



## Complete Summary

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### GUIDELINE TITLE

Guidelines for the inter- and intrahospital transport of critically ill patients.

### BIBLIOGRAPHIC SOURCE(S)

Warren J, Fromm RE Jr, Orr RA, Rotello LC, Horst HM. Guidelines for the inter- and intrahospital transport of critically ill patients. Crit Care Med 2004 Jan;32(1):256-62. [60 references] [PubMed](#)

### GUIDELINE STATUS

This is the current release of the guideline.

## COMPLETE SUMMARY CONTENT

SCOPE  
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IDENTIFYING INFORMATION AND AVAILABILITY  
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## SCOPE

### DISEASE/CONDITION(S)

Any critical illness or condition

### GUIDELINE CATEGORY

Management

### CLINICAL SPECIALTY

Critical Care  
Emergency Medicine  
Family Practice  
Pediatrics

## **INTENDED USERS**

Advanced Practice Nurses  
Allied Health Personnel  
Emergency Medical Technicians/Paramedics  
Hospitals  
Nurses  
Physician Assistants  
Physicians  
Respiratory Care Practitioners

## **GUIDELINE OBJECTIVE(S)**

To outline the minimum recommendations to promote measures to ensure safe intra- and interhospital transport of critically ill patients

## **TARGET POPULATION**

Critically ill adult and pediatric patients requiring intra- or interhospital transport

## **INTERVENTIONS AND PRACTICES CONSIDERED**

Formalized hospital plan for intrahospital and interhospital transfer of patients, addressing:

1. Pretransport coordination and communication among multi-disciplinary team
2. Transport personnel
3. Transport equipment
4. Monitoring during transport
5. Documentation

## **MAJOR OUTCOMES CONSIDERED**

- Safety of patient during transfer
- Morbidity and mortality during transport

## **METHODOLOGY**

### **METHODS USED TO COLLECT/SELECT EVIDENCE**

Searches of Electronic Databases

### **DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE**

Guideline developers reviewed Index Medicus from January 1986 through October 2001 using the following key words: intrahospital transport; interhospital transport; critical care; health planning; policy making; monitoring; standards.

Several prospective and clinical outcome studies were found. However, much of the published data comes from retrospective reviews and anecdotal reports.

## **NUMBER OF SOURCE DOCUMENTS**

Not stated

## **METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE**

Weighting According to a Rating Scheme (Scheme Given)

## **RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE**

### **Grades of Evidence**

**a** denotes a randomized, prospective controlled investigation

**b** denotes a nonrandomized, concurrent, or historical cohort investigation

**c** denotes a peer-reviewed "state-of-the-art" article, review article, editorial, or substantial case series

**d** denotes a non-peer-reviewed opinion such as a textbook statement or official organizational publication

\*The asterisk symbol will follow a statement of practice standards and indicates a recommendation by the American College of Critical Care Medicine that is based on expert opinion and is used in circumstances where published supporting data are unavailable.

## **METHODS USED TO ANALYZE THE EVIDENCE**

Systematic Review

## **DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE**

Not stated

## **METHODS USED TO FORMULATE THE RECOMMENDATIONS**

Expert Consensus

## **DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS**

Not stated

## **RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS**

Not applicable

## **COST ANALYSIS**

A formal cost analysis was not performed and published cost analyses were not reviewed.

## **METHOD OF GUIDELINE VALIDATION**

Not stated

## **DESCRIPTION OF METHOD OF GUIDELINE VALIDATION**

Not applicable

# **RECOMMENDATIONS**

## **MAJOR RECOMMENDATIONS**

The grades of evidence (a, b, c, d, \*) are defined at the end of the "Major Recommendations" field.

### **Intrahospital Transport**

Because the transport of critically ill patients to procedures or tests outside the intensive care unit is potentially hazardous, the transport process must be organized and efficient. To provide for this, at least four concerns need to be addressed through written intensive care unit policies and procedures: communication, personnel, equipment, and monitoring.

### **Pretransport Coordination and Communication**

When an alternate team at a receiving location will assume management responsibility for the patient after arrival, continuity of patient care will be ensured by physician-to-physician and/or nurse-to-nurse communication to review patient condition and the treatment plan in operation. This communication occurs each time patient care responsibility is transferred. Before transport, the receiving location confirms that it is ready to receive the patient for immediate procedure or testing. Other members of the healthcare team (e.g., respiratory therapy, hospital security) then are notified as to the timing of the transport and the equipment support that will be needed. The responsible physician is made aware of the transport. Documentation in the medical record includes the indications for transport and patient status throughout the time away from the unit of origin.

