

Diagnostic Error in General Surgery: Cognitive Bias and Systems Issues in Medical Malpractice Claims

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Since the publication of the [1999 Institute of Medicine \(IOM\) report *To Err is Human*](#), a major focus in healthcare has been understanding the cause of medical errors in an attempt to improve quality and safety of care. In a [2016 British Medical Journal study](#), diagnostic errors were cited as the third leading cause of death in the United States. The [IOM 2015 report *Improving Diagnosis in Health Care*](#) emphasized that diagnostic errors are among the most costly errors in both adverse patient outcomes and malpractice indemnity, while concurrently being under-studied in the patient safety areas in healthcare. Other recent studies, such as those appearing in [JAMA Internal Medicine](#) and from [CRICO Strategies](#), the risk management arm of the Harvard Medical Institutions, have also demonstrated these findings. In their 2015 study *Improving Diagnosis in Health Care*, the IOM [defined diagnostic error as](#) “the failure to (a) establish an accurate and timely explanation of the patient’s health problem(s) or (b) communicate that explanation to the patient.”

Diagnostic errors remain the [most common type of malpractice allegation](#) paid between the years 1992 and 2014. The [Emergency Care Research Institute \(ECRI\)](#) listed diagnostic errors among its top ten organizational concerns in 2018. Researchers publishing in [JAMA Internal Medicine](#) found that among their sample of paid malpractice claims based on a diagnostic error and involving general surgeons, the high-severity rate was over 85 percent (high-severity injuries would include disabling injuries, loss of senses, brain damage, reduced life expectancy, and death). In 2018, using a database of 6,700 closed malpractice claims, [CRICO Strategies](#) studied the diagnostic process, finding multiple errors in all phases of the diagnostic pathway.

Research appearing in [Academic Medicine](#) initially described three major categories of diagnostic errors: no-fault errors, system errors, and cognitive errors. Currently, the no-fault error category has been eliminated. System errors are attributed to underlying problems in the healthcare delivery system. Cognitive errors reflect the constraints of human processing-signaling, incomplete knowledge, flawed reasoning, or faulty reasoning. A typical adult makes an average of 35,000 decisions every day, many occurring as second nature based on our life experiences. Healthcare providers use heuristics, or cognitive shortcuts, and internalized, tacit knowledge (based on life experiences, discussions with, and/or opinions from peers) to simplify the clinical decision-making process. However, these processes are frequently flawed and can lead to misses and adverse events.

Although claims against general surgeons primarily allege technical surgical-type errors, general surgeons are not immune to making critical diagnostic errors. The [IOM report *Improving Diagnosis in Health Care*](#) suggested that critical analysis of malpractice claims might elucidate the causes and solutions to diagnostic errors. As such, the goal of this study is to examine diagnostic-type errors among general surgeons using a [standardized, 12-step diagnostic process of care as described by CRICO](#). The study considered differences between diagnostic errors, both cognitive and systemic, committed by general surgeons in the inpatient and outpatient settings, as well as their severity.

METHODS

Diagnosis-Type Cases

As defined for this analysis, a diagnostic error included any failure along the diagnostic process leading to the failure to diagnose, a misdiagnosis, or a delay in diagnosis. This definition includes:

- Failing to provide access to care
- Experiencing problems with the history and physical
- Incorrectly interpreting signs, symptoms, and/or test results
- Failing to establish a differential diagnosis
- Delaying the performance of tests
- Managing inappropriately the interpretation and transmittal of tests
- Delaying follow-up with patients
- Neglecting to refer and consult for patients
- Neglecting to communicate patient information among the care team
- Neglecting to establish a treatment plan with the patient and healthcare team

The CRICO 12-Step Diagnostic Process of Care Framework

CRICO's standardized description of the diagnostic process of care has been designed to assist in defining areas where improvements can be made, where training and education can be introduced, and where errors can be prevented. Therefore, only certain contributing factors are included in this analysis of the diagnostic process.

The CRICO 12-step diagnostic process of care framework includes three main phases: Initial Diagnostic Assessment; Tests and Results Processing; and Follow-Up and Coordination. Each of these steps may involve one or more individual contributing factors.

Phase 1: Initial Diagnostic Assessment

Step 1: Patient notes problem and seeks care

Step 2: History and physical

Step 3: Patient assessment/evaluation of symptoms

Step 4: Diagnostic processing

Step 5: Ordering of diagnostic/lab tests

Phase 2: Tests and Results Processing

Step 6: Performance of tests

Step 7: Interpretation of tests

Step 8: Receipt/transmittal of test results to provider

Phase 3: Follow-Up and Coordination

Step 9: Physician follow-up with patient

Step 10: Referral management

Step 11: Provider-to-provider communication

Step 12: Patient compliance with follow-up plan

The CRICO 12-step diagnostic process of care framework was used to assess where diagnostic errors occurred in closed malpractice cases involving general surgeons. Diagnosis allegations against general surgeons, both major and secondary, were chosen. The diagnosis major allegations (case type) were further examined for location, severity, major injury, final diagnosis, and final disposition.

