



**BOARD OF CERTIFICATION
FOR EMERGENCY NURSING**
Excellence. Achievement. Impact.

“The ethics of excellence are grounded in action — what you actually do”
— Price Pritchett

Grounded in Excellence: The Certified Transport Registered Nurse (CTRN®)

When traveling by ground is the best or only way to get a critically ill or injured patient to the definitive care they need, having advanced caregivers on board who are well-versed in the transport environment promotes optimal outcomes. It can even mean the difference between life and death. Nurses who earn the Certified Transport Registered Nurse (CTRN) certification from the Board of Certification for Emergency Nursing (BCEN®) possess the critical care ground transport specialty knowledge, skills and experience necessary to deliver and sustain essential care—every second, and every mile, of the way.

Expert Care Starting on Scene or at the Referring Hospital

Ground transport nurses are primary members of highly trained critical care teams who offer enhanced services with a scope of practice beyond advanced life support (ALS).¹ Responding *on scene*, transport nurses rapidly assess, stabilize, and initiate life-sustaining and life-saving interventions in a wide variety of prehospital environments. Their education and skills give them the flexibility to “scoop and run” or “treat and then run.”²

Even more frequently, critical care ground transport nurses are called to take the lead during *interfacility transfers*. In these situations, they must maintain the complex treatments of patients with complex needs while moving them across the highways to a higher level or specialty care facility—ready and able at any moment to escalate the level of care.

Consider this scenario: An EMS ground ambulance crew delivers a 48-year-old male with a serious heart attack involving complete blockage of a major artery to the local community hospital where initial treatment—a cardiac catheterization with stent placement—is given. Although the blockages are opened, the heart muscle has suffered significant damage. The patient’s condition deteriorates to ventricular arrest.

He is resuscitated at the bedside and put on a special type of heart and lung bypass known as extracorporeal membrane oxygenation (ECMO). This both resumes blood and oxygen flow and stabilizes him for transfer to a facility that has the capacity to perform the open heart surgery his physicians deem necessary to save his life.

At this point, the patient is receiving blood pressure support, sedation and pain management, as well as maintenance fluids, anticoagulants, and blood products, for a total of 10 drips and 10 pumps. In addition, he is also connected to a cardiac monitor with monitoring for blood pressure, heart rate and rhythm, arterial blood pressures, and oxygen saturation, plus a carbon dioxide monitor and the ECMO ventilator device consisting of a pump and an oxygenator. Once transport gets underway, each of these therapies and pieces of equipment must be maintained, monitored and potentially rapidly adjusted.

Whether working a scene or a facility transfer, it is crucial that nurses caring for patients in out-of-hospital environments stay current on critical care clinical and technological advances *and also* possess a mastery of the real and consequential impacts and risks that moving by ground means for their patient’s condition. Transport nursing practice depends on “independent judgment, analytical thinking, decision-making and prioritization.”³ It is in this vein that BCEN offers the CTRN credential.

Nurses Preferred for Critical Transitions

In the dynamic, challenging and space-limited transport environment, ground transport team configurations must maximize scope of practice and knowledge, skills and abilities. A typical team consists of a critical care transport RN, a critical care paramedic, an emergency medical technician (EMT) driver, and quite often a perfusionist who helps the nurse and paramedic monitor and manage the patient and all the equipment.

Transport RNs combine “an educational foundation with clinical experience and the flexibility to operate at an expanded scope of practice. Relative to paramedics and respiratory therapists, nurses offer more extensive clinical assessment skills, pharmacology experiences, radiology and laboratory data interpretation ability, and critical care for complex disease processes,” plus they have (institution-specific) ability to perform advanced procedural skills.⁴ Further, “[b]ecause of this expanded skill set and clinical experience, the RN is the typical team leader for specialty care transport,” with nurses preferred as team leader even over physicians because of their “heightened familiarity of the logistics and operations of transport medicine.”⁴

More Interfacility Transfers Mean Greater Need for Ground Transport Expertise

In addition to a wide range of cardiac scenarios and ECMO scenarios, including those seen with COVID-19 patients, critical care transport scenarios also span high-risk obstetric (OB) patients, patients suffering from complex neurological conditions, and pediatric patients requiring care at specialized centers. As a result, the need for CTRN-certified nurses has never been greater.