### **Accompanying Personnel**

It is strongly recommended that a minimum of two people accompany a critically ill patient. (**Grade of Evidence: \***) One of the accompanying personnel is usually a nurse who has completed a competency-based orientation and has met previously described standards for critical care nurses (**Grades of Evidence: c & d**). Additional personnel may include a respiratory therapist, registered nurse, or critical care technician as needed. It is strongly recommended that a physician with training in airway management and advanced cardiac life support, and critical

care training or equivalent, accompany unstable patients. (**Grade of Evidence: \***) When the procedure is anticipated to be lengthy and the receiving location is staffed by appropriately trained personnel, patient care may be transferred to those individuals if acceptable to both parties. This allows for maximum utilization of staff and resources. If care is not transferred, the transport personnel will remain with the patient until returned to the intensive care unit.

### **Accompanying Equipment**

A blood pressure monitor (or standard blood pressure cuff), pulse oximeter, and cardiac monitor/defibrillator accompany every patient without exception. (**Grade of Evidence: \***) When available, a memory-capable monitor with the capacity for storing and reproducing patient bedside data will allow review of data collected during the procedure and transport. Equipment for airway management, sized appropriately for each patient, is also transported with each patient, as is an oxygen source of ample supply to provide for projected needs plus a 30-min reserve.

Basic resuscitation drugs, including epinephrine and antiarrhythmic agents, are transported with each patient in the event of sudden cardiac arrest or arrhythmia. A more complete array of pharmacologic agents either accompanies the basic agents or is available from supplies ("crash carts") located along the transport route and at the receiving location. Supplemental medications, such as sedatives and narcotic analgesics, are considered in each specific case. An ample supply of appropriate intravenous fluids and continuous drip medications (regulated by battery-operated infusion pumps) is ensured. All battery-operated equipment is fully charged and capable of functioning for the duration of the transport. If a physician will not be accompanying the patient during transport, protocols must be in place to permit the administration of these medications and fluids by appropriately trained personnel under emergency circumstances.

In many hospitals, pediatric patients share diagnostic and procedural facilities with adult patients. Under these circumstances, a complete set of pediatric resuscitation equipment and medications will accompany infants and children during transport and also will be available in the diagnostic or procedure area.

For practical reasons, bag-valve ventilation is most commonly employed during intrahospital transports. Portable mechanical ventilators are gaining increasing popularity in this arena, as they more reliably administer prescribed minute ventilation and desired oxygen concentrations. In adults and children, a default oxygen concentration of 100% generally is used. However, oxygen concentration must be precisely regulated for neonates and for those patients with congenital heart disease who have single ventricle physiology or are dependent on a right-to-left shunt to maintain systemic blood flow. For patients requiring mechanical ventilation, equipment is optimally available at the receiving location capable of delivering ventilatory support equivalent to that being delivered at the patient's origin. In mechanically ventilated patients, endotracheal tube position is noted and secured before transport, and the adequacy of oxygenation and ventilation is reconfirmed. Occasionally patients may require modes of ventilation or ventilator settings not reproducible at the receiving location or during transportation. Under these circumstances, the origin location must trial alternate modes of mechanical ventilation before transport to ensure acceptability and patient stability with this

therapy. If the patient is incapable of being maintained safely with alternate therapy, the risks and benefits of transport are cautiously reexamined. If a transport ventilator is to be employed, it must have alarms to indicate disconnection and excessively high airway pressures and must have a backup battery power supply. (**Grade of Evidence: \***)

### **Monitoring During Transport**

All critically ill patients undergoing transport receive the same level of basic physiologic monitoring during transport as they had in the intensive care unit. This includes, at a minimum, continuous electrocardiographic monitoring, continuous pulse oximetry (**Grade of Evidence: c**), and periodic measurement of blood pressure, pulse rate, and respiratory rate. In addition, selected patients may benefit from capnography, continuous intra-arterial blood pressure, pulmonary artery pressure, or intracranial pressure monitoring. There may be special circumstances that warrant intermittent cardiac output or pulmonary artery occlusion pressure measurements.

