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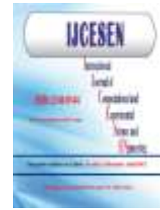

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Research Article

Nursing and Radiology Roles in Monitoring Patients During Mobile and Bedside Imaging

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Abstract:

Nursing and radiology professionals play pivotal roles in ensuring patient safety and comfort during mobile and bedside imaging procedures. Nurses serve as the primary caregivers, responsible for assessing patients' physical and psychological needs before, during, and after imaging studies. They administer pre-procedural sedation when necessary, monitor vital signs, and provide emotional support to alleviate patient anxiety. By establishing a trusting relationship, nurses are instrumental in communicating procedural information, answering questions, and preparing patients for the imaging process. Meanwhile, radiology technologists handle the technical aspects of the imaging equipment, ensuring proper positioning, image quality, and adherence to safety protocols. Effective collaboration between nursing and radiology teams enhances overall patient care and minimizes potential risks. In the context of bedside imaging, where procedures are conducted in various clinical environments, the teamwork between nursing staff and radiologic technologists is even more critical. This collaboration ensures that imaging is performed seamlessly, particularly for patients who are critically ill or have mobility limitations. Both nursing and radiology professionals must remain vigilant, continuously monitoring patients for any adverse reactions and promptly addressing any concerns that arise during the imaging process. By combining their expertise, they navigate complex situations, ensuring quality imaging while prioritizing patient-centered care. This synergistic approach not only enhances diagnostic accuracy but also reinforces the importance of interdisciplinary teamwork in delivering high-quality healthcare.

1. Introduction

The landscape of diagnostic imaging has undergone a profound transformation with the widespread adoption of mobile and bedside imaging modalities. This evolution, moving the diagnostic tool to the patient rather than transporting the patient to the machine, represents a significant advancement in patient-centered care, particularly for critically ill, immobilized, or high-risk patients in settings such as Intensive Care Units (ICUs), Emergency Departments, and operating rooms [1]. Technologies like portable digital X-ray units, point-of-care ultrasound (POCUS), and mobile computed tomography (CT) scanners have become indispensable in modern healthcare, enabling rapid diagnostic assessment and guiding immediate clinical interventions [2]. However, this convenience and immediacy introduce a complex set of challenges that extend far beyond the simple operation of machinery. The environment of care shifts from the controlled, purpose-built radiology department to the often chaotic and equipment-filled patient room, where the patient's primary condition is severe and unstable. In this high-stakes scenario, the monitoring of the patient transcends the simple acquisition of an image; it becomes a sophisticated, collaborative ballet of clinical vigilance, technical expertise, and unwavering patient advocacy [3].
The inherent risks associated with transporting unstable patients—termed "journey morbidity"—are well-documented and include dislodgement of lines and tubes, hemodynamic instability, and exposure to pathogens [3]. Mobile imaging seeks to eliminate these risks. Yet, it simultaneously creates a new set of potential hazards: the unfamiliar environment for the imaging team, the lack of immediate access to specialized radiology department resources, and the paramount need to maintain continuous therapeutic and monitoring measures during the imaging procedure itself [4]. It is within this critical intersection that the roles of the nurse and the radiologic technologist converge, intertwine, and become fundamentally interdependent.

1.1 Nurse's Role as Patient Guardian and Integrator

The nurse's presence at the bedside is constant, and their role during mobile imaging is that of the patient's primary guardian, clinical integrator, and continuous assessor. Their responsibilities are deeply rooted in a holistic understanding of the patient's baseline condition, pathophysiology, and therapeutic plan.