The major factors driving the increase in interfacility transfers and the need for expert transport teams⁵ are:

- **Specialization** accelerated by medical advances
- **Closures** of OB and other specialty units, and even entire facilities, particularly in rural communities⁶
- **Regionalization** due to closures and pooling of specialty resources in select locations

Other factors include the rise of freestanding emergency departments (EDs), an aging baby boomer generation, and changes in reimbursement.⁵ During the COVID-19 pandemic, interfacility transfers have also been driven by hospitals running out of, or needing to free up, beds.

All of these factors piggyback on aspects of the landmark Emergency Medical Treatment and Active Labor Act (EMTALA), a 1986 federal law that governs the transfer of patients between hospitals. Among the requirements for transferring *unstable* patients to a higher level facility is the mandate that those type of transfers are made with *qualified personnel* and appropriate medical equipment in order to minimize risks to the patient.

When Going by Ground Makes Sense

Whether for interfacility transport or emergency scene response, going by ground may be the preferred mode for a variety of practical and medically appropriate reasons, including:

- Timeliness that rivals air travel in certain scenarios
- Ability to accommodate an extended medical team and more/larger equipment (bigger cabin space and less weight restrictions)
- Ability to accommodate a patient's family member
- Capability to travel over long distances
- Overall capacity and capabilities to support a wider range of patient needs

Ground also serves as the backup mode when weather or other conditions prohibit flying. Ground transport is also required on both ends of fixed-wing transports in order to get patients to and from the airport. In less developed countries, ground transport is very common.⁴ When compared to air transport, ground transport is typically more cost-effective, reliable and safe overall.

Why Moving a Patient Is Risky Business

While research on *interfacility* transfers (IFTs), moving between hospitals, is still limited, the risks associated with moving a patient from one location *within* a hospital to another, called *intra*hospital transfers (IHTs), are well known and well-documented.⁷⁻¹²

Inside hospitals, patients are moved for temporary reasons, such as for diagnostic imaging, and more permanently, such as from the ED to a critical care unit. Such moves—even for stable, non-serious patients—present significant risks. For critically ill patients, whose conditions are often unstable and who are typically hooked up to multiple pieces of apparatus and equipment, intrahospital transfers are “associated with increased incidence of life-threatening complications, morbidity and mortality.”¹⁰

The potential complications and adverse events that moving a patient may precipitate¹⁰⁻¹² include:

- Pulmonary and airway-related complications (especially if the patient is on a ventilator)
- Cardiovascular complications (from blood pressure and heart rhythm alterations to cardiac arrest)
- Exacerbation of existing injury (especially brain, spine and orthopedic)
- Interruption of therapies in place (such as medications and infusions)
- Nosocomial infection
- Endocrine imbalances or abnormalities
- Problems that occur due to equipment or monitoring failures (equipment dislodged, interruption of therapy/care)

Beyond patient-related factors, and separate from facility- and equipment-specific factors, there are also multiple *staff-related factors* that contribute to adverse events during transport,¹⁰⁻¹² including:

- Lack of supervision
- Insufficient preparation of patient for transport
- Inexperienced staff & insufficiently educated and trained staff
- Unfamiliarity with/failure to inspect equipment
- Interruption of therapy or equipment dislodgement
- Inadequate resuscitation

To be clear, these are the documented risks that persist for transport *inside* hospitals, despite the presence of countless resources and personnel. For *interfacility* transfers, no such safety net exists.