The [2018 CRICO benchmarking report](#) used the 12-step diagnostic process of care framework to assess claims against providers of ambulatory care from 2007 to 2016. The diagnostic process of care framework uses three phases of care (initial diagnostic assessment; testing and results processing; follow-up and coordination) to examine multiple areas involved in the diagnostic process that may be amendable to patient safety intervention. Our study specifically investigated medical malpractice diagnosis-type claims against general surgeon members of The Doctors Company that closed between 2008 and 2018.

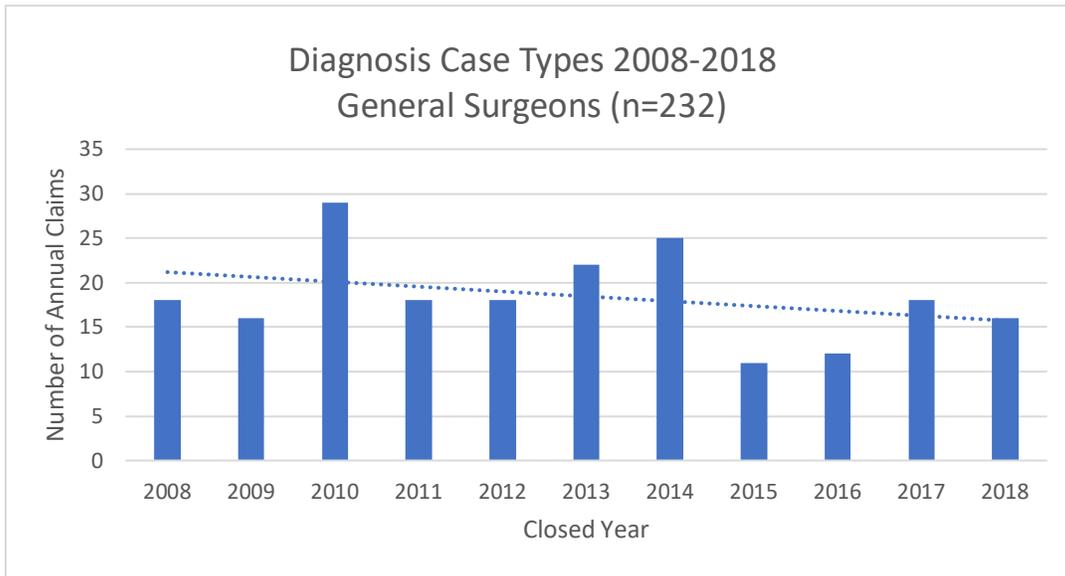
Analysis

This was a cross-sectional analysis of closed medical malpractice claims from The Doctors Company database using the CRICO Comprehensive Risk Intelligence Tool (CRIT). Analysis was descriptive for the characteristics of claims based on years, type of patient (inpatient, outpatient), severity, final diagnosis, and contributing factors. The CRICO 12-step diagnostic process of care framework was used to examine diagnostic error by general surgeons. Chi-square was used to determine potential differences between inpatient and outpatient settings.

Sample

Two hundred and thirty-two diagnosis-type cases were extracted, as defined using the initial CRIT criteria listed above. The overall frequency of diagnosis-type claims in which general surgeons are listed as the primary responsible party has been trending down for the years 2008 to 2018.

