Differentiating Close Calls From Errors
A Multidisciplinary Perspective

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Objectives: To investigate the ability of health care providers to correctly identify close calls and errors and to examine the role of close call and error definitions on such identification.

Methods: Sixty-eight health care providers from a large, academic medical center institution participated (22 physicians, 23 nurses, 13 pharmacists, and 10 physician assistants). Five hypothetical errors and 5 close call scenarios were developed based upon actual errors and close calls from the institution. Each participant was provided with all 10 scenarios to evaluate. Additionally, to determine the importance of including a definition of a close call or error, participants were randomly assigned to 1 of 2 groups: group 1 received definitions of errors and close calls before reading each scenario, whereas group 2 did not receive these definitions. After reading each scenario, providers classified the scenarios as errors, close calls, or neither.

Results: The majority of participants correctly identified close call and error scenarios. The percentage of scenarios categorized correctly by profession for close calls and errors, respectively, was: 67.8% and 74.8% for nurses, 73.8% and 78.5% for pharmacists, 74% and 80% for physician assistants, and 67.6% and 78.2% for physicians. Participants with definitions of close calls were significantly more likely to identify them correctly than participants without definitions ($t(65) = 2.303$, $P < 0.05$). The same finding was not replicated for error scenarios ($t(66) = 0.149$, $P > 0.05$).

Conclusions: The rate of incorrectly identifying close calls, although relatively low, suggests that close call reporting systems might be underutilized due to provider knowledge about these medical situations. The findings provide support for the need to educate providers about close calls to maximize the likelihood of receiving close call reports.

Key Words: close call, near miss, error

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Institute of Medicine (IOM) reports[1,2] and experts[3–7] are calling for increased close call and error reporting to identify reasons for these occurrences and improvement opportunities. While health care providers are familiar with errors, urged to report them, and presumably identify errors correctly, it is unclear whether the same holds true for close calls. The present study focuses on whether health care providers can correctly identify errors and close calls. By definition, close calls do not result in patient harm and, therefore, are less noticeable and more difficult to identify.

We defined close calls as potential errors that were caught and prevented, either through skill or happenstance, before they could reach a patient.[8] Additionally, we considered close calls synonymous with near misses. Whereas the patient safety literature[2] uses the term "near misses" for *potential* errors, we opted for the term "close call" because one impetus for the present study was to inform the educational design of a close call reporting system.

Traditionally, providers have not been asked or trained to report close calls, so collecting information about close calls represents a relatively new approach for health care. One practical concern with implementing close call reporting systems is whether providers can identify close calls and whether they can be taught to identify them. A review of the literature indicated no studies that assessed the ability of untrained providers to differentiate close calls from errors.

The present study explored 2 research questions: (1) To what extent will health care providers from different professions correctly identify close calls and errors? and (2) Will the presence or absence of definitions improve identification of these medical situations? For this study, the definition of human error was "something that has been done which was: not intended by the actor; not desired by a set of rules or an external observer; or that led the task or system outside its acceptable limits."[9]

METHODS

Setting and Participants

All nurses, pharmacists, physician assistants, and attending physicians in a large, 500-bed academic teaching institution in the Southwestern United States were eligible. We randomly selected participants and invited them via e-mail to participate in the study. Thirty providers from each group were invited and sent a follow-up invitation; new providers were selected from a comprehensive list of nurses, pharmacists, physician assistants, and physicians. All eligible participants were eventually contacted and offered the opportunity to participate due to low participation rates. Sixty-eight health care providers participated in the study, consisting of 23 nurses, 13 pharmacists, 10 physician assistants, and 22 physicians.

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Scenario Development and Review

A multidisciplinary group of health care providers and professionals, including physicians, nurses, pharmacists, quality and performance improvement experts, and human factors experts, wrote 10 scenarios depicting hypothetical close calls and errors. Based on the definitions of errors and close calls mentioned previously, the 10 scenarios consisted of 5 medical errors and 5 close calls. To assure content validity of the scenarios, we based them upon a review of past incident reports in the participating institution. We identified the most frequently reported incidents, and samples of these most common incidents were analyzed to determine the significant contributing factors. The incident types and contributing factors were put into a table to guide creation of the scenarios (both errors and close calls). Appendix A contains the close call scenarios; Appendix B contains the error scenarios.

