Orientation to your role as  
“Medical Control” for Airlift Northwest  
For Medic One and Trauma Docs

GOALS OF THIS DOCUMENT
1. Understand Airlift Northwest’s mission and role in medical transport in the Northwest and WWAMI region.
2. Understand the indications for air medical transport and the factors that go into the decision to fly.
3. Be able to communicate succinctly via radio with the ALNW flight crew and provide direction for trauma, surgical (Trauma Doctor) and medical emergencies (Medic One Doctor).
4. Understand basic principles of flight physiology and how they relate to patient care.
5. Appreciate transport times for the WWAMI region.
6. Be familiar with equipment, medications, and nursing abilities for both fixed wing and rotary flights.

THE ARLIFT NORTHWEST MISSION

“Airlift Northwest is dedicated to providing safe, efficient air medical care to critically ill and injured infants, children, and adults”

ALNW was created in 1982 to provide emergent and inter-hospital air transport services to critically ill or injured patients. The primary service area has been Washington, Alaska, Montana, and Idaho (the WAMI region). This is an area of approximately 900,000 square miles, and Airlift has helped connect rural areas to hospitals that can provide subspecialty care.

THE ARLFIT NORTHWEST LEGACY: DR. MICHAEL COPASS

Airlift Northwest began when a tragic house fire in Sitka, Alaska, claimed the lives of three children before they could be safely transported by air to a regional burn center for care. Dr. Michael Copass, Airlift Northwest President and Medical Director, was teaching in the Sitka hospital that day and was called into the local emergency room to help care for the children. "I came away from it saying that was the last time any doctor would have to get on the phone and beg someone to come and pick up a child," said Copass. He returned to Seattle, determined to find a way to provide air medical transport for residents in Alaska and the Pacific Northwest. Airlift Northwest was born.

OPERATING PRINCIPLES
1. Safety First
2. “One call does it all”
3. Medical equipment and capabilities equivalent to an ICU
MEDIC ONE DOCS AND TRAUMA DOCS AS MEDICAL CONTROL

Physicians based in the Emergency Department at Harborview Medical Center provide medical control for ALNW. This includes Emergency Department Attendings (for trauma, surgical, and medical patients), the Medic One Doctor (medical patients), and the Trauma Doctor (trauma and surgical patients).

These physicians approve plans and provide oversight of care delivered for all patients, whether coming to Harborview or to another facility. In general, flight nurses and/or referring physicians have discussed the patient with the accepting facility. However, all in flight medical control occurs via the Harborview ED.

CLINICAL POLICIES AND PROCEDURES

Printed, up to date copies of all clinical policies and procedures used by Airlift Northwest are located in a three ring binder in the radio room, along with all orientation material.

QUALITY CONTROL

All communication by phone is done via recorded lines. ALNW’s Medical Director, Chief Flight Nurse, and clinical educators review flight records daily and refer concerns to the ALNW Quality Management Committee. Both flight nurses and physicians are expected to immediately contact the Medical Director for safety or clinical concerns.

CONTACT INFORMATION

ALNW Dispatch: 206-329-2569
Transfer Center: 206-744-3597
Medical Director (David Baker): 206-550-5516, davbaker@u.washington.edu
Children’s Hospital Communications Center: 206-987-8899

INDICATIONS FOR AIR TRANSPORT

The Trauma and Medic One Doctors are actively involved in the decision to transport a patient by air with all inter-facility transfers to Harborview. The ultimate decision and responsibility, however, falls on the referring physician. The National Association of EMS Physicians has published a position paper entitled “Guidelines for Air Medical Dispatch”, which offers insight into the various indications for flying patients (www.naemsp.org). While there are no universally accepted indications for air transport, there are some general considerations one must always keep in mind:

- **Transport time**: Will transport by helicopter or fixed wing reduce the time it takes to get a patient to definitive care?

- **Time spent in out of hospital environment**: Is the patient’s condition such that a prolonged period outside of the hospital could lead to adverse outcomes. For example, there are instances when the ETA for a patient may be the same whether they come by ground or air.
However, the travel time (time out of the controlled setting of the hospital) may be much reduced by going by air.

