Chapter 1
Patient Identification

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"Give me a fruitful error any time, full of seeds, bursting with its own corrections."

Vilfredo Pareto

Introduction

Patient misidentification is the failure to properly confirm the correct identity of a patient for whom clinical services are being provided [1]. Often during a misidentification, the correct identity of the patient, or vital details pertaining to the patient's care, are confused with that of another patient. Patient misidentifications are present during all types of care and result from a multitude of factors. If patient identification procedures are not the standard practice, then inpatients with roommates are vulnerable to misidentification, as are outpatients with common names. The severity of patient misidentifications varies greatly. Some events cause no harm (i.e., the patient almost received another patient's medication, but the error was detected before the medication was administered) and others are catastrophic in nature (i.e., the wrong patient was brought into the operating room and surgery commenced on the wrong patient).

The actual incidence of patient misidentifications in healthcare is unknown as the majority of these events go unreported. Over an 8-year period, the Joint Commission received 30 reports of invasive procedures being performed on the wrong patient [2]. Over a 1.5-year period, the United Kingdom (UK) National Health Service's, National Patient Safety Agency, received 236 reports of patient misidentifications

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Table 1.1 Five rules of causation for root cause statements

Rule	Meaning
1	Root causes must show a cause and effect relationship
2	Negative descriptions should be avoided
3	Human error must have a preceding cause
4	Violations of procedure must have a preceding cause
5	Failure to act is only causal when there is a pre-existing duty to act

related to wristbands (missing or incorrect) [3]. Additionally, recent quarterly data from the UK's National Health Service indicates that about 6 % of total reported incidents pertain to documentation-related errors, which include identification error [4]. Over a 3-year period, the United States' Veterans Health Administration reviewed over 100 root cause analyses (RCAs) that investigated patient misidentification events [5]. Finally, for one fiscal year, a large academic medical center identified that upwards of 15 times per month the wrong patient was selected during inpatient and outpatient visit registration processes, with the majority of the errors occurring during the inpatient admission [1].

The widespread nature of patient misidentification has garnered national and international attention. The Joint Commission's first National Patient Safety Goal in 2012 (http://www.jointcommission.org/assets/1/6/2012_NPSG_HAP.pdf) is focused on patient identification; it emphasizes the usage of at least two identifiers to confirm the correct identity of patients and focuses on the elimination of patient misidentifications during blood transfusions. When the Joint Commission surveys healthcare settings for accreditation, they observe patient identification processes. If two identifiers are not being used to identify patients during all points of care, it is considered as patient safety vulnerability.

Patient misidentifications are an indicator of hospital quality and are considered avoidable adverse events. Hospitals and healthcare settings use root cause analysis (RCA), proactive risk assessments, and other methodologies to investigate patient misidentifications in order to formulate viable systems-based solutions to eliminate these occurrences. By using these methodologies, hospitals determine the specific nature of the event (i.e., human, cultural, technical, environmental, etc.) and make targeted changes. During the RCA process, when crafting root cause statements, hospitals can avoid the trap of not digging deep enough by understanding and utilizing the five rules of causation, which are highlighted in Table 1.1 [6, 7]. Technically, all five rules of causation should be applied to each root cause. But, certain rules may be more applicable than others when writing specific root cause statements. For example, when describing a system vulnerability that involves staff training, it is particularly important to avoid negative descriptions (e.g., poorly trained pharmacist) and to focus on the system reasons for the lack of adequate training [7]. Often, targeted changes involve several layers of intervention, including staff training, policy creation or revision, electronic health record (EHR) changes or enhancements, and work area redesign to name just a few. Journal articles and

published reports have demonstrated the effectiveness of these strategies, in particular the EHR, in reducing or eliminating patient safety events, including misidentifications [8]. In this chapter, we describe two cases with common patient misidentification events, analyze the factors that contributed to the events, and discuss improvement strategies.

Case Studies: Clinical Summary

Case 1: Wrong Patient Brought to Dermatology Clinic

One quiet weekday morning, a staffer in the Dermatology Clinic telephoned the inpatient unit requesting Patient Dee to be sent down to the clinic. The nurse on the receiving end understood the staffer to request Patient Vee, not Patient Dee. There was no write-down read-back verification of the patient's identity over the phone.

One hour later, the unit escort brought Patient Vee to the Dermatology clinic with the patient's paper chart. Once in the clinic, the escort handed-off the paper chart to the nurse and then waited with Patient Vee, who was being consulted for a leg rash.