Specially Trained Teams Can Make a Difference

Following years of documented mishaps, accidents and worse, detailed intrahospital transport rules, protocols, checklists and documentation now exist worldwide and require *entire teams* of advanced and well-prepared personnel to accompany patients being moved within a facility. Still, risks persist. Even with guidelines in place, one prospective audit of IHTs found “[o]verall, 44% of transfers resulted in incident occurrence, many of which were preventable....”⁹

Having the right team in place can make a big difference. Stearly's intrahospital study found “patients moved by a specially trained transport team had a 15.5% overall complication rate” versus national complication rates as high as 75%.⁷ When you add the variables and vagaries of interfacility transfers, the need for experts is clear.

A Call to Action: National Certification Matters

Today's critical care ambulances are a combination of an emergency department and an ICU on wheels. When the doors of the ambulance close, ground transport nurses step into a very autonomous environment. While they operate under physician's orders, they also run off of standing protocols and their own clinical judgment when immediate action is required. Following every safety protocol¹³ and navigating the clinical impacts endemic to the ground transport environment—noise, vibration, acceleration, turns, abrupt stops, and temperature and humidity variations—are part and parcel of every trip.

Although transport medicine draws and borrows from many medical specialty areas, as a recent review article points out, "it is much more than the sum of its parts."¹⁴ As the authors explain: "[t]here are important, unique aspects of transport medicine that make it impossible to assume that someone competent in an ICU setting will be equally competent in the environment of transport..." Competencies, they add, "in the peculiarities of transport ... are critical."¹⁴

National board certification—distinct from completing technical courses—validates a nurse's mastery of the entire critical care ground transport body of knowledge. Nurses who hold the CTRN have demonstrated they have the know-how to manage the care of a critically ill adult or pediatric patient, continually assessing changes in their patient's status and appropriately intervening when necessary to maintain their patient's optimum health *while* managing and minimizing the impacts and risks of the ground transport environment.

CTRN's History: The Emergence of Ground Transport as a Distinct Nursing Specialty

Recognition of ground transport as a discrete specialty came a decade after the 1993 introduction of BCEN's flight nursing credential, the Certified Flight Registered Nurse (CFRN), as the role of RNs in critical care ground transport programs increased. BCEN joined with the Air & Surface Transport Nurses Association (ASTNA) to collaborate on the development of the CTRN. In 2004, BCEN and ASTNA jointly funded a flight and ground transport nursing role delineation study (RDS) that determined there was sufficient difference to merit a separate certification for ground transport nurses.

Then on March 31, 2006, BCEN offered the first CTRN certification exam. Several years later, in February 2009, the CTRN was deemed a Magnet®-accepted certification program—important information for hospitals to know.

Advocacy for Transport Nursing Excellence

In the still relatively young field of transport medicine, ASTNA and the Commission on Accreditation of Medical Transport Systems (CAMTS) are steadfast advocates for transport nursing and specialty certification. ASTNA's *Transport Nurse Certification* position statement encourages nurses to "demonstrate their commitment to the profession and validate their nursing expertise by becoming certified in their specialty."¹⁵ CAMTS requires accredited transport agency-employed nurses to be nationally certified in a relevant specialty.¹⁶ As CAMTS leaders explain in their "Education and Certification for Patient Transport" article: "Using standardized certifications helps ensure the health, safety and welfare of the patients we transport. These certifications are a reflection of who we are as professionals."¹⁷

Also championing for safe, effective, evidence-based ground transport care are the Association of Air Medical Services and the Association of Critical Care Transport.¹⁸ The American Academy of Pediatrics (AAP) joined with the American College of Emergency Physicians and the Emergency Nurses Association and emergency medical services organizations to elevate emergency pediatric care and transport.¹⁹⁻²¹ In fact, AAP recommends every pediatric transport team have at least two patient care providers, with at least one being an RN.⁴

Today's CTRN: Indispensable Expertise for Patients on the Move

Right now, the CTRN is BCEN's second fastest growing certification, having posted over 19%* growth in 2020. The March/April 2021 *Air Medical Journal* cover images honor critical care transport nurses and commemorate the CTRN's 15th anniversary. BCEN's newest transport nursing RDS describes the unique responsibilities of today's ground transport nurses. And starting this year, BCEN will annually recognize a Distinguished CTRN.