### **Interhospital Transport**

Patient outcomes depend to a large degree on the technology and expertise of personnel available within each health-care facility. When services are needed that exceed available resources, a patient ideally will be transferred to a facility that has the required resources (**Grade of Evidence: d**). Interhospital patient transfers occur when the benefits to the patient exceed the risks of the transfer. A decision to transfer a patient is the responsibility of the attending physician at the referring institution. Once this decision has been made, the transfer is effected as soon as possible. When needed, resuscitation and stabilization will begin before the transfer (**Grades of Evidence: b & c**), realizing that complete stabilization may be possible only at the receiving facility.

In the United States, it is essential for practitioners to be aware of federal and state laws regarding interhospital patient transfers. The Emergency Medical Treatment and Active Labor Act (EMTALA) laws and regulations (updated at intervals from the 1986 Consolidated Omnibus Budget Reconciliation Act (COBRA) laws and the 1990 OBRA amendment) define in detail the legal responsibilities of the transferring and receiving facilities and practitioners. The American College of Emergency Physicians has published a book (Frew, SA: Patient Transfers. How to Comply with the Law. Dallas, TX, American College of Emergency Physicians, 1990)(**Grade of Evidence: d**) that reviews the legal responsibilities of referring institutions as well as the ramifications of noncompliance with the COBRA/EMTALA regulations, and it is an excellent resource for any facility involved in patient transfers. In general, under COBRA/EMTALA, financially motivated transfers are illegal and put both the referring institution and the individual practitioner at risk for serious penalty (**Grade of Evidence: d**).

Current regulations and good medical practice require that a competent patient, guardian, or the legally authorized representative of an incompetent patient give informed consent before interhospital transfer. The informed consent process includes a discussion of the risks and benefits of transfer. These discussions are documented in the medical record before transfer. A signed consent should be obtained, if possible. If circumstances do not allow for the informed consent

process (e.g., life-threatening emergency), then both the indications for transfer and the reason for not obtaining consent are documented in the medical record. The referring physician always writes an order for transfer in the medical record.

Several elements are included in the process of interhospital transfer, and all fall within minimum guidelines, as described subsequently. It is important to recognize that these process elements may frequently, and out of necessity, be implemented simultaneously, especially when stabilization and treatment are needed before transfer. An algorithm has been developed to guide practitioners through the transfer process (Refer to Fig. 1 in the original guideline document).

### **Pretransport Coordination and Communication**

The referring physician will identify and contact an admitting physician at the receiving hospital to accept the patient in transfer and confirm before the transfer occurs that appropriate higher level resources are available. The receiving physician is given a full description of the patient's condition. At that time, advice can be requested concerning treatment and stabilization before transport. The appropriateness of transferring a patient from an inpatient setting (critical care unit) to an outpatient setting (e.g., emergency department) at a receiving institution must be cautiously examined. If a physician will not be accompanying the patient during transport (**Grade of Evidence: b**), the referring and accepting physicians will ensure there is a command physician for the transport team who will assume responsibility for medical treatment during the transport. It may be appropriate for this individual to receive a medical report before the team departs.

In some instances (e.g., when a receiving institution provides the transport team), the receiving physician may determine the mode of transport. However, the mode of transportation (ground or air) usually is determined by the transferring physician, in consultation with the receiving physician, based on the urgency of the medical condition (stability of the patient), time savings anticipated with air transport, weather conditions, medical interventions necessary for ongoing life support during transfer, and the availability of personnel and resources (**Grades of Evidence: b & c**). The transport service then will be contacted to confirm its availability, to prepare for anticipated patient needs during transport, and to coordinate the timing of the transport.

A nurse-to-nurse report is given by the referring facility to the appropriate nursing unit at the receiving hospital. Alternatively, the report can be given by a transport team member at the time of arrival. A copy of the medical record, including a patient care summary and all relevant laboratory and radiographic studies, will accompany the patient. The preparation of records should not delay patient transport, however, as these records can be forwarded separately (by facsimile or courier) if and when the urgency of transfer precludes their assemblage beforehand. Under these circumstances, the most critical information is communicated verbally. It is strongly suggested that policies be established within each institution regarding the content of documentation and communication between personnel involved in the transfer.