After 10 min, the patient was called into the examination room. The dermatology resident entered the room and said "Hello, Ms. Dee". The patient responded "Hello Doctor". Without referring to the paper chart, the resident examined the patient but could not identify a leg rash, which was the subject of the consultation.

After the exam, the escort and Patient Vee returned to the inpatient unit. Later that day, the nurse was looking in Patient Dee's chart for the Dermatology note and was unable to locate it. Upon further investigation, the nurse discovered the note in Patient Vee's chart and realized that the wrong patient had been brought down and examined. She immediately called the Dermatology Clinic and notified staff there of the error.

Case 2: Blood Drawn from Wrong Patient

Patient Alex and Patient Oscar were both admitted to the same medical unit, on the same day. They had the same last name and date of birth. Alex's blood type was A-positive and Oscar's blood type was O-positive. The physician ordered a transfusion for Patient Oscar.

The medical resident went to Patient Alex's room with an empty vial and drew the blood specimen. Patient Alex was dozing off and not paying much attention. Then, the resident proceeded to the nurses' station and asked the nurse to label the tube with Patient Oscar's information while she completed the blood request form. Once complete, both the resident and nurse signed the form. Then, the clerk transported the specimen and form to the Blood Bank for processing.

The Blood Bank processed the specimen according to standard protocol. They did not have a historical blood type on file for Patient Oscar, since he was a new patient to the hospital. Based on the appropriate processing results, the Blood Bank released a unit of A-positive blood to the medical floor.

The unit nurse along with another nurse hung the A-positive blood at the patient's bedside. Before starting the transfusion, the nurse casually asked the patient "so, what's your blood type again?" Patient Oscar responded "O-positive." At that moment, both nurses realized the significant error; an A-positive bag of blood was hanging at the bedside. They immediately removed the blood before the transfusion was started and notified the medical resident and the Blood Bank. Upon further investigation, the medical resident discovered that she had drawn the blood from the wrong patient.

Case Study Analyses

RCA teams were chartered to investigate both patient misidentifications. Teams drilled down into each incident, focusing on systems instead of human error, on processes instead of only clinical decision making, and pursued hard-fix solutions. After the debriefing and fact-finding, the next critical steps in the RCA process are as follows:

1. Conduct a group flowchart and notate system breakdowns
2. Convert notation statements into formal root causes
3. Apply the five rules of causation
4. Write actions to address each root cause
5. Focus on hard-fix actions (e.g., actions difficult to override) or intermediate strength actions (e.g., actions that provide another barrier of protection can be overridden)
6. Apply quantifiable outcome measures
7. Seek frontline as well as leadership buy-in before implementing actions

Case 1 Analysis: Wrong Patient Brought to Dermatology Clinic

Identifying Root Causes

During the final flowcharting of Case 1, the RCA team identified several breakdown points which are highlighted on the yellow notes in Fig. 1.1.

(a) During all discussions about patient care, but especially during hand-offs, the Joint Commission recommends that clinical staff use at least two patient identifiers to accurately identify a patient. The RCA team found that during almost every process where the patient should have been properly identified, two

