J Wound Ostomy Continence Nurs. 2019;46(4):298-304.
Published by Lippincott Williams & Wilkins

CE 1.5 ANCC Contact Hours

Root Cause Analysis for Hospital-Acquired Pressure Injury

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ABSTRACT

Root cause analysis (RCA) is a systematic process for identifying the causes of an adverse occurrence or combined with an approach for a response designed to prevent recurrences. This method may be used for continuous quality improvement in a facility or health system. Root cause analysis can aid nurses and hospital risk managers to determine how the system can improve to reduce the number and severity of pressure injuries. The process of RCA begins with being certain the wound is a pressure injury using differential diagnoses of similar appearing skin disease and injury, followed by an examination of the processes of care (human roots) for missed actions or inactions that are linked to development of a particular pressure injury. The final step of RCA is a critical examination of the system (including people and processes) to look for modifiable trends or patterns are identified that are used to prevent recurrences.

KEY WORDS: Cause analysis, Hospital-acquired pressure injury, Pressure injury, Pressure ulcer, Root cause analysis, Wounds and injuries.

INTRODUCTION

Root cause analysis (RCA) is a process for identifying causal factors resulting in variations in performance, including sentinel events.[1] A root cause is defined as the most fundamental reason leading to a situation where performance did not meet expectations. In simplest terms, RCA is a method of problem solving with the goal of identifying the true roots of a problem in order to understand it and prevent it from occurring again. The RCA process has its underpinning in the systems approach to human error and human factor research. Root cause analyses were initially used to analyze industrial accidents, such as aviation, automotive, or nuclear power incidents. In 1997, The Joint Commission mandated the use of RCA to examine sentinel events in hospitals (wrong site surgery) and it remains today as a valuable component used in high-reliability organizations to improve the safety profile.

Through a structured review and analysis of findings, conclusions from an RCA can be used to identify areas of opportunity and promote positive system-level changes. While it is tempting to start with a solution, it should not be assumed that a complex problem can be resolved without fully understanding it. There are many methods to conduct RCAs; most start with a known adverse occurrence, such as within hours of a pressure injury (PI) to be assured that the patient is safe. For example, if a faulty bed was in use, it would be replaced first and then the RCA would examine the remainder of the problem. Human causes of PI, such as infrequent or inadequate turns, will require a longer period for investigation. In addition, problems with policy or training will take even longer to decipher.

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DOI: 10.1097/WON.0000000000000546

This article describes a 3-level RCA process beginning with exploring the symptoms of the problem. The second level is identification of the human roots (when examining a PI, the human roots are the actions or inactions of the staff caring for the patient). The third level is identification of the latent roots; these roots include the system of care and the processes within the system. All 3 levels of this process must be examined in a structured manner. The Box provides a case example of a deep tissue pressure injury (DTPI) affecting the heel of a patient following total knee replacement surgery.

CREATING POLICY AND PROCEDURES FOR RCA ON PI

I strongly believe that facility leadership should be actively involved in the creation of RCA teams. Leadership should approve of the RCA concept, clarify which events or near-misses are studied, identify the team members, and periodically review results.[2] The system should include clear procedures for reporting a PI to justify initiation of an RCA. Because these teams are resource-intensive, they should not be used for every event. Criminal acts such as abuse, acts due to impairment or substance abuse, and unsafe acts where the provider intended to cause harm or was fully aware of the potential for harm are legally labeled as reckless.[2,3] However, even if a patient developed a PI due to lack of care by an impaired provider or as a result of abuse, the facility should still examine its system for early detection and mitigation of these problems.

Root cause analysis reviews should begin within 72 hours of an occurrence. Teams for RCA usually consist of 4 to 6 persons, drawn from all levels of the organization.[2] Due to the potential for mislabeling multiple disorders of the skin as a PI, I advocate starting the RCA process by ensuring the wound truly represents a PI. An important team member is a wound care specialist with significant training and expertise, such as a certified WOC nurse. Specialized knowledge of the natural history of PIs combined with knowledge of differential diagnosis needed to distinguish a PI from other forms of skin

BOX.