Figure 1

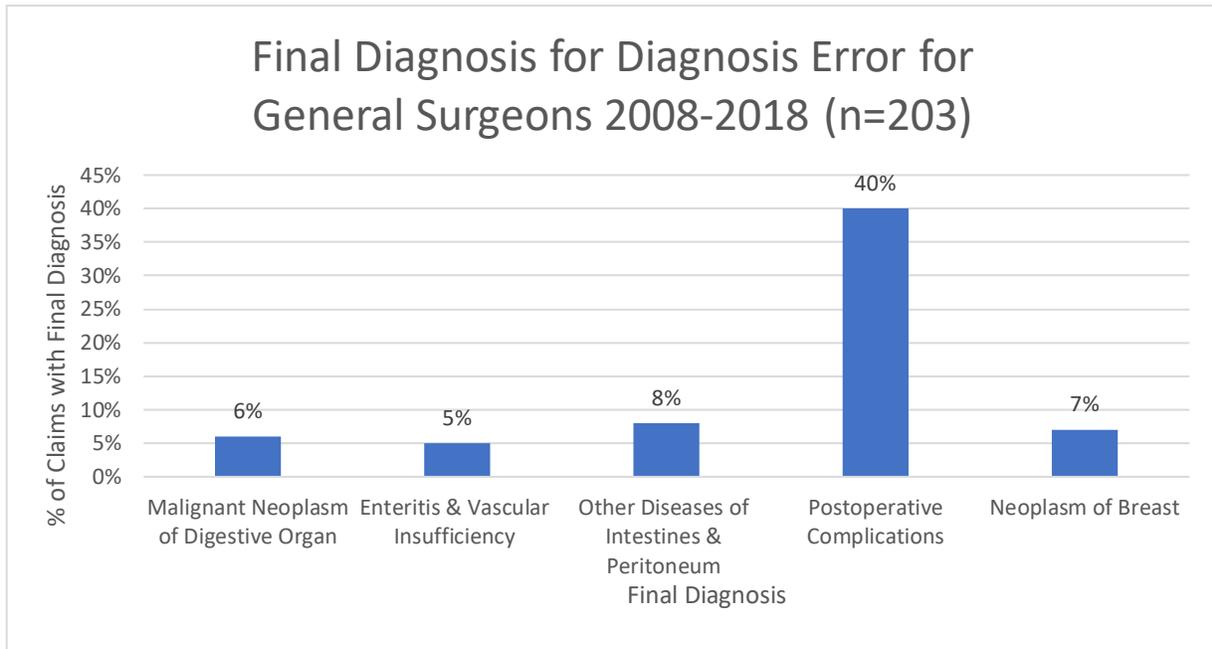


Once the contributing factors for the CRICO 12-step diagnostic process of care framework were applied to the accessioned cases, 203 claims remained. The majority of the claims were inpatient (n=129; 64 percent), followed by ambulatory (n=68; 34 percent). The top three locations where injuries occurred were the patient’s room (n=61; 30 percent), the doctor’s office (n=49; 24 percent), and the operating room (n=38; 19 percent). The severity of injuries was 69 percent high severity, 30 percent medium severity, and only 1 percent low severity. Of those claims that settled (n=73; 36 percent), the majority were high-severity claims (n=61 or 84 percent of the settled claims) with the remaining claims being medium severity.

MOST COMMON ACTUAL FINAL DIAGNOSES

Of the claims in the analysis, the final diagnoses noted in Figure 2 are the actual diagnoses rather than the erroneous working diagnoses. Other diseases of intestine and peritoneum involved in studied claims include intestinal obstruction, peritonitis, and rupture of colon unrelated to a surgery or procedure. The most common postoperative complication erroneously diagnosed was an unrecognized intestinal puncture or perforation. This complication accounted for 16 percent overall of the final diagnoses missed.

Figure 2



There were 141 general surgery diagnosis-related high-severity claims. For each claim, severity of patient injury was assessed using the National Association of Insurance Commissioners (NAIC) Injury Severity Scale.

Each ICD 9 code was evaluated. Malignancy diagnosis was noted to be the most frequently found, appearing in 39 studied claims, followed by vascular events at 22 claims and infections with 15 claims. Punctures or lacerations during a procedure and other postoperative complications were noted in 8 claims each. Other diagnoses were found in the remaining 16 percent of the claims.

Another assessment of the data was completed with a focus on those high-severity claims for which an indemnity was paid that was over \$500,000. Of the 14 claims that fit the criteria, eight of these claims (57 percent) had diagnoses that were from the [“big three” categories of disease](#) (neoplasms, vascular events, and infections) that account for the most morbidity and mortality in adverse events that derive from diagnostic errors. Another 21 percent of the high-severity injury, high-indemnity claims involved a diagnosis related to postoperative complications that could be expected following a general surgical procedure.

Figure 3

Diagnosis	Indemnity Paid \$500,000– \$999,999	Indemnity Paid >= \$1,000,000	Indemnity Paid >= \$2,000,000
Infection	2	0	1
Vascular event	1	0	0
Malignancy	2	2	0
Other diagnosis	1	2	0
Puncture during procedure	0	1	0
Other postoperative complication	2	0	0

FINDINGS FROM THE CRICO 12-STEP DIAGNOSTIC PROCESS OF CARE FRAMEWORK

Initial Diagnostic Assessment

Forty-eight percent of claims studied involved initial diagnostic assessment failures. During the Initial Diagnostic Assessment, part of the CRICO 12-step diagnostic process of care framework, the patient presents to the healthcare provider with their chief complaint. The provider performs the history and physical, completes the assessment, and evaluates their symptoms. A differential diagnosis is developed, and diagnostic tests may be ordered. Some problems that may arise can include an insufficient assessment or history; poor communication with the patient; failure to pursue any alternative diagnosis; failure to order the correct tests; and overlooking symptoms.

- Thirty-four percent of claims were due to inadequate patient assessment and symptom evaluation. Of the contributing factors in this step, the failure to appreciate and reconcile relevant signs, symptoms, and test results was predominant, seen in 33 percent of the claims.
- The diagnostic process was inadequate in 47 percent of the claims. The contributing factor of the failure to establish of differential diagnosis occurred in thirty-seven percent of the claims.
- Step five involved the ordering of lab and diagnostic tests. Thirty-six percent of the claims had a failure or delay in ordering an appropriate diagnostic test.

Testing and Results Processing

Eleven percent of the claims involved testing and results processing. In this phase of the diagnostic process of care, the patient presents to the healthcare provider to schedule the required tests, or to have the required tests performed or interpreted. It is during this period that an array of problems may arise, everything from delays, to failures to review, to misinterpretations, to system failures in the delivery of results to the healthcare provider or patient. There were no specific steps or individual contributing factors that were above 10 percent for the general surgeon subset in this review.