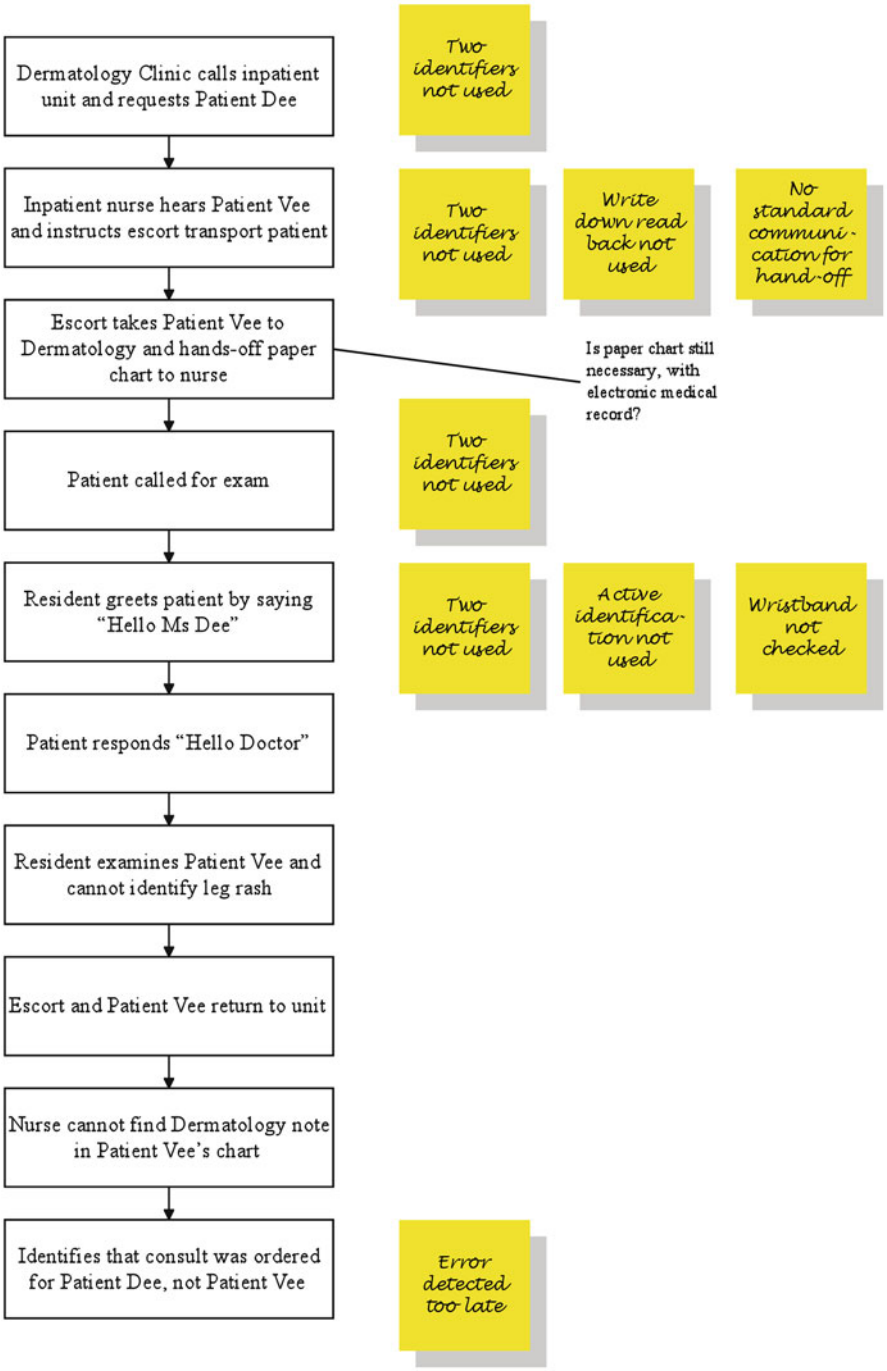

Fig. 1.1 Case study—Wrong patient brought to dermatology clinic: flow chart analysis

identifiers were not used. The nurse-to-nurse phone communication did not involve the use of two identifiers. As a result, staff thought they were communicating about the same patient, when in fact they were not. When the patient was called from the waiting room for her exam, two identifiers were not used. Finally, when the resident entered the room to examine the patient, two identifiers and *active identification* were not used during the greeting. Active identification involves asking the patient to state his or her name. For example, the provider should say, "Good morning. My name is Dr. Doctor. What is your name?" During passive identification, the provider would say, "Good morning Mr. Smith. I'm Dr. Doctor and I'm here to examine you." By stating the patient's name, the provider introduces the opportunity for misidentification by assuming the identity of the patient and eliminating the two-way communication engaging the patient in verifying his/her identity. Without such confirmation, the resident was unaware with whom he was communicating and that he was about to examine the wrong patient. Of note, patient misidentifications are more common when patients have similar or same names, surnames, dates of birth, or other demographic information [9]. Therefore, it becomes vitally important to use at least two identifiers to avoid similar name misidentifications.

(b) The team identified that during the nurse-to-nurse phone communication, write-down read-back was not used. Standard communication practices such as write-down read-back offer the opportunity to detect misidentification errors during verbal communications and are considered a best communication practice.

(c) When the patient was called into the exam room, the medical resident did not use active identification to confirm the correct identity of the patient. Due to the hierarchical nature of the physician–patient relationship, patients may be less likely to speak up and correct a physician if they are being addressed by the wrong name. The RCA team identified that the dermatology resident was not familiar with the process of active identification.

(d) The patient's wristband was never double-checked to confirm her identity. Patient wristbands are vigilantly placed on all patients prior to admission to facilitate identification processes. They are another vehicle by which a clinician can double-check the identity of a patient. Without checking the wristband, the final opportunity to correctly identify the patient was lost.