Root Cause Analysis of a Case of DTPI on the Heel

A 64-year-old woman was admitted following left total knee replacement (TKR). Her past medical history included type 2 noninsulin-dependent diabetes for 15 years, hypertension, osteoarthritis, and obesity (225 lb, 5 ft 4 in, body mass index = 38.6). Following surgery, her pain was managed with a femoral nerve block. Postoperative care included elastic stockings and sequential compression devices. Physical therapy had been treating the patient with both bed exercise and ambulation. The discharge plan was to go for continued rehabilitation. A purple left heel was discovered 2 days after admission, and the RCA began on day 3 following hospital admission (Figure).

Figure. Left heel with deep tissue pressure injury

Level 1 RCA

The RCA process started by determining that this skin problem was indeed a PI. Confirmation was based on its location (over the bony prominence of the posterior heel). The DTPI was most likely a result of pressure from the leg being positioned on the bed and being numb after a spinal block used for her TKR. Pressure on the heel might have also been attributed to use of elastic stockings. There is likely a component of shear from sliding in bed as one of the exercises used for strengthening her quadriceps muscle.

Nevertheless, the RCA team considered other conditions leading to changes in skin color in the lower leg. The RCA team examined the medical record for evidence of poor perfusion. Nurses' notes indicated that she had pedal pulses and did not have pallor or cyanosis. Therefore, arterial disease was ruled out. Because the patient was diabetic, the possibility of a DFU was also considered. A DFU was excluded because of the location of the discolored area. A DFU typically occurs on the walking portion of the plantar foot in ambulatory patients, but this area of discoloration occurred over the posterior heel.

The timing of the DTPI was then examined. This DTPI had intact skin, although the epidermis was starting to lift. Based on these observations, it was estimated that the DTPI occurred between 48 and 72 h ago.

Therefore, the team's level 1 RCA ended with determining that this DTPI occurred between 48 and 72 h ago while the patient was supine in the bed.

Level 2 RCA

The medical record indicated that the patient had no skin issues upon admission. However, the record did not specifically note whether the skin over the heel was intact. The RCA team then examined care during surgery by speaking to the OR circulator who worked with the patient. It was explained that the leg was positioned in a boot to hold the knee in flexion. The posterior heel was not in contact with the OR table and therefore no additional protection for the heel was used. The patient was placed in elastic stockings at the end of the operation.

The Braden Scale score on admission to the hospital was 21 (subscale scores were 4, 4, 3, 3, 4, and 3, respectively). There was no indication of diabetic neuropathy in nurse's notes; however, the hospitalist found evidence of neuropathic disease and ordered heel off-loading devices for the patient. The Braden Scale risk score following surgery was the same at 21, with the same subscale scoring. There was no indication of awareness of risk stemming from a loss of sensation with the femoral nerve block or any reluctance of the patient to turn herself.

Hospital policy indicated that a cumulative Braden Scale score of 17 should be used as a cut point for implementation of preventive measures for PI development other than regular turning and repositioning as indicated. Because the cumulative Braden Scale score was 21, no additional preventive interventions, such as floating the heels, were applied.

To examine what prevention measure was undertaken for this patient, the RCA team examined both the medical record and the patient's room. I find this approach advantageous because the processes of care can also be seen. An order for heel off-loading device was in place, but the team observed that the device remained on the windowsill, in its original package. The care tech did not recognize the need to apply this device to the patient's leg. She did not have time to ask the nurse about it because she was busy with other patients. The RCA team spoke to the physical therapists about the patient. They had taught her to do quad setting by flexing her knee and sliding her heel up and down in the bed.

The medical record indicated that the DTPI was found yesterday; the nurse who noted it thought that it was a bruise from surgery. The patient said her heel had been uncomfortable; the RCA team members found no notes about changes in the condition of the heel until the morning of their investigation. In order to determine the likely time frame when the DTPI developed, the RCA team reviewed the medical record and interviewed the staff. Medical record review revealed no notes about removing her elastic stockings or sequential devices. Yesterday's day shift nurse tried to remove the stockings, but the patient complained of pain during her attempt, so she stopped because she did not wish to cause additional pain. When interviewed, the nurse stated that the night shift had recorded the skin as intact and she assumed it still was.