Follow-Up and Coordination

Forty-two percent of claims involved follow-up and coordination failures. In this phase of the diagnostic process of care, the patient presents to the healthcare provider for the actions and implementation of decisions made after the test results and assessment have been completed. This entails making referrals or consults, discussing and interpreting the key results with the patient and other involved providers, and developing a mutually acceptable plan of care with the patient.

- A deviation in provider-to-provider communication was present in 28 percent claims. Of the contributing factors in this step, communication among providers regarding the patient's condition appeared in 23 percent in the claims.
- Patient adherence to the follow-up plan was frequently noted in this analysis, with 15 percent of the cases having adherence problems. Twelve percent of the claims involved both patient nonadherence to the treatment regimen and nonadherence to follow-up calls and/or appointments.

MEANINGFUL CONTRIBUTING FACTORS IN THE DIAGNOSTIC PROCESS OF CARE

In appraising the studied claims using the CRICO 12-step diagnostic process of care framework, it was noted that some of the detailed contributing factors appear in more than ten percent of claims studied. Those contributing factors include:

- From Phase 1, Initial Diagnostic Assessment:
 - Failure to appreciate signs, symptoms, and test results
 - Failure or delay in ordering a diagnostic test
 - Failure in establishing differential diagnosis
- From Phase 2, Testing and Results Processing:
 - None of the contributing factors appeared in more than 10 percent of studied claims.
- From Phase 3, Follow-Up and Coordination:
 - Failure or delay in obtaining a consult or referral
 - Failure in communication among providers regarding patient's condition
 - Patient nonadherence to follow-up plan

DIAGNOSTIC ERRORS AND THE INFLUENCE OF DIAGNOSTIC PROCESS PHASES

The results of this study were similar to those reported in the [CRICO 2018 annual benchmarking report](#), which assessed the various phases involved in the diagnostic process and how each of those phases were involved in both financial losses and injury severity from patient cases involving general surgeons.

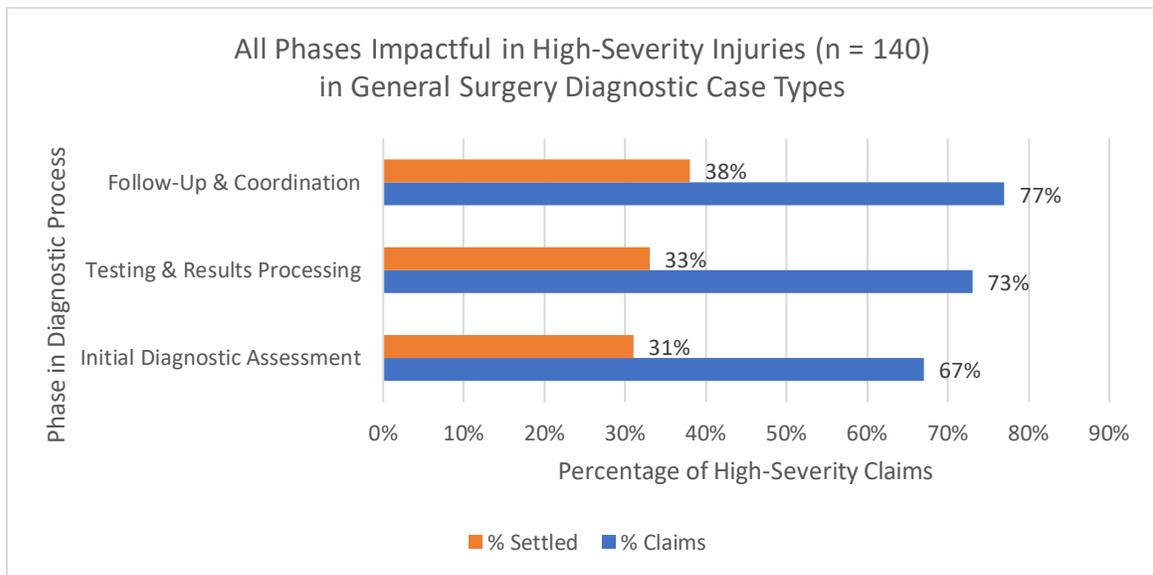
This study indicated that the Initial Diagnostic Assessment and the Follow-Up and Coordination phases are the phases of care where diagnostic errors most commonly occur, and are the phases where intervention may have the biggest impact on patient safety and malpractice costs. In particular, meaningful interventions would address the contributing factors that led to claims associated with these phases of care:

- Failure to appreciate signs, symptoms, and test results
- Failure or delay in ordering a diagnostic test

- Failure to establish a differential diagnosis
- Failure or delay in obtaining a consult or referral
- Gaps in communication among providers regarding the patient’s condition
- Patient nonadherence to follow-up plan

The Initial Diagnostic Assessment was implicated in 63 percent of studied cases and 42 percent of their financial losses. Testing and Results Processing made up 11 percent of the claims and 35 percent of the losses. The Follow-Up and Coordination phase was implicated in 60 percent of the studied claims and 45 percent of their financial losses. However, when the categorization of injury severity was explored, it was evident that every phase of the diagnostic process was influential, as 65 percent or more of claims involving high-severity injuries, and more than 30 percent of claims involving high-severity injuries settled.