The RCA team identified the following root causes of this particular patient misidentification and the most relevant of the five rules of causation that applied, which are described in Table 1.2. Had at least one of these vulnerabilities been prevented, the patient would have been correctly identified.

After identifying the root causes, the team focused on implementing solutions to those procedural, cultural, communicative, and training-related vulnerabilities that led to the patient misidentification. The team agreed that the new procedures related to patient identification should be built into the current in situ simulation modules that were being conducted in the hospital. In situ simulation is an innovative approach to clinical education, which uses a realistic scenario to teach decision making within the complexity of interdisciplinary teamwork [10]. Additionally,

Table 1.2 Case 1: Root causes and five rules of causation

Root cause	Category	Five rules of causation				
		1	2	3	4	5
The standard protocol for phone communications involving patient hand-offs did not involve the use of two identifiers, or write-down read-back, which contributed to the wrong patient being sent to Dermatology	Communication	✓	✓			✓
The organization lacked comprehensive education on how to properly identify patients, using active identification and two identifiers. As a result, staff were not familiar with the process of using two identifiers and the cultural norm was to only use one	Training	✓	✓	✓		

Table 1.3 Case 1: Action strength table

Action	Type	Strength category		
		Strong	Intermediate	Weak
Write a standard protocol for staff to staff phone communications, which mandates the use of two patient identifiers and write-down read-back	Standardized process	✓		
Use in situ simulation to train staff on how to appropriately communicate using these new standards (two identifiers and write-down read-back)	Education via simulation		✓	

clinical managers were tasked with developing standard processes that would incorporate the use of two identifiers and active patient identification when delivering care, treatment, services, and communicating critical patient information.

Finally, as a secondary recommendation to address efficiency, the team recommended that paper charts no longer travel with the patient since the hospital uses an EHR, which can be accessed anywhere in the hospital. Transport of the paper chart is a redundant process that does not contribute to the overall safety of the patient.

The RCA team crafted the following corrective actions highlighted in Table 1.3, to correct the systems issues that contributed to this patient misidentification. These actions are considered strong and intermediate fixes and therefore, address the root cause of the misidentification.

Perhaps the most important aspect of the RCA action plan is to ensure the actions are implemented and measured for effectiveness. The RCA team labored with writing the outcome measures and eventually agreed that multiple, quantifiable measures would best ascertain when these actions were implemented and how effective they were. Timelines and action completion dates were requested from clinical managers (i.e., ensure the protocol is written by x-date and confirm that the in situ simulations have occurred via attendance and training records by y-date).

Fig. 1.2 Packed red blood cells ready for patient transfusion

Additionally, employees who participated in the in situ simulation were evaluated based on if and how they used two identifiers during the clinical scenario. Simulations were repeated, if necessary, to ensure compliance with the new identification procedures.

The RCA team also recommended the use of "secret shoppers" to monitor adherence to the new patient identification protocols such as (a) using two identifiers and write-down read-back for all phone communications involving patient hand-offs and (b) using two identifiers, active identification, and checking the patient's wristband when available before examining the patient. The Centers for Medicare and Medicaid Services (CMS) has been successfully using "secret shoppers" for years to assess prescription drug programs for compliance with marketing requirements and the accuracy of information provided to customers [11].

Finally, the team tasked the Patient Safety department with tracking and trending all future patient misidentifications submitted via the institution's incident reporting system. The overall goals were a 100 % reduction in adverse misidentification events, monitoring of all close call misidentification events, and encouraging all staff to continue reporting these events through the Just Culture modalities.

Case Study 2 Analysis: Blood Drawn from Wrong Patient (Fig. 1.2)

Transfusion errors related to patient misidentification are considered sentinel events, which are unexpected occurrences involving death or serious physical or psychological injury to patients [12]. Although the incident in Case 2 is a close call, it had the potential of becoming a sentinel event had the transfusion not been halted. As a result, the RCA process treats close-call sentinel events as if they were actual

sentinel events and investigates them just as rigorously. Close-calls provide organizations with the opportunity to learn about an incident and correct system vulnerabilities.

During the analysis of this close-call sentinel event, the RCA team identified the following main breakdown points that contributed to the blood being drawn from the incorrect patient, which are highlighted on the yellow notes in Fig. 1.3.