Hospital policy stated that a skin assessment and a PI risk assessment be completed when patients are transferred from one unit to another. The hospital policy also describes DTPI as a form of PI. Education had been imparted in the prior 12 months about skin assessments to detect PI.

Level 3 RCA

Because this situation occurs frequently in this orthopedic nursing unit, the unit manager and the clinical nurse specialist created a plan of correction. Skin assessment of the heel was reviewed with the staff during a unit meeting, and mirrors were made available to facilitate skin assessments. The stages of PI were reviewed with emphasis on DTPI, and the risks seen in patients who have orthopedic surgery were emphasized. The manufacturer's representative for the heel off-loading device was contacted, and she reeducated nurses and nurse techs on how to apply and remove the boot. The effectiveness of these solutions will be measured over time. Cases of similar risks that do not develop DTPI will be celebrated with the staff.

Abbreviations: DFU, diabetic foot ulcer; DTPI, deep tissue pressure injury; OR, operating room; PI, pressure injury; RCA, root cause analysis; TKR, total knee replacement.

damage is essential. I also recommend including a team member with knowledge or expertise in the RCA process. I have observed that most facilities use members of their quality and safety committee as experts in RCA. Risk managers should be included if there is an incident of PI that may lead to litigation. The RCA teams should include personnel familiar with the processes of care and the unit or care environment. For example, if investigating a PI from critical care or the operating room, I advocate engaging clinicians who are familiar with patient care in this environment. I also advise against involving team members who were involved with the event; rather, the team should interview these individuals. Inclusion of a patient representative should be considered; some facilities interview the patient and family because they are often firsthand witnesses to the incident.[1-3]

The leadership team will also need to provide direction on the use of photographs, both for the medical record and for the RCA process. Photographs are instrumental in determining when and where the PI began. However, I have found that many facilities do not photograph PI due to a perceived litigation risk. If photographs are not taken, I recommend educating the staff to use accurate anatomy as they describe the PI; for example, documentation of "excoriation of the buttocks" is not helpful when completing an RCA involving a full-thickness PI.

Root cause analysis can be threatening to both staff and the system because it focuses on an adverse outcome such as a PI. Therefore, it is imperative that RCAs do not blame a person while ignoring the system. I advocate use of a Socratic method to understand the problem, the underlying assumptions, and the evidence when undergoing an RCA process. Some RCA teams use a technique called "the 5 whys" to examine a problem. Each time a statement is made, it is investigated using the word "Why?" until the latent roots are fully understood. This technique often requires 5 repetitions of "Why?" to reach an understanding.[1-4] Plans for communicating findings by the RCA team should be identified early in the process.

LEVELS OF RCA WHEN INVESTIGATING A PI

The first level for an RCA following PI is defining the problem, or the physical roots, including confirmation that the skin or soft tissue wound or deformity is truly a PI. In the United States, PIs are categorized using a staging system promulgated by the National Pressure Ulcer Advisory Panel.[5] I have observed that this first level in RCA is usually completed by a WOC nurse or other wound care specialist. This clinician must differentiate PI from frequent coexisting skin lesions such as category 2 incontinence-associated dermatitis with skin erosion.[6] Less common skin lesions of the buttocks include friction injury of the buttocks,[7] ischemic necrosis,[8] and Morel-Lavallée lesions.[9] When examining the foot and the heel, I recommend considering limb ischemia from advanced arteriosclerosis or the use of vasoconstrictors for blood pressure management.[10,11]

While the attribution of a presumed PI to pressure or shear may seem obvious, I have found that assigning a clear attribution is often challenging. A PI occurs when the intensity of pressure is high or the duration of pressure is long.[5] High-intensity PIs occur when the patient is lying on a hard surface, such as the floor, the ground, an interventional radiology table, or a thinly padded operating room tables. In these situations, the location of the ulcer matches the position of the patient on the hard surface. For example, if the patient fell and broke his hip in the kitchen at home and was not rescued for hours, the hard surface would create soft tissue injury (DTPI) on the surfaces of the body in contact with the floor. Likewise, if the patient was positioned prone for surgery, a PI will develop on the anterior surface of the body. The injury from intense pressure is due to deformation of soft tissues.[12]

