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Flight Physiology

Advanced Care Paramedicine

Module: 12
Section: 04

Modes of transportation

- Rotary craft

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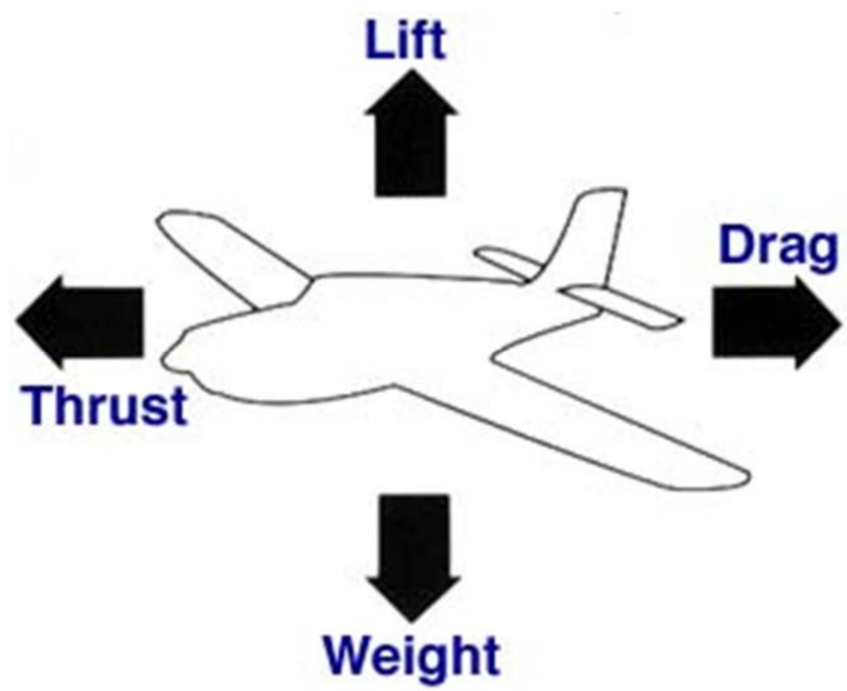
Modes of transportation

- Fixed wing
  - Air medical dedicated
  - Charter
  - Commercial

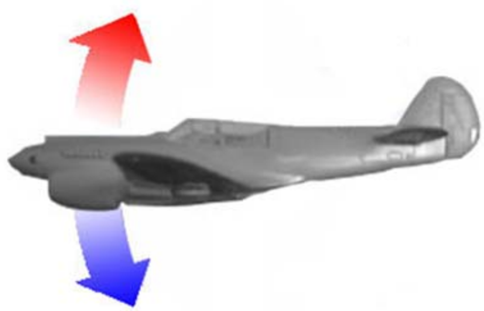
Flight Physics

- Forces affecting the aircraft
  - Lift
  - Weight (Gravity)
  - Thrust
  - Drag



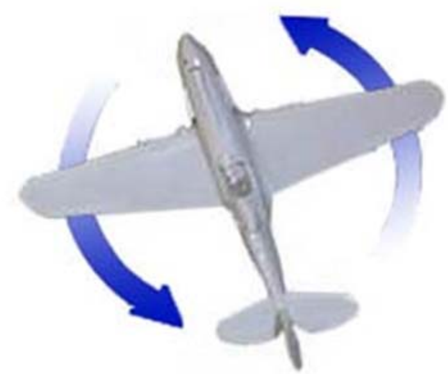
Flight Physics

- 3 axis of flight
  - Vertical Axis (“Yaw”)
  - Longitudinal Axis (“Roll”
  - Lateral Axis (“Pitch”)



Pitch

Roll



Yaw

Role of Lifeflight

- Transport critically ill / injured patients from provincial hospitals to QEII / IWK / CBRH
- Transport critically ill / injured patients from scene to appropriate receiving facility

Core components of Air transport

- Notification of need by hospital staff / paramedics
- Prepare aircraft for mission
- Response to facility / scene
- Assessment, change over of equipment, and extrication
- Transport to QEII / IWK / CBRH

Preparations for implementation

- Obtain funding
- Set goals of service
- Identify staffing needs
- Develop scopes of practice
- Hire and educate staff regarding physiology of flight medicine
- Develop ground personnel training
    - MFR's
    - Paramedics
    - Hospital staff
- Educate staff and associates