When the blood was drawn for the transfusion, the RCA team identified four procedural vulnerabilities that contributed to the blood being drawn from the wrong patient: (1) the patient's specimen labels were not brought to the bedside so that they could be verified against the patient's wristband, (2) two identifiers were not used to properly identify the patient, (3) the tube was not labeled at the bedside after the blood was drawn, and (4) a second verification process (e.g., another person or technology) was not instituted. As previously stated, patients with similar or similar-sounding names are more likely to be misidentified, especially if two identifiers are not used. Additionally, blood specimens should always be labeled at the bedside or in front of the patient. This creates an environment of safety because it allows the patient to be involved in the identification process and creates patient confidence through transparency. Furthermore, a redundant safety system was not in place to ensure that this critical process went without error.

During the debriefing, the RCA team drilled down further with staff as to why the labels were not brought to the bedside. The team identified some misperceptions held by clinical staff that the labeling of blood tubes was considered an *administrative* duty and not a clinical duty. As a result, bringing the labels to the bedside was not perceived as an important part of the clinical process of drawing blood.

Additionally, the nurse agreed to label the tubes without having witnessed the blood draw. At some hospitals, two clinical staff members are involved in the process of drawing blood for a transfusion, especially if no other redundant identification system is in use. And, both members must be present at the patient's bedside when the blood is drawn and the tubes are labeled. Alternatively, at other hospitals, two blood specimens are required to ensure that the correct identity and blood type of the patient have been captured. In either case, redundant processes ensure a misidentification will be detected if it occurs. As discovered during this RCA, there was not a redundant system in place to ensure that this critical process went without error.

Finally, the RCA team found that an informal process was in place before the transfusion was initiated. Although two staff members were involved, there was not a standard checklist to review prior to the transfusion. Only by chance did nurse ask the patient about his blood type, which ultimately prevented the sentinel event from occurring. During surgical procedures, staff conducts a time-out prior to the commencement of the procedure to ensure (1) correct patient, (2) correct procedure, and (3) correct site. The World Health Organization summarizes this best safety practice in their comprehensive Surgical Safety Checklist, which outlines how the standard process, including the time-out, should occur before surgical procedures [13]. The RCA team identified that a lack of standardized process, including checklist, prior to initiating the transfusion created an unsafe environment and a lost opportunity for final verification of correct patient and correct blood type.

