New Hampshire Department of Safety

Division of Fire Standards & Training
And
Emergency Medical Services

Student Manual

Rapid Sequence Intubation

The Role of the NH
EMT-Paramedic

May 2011

NH Fire Standards & Training and Emergency Medical Services
Toll Free: 1-888-827-5367
33 Hazen Drive, Concord, NH 03305
Business: (603) 271-4568

INTRODUCTION

Securing and maintaining an airway is a paramedic's highest priority when caring for critically ill or injured patients. When required, advanced airway interventions must be performed quickly and efficiently by an experienced individual with the goal of establishing a definitive airway while minimizing any possible complications. The State of New Hampshire, Division of Fire Standards and Training and Emergency Medical Services (FST&EMS) had established a Rapid Sequence Intubation (RSI) program which offers an advanced technique using medications to facilitate intubation. In order to be performed successfully, it requires an experienced provider with a thorough understanding of the indications, contraindications and pharmacology of RSI medicines.

This class will discuss the recognition of airway compromise and management as well as the proper use of RSI medications and clinical skills with the goal of developing a paramedic confidence and competence to successfully and safely perform RSI in the pre-hospital setting.

RAPID SEQUENCE INTBUATION CREDENTIALING PROCESS

In order to ensure the RSI program operates at a safe and efficient level, FST&EMS has stringent requirements for paramedics who wish to complete the credentialing process.

The first step in the process is to decide whether you, as a paramedic, are ready to take on the added responsibility associated with performing RSI. Are you completely comfortable with your basic airway and intubation skills or do you need more time to develop them? Are you intimately familiar with the back up airways and medications? If not, then RSI is not for you. Basic airway management is not a part of this program. Rather is it expected that anyone wishing to obtain RSI privileges be able to demonstrate mastery of basic airway assessment and management, as well as endotracheal intubation.

Once ready, you will need to complete some competencies and meet other minimum requirements:

- Been a paramedic for a minimum of 2 years
- Documented a minimum of 5 successful field intubations. This is beyond any intubations performed as a student
- Completion of the Airway Assessment Module
- Completion of the Backup Airway Module
- Completion of the Pharmacology Module
- Completion of the Malignant Hyperthermia Competency
- Completion of the Rapid Sequence Intubation Module (aka Putting it all Together)
- Successfully complete the RSI in-service. This involves the RSI class, a final written exam, practical exams on the backup devices and completing RSI SimLab with Medical Director.

Once the requirements are met the EMS Medical Director and Unit Leader will review your packet and, if satisfied, give you final approval. Once you have protocol, they must be renewed every 2 years. The renewal process will require:

≥10 successful prehospital RSIs (no further recertification required)

<10 successful prehospital RSIs (two options)

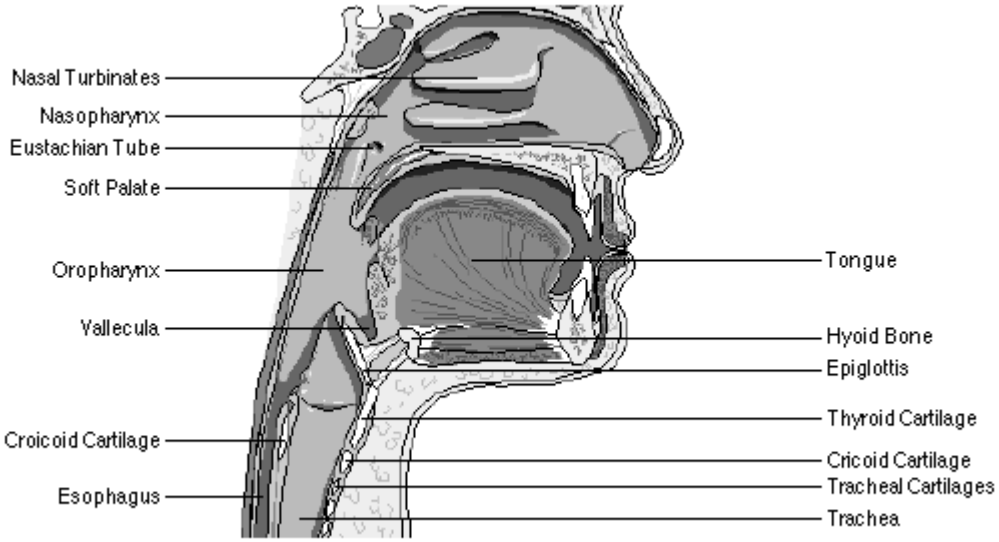
1 - Challenge SimLab final practical and exam with approval from program Medical Director.

