Essential Competencies of Specialized Transport Teams
Inter-facility Transport of Neonatal & Paediatric Patients

Prof. Hilary E.A. Whyte
Neonatologist, University of Toronto
Medical Director, Acute Care Transport Service & SickKids International
Disclosure

I have no relevant financial relationships with the manufacturer of any commercial product and/or provider of commercial services discussed in this CME activity.
Regionalization of Health Care

- Method of providing high-quality, cost-efficient health care to the largest number of patients.
- Aim is to improve patient outcomes by directing patients to facilities with optimal capabilities for a given type of illness or injury.
- Right patient, in right time, to right place, to be treated by right personnel – require transport

Transport Medicine

Transport medicine is an area of specialization and a fundamental requirement for optimal outcomes.

Clinical expertise and transport expertise are both required to provide safe transport for critically ill patients.

Standardization in training and evaluation, equipment, and systems design will promote best outcomes for patients.
Guidelines for Air and Ground Transport of Neonatal & Pediatric Patients

American Academy of Pediatrics Section on Transport Medicine

Edited by George A. Woodward, MD, MBA, FAA
3rd edition.
Responsibility of the Transport System

Ensure safe transport:

- **Qualified Personnel**
- **Necessary Equipment**
- **Appropriate Mode**

Appropriate Mode:

- Acuity of patient
- Special needs of pt
- Team availability
- Mode availability
- Weather
- Distance
- Traffic
- Practicality
Reduced morbidity with the use of specialized teams that are equipped and educated to anticipate and deal with the needs of critically ill infants and children 


Patients at highest risk of in-transport deterioration are those < 1 years of age, or those that are already intubated


75% children transported by non-specialist teams have complications

Barry, Arch Dis Child, 1994

“Mobile-Intensive-Care” teams from regionalized lead center dramatically improved outcomes

Booy, Arch Dis Child, 2001
Specialized transport teams

• **Improve outcomes** especially for neonates
  
  Belway D, Henderson W, Keenan S et al. J. of Crit.Care 2006;21(1)
  Chang A, Berry A, Sivasangari S. Cochrane Database 2008; 4

• **Reduce paediatric mortality** – 23% vs. 9%
  

• **Decrease adverse events** – RR 41.5
  
  Orr r, Felmet K, Han Y et al. Pediatrics 2009;124 (1)

• **Dedicated transport teams** enhance availability, improve response times
  
In-Utero or Neonatal Transport

In-utero transport is superior to neonatal transport - decreased mortality & morbidity, length of stay, costs


Transport team attendance at high risk deliveries improved resuscitation, intubation success & stabilization
But no added benefit when doctor was also present
McNamara, Mak, Whyte. J of Perinatol, 2004

Paramedic/EMT vs. RN/RN vs. RN/RT teams
No difference in patient outcomes
Outcomes impacted by GA, pre-transport status of infant and prolonged transport time
Shoo Lee, Whyte et al. Medical Care; 2002
Interfacility transport of critically ill infants, children and high risk pregnant women in Canada was provided in different ways in different parts of Canada with significantly different outcomes. There was no consistency as to the personnel involved or the expected competencies of these individuals. 

*S.Eliason, H.Whyte, K.Dow et al. A.J.Perinatology, 2013*

National Survey of Neonatal Transport Teams in the United States

Interfacility Transport Practitioner Competencies Profile

www.CAPHC- Knowledge Exchange Network:

Competencies Profile - Interfacility Critical Care Transport of Maternal, Neonatal, and Paediatric Patients, 2010
Canadian Competencies Profile

Recommendation:
Competencies are essential to the combined set of practitioners performing critical care in high risk interfacility transport of pregnant women, newborns and children

- Each individual may not have all skills or competencies but together the involved practitioners should have a complete set
Models for Transport Teams

- RN/RN
- EMT ± MD
- RN/MD
- RN/RT ± MD
# Intubation Skills of Transport Team Members

<table>
<thead>
<tr>
<th></th>
<th># pts</th>
<th>Success %</th>
<th>1&lt;sup&gt;st&lt;/sup&gt; pass %</th>
<th>2&lt;sup&gt;nd&lt;/sup&gt; pass %</th>
<th>&gt;2&lt;sup&gt;nd&lt;/sup&gt; pass %</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD</td>
<td>110</td>
<td>77</td>
<td>58</td>
<td>22</td>
<td>20</td>
</tr>
<tr>
<td>RT</td>
<td>51</td>
<td>92</td>
<td>83</td>
<td>17</td>
<td></td>
</tr>
</tbody>
</table>

