

Intervention efficacy for eliminating patient misidentification using step-by-step problem-solving procedures to improve patient safety

Tatsuya Fukami, Masakazu Uemura, Mineko Terai, Tomomi Umemura, Mika Maeda, Mayumi Ichikawa, Naoko Sawai, Fumimasa Kitano, and Yoshimasa Nagao

Department of Patient Safety, Nagoya University Hospital, Nagoya, Japan

ABSTRACT

This study aimed to evaluate the efficacy of interventions to reduce patient misidentification incidents classified as level 2 and over (adverse events occurred for patients) with the step-by-step problem-solving method. All incidents related to patient misidentification were selected, and relevant information was collected from the original electronic incident reports. We then conducted an eight-step problem-solving process with the aim of reducing patient misclassification and improving patient safety. Step 1: the number of misidentification-related incident reports and the percentage of these reports in the total incident reports increased each year. Step 2: the most frequent misidentification type was sample collection tubes, followed by drug administration and hospital meals. Step 3: we set a target of an 20% decrease in patient misidentification cases classified as level 2 or over compared with the previous year, and established this as a hospital priority. Step 4: we found that discrepancies in patient identification procedures were the most important causes of misidentification. Step 5: we standardized the patient identification process to achieve an 10% reduction in misidentification. Step 6: we disseminated instructional videos to all staff members. Step 7: we confirmed there was an 18% reduction in level 2 and over patient misidentification compared with the previous year. Step 8: we intend to make additional effort to decrease misidentification of patients by a further 10%. Level 2 and over patient misidentification can be reduced by a patient identification policy using a step-by-step problem-solving procedure. This study aimed to evaluate the efficacy of interventions to reduce patient misidentification incidents with step-by-step problem-solving method. Continued seamless efforts to eliminate patient misidentification are mandatory for this activity.

Keywords: patient misidentification, patient safety, problem-solving process

This is an Open Access article distributed under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. To view the details of this license, please visit (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

INTRODUCTION

Misidentification of patients is a fundamental patient safety issue. Facilitating the accurate identification of patients will help minimize the risk of patient harm as a result of misidentification.¹⁻⁸ Eradicating patient misidentification is also important to improve the quality of healthcare.

Received: August 1, 2019; accepted: October 11, 2019

Corresponding Author: Tatsuya Fukami, MD, PhD

Department of Patient Safety, Nagoya University Hospital,

65 Tsurumai-cho, Showa-ku, Nagoya 466-8560, Aichi, Japan

Tel: +81-52-744-2940, Fax: +81-52-744-2781, E-mail: fukami@med.nagoya-u.ac.jp

Major areas where patient misidentification occurs include drug administration, blood transfusions, surgical interventions, and sample collection.⁹ Hand-over and other communication problems increase the risk of misidentification issues, particularly when multiple healthcare providers and specialists are involved in caring for a patient.¹⁰ Patient misidentification occurs for many reasons; therefore, we applied the eight-step Toyota problem-solving method to reduce this issue in our institution. This method is constantly evolving with input from multiple professionals in various industries^{11,12} and is simple and practical to apply, even for complex issues.¹³ The problem-solving process follows eight steps (Table 1). These practical problem-solving steps include the “Plan, Do, Check and Act” cycle. The planning process incorporates Steps 1 to 5, Step 6 concerns implementation or “doing,” and Step 7 involves checking the process. Step 8 reflects acting for the future. This project aimed to reduce patient misidentification, especially incidents classified as level 2 and over (adverse events occurred for patients) according to National University Hospital Council of Japan recommendations. This study aimed to evaluate the efficacy of interventions to reduce patient misidentification incidents classified as level 2 and over (adverse events occurred for patients) with step-by-step problem-solving method.

MATERIALS AND METHODS

Our hospital is a 1,000-bed university hospital with a clinical patient safety and quality management department that oversees patient safety affairs and is responsible for the incident reporting system. The department comprises two doctors, three nurses, one pharmacist, one lawyer, and 10 clerical staff. When patient safety incidents and accidents occur in the hospital, they are submitted to general risk and safety managers from various occupations via an electronic reporting system; over 11,000 cases are reported each year. Patient safety incident reporting is mandatory for all staff in our hospital, including contracted workers. We surveyed the incident reports submitted in the 2016 and 2017 fiscal years, selected all patient misidentification-related incidents, and collected information from the corresponding original electronic incident reports. We compared with before and after intervention to validate the effect of countermeasure. The collected data included the incident date; ward/department where the incident occurred; healthcare profession, years of experience, and affiliated department of the reporter and person involved in the incident; information regarding the patient; incident details; incident classification; and incident severity classification. Incident severity classification is widely used in Japanese hospitals to evaluate incident severity, and is based on a classification system developed by the National University Hospital Council of Japan (Table 2).¹⁴ The definition of patient misidentification is