2 – Complete NH RSI training modules/SimLab

The airway is divided into 3 regions, each with separate structures:

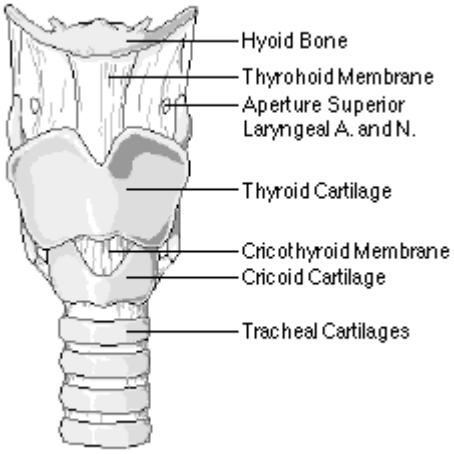
Upper Airway

The face and the facial skeleton and are considered components of upper the airway. The upper airway heats, humidifies and conducts air into the lower airways. Problems can arise from obstructions, fractures and soft tissue injuries.



Middle Airway

The middle airway consists primarily of the larynx. It is fairly well protected but is susceptible to injury. The larynx is comprised of cartilage and contains the vocal cords. Because it is narrow, edema, secretions, or foreign bodies can quickly cause problems.



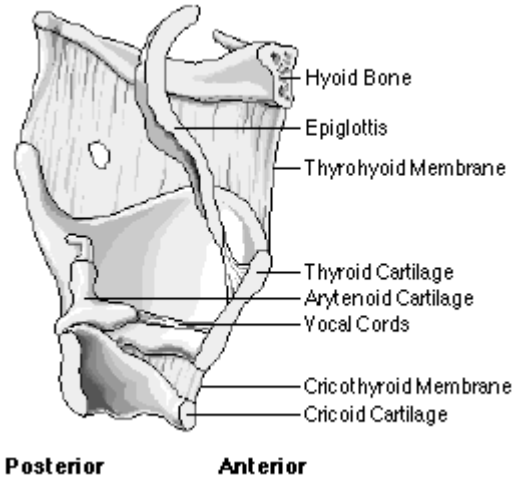
The rigid laryngeal structures are the hyoid bone, thyroid cartilage, cricoid cartilage and arytenoid cartilage. Inferior to the cricoid cartilage are tracheal cartilages. The cricoid cartilage is a complete ring and can be used to prevent passive reflux of stomach using cricoesophageal pressure (Sellick's Maneuver)

Laryngeal Cartilages

The Cricothyroid artery is a small branch of the superior thyroid artery. It travels along the inferior border of the thyroid cartilage and becomes smaller as it reaches the midline. Cricothyroid puncture in the midline, inferior part of the membrane above the cricoid cartilage is least likely to produce bleeding.

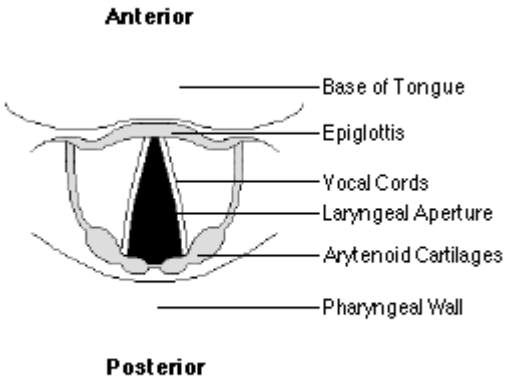
The large superior and inferior thyroid arteries

supply the thyroid gland. The gland is highly vascular. A pyramidal lobe may extend to the hyoid bone. Puncture below the cricoid cartilage has increased risk of bleeding. Palpate the puncture site carefully and avoid any masses (Engel et al, 2001).



Laryngoscopic View

View during laryngoscopy is variable. Under ideal circumstances the epiglottis, arytenoid cartilages and nearly the entire vocal cords will be visible.



Lower Airways

The lower airway begins at the trachea as it exits the neck and enters the chest. It consists of c-shaped cartilage rings held together by elastic-muscle tissue posteriorly, divides into the right and left mainstem bronchi and continues to the lung tissue.

INDICATIONS

One of the basic functions of a paramedic is to ensure a patent airway. A paramedic must be able to rapidly identify patients at risk and determine the most appropriate method to manage the airway.