Advantages

- Increased scope of practice
- Decreased door to door time between facilities
- Speed of flight enables definitive treatment at appropriate facility in more timely fashion
- Allows rural patients better access to surgical intervention

Disadvantages

- Weather specific
- Night time scene landings
- Aircraft undergoing maintenance / on a mission
- Rotary craft not generally used for repatriation
- Expense
- High crash fatality rates

Complications

- Severe and unexpected weather changes
- Minor mechanical failure of aircraft / equipment
- Death en route
- Major mechanical failure of aircraft

The atmosphere

- 4 stratified layers
  - Troposphere Sea level - 50,000 ft
  - Stratosphere
  - Ionosphere
  - Exosphere
- Air medical aircraft typically fly in first 10,000 ft of troposphere

The atmosphere

Atmosphere (14.7 lb/in^2)	Height	Pressure (mmHg) Weight applied on object from above	Volume
½ (7.34)	18,000	380	2 volume
(10.11)	10,000’	523	
(14.17)	1,000’	733	
1 (14.7)	Sea level	760	1 volume
2 (29.4)	33’ BSL	1520 (2 X)	½ volume
3 (44.1)	66’ BSL	2280 (3 X)	⅓ volume
4	99’ BSL	3050 (4 X)	¼ volume

Table 2-2: Barometric Pressure at Various Altitudes		
	Barometric Pressure	
Altitude (ft)*	In mm Hg	In psi
Sea level	760	14.7
1 000	733	14.2
3 000	681	13.2
5 000	632	11.8
7 000	586	11.3
10 000	523	10.1
12 000	483	9.3
14 000	447	8.6
16 000	412	8.0
18 000	380	7.3
20 000	350	6.8
25 000	282	5.5
30 000	226	4.4
35 000	179	3.5

Note: psi = pounds per square inch.
*1000 ft = 304.8 m.

Atmosphere

- Air temp drops 2 degrees Celsius per 1000 ft
- Atmospheric pressure falls
- Water vapour decreases
- Turbulence increases

Atmosophere

Table 2-1: Gaseous Components of the Atmosphere

Gas	% of Total
Oxygen	21
Nitrogen	78
Trace gases	1
Total	100

Barometric pressure

- The pressure exerted on an object by the atmosphere
- Measured in mm Hg
- Barometric pressure falls as aircraft ascends

Physiological significance

- Ascent = decreased atmospheric pressure
- Decreased atmospheric pressure = decreased component gas pressure
- Decreased component gas pressure = decreased oxygen availability
- Decreased oxygen availability = hypoxia and hypoxemia

- Think
  - At sea level 760 mmHg 21% Oxygen
  - 18,000’ 380 mmHg 21% Oxygen (but now half of the # of molecules)

- 25,000’ – 30, 000’ is upper limits without supplemental Oxygen

Boyle's Law

- Gas volume is inversely proportional to its pressure when temperature remains constant
- Ascent = decreased atmospheric pressure
- Decreased atmospheric pressure = expansion of gases
- Expansion of gases within the body = pressure and possible damage on tissues, i.e GI tract, sinus'.

Henry's Law

- The amount of gas that will dissolve and remain in a solution is directly proportional to the pressure of the gas over the solution
- As decompression occurs, nitrogen dissolves from the blood and into the tissues causing the bends

Effects of altitude

Table 2-3: Effects of Altitude on a Typical Healthy Person			
Altitude*	Oxygen Saturation	Effects on Vision	Other Effects
4000 to 5000 ft ASL	>93% (no effects of hypoxia)	Some impairment of night vision	
5000 to 8000 ft ASL	90% to 93%	Greater impairment of night vision	
8 000 to 10 000 ft ASL	88% to 90%	Some impairment of day vision	Reduced ability to perform tasks
10 000 to 14 000 ft ASL	83% to 85%		Critical loss of judgment, accompanied by euphoria and fatigue
14 000 to 20 000 ft ASL	<83%		Severe loss of judgment, accompanied by belligerence or euphoria
> 20 000 ft ASL	Severe hypoxia		Death occurs in a short time

Note: ASL = above sea level.
* 1000 ft = 304.8 m.