1.2 Continuous Physiological Surveillance and Management

The nurse's primary imperative is the maintenance of physiological stability. During a portable X-ray or a bedside ultrasound, they must continuously monitor a vast array of parameters. This includes, but is not limited to, cardiac rhythm and rate via bedside monitors, oxygen saturation (SpO2), invasive and non-invasive blood pressure, respiratory rate and pattern, and neurological status if applicable [5]. The act of positioning for an

image—such as placing a heavy imaging plate behind a critically ill patient for a chest X-ray—can cause significant pain, alter hemodynamics, or compromise respiration. The nurse must anticipate these effects, administer prescribed analgesics or sedatives proactively in consultation with the physician, and be prepared to intervene immediately if the patient's condition deteriorates [6]. Furthermore, they manage the integrity of life-sustaining equipment. Ensuring that ventilator circuits remain connected and functional during patient repositioning, that vasoactive medication infusions are not interrupted, and that chest tubes or drains are not dislodged are all critical nursing actions that take precedence over image acquisition [7].

1.3 Advocacy, Communication, and Psychological Support

Beyond machinery and monitors, the nurse advocates for the patient's overall well-being. They serve as the communication bridge between the imaging team and the broader healthcare team, providing essential context: "This patient has a fresh thoracic surgical incision on the right side," or "They are extremely confused and may pull at lines." This context is invaluable for safe positioning. The nurse also provides direct psychological support, explaining the procedure to an anxious, conscious patient in a calming manner, which can greatly enhance cooperation and reduce motion artifact [8]. For an intubated or sedated patient, this advocacy involves speaking on their behalf, ensuring their dignity is maintained during the procedure, and that unnecessary exposure is minimized. The nurse must also enforce strict infection control protocols, such as ensuring the radiologic technologist performs hand hygiene and that the portable machine's surfaces are cleaned before entering the room of a patient on contact precautions, acting as a steward for the unit's infection prevention practices [9].

1.4 Preparation of the Patient and Environment

Prior to the imaging team's arrival, the nurse performs crucial preparatory work. This involves securing all lines and tubes to prevent accidental removal, removing unnecessary bedding or equipment that may obstruct the machine or create artifact, and ensuring adequate staff is available to assist with patient movement if needed [10]. They also verify patient identification using two identifiers, a fundamental safety step that the imaging team will later corroborate. The nurse assesses whether the procedure is appropriate at that moment; if the patient is undergoing a clinical crisis (e.g., a coding event, severe desaturation), the nurse has the authority and responsibility to request a delay until the patient is stabilized, prioritizing immediate life-threatening needs over diagnostic ones [11].

1.5 The Radiologic Technologist's Role as Image Expert and Safety Officer

The radiologic technologist (RT) arrives at the bedside as the expert in image acquisition, radiation safety, and equipment operation. Their role, while focused on obtaining a diagnostically superior image, is intrinsically bound to patient safety and collaboration with the nursing team.

1.6 Technical Execution and Diagnostic Quality Assurance

The RT's core duty is to produce an image that meets diagnostic standards for the radiologist to interpret. At the bedside, this is profoundly challenging. Limitations include suboptimal lighting, cramped spaces, overlying hospital equipment (IV poles, ventilator tubing), and the inability to use standard positioning aids [12]. The RT must employ advanced technical knowledge to adapt: selecting appropriate exposure factors to penetrate through bedside clutter and patient conditions like edema, using creative positioning techniques, and employing digital processing tools to enhance image quality while minimizing the need for repeat exposures [13]. For ultrasound, the sonographer must have the skill to obtain diagnostic images despite limitations like dressings, wounds, or patient inability to cooperate. The technologist is also responsible for the integrity and aseptic handling of imaging detectors or ultrasound probes, particularly when used for sterile procedures or on patients with contagious infections [14].

2. Radiation Safety and Protection

In the realm of ionizing radiation (portable X-ray and CT), the RT is the undisputed safety officer. In the radiology department, fixed shields and controlled spaces protect staff. At the bedside, the environment is uncontrolled. The RT must rigorously apply the ALARA principle (As Low As Reasonably Achievable) for the patient, but crucially, for all other personnel in the room [15]. This involves clear, loud communication before exposure ("Radiation exposure!") to allow non-essential staff to step out or behind a shield, the proper use of portable lead shields, and maintaining a safe distance. They must ensure that any

accompanying staff, especially nurses who must remain close for patient care, are wearing appropriate protective lead aprons and thyroid shields. The RT is responsible for calculating and minimizing scatter radiation, a significant concern in confined spaces [16]. Their expertise ensures that the necessary diagnostic information is obtained with the lowest possible radiation dose to all involved.