When determining the best method for maintaining an airway, consider the following:

- Is the patient at risk for a positional obstruction or aspiration?
- Is there inadequate oxygenation and/or ventilation?
- Is the patient's condition is expected to deteriorate?

AIRWAY ASSESSMENT

Difficult Airway Prediction

One of the most important factors when considering RSI is predicting the difficulty of an airway. There are three different dimensions of airway difficulty:

- Difficult to oxygenate
- Difficult to intubate
- Difficult to perform a cricothyroidotomy (Walls 2000)

Being able to predict a difficult airway will help the paramedic decide what interventions and techniques to use for securing the airway.

Anatomic Clues to a Difficult Airway

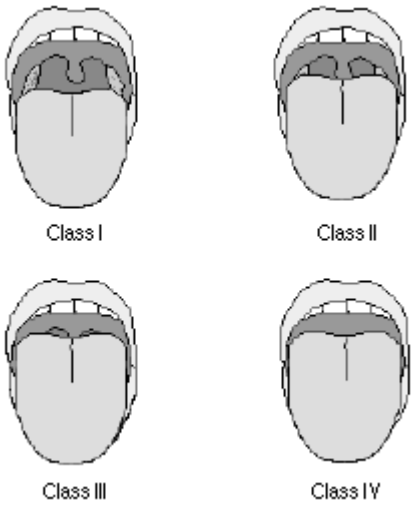
Visualizing the airway can be difficult in patients with the following features:

- Beards or facial hair
- Short, fat neck
- Morbidly obese patients
- Facial or neck trauma
- Broken teeth (can lacerate balloons)
- Dentures (should be removed)
- Large teeth
- Protruding tongue
- A narrow or abnormally shaped face

Physical Examination of the Airway (3-3-2 Rule)

- The mouth should be able to accommodate a width of 3 fingers, incisor-to-incisor, top to bottom. The tongue should be normal sized.
- There should be a 3-finger distance from the tip of the chin to the hyoid bone (see picture)
- There should also be a 2-finger distance from the top of the thyroid cartilage to the hyoid bone

Any patient whose dimensions are smaller that 3-3-2 will probably present an intubation challenge.



Mallampati Classification

The Mallampati classification relates tongue size to pharyngeal size. This test is performed with the patient in the sitting position, the head held in a neutral position, the mouth wide open, and the tongue protruding to the maximum. The subsequent classification is assigned based upon the pharyngeal structures that are visible.

Class I visualization of the soft palate, fauces, uvula, anterior and posterior pillars

Class II visualization of the soft palate, fauces and uvula

Class III visualization of the soft palate and the base of the uvula

Class IV soft palate is not visible at all

The classification assigned by the clinician may vary if the patient is in the supine position (instead of sitting).
If the patient phonates, this falsely improves the view. If the patient arches his or her tongue, the uvula is falsely obscured.

A class I & II views correlate well with a laryngoscopic view grades I & II suggests relative ease of intubation. Class III & IV views suggests a poor laryngoscopic view, which may result in a difficult or failed intubation.

Laryngoscopic View Grading

Grade I: full aperture is visible
Grade II: Lower portion of cords visible
Grade III: Epiglottis only visible
Grade IV: Epiglottis not visible

Grades III & IV are rare. So, if you frequently see Grade III or IV – consider revisiting your technique. A severe grade III or IV view with failed endotracheal intubation occurs in 0.05-0.35% of patients

Cervical Spine Mobility

Patients with decreased C-spine mobility may be difficult or impossible to intubate in the field. As a rule the patient should be able to extend the neck 35º or greater to allow the maximal laryngoscopic view.

Suspected C-spine injury and immobilization also make it difficult to get a good laryngoscopic view. Additionally the application of Sellick's Maneuver has the potential of causing motion on unstable segment. Still, it is important to use cric pressure when performing RSI on these patients.

Airway Obstruction

Any type of airway obstruction, whether from a foreign body, trauma, tumors or edema will make intubation difficult or impossible even if the patient has no other difficult airway indicators.