Un-pressurized aircraft

- Useful in transporting non emergent conditions
- Limited by altitude restrictions
- Lower altitude = increased turbulence
- Increased turbulence = greater incidence of complication i.e spinal trauma, hemorrhage
- Also complicates the administration of care

Hypoxia

- Hypoxic Hypoxia
- Hypemic Hypoxia
- Stagnant Hypoxia
- Histotoxic Hypoxia

Hypoxia

- Hypoxia
  - Hypoxia is a state of oxygen deficiency in the body which is sufficient to cause an impairment of function. Hypoxia is caused by the reduction in partial pressure of oxygen, inadequate oxygen transport, or the inability of the tissues to use oxygen.
  - In brief, being drunk is kind of the same as being exposed to high altitude. In both cases, oxygen to your brain and muscles is reduced.

Hypoxia

- Hypoxic Hypoxia
  - A reduction in the amount of oxygen passing into the blood.
  - Caused by a reduction in oxygen pressure in the lungs, by a reduced gas exchange area, exposure to high altitude, or by lung disease. [This is the hypoxia that is a hazard to aviators.]

Hypoxia

- Hypemic Hypoxia
  - A reduction in the oxygen carrying capacity of the blood. It is caused by a reduction in the amount of hemoglobin in the blood or a reduced number of red blood cells.
  - Occurs through:
    - Blood donation, hemorrhage, or anemia.
    - Drugs, chemicals, or carbon monoxide.

- Stagnant Hypoxia
  - is an oxygen deficiency due to poor circulation of the blood or poor blood flow.
  - Examples
    - high "G" forces
    - prolonged sitting in one position or hanging in a harness
    - cold temperatures
    - positive pressure breathing

Hypoxia

- Histotoxic Hypoxia
  - The inability of the tissues to use oxygen
  - Examples
    - Carbon monoxide
    - Cyanide poisoning
    - Narcotics, chewing tobacco, and alcohol will prevent oxygen use by the tissues

Table 2-4: Clinical Manifestations of Hypoxia	
Subjective Signs	Objective Signs
Insidious onset	Dyspnea
Visual signs	Hyperventilation
Night vision reduced at 4000 ft (1219 m)	Cyanosis (late sign)
Day vision reduced at 15 000 ft (4572 m)	Tremors, muscle incoordination
Blurred vision	Decreased level of consciousness (confusion, stupor, unconsciousness)
Tunnel vision	Restlessness
Air hunger	Euphoria, belligerence
Apprehension	Clamminess
Fatigue	Tachycardia or bradycardia
Nausea	Tachypnea
Headache	Hypertension (initially)
Dizziness	Hypotension (late sign)
Confusion	Seizures
Euphoria, belligerence, overconfidence	Arrhythmia
Insomnia	
Hot or cold flashes	
Numbness	
Tingling	

Factors influencing hypoxia

- Altitude
- Rate of ascent
- Time at altitude
- Individual tolerance
- Fitness of individual
- Activity at altitude
- Temperature at altitude
- Medications, toxic substances, smoking

Time of useful consciousness

- The time between loss of O_2 supply and dysfunction as it relates to altitude

Table 2-5: Time of Useful Consciousness (TUC) at Various Altitudes

Altitude (ft)	Altitude (m)	Approximate TUC* (minutes)
18 000	5 486	20–30
25 000	7 620	3–5
30 000	9 144	1.5 (90 seconds)
40 000	12 192	≤0.25 (15 seconds or less)

*Individual tolerance varies.

Management of hypoxia

- Recognize potential need prior to definite need
- Highest concentration available
- Utilize pulse oximetry
- Humidify O_2 if possible

Oxygen Administration

- For barometric changes
  - $FiO_{2\ (at\ flight\ level)} = \dfrac{FiO_2 \text{ X Barometric pressure one}}{\text{Barometric pressure two}}$

- Example:
  - Flight level = 5000 ft
  - Barometric pressure one = 760 mmHg
  - Barometric pressure two = 632 mmHg

- $FiO_{2\ (5000')} = \dfrac{0.5\% \text{ X } 760 \text{ mmHg}}{632 \text{ mmHg}} = 0.6\%$