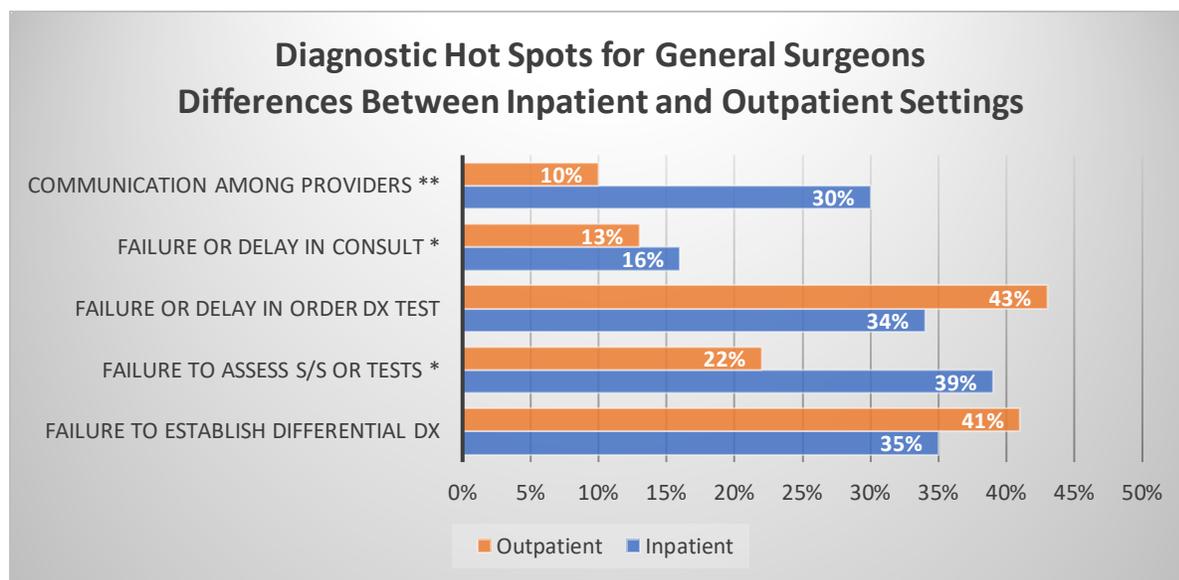
Figure 4



CONTRIBUTING FACTOR DIFFERENCES BETWEEN THE OUTPATIENT AND INPATIENT SETTINGS

The meaningful six contributing factors from the diagnostic process that emerged from this study were further explored. A chi-square test was done to determine if differences existed between inpatient and outpatient diagnostic process hot spots.

Figure 5



Statistically significant at * $p < .05$; ** $p < .01$

No significant differences between inpatient and outpatient settings emerged in the failure to establish a differential diagnosis or in the ordering of diagnostic tests.

In inpatient settings, significant differences from outpatient settings emerged with communication between providers regarding the patient's condition (1, $n=197$), $p < 0.01$. However, when considering the complexity of a hospitalized patient today, including the number of providers involved in the care, these findings of greater communication issues in the outpatient setting should not be surprising.

The risk factors involved in cognitive errors include fatigue, compounded by lack of training or lack of medical knowledge relative to a specific case. Additionally, external factors, such as disruptive patients or families, distractions (alarms, other healthcare providers, phones), and heavy workloads have been implicated in cognitive errors. These elements can be found in a hospital environment, so general surgeons must be alert for these factors as they further concentrate patient safety efforts in this area of communication.

General surgeons in the inpatient setting were found to be more likely to have a failure or delay in consult included in their claims (1, $n=197$), $p < 0.01$. Managing patients within a hospital environment often requires a multidisciplinary team; as such, this difference was not surprising.

Findings related to the failure to appreciate signs, symptoms, and/or test results were also significantly different between inpatient and outpatient settings for general surgeons (1, $n=197$), $p=0.02$. The inpatient claims had multiple providers noted as responsible, and there was often some element, such as a failure of communication, that involved another provider and other clinical judgment contributing factors associated with them.

In the outpatient settings, there was not a significant difference seen in patient assessment issues with the failure or delay in the ordering of a diagnostic test. In reviewing the clinical summaries, it was noted that many of the office claims involved delayed biopsies, orders for which were based on symptoms or

recommendations from radiologists. Expert physician reviewers had varying opinions regarding the decision making and timing of intervention. Additionally, cases in the outpatient setting showed a higher percentage of patient nonadherence to follow-up calls and appointments, but this contributing factor did not meet the criteria for statistical analysis in this study. However, the reasons for the patients' nonadherence may be multifactorial and require more investigation. Issues involving health literacy, not understanding instructions, being dissatisfied with care, or other factors should be considered.

Given the differences between findings for inpatient and outpatient settings, patient safety interventions may vary by setting as well. More research is needed, though, since this study is based only on a group of general surgeons from one large national medical malpractice insurer.