- **Geography/Distance:** How will both the distance and geography affect transport conditions and travel time. This is a particular concern in the Northwest where rugged terrain, waterways, and traffic patterns can drastically increase ground transport times.
  - Olympic Peninsula and the San Juan Islands: Access to Harborview and other major medical centers is limited by the need to either travel by ferry or a drive around Puget Sound.
  - Cascade Mountains: The mountain passes routinely close or traffic is drastically slowed due to weather conditions
  - I-5 and I-90 Corridor: During morning and afternoon commutes, ground transport greater than 15 or 20 miles can take longer than 1 to 1.5 hours. At these times, helicopter transport should be considered for patients that may require time dependent care for life or limb threatening injuries. This includes hospitals in the Tacoma area (St. Joes, Tacoma General, St. Claire), Auburn, Highline, and hospitals in the North (Stevens, Providence – Everett), which are relatively close in terms of miles.
  - Eastern Washington: ALNW does not have a base in Eastern Washington. Nevertheless, certain parts of this area are quickly accessible by helicopter, and most areas are accessible by fixed-wing aircraft. While the ETA may be prolonged in some cases because of the location of the aircraft, bear in mind that the actual transport time will always be shorter than ground.

- **Time Critical Medical Conditions:** Air transport should be considered for any patient who can get to definitive care faster by flying when they are suffering from conditions that could deteriorate if not managed quickly. While a list of all potential conditions is too long to include here, examples include STEMI, ischemic stroke, intracranial hemorrhage (especially if there is likely a need for decompression), limb threatening injuries, and major trauma.

- **Abilities of Medical Crew:** The critical care knowledge and trauma experience of the transport crew may influence the decision to fly, even if transport times are similar between ground and air. While there are dedicated ground critical care teams, there is variability in their training and experience. The standards, experience, and critical care capabilities are a known quantity among the Airlift flight nurses. Furthermore, the real time communication with the flight team allows for up to date information and medical control.

- **Would the use of ground transport leave the local community without EMS support for a prolonged period?** Rural communities throughout the area often operate with only one EMS unit (for example, many of the islands in Puget Sound). Transporting patients by ground may take the only EMS unit out of service for some time with no back-up.

- **Cost:** While cost may be a consideration for the patient, the clinician should make the decision to fly based upon clinical and safety considerations.
• **Safety/Weather:** The pilots, Communication Center, and flight crew will determine whether conditions are safe to provide transport.

**COMMUNICATING WITH THE FLIGHT CREW**

Radio contact with the flight crew should be brief and formal. It is important to realize that while the crew will ask permission for specific interventions, their plan for a patient will conform to policies and procedures set by Airlift and the medical director. Asking the flight nurses to drastically stray from their guidelines should only occur in extenuating circumstances. General hints:

• Be prompt in answering pages to the radio room. Begin communication with “This is the trauma doctor standing by for Airlift #__.” They will acknowledge you with “Trauma doctor this is Airlift # __, how do you copy?” Respond with “Trauma doctor to ALNW #__, I copy loud and clear” or “you are breaking up”, etc.

• Once the flight nurse has given report, succinctly re-cap the information, including vital signs, and allow permission for the plan outlined (if appropriate). For example:

“This is trauma doctor for Airlift#__, I understand you are en route with a 56 y/o male involved in an MVC. He was intubated on scene for a GCS of 3 and has obvious head and facial injuries. His vital signs are stable with a BP of 180/90, HR of 90, and O2 sats of 98%. I agree with plan to continue current therapy and you have permission to use valium in 5 mg increments for sedation, and morphine in 5 mg increments for pain. I understand you are in route to our location with an ETA of 10 minutes.”

“This is medic one doctor for Airlift#__, I appreciate your history of a 70 year old female with ongoing chest pain and ST elevations despite TPA given in Wrangle AK. She has stable vital signs and is alert. I agree with plan to continue current therapy of nitroglycerin drip and morphine in 5 mg increments for pain. I will inform St. Joe’s in Bellingham of your ETA of 45 minutes.”

• Do not use names or personal information of providers or the patient.

• Do not use slang or informal language

• Ensure you have complete vital signs and GCS. Inquire about lowest blood pressure.

• If traveling to other hospitals, make sure you promptly call (using speed-dial in radio room) the other hospitals to provide report.

• For immediate access to pediatric or neonatal advice, the speed-dial to CHMC goes directly to the CHMC ED Communications Center and a pediatrician will be quickly available.
TRANSPORT TO FACILITIES OTHER THAN HARBORVIEW

When a patient is being transported to other facilities, you must contact that facility with a clinical update and ETA, EVEN IF THE OTHER FACILITY ALREADY IS AWARE THAT THE PATIENT IS EN ROUTE.

- Be sure of the facility where the patient is being transported to. This is particularly important with hospitals that have similar names (i.e. Providence Everett versus Providence Centralia, or St. Josephs Bellingham versus St. Josephs Tacoma).

- The speed-dial phones in the radio room should connect directly to most in-state Emergency Departments. If the speed dial is not working, have the hospital operator connect you directly.

FLIGHT PHYSIOLOGY: CLINICAL CONSIDERATIONS

You need to be aware of the stresses that air transport imposes on a patient (and the flight crew) and to be aware of particular conditions that warrant caution when flying. A detailed discussion of flight physiology is beyond the scope of this text, but the medical control physician should be familiar with several points:

- **Boyle’s Law:** When temperature is constant, the volume of a gas is proportional to its pressure. Thus, as altitude increases, barometric pressure decreases and the volume of a gas increases. This principle is extremely important when transporting patients with gas in abnormal locations (i.e. pneumothorax, pneumocephalus, necrotizing soft tissue infections). Approximate volume increases at particular altitudes:
  
  - 10,000 feet: volume increases by 1.5
  - 15,000 feet: volume increases by 1.8
  - 20,000 feet: volume increases by 2.2

- **Dalton’s Law:** The pressure of a gas mixture is equal to the sum of the partial pressures of the gases in the mixture. The oxygen concentration remains at 21% regardless of altitude. Thus, as the barometric pressure decreases, hypoxia results. This is most relevant in patients already hypoxic from an acute or chronic condition.

- **Henry’s Law:** The quantity of gas in a liquid is proportional to the partial pressure of the gas in contact with the liquid. Gases move from an area of higher concentration to lower concentration. An example is when a scuba diver ascends too rapidly: as the pressure decreases, nitrogen gas escapes bodily fluid and forms bubbles in tissue, joints, blood, etc. Decompression sickness from flying tends to occur at very high altitudes (> 25,000 feet) though reports exist of patients who recently have scuba dived developing decompression sickness at altitudes less than 18,000 feet.

- **Charles’ Law:** The volume of a gas at a constant pressure is directly proportional to its absolute temperature.
- **Cabin Pressurization:** The pilots on the fixed wing aircraft (which typically fly at cruising altitude of 30,000 feet) can adjust the cabin pressure based on patient needs. The helicopters are not equipped for cabin pressurization, but fly at much lower altitudes (generally less than 10,000 feet). The flight nurses can request that the pilot fly as low as is safe. That said, patients and crew members with ear, sinus, or respiratory conditions may become symptomatic with as little as 1000 feet of altitude change.

The principle effects that flight has on the human body, in summary, include:

- Hypoxia
- Gas expansion
- Temperature changes
- Noise
- Vibration
- Prolonged immobilization
- Gravitational Forces
- Dehydration

The flight crews are well trained to consider these effects and take measures to mitigate their effects on a particular patient. You must consider these effects when making the decision whether or not to fly a patient. Referring physicians should be instructed to intervene in conditions that may be worsened with altitude. Examples include placing chest tubes prior to flight, gastric decompression with OG tube, loosening of air splints, MAST pants, etc. Particular conditions that require careful consideration include:

- Pneumothorax
- Pneumomediastinum
- Pneumocephalus
- Pneumopericardium
- SBO
- Air in globe of eye
- Decompression Illness
- Cardiac or respiratory disease

If you have any question whether or not it is safe for the patient to fly, the medical director should be contacted immediately.

**Airlift Northwest: Bases and Flight Nurse Capabilities**

**The Bases**

1. **Seattle/Boeing Field:**

Two Lear 35A Fixed Wing Aircraft:
- Range = 1500 miles
- Capable of carrying two patients
One Turboprop Fixed Wing Aircraft (arriving July 2010):
  • Range = 500 miles
  • Able to land on smaller runways than the Lear

Two helicopters ("Airlift 2")
  • Range = 200 miles
  • One flight crew + one back-up aircraft

2. Arlington, WA Municipal Airport
   • One helicopter ("Airlift 6")

3. Olympia, WA
   • One helicopter ("Airlift 3")

4. Bellingham, WA (St. Joseph hospital)
   • One helicopter ("Airlift 5")

5. Juneau, AK
   • One Lear 35A Fixed Wing Aircraft

RESPONSE TIMES

Note: Response times are estimates. Weather, location of aircraft and crew can affect times. The Airlift communication center will give medical control a more accurate ETA on a case-by-case basis.

Helicopters can land directly at certain hospitals (Harborview, Seattle Children’s) or in open spaces very close to hospitals (UWMC.) Jets (fixed wing aircraft) need to land at Boeing Field in south Seattle. Patients are then transported to hospitals via ambulance. This adds 10 to 15 minutes to the ETA listed below.

**Washington:** rotary or fixed wing from bases in Puget Sound
This is **flight time only:** does not include flight time to referring facility, packaging, or ground transport once in Seattle.

<table>
<thead>
<tr>
<th>Southern Puget Sound</th>
<th>Tacoma</th>
<th>12 min</th>
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<tbody>
<tr>
<td></td>
<td>Olympia</td>
<td>25 min</td>
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<tr>
<td></td>
<td>Gray’s Harbor</td>
<td>35 min</td>
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<table>
<thead>
<tr>
<th>Eastern Washington</th>
<th>Ellensburg</th>
<th>45 min</th>
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<tbody>
<tr>
<td></td>
<td>Yakima</td>
<td>45 min (20-30 min if fixed wing)</td>
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<tr>
<td></td>
<td>Moses Lake</td>
<td>1 hr 10 min (40 min if fixed wing)</td>
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<table>
<thead>
<tr>
<th>Northern Puget Sound</th>
<th>Friday Harbor</th>
<th>35 min</th>
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<tbody>
<tr>
<td></td>
<td>Mount Baker</td>
<td>45 min</td>
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Air Medical Helicopter Service in Washington

Four high-performance air medical helicopters are based in Bellingham, Arlington, Seattle and Olympia.

These twin-engine helicopters are IFR, NVG and GPS equipped, fly at 150 MPH, have a range of 150 miles, and are equipped to care for neonatal, pediatric and adult patients of all types.
Greater Northwest: fixed wing aircraft from base in Seattle. Round trip including flight from Seattle to referring hospital, packaging, and return is 3.5 to 4 hrs.

<table>
<thead>
<tr>
<th>State</th>
<th>City</th>
<th>Time</th>
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<tbody>
<tr>
<td>Idaho</td>
<td>Sandpoint</td>
<td>45 min</td>
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<tr>
<td>Montana</td>
<td>Missoula</td>
<td>1 hour</td>
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<tr>
<td></td>
<td>Great Falls</td>
<td>1 hour 15 min</td>
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Southeast Alaska: fixed wing aircraft from base in Juneau, Alaska. Round trip varies greatly depending on aircraft and staff availability.

<table>
<thead>
<tr>
<th>City</th>
<th>Time</th>
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<tbody>
<tr>
<td>Ketchikan</td>
<td>1 hour 35 min</td>
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<tr>
<td>Juneau</td>
<td>2 hours</td>
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FLIGHT TEAM

- Two critical care nurses
- Adult Critical Care Experienced
- Cross-trained to manage and transport all age patients, ill or injured (neonates, pediatrics, adults, high-risk obstetrics)
- Trained in altitude and flight physiology, aircraft safety
- Certifications: ACLS, PALS, NRP, TNCC, ATLS (audit)

Flight Nurses: Skills and Interventions

- Rapid Sequence Intubation
- Cricothyrotomy
- Needle Thoracostomy
- Ventilator management
- Pelvic Stabilization

Medications available in flight:

**Pressors:**
- Neosynephrine 10mg/ml
- Norepinephrine 4mg/ml
- Dopamine 400mg/10ml
- Dobutamine 250/20ml

**Cardiac:**
- Adenosine 6mg/2ml
- Amiodarone 150mg/3ml
- Asa 81mg
- Atropine 2mg
- CaCl 10%
- Calcium gluconate 10%
- Diltiazem 25mg/ml
- Lidocaine drip
- Metoprolol 5mg/ml
- Nitroglycerin drip/spray
- Procainamide
- Magnesium (5gm/10cc)
- Heparin 20,000/500cc

**RSI**
- Etomidate
- Ketamine
- Ativan/Versed
- Fentanyl/Morphine
- Succinylcholine/Vecuronium/Pancuronium

**Code Drugs:**
- Calcium chloride
- Epinephrine (1:10,000, 1:1000)
- Atropine 2mg
- Dextrose 50%
- Lidocaine 2%, Lidocaine drip
- Norepinephrine
- Dopamine
- Neosynephrine
- Vasopressin
- Sodium Bicarbonate

**Anti-Hypertensives**
- Diltiazem
- Metoprolol
- Labelalol
- Nicardipine
- Lasix
- Esmolol drip
- Nitroprusside
- Nitroglycerin drip

**Anti-convulsant:**
- Dilantin

**Sedation/ Pain/ Anti-nausea:**
- Morphine
- Fentanyl
- Ativan
- Valium
- Reglan
- Zofran
- Haldol
- Versed

**Paralytics:**
- Succinylcholine
- Vecuronium
- Rocuronium

**Obstetrics:**
- Oxytocin
- Terbutaline
- Magnesium

**Miscellaneous:**
- Diphenhydramine
- Solumedrol
- Narcan
- Heparin
- Mannitol