The institution's human subjects committee approved this study and participants provided informed consent. We randomly assigned participants into 2 groups; one group received scenarios with definitions of close calls and errors whereas the second group received the same scenarios without such definitions. Individuals in each group were assigned a time to come to a conference room and read the scenarios (5 close calls and 5 errors). After reading each scenario, the participant indicated whether the scenario depicted an error, close call, or neither.

RESULTS

The percentage, within profession, correctly identifying each close call and error scenario based on whether they received a definition of a close call and an error is contained in Table 1. More than half of the participants from each provider group correctly identified 4 or 5 of the 5 close call scenarios (nurses = 56.5%, pharmacists = 69.2%, physician assistants = 60.0%, physicians = 52.4%) regardless of presence/absence of definitions. More than three quarters of the participants also correctly identified 4 or 5 of the 5 error scenarios (nurses = 78.3%, pharmacists = 84.6%, physician assistants = 90%, physicians = 81.8%).

The percentage of scenarios categorized correctly by profession for close calls and errors, respectively, was: 67.8% and 74.8% for nurses, 73.8% and 78.5% for pharmacists, 74% and 80% for physician assistants, and 67.6% and 78.2% for physicians.

The secondary research question of the present study—what impact, if any, will definitions of close calls and errors have on the correct identification of each—was examined via independent samples *t* test. Significant differences were found between the definitional categories (i.e., present or absent) for close call scenarios ($t(65) = 2.303$, $P < 0.05$) but not for error scenarios ($t(66) = 0.149$, $P > 0.05$). For close calls, the group that received definitions identified more scenarios correctly (M = 77.5; SD = 24.2) than the group without definitions (M = 62.9; SD = 27.5). For errors, the group with definitions identified a similar number of scenarios correctly (M = 77.6; SD = 9.7) as the group without definitions (M = 77.1; SD = 13.8).

DISCUSSION

We assessed whether a sample of multidisciplinary health care providers could identify close call and error scenarios correctly. Although the participants accurately categorized errors 77.1% of the time without definitions, they accurately categorized close calls only 62.9% of the time, resulting in a statistically significant difference ($t(65) = 2.303$, $P < 0.05$). Providing a definition of a close call significantly increased their accuracy of close call identification to 77.5%, but providing definitions of errors did not improve their accuracy. Pharmacists and physician assistants correctly identified close calls more often than physicians and nurses, but

TABLE 1. Descriptive Results for All Scenarios

	Definitions							
	Nurse % Correct		Pharmacist % Correct		Physician Assistant % Correct		Physican % Correct	
Scenario Type and Number	Present *n* = 12	Absent *n* = 11	Present *n* = 7	Absent *n* = 6	Present *n* = 3	Absent *n* = 7	Present *n* = 11	Absent *n* = 11
Close call 1	100.0	90.9	85.7	83.3	100.0	100.0	90*	72.7
Close call 2	50.0	72.7	85.7	83.3	100.0	42.9	63.6	45.5
Close call 3	58.3	36.4	42.9	33.3	100.0	14.3	54.5	45.5
Close call 4	83.3	54.5	71.4	83.3	100.0	100.0	81.8	45.5
Close call 5	75.0	54.5	71.4	100.0	100.0	57.1	81.8	72.7
All close calls	73.3	61.8	71.4	76.6	100.0	62.9	80	56.4
Error 1	75.0	90.9	100.0	100.0	100.0	100.0	100.0	100.0
Error 2	33.3	9.1	0	33.3	0	14.3	9.1	18.2
Error 3	100.0	90.9	100.0	100.0	100.0	100.0	100.0	100.0
Error 4	83.3	72.7	85.7	83.3	66.7	100.0	81.8	72.7
Error 5	100.0	90.9	100.0	83.3	100.0	100.0	100.0	100.0
All errors	78.3	70.9	77.1	80	73.3	82.9	78.2	78.2

Note: Present = participants were provided with a definition of an error and a close call. Absent = participants were not provided with definitions.
* *n* = 10.

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this finding was not statistically significant, likely due to small sample sizes that limited the ability to detect a difference.