### **Accompanying Personnel**

It is recommended that a minimum of two people, in addition to the vehicle operators, accompany a critically ill patient during interhospital transport. (**Grade of Evidence: \***) When transporting unstable patients, the transport team leader should be a physician or nurse (**Grades of Evidence: c & d**), preferably with additional training in transport medicine. For critical but stable patients, the team leader may be a paramedic (**Grade of Evidence: d**). These individuals provide the essential capabilities of advanced airway management, intravenous therapy, dysrhythmia interpretation and treatment, and basic and advanced cardiac life support. In the absence of a physician team member, there will be a mechanism by which the transport team can communicate with a command physician. If communication of this type becomes impossible, the team will have preauthorization by standing orders to perform acute lifesaving interventions. In the absence of a readily available external transport team, a transport team and vehicle may need to be assembled locally. The development of policies and procedures for such emergencies is strongly recommended.

### **Minimum Equipment Required**

Refer to Tables 1 and 2 in the original guideline document for a detailed list of the minimum recommended equipment and pharmaceuticals needed for safe interhospital transport. Emphasis is placed on airway and oxygenation, vital signs monitoring, and the pharmaceutical agents necessary for emergency resuscitation and stabilization as well as maintenance of vital functions. Very short or very long transports may necessitate deviations from the listed items, depending on the severity and nature of illness or injury. Furthermore, advances in knowledge over time will result in periodic review and modification of these lists. All items are checked regularly for expiration of sterility and/or potency, especially when transports are infrequent. Equipment function is verified on a scheduled basis, not at the time of transport when there may be insufficient time to find replacements.

### **Monitoring During Transport**

All critically ill patients undergoing interhospital transport must have, at a minimum, continuous pulse oximetry, electrocardiographic monitoring, and regular measurement of blood pressure and respiratory rate. (**Grade of Evidence: \***) Selected patients, based on clinical status, may benefit from the monitoring of intra-arterial blood pressure (**Grade of Evidence: b**), central venous pressure, pulmonary artery pressure, intracranial pressure, and/or capnography (**Grade of Evidence: b**). With mechanically ventilated patients, endotracheal tube position is noted and secured before transport, and the adequacy of oxygenation and ventilation is reconfirmed.

Occasionally, patients may require specialized modes of ventilation not reproducible in the transport setting. Under these circumstances, alternate modes of mechanical ventilation are evaluated before transport to ensure acceptability and patient stability with this therapy. If the patient is incapable of being maintained safely with alternate ventilator therapy, the risks and benefits of transport are cautiously reexamined.

Patient status and management during transport are recorded and filed in the patient medical record at the referring facility. Copies are provided to the receiving institution.

## **Preparing a Patient for Interhospital Transport**

There is no evidence to support a "scoop and run" approach to the interhospital transport of critically ill patients. Therefore, referring facilities will, before transport, begin appropriate evaluation and stabilization to the degree possible to ensure patient safety during transport. Unnecessary delays may be experienced if the transport team must perform lengthy or complex procedures to stabilize the patient before the transfer (**Grade of Evidence: c**). Nonessential testing and procedures will delay transfer and should be avoided. Information and recommendations about this aspect of patient care generally can be requested from the accepting physician at the time of initial contact with the receiving facility.

All critically ill patients need secure intravenous access before transport. If peripheral venous access is unavailable, central venous access is established. If needed, fluid resuscitation and inotropic support are initiated, with all intravenous fluids and medications maintained in plastic (not glass) containers. A patient should not be transported before airway stabilization if it is judged likely that airway intervention will be needed en route (a process made more difficult in a moving vehicle). The airway must be evaluated before transport and secured as indicated by endotracheal tube (or tracheostomy). (**Grade of Evidence: \***) Laryngeal mask airways are not an acceptable method of airway management for critically ill patients undergoing transport. For trauma victims, spinal immobilization is maintained during transport unless the absence of significant spinal injury has been reliably verified. A nasogastric tube is inserted in patients with an ileus or intestinal obstruction and in those requiring mechanical ventilation. A Foley catheter is inserted in patients requiring strict fluid management, for transports of extended duration, and for patients receiving diuretics. If indicated, chest decompression with a chest tube is accomplished before transport. A Heimlich valve or vacuum chest drainage system is employed to maintain decompression. Soft wrist and/or leg restraints are applied when agitation could compromise the safety of the patient or transport crew, especially with air transport. If the patient is combative or uncooperative, the use of sedative and/or neuromuscular blocking agents may be indicated. A neuromuscular blocking agent should not be used without sedation and analgesia.