Oxygen paradox

- Approximately 15 second period when the hypoxic patient's symptoms actually worsen following oxygen administration
- Researchers unsure of cause
- Possible link to role of O_2 - CO_2 balance regarding vasoconstriction / vasodilatation

Interfacility transport

- Landing pad or landing zone
- Latter requires ground ambulance transport from LZ to hospital
- Consults and agreement for transfer between facilities done prior to dispatch of aircraft
- Standing and direct orders in conjunction

Scene response

- GPS coordination
- 150 sq ft landing area
- Closest approved landing zone
- Landing zone safety

Scene response

- Paramedics and TMR capable MFR’s have ability to discuss scene / patient specifics with crew prior to arrival
- Paramedics and MFR’s can have patient extricated, treated, and prepared for transport prior to arrival of aircraft
- Minimal on scene time required

Landing zones

- Pads at airports and hospitals
- Landing zones throughout province
- Require lighting @ night
- Require landing zone officer
- Dusty site may need wetting

Safe approach

- Fixed wing
  - Be guided by flight crew / ground crew
  - Reverse unit using spotter to loading doors
  - Avoid propellers / wings
- Rotary craft
  - Avoid rotors
  - Approach from front / front lateral areas
  - Ensure pilot / crew is aware of you
  - Approach in a crouch
  - Hold long equipment level with ground

Pre flight safety measures

- Daily maintenance
- Equipment assessment
- Pre load checklist
- Start up check

Repatriation

- Fixed wing aircraft commercial / private / air ambulance
  - Province to Province
  - Country to Country
  - Continent to Continent
- Extrication often prolonged / awkward

Indications for Adult (Hospital)

- These are guidelines only and may not apply to several regional hospitals with more advanced capabilities
  - Final decision for transfer will occur with Medical Control Physician input
    - Dissecting/bleeding aortic aneurysm
    - Intracranial bleed (e.g. subarachnoid hemorrhage)
    - Severe hypothermia/hyperthermia
    - Patients in need of emergency cardiac surgery (e.g. ruptured mitral valve)
    - Patients needing mechanical ventilation and/or inotropic support for shock states (such as septic shock)
    - Unstable patient who may warrant investigations not available at referring institution
    - Severe poisonings
    - Renal failure (acute) where dialysis is not available
    - Uncontrollable seizure activity (status).
    - Indications for hyperbaric oxygen therapy

Contraindications

- Patient in full arrest
- Terminally ill patient
- Active untreated communicable disease that would put the crew at risk.
- Uncontrollable, combative patient
- Patient of sound mind who refuses transfer
- Unstable patient, who requires a procedure (i.e. laparotomy) which could be performed at the sending centre
- Stable patient in whom another means of transport would be more appropriate

Special Considerations - Trauma

- Physiologic Criteria:
  - Systolic BP < 90 with hypoperfusion
  - Ventilatory Compromise (RR < 10 or > 29)
  - Glasgow Coma Scale $\leq$ 12 or evidence of significant head injury
- Anatomic Criteria:
  - Amputation proximal to elbow or knee.
  - 2 or more proximal long bone fractures.
  - Suspected spinal cord injury with neurological deficit.
  - Severe maxillofacial injury with potential airway compromise.
  - Burns (2nd, 3rd, chemical, inhalation) >15% TBSA.
- Mechanism Criteria:
  - Gunshot wound proximal to knee or elbow.
  - Significant penetrating wound to head, neck, chest, abdomen, or groin.
- Logistical Criteria:
  - Simultaneous arrival or presence of 3 or more multiple-trauma patients and / or local resources are overwhelmed.

Adult Pt Preparation

- Airway
  - Intubation is essential if there is any concern about oxygenation, ventilation, obstruction or altered level of consciousness or concern about pending airway compromise (e.g. inhalation thermal injury)
- Breathing
  - Oxygen is essential, to keep SaO_2 >95%
  - Chest Tubes pre-flight are essential if there is evidence of pneumothorax, hemopnuemothorax, significant post-traumatic SQ emphysema, or significant post-traumatic pulmonary contusion
    - larger chest tube is most appropriate (28-32 Fr.)
    - non-trauma patient where only air is to be drained, a smaller sized tube is acceptable
- Circulation
  - IV access (two large bore IV sites)
  - Fluids: Normal saline (unless contraindicated)
  - Blood Products
  - Monitoring:
    - Cardiac monitoring, oxygen saturation, temperature and blood pressure
    - Foley catheter with urine output monitoring