Medications

Atropine

Dose	0.5mg IVP
Action	Inhibits actions of acetylcholine on smooth muscles, secretory glands and CNS.
Indications	Bradycardia
Onset	Immediate
Duration	4 – 6 hours
Precautions	Tachycardia, flushing, nausea, vomiting

Lidocaine

Dose	1.5mg/kg IVP
Action	Suppresses the cough reflex. Helps mitigate potential increases in ICP, but must be given 3 minutes before intubation.
Indications	Use in patients with reactive airway disease (tight chest) and suspected increased ICP (tight head).
Precautions	Can cause seizures, especially if given rapidly. Takes 2-3 minutes to take effect.

Lorazepam (Ativan)

Dose	1-2mg IVP
Action	Enhances the inhibitory effects of GABA receptors on chloride channels in central nervous system, hyperpolarizing membrane. Induces sleep, decreases anxiety, and impairs memory retention.
Indications	Post-RSI sedation, seizures
Onset	5 minutes
Duration	6-8 hours, dose dependant
Reversal Agent	Flumazenil Dosage 0.1 mg IV (remember you do not want to reversal the entire effect) Reversal of Benzodiazepines with Flumazenil may cause seizures/status seizures.

Midazolam (Versed)

Dose	0.05-0.1 mg/kg IVP
Action	
Indications	Post-RSI sedation, seizures
Onset	1 – 2 minutes
Duration	15 – 20 minutes for single dose

Reversal	Flumazenil (Dosage 0.1 mg IV, remember you do not want to reversal the entire effect, reversal of benzodiazepines with flumazenil may cause seizures/status seizures.)
Precautions	In the prehospital setting, hypotension with midazolam was found to be dose related and thus should be used cautiously in patients with hypovolemia or traumatic brain injury, or both.

Etomidate (Amidate)

Dose	20-30mg IVP
Action	The exact mechanism of action of Etomidate is not known. It is thought to enhance the action of GABA (Gamma-amino butyric acid), the principal inhibitory neurotransmitter in the CNS, by interacting with the GABA-A receptor
Indications	Sedation for RSI
Onset	1 arm-brain circulation
Duration	3-5 minutes, dose dependant
Interactions	Sedative effect of etomidate may be accentuated by concomitant use of barbiturates, alcohol or narcotics.
Side effects	Pain at injection site, Muscle twitching, Hypoventilation may occur, especially with rapid injection, Hypotension (rare), Laryngospasm, Hiccups

Fentanyl (Sublimaze)

Dose	50-100mcg IVP
Action	Binds with opiate receptors in the CNS, altering both perception of and emotional response to pain through unknown mechanism.
Onset	1-2 minutes, often immediate
Duration	30- 60 minutes
Interactions	Consider reducing dose of Fentanyl to ½ of the normal dose if taking any of the following drugs: • Any CNS depressants • Alcohol • MAO inhibitors • Hypnotics • Other Narcotics • Tricyclic Antidepressants
Side effects	Respiratory Depression, Chest wall muscle stiffening, Hypotension/Hypertension, Sedation (CNS depressant), and Nausea/vomiting
Reversal	Naloxone, 0.01-0.04 mg IV (you do not want to block all opiate receptors, use a very small dose and titrate)

Succinylcholine (Anectine)

Dose	150-200mg IVP
Action	Succinylcholine has the briefest duration of action of all neuromuscular blocking agents. Like nondepolarizing blockers, depolarizing drugs also bind to the nicotinic M receptors for acetylcholine. However, because they cause an initial

depolarization of the muscle membrane, they often lead to fasciculations prior to inducing paralysis.

Onset < 1 minute

Duration 5-10 minutes

Side effects Hypotension, Bradycardia, Dysrhythmias, Initial Muscle fasciculations, Excessive salivation, malignant hyperthermia (rare), Allergic reaction

Reversal Neostigmine Methylsulfate 0.5-2mg IV

Special Considerations

- Premedication with atropine should be strongly considered, particularly in the pediatric patient.
- Premedicating with lidocaine may blunt any increase in intracranial pressure.
- Neuromuscular blocking agents will produce respiratory paralysis. Therefore, intubation and ventilatory support must be readily available.
- Carefully monitor the patient and be prepared to resuscitate.
- Administer with caution to patients with severe trauma, burns, and electrolyte imbalances (high potassium levels).
- Brain or spinal cord injury may prolong effects.
- Children are not as sensitive to succinylcholine on a weight basis as adults and may require higher doses.
- Succinylcholine has no effect on consciousness or pain.
- Will not stop neuronal seizure activity.

Rocuronium (Zemuron)

Dose 1mg/kg IVP – Requires on-line medical control

Action Blocks cholinergic receptors on motor endplate, does not result in muscle depolarization, no fasciculations observed. Subsequent nerve impulse transmission inhibited.