DISCUSSION

Figure 6

Contributing Factor	2018 CRICO Study: Factor appeared in % of cases	2021 The Doctors Company's General Surgery Study: Factor appeared in % of cases
<i>Initial Diagnostic Assessment: Failure to appreciate signs, symptoms, and test results</i>	35%	33%
<i>Initial Diagnostic Assessment: Failure to establish differential diagnosis</i>	39%	37%
<i>Initial Diagnostic Assessment: Delay in ordering diagnostic test</i>	36%	36%
<i>Testing and Results: Misinterpretation of diagnostic tests</i>	26%	10%
<i>Follow-Up and Coordination: Physician follow-up with patient</i>	21%	12%
<i>Follow-Up and Coordination: Referral for patient</i>	24%	19%
<i>Follow-Up and Coordination: Provider-to-provider communication</i>	16%	28%
<i>Follow-Up and Coordination: Patient adherence to treatment</i>	17%	7%

The top three categories of contributing factors appearing in this study were clinical judgment (68 percent of claims studied); communication (16 percent of claims studied) and clinical systems (8 percent of claims studied). These factors are also the three most common contributing factors found in other medical malpractice claims against members of The Doctors Company.

Both the [2018 CRICO benchmarking report](#) and our present study found three notable contributing factors related to the Initial Diagnostic Assessment: failure to appreciate relevant signs, symptoms, and test results (33 percent in our study compared to 35 percent in the CRICO benchmarking report); failure to establish a differential diagnosis (37 percent in our study compared to 39 percent in the CRICO benchmarking report); and failure or delay in ordering a diagnostic test (36 percent in our study, the same as 36 percent in the CRICO benchmarking report). The diagnostic tests most often delayed or not ordered in our study were CT scans or MRIs. Imaging exams were often not ordered in the course of the

postoperative management of patients. In the office setting, biopsies (in particular, breast biopsies) were the second most common diagnostic test not ordered or delayed.

With the Testing and Results Processing phase in the diagnostic process of care framework, our study differed some from the [2018 CRICO benchmarking report](#). While the same contributing factor, misinterpretation of diagnostic studies, appeared in our study compared with the CRICO, the percentages varied. In our study, misinterpretation of diagnostic studies occurred in 10 percent of the claims, compared with 26 percent of the claims in the [2018 CRICO benchmarking report](#). The majority of the misinterpretations involved a secondary specialty, such as radiology or pathology, rather than the general surgeon named in the claim. Among claims against surgeon members of The Doctors Company, tests that were misinterpreted included CT scans and x-rays. One claim involved a general surgeon who ordered a CT angiogram, which the surgeon interpreted on their own as showing no vascular injury. However, one day later, the patient was found without pulses in their leg and diagnosed with thrombosed popliteal artery with an intimal tear. After multiple surgeries, the patient required an above-the-knee amputation. The major issue, besides the misread of the CT angiogram, was that the general surgeon was not qualified to read the CT angiogram because of a lack of vascular training.

The last phase in the diagnostic process of care framework is Follow-Up and Coordination. Some variances between the two studies were noted; these may reflect the inclusion of both inpatients and outpatients in The Doctors Company study. But in both studies, steps 9 through 12 of the CRICO 12-step diagnostic process of care framework appear in a substantial portion of claims studied:

- Step 9 is physician follow-up with patient: CRICO 21 percent; The Doctors Company 12 percent.
- Step 10 is referral management: CRICO 24 percent; The Doctors Company 19 percent.
- Step 11 is provider-to-provider communication: CRICO 16 percent; The Doctors Company 28 percent.
- Step 12 is patient compliance with follow-up plan: CRICO 17 percent; The Doctors Company 15 percent.

Incidental findings remain an issue for physicians. One example in this study was a patient who presented through the emergency department (ED) after an accident. The patient had a CT scan, which showed mesenteric nodes that the radiologist noted could indicate inflammation or a neoplastic (lymphoma) process. The radiologist discussed this finding with the ED doctor. The ED doctor later discussed the findings with the general surgeon who admitted the patient. However, there was no follow-up on the CT scan, and the patient remained unaware of the abnormalities. Nine months later, the patient was diagnosed with low-grade non-Hodgkin's lymphoma, and by that time, the patient's kidney was damaged and had to be removed.

One of the purposes of this study was to determine whether diagnostic errors by general surgeons differ in inpatient vs. outpatient settings. We found significant differences between the settings. One significant difference was the inpatient-setting communication between providers regarding the patient's condition. Given the complexity of interaction between multiple providers in a hospital setting, communication, or the lack of it, can have strong influence on diagnosis and treatment. Communication remains an essential tool for avoiding diagnostic failure. Communication is accomplished through multiple modes—verbal, electronic, written, and nonverbal—and under conditions from calm to stressed. In our study, provider-to-provider communication was found to be lacking, and the failure to