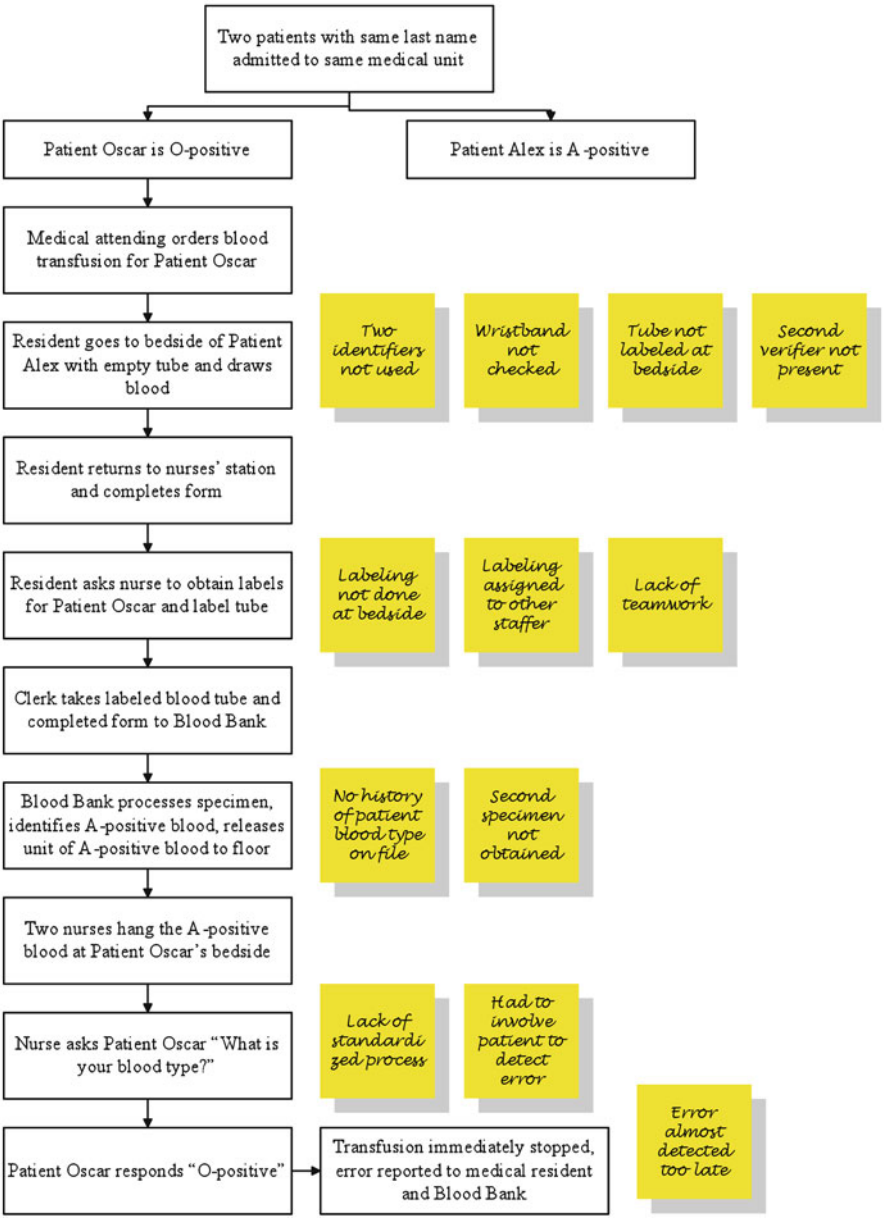

Fig. 1.3 Case study 2—Blood drawn from wrong patient: flow chart analysis

The RCA team identified the following root causes of this close-call sentinel event, which involved blood that was drawn from the wrong patient and the most relevant of the five rules of causation that applied [Table 1.4].

Table 1.4 Case 2: Root causes and five rules of causation

Root cause	Category	Five rules of causation				
		1	2	3	4	5
Due to cultural misperceptions, staff were not accustomed to bringing labels to the bedside when drawing blood for a transfusion. As a result, the opportunity to correctly identify the patient using the labels and the patient's wristband was lost	Procedures	✓			✓	
The recommended practice of using two identifiers and active identification at the bedside was not built into the standard process for drawing blood. As a result, the patient was not correctly identified	Procedures	✓	✓			
The organization did not have a standard process (i.e., checklist), such as a time-out, before the transfusion was initiated. As a result, the final opportunity to correctly identify the patient was almost lost	Communication	✓				✓

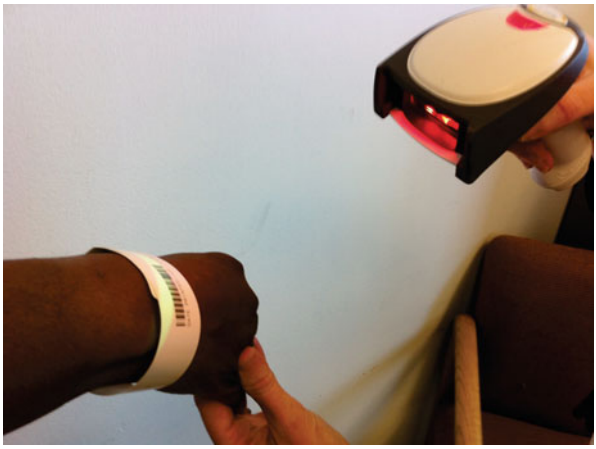

Fig. 1.4 Scanning a patient's barcoded wristband

These root causes were validated against a literature review. In a study analyzing 227 RCAs conducted on patient misidentifications in laboratory medicine, it was found that the majority of misidentifications occurred during the pre-analytic phase of the process and that patient misidentifications accounted for 73 % of adverse events [14]. Furthermore, the study identified that during the pre-analytic phase, the majority of causal factors for those misidentifications involved printed labels, wristbands, two identifiers, and two-person verifications.

The RCA team felt the strongest fix for ensuring that both wristband and labels were used to identify the patient with the usage of two identifiers was by applying wireless barcode technology at the bedside (Fig. 1.4).

Barcode-based transfusion processes have been shown to be 15–20 times safer than current hospital practices [15]. Bar-coded transfusion verification systems confirm patient identity, display transfusions orders, track blood products, and maintain transfusion records. They eliminate opportunities for human error involving wristbands and patient labels and make the process safer for patients and more efficient. Additionally, they offer a redundant system to ensure patient safety and require that (1) the patient's wristband is used in the identification process and (2) that it is checked against the labels, which are applied to the blood tubes at the bedside after the blood is drawn. The usage of barcode technology with this standardized process would eliminate the need to involve another staff member during the pre-analytic blood draw process. As the hospital learned from this incident, adding that second person to the process does not necessarily make it safer.

