

Intrafacility Transport of Critically Ill Patients (Respiratory Therapy)

ALERT

Communicate specific isolation or precaution needs before transport and adhere to them during transport.

If the patient's current mode of ventilation cannot be reproduced for transport, then an alternate mode of ventilation should be evaluated before transport.

Don appropriate personal protective equipment (PPE) based on the patient's signs and symptoms and indications for isolation precautions.

OVERVIEW

Intrafacility transport of patients is a necessary part of critical care. Intrafacility transport may be required for diagnostic or therapeutic purposes for patients with high acuity and complex diagnoses. The use of guidelines and checklists for organization, equipment, personnel, handoff communication, and patient assessment promotes safe, consistent, and comprehensive management of the patient throughout the transport process. Lack of communication, human error, and equipment failure are common reasons for complications related to transport. Careful preparation can reduce the risk of adverse events.

The standard for intrafacility transport is to provide the same level of care, monitoring, and interventions that are available in the intensive care unit. Because intrafacility transport is associated with adverse physiologic changes and adverse events, transport of the patient must be considered carefully, and the benefits must outweigh the risks. Positive intrafacility transport outcomes are highly dependent on the availability of staff with expert knowledge and properly functioning monitoring technology, supplies, and equipment. The preferred multidisciplinary transport team includes a respiratory therapist (RT), registered nurse, and physician, depending on the patient's acuity level. They should possess the skills, equipment, and supplies needed to provide emergency care. The RT's primary responsibility is to maintain airway patency, oxygenation, and ventilatory support throughout transport.¹

Standard precautions and special precautions needed for communicable diseases throughout transport should be strictly maintained. These precautions reduce the transmission of microorganisms and protect other patients and personnel. Specific isolation or precaution needs must be communicated to all team members, including those at the receiving unit, before transport begins.

To perform intrafacility transport, team members must have an understanding of:

- Cardiopulmonary resuscitation (CPR)
- Communication systems available to contact additional health care providers as needed to manage physiologic changes or adverse events
- Organization-specific protocols or procedures for intrafacility transport
- Safety considerations during intrafacility transport

Additionally, transport team members must be able to perform these tasks:

- Identify and troubleshoot malfunctioning monitoring devices and equipment
- Monitor the patient and recognize changes in his or her status

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- Provide a comfortable and secure environment during transport
- Use monitoring devices and equipment

EDUCATION

- Provide developmentally and culturally appropriate education based on the desire for knowledge, readiness to learn, and overall neurologic and psychosocial state.
- Provide the patient and family information that explains the need for and the mode of intrafacility transport.
- Explain to the patient and family how the transport will occur, who will accompany the patient, the anticipated duration of the transport, and how the level of care will be maintained.
- Encourage questions and answer them as they arise.

ASSESSMENT AND PREPARATION

Assessment

1. Perform hand hygiene and don PPE as indicated for needed isolation precautions.
2. Introduce yourself to the patient.
3. Verify the correct patient using two identifiers.
4. Assess the patient's hemodynamic parameters, level of consciousness, and respiratory status.¹
5. Determine the anticipated duration of the transport.
6. Determine the personnel needed for the transport and the need for medical interventions that necessitate a practitioner to accompany the transport. Critical patients should be accompanied by at least two escorts during transportation.¹
7. Assess the endotracheal (ET) tube, if present, for patency, security, proper cuff pressure, and position.
8. Assess the need for suctioning of the artificial airway, if present.
9. Assess the security of lines and tubes and secure as needed.
10. Determine the necessity of equipment that increases the difficulty of transport (e.g., ventilator, traction device, or other equipment).
11. Identify required equipment or patient-specific devices that cannot function in a specific procedure area (e.g., metal in a magnetic resonance imaging [MRI] area).
12. Assess the route for challenges to moving the transport vehicle and equipment (e.g., elevators that are too small or not operational).

