

The state of pediatric interfacility transport: Consensus of the Second National Pediatric and Neonatal Interfacility Transport Medicine Leadership Conference

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Interfacility transport of pediatric and neonatal patients for advanced or specialty medical care is an integral part of our medical delivery system. Assessment of current services and planning for the future are imperative. As part of this process, the American Academy of Pediatrics and the Section on Transport Medicine held the second National Pediatric and Neonatal Transport Leadership Conference in Chicago in June 2000. Ninety-nine total participants, representing 25 states and 5 international locations, debated and discussed issues relevant to the developing specialty of pediatric transport medicine. These topics included: 1) the role of the medical director, 2) benchmarking of neonatal and pediatric transport programs, 3) clinical research, 4) accreditation, 5) team configuration, 6) economics of transport medicine in health care delivery, 7) justification of transport teams in institutions, and 8) international transport/extracurricular transport opportunities. Insights and conclusions from this meeting of transport leaders are presented in the consensus statement.

INTRODUCTION

In 1990, the 1st pediatric transport leadership conference was held in Sun Valley, Idaho. The participants in that conference included physician medical directors of pediatric transport programs,

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Key Words: Pediatric interfacility transport, neonatal interfacility transport, transport medicine

as well as representatives from the American Academy of Pediatrics (AAP) and Association of Air Medical Services. That physician leadership retreat resulted in a consensus statement regarding current practices in pediatric interfacility transport (PIT), educational experiences with PIT, consideration of the development of standards for PIT, and the promotion of high quality care during PIT (1). Multiple documents regarding pediatric transport were available at that time; however, there had not been an intellectual retreat to evaluate and discuss standards for PIT. Pediatric transport has benefited and grown from its roots in the emergency medical system (EMS) and the interfacility transport of adult patients, in both modalities and issues of patient care. Primarily, neonatal transport systems preceded dedicated pediatric and combined pediatric/neonatal programs. Pediatric transport literature in the 1970s focused on the neonatal transport patient, personnel, and system, while the literature of the 1980s and 1990s included more pediatrics, system issues, team composition, and mode of transport discussions (2–7). With the development of pediatric critical care medicine as a distinct specialty, pediatric critical care transport received greater attention in both practice and the literature (8–10). Many excellent textbooks, summary articles, research papers, and statements have been published since the Sun Valley leadership conference in 1990 (11–13).

Transport medicine received section status within the AAP in 1990. The Section on Transport Medicine (SOTM) is dedicated to those who are active or have a significant interest in pediatric and neonatal interfacility transport (hereafter referred to as "pediatric transport"). Members include AAP Fellows, physicians who are not Fellows of the AAP (international, non-pediatric), and affiliates (non-physicians). The section includes transport education in its mission, by way of didactic conferences and other venues. The SOTM, with input from other AAP sections, has published transport information and suggested standards as "Guidelines for Air and Ground Transport of Neonatal and Pediatric Patients" in 1993 and 1999. (14, 15).

In 1998, the AAP SOTM recognized the need to address and reassess issues relevant to the specialty, and initiated organization of the second National Pediatric Interfacility Transport Leadership Conference. The conference planning committee dedicated approximately 18 months to determining appropriate participants and topics for discussion, as well as the most productive format for this conference, and decided to expand the participant pool (from physician directors only) to also include non-physicians in management roles.

The conference format involved small discussion groups, entire participant review of small group conclusions, and recommendations and plenary discussions. Participants in the small groups were assigned by choice prior to the conference to allow ample time for preparation regarding the topic. Small group moderators included members of the executive committee of the SOTM, as well as other experts in transport and leadership.

This conference, held in Chicago in June 2000, included 86 participants in addition to 13 faculty members, representing at least 25 states and 5 international locations. The registrants and faculty included 58% physicians and 42% non-physicians (registered nurse/nurse practitioner, respiratory therapists, etc). Topics addressed in small group sessions included: 1) role of the medical director, 2) benchmarking of neonatal and pediatric transport programs, 3) clinical research, 4) accreditation, 5) team configuration, 6) economics of transport medicine in health care delivery, 7) justification of transport teams in institutions, and 8) international transport/extracurricular transport opportunities. Plenary sessions included a review of transport development, current issues, future challenges and opportunities, and a panel discussion entitled, "Is specialty critical care transport necessary?"