Indications RSI, long-term paralysis after RSI

Contraindications Known hypersensitivity

Side effects Respiratory paralysis, malignant hyperthermia, rhabdomyolysis. Increased intracranial, intragastric, and intraocular pressure. No faciciulations.

Special Considerations Consider use of sedative or analgesic to decrease cardiovascular side effects. Eye care to prevent desiccation, abrasions.

Vecuronium (Norcuron)

Dose 0.1 mg/kg IVP – Requires on-line medical control

Actions Blocks cholinergic receptors on motor endplate, does not result in muscle depolarization, no fasciculations observed. Subsequent nerve impulse transmission inhibited.

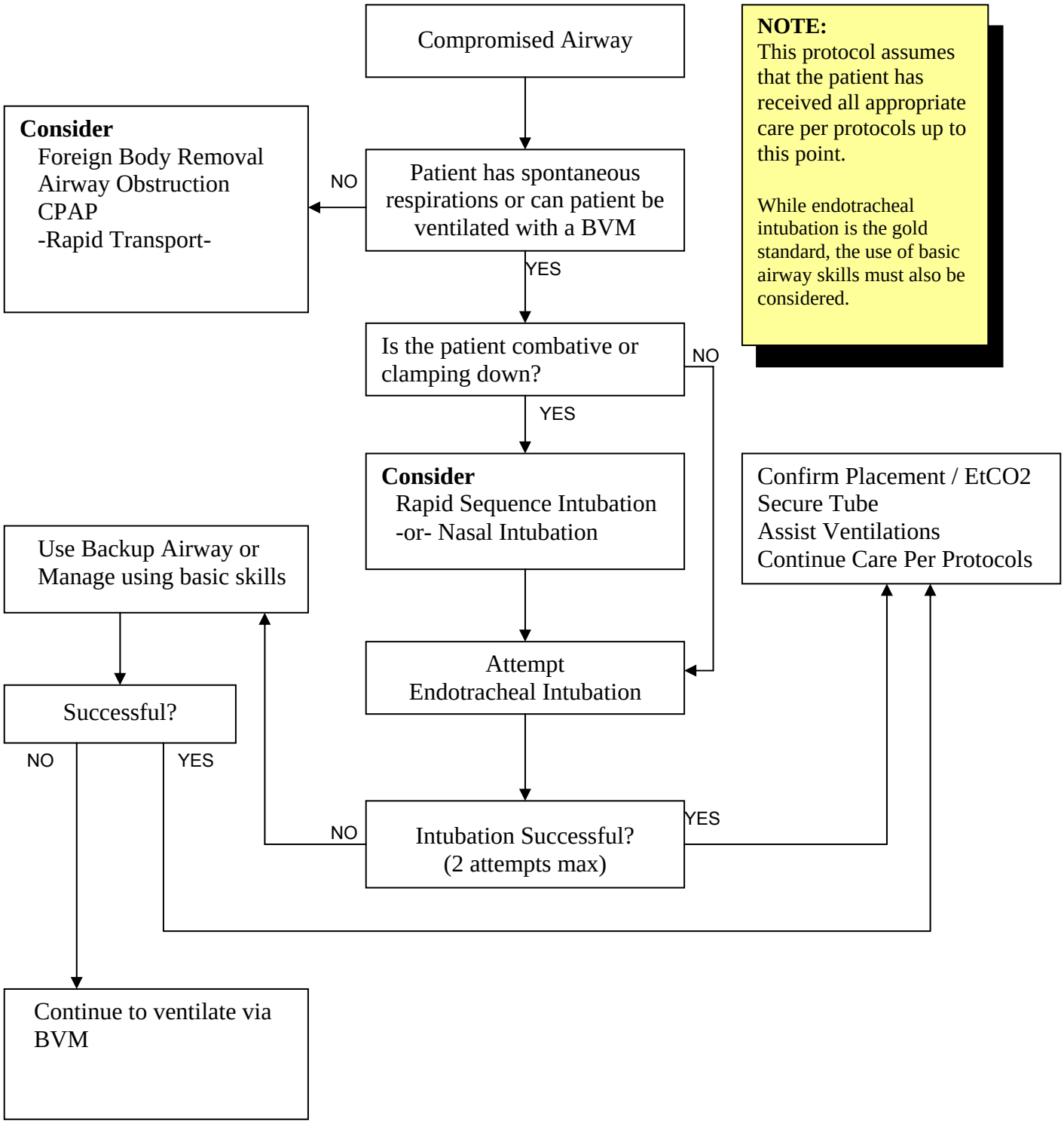
Indications RSI, long-term paralysis after RSI

Contraindications Known hypersensitivity

Side Effects Respiratory paralysis, malignant hyperthermia, rhabdomyolysis. Increased intracranial, intragastric, and intraocular pressure. No faciciulations.