2.1 Collaborative Positioning and Equipment Safety

The RT cannot position a critically ill patient alone. They must direct a coordinated maneuver with the nurse(s) and possibly other caregivers. This requires clear, concise communication: "On my count of three, we will all roll the patient towards us. Nurse, please ensure the endotracheal tube and the central line on this side are free." The RT must listen to the nurse's input regarding patient limitations and vulnerabilities [17]. Furthermore, the RT is responsible for the safe navigation of the often bulky and heavy portable equipment through crowded corridors and into the patient room, ensuring it does not collide with vital stationary equipment like ventilators or infusion pumps, and that its cords do not create a tripping hazard—a key aspect of environmental safety [18].

2.2 The Crucible of Collaboration: Integrating Roles for Optimal Outcomes

The highest level of patient safety and care quality is achieved when nursing and radiology roles are not merely adjacent but integrated. This synergy transforms the procedure from a technical task into a holistic patient care episode.

2.3 Pre-Procedure Briefing and Shared Mental Model

The foundation of successful collaboration is a pre-procedure briefing. Upon entering the room, the RT should verbally confirm the patient's identity and the ordered procedure with the nurse, who holds the patient's chart and latest orders [19]. The nurse should then provide a succinct "situation-background-assessment" update: "This is Mr. Smith, post-op day 1 from abdominal aortic aneurysm repair, on a norepinephrine drip for borderline blood pressure, intubated and sedated with Propofol, with a right internal jugular central line and two surgical drains." The RT can then state their needs: "I will need a supine AP chest image, which will require us to slide the detector behind his back. I have brought a slide sheet. Let's plan to do it after the next analgesia dose." This 60-second exchange establishes a shared mental model, aligns goals, and preempts problems [20].

2.4 Synchronized Execution and Dynamic Adaptation

During the procedure, communication must be continuous and closed-loop. As the team prepares to move the patient, the nurse might say, "His blood pressure is dipping slightly with turning." The RT can respond, "Understood. Let's get the detector placed quickly and return him to his baseline position immediately after the exposure." The nurse focuses on the monitor and the patient's face; the RT focuses on the alignment of the machine and the patient's anatomy. Each is the expert in their domain, but their attention overlaps on the patient's overall state. If an unexpected event occurs, such as a ventilator alarm, roles are clear: the nurse addresses the clinical alarm, while the RT secures the imaging equipment to prevent it from falling or obstructing care, and awaits further instruction [21]. This dynamic adaptation is the hallmark of a high-reliability team.

2.5 Post-Procedure Handoff and Quality Review

Collaboration does not end with the image capture. The RT should inform the nurse when the procedure is complete and the equipment is clear, allowing the nurse to immediately reassess the patient and restore any temporarily disconnected monitoring lines. The RT should also provide immediate feedback if they notice a potential issue, such as a line that appears kinked post-positioning. Furthermore, a culture of joint quality improvement is beneficial. If an image is suboptimal due to an unavoidable artifact from life-support equipment, the nurse and RT can jointly document this in the patient's record or the imaging requisition, providing crucial context for the radiologist [22]. Conversely, discussions about repeated exposures due to motion can lead to shared strategies for better pre-procedure sedation or coordination.

2.6 Special Considerations and High-Risk Scenarios

The interplay between nursing and radiology roles intensifies in specific high-acuity scenarios, demanding even greater precision and understanding.

Imaging the Critically Ill in the ICU
The ICU patient is often the most vulnerable. Here, the nurse's knowledge of minute-to-minute physiology is paramount. Procedures like obtaining

a portable chest X-ray for a patient on advanced ventilator modes (e.g., high-frequency oscillatory ventilation) or on extracorporeal membrane oxygenation (ECMO) require exquisite coordination. The RT must understand the absolute criticality of not disconnecting the ECMO circuit or the ventilator, and the nurse must guide the positioning around a plethora of cannulas and circuits [23]. The simple act of placing a detector becomes a major logistical and safety challenge.