In addition to barcode technology, a formal process including the usage of a checklist, much like the surgical time-out, should be instituted using two staff members at the patient's bedside before the transfusion is initiated. The time-out is considered a best safety practice and now widely accepted among staff who perform invasive and surgical procedures. Therefore, the process of blood transfusion could also benefit from this safety feature.

Finally, the possibility of maintaining a historical blood type for all patients in the blood bank was explored. Having a historical blood type on file would have allowed the blood bank to verify the patient specimen against an accurate blood type and quickly identify that a misidentification had occurred. Unfortunately, without having an integrated health information system and a patient population for which a blood type is already on record, such as that of the Veterans Health Administration, this hard-fix solution was not deemed feasible at the time.

Therefore, the following corrective actions were developed to address the identified systems vulnerabilities, which are highlighted in Table 1.5.

In order to measure the effectiveness of these proposed strategies, the RCA team recommended that the Patient Safety department in the hospital work closely with the information technology team responsible for installing and maintaining the barcode technology to track and trend data associated with the new system. All usage and scanning discrepancies were to be tracked for the first year post-implementation. Additionally, an implementation team consisting of patient safety, clinical staff, and information technology, was assigned to conduct random rounds on the units to ensure that barcode technology is being utilized accurately and to resolve any technical issues that staff may encounter. Furthermore, the implementation team was charged with monitoring how staff are interacting with each other and the technology. Finally, a separate Patient Safety team would monitor when transfusions are taking place in the hospital and round on the units during those times to observe and ensure that a time-out, checklist, and two engaged staff members are involved in the transfusion initiation process. Due to the sentinel nature of mistakes made in this context, staff must have 100 % confidence that they are drawing blood from or transfusing the correct patient with a unit of blood.

Table 1.5 Case 2: Blood drawn from wrong patient: action strength table

Action	Type	Strength category		
		Strong	Intermediate	Weak
Implement the usage of wireless barcode technology at the bedside to confirm accurate patient identity using two identifiers during the specimen collection process	New nonmedical device	✓		
Educate all staff to use two patient identifiers when drawing blood and during all aspects of the transfusion administration process	Training			✓
Implement a time-out with checklist, that involves two staff members who are actively involved and present, before the initiation of the blood transfusion, to confirm correct patient and correct blood type	Standardized process	✓		

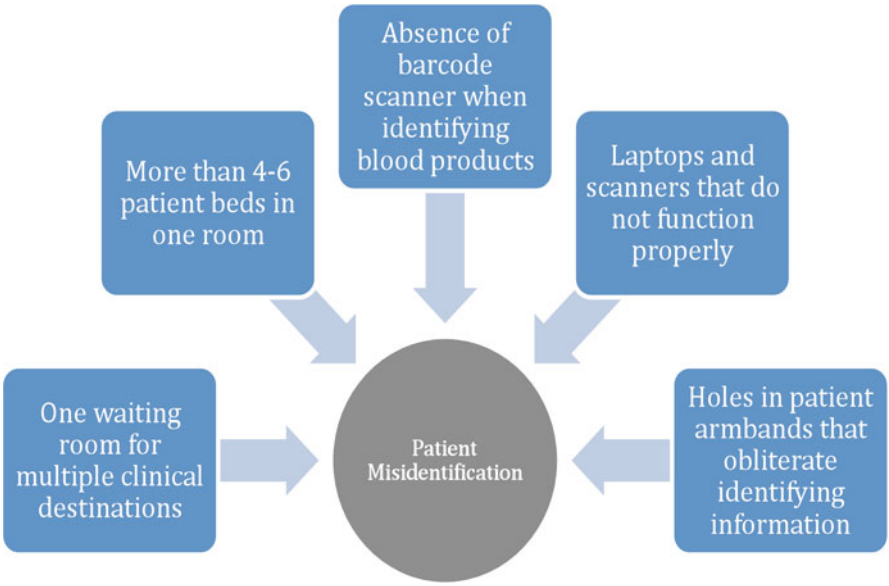

Fig. 1.5 Environmental factors that contribute to patient misidentification

Discussion

During the RCA of both these cases of patient misidentification, several key lessons were learned. Patient misidentifications are common occurrences within hospitals and have the potential for having devastating consequences. Additionally, many factors contribute to patient misidentification, which are highlighted in Figs. 1.5, 1.6, and 1.7.