This manuscript reviews the conclusions from the conference.

ROLE OF THE MEDICAL DIRECTOR

The qualifications of a medical director should include the following: the medical director of a pediatric specialty transport system should be a physician and pediatrician with acute care expertise or subspecialty training in the types of patients being transported. If an individual with those qualifications is not available, direction and advice should be solicited from someone who meets those criteria. Transport medical directors should have a working knowledge of transport medicine. Pediatric training should be encouraged in our fellowship programs, to enable our trainees to have pediatric transport expertise as attending physicians and medical directors. The AAP transport section should take a leadership role in the development of materials (eg, didactic, taped, written) for improving transport expertise in those who become medical directors. The medical director should have an awareness of clinical transport issues via direct involvement, discussions with providers, or involvement in the quality assessment process. The medical director should be aware of opportunities to facilitate knowledge at these levels and be actively involved. The medical director should be aware of developments outside his/her local area. Involvement with established transport medicine groups should enable further awareness, development of ideas, comparisons of programs and care issues, and sharing of best practices.

A need for administrative time is recognized as a prerequisite for team development, maintenance, and evolution. The value of the medical director should be recognized and supported by the hospital and areas of the hospital that benefit from the successful transfer of infants and children. Expertise, direction, and implementation assistance from appropriate personnel should be used to augment the medical director's time and expertise. A transport team manager is essential to successful organization and operation.

The medical director should be a leader who actively participates in and provides oversight to the issues noted below. Specific administrative responsibilities should include the following: 1) mission statement production, 2) team structure and development, 3) advocacy, 4) transport agreements, 5) service as administrative staff liaison, 6) financial planning and revenue generation, 7) accreditation issues, 8) legal awareness and compliance,

9) marketing plan development/supervision, and 10) strategic plan development.

Educational issues should be a priority of the medical director. An educational program should be provided for personnel at referring and receiving institutions, as well as at those institutions involved in the transfer of critically ill infants and children. The educational involvement of the medical director may be direct or indirect (oversight). Specific educational responsibilities should include: 1) establishment of transport standards, 2) ensuring of compliance with local and national standards, 3) protocol/guideline design and review, 4) determination of education needs and requirements and, 5) development of training. Educational resources for teams, residents (during and after training), and community health care providers should include participation in or observation during transport, as well as didactic presentations. Fellows, academic liaisons, safety education staff, and Health Care Financing Administration (HCFA) compliance staff should be included in educational experiences to optimize referral relationships and promote understanding of the responsibilities of referring facilities. National education conferences and annual meetings for transport medical directors should be considered.

The medical director should be instrumental in setting standards and ensuring compliance for and integrity of operational activities. Additional personnel members such as program managers or coordinators are required to be part of a multidisciplinary management team. Cooperation between medical directors and managers of personnel should be ensured, regardless of ultimate personnel responsibilities.

Specific operational responsibilities should include: 1) personnel selection and assessment, 2) medical command development and assessment, 3) assurance of appropriate and safe use of the system, 4) centralized communications management, 5) maintaining awareness of referral patterns and the needs of the referral market, 6) integration with other services, 7) equipment and medication selection, 8) vendor contact and relationship development, 9) licensure, certification, and competency assurance, and 10) introduction of new technologies and treatments.

The medical director should be aware of the importance of outreach efforts and should participate directly or ensure adequate team representation in the community. These efforts may be for an individual team or hospital, system, consortium, or larger (state, national) organization or program. Efficient and preferred routes of access to pediatric critical care transport, as well as descriptions of team capabilities, transport options, preparation for transport, and clinical and logistic issues should be available for the referral population. The medical director should function as a liaison for and with the referral hospital and physicians. Specific outreach responsibilities should include: 1) EMS consultation, 2) educational resource development, 3) case-based review production, and 4) availability and coordination of pediatric expertise to other teams, systems, and organizations.