2.7 Intraoperative and Trauma Bay Imaging

In the operating room or trauma bay, the radiologic technologist enters a high-paced, sterile environment. The nurse (often a perioperative or trauma nurse) and surgeon are focused on the surgical field or resuscitation. The RT must integrate seamlessly, maintaining sterile fields when using draped C-arms for fluoroscopy, responding quickly to surgeon requests for specific angles, and being acutely aware of time pressure [24]. The circulating nurse acts as a key liaison, helping to manage equipment cords and ensuring the RT has the access needed without contaminating the field.

2.8 Pediatric and Neonatal Imaging

Imaging children, especially premature neonates in isolettes, presents unique challenges. Patient motion is a greater issue, and radiation dose sensitivity is heightened. The nurse's role in comforting, swaddling, and potentially administering feedings or sucrose for analgesia is critical to obtaining a still image [25]. The RT must employ specialized pediatric exposure settings and finest collimation. Their collaboration ensures that the most fragile patients receive safe, effective imaging with minimal psychological and physical stress.

2.9 Barriers to Effective Collaboration and Strategies for Improvement

Despite its clear benefits, effective collaboration is often hampered by systemic and cultural barriers. Recognizing these is the first step toward mitigation.

2.10 Educational Silos and Role Ambiguity

Traditionally, nursing and radiology programs provide little interdisciplinary training. Nurses may not fully understand radiation safety principles, and RTs may not receive adequate training in the management of critical care equipment or complex pathophysiology [26]. This can lead to tension, such as a nurse feeling an RT is rushing the procedure, or an RT feeling a nurse is being overly obstructive. Role ambiguity about who is "in charge" in the patient's room can also create friction.

2.11 Communication Failures and Hierarchical Structures

The fast-paced environment and lack of standardized communication tools (like checklists for bedside imaging) can lead to assumptions and errors. Hierarchical structures, where either profession feels subordinate to the other or to physicians, can inhibit the open dialogue necessary for safety [27]. A nurse may hesitate to question an RT's positioning plan, and an RT may not feel empowered to suggest a delay if they feel the patient is unstable.

2.12 Operational and Time Pressures

Both professions operate under significant time constraints. Nurses are managing multiple patients, and RTs often have a long queue of portable exams across a large hospital. This pressure can shortcut the essential pre-procedure briefing and foster a "just get the image" mentality, increasing risk [28].

Strategies for Enhancement: Simulation, Joint Protocols, and Interprofessional Education

To overcome these barriers, institutions must invest in deliberate strategies. High-fidelity simulation training that pits nurses and RTs together in scenarios involving unstable patients during portable imaging is highly effective for building trust and shared understanding [29]. The development of joint protocols, endorsed by both nursing and radiology leadership, that outline standardized steps for high-risk procedures (e.g., "Portable Chest X-Ray in the Mechanically Ventilated Patient") can clarify roles and expectations [30]. Furthermore, incorporating interprofessional education modules into orientation and continuing education for both groups can demystify each other's expertise and foster a culture of mutual respect.

3. Conclusion:

The deployment of mobile and bedside imaging technology is a testament to modern medicine's commitment to bringing advanced diagnostics to the most vulnerable patients. However, this technological capability does not exist in a vacuum. Its safe and effective application is entirely dependent on the human professionals who orchestrate its use at the point of care. The nurse, as

the constant guardian of the patient's holistic clinical status, and the radiologic technologist, as the expert in diagnostic acquisition and radiation safety, form the two essential pillars supporting this process. Their roles, while distinct in primary focus, are inextricably linked by the common goal of achieving a diagnostic outcome without compromising patient safety or dignity.