*Adams, Paeds Emer care, 2000*
Cross Trained RN/RT model

Operate with medical directives, all within scope of professional practice
Cost effective to consolidate, collaborate, even across academic circles: AAP Section on Transport Medicine
Transport Clinician

Seven categories of competencies:

- Professional Responsibilities
- Communication
- Health and Safety
- Assessment & Diagnostics
- Therapeutics
- Integration
- Transportation
Examples of Competencies

GENERAL COMPETENCY - Practice safe lifting and moving techniques in different modes of transport

✓ Practise safe biomechanics.
✓ Transfer patient from various positions using applicable equipment and/or techniques.
✓ Transfer patient using emergency evacuation procedures and/or techniques.
✓ Secure patient using applicable transport equipment and/or techniques.
✓ Lift patient and transport equipment in and out of different modes of transport as appropriate.
Interfacility Transport System: Skills and Training

King B, Woodward G. Ped Emerg.Care 2001;17(6) & 2002;18(6)
ACTS Education Program Overview

- Transport Associate program: 3 - 6 months
- Clinician in Training education: 1 year

- Post-certification continuing education (72 hrs annually)

- Transport Physician orientation & certification

- Neonatal/Perinatal Fellow transport rotation
- Paediatric Emergency Medicine fellow rotation

- Outreach Education - knowledge, skills, conferences
Transport

Clinical environments
OR, ER, NICU, PICU, L&D

Simulation Lab environment
Transport Education Program

Part 1: 5 orientation days

- ACTS mandate, operations, role/expectations
- Code of conduct
- Regionalization in Ontario
- Transport safety: land and air (aero-medical physiology)
- Transport documentation standards
- Medical directives
- Disease specific presentations-with some case based integration/Resuscitation-simulation scenarios
- Equipment review
- Mock transport run/vehicle site visit (rotary)
- Technical procedure skills
- Receive learning objectives, education CD & binder

Part 2: Clinical shifts
Transport, L&D, emergency department, PICU, NICU
3 weeks (20 shifts)
Equipment Training: Expectations

- Completion of Competency Based Assessments within 1st month from orientation start date:
  - Transport incubator/stretcher /infusion pumps/monitoring devices
  - Ventilator(s)
  - Nitric Oxide Delivery System
  - Defibrillator
  - Point of Care Testing: iSTAT® & Glucometer
Core Clinical and Technical Skills

Orientation, learning package(s), hospital resources, observation shifts, skills log

- PIV insertion/sampling
- Arterial puncture
- UAC/UVC sampling
- ETT suturing/taping
- Assisting with Intubation
- Assisting with Needle thoracentesis
- Sterile field
- Blood products
- Medication administration
Safety training: Enhances Team & Patient Safety

HELICOPTER & AIRCRAFT SAFETY

UNDER WATER SURVIVAL – EGRESS

WINTER SURVIVAL TRAINING
Aircraft Safety Training
Under Water Safety Training
Crew Resource Management
Winter Survival

Healthier Children. A Better World™
Clinician Training Program

- 9 - 12 month training position
- structured learning program, self directed components, various evaluation methodology
- Curriculum includes:
  - Transport Medicine
  - High risk maternal/L&D
  - Neonatology
  - Paediatrics
Therapeutics

• **Airway patency**
  - Positioning strategies to maintain airway patency
  - Suctioning:
    a. Oropharynx
    b. Beyond oropharynx

• Oxygen and air administration
• Nasal prong application
• Bag mask ventilation
• Oropharyngeal airway
• Nasopharyngeal airway
• Laryngeal Mask Airway
• Subglottic airway device
• **Intubation**
  - Foreign body removal
  - continued /
  - Percutaneous cricothyroidotomy
  - Needle thoracotomy

• **Chest tube insertion / drainage**
• Peripheral intravenous insertion
• Venipuncture
• Umbilical venous insertion / sampling
• Umbilical arterial insertion / sampling
• Intraosseous needle insertion
• Peripheral arterial puncture/ line insertion / sampling
• Capillary blood sampling
• Blood product administration
• **Cardioversion**
• **Defibrillation**
• Transcutaneous pacing
• Urinary catheter insertion
• Burn care
• Neonatal therapeutic hypothermia
Procedures

- Arterial puncture
- UAC/UVC insertion
- Intubation
- Needle thoracentesis
- Chest drain
- Central lines