Table 1 Rules of patient identification in the study hospital

Plan	Step 1	Clarifying the problem and setting the theme
	Step 2	Understanding the current situation and breaking down the problem
	Step 3	Setting the target
	Step 4	Analyzing root cause factors
	Step 5	Developing countermeasures
Do	Step 6	Implementing the countermeasures
Check	Step 7	Confirming the effects, and monitoring results and process
Action	Step 8	Standardizing, stabilizing control, and sharing success

Table 2 Incident severity classification system recommended by the National University Hospital Council of Japan

Level	Continuity of injury	Severity of injury	Outcome/Treatment of injury
Level 0	–	–	Error or trouble with a pharmaceutical or medical device was found, but did not affect the patient
Level 1	None	–	There was no harm to the patient (but there was a possibility of some influence)
Level 2	Transient	Mild	Treatment was not necessary (mild change in vital signs, need for increased patient observation, examination for confirmation of safety, etc.)
Level 3a	Transient	Moderate	Simple treatment was required (disinfection, poultice, skin suture, administration of analgesics, etc.)
Level 3b	Transient	Severe	Substantial treatment was required (significant change in vital signs, use of artificial respirator, surgery, prolongation of hospitalization, hospitalization, fracture, etc.)
Level 4a	Permanent	Mild to moderate	Permanent disability or subsequent complication remained, but was not accompanied by significant dysfunction or an aesthetic problem
Level 4b	Permanent	Moderate to severe	Permanent disability or subsequent complication remained, accompanied with significant dysfunction or an aesthetic problem
Level 5	Death	–	Death (excluding those due to the natural course of the underlying disease)

mistaking individual patients, including misunderstanding patient information. Misunderstanding a patient's information also includes cases where patient information is compromised, although they are not mistaken directly (e.g., misprint of paper data or electronic medical record input error). Tools commonly used in quality monitoring include proportion charts and Pareto charts. A proportion chart is a control chart used to monitor the proportion of nonconforming units in total sample; however, it is only suitable for a pass/fail type inspection. A value that indicates the highest level of quality acceptable for a product or service. The upper control limit is used in conjunction with the lower control limit to create the range of variability for quality specifications, enabling those within the organization to provide an optimal level of excellence by adhering to the established guidelines. In a Pareto chart, the values are presented in decreasing order and the cumulative function is a concave function. A Pareto chart was deemed appropriate for the first three steps in the problem-solving process (i.e., clarifying and breaking down the problem and setting to target), as a Pareto chart aims to highlight the most important causing factors.

The electronic incident reporting system used by the study hospital is Incident Report System version 1.0 (Safe Master Inc., Fukuoka, Japan). We extracted only necessary incident information items for this study, and processed information concerning individuals (e.g., the reporter and target patient) anonymously. All analyses were performed using SPSS® version 25 (IBM, Armonk, NY, USA). This study was approved by the Institutional Review Board of the study hospital.

RESULTS

We performed the Toyota step-by-step problem-solving procedure. In Step 1, we clarified that patient misidentification had increased. A review of the total number of patient misidentification incidents each year from 2000 revealed that the total number of incident reports increased each year (Fig 1a), along with the number of misidentification-related incident reports and percentage of the total incident reports (Fig 1b). In Step 2, we assessed the proportion chart, which also showed deterioration (Fig 2), and investigated cases of patient misidentification classified as level 2 and over using a Pareto chart. The most frequent kind of misidentification was sample collection tubes, followed by drug administration and hospital meals (Fig 3a). In Step 3, we decided the target was an 20% decrease in cases of level 2 and over patient misidentification compared with the previous year, and set this goal as a hospital priority. In Step 4, we found that the most important cause of misidentification was discrepancies in patient identification procedures. In Step 5, we standardized the patient identification process to achieve the goal of 20% reduction (Table 2). While we want to eliminate this type of defect, it may not be reasonable or achievable to set this as a goal. Most would agree that starting with a 20-50% reduction per improvement period is a reasonable goal in the beginning. For Step 6, we developed digital image demonstration videos of several patient identification situations (blood sampling, hospital meal delivery, blood transfusions) to be shown to all staff members. In Step 7, we confirmed the 18% reduction of patient misidentification (level 2 and over) compared with the previous year (55 cases in 2016 to 45 cases in 2017) (Fig 3b). The proportion chart (Fig 2) also showed a reduction from these activities. Finally, in Step 8, we encouraged improved reporting attitudes and set a subsequent goal of a further decrease 10% in patient misidentification.