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Adult Pt Preparation

- Pelvic Splinting
  - In a hemodynamically unstable patient with a suspected pelvic fracture

- Other
  - Consider: NPO and use of orogastric or nasogastric tube pre-transport
  - Lab Work: Any recent lab work including CBC, lytes, BS, blood gases.
  - X-Rays: Chest x-ray is of most importance. C-spine and pelvis if possible but not essential
  - C-Spine
  - Photocopy of the patient’s information
    - prehospital record, hospital chart, a signed consent to transfer care, relevant X-rays/CTs, a brief transport note from the referring MD and name of accepting MD and place of patient destination.

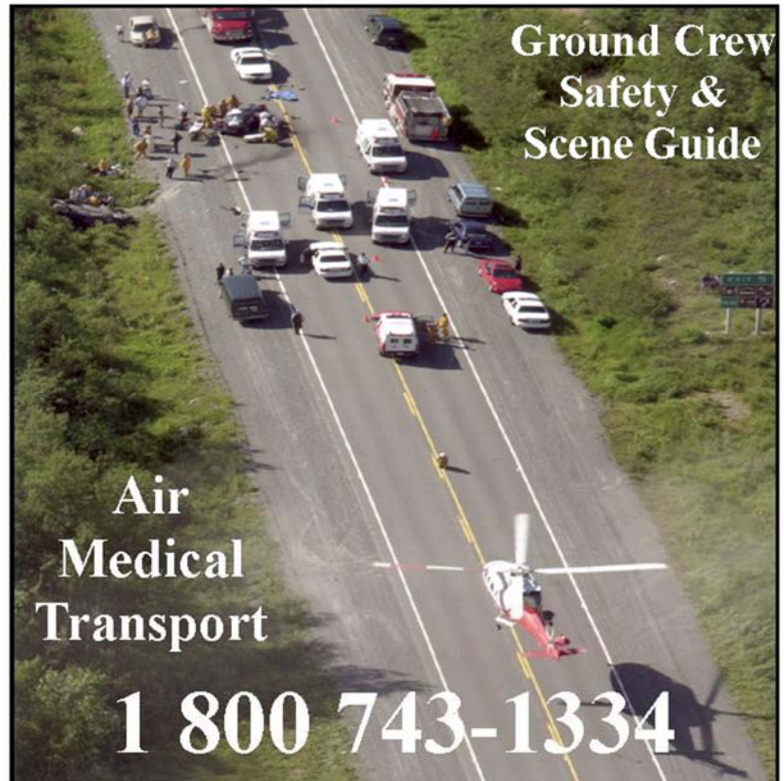
Indications – Youth (Hospital)

- Asthma, croup, bronchiolitis, pneumonia or other respiratory conditions who:
  - are ventilated or in imminent need of ventilation
  - are intubated or in imminent need of intubation
  - require more than 40% oxygen to maintain Saturations 94%
  - require hourly or more frequent aerosols
  - have visible respiratory distress and increased work of breathing
  - have a respiratory or metabolic acidosis on blood gas analysis
  - have an upper airway obstruction, mediastinal mass or foreign body
- Sepsis and signs of manifest or impending shock, particularly those with immune suppression.
- Unstable cardiac conditions including arrhythmias, heart failure, unstable or unexplained cyanosis.
- Status epilepticus, coma, meningitis, or increased intercranial pressure.
- Unstable metabolic conditions
- Significant head or spinal injuries, cardiothoracic injury, limb amputation, burns, smoke inhalation, near drowning or multi-system trauma.
- Drug ingestions that may require dialysis or life support.
- Rare life threatening systemic conditions such as Hemolytic Uremic Syndrome

NOVA SCOTIA Department of Health

EHS Emergency Health Services LifeFlight

NOVA SCOTIA Department of Health



EHS LifeFlight provides Nova Scotia's air medical transport (AMT). The AMT program provides rapid emergency air transport for critically ill and injured patients from hospitals as well as from the scene of an accident.

