to teambuilding was not adoptable because the ICU team was not a "team" but rather a collection of professionals whose only common interest was patient outcome. The retreat made it clear that another teambuilding model—one strong enough to confront rigid power structures based on role, rank, gender, age, race/ethnicity, etc.—would be needed. The proposed project is the first step in the development of this model.

Current efforts to facilitate conflict resolution, such as Emory Healthcare's disputed pledges of good conduct, aim to completely suppress, rather than channel and mitigate, behaviors humans are prone to by nature. The research resulting from this pilot study will steer the design of an intervention that reduces workplace conflict, minimizes emotional abuse, and optimizes patient safety in the OR. It will do so through an

understanding of the origins and function of conflict between individuals with different roles and ranks.

The project proposes a systematic observational approach borrowed from studies on nonhuman primates and field anthropology. Conflicts in the OR between physicians are not dissimilar to those between nonhuman primates, in that they often involve status contests. Moreover, they tend to occur between males in front of a mostly female audience, which adds another layer of complexity. While it is not the project's goal to explore the similarities and differences with nonhuman primate behavior, it is its goal to adopt the techniques of primate research, tested and elaborated over the last few decades, to carefully document what sort of conflicts occur in the OR, between which parties, and perhaps also for what reasons. With the School of Medicine, Emory Healthcare, and the Living Links Center for the Advanced Study of Ape and Human Evolution (at Yerkes National Primate Research Center) all operating under the Emory umbrella, the PI and his colleagues are uniquely poised to lay the groundwork for the development of such a protocol.

## II. Questions, Specific Aims, and Hypotheses

The Central Research Questions are:

1) What conditions (e.g. team composition, nature of procedure, noise levels) facilitate the occurrence of conflict in the OR?
2) Which team members or combinations of team members are most conflict-prone?
3) What is the immediate impact of an episode of conflict on team dynamics? How does the social atmosphere of the OR affect the duration of a procedure?
4) How are conflicts being resolved? Is there active mediation by third parties, and which positions on the team do they occupy?
5) Which team relations are most positive, constructive, and have the least conflict?
6) Do teams ever socially disintegrate in that some individuals quit or stop working?
7) Is there any consistent debriefing in which team members comment on the procedure, on the team work, shake hands, say goodbye, and so on?

The specific aims are:

1) To understand operating room (OR) social behaviors so that extensions of the proposed project may challenge the social behaviors that commonly initiate conflict.
2) To proceed toward remedying a major problem in the OR—interprofessional conflict.

The proposed research will test the following hypotheses:

1) More powerful team members, e.g. surgeons, are the most common initiators of conflict in the OR.
2) More powerful team members are rarely impugned for confrontational behaviors in the OR.

## III. Methods

While conducting preliminary research, Dr. Jones observed a variety of surgical procedures at Emory University Hospital and Emory University Hospital Midtown. Based on her field notes, she and Dr. de Waal developed a primatology-inspired.

ethogram, or catalog that encompasses all of the reliably observable social behaviors in the OR. The ethogram was continually refined until the present, finalized version was attained.

The social behaviors contained in the ethogram are organized into 10 general groups. Example groups include “Confrontational Behaviors” and “Cooperative Behaviors.” Each group contains 2 to 4 subgroups that list specific observable actions. For the group “Confrontational Behaviors,” examples of events belonging within Subgroup 1 include “interrupting unnecessarily” and “being demanding.” As the number of the subgroup increases, so does the intensity of the event. Events included in “Confrontational Behaviors” Subgroup 4 include “asking for a mediator” and “storming out of the OR.”

Each of the 10 general groups comprising the ethogram and each type of OR team member have been assigned a random letter that cannot be decoded without the ethogram. It works as follows: to document that, for example, the attending surgeon (S1) cursed (C3) at the surgical fellow (S2) and the scrub nurse (B1), the observer would record “S1 C3 S2 B1.” Neukadye’s iPad application “Field Notes” contains all of the codes in the ethogram. Once a code such as “S1 C3 S2 B1” is entered, the program assigns a timestamp. Observers will use the timestamping application to record all possible observable behaviors occurring within a surgical procedure. In addition to documenting social behaviors in real time, observers will classify the atmosphere in the room as “positive,” “neutral,” or negative,”—or “O,” “U,” and “G”—in 10 minute increments. Every coded entry will be exported to Microsoft Excel for the immediate correction of entry errors and for future analysis.

The coded data will be uploaded into Excel and analyzed using pivot tables. The researchers will investigate data surrounding episodes of conflict to discover what types of events precede conflict, which type of clinicians are most frequently engaged in conflict, which surgical specialties are most conflict-prone, what the gender composition of the room is when conflict arises, etc.

With Craig Zimring, PhD, an environmental psychologist at the Georgia Institute of Technology, we will examine how the built environment correlates with conflict. To see if conflict is occurring when the OR is loud, for instance, we will use an iPad app that measures decibels to find the average volume of the room for each procedure. Similarly we will use an iPad app that measures the average amount of light in the room for each procedure. Sound and light measurements will be recorded every 20 minutes for the duration of each procedure.

In total, 250 procedures will be observed over a period of one year. This number is based on how many observations observers can complete in a week. The procedures observed will be distributed across Emory Healthcare’s surgical specialties. The names and departments of key subjects (specifically, surgeons, anesthesiologists, circulating and scrub nurses) will be recorded in code so that observers will be able to determine the largest, most diverse sample possible.

A potential concern with the proposed approach is how the teams' awareness of the observer's presence might affect behaviors (e.g., the Hawthorne Effect) [12]. However, behavioral scientists contend with this regularly, and most often by the time the procedure begins the surgical team is no longer mindful of their presence. In an observational study conducted in two Australian ICUs, for instance, the investigators noted that participants quickly habituated to the presence of the observer [13], a finding that is consistent with other observational reports in clinical settings [14-17].

## IV. Anticipated Results

The goal of this pilot study is to document the occurrence of conflict in the OR—to demonstrate the frequency of conflict and to explore the events that transpire in and around it. Based on the success of the First Research Phase (see the appendix for early findings), the PI expects to observe habitual conflict that causes distraction, emotional abuse, and decreased time for direct patient care.

Based on hundreds of observed procedures, rather than self-reports and debriefings, the ethological methodology proposed will yield an objectively quantified picture of both positive and negative interactions in the OR. Once OR conflict is understood and shown to impact team dynamics, external sponsorship will be pursued. It will substantiate the highly valuable next step—to produce and introduce the intervention based on nonhuman primate mechanisms of reconciliation. The protocol will initiate valuable logistical and financial advantages in other ORs and eventually to other healthcare settings.

In years to come, the proposed research will help OR team members from surgery, anesthesia, nursing, and other specialties have an enriched working environment characterized by greater interprofessional support, decreased tension and turnover, and increased time for direct patient care. Considering the costs of OR time, staff turnover, and medical error caused by underdeveloped teamwork, this research will help bring crucial, long-term savings to Emory Healthcare and perhaps even US healthcare [11]. The patient, however, is the ultimate beneficiary of this important research because better performing teams have better results, including better patient outcomes [3].

## V. Budget

Please see NIH PHS 398 Budget Form.

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