The medical director should ensure efficient access to sophisticated pediatric transport care. There is a need for benchmark data on quality, expectations, and standards of care. The SOTM should be instrumental in developing and distributing this type of information. Specific quality of care responsibilities should include: 1) team development and supervision, 2) on-line and off-line medical command, 3) service as liaison with on-line staff, 4) patient review provision, 5) logistic review provision, 6) ensuring clinical competence, and 7) quality assurance and quality improvement resource provision.

The medical director should strive for adequate and complete data collection for the purposes of quality assessment (morbidity

and mortality trends, not just sentinel events), financial evaluation (charges, collections, contracts), and research efforts. There is a need for collaborative research and a national database to enable further progress in this area. This effort could be coordinated through the SOTM or through another associated organization. Specific data collection and research responsibilities should include: 1) development and maintenance of data collection system and tools, 2) research coordination, data collection supervision, 3) development of data sharing for system improvement, and 4) publication.

BENCHMARKING OF NEONATAL AND PEDIATRIC TRANSPORT PROGRAMS

The need for a well-organized and comprehensive quality improvement program is emphasized in the most recent edition of the American Academy of Pediatrics' "Guidelines for Air and Ground Transport of Pediatric and Neonatal Patients." The guidelines stress that quality improvement should continually monitor and evaluate the transport program to provide quality patient care and ensure that the program meets defined standards. A continuous quality improvement program allows one to compare one's own process to itself but may not necessarily demonstrate that the process is faulty. Using the data obtained through continuous quality improvement and comparing it to similar programs and processes is the basis of benchmarking.

Conference participants recognized a wide variety of transport programs, ranging from those that transport neonatal or pediatric patients exclusively to those that provide care for neonates, children, and adults. Establishing benchmarks applicable to the entire spectrum of transport programs will be difficult with the diversity of individual transport team programs, patient populations, transport volumes, and geographic regions. However, the group identified the following specific goals that programs could adopt and use as resources. Every program should have a quality assurance process that reviews specific indicators for its program. Categories should include, but are not limited to, efficiency, patient outcome, and cost of service. Established resources available for information and utilization include the American Academy of Pediatrics, Joint Commission of Accreditation of Healthcare Organizations (JCAHO), Commission on Accreditation of Medical Transport Systems (CAMTS), and the National Association of Children's Hospitals and Related Institutions (NACHRI). Standards for transport programs that might be determined at a national level and used locally as benchmarks include: 1) response time, 2) turnaround time, 3) successful airway management (including intubation success rate), 4) incidence of deferred or missed calls due to team availability, 5) patient and customer satisfaction, 6) team composition and equipment, 7) accuracy of documentation and billing, 8) compliance with operational and patient care protocols, 9) efficiency of outreach and marketing programs, and 10) efficiency of ongoing educational processes for team members.

CLINICAL RESEARCH

Clinical research in pediatric transport medicine has historically focused on justification and optimal composition of specialized neonatal and pediatric transport teams. There have been only a few studies, mostly single-center, analyzing the efficacy and benefit of key transport equipment and therapies. A consensus of the conference was that SOTM should support efforts to improve quality of care using evidenced-based research. This research should also substantiate future revised published Guidelines for Air and Ground Transport of Pediatric and Neonatal Patients. Recognizing the diversity of transport

programs and the geography served is essential in study planning and data interpretation. Also, severity of illness measures should be further defined and a determination made if such scoring modalities enhance quality.

There was unanimous agreement that the SOTM should establish a clinical research subcommittee to oversee and direct national research endeavors. An organized national transport research network should be established to investigate important clinical questions that could be studied through large, multicenter studies. In conjunction with this network would be a centralized interactive secure database that would be web-based and use a standard minimum data set for transport.

Proposed research questions should be answerable and relevant to clinical practice. Research is needed to evaluate new and existing equipment and devices for efficacy and cost benefit. There is significant agreement that the implementation of most transport equipment is based on minimal data. For example, do existing isolettes and stretchers conform to established national safety guidelines, and do these guidelines offer maximum safety for the transported patient?

In addition, there is a great need to evaluate the cost/benefit of existing neonatal and pediatric intensive care therapies (eg, nitric oxide, head cooling, blood analysis, end-tidal CO₂ monitoring, ECMO, high frequency ventilation) prior to automatically extending them to the transport environment. There is also concern about the informed consent process for transport; studies into variations in the practice of obtaining consent may help establish more uniformity in standards. Further analysis of team justification may be necessary, especially given increasing financial pressures.