Pressure of high intensity or long duration leads to tissue ischemia. The exact timing of exposure to pressure is not clear because the tolerance for pressure is a major determinant of the time needed for injury to occur.[13] The tolerance of soft tissue for pressure is reduced when the skin is damaged by incontinence,[14,15] impaired perfusion,[16] and protein-calorie malnutrition.[17]

Deep tissue pressure injury is particularly complex; it is a newer PI category, and evidence concerning its natural history is limited.[12] Deep tissue pressure injury is often not visible for 48 hours.[18] Depending on the timing preceding admission, the skin may be intact. Purple discolored tissue will appear some 24 to 36 hours later. Thus, the timing of DTPI evolution makes it seem like the injury occurred while in the hospital. In addition, purple skin can reflect multiple etiologic factors and a thoughtful differential diagnosis is necessary. Purple skin can be present in vascular insufficiency, inflammatory disease, congenital skin lesions, traumatic injury, and coagulative diseases.[18]

Level 1A: When Did the PI Start?

I have found that determining the time of onset of a PI is vital to RCA. The Centers for Medicare & Medicaid Services (CMS) policies state that a PI present on admission is eligible for additional payment within the diagnoses related group (DRG) payment process.[19] Present on admission is defined as a condition or problems that were evolving at the time of admission or existed at the time of admission. Despite widespread opinion, there is no required time frame as to when a provider must identify a condition as present on admission. A PI does not need to be documented within 24 hours to be deemed present on admission; situations such as infections or occult injury occur when a definitive diagnosis cannot be established rapidly.[20] Therefore, with a structured and accurate RCA process, cases of PI can be classified as present on admission even if the injury was not diagnosed within the first 24 hours.

A PI that occurs after admission is considered a hospital-acquired condition (HAC), and the care for treatment of it is not reimbursable.[19] Although HAC diagnoses no longer generate additional payment, hospital coders following federal guidelines are required to list all diagnoses that affect patient care or length of stay (LOS) in administrative data. Each hospital's HAC rate from administrative data has been publicly reported by the CMS on its Hospital Compare Web site since 2011.[21,22] The accuracy of these data has been questioned. Administrative data of hospital-acquired pressure injury (HAPI) taken from coding were lower than those reported from surveillance data.

Pressure injury develops over time. The time frame to guide decisions about where the patient was located at the time pressure was applied to soft tissue is shown in the Table. It is important to understand the timing of PI development so that changes to care processes can improve the entire span of care. For example, if the individuals completing the RCA determine that PIs have started during surgery but appeared while the patient is in surgical intensive care, prevention will be unsuccessful if the operating room is not included in the plan for change.

TABLE.
Timing of Pressure Injury Based on Updated NPUAP Staging Taxonomy[a]

Stage[5]	Timing of Clinical Manifestations—Using the First Citation of the PI
Stage 1	Nonblanchable erythema occurs within 12-24 h.
Stage 2	Superficial injury with ulceration of skin presents within 24 h.
Deep tissue pressure injury[18,55]	Dark red, maroon, or purple intact skin presents within 48 h.
Stage 3	Full-thickness loss of skin and soft tissue presents within 72 h.
Stage 4	Full-thickness loss of skin and soft tissue occurs extending to the ligament or bone presents within 72 h of assessment.
Unstageable	Extent of the wound bed occluded by slough or eschar presents within 72 h or earlier.
MDRPI	The PI under a medical device that appears in the shape of the medical device. The PI often involves the mucous membrane, which cannot be staged using the staging system. The time frame present here likely still applies.

Abbreviations: MDRPI, medical device–related pressure injury; NPUAP, National Pressure Ulcer Advisory Panel; PI, pressure injury.
[a]Use this time frame to determine the likely time of onset of pressure when compared to the time when changes in the skin are first identified.

Level 1B: Where Is the PI?