Our finding that almost 40% of providers could not correctly identify close calls highlights an important barrier to the effectiveness of close call or near miss reporting systems. If our findings are generalizable, they suggest that lack of ability to identify these events is yet another barrier to reporting. Health care organizations implementing close call or near miss reporting systems cannot assume that providers understand the meaning of these terms. Our findings support previous research that more broadly describes the importance of event definition and its impact on organizational learning.[10] Further, our findings illustrate the importance of training providers to differentiate between medical events of varying severity. It is important to note, however, that correct identification of a close call or error is only one aspect that influences whether a provider will report the situation.

Other barriers to reporting have been described and include fear of punishment and concern about confidentiality.[11] Fortunately, the ability of providers to correctly identify close calls may be improved by providing a definition of close calls. Those who implement reporting systems may need to clearly define events during training sessions and provide accessible and ongoing access to the definitions.

There are several possible explanations for our findings. First, the terms "close call" and "near miss" are new to health care and they are not taught in professional schools. Therefore, providers may simply not be familiar with the terms and may need significant education. Second, when participants were not given definitions of close calls and errors, there was 1 close call (see Appendix A, Close Call Scenario 3) and 1 error (see Appendix B, Error Scenario 2) that a majority of the providers categorized incorrectly. The data do not explain why these miscategorizations occurred; rather, the data indicated that providers tended to categorize the specific close call and error as neither a close call nor an error. The providers might have categorized the close call as neither because the scenario described a potentially common problem that providers tend to fix routinely during the course of their day. Given that close calls are estimated to occur as much as 300 times more often than errors,[12] it may be that providers correct close calls as they accomplish their tasks rather than stop and report these situations. Alternatively, the error might have been categorized as neither because it reflected a patient fall, which is a situation unrelated to a specific provider. Third, it may be that our scenarios were confusing or not realistic to the participants, even though the scenarios were based upon events and contributing factors previously identified in the study institution and developed with the assistance of health care providers.

Other limitations include our small sample size and our reliance upon scenarios. It is possible that providers can more accurately identify close calls in actual clinical care. Our findings may also have limited generalizability because the study site, like others,[10] may have had idiosyncratic definitions of events (either explicit or implicit) that make it more difficult for these providers to accurately identify close calls. Conversely, participants who chose to participate might be more interested in close call and error identification than those not choosing to participate. An examination of differences between these 2 groups, which was not conducted in the present study, might provide insight about whether such differences are statistically meaningful.

CONCLUSIONS

The findings provide an optimistic yet cautionary note. Most of the participants correctly categorize close calls and errors; however, the rate of miscategorization was high enough to suggest that the effectiveness of close call and near miss reporting systems can be hampered by lack of provider knowledge. Educating providers about the types of medical situations that are consistent with the concept of close calls will be vitally important to obtaining reports from providers. Given that providers are accustomed to reporting incidents, but not necessarily close calls, it is possible that close calls might be underreported if providers do not correctly view these situations as potential problems.

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APPENDIX A

Close Call Scenario 1

Medication orders were written for high-dose methotrexate in a dose that requires calcium leucovorin to be administered after the methotrexate. Because the ordering physician was tired, no orders for the calcium leucovorin were written, as is required by pharmacy policy. When the orders arrive in the pharmacy for processing, an experienced pharmacist

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notes the lack of calcium leucovorin orders, contacts the patient's attending physician medical oncologist, and obtains the required orders. The medications are administered as planned.

Close Call Scenario 2

Two units of red blood cells have been ordered for a patient on the BMT service. The Blood Bank completes the type and crossmatch (T&C) according to institutional policy; however, the patient becomes febrile and cannot get the blood at that time. The blood is in date at the time of the T&C, but by the time the patient no longer has a fever, it has expired. Before administering the blood to the patient, the patient's nurse and a second nurse check the blood per policy and find that the unit of blood has expired. The unit of blood is returned to the blood bank and the appropriate staff, including the patient's physician, are notified. The blood bank issues a new unit of blood immediately.

Upon investigation, it is determined that the Blood Bank personnel were very experienced in dispensing blood. In this instance, however, they failed to follow institutional policy for checking for an expiration date before dispensing it to the nurses because they were busy with multiple phone calls.

Close Call Scenario 3

A registered nurse on an inpatient unit goes to the Pyxis™ machine to obtain a dose of dilaudid for a patient who is complaining of pain. The order is for 8 mg by mouth. When the Pyxis™ machine is opened, the nurse finds that 2-mg tablets rather than 4-mg tablets are in stock. When the nurse records, according to the correct process, that 2 tablets have been taken, the Pyxis™ machine displays a prompt that the correct number of tablets required to meet the patient's ordered dose have not been taken. The nurse observes the Pyxis™ warning and obtains the 2 additional tablets, which will be required to meet the ordered dose of 8 mg. The medications are administered to the patient as planned.