Preparation

1. Assemble equipment, ventilator, oxygen source, and other supplies.
2. Suction the artificial airway before departure, if needed.
3. Prepare MRI-compatible and conditional equipment, if necessary.
4. Ensure that equipment is functioning correctly. Keep equipment plugged in until actual departure.

Rationale: Keeping equipment plugged in ensures that the battery is charged before transport.

5. If transport staff has responsibilities for other patients, ensure that responsibility for care has been transferred to another staff member and that a complete report has been given.

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6. Contact the receiving location to identify the anticipated time of arrival and the patient's special needs (e.g., artificial airway, ventilator) and special precautions, such as communicable disease isolation.
7. Determine adequate supplies, medications, and oxygen required based on estimated length of transport, patient's condition, and possible delays.
8. If the patient's current mode of ventilation cannot be reproduced, then ensure that an alternate mode of ventilation is evaluated before transport.

PROCEDURE

1. Perform hand hygiene and don gloves and appropriate PPE based on the patient's signs and symptoms and indications for isolation precautions.
2. Introduce yourself to the patient.
3. Verify the correct patient using two identifiers.
4. Explain the procedure to the patient and ensure that he or she agrees to treatment.
5. Secure the transport equipment so it is not on top of the patient and is visible to the transport team during transport.
 - a. Place oxygen tanks in a tank carrier attached to the transport bed.
 - b. Secure ventilators either on a platform designed for transport or with straps to ensure that it will not fall during transport.

Be aware that equipment that falls or is dropped may result in equipment failure, inability to monitor the patient, or dislodgment of lines or tubes.

6. Ensure that the patient is in a comfortable and safe position for transport.
7. Immediately before transport, assess the patient's physiologic status.

Rationale: Assessment of the patient's physiologic status establishes baselines and ensures that he or she can be safely transported.

8. Immediately before transport, ensure that all monitors, equipment, and alarms are functioning properly, and that adequate supplies of medications and oxygen are available.
9. Transfer respiratory support to transport mode.
 - a. Turn on the oxygen tank(s).
 - b. Attach tubing or hose, as needed.
 - c. Set the oxygen flow rate to the appropriate level, if necessary.
 - d. Connect the transport oxygen source to the oxygen delivery device (e.g., nasal cannula, nasal mask), if applicable.
 - e. If the patient is on mechanical ventilation, turn on the ventilator and set the appropriate settings, then connect the patient to the transport ventilator.
 - f. If the intrafacility transport will be done with manual ventilation, then disconnect the ventilator and use a bag-mask device to ventilate the patient with the same level of assistance.

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10. Ensure that ventilator parameters (e.g., tidal volume, positive end-expiratory pressure, peak inspiratory pressure) are maintained during the transport.¹

Rationale: Ensuring that ventilator parameters are maintained prevents destabilization from inadequate or inappropriate ventilation.

11. Monitor the patient's ET tube for patency and security throughout the transport.

Rationale: The risk of obstruction and dislodgment of lines or devices increases when transporting and moving patients.

12. Monitor the ventilator's settings and measurements continuously for unexpected differences that may indicate an adverse reaction.
13. Upon arrival at the receiving unit and after the patient is transferred to the receiving unit's monitors and equipment, reassess his or her physiologic status and the intactness of all lines and tubes. Ensure that all alarms are activated.

Rationale: Assessing the patient's physiologic status ensures that equipment and monitors are functioning correctly and that his or her condition remains stable on the new equipment. Activation of alarms promotes the patient's safety.

14. Discard supplies, remove PPE, and perform hand hygiene.
15. Document the procedure in the patient's record.
16. Ensure that the transport equipment is cleaned, restocked, checked, and returned to the storage location per unit-specific protocols or the organization's practice.

MONITORING AND CARE

1. Monitor the patient's tolerance of intrafacility transport.

Rationale: Changes in the patient's condition may indicate complications arising during intrafacility transport. Agitation may increase the likelihood of loss of invasive lines or tubes.