This safety and scene guide is a quick reference for all EMS agencies. These cards will familiarize all agencies involved with the indications for requesting LifeFlight and how to access air medical transport, set up and secure a Landing Zone, communicate with the LifeFlight crew, and be safe around the helicopter.

"Safety: A team Approach"

Our primary goal is to provide a safe air medical environment for all team members (Ground and Air) and patients. This can only be accomplished by us looking out for each other and ensuring that we all work safely. If at any time you do not feel comfortable or safe doing any of the tasks requested of you by the LifeFlight crew, please let us know ASAP. If you have any "non-urgent" questions about the information contained in this Safety Guide, feel free to call us at our base (902) 873-3657. If you have any urgent questions (mission related) on the information contained in this Safety Guide, call the EHS Communications Centre at 1-800 743-1334 or on "AMT Air", via the Trunked Mobile Radio (TMR) system.

Requesting EHS LifeFlight for Scene Response

Putting EHS LifeFlight on "STAND-BY"

Any Ground EMS agency (Fire, Police, Ambulance, etc.) may put LifeFlight on "STAND-BY" while you assess the patient. Here are some general guidelines to assist you in determining whether to put LifeFlight on stand-by.

- Patient has life or limb time-dependent injury and AMT may significantly decrease time to definitive care.
- Patient may require critical care or advanced Life Support beyond the capabilities of local ground-based pre-hospital practitioners.
- Critical care personnel and equipment may be needed to enhance care for the patient during transport.
- Weather or road conditions may delay patient access to the appropriate hospital.
- Extrication & ground transport time of greater then 30 minutes for critically ill/injured patients whose condition is likely to worsen in transport, and air transport will significantly reduce that time.

This can also be done by radio communication with EHS Communications Centre or by calling our 1-800 emergency phone number on the front card.

Be prepared to communicate the following to Dispatch:

- Requesters name, agency and call back number. Give the service, Unit #, and the level of medical training.
- Exact location of occurrence: use highway numbers and distance to closest town or Global Positioning System (GPS) coordinates.
- Number and ages of patients possibly needing air transport.
- Mechanism of injury or type of illness.
- Weather conditions at the scene: wind, lightning, visibility, freezing rain, etc.
- What other resources are on-scene at present.

After putting EHS LifeFlight on stand-by, scout out a good LZ while noting the hazards. During this time LifeFlight will quickly prepare the helicopter, file flight plan, etc.

"Launching" EHS LifeFlight

Once the need for LifeFlight has been established via the criteria listed on the next card, EHS Paramedics (P1, P2, P3, or CCP) at the scene must contact EHS Communications Centre to "LAUNCH" EHS LifeFlight. The Paramedics will then call-conference with the LifeFlight Medical Control Physician (MCP) via TMR, providing them with the following information.

Communicate the following to the EHS LifeFlight MCP:

- Patient age, pertinent medical findings, mechanism of injury, and current vitals.
- Pertinent past medical history.
- Treatment given thus far and response.

The EHS LifeFlight MCP has the final say whether the LifeFlight crew shall continue with the mission or abort. The LifeFlight MCP will advise the Paramedics at the scene how to proceed with patient care and are able to provide "Patch Orders" as per EHSNS provincial protocols if needed. The EHS LifeFlight MCP will also designate a rendezvous LZ (scene, community helipad, airport or hospital helipad).

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Indications For Paramedic Launch of LifeFlight To The Scene For Trauma

"Launch" LifeFlight if the patient is a victim of penetrating and/or blunt trauma, with one or more of the following indications present.

Anatomic Criteria:
- Amputation proximal to elbows or knees
- Two or more suspected long bone fractures
- Suspected spinal cord injury
- Severe facial fractures with possible airway compromise
- Burns > 15% Body Surface Area (2°, 3°, chemical or inhalation)
- Pediatric Trauma Score ≤ 8

Physiologic Criteria:
- Glasgow Coma Scale ≤ 12
- Respiratory rate < 10 or > 29 breaths per minute
- Shock, or significant hypotension (BP < 90 mmHg systolic)

Logistical Criteria:
- Simultaneous occurrence of three or more trauma patients, and/or local resources are overwhelmed with victims