In addition to determining the time of onset of a PI, the team must identify its location on the body. The last step in the physical roots (the visible problem being investigated), level of the RCA, is to determine what part of the body has a PI. Identifying the location of a PI provides clues to events leading to its occurrence. For example, a PI of the buttocks usually occurs when the patient lies in a supine position for a prolonged period of time, such as during an operative procedure. Similarly, I have observed that a PI on the sacrum usually occurs when the patient is positioned supine with the head of the bed elevated or in a recliner chair. Ischial PIs usually occur when the patient is seated erect, such as in the wheelchair. By combining the duration of pressure and the location of the injury, generally the RCA team can narrow its investigation to a more circumscribed series of events preceding the PI. For example, the team investigates a patient with intact purple tissue on the sacrum from DTPI; additional inquiry indicated that the patient was in a head-of-bed elevated positon about 48 hours ago. This finding may prompt the team to ask if the patient was moved from that position during those hours. Likewise, when investigating a patient with PI on both buttock cheeks, the team surmises that the patient was supine when prolonged exposure to pressure to the skin and soft tissue occurred. This situation might prompt the team to ask if the patient was undergoing surgery when the PI started.

Level 2: Examine the Processes of Care

Examination of human roots in an RCA is used to elucidate the care processes that lead to the event under scrutiny. I recommend beginning with an examination of the patient's medical record for (1) condition of the skin at the time of admission, (2) PI risk, (3) preventive care plans for PI, and (3) care provided.

A review of the nurse's initial head-to-toe skin assessment ideally will reveal or exclude visible PIs present on admission. However, not all nurses are expert examiners of the skin and do not always include all differential diagnoses in their analysis. For example, nursing notes can indicate "stage 2 pressure injury on the buttock" or "maceration of the skin" when moisture-associated skin damage is the actual problem. If the evaluation reveals errors in the initial skin assessment, I advise changing the process of admission to include a second assessor (sometimes called a "four eyes" assessment). A unit-based skin champions is recommended as a second assessor.[23] Admission photographs can be extremely helpful in determining the etiology of a wound, especially when combined with a complete patient history and physical examination. There are instances where a complete skin assessment cannot be done due to patient condition. In these cases, I advise using the timeline described earlier to determine a more accurate depiction of development of the PI.

Following determination of the skin condition on admission, I recommend assessment of the accuracy of the PI risk injury assessment. I have observed that the Braden Scale for Pressure Sore Risk (Braden Scale) is widely used in the United States to evaluate PI risk on admission and during the patient's hospital course. I have found that examination of the risk assessment scores at the time the PI began is particularly useful. If the score does not reflect the anticipated level of risk, the RCA team may use other sources to determine if the risk score was accurate. For example, the team may review the physical therapist's notes for an assessment of mobility and activity level and the nutritionist's notes for an assessment of nutritional status. In addition, the team might review scores from the Richmond Agitation-Sedation Scale[24] or another validated instrument may be completed to describe level of consciousness.

While the Braden Scale is extensively validated and reliable,[25] it does not capture all risks. For example, the Braden Scale does not predict a PI well in the malnourished,[26] critically ill,[27-29] children,[30] or patients in the operating room.[31,32] If the RCA showed that risk stemmed from time in the operating room, poor perfusion, use of medical devices, use of hemodialysis, or terminal conditions, your facility should consider augmenting risk assessments to capture these areas.

The RCA team should then determine if a logical plan of care was formulated based on the initial PI risk assessment. Guidelines on PI prevention will provide evidence to build nursing policy and procedures.[33] The use of bundled preventive interventions has been shown to reduce PIs.[34-36] Items in the bundle include skin assessments, risk assessments, routine turning and repositioning, support surfaces, use of repositioning devices (ie, devices to assist with turning, wedges, heel off-loading devices), and preventive dressings.

After the RCA team has determined when the PI started, anatomical site of the PI, and location of the patient in the facility at that time, the remainder of the RCA can be completed. For example, if a DTPI occurred during surgery, the team should assess the process of assessment of risk for PI during surgery, including skin inspection prior to surgery, use of pressure redistributing devices on high-risk areas of the body, duration of the surgery, and age and quality of the operating room table mattress. Alternatively, if the PI under investigation is linked to use of a medical device, the team should determine

the product name, time from application of the product until discovery of the PI, use of protective dressings between the product and the skin, frequency of moving the device, and frequency of skin assessments. If an intraoperative PI is suspected, I recommend assessment of the surgical suite, operating table, positioning equipment, and use of pressure redistributing devices. For example, identification of a PI on the face following prone cases immediately alerts the RCA team to the equipment used to hold the head and any pressure redistributing devices in this area.