ACCREDITATION

A transport service may seek accreditation through 2 voluntary organizations: the Commission on Accreditation of Ambulance Services (CAAS), and CAMTS. The AAP currently supports a board member for CAMTS. The current accreditation process for transport programs is similar to that of the JCAHO. Accreditation evaluates 2 important areas of pediatric transport: safety and quality. Current accreditation standards are general in nature, especially in their applicability to children and neonates. Therefore, a transport system that is awarded accreditation might not necessarily be the most qualified system within a certain region to transport a critically ill infant or child. If payers begin to reimburse only accredited programs for the transport of infants and children, this might not necessarily guarantee the most qualified transport team. In the arena of financial uncertainty and cost-cutting measures, a transport program might not be afforded the opportunity to participate in an accreditation process.

The AAP should continue to support qualified representation on accreditation boards, and members from the SOTM or neonatal/pediatric transport teams should be given the opportunity to have substantial input into accreditation standards. Accreditation standards committees should establish specialized transport subcommittees to address standards and issues specific to children and neonates. There should be expansion of the current accreditation process, rather than establishment of a separate process, to appropriately represent infants and children, and accreditation should remain a voluntary process to preclude unfair competition. However, neonatal and pediatric transport teams are encouraged to consider accreditation to help ensure a peer-review process that might improve and standardize patient care and safety, and quality improvement for individual systems. Finally, evidenced-based research regarding the effects of accreditation would be useful.

TEAM CONFIGURATION

The conferees recommended that at least 2 patient care providers be present on every acute care transport. These providers would be in addition to personnel serving as drivers or pilots. Currently, transport team configurations include 5 models: 1) nurse (RN)-nurse, 2) nurse-respiratory therapist (RT), 3) RN-RT-physician, 4) RN-physician, and 5) RN-Emergency Medical Technician-Paramedic (EMT-P). Appropriately trained and oriented senior residents, especially those interested in critical care, are also appropriate transport team members. Some programs use a constant team configuration. Others use a team configuration based on patient acuity. Use of triage scoring systems to aid in the triage/team configuration process may be beneficial in the personnel determination process.

The conferees recommended that a RN be a member (most likely the team leader) of the team during every transport. The rationale is that a RN is most likely to offer the level of education, versatility, and licensing requirements for providing acute transport care. The conferees recommended a minimum of 5 years' experience in nursing, with at least 3 of the 5 years focused on neonatal/pediatric critical care in a NICU, PICU, or ED setting. Consensus was not reached for minimum experience recommendations for respiratory therapists and paramedics. However, it was agreed that competency was more important than absolute length of experience. Personality factors and attitude were also identified as vital characteristics for competent transport team members.

The conferees recommended that the skills of the team match the population served whenever possible. Thus, unless they have received specific training in this area, teams with an exclusive focus on older pediatric patients should not consider themselves able to optimally transport a neonate. Similarly, primarily non-pediatric providers who transition to become involved in pediatric transport should receive additional, intensive, pediatric training to ensure clinical competence. With pediatric residency training now requiring a greater focus on ambulatory medicine, as compared to such training's previous emphasis on critical care, courses and training that augment critical care experiences and expertise (APLS [Advanced Pediatric Life Support], PALS [Pediatric Advanced Life Support], ACLS [Advanced Cardiac Life Support]) would be useful adjuncts for transport preparation. Certification courses (NRP [Neonatal Resuscitation Program], PALS, APLS), however, were not felt to be sufficient educational preparation in the absence of or substitution for pediatric or neonatal critical care experience and expertise.

The conferees agreed that extensive orientation programs are needed in addition to experience in order to transition a critical care health team member to the more independent transport environment.

ECONOMICS OF PEDIATRIC TRANSPORT

There is a need for initial and ongoing education of all personnel who relate to transport services. Educating hospital administrators, who may not have experience in the transport arena, regarding benefits of pediatric transport might affect resource availability, while educating the consumer (eg, referring facility and personnel, the public) regarding transport services might improve cost efficiency. It is important for transport teams to learn to generate as much income as possible from available resources. Limited understanding of team costs and revenue streams threaten the survival of transport services. In many cases, the medical staff requires education regarding opportunities for cost efficiency. While cost containment remains important, the mission of the transport programs should continue to guide administrative decisions. If financial limitations

impair the team's mission, the team will become ineffective in its ability to deliver care.