Special Considerations Consider use of sedative or analgesic to decrease cardiovascular side effects. Eye care to prevent desiccation, abrasions.

Difficult Airway Flowchart



DOCUMENTATION AND THE QA PROCESS

The hallmark of any good program is ongoing quality assurance and the Unit Leader and the EMS Medical Director will review all uses of RSI for appropriateness and adherence to protocol. Paramedics are required to complete the QI form after any RSI case, and forward it and a copy of the run report to the paramedic manager prior to the end of their shift.

REFERENCES

Engel, Applegate II, Chung & Sanchez. Management of the Difficult Airway, Cook Incorporated, 2001.

Scanlan, Wilkins & Stroller. Egan's Fundamentals of Respiratory Care, Mosby, St. Louis 1999.

Walls, Luten, Murphy, Schneider. Manual of Emergency Airway Management, Lippincott Williams and Wilkins, 2000.

AIRWAY MANAGEMENT 5.0

ASSESSMENT

Each patient presents unique problems that cannot be fully outlined in any algorithm. As such, the provider must rely on thorough assessment techniques and consider each of the following:

1. **Airway Patency**: Assess for airway obstruction or risk of impending obstruction due to facial injuries, mass, foreign body, swelling, etc. Assess for presence/absence of gag reflex.
2. **Ventilatory Status:** Assess for adequate respiratory effort and impending fatigue/failure/apnea. Assess for accessory muscle use, tripod positioning, the ability of the patient to speak in full sentences. If available, assess end-tidal (ET) CO2.
3. **Oxygenation:** Any oxygen saturation <90% represents relatively severe hypoxia and should be considered an important warning sign. In addition to oxygen saturation, assess for cyanosis.
4. **Airway Anatomy:** Before attempting airway maneuvers or endotracheal intubation, especially with the use of medications, assess patient anatomy to predict the probability of success and the need for backup device or technique.
   - ♦ First, assess for difficulty of mask seal. Patients with facial hair, facial fractures, obesity, extremes of age, and pathologically stiff lungs (COPD, ARDS, etc.) may require special mask techniques or alternatives.
   - ♦ Next, assess for difficulty of intubation. Patients with a short neck, the inability to open their mouth at least three finger widths (or other oral issues such as a large tongue or teeth), less than three finger-widths of thyromental distance (or a receding jaw), reduced atlanto-occiptal movement (such as in suspected c-spine injury), obesity or evidence of obstruction (such as drooling or stridor) may be difficult to intubate.

DEVISE A PLAN

1. Each patient will present unique challenges to airway management. Therefore before any intervention is attempted, the provider should contemplate a plan of action that addresses the needs of the patient, and anticipates complications and how to manage them.
2. Airway management is a continuum of interventions, not an "all or none" treatment. Some patients may only need airway positioning or a nasal or oral airway to achieve adequate ventilation and oxygenation. Others will require more invasive procedures. The provider should choose the **least invasive** method that can be employed to achieve adequate ventilation and oxygenation.
3. Continually reassess the efficacy of the plan and change the plan of action as the patient's needs dictate.
4. In children, a graded approach to airway management is recommended. Basic airway maneuvers and basic adjuncts followed by bag valve mask ventilation are usually effective.

BASIC SKILLS

Mastery of basic airway skills is paramount to the successful management of a patient with respiratory compromise.

- ► Ensure a patent airway with the use of:
  - ♦ Chin-lift/jaw-thrust.
  - ♦ Nasal airway.
  - ♦ Oral airway.
  - ♦ Suction.
  - ♦ Removal of foreign body.

Airway Management continued on next page ⇨

AIRWAY MANAGEMENT continued 5.0

⇦Airway Management continued from previous page

- Provide ventilation with a bag valve mask. Proper use of the BVM includes appropriate mask selection and positioning to ensure a good seal. If possible, utilization of the BVM is best accomplished with two people: one person uses both hands to seal the mask and position the airway, while the other person provides ventilation. If