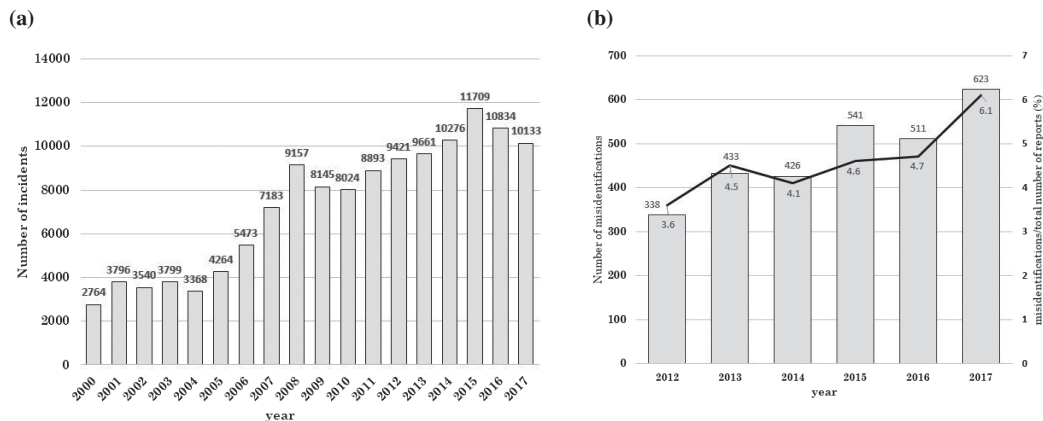


Fig. 1 The fact of incident reports

Fig. 1a: The total number of incident reports in each fiscal year.

Fig. 1b: The number of patient misidentification-related incident reports and percentage of total incident reports.

Patient misidentification elimination

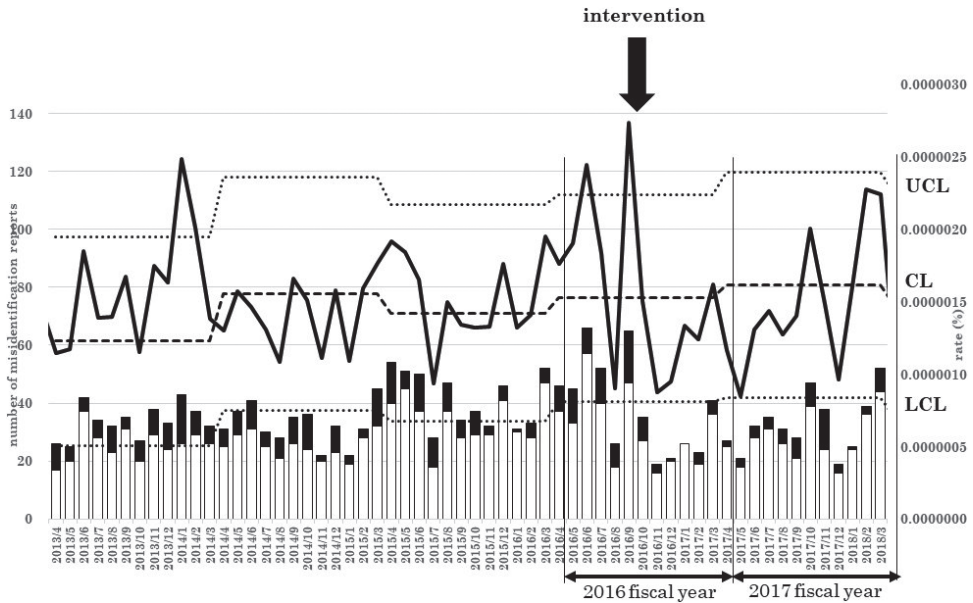


Fig. 2 Proportion chart of monthly report percentages relating to patient misidentification issues (number of misidentification reports/total number of inpatient-days)
 Open bar: level 0 or 1 incident; Closed bar: level 2 and over incidents; solid line: rate; UCL: upper control limits; LCL: lower control limit; CL: control limit in proportion chart.