When gaps in patient care processes are identified, the RCA team should ask why they occurred. In my experience, common gaps in care processes include a lack of staff time, relegating PI prevention as a lower priority, and lack of a clear and effective procedure for turning patients with multiple tubes, lines, or other medical devices. Gaps in care may reflect system problems or errors in the care of an individual patient. Interviews with the appropriate staff may be useful if an individual error is suspected. The RCA team should include the unit manager when an individual error is suspected so that corrective actions can be taken. In a just culture, leadership and the frontline staff share accountability for safety.[37] Typical just culture questions include the following: (1) Was the clinician knowingly impaired? (2) Did the clinician consciously engage in an unsafe act? (3) Did the clinician make a mistake that 3 other clinicians with similar experience are likely to make under the same circumstances? or (4.) Does the clinician have a history of committing unsafe acts?

If the event represents a liability concern, the risk manager should be advised about the issues. If the outcome is attributed to actions of a specific employee, the individual's managers or clinical leaders should review the events and determine the next appropriate steps, which may include education and/or remediation. Without this approach, I have found that questioning the staff may lead to feelings of a "witch hunt" rather than a quality improvement project.

Level 3: System-Level Aspects

Pressure injury rates are a commonly used indicator of performance of health care facilities and present a significant economic burden to health care systems.[33] Therefore, systems governing PI prevention should include policy and procedures, staff education, regular assessments of staff competence, and availability of essential preventive equipment and additional supportive resources such as preventive dressings and upgraded support surfaces. The system needs to ensure the RCA identifies 1 or 2 major causes for each specific PI. Examples of end findings include Assessment, Prevention Techniques, Prior to Admission, Personnel, Equipment, and Prioritization.

Policies

A facility's system must use clinicians with expertise in wound care who regularly monitor policies and procedures to ensure they are current and evidence-based. Responsibility may be partially delegated to a unit champion, in coordination with an advanced practice wound care provider such as a clinical nurse specialist, nurse practitioner, or physician. The system should include processes allowing for flexibility in staffing depending on the patient acuity.[38] For example, for a unit with high-acuity patients at risk for PI development, additional staff members may be needed, either temporarily or on an ongoing basis, to ensure PI prevention care is regularly completed. It is unlikely that all components will exist in one case being examined by an RCA process.

Education

Ongoing education and skill training for all staff members are needed to ensure care providers are able to effectively execute policies and procedures relative to PI prevention.[39] Topics usually include completion of a head-to-toe skin assessment and use of the facility's chosen PI risk assessment instrument. Based on identification of a specific facility's or unit's needs, education also may include procedures for PI risk assessment and prevention in specialty service areas such as the surgical suite or in the intensive care unit caring for ventilated and hemodynamically unstable patients. Pressure injury prevention education must be individualized for each facility. If a wound nurse completes all dressing changes, procedures must ensure that first-line nurses know how to reach the wound care nurse, alternative plans if that person is not immediately available, and how to manage topical dressings between changes. If care systems within a facility dictate that the wound care nurse completes an assessment only upon request, policies and procedures must clarify discrepancies in the medical record. For example, what is the accepted procedure when a PI is described as a diabetic foot ulcer? Finally, I recommend clarifying procedures related to communication with providers and staff. This is essential in order to ensure consultations for wound care are effectively communicated, promptly responded to, and recommendations implemented. If the WOC or wound care specialty practice nurse is only available during working hours, alternative plans may be needed to ensure coverage when the wound care team is not available. I have found that providing the bedside nurses with a photographic library of different wounds on different body parts, clear directions for documenting each wound in the medical record, and follow-up actions when a wound or skin damage is identified, including timely notification of the patient's provider and wound care expert, offers an excellent adjunct for coverage when the wound care team is not immediately available.