Finally, the patient medical record and relevant laboratory and radiographic studies are copied for the receiving facility. In the United States, a COBRA/EMTALA checklist is strongly suggested to ensure compliance with all federal regulations regarding interhospital patient transfers. Items on this checklist will include documentation of initial medical evaluation and stabilization (to the degree possible), informed consent disclosing benefits and risks of transfer, medical indications for the transfer, and physician-to-physician communication with the names of the accepting physician and the receiving hospital.

### **Definitions**

#### **Grades of Evidence**

**a** denotes a randomized, prospective controlled investigation

**b** denotes a nonrandomized, concurrent, or historical cohort investigation

**c** denotes a peer-reviewed "state-of-the-art" article, review article, editorial, or substantial case series

**d** denotes a non-peer-reviewed opinion such as a textbook statement or official organizational publication

\*The asterisk symbol will follow a statement of practice standards and indicates a recommendation by the American College of Critical Care Medicine that is based on expert opinion and is used in circumstances where published supporting data are unavailable.

### **CLINICAL ALGORITHM(S)**

An algorithm is provided in the original guideline document for Interfacility transfer of critically ill patients.

## **EVIDENCE SUPPORTING THE RECOMMENDATIONS**

### **TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS**

Experience and consensus opinion form the basis of much of these guidelines.

The type of supporting evidence is identified and graded for select recommendations (see the "Major Recommendations" field).

## **BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS**

### **POTENTIAL BENEFITS**

These guidelines promote measures to ensure safe inter-and intrahospital transport of critically ill patients.

### **POTENTIAL HARMS**

Not stated

## **QUALIFYING STATEMENTS**

### **QUALIFYING STATEMENTS**

These guidelines reflect the official opinion of the Society of Critical Care Medicine and do not necessarily reflect, and should not be construed to reflect, the views of certification bodies, regulatory agencies, or other medical review organizations.

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

### IMPLEMENTATION TOOLS

Clinical Algorithm

For information about [availability](#), see the "Availability of Companion Documents" and "Patient Resources" fields below.

## INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

### IOM CARE NEED

Getting Better

### IOM DOMAIN

Effectiveness  
Patient-centeredness  
Safety

## IDENTIFYING INFORMATION AND AVAILABILITY

### BIBLIOGRAPHIC SOURCE(S)

Warren J, Fromm RE Jr, Orr RA, Rotello LC, Horst HM. Guidelines for the inter- and intrahospital transport of critically ill patients. Crit Care Med 2004 Jan;32(1):256-62. [60 references] [PubMed](#)

### ADAPTATION

Not applicable: The guideline was not adapted from another source.

### DATE RELEASED

2004 Jan

### GUIDELINE DEVELOPER(S)

Society of Critical Care Medicine - Professional Association

### SOURCE(S) OF FUNDING

Society of Critical Care Medicine (SCCM)

## **GUIDELINE COMMITTEE**

Not stated

## **COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE**

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## **FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST**

Not stated

## **GUIDELINE STATUS**

This is the current release of the guideline.

## **GUIDELINE AVAILABILITY**

Electronic copies: Available in Portable Document Format (PDF) from the [Society of Critical Care Medicine \(SCCM\) Web site](#).

Print copies: Available from the Society of Critical Care Medicine, 701 Lee Street, Suite 200, Des Plaines, IL 60016; Phone: (847) 827-6869; Fax: (847) 827-6886; on-line through the [SCCM Bookstore](#).

## **AVAILABILITY OF COMPANION DOCUMENTS**

The following is available:

- Dorman T, Angood PB, Angus DC, Clemmer TP, Cohen NH, Durbin CG Jr, Falk JL, Helfaer MA, Haupt MT, Horst HM, Ivy ME, Ognibene FP, Sladen RN, Grenvik AN, Napolitano LM. Guidelines for critical care medicine training and continuing medical education. Crit Care Med 2004 Jan;32(1):263-72.

Electronic copies: Available in Portable Document Format (PDF) from the [Society of Critical Care Medicine \(SCCM\) Web site](#).

Print copies: Available from the Society of Critical Care Medicine, 701 Lee Street, Suite 200, Des Plaines, IL 60016; Phone: (847) 827-6869; Fax: (847) 827-6886; on-line through the [SCCM Bookstore](#).

## **PATIENT RESOURCES**

None available

## **NGC STATUS**

This NGC summary was completed by ECRI on June 22, 2004. The information was verified by the guideline developer on August 9, 2004.

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Date Modified: 9/22/2008