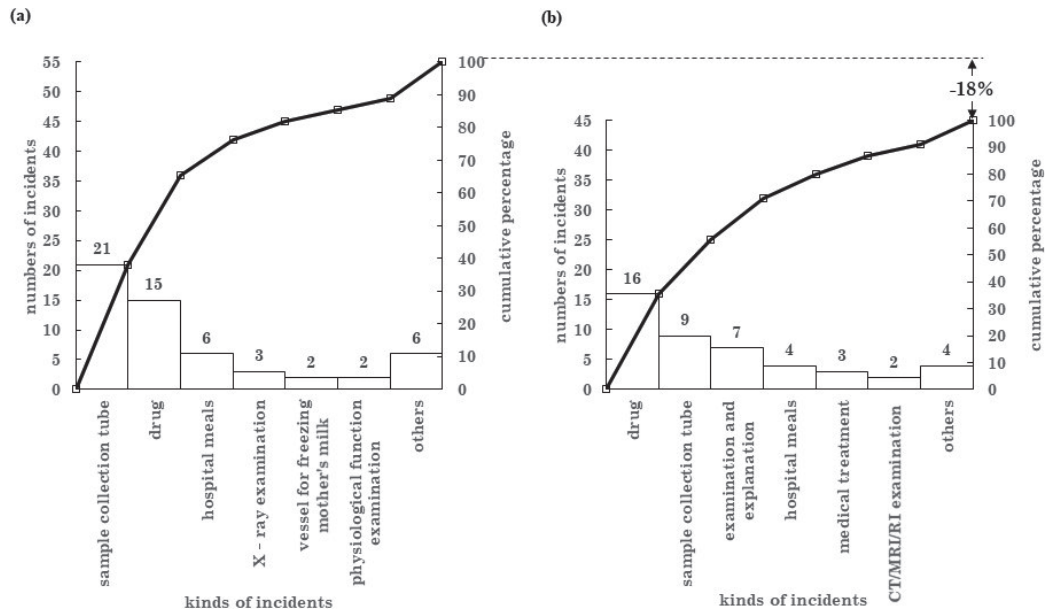


Fig. 3 Pareto chart of level 2 and over patient misidentification incidents

Fig. 3a: 2016 (n=55).

Fig. 3b: 2017 (n=45).

The data are ordered by importance.

DISCUSSION

In 2003, the US Joint Commission listed improving patient identification accuracy as the first of its national patient safety goals, and this continues to be an accreditation requirement.¹⁵ The identification process used throughout the study hospital requires at least two ways of identifying a patient, such as the patient's name, identification number, birth date, or a bar-coded wristband. The process for using two different identifiers for a patient is uniform throughout the hospital. The first rule is that patients are identified using two patient identifiers, excluding the patient's room number and location in the hospital. The second rule is that patients are identified before performing diagnostic procedures, providing treatments, and performing other procedures. Finally, rule three is that the hospital ensures the correct identification of patients in special circumstances, such as comatose patients or newborns that are not immediately named.

We found that the number of misidentification-related incident reports and the percentage of these reports in total incident reports had been increasing each year. However, our problem-solving strategy intervention reduced level 2 and over patient misidentification incidents (which are incidents that may possibly affect the patient) by about 18%. This countermeasures and interventions could not help achieving the goal, but these results suggest our countermeasures a certain effect for reducing patient misidentification.

The step-by-step problem-solving method is effective in the medical field, despite the complex issues involved. Using countermeasures developed and implemented as part of this process (e.g., demonstration videos for dissemination to all staff), we partially overcame patient misidentification, and reduced sample collection tube and hospital meal errors. These are one of the achievements of priority focused approach with Pareto chart. However, sample collection tube and hospital meal errors were only two of the three major errors identified, with the third being misidentification-related drug administration errors. Many different roles are involved in drug administration, including physicians (orders), pharmacists (inspection, setting, amount, specification), and nurses (delivery and administration of medication to patients). This complexity meant that we could not develop a simple countermeasure for drug administration issues. However, we intend to focus on reducing patient misidentification in relation to drug administration errors in a follow-up project.

Clinical staff must always validate that the verbal identification given by a patient matches the

Table 3 Rules of patient identification in the study hospital

1. Patient can state their full name (first and last names).

Patient's name information: Healthcare providers promote the patient's self-introduction with their full name and date of birth (or hospital identification number) with accurate details (full name, date of birth, and hospital identification number) that correctly identify them and match them to their care.

Healthcare provider has the patient's name information: This must be checked with the available health records to ensure all details match. This information includes display of electric medical records for this patient, labels on sample collection tubes, medical prescriptions, label of syringes, meal tags, documents, and others.

