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## Results of a statewide survey of surgeons' care practices for emergency Hartmann's procedure

Kyle Sheetz, MD, MS,<sup>a,b,\*</sup> Mark R. Hemmila, MD,<sup>a,b</sup> Ashley DUBY, MS,<sup>a</sup>  
Greta Krapohl, RN, PhD,<sup>b</sup> Arden Morris, MD, MPH,<sup>a,b</sup>  
Darrell A. Campbell Jr., MD,<sup>a,b</sup> and Samantha Hendren, MD, MPH<sup>a,b</sup>

<sup>a</sup>Department of Surgery, University of Michigan Medical School, Ann Arbor, Michigan

<sup>b</sup>Michigan Surgical Quality Collaborative, Ann Arbor, Michigan

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### ABSTRACT

**Background:** Emergency general surgery is associated with high morbidity and mortality but has seldom been targeted for practice improvement. The goal of this study was to determine whether perioperative practices vary among surgeons for emergency Hartmann's procedures and whether perioperative care practices are associated with hospitals' complication rates.

**Materials and methods:** We conducted a survey of surgeons at 27 Michigan hospitals. Questionnaires focused on preoperative, intraoperative, and postoperative care practices. Hospitals were divided into quartiles of risk-adjusted complication rates. Responses of surgeons at hospitals with the lowest complication rates were compared to those with the highest, to determine whether there were systematic differences. Qualitative content analysis was performed for open-ended questions.

**Results:** A total of 106 surgeons returned questionnaires (response rate 49%). We identified variation in use of bowel preparation, ostomy site marking, rectal stump management, ostomy protrusion, skin closure method, antibiotics duration, and ambulation/physical therapy practices. Surgeons from hospitals with low complication rates were more likely to use a clean instrument tray during wound closure (61% versus 11%,  $P = 0.001$ ) and reported greater use of laparoscopic lavage without resection for emergency diverticulitis cases (31% versus 6%,  $P = 0.05$ ). Surgeons in the lower complication rate hospitals listed more modifiable care factors in their open-ended responses to questions about reasons for complications.

**Conclusions:** Surgeons' practices vary for emergency Hartmann's procedure. This study serves as a proof of concept that studying surgeons' practices is feasible within a quality collaborative setting. Such data can be used to generate testable hypotheses for performance improvement aimed in high-risk, emergency surgery.

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\* Corresponding author. Department of Surgery, University of Michigan, 2800 Plymouth Rd, Bldg 16, Flr. 1, Ann Arbor, MI 48109. Tel.: (734) 998-8200; fax: (734) 998-7473.

E-mail address: [ksheetz@med.umich.edu](mailto:ksheetz@med.umich.edu) (K. Sheetz).

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## Introduction

Emergency surgical procedures comprise a minority of the total case volume at most hospitals; however, they carry a disproportionately high risk of mortality and account for up to 47% of all postoperative deaths in general surgery patients.<sup>1</sup> Wider variation in mortality and morbidity outcomes exists across hospitals for emergency general surgery operations when compared to elective procedures.<sup>2,3</sup> Despite these findings, emergency general surgery has received little focused attention for quality improvement.<sup>4</sup>

Collaborative quality initiatives (CQI) in surgery have been created based on the premise that surgeons can learn “best practices” from one another through feedback of risk-adjusted outcomes, regular face-to-face interactions, and rapid dissemination of new information.<sup>5</sup> The organizational structure of a CQI provides an ideal real-world setting to study how differences in practice influence outcomes of surgery and to disseminate the knowledge gained.<sup>6</sup> As a first step in identifying emergency surgery “best practices,” we chose to study surgeons’ perioperative care for emergency Hartmann’s procedure. Previous work has shown that operations involving ostomy creation are more likely to be performed in the emergency than elective setting and are associated with a high risk of adverse outcomes, making emergency Hartmann’s procedure a logical target for quality improvement.<sup>7-10</sup>

In this context, we conducted a statewide survey of surgeons’ care practices for patients undergoing emergency Hartmann’s procedures within the Michigan Surgical Quality Collaborative. Using our survey, we sought to characterize preoperative, intraoperative, and postoperative care practices. We then compared elements of clinical practice to hospitals’ risk-adjusted complication rates for procedures involving ostomy creation. Finally, we performed an analysis of open-ended survey responses in an effort to understand what surgeons do in practice to mitigate the high morbidity and mortality risks of these operations.

## Materials and methods

### Study setting

We conducted a survey of surgeons from 27 hospitals participating in the MSQC. MSQC is a Blue Cross Blue Shield of Michigan/Blue Care Network–sponsored CQI focused on general and vascular surgery quality improvement. This CQI program uses defined data elements described in a data dictionary, performance of annual data validation audits, and sophisticated risk adjustment models to achieve benchmark reporting at the hospital level.

### Survey design

We surveyed general and subspecialty surgeons affiliated with the MSQC CQI program. In an effort to explain the wide variation in complication rates identified in prior work, we developed a 23-item survey to assess differences in surgeon’s care practices for emergency Hartmann’s procedure

(Table 1).<sup>10</sup> We chose to limit our survey to one operation to improve clarity and conciseness. Hartmann’s procedure was chosen because it is associated with high complication rates and is performed by various types of surgeons (i.e., general, colorectal, and acute care surgeons).

In designing the survey, we began with several informal interviews with attending surgeons to discuss what factors in perioperative care might influence outcomes in the emergency colectomy setting. We then designed questions about preoperative care, intraoperative practices, and postoperative care. We piloted our survey with 10 local attending surgeons and senior surgical residents to evaluate the clarity of questions and the response burden and modified the questionnaire based on this pilot. We also sent the survey to several colorectal surgeons within our statewide collaborative to confirm that the instrument would capture meaningful, and potentially variable, care practices for Hartmann’s procedure. Feedback from the pilot phase was incorporated into the final survey instrument.

### Survey administration

The MSQC interfaces with each participating hospital through a “surgeon champion.” MSQC currently consists of 52 hospitals; however, we initially directed this survey to 34 hospitals that have participated long enough to have adequate historical data for analysis and comparison. These hospitals tended to be larger in size, perform a wider variety of surgical procedures, and have more general surgeons on staff. We received written permission from 27 hospitals’ surgeon champions to survey their providers, which is how we arrived at the final sample of 27 hospitals. We then mailed the questionnaire with a cover letter to surgeons who perform ostomy creation surgery in those hospitals. We matched surgeon respondents to hospital-level data captured in the MSQC clinical registry between 2008 and 2013. All surveys contained unique identification codes to ensure confidentiality.

To maximize our response rate, we used a modification of Dillman’s Tailored Design Method in administering the questionnaire to the surgeons.<sup>11</sup> The survey was mailed with a stamped-addressed return envelope. Surgeons who did not initially respond received a second mailing 3 wk later. Survey results were then collected and manually entered in to a database created within the Research Electronic Data Capture (REDCap) software (Nashville, TN).<sup>12</sup> Accuracy of data entry was evaluated through dual-entry of 30% of surveys. This revealed an error rate less than 1%. Questionnaires were collected, entered, and deidentified by a research assistant, so that analysis and interpretation of the data was performed in a blinded fashion (without researcher knowledge of particular hospitals’ or surgeons’ identities).

### Surgical outcomes

We used hospital-level data from the MSQC clinical registry to compare survey results with objective clinical outcomes.<sup>13</sup> Information regarding MSQC data collection, auditing, and reliability has been previously published.<sup>14</sup> We identified cases involving ostomy creation using Current

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