This essay has delineated the multifaceted responsibilities of each profession, from the nurse's continuous physiological surveillance and advocacy to the technologist's technical mastery and safety enforcement. More importantly, it has argued that the intersection of these roles—the collaborative space of shared mental models, synchronized execution, and dynamic communication—is where true safety and quality reside. The challenges of educational silos, communication gaps, and operational pressure are real, but they can be overcome through intentional institutional support for interprofessional training, standardized protocols, and a culture that values speaking up. Ultimately, monitoring a patient during mobile imaging is not a task divided between two professions, but a unified, patient-centric practice. It is a practice where clinical wisdom and technical expertise fuse, ensuring that the journey of the machine to the bedside culminates not just in a clear image on a screen, but in the continued well-being of the person at the center of it all. The future of point-of-care imaging depends on strengthening this collaborative model, ensuring that every technological advancement is matched by an equally advanced human system of care.

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- **Ethical approval:** The conducted research is not related to either human or animal use.
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References

[1] Inacio MC, Jorissen RN, Gaget V, Tivey DR, Visvanathan R, Maddern GJ. The utilization and National Variation of Plain X-Ray Services by australian residents of Long-Term Care Facilities. J Am Med Dir Assoc. 2022.

[2] Kjelle E, Lysdahl KB. Mobile radiography services in nursing homes: a systematic review of residents' and societal outcomes. BMC Health Serv Res. 2017;17(1):231. doi: 10.1186/s12913-017-2173-8.

[3] Montalto M, Shay S, Le A. Evaluation of a mobile X-ray service for elderly residents of residential aged care facilities. Aust Health Rev. 2015;39(5):517–21. doi: 10.1071/AH15059.

[4] Hullick C, Conway J, Higgins I, Hewitt J, Dilworth S, Holliday E, et al. Emergency department transfers and hospital admissions from residential aged care facilities: a controlled pre-post design study. BMC Geriatr. 2016;16:102. doi: 10.1186/s12877-016-0279-1.

[5] Carter HE, Lee XJ, Farrington A, Shield C, Graves N, Cyarto EV, et al. A stepped-wedge randomised controlled trial assessing the implementation, effectiveness and cost-consequences of the EDDIE + hospital avoidance program in 12 residential aged care homes: study protocol. BMC Geriatr. 2021;21(1):347. doi: 10.1186/s12877-021-02294-8.

[6] Inacio MC, Jorissen RN, Gaget V, Tivey DR, Visvanathan R, Karnon J, et al. National spending and uptake of mobile radiology services in aged care facilities: an opportunity to improve access remains. Intern Med J. 2021;51(12):2157–9. doi: 10.1111/imj.15611.

[7] Pulst A, Fassmer AM, Schmiemann G. Experiences and involvement of family members in transfer decisions from nursing home to hospital: a systematic review of qualitative research. BMC Geriatr. 2019;19(1):155. doi: 10.1186/s12877-019-1170-7.

[8] Dollard J, Edwards J, Yadav L, Gaget V, Tivey D, Inacio M, et al. Stakeholders' perspectives of mobile x-ray services in support of healthcare-in-place in residential aged care facilities: a qualitative study. BMC Geriatr. 2022;22(1):700. doi: 10.1186/s12877-022-03162-9.

[9] Department of Health. New MBS Item for mobile provision of skeletal X-ray to patients within residential aged care facilities factsheet. 2019.

[10] Dollard J, Edwards J, Yadav L, Gaget V, Tivey D, Inacio M, et al. Residents' perspectives of mobile X-ray services in support of healthcare-in-place in residential aged care facilities: a qualitative study. BMC Geriatr. 2022;22(1):525. doi: 10.1186/s12877-022-03212-2.

[11] Gaget V, Inacio MC, Tivey DR, Jorissen RN, Babidge W, Visvanathan R, et al. Trends in utilisation of plain X-rays by older Australians (2010–2019) BMC Geriatr. 2022;22(1):100. doi: 10.1186/s12877-022-02786-1.

[12] Arendts G, Reibel T, Codde J, Frankel J. Can transfers from residential aged care facilities to the emergency department be avoided through improved primary care services? Data from qualitative interviews. Australas J Ageing. 2010;29(2):61–5. doi: 10.1111/j.1741-6612.2009.00415.x.