Education should focus on identifying the importance of the transport team with respect to the larger organization's mission, as well as explaining advantages of this level of care to other practitioners. Administrators, medical directors, and program managers, working in relative isolation within a larger organization, might not understand how transport services affect the larger organization's mission and bottom line. Those in the transport community must generate and critically evaluate outcome data to help justify the expense of a critical care transport system.

Developing appropriate methods for accurately anticipating patient need and marshaling appropriate resources are important. Many teams currently use the same level of resources for all transports, because it is difficult to determine in advance which resources a given patient might need. The conferees identified education of referral hospitals as one method of improving patient triage. Improving the ability of referring hospitals to stabilize sick children will also help conserve resources. As referring hospitals improve their ability to manage pediatric patients, transport teams will gain the luxury of responding in a more timely and cost-efficient manner. Other methods of enhancing triage, such as video conferencing, may allow the referring and receiving physician to see and discuss the patient in a real time basis. These advanced methods of communication should allow more appropriate allocation of team resources.

Fiscal awareness and revenue generation must be a concern of each transport team director and manager. Those responsible for billing could examine procedures used by institutions and systems that have achieved financial success. EMS is an example of one such system. Similarly, mentoring relationships regarding general financial strategies might be developed between successful transport programs and other less established programs.

There are many variations in practices for billing for transport services. A survey that investigates successful strategies could serve as a useful tool for transport administrators.

CPT transport codes that accurately reflect the levels of care provided by transport personnel as well as medical command physicians should be developed and supported by the AAP. Useful strategies might include considering transport team costs when managed care contracts are being negotiated, considering transport services as a "carve out" (transport as a specialized service that can be reimbursed as a flat discount on charges), and employing specialized billing agents for transport. The conferees emphasized that most pediatric interfacility transport systems do not generate profit if considered as stand-alone entities. The added value from a pediatric interfacility transport service is not necessarily fiscal return. Rather, the service enables the institution to participate in (and enhance) care of patients from their referral communities.

Additional extramural resources for support of transport programs may exist in many systems and communities. Health care personnel who are primarily focused on patient care, however, may not be the most appropriate fundraisers. Broadening the base of support and soliciting the help of others (eg, development teams, philanthropic organizations) could improve funding and allow the team to focus on its mission.

JUSTIFICATION OF TRANSPORT TEAMS IN INSTITUTIONS

Justification of specialty transport teams within an institution or health care system is complex and multifaceted, but it is a process that should be constant. It involves balancing the costs of develop-

ing and maintaining a specialty service with its direct and indirect benefits. Quality and scope of care, financial ramifications, regionalization, and medical legal issues are important components of the justification process. Specific issues will vary, depending on factors such as institutional mission, geography, patient demographics, options currently available, type of team (unit based vs. free standing), classification as cost or revenue center, referral patterns, and projected changes in referral population. Systems considering starting a transport team may have different factors to consider than those who are contemplating expansion or contraction of services.

When justifying a specialized transport team, need and impact must be established. Will (does) the proposed service fill a void recognized by the population and medical community, or is it competing for part of an established subset of patients? The current and projected referral patterns of the regional hospitals and medical community as well as projected regional population and demographic changes are important to consider. Does the specialized team provide an improved level of care for the community? Transport teams should strive to collect and present outcome data to help justify the specialization of their service.

Planned initiation of new or expansion of existing services by a receiving center is an important factor to consider when assessing transport need. Potential increases in patient referrals and admissions from the transport service are also important to evaluate. Medical personnel and hospital services may see an impact as the transport team brings new patients to the referral center. These patients will require inpatient and potentially outpatient medical services, by both generalists and subspecialists. Projections may identify a need for new or more comprehensive services.