2. Patient cannot state their name (first and last names).

Patient's name information: Healthcare providers make sure that the patient is wearing a wristband with accurate details (full name, date of birth, and hospital identification number) that correctly identifies them and matches them to their care.

Healthcare providers have the patient's name information: same as for patients that can state their full name.

information on that patient's wristband before performing any procedure, examination, treatment, or administering any prescribed medications. Before any intervention or procedure is performed, it is the responsibility of the staff member undertaking the intervention/procedure to check the patient's identity (Table 3). To support this movements, all clinical and non-clinical staff members receive an induction program from the ward or department manager to ensure they are trained in the appropriate systems. Effective interventions need useful strategies for problem-solving.¹⁶ We encourage the application step-by-step problem-solving procedure for complicated issues in healthcare.

Quality improvement is continuous, and seamless effort to eliminate misidentification of patients at our hospital will continue.

DISCLOSURE STATEMENT

None of the authors has any conflicts of interest to declare in relation to this work.

REFERENCES

1. World Health Organization. World Alliance for Patient Safety: forward programme 2005. <http://apps.who.int/iris/bitstream/10665/43072/1/9241592443.pdf>. Published 2004. Accessed May 11, 2019.
2. World Health Organization. WHO draft guidelines for adverse event reporting and learning systems: from information to action. <http://apps.who.int/iris/bitstream/10665/69797/1/WHO-EIP-SPO-QPS-05.3-eng.pdf>. Published 2005. Accessed May 11, 2019.
3. Sandhu P, Bandyopadhyay K, Ernst DJ, et al. Effectiveness of laboratory practices to reducing patient misidentification due to specimen labeling errors at the time of specimen collection in healthcare: systematic review. *J Appl Lab Med*. 2017;2:244-258. doi: 10.1373/jalm.2017.023762.
4. Abraham P, Augey L, Duclos A, Michel P, Piriou V. Descriptive analysis of patient misidentification from incident report system data in a large academic hospital federation [published online ahead of print March 8, 2018]. *J Patient Saf*. doi:10.1097/PTS.0000000000000478.
5. Bittle MJ, Charache P, Wassilchuk DM. Registration-associated patient misidentification in an academic medical center: causes and corrections. *Jt Comm J Qual Patient Saf*. 2007; 33(1):25-33.
6. Cohen R, Ning S, Yan MTS, Callum J. Transfusion safety: the nature and outcomes of errors in patient registration. *Transfus Med Rev*. 2019;33:78-83. doi: 10.1016/j.tmr.2018.11.004.
7. Lee NY. Reduction of pre-analytical errors in the clinical laboratory at the University Hospital of Korea through quality improvement activities. *Clin Biochem*. 2019;70:24-29. doi: 10.1016/j.clinbiochem.2019.05.016.
8. Lippi G, Chiozza L, Mattiuzzi C, Plebani M. Patient and sample identification: out of the maze? *J Med Biochem*. 2017;36:107-112. doi: 10.1515/jomb-2017-0003.
9. Bártlová S, Hajduchová H, Brabcová I, et al. Patient misidentification of nursing care. *Neuro Endocrinol Lett*. 2015;3:17-22.
10. World Health Organization Patient safety curriculum guide. Multi-professional ed. http://apps.who.int/iris/bitstream/10665/44641/1/9789241501958_eng.pdf. Published 2011. Accessed May 11, 2019.
11. Dogru M. The application of problem solving method on science teacher trainees on the solution of the environmental problems. *IJESE*. 2008;3:9-18.
12. von Hippel E. "Sticky information" and the locus of problem solving: implications for innovation. *MNSC*. 1994;40:429.
13. Jimmerson C. *A3 Problem Solving for Healthcare: A Practical Method for Eliminating Waste*. 1st ed. New York, NY: Productivity Press; 2007.
14. National University Hospital Council of Japan. Guidelines for the public announcement of medical accidents at national university hospitals [in Japanese]. Rev ed. http://www.univ-hosp.net/guide_cat_04_15.pdf. Published June 2012. Accessed May 5, 2019.
15. Goal1. Identify patient correctly. Joint Commission International Accreditation Standards for Hospitals. 6th ed. Chicago, IL: Joint Commission International; 2017:43-44.
16. Kobayashi K, Imagama S, Inagaki Y, et al. Incidence and characteristics of accidental falls in hospitalizations. *Nagoya J Med Sci*. 2017;79(3):291-298. doi: 10.18999/nagjms.79.3.291.