[13] Office of the Royal Commission into Aged Care Quality and Safety. Background Paper 6 - Carers of Older Australians. Canberra; 2021.

[14] Australian Government Aged Care Quality and Safety Commission. Charter of Aged Care Rights.

[15] Australian Institute of Health and Welfare . Australia's Welfare 2021. Canberra: Australian Government; 2021.

[16] Powell C, Blighe A, Froggatt K, McCormack B, Woodward-Carlton B, Young J, et al. Family involvement in timely detection of changes in health of nursing homes residents: a qualitative exploratory study. J Clin Nurs. 2018;27(1–2):317–27. doi: 10.1111/jocn.13906.

[17] Morphet J, Innes K, Griffiths DL, Crawford K, Williams A. Resident transfers from aged care facilities to emergency departments: can they be avoided? Emerg Med Australas. 2015;27(5):412–8. doi: 10.1111/1742-6723.12433.

[18] Royal Commission into Aged Care Quality and Safety. Royal Commission into Aged Care Quality and Safety Final Report: Care, Dignity and Respect Volume 1 Summary and Recommendations. Canberra; 2021.

[19] Kjelle E, Kleven L, Olerud HM, Melberg HO. Cost analysis of mobile radiography services for nursing home residents in Southeast Norway. J Eval Clin Pract. 2019;25(2):275–81. doi: 10.1111/jep.13058.

[20] Arendts G, Popescu A, Howting D, Quine S, Howard K. They never talked to me about… perspectives on aged care resident transfer to emergency departments. Australas J Ageing. 2015;34(2):95–102. doi: 10.1111/ajag.12125.

[21] Braun V, Clarke V. Using thematic analysis in psychology. Qualitative Res Psychol. 2006;3(2):77–101. doi: 10.1191/1478088706qp063oa.

[22] Hill T, Broady T. Understanding the social and emotional needs of carers: final report (SPRC Report 2/19) Sydney: Social Policy Research Centre, UNSW Sydney; 2019.

[23] Deloitte Access Economics. The value of informal care in 2020. Canberra; 2020.

[24] Bisgaard M, Andersen PAB, Jensen AT, Sørensen CB, Larsen TS, Jensen JM et al. Exploring radiographers' experience with mobile X-ray of patients in their homes. Radiography (London, England: 1995). 2022;28(1):102-6.

[25] Coe NB, Werner RM. Informal Caregivers provide considerable front-line support in residential care Facilities and nursing Homes. Health Aff (Millwood) 2022;41(1):105–11. doi: 10.1377/hlthaff.2021.01239.

[26] Lilleheie I, Debesay J, Bye A, Bergland A. The tension between carrying a burden and feeling like a burden: a qualitative study of informal caregivers' and care recipients' experiences after patient discharge from hospital. Int J Qual Stud Health Well-being. 2021;16(1):1855751. doi: 10.1080/17482631.2020.1855751.

[27] Morphet J, Decker K, Crawford K, Innes K, Williams AF, Griffiths D. Aged care residents in the emergency department: the experiences of relatives. J Clin Nurs. 2015;24(23–24):3647–53. doi: 10.1111/jocn.12954.

[28] Ricauda NA, Tibaldi V, Bertone P, Quagliotti E, Tizzani A, Zanocchi M, et al. The RAD-HOME Project: a pilot study of Home Delivery of Radiology Services. Arch Intern Med. 2011;171(18):1678–80. doi: 10.1001/archinternmed.2011.336.

[29] Jensen JM, Andersen PAB, Kirkegaard L, Larsen N, Most W, Nielsen D et al. Exploring the patient perspectives of mobile X-ray in nursing homes - A qualitative explorative pilot study. Radiography (London, England: 1995). 2021;27(2):279 – 83.

[30] Boyle LM, Mackay M, Stockman K. Ambulance ramping, system pressure, and hospitals in crisis: what do the data tell us? Med J Aust. 2021;215(11):526–7. doi: 10.5694/mja2.51335.