Mechanism Criteria:
- Gunshot wound proximal to elbow or knees
- Any significant penetrating wound to the head, neck, chest, abdomen or groin

Other:
- Paramedic Judgement

"Remote" Medical / Trauma Scene Response

Consider EHS LifeFlight if the patient is in a remote/isolated area where access/extrication is difficult or impossible by ground ambulance. If the "Remote" patient presents with a significant traumatic injury or an acute medical condition, EMS should contact LifeFlight via EHS Communication Centre ASAP. The agency with the highest medical training at the scene may request LifeFlight to launch. They will be call-conferenced with the LifeFlight MCP first. Be prepared to provide the scene specifics and patient findings. The LifeFlight MCP will decide if the helicopter will be launched. While one member of ground EMS is talking with the LifeFlight MCP, have another member scout out a nearby LZ that meets LifeFlight requirements. Inform dispatch of the LZ location, hazards, and proximity to the scene. If no LZ can be found, inform LifeFlight. A suitable LZ may be identifiable from the air.

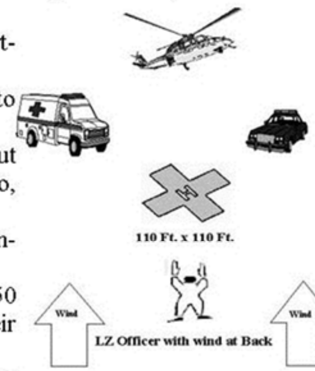
Daylight vs. Nighttime LZ Options

Possible Daylight LZ	Possible Nighttime LZ
Scene	
LifeFlight Community Helipad	LifeFlight Community Helipad
Hospital Helipad	Hospital Helipad
Airport	Airport (Night Rated)

LifeFlight will not land at a scene LZ after dusk or before dawn.

Landing Zone Set-up & Control

- Identify one person as the "Landing Zone Officer (LZO)"
- Identify people as "Security Officers"; keeping everyone back 100 ft from the LZ perimeter
- The LZ should be a firm, level surface 110 ft x 110 ft (35x35 Paces)
- The LZ should be free of overhead obstructions; trees, wires, signs, etc.
- Nearby obstructions must be identified; poles, wires, antennas, etc.
- Secure or remove debris/objects; branches, trash cans, stretcher sheets, etc. on and around the LZ.
- If the LZ is dusty, have the fire department wet it down.
- Turn all emergency vehicle lights on to help identify the LZ.
- Fire Departments should not lay out hoses. If they have already done so, they should be charged.
- Ensure that everyone stays back, including vehicles.
- The LZO should be approximately 50 ft. outside the LZ perimeter with their back to the wind.
- The closer to the scene the better, but remember that safety is of the utmost importance. Roads, highways, and nearby fields all make good LZ's, provided that there are no hazards.
- If setting up the LZ on a road or highway, set up road blocks approximately 500 meters on either side of the LZ. Ensure that traffic is stopped in both directions.
- The helicopter will be approaching / landing / taking off and departing into the wind. Therefore, the direction they came in before may be different this time.
- The final decision where and when to land will be with the pilots.
- Close vehicle doors, leave the stretcher in the ambulance and secure loose objects. Hats without chin straps will be gone!



Night time at pre-designated Landing Zones

* Use an EHS LifeFlight approved Lighting Kit. Place lights at each corner, shining at opposite florescent cone to identify LZ.
* Point out hazards by shining lights on them, i.e. Poles, trees, wires, etc.
* Do not shine lights directly at the helicopter or use flash bulbs.

Scene Pre-Landing Check List

Terrain / Security
- Firm & level surface
- Free of large rocks / bushes
- Dusty surface watered down
- Security around safety zone ready

Obstacles / Hazards
- Street signs near LZ identified
- Vehicles out of LZ & Safety Zone
- Antennas / towers / trees identified outside Landing Zone

Wind / Communications
- Wind direction identified by LZO
- LZO on right frequency
- LZO reviews hand signals

Wires / Road Blocked
- Wires identified near LZ
- Fences near LZ identified
- Road blocked 500 meters either side of LZ

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Communications

Good communication between EHS LifeFlight, EMS (LZO, Fire, Police, Ground Paramedics, etc.), and the EHS Communications Centre is essential in providing high quality patient care, as well as maintaining safety for all involved.