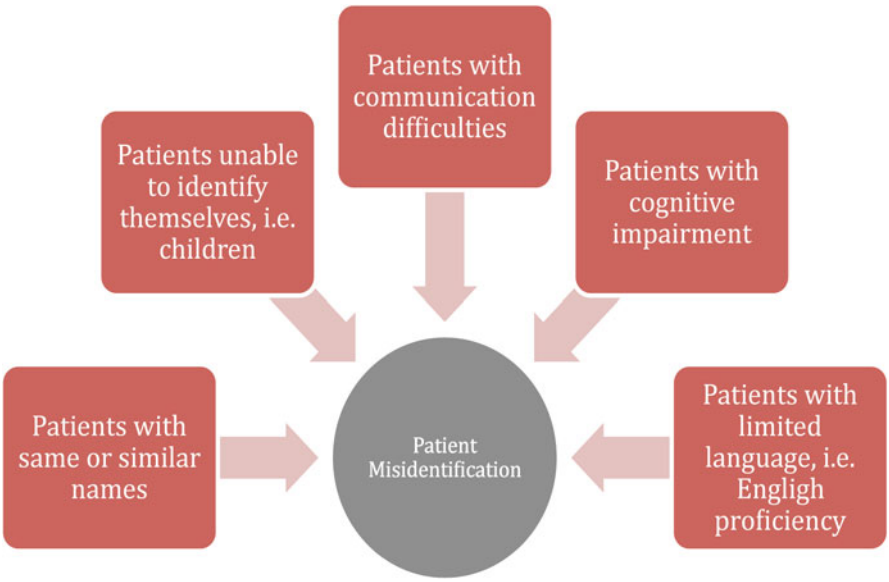

Fig. 1.6 Patient factors that contribute to patient misidentification

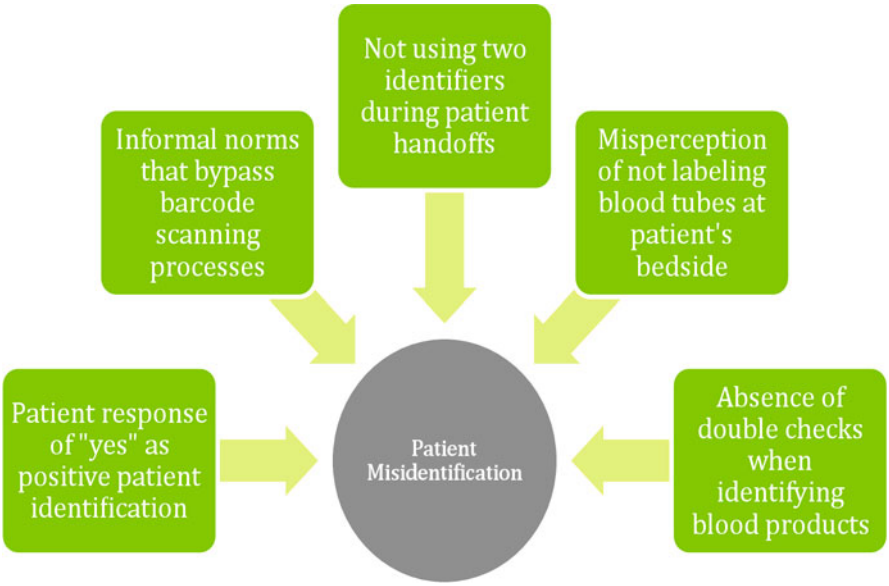

Fig. 1.7 Cultural factors that contribute to patient misidentification

These factors can occur at any stage in the healthcare delivery process. A lack of redundant nonhuman methods for identification, such as barcode scanning technology, increases the likelihood of patient misidentifications. Patient factors, such as patients with same or similar names, introduce the possibility of misidentification if more than one identifier is not used to actively identify the patient. Finally, cultural factors and deviations from standard practices continue to put patients at risk for misidentification.

Key Lessons Learned

As presented through the analyses of the two case studies in this chapter, there are many factors that contribute to patient misidentification. Below are some key takeaways that will help to ensure accurate patient identification and hopefully eliminate the occurrence of these preventable and distressing events.

- Two identifiers must be used during all aspects of patient care.
  Wristbands are a second method for identifying the patient and should be read or scanned.
- Write-down and read-back of the patient's identity should take place during phone communication about a patient.
- *Active identification* (asking patient to state his or her name) should be used during all verbal communications with the patient; passive identification should be avoided.
- Redundant systems that are technologically based (e.g., bar-coded technology) are hard-fixes to ensure the correct identity of patients.
- Cultural misperceptions about the importance of patient identification, labeling tubes at the bedside, and other practices can be addressed through simulation type training.
- Best practices, such as time-outs, should be adopted when appropriate.

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