There are also intangible benefits that the institution should consider. These include increased availability to the extended community, branding of its hospital and transport services, public relations, outreach potential, opportunity to gain insight into referral systems, and a chance to influence the quality of regional health care for children. Another benefit may include increased job satisfaction and advancement for nursing personnel who would have the opportunity to function in an advanced, more autonomous role.

TRANSPORT OUTSIDE OUR BORDERS; INTERNATIONAL TRANSPORT

Pediatric transport programs are sometimes asked to provide services in nontraditional settings (eg, the transport of patients from the physician's office or clinic). Unless transport of these patients is a routine practice of an interfacility transport program, the service might be more appropriately provided by local EMS resources. The conferees identified the following issues that a transport team should investigate before routinely participating in office-to-hospital transports: Is the transport team able to provide similar time response and medical expertise compared to local EMS services? Are physician offices and clinics adequately prepared, in terms of personnel, basic emergency equipment, emergency drugs, suction, and airway management equipment, as defined in the AAP guidelines for office emergencies? How is this information made available to local interfacility transport services? Do physician offices/clinics have capabilities for initial resuscitation as well as appropriate resources for evaluation, investigation, and monitoring of the patient until the transport team arrives? Are physicians able to monitor patients physically and communicate with the interfacility transport services?

The conferees discussed the involvement of specialized pediatric transport teams in disaster management systems. They agreed that pediatric/neonatal transport systems should have a role in disaster

management, and that the medical expertise of the transport teams can and should be integrated into these response systems. They recommended that pediatric/neonatal transport systems pursue dialogue with various agencies regarding development of guidelines and integration into the local, state, national, and, potentially, international disaster systems. The general consensus was to approach this area through the SOTM. A suggestion was made that the AAP help develop a transport medicine information center for national and international disaster assistance. The SOTM could be the information hub for pediatric/neonatal transport teams capable of providing medical expertise for a coordinated and medically efficient response to national and international disasters.

"Third-party transport" or "out-sourcing of teams" is an option for the provision of PIT. The conferees agreed that medical control for this type of transport should be the responsibility of the transport service's medical director and not the receiving facility. However, medical decision-making should occur through dialogue between the transport team, the medical director, and the receiving physician.

Considerable controversy exists regarding the shift in responsibility between referring and receiving services during the conduct of a transport. The conferees recommended the SOTM help define guidelines regarding who has medical and legal control at various points in time during a transport. The conferees agreed that the transport team should establish medical control upon arrival in the referring hospital. The stabilization of the patient should become the responsibility of the transport team/medical control physician at that point. If medical conflict regarding stabilization or intervention occurs while at the referring institution, resolution by direct communication between the referring physician and receiving physician or medical control physician is recommended.

Many of the transport teams represented at the conference reported being involved in international transport, most averaging over 40 international transports per year. The geographic areas involved included South America, Europe, Asia, Russia, the Caribbean, and Africa. Globalization of medicine has become common, and quality international transport systems capable of serving pediatric patients need to be established to enable worldwide access to care. The conferees agreed that the SOTM needs to encourage both the use of specialized pediatric/neonatal services for international support as well as the development of international pediatric/neonatal transport guidelines. These guidelines should include team configuration, medical management, communications, pharmaceutical issues, equipment compatibility, disaster plan for the team/patient, and personnel health issues. Establishment of minimum standards for providers of pediatric transport, standards for medical configuration of aircraft for international pediatric/neonatal transport, standards for custom issues (immigration) for the patients and transport team, and a research database for pediatric/neonatal international transport is recommended. Topics that warrant further investigation and standardization include the development of an international office, information center, or database for international transport, and the development of a database for pediatric neonatal transport teams with international capabilities or interest. Issues that should be addressed prior to the transport of an individual patient include patient management issues (medical command, ensuring expertise of transport system) and legal issues (controlled substances and the international environment).

CONCLUSIONS

While the topics chosen for discussion and debate at this conference were not all-inclusive, they offer significant insight into many

issues related to pediatric interfacility transport. We hope that this report is a useful resource for both developing and established transport programs. There is a clear need to expand critical assessment in the literature, develop educational and clinical standards of care, and continue discussions among those who participate in PIT. As pediatric health care delivery and systems continue to evolve, it is evident that expert PIT must be a priority in the development and maintenance of a full service health care system.

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