communicate between the providers resulted in delays in ordering tests and consults. As an example, a patient had a laparoscopic surgery, and during the procedure, the insufflation device ran out of gas, leading to the abdomen collapsing. The general surgeon waited for the exchange in tanks with the equipment in place, then reinflated the abdomen and continued the surgery. Unfortunately, the general surgeon did not document this event. Later, in the post-anesthesia care unit (PACU), the patient had a firm, painful, distended abdomen. A CT scan of the abdomen with contrast was done, but the radiologist was unaware of the adverse event in the OR and noted a pneumoperitoneum, possibly due to recent surgery. The family was not aware of the equipment failure, and neither were the nurses on the units. Early in the morning, the patient developed severe abdominal pain, had a very distended abdomen, and had no bowel sounds. The surgeon was not called. A few hours later the patient had a code and died. Clearly, this example included multiple communication failures, moments where earlier interventions may have changed the outcome for this patient. A minimum of four providers were involved (general surgeon, PACU nurse, radiologist, floor nurse), in addition to the family members who were spending the night in the patient's room, and all participated in failed communication, both written and verbal.

Another example emerged with the failure to note symptoms, along with delay in obtaining a consult. This case involved an immediate postoperative patient with no significant medical history. In the PACU the patient was restless with low oxygen saturations (87–91 percent). However, the surgeon thought these symptoms were related to a normal postoperative process and failed to obtain a hospitalist consult. Over the course the night, the patient's condition declined; the patient developed tachycardia and had no urine output. There was no communication by the nurse to the surgeon, but the surgeon did see the patient in the morning. The patient's renal labs were elevated, and the patient was complaining of abdominal pain. The surgeon ordered an ultrasound and kidney, ureter, and bladder (KUB) x-ray, but still no consult. A few hours later the patient's systolic blood pressure dropped to around 80. When a hospitalist was consulted, the patient was diagnosed with sepsis from an undiagnosed bowel perforation. The patient had multiple surgeries, but unfortunately died.

Hospitals are open twenty-four hours a day, every day of the year. Consequently, the clinical environment and administrative factors should be expected to have more effect on patient safety than in the outpatient settings. One claim involved a patient with Crohn's disease and severe abdominal pain who was unable to get a CT scan because of the unavailability of a radiology technician. The technician was not available for the next 12 hours as the patient's condition worsened. When the CT scan was finally obtained, it revealed small pockets of air consistent with a perforation. The patient was assessed by a hospitalist, who noted the patient appeared toxic, but when the case was discussed with the only on-call general surgeon in the late hours of the night, the on-call surgeon responded that surgery could wait until morning, even after being informed of current tachycardia and without seeing the patient. The surgeon finally did respond, but only after attempts to transfer the patient failed and the administration of the hospital became involved. However, by the time the surgeon completed the surgery, the patient was septic and did not survive.

Findings in this study demonstrated that the majority of medical malpractice claims involving general surgeons resulted in high-severity injuries, and the bulk of those high-severity injury claims resulted in payments. Researchers publishing recently in [JAMA Internal Medicine](#) discovered similar findings in their sample of paid National Practitioner Data Bank (NPDB) claims against general surgeons (n=10,416). Almost 85 percent of the sample in their study had a high-severity injury. An additional 14.8 percent (n=1,560) of their general surgery sample faced a major diagnosis-related allegation.

A [2019 study examined high-severity injury malpractice claims](#), examining the “big three” categories of diagnoses that account for the most morbidity and mortality when diagnostic errors occur: vascular events (23 percent of claims studied), infections (12 percent), and malignancies (38 percent). The authors’ conclusions supported that three-fourth of serious misdiagnosis-related harms in their study were from the “big three” categories of diagnoses. Our findings with general surgeons reinforce these findings. Thirty-five percent of the patients in our study had a malignancy diagnosis, followed by 20 percent having vascular diagnoses, 14 percent having an infection/sepsis diagnosis, 7 percent experiencing a puncture during surgery, and another 7 percent experiencing other complications related to procedures. The latter two diagnoses, puncture during surgery and other complications related to procedures, are not surprising given the specialty of general surgeons.

When our analysis zeroed in on claims settled for over \$500,000, the most common diagnosis remained malignancies (29 percent). However, infection/sepsis (21 percent) shifted to the second most common diagnosis, then other complications related to procedures (14 percent), with vascular events and puncture during surgery both reporting 7 percent. Similarly, [researchers examining paid NPDB claims](#) noted that general surgeons had a higher rate of paid claims per 1,000 physicians (30.0 per 1,000 physicians for general surgeons compared with 14.1 per 1,000 physicians for all specialties). Their research also found a decline in the rate of paid malpractice claims over the time period of 1992 to 2014 for all specialties of 55.7 percent, although for general surgeons this decline was only 35.5 percent. The researchers concluded that several factors may be related to this decline, such as tort reforms like damage caps and statutes of limitations, and improvements in patient safety like handoffs and checklists. However, the authors of the study mentioned mixed empirical support for these two factors. Other possibilities considered include the growing trend toward institutions settling alone instead of the physician, as well as resolution programs (promoting disclosure of and apology for unexpected outcomes). Historically, some specialties have a few physicians who practice in high-risk specialties or care for high-risk patients, which leads to increased payments.