Resources

Effective prevention of PIs requires resources such as pressure redistributing support surfaces,[33,40,41] overlays,[42] heel off-loading devices,[43] and preventive multilayer dressings.[44] Each of these items is associated with costs that must be weighed against their ability to ensure positive patient outcomes delivered in a cost-effective manner. In the context of completing an RCA for PI prevention, this requires developing a system of care where preventive products are used for the right patient at the right time resulting in effective and sustained reductions in PI incidence.[33,34,36,39]

The RCA process should provide a method for reporting findings to the administrative team. Reporting outcomes not only enables techniques to be implemented in a nonthreatening manner but also ensures staff members are not blamed for unavoidable injuries.[45] There is increasing interest in understanding the role of skin failure; although evidence remains sparse, research is ongoing to enable more effective identification of this phenomenon and its differentiation from avoidable PIs.[46]

COMMON CAUSE ANALYSIS

While single cases of HAPI are important to understand, I have found that facility-wide changes often occur when outcomes of several RCAs are examined collectively. This process, commonly referred to as common cause analysis, seeks out common threads of timing, personnel, equipment, and processes

resulting in a recurrent event such as PI development.[47] For example, if common cause analyses determine that LOS is a contributing factor to the development of a HAPI, use of pressure redistribution surfaces over time should be reviewed. Similarly, if seasonal variability is observed, analysis may examine whether increased PI occurrences coincide with hiring new nurses. I have observed that novice first-line nurses may be overwhelmed by other duties as they familiarize themselves with the culture and multiple care routines of a new facility, resulting in less emphasis on PI prevention.

Similar to RCA, completion of a common cause analysis should lead to a plan of action designed to improve care processes and prevent recurrences of PIs. As hospitals strive to become high-reliability organizations, ensuring a safety-focused culture is essential. Facility leadership should be involved since this plan will have direct costs for resources, staff time, and staff education/training. Involving the front-line staff and a multidisciplinary team of stakeholders to identify and improve patient is difficult to achieve but a key to success.[39,48,49]

LIMITATIONS OF RCA

While RCA is generally effective, this process has limitations. Not all problems are linear, and root causes will vary based on the individual patient's situation. In my experience, a nonlinear problem exits when an RCA team examines the facts and roots but fails to move beyond the basic question, "I wonder why that happened?" In addition, the effectiveness of RCA may be impaired when the team lacks adequate independence from the care process. If team members are attempting to analyze their own coworkers or peers, there is a risk of compromising the depth of data collection and soften the accuracy conclusions in order to avoid criticizing colleagues or coworkers. Consider the investigation of airplane crashes; the US Federal Aviation Administration demands selection of investigators who are independent of the flight crew and the airline manufacturer. I recommend adopting a similar approach when completing RCA in response to PI occurrences. The effectiveness of RCA is also lessened when corrective intervention is delayed or inadequate. If nothing changes following the RCA, the time spent collecting and analyzing the data is rendered worthless. High-reliability organizations profess to consistent excellence in quality and safety for every patient, every time.[49]

Evidence concerning efficacy of RCA is limited. Several studies have examined the RCA process from the perspective of the RCA team.[50-53] Barriers to successful completion of an RCA process were lack of time to complete the process, lack of resources, and conflicts within the team or between the team and the facility staff or leadership. Nevertheless, cross-sectional data from RCA teams indicate they believe RCA improves patient safety (87.9%) and enhances communication about patient care (79.8%).[50,54]

CONCLUSION

Root cause analysis is a process for identifying causal factors resulting in variations in performance, including sentinel events. I advocate considering use of RCA for full-thickness PI occurrences and use of common cause analysis if multiple PIs occur. The RCA process should focus on determining whether the wound undergoing evaluation is actually a PI, what the processes of care were in place at the time the PI started, and finally what system measures or problems were identified that should be corrected.

KEY POINTS

- Root cause analysis is used to determine why a specific problem occurred.
- When evaluating a PI, the RCA process begins with determining that the skin and soft tissue wound is a pressure injury.
- After determining the etiology of the wound, RCA focuses on the processes of care at the time the PI began.
- Finally, RCA addresses what issues may exist in the system that could be changed to reduce risk of subsequent PI.

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Disclosure Statement: The authors and planners have disclosed that they have no financial relationships related to this article.

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DOI: 10.1097/WON.0000000000000561