As the medical value of ground transport care and the patient care and safety contributions of expert ground transport nurses gain greater awareness, BCEN's proud dedication to critical care ground transport nurses and the CTRN is grounded in excellence.

Author:

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Learn more about transport nursing and specialty certification [in *Excellence in the Air: The Certified Flight Registered Nurse \(CFRN\)*](#).

References

- ¹Wilcox, S.R., Ries, M., Bouthiller, T.A., Berry, E.D., Dowdy, T.L., & DeGrace, S. (2017). The importance of ground critical care transport: A case series and literature review. *J Intensive Care Med*, 32(2), 163-169. doi.org/10.1177/0885066616668484
- ²Orr, R.A., Felmet, K.A., Han, Y., McCloskey, K.A., Dragotta, M. A., Bills, D.M., Kuch, B.A., & Watson, R. S. (2009). Pediatric specialized transport teams are associated with improved outcomes. *Pediatrics*, 124(1), 40-48. doi.org/10.1542/peds.2008-0515
- ³Air & Surface Transport Nurses Association. (2018). Position Statement: Role of the Registered Nurse in the Out-of-Hospital Environment [ASTNA Web site]. Retrieved from https://cdn.ymaws.com/astna.site-ym.com/resource/collection/4392B20B-DoDB-4E76-959C-6989214920E9/ASTNA_Position_Statement_Role_of_RN_in_Out-of.pdf
- ⁴Mathison, D.J., Berg, E., & Beaver, M. (2013). Variations in interfacility transport: Approach to call intake, team composition, and mode of transport. *Clin Pediatr Emerg Med* 14(3), 193-205. doi.org/10.1016/j.cpem.2013.08.004
- ⁵National Highway Traffic Safety Administration (NHTSA). (2006). Guide for Interfacility Patient Transfers. Washington, DC: NHTSA. Retrieved from <https://www.nhtsa.gov/people/injury/ems/interfacility/images/interfacility.pdf>
- ⁶Anderson, B., Gingery, A., McClellan, M., Rose., R., Schmitz, D., & Schou, P. (2019). National Rural Health Association (NRHA) Policy Paper: Access to Rural Maternity Care [NRHA Web site]. Overland Park, Kansas: NRHA. Retrieved from [https://www.ruralhealthweb.org/NRHA/media/Emerge_NRHA/Advocacy/Policy_documents/2019-NRHA-Policy-Documents-Access-to-Rural-Maternity-Care.pdf](https://www.ruralhealthweb.org/NRHA/media/Emerge_NRHA/Advocacy/Policy_documents/2019-NRHA-Policy-Documents/2019-NRHA-Policy-Documents-Access-to-Rural-Maternity-Care.pdf)
- ⁷Stearley, H.E. (1998). Patients' outcomes: Intrahospital transportation and monitoring of critically ill patients by a specially trained ICU nursing staff. *Am J Crit Care*, 7(4), 282-287. doi.org/10.4037/ajcc1998.7.4.282
- ⁸Warren, J., Fromm, R.E., Orr, R.A., Rotello, L.C., Horst, H. M., & American College of Critical Care Medicine. (2004). Guidelines for the inter- and intrahospital transport of critically ill patients. *Crit Care Med*, 32(1), 256-262. doi.org/10.1097/01.ccm.0000104917.39204.0a
- ⁹Winter, M.W. (2010). Intrahospital transfer of critically ill patients; A prospective audit with Flinders Medical Centre. *Anaesth Intensive Care*, 38(3), 545-549. doi.org/10.1177/0310057X1003800321
- ¹⁰Alamanou, D.G., & Brokalaki, H. (2014). Intrahospital transport policies: The contribution of the nurse. *Health Sci J*, 8(1), 166-178. <https://www.hsj.gr/medicine/intrahospital-transport-policies-the-contribution-of-the-nurse.pdf>