Close Call Scenario 4

A patient service coordinator (PSC) schedules a patient's next set of appointments as the patient is about to leave the clinic. The PSC schedules a Laboratory and a Barium Swallow on November 25, an IVP on November 26, and a Follow-Up on November 27.

Because the PSC is new to the organization, she/he did not remember from orientation the specific order in which an IVP and Barium Swallow must be scheduled and that a prep is required for the patient before the IVP. According to institutional policy, an IVP must be scheduled either 2 days after the Barium Swallow, or 1 day before. The patient left the clinic without the schedule but called the nurse the next day to inquire about the appointment date. After visiting with the patient, the nurse realized the Barium Swallow and IVP were not scheduled correctly and that the patient had not received a prep. The nurse spoke with the PSC and the schedule was corrected. The patient received the prep instructions and completed the IVP and Barium Swallow.

Close Call Scenario 5

A nurse had orders to do a nasal wash and a urine specimen collection on a Bone Marrow transplant outpatient. The nurse had a very heavy patient assignment and asked a peer nurse to collect the nasal wash and urine specimen, which the nurse did. The second nurse collected both specimens and labeled the clear nasal wash specimen "urine" and labeled the yellow urine specimen "nasal wash," with the patient's name and medical record number. The second nurse left the specimens in the pick-up location. When the runner came to pick up the specimens, the runner asked the originally assigned nurse to sign the pick-up log. As the original nurse signed the pick-up log, the original nurse also rechecked the specimens, noted the color inconsistency, and presumed that the specimens were mislabeled. The original nurse then asked the nurse who collected the specimens to identify both specimens and to correct the labeling.

APPENDIX B

Error Scenario 1

A patient with melanoma is scheduled to go to the OR for an excision of a cancerous lesion. Before the operation, a Surgical Fellow visits the patient in his room and places an ink circle around the lesion to be removed. The patient has received several pre-medications and is somewhat groggy. When the patient arrives in the operating room, the Attending physician inquires as to the marking on the patient's arm. The Fellow reports that this is the lesion to be operated on. The Surgeon does not review the diagnostic films to confirm that the Fellow is correct. During the procedure the Attending physician realizes that the wrong spot on the patient's arm was marked and must close one incision and begin again.

Error Scenario 2

A nurse walks into a patient's room to conduct a routine check on a patient. The nurse sees the patient reaching for the handle of the bathroom door. The patient appears to be dizzy and unsteady on her feet. As the nurse approaches the patient to offer assistance, the patient falls to the floor and hits her head on the tile floor. The patient's physician is called to examine the patient due to the large lump on the back of the patient's head, and the patient is assisted back into bed.

Error Scenario 3

A Registered Respiratory Therapist (RRT) arrives in a semi-private room to deliver a nebulization treatment. Just after the therapist delivers the treatment to the patient in the "A" bed, the patient's nurse enters the room and witnesses the RRT completing the treatment. The nurse and therapist exit the room, and the nurse questions the therapist about the treatment as the nurse does not believe that the patient in the "A" bed has nebulization treatments ordered. The RRT and nurse go to the nurses' station to check the patient's medical record for physician orders and find that no nebulization treatments are ordered. The RRT then realizes that the

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treatment was actually ordered for the patient in the "B" bed in the same semi-private room rather than the patient in the "A" bed.

Error Scenario 4

A physician hand-delivers a requisition for a non-stat portable chest x-ray to the patient's nurse. In the nurse's haste to care for the immediate needs of another patient, the nurse places the requisition for the chest x-ray on a clipboard rather than processing it per policy. The next day the physician who ordered the chest x-ray checks the patient's chart for the results of the chest x-ray and finds that the test was never performed.

Error Scenario 5

In the OR, a Certified Registered Nurse Anesthetist (CRNA), while preparing 2 different medication syringes for surgery at the same time, is interrupted to answer 2 questions. The CRNA affixes pre-printed medication labels to the 2 syringes but accidentally switches the labels. The wrong medication is administered because of the incorrectly labeled medications.