RECOMMENDATIONS

Communication and Shared Decision Making

Ineffective communication has been shown to be a factor in malpractice claims, highlighting both system failures and human errors. Employing shared decision making (SDM) for diagnostic situations improves communication, enriches patient satisfaction, and builds trust. [SDM is a patient-centered diagnostic process](#) that respects the needs, values, circumstances, and preferences of the patient. SDM occurs when the clinical context is shared (the evidence, testing bias, and risks of tests) and patient goals (preferences, test feasibility, and risk tolerance). Then a collaborative diagnostic work-up plan is developed through conversation and dialogue including the healthcare provider, the patient, and their family and/or significant other.

Patient safety expert Hardeep Singh, MD, MPH, among others, has noted that it remains crucial to [understand where the breakdowns in communication are occurring](#), so interventions can be implemented, because the lack of communication can influence so much along the diagnostic process of care, from the start of taking the patient’s history to the patient’s nonadherence to the plan of care. Multiple claims involved issues with patients failing to follow up with recommended imaging tests or lab tests. In this study, multiple claims with indemnities involved a mammogram not followed up.

Mammograms can become problematic, since the tests are scheduled often by the patient and done at multiple locations, making them difficult to track.

Cognitive Biases

Many of the contributing factors seen along the diagnostic process for general surgeons involved clinical judgment. Researchers have discussed the need [to overcome, not rely on intuition, in order to make better clinical decisions](#), because cognitive bias is a common error across diagnostic allegations and case types. There are a variety of cognitive biases to be alert for in daily practice. Many researchers and organizations [recommend the use of checklists to reduce diagnostic errors](#), as the use of such tools can lead to more reliable and safe diagnosis. Clinicians should take time for a diagnosis time-out to ask themselves important questions, like “Did I just accept the first diagnosis without considering other possibilities?” (anchoring bias); “Are there external pressures?” (fatigue, distraction, patient hostility, time pressure, end of shift); or “Is there anything that does not fit or is inconsistent with the diagnosis?” Furthermore, it is recommended that the provider include the patient in the diagnostic process.

When considering possible diagnoses to be alert for, those top ones often missed by general surgeons, especially those leading to high-severity injuries, include malignancies, vascular events, and infections. The infection most often seen for general surgeons was sepsis. Although sepsis should be a top differential diagnosis for a postoperative patient, several general surgeons missed obvious signs and symptoms. A possible reason could be considered an anchoring heuristic, relying on initial diagnostic impression, despite subsequent information to the contrary. Or it may be an availability heuristic, in that the diagnosis of the current patient is biased with respect to past experiences of the healthcare provider. General surgeons should consider all possibilities in the postoperative management phase.

Another contributing factor that was prominent in the study was failure or delay in ordering a diagnostic test, which is another example of a cognitive error. A solution proposed by several is the use of a clinical guideline or a clinical decision-support system. Using this technique enables the provider to decrease the variability in their response patterns. Examples include, but are not limited to, DXplain, Isabel, VisualDx.

Misinterpretation of diagnostic tests was seen not often in this study, but when it was, it frequently involved a secondary provider, and the outcome resulted in diagnostic failure and a high-severity injury. These adverse outcomes derive from intersections of cognitive error in situations where the diagnostic process can be aided with a system enhancement, such as [seeking a second opinion](#). For elective surgeries, second opinions should be encouraged. In radiology, the use of teleradiology permits the ability to get a quick diagnosis followed by another in-house opinion. In addition, both radiologists and pathologists frequently have the capability to use computer-aided diagnosis (CAD) algorithms to assist with diagnosis.

Systems Issues

Additionally, other systems issues play a role, like a poorly developed process to track whether authorizations were approved. If a test was ordered, then a mechanism to ascertain the test was completed needs to be in place. Having a clinical decision support system integrated into an electronic health record provides opportunities to alert providers and their staff to follow up on tests that were ordered or on appointments that patients missed.

This study illustrated many postoperative diagnoses that were missed or delayed. With the addition of electronic physiological surveillance systems (EPSS) or clinical surveillance systems (CSS), these diagnoses could have been detected earlier, thus decreasing mortality and morbidity. [Implementing EPSS has led to decreased mortality and morbidity](#). The EPSS and CSS input patients' vital signs, flowsheets, and other data from their electronic health records, which provides an up-to-date, accurate status of patients. Alerts can be sent to healthcare providers in real time when there are declines in patients' condition.

LIMITATIONS

This study used only closed medical malpractice claims involving general surgeons from one large national malpractice carrier. These findings may not be representative of all closed medical malpractice claims of general surgeons in the United States. Additionally, the total number of diagnostic errors may be larger than those represented in closed medical malpractice claims, since not all patients injured seek legal action.

CONCLUSION

Diagnostic error is the second most frequent allegation against or case type for general surgeons, and it results often in high-severity injuries. This study provided insight into various steps along the diagnostic process in which general surgeons can make changes in the manner in which they interact with individuals through communication, or work to develop improved systems, or consider different modes of thinking. Decreasing diagnostic error is feasible. Clinical judgment, technical skill, and communication remain the top three contributing factors involved in medical malpractice claims, and this study's findings confirmed this.

ACKNOWLEDGMENTS

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