- ¹¹Knight, P.H., Maheshwari, N., Hussain, J., Scholl, M., Hughes, M., Papadimos, T.J., Guo, W.A., Cipolla, J., Stawicki, S.P., & Latchana, N. (2015). Complications during intrahospital transport of critically ill patients: Focus on risk identification and prevention. *Int J Crit Illn Inj Sci*, 5(4), 256-264. doi.org/10.4103/2229-5151.170840
- ¹²Kulshrestha, A., & Singh, J. (2016). Inter-hospital and intra-hospital patient transfer: Recent concepts. *Indian J Anaesth*, 60(7), 451-457. doi.org/10.4103/0019-5049.186012
- ¹³Air & Surface Transport Nurses Association. (2018). Position Statement: Critical Care Transport Nurse Safety in the Transport Environment [ASTNA Web site]. Retrieved from https://cdn.ymaws.com/www.astna.org/resource/collection/4392B20B-DoDB-4E76-959C-6989214920E9/ASTNA_Safety_Position_Paper_2018_FINAL.pdf
- ¹⁴Lee, S.H., Schwartz, H.P., & Bigham, M.T. (2018). From the street to the ICU: A review of pediatric emergency medical services and critical care transport. *Transl Pediatr*, 7(4), 284-290. doi.org/10.21037/tp.2018.09.04
- ¹⁵Air & Surface Transport Nurses Association. (2019). Position Statement: Transport Nurse Certification [ASTNA Web site]. Retrieved from https://cdn.ymaws.com/www.astna.org/resource/resmgr/astna_position_statement_tra.pdf
- ¹⁶Commission on Accreditation of Medical Transport Systems (CAMTS). (2018). Eleventh Annual Accreditation Standards of the Commission on Accreditation of Medical Transport Systems. Sandy Springs, South Carolina: CAMTS. Retrieved from <https://www.camts.org/standards/>
- ¹⁷Frazer, E., & Holleran, R.S. (2016). Education and certification for patient transport. *Air Med J*, 35(3), 101-102. doi.org/10.1016/j.amj.2016.03.001
- ¹⁸Association of Critical Care Transport (ACCT). (2019). Critical Care Transport Standards – Version 2.0 [White paper]. Platte City, Missouri: ACCT.
- ¹⁹Ritwis, C.L. (2019). Position Statement: Interfacility Transfer of Emergency Care Patients [Emergency Nurses Association Web site]. Retrieved from <https://www.ena.org/docs/default-source/resource-library/practice-resources/position-statements/facilitatingtheinterfacilitytransfer.pdf>
- ²⁰Moore, B., Shah, M.I., Owusu-Ansah, S., et al. AAP and the American Academy of Pediatrics Committee on Pediatric Emergency Medicine and Section on Emergency Medicine EMS Subcommittee, AAP American College of Emergency Physicians Emergency Medical Services Committee, AAP Emergency Nurses Association Pediatric Committee, AAP National Association of Emergency Medical Services Physicians Standards and Clinical Practice Committee, and AAP National Association of Emergency Medical Technicians Emergency Pediatric Care Committee. (2020). Pediatric readiness in emergency medical services systems [Policy statement]. *Pediatrics*, 145(1), e20193307. doi.org/10.1542/peds.2019-3307
- ²¹Owusu-Ansah, S., Moore, B., Shah, M.I., et al. AAP Committee on Pediatric Emergency Medicine, Section on Emergency Medicine, AAP EMS Subcommittee, Section on Surgery. (2020). Pediatric readiness in emergency medical services systems [Technical report]. *Pediatrics*, 145(1), e20193308. doi.org/10.1542/peds.2019-3308