Furhman Chest Drain: Seldinger technique utilized
Crew Resource Management
Human Patient Simulation
| S | **Situation:**  
I am calling about: (patient name and location)  
The purpose of this call is:___  
I am concerned about:___ |
| B | **Background:**  
This is a patient with a history of:___  
The current management includes: (infusions, boluses, ventilation, interventions) |
| A | **Assessment:**  
I have just assessed the patient:  
Vital Signs: HR__ RR __ SpO2__ Temp __ BP  
____ CRT ____ Pulses ____ LOC __ Glucose ____  
Vent Support ____ if any  
IV Fluids ____ TFI ____  
Recent labs: CBC ___ Lytes ___Gas ___  
Physical Exam:____ |
| R | **Recommendations:**  
I feel this patient would benefit from: _____  
RECAP “I understand the treatment plan is:___” |
<table>
<thead>
<tr>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>KNOWLEDGE ACQUISITION (0-3 Months)</td>
<td>APPLICATION AND INTEGRATION (3-6 Months)</td>
<td>CERTIFICATION (6-12 Months)</td>
</tr>
<tr>
<td>• Joint Orientation (Neonatal &amp; Pediatric)</td>
<td>• Advanced Theory education sessions by video-conference (if applicable)</td>
<td>• Successful integration of knowledge and skills</td>
</tr>
<tr>
<td>• Self-Directed learning modules, Program CD</td>
<td>• Preceptor/Preceptee clinical experiences on transport</td>
<td>• Clinician Competencies demonstrated</td>
</tr>
<tr>
<td>• Resource reading</td>
<td>• Participation at Transport Team education days</td>
<td>• OSCEs</td>
</tr>
<tr>
<td>• Preceptor(s) identified</td>
<td>• Self-directed learning modules, case reviews, high fidelity simulation education day(s)</td>
<td>• Certification Transport Runs with Neonatologist/Intensivist or delegate</td>
</tr>
<tr>
<td>• Clinical placement starts, advanced skills education day &amp; skills OSCE session</td>
<td>• Ongoing evaluation with Preceptor and Transport Medical Director/delegate</td>
<td>• Certification meeting &amp; post certification CME requirements reviewed</td>
</tr>
<tr>
<td>• Needs assessment completed</td>
<td>• Written exam (validate knowledge transfer)</td>
<td></td>
</tr>
</tbody>
</table>
Interfacility Transport System: Quality Assurance

Lee S, Zupanic J, Pendray et al. J.of Paeds 2011;139(2)
Lucas da Silva, Euzebio de Aguiar, Reis M. Am J. of Perinatal. 2012;29(7)
Bigham M, SchawartzH. Ped Crit.Care Med 2013; 14(5)
<table>
<thead>
<tr>
<th>Step</th>
<th>Factors affecting</th>
<th>Causes of delays</th>
<th>Modifiable with current resources</th>
<th>Medians</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Request for transport</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Dispatch of team</td>
<td>Dependent on efficiency of information gathering and decision making</td>
<td>No team available</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Triaging with other competing calls</td>
<td>No transportation available for long distance runs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Leave NICU</td>
<td>Team efficiency in getting equipment together, departing</td>
<td>Wait for MD</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Equipment not available</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Waiting for blood products</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Ambulance arrives at</td>
<td></td>
<td></td>
<td></td>
<td>Mobilization time</td>
</tr>
<tr>
<td>SickKids</td>
<td></td>
<td></td>
<td></td>
<td>15 mins.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Leave SickKids</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not enough personnel to lift transport incubator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Arrive at referring</td>
<td>Dependent on distance and mode of transportation</td>
<td></td>
<td></td>
<td>Response time</td>
</tr>
<tr>
<td>hospital</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Stabilized for transport</td>
<td></td>
<td></td>
<td>(Yes)</td>
<td>Stabilization</td>
</tr>
<tr>
<td></td>
<td>Patient acuity, procedures performed</td>
<td></td>
<td></td>
<td>time 60- 120 mins.</td>
</tr>
<tr>
<td>8. Leave referring</td>
<td></td>
<td></td>
<td></td>
<td>In-hospital time</td>
</tr>
<tr>
<td>hospital</td>
<td></td>
<td>Delays due to lack of beds or transportation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Database must capture severity of illness, clinical and utilization metrics to ensure benchmarking, quality improvement and research initiatives. Metrics include:

- Safety
- Efficiency
- Effectiveness
- Timely
- Patient/family centered
- Equitable
Thank You

Save the date: 6th OCTOBER, 2015

SickKids
The inaugural INTERPROFESSIONAL Neonatology Conference

T4 Health
Triage, Transport, Treatment & Transition
with Guest Speakers
Joan Brennan-Donnan, PhD candidate
Dr Andrew Berry, MB. FRACP
Dr Lianne Woodward, PhD

Healthier Children. A Better World™