2. Observe the patient for signs and symptoms of pain. If pain is suspected, report it to the authorized practitioner.

EXPECTED OUTCOMES

- Hemodynamic stability throughout intrafacility transport
- Invasive lines and tubes intact and functioning throughout intrafacility transport
- Equipment functioning correctly throughout intrafacility transport
- No adverse events
- Complete and timely diagnostic test or therapy

UNEXPECTED OUTCOMES

- Hemodynamic instability
- Inadvertent removal of ET tube or other invasive lines or tubes (e.g., indwelling urinary catheter, chest tube)²

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- Equipment malfunction or failure
- Injury to patient or staff
- Cardiopulmonary arrest
- Death
- Deterioration in physiologic and cardiopulmonary status
- Disruption in ventilation or hyperventilation during manual ventilation¹
- Dislodgment of artificial airway
- Loss of oxygen supply
- Lack of necessary equipment
- Omission or delayed administration of required medication dose
- Ventilator-associated pneumonia

DOCUMENTATION

- Education
- Patient's physiologic status before, during, and after intrafacility transport
- Patient's response to and tolerance of intrafacility transport
- Mode of transport
- Equipment and monitoring used during intrafacility transport
- If appropriate, ET tube position before and after intrafacility transport
- Accompanying personnel
- Interventions used during intrafacility transport
- Indications for intrafacility transport
- Unexpected outcomes and related interventions
- Respiratory support provided and changes made during intrafacility transport

REFERENCES

1. Brunsveld-Reinders, A.H. and others. (2015). A comprehensive method to develop a checklist to increase safety of intra-hospital transport of critically ill patients. *Critical Care*, 19(6), 214. doi:10.1186/s13054-015-0938-1
2. Comeau, O.Y., Armendariz-Batiste, J., Woodby, S.A. (2015). Safety first! Using a checklist for intrafacility transport of adult intensive care patients. *Critical Care Nurse*, 35(5), 16-25. doi:10.4037/ccn2015991

ADDITIONAL READINGS

- Chang, D.W., American Association for Respiratory Care. (2002). AARC clinical practice guideline: In-hospital transport of the mechanically ventilated patient—2002 revision & update. *Respiratory Care*, 47(6), 721-723. (classic reference)*
- Jia, L. and others. (2015). High incidence of adverse events during intra-hospital transport of critically ill patients and new related risk factors: A prospective, multicenter study in China. *Critical Care*, 20(1), 12. doi:10.1186/s13054-016-1183-y

*In these skills, a "classic" reference is a widely cited, standard work of established excellence that significantly affects practice and may also represent the foundational research for practice.

Elsevier Skills Levels of Evidence

- Level I - Systematic review of all relevant randomized controlled trials
- Level II - At least one well-designed randomized controlled trial

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- Level III - Well-designed controlled trials without randomization
- Level IV - Well-designed case-controlled or cohort studies
- Level V - Descriptive or qualitative studies
- Level VI - Single descriptive or qualitative study
- Level VII - Authority opinion or expert committee reports

Supplies

- Appropriate-size face mask or oxygen delivery device
- Appropriate-size suction catheters
- Backup battery supply for equipment, as indicated
- Capnography device, if available and necessary
- Cardiopulmonary monitor with visual and audible alarms
- Emergency airway supplies, checked for operation before transport
- Gloves and PPE, as indicated
- Hygroscopic condenser humidifier or other humidification source for ventilator
- Medications that are scheduled for administration during transport and appropriate delivery device (e.g., nebulizer)
- Portable oxygen source with adequate supply
- Portable suction
- Portable ventilator and associated supplies with sufficient power and capability to provide patient's ventilator requirements
- Pulse oximeter
- Manual resuscitation bag
- Stethoscope
- Syringe for cuff pressure adjustment, if necessary
- Tape to secure lines and tubes

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