

realistic, and effective means to drive change is to investigate and own the data in the operational or administrative domain in addition to the clinical or surgical realms. In doing so, we continue to be the nobles of our profession and prove that we are not squires of a system.

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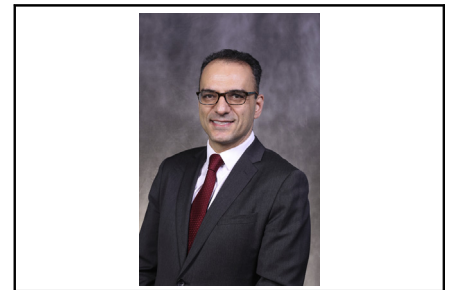
## Commentary: Performance, safety monitoring, and needle counts in the operating room

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Cardiac surgery operations have a low error tolerance and share many unique properties with high technology systems and military operations in which performance and outcomes depend on complex individual, technical, and organizational factors and their interactions.<sup>1</sup> In those systems often referred to as “complex socio-technical systems,” human factors research has been a major contributor to risk management and reliability enhancement.

Although patient outcomes in cardiac surgery are multifactorial, the patient's intraoperative course is of paramount importance.<sup>2</sup> The surgical community is placing an intense focus on the microcosmos and team interactions in the operating room in an attempt to analyze all possible outcome associations.

Safety monitoring in the operating room and the concept of “near miss” were explored 20 years ago to detect warnings of suboptimal performance in the arterial switch operation in a multicenter study by analyzing minor and major events representing various types of human errors.<sup>1</sup> Both minor events (eg, instrument handling errors by the scrub nurse, communication or coordination errors) and major events (eg, technical errors) had a strong correlation



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### CENTRAL MESSAGE

Safety monitoring in the operating room is of paramount importance for cardiac surgery performance improvement. SCEs are associated with high staff turnover and are likely surrogates of suboptimal team member dynamics.

with patient outcomes (mortality or near-miss). It is no surprise that the present study by Bloom and colleagues<sup>3</sup> elicits a significant association of sharp count error (SCE) with mortality. More important, this study exposed the impact of increased team turnover, such as nursing and scrub personnel, on care in the operating room with a significant association with SCEs. The sophisticated organizational structure and function of the cardiac operating rooms require the coordinated efforts of multiple people working together as a team with high levels of cognitive and technical performance of precise tasks.

The impact of staff turnover on SCEs and its possible association with patient outcomes as examined by Bloom and colleagues<sup>3</sup> in this article are important contributions in delineating yet again the delicate interaction of operating room team dynamics and patient outcomes. Although SCEs were associated with high staff turnover and mortality, this

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Disclosures: Author has nothing to disclose with regard to commercial support.

Received for publication Jan 1, 2020; revisions received Jan 1, 2020; accepted for publication Jan 2, 2020; available ahead of print Jan 22, 2020.

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*J Thorac Cardiovasc Surg* 2021;161:146-7

0022-5223/\$36.00

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<https://doi.org/10.1016/j.jtcvs.2020.01.008>

relationship is unlikely to be a “cause and effect,” but rather SCEs are a surrogate of important team dynamics indicating suboptimal performance and communication breakdown. As surgical complexity increases, the amplitude of the impact of suboptimal performance and intraoperative adverse events becomes exponential as shown by other studies.<sup>4-6</sup> Identifying surrogates of suboptimal performance such as SCEs could facilitate error detection, which is the first step in error handling. The optimization of the delicate and complex interactions of many individuals in the performance of precise tasks in the operating room is required for best patient outcomes, similar to the organization and management of a nuclear power plant or an aircraft carrier.

Creating the sanctuary of the modern operating room is an important concept that has now transformed the surgical culture to constantly searching for information and surrogates in the analysis of team interactions, dynamics,

and performance associated with outcomes and the achievement of excellence.

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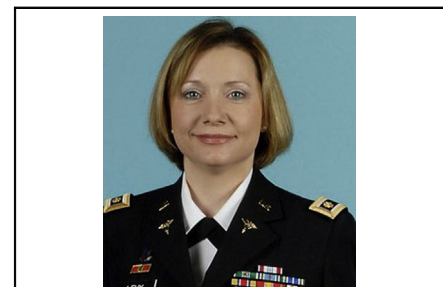
## Commentary: Influence of staff turnover during cardiac surgical procedures: Less is more

LTC Julie Brian, AN, USAR

*“The very first requirement in a hospital is that it should do the sick no harm.”*

—Florence Nightingale

Bloom and colleagues<sup>1</sup> report their first-of-its-kind study on the relationship between staff turnover and sharp count errors (SCEs) during cardiac surgery. It was a significant finding that among 7264 cardiac surgeries, among the factors associated with increase in SCEs was staff turnover,



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### CENTRAL MESSAGE

Staff turnover for breaks and shift change during cardiothoracic surgery can lead to an increase in sharp count errors. This first-of-its-kind study reveals that poor outcomes may be associated with sharp count errors.

including >2 scrub personnel (eg, 3 scrubs [odds ratio, 1.3;  $P = .032$ ], 4 scrubs [odds ratio, 2;  $P < .004$ ], and 5 scrubs [odds ratio, 2.4;  $P = .004$ ]) and >1 circulating nurse (eg, 2 nurses [odds ratio, 1.9;  $P < .001$ ], 3 nurses

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Disclosures: Author has nothing to disclose with regard to commercial support.

Received for publication Jan 21, 2020; accepted for publication Jan 22, 2020; available ahead of print Feb 7, 2020.

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*J Thorac Cardiovasc Surg* 2021;161:147-8

0022-5223/\$36.00

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<https://doi.org/10.1016/j.jtcvs.2020.01.058>