The "**AMT Air**" talk group on the Trunked Mobile Radio (TMR) is the preferred mode of communication for EMS personnel to communicate with the LifeFlight crew. If you are in an area that is out of TMR network coverage, switch to the "**AMT Sim**" talk group. "AMT Sim" will operate as a simplex talk group allowing direct antenna to antenna communication. These are restricted talk groups that are programmed in all public safety service TMR portables and mobiles. Only those that are assisting LifeFlight on a mission are allowed to be on these talk groups. If you do not have access to a TMR radio, communication can be established via **VHF FM** "**Mutual Aid**" or "**Disaster/Air Med**" simplex frequencies.

At least ten minutes prior to LifeFlight's arrival at a scene or community pad, the LZO should be on one of the talk groups or frequencies listed above. Initial contact should be made between the parties, confirming that the LZ is set up, controlled, hazards identified and if required, community pad illuminated. Upon notification of final approach, radio silence should be observed unless the LZO or EMS identify a safety concern or problem on or near the LZ. Both the LZO and EMS will be acting as extra sets of eyes warning the LifeFlight crew of possible hazards, wires and people that are too close to the LZ. If a safety concern is identified, notify LifeFlight immediately. LZO communication on final approach should be visual (as outlined below) due to the high noise level. Continuing to monitoring the radio as well.

The LZO should be wearing eye protection, bright colored clothing and be familiar with the following signals:

Land here: Both arms raised above head, facing LZ with wind at their back, standing approximately 50 ft. back from the LZ perimeter. This indicates to the pilots the location, that it is clear to land and the wind direction.

Abort landing: Both arms waving widely overhead. This indicates that the LZ is not clear and to abort the landing attempt.

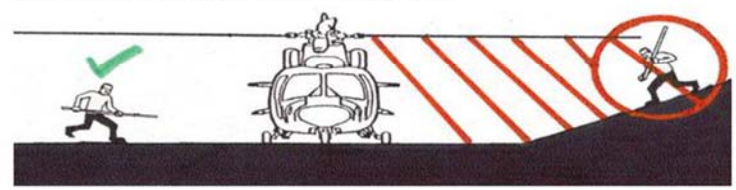
All Clear: Thumb up on one hand with fist clenched. This indicates that the landing is good and the LZ remains clear of debris, people, etc.

All parties will remain on one of these talk groups or frequencies anytime the rotors are turning, or until the rotors have come to a complete stop. During warm-up, take-off, and two minutes post take-off, the LZO and EMS personnel are to be on one of these talk groups or frequencies for the same reasons.

Safety Around The Helicopter

- Never approach or depart the helicopter unless guided by the LifeFlight crew. They will approach you first.
- When guided to approach the helicopter, only do so in the green areas. All other areas could be fatal!
- Never walk behind the helicopter because the tail rotor spins at such a fast rate it cannot be seen and therefore can be fatal.
- Never approach or depart from the front of the helicopter as this area is where the main rotor blades have the lowest clearance.
- Never run. Always walk and always keep your head down when approaching or departing the helicopter
- No backing up of emergency vehicles to the helicopter unless directed to by the pilot. If directed, keep the pilot in sight as he will be spotting you in order to avoid the ambulance hitting the rotor blades.

- On uneven ground, always approach and depart the helicopter on the downhill side. Never approach and depart on the uphill side!
- Remember to always carry IV's, objects or equipment at waist height. Nothing goes over your crouched head.
- If asked to assist the LifeFlight crew in carrying equipment to or from the helicopter, always ensure that objects are parallel to the ground – never upright.
- Please help EHS LifeFlight to ensure that no one smokes within 100 ft. of the helicopter. If you see someone smoking too close, please ask them to butt it out, well away from the Safety Zone.



Safety: A Team Approach

Nova Scotia Fire Service	*EHS* Communications Centre
Nova Scotia Police Service	*EHS* Ground Ambulance Service
Nova Scotia Ground Search & Rescue	*EHS* LifeFlight

EHS Emergency Health Services LifeFlight

693 Barnes Dr.
Halifax International Airport
Enfield, Nova Scotia
B2T 1K3
Phone: (902) 873-3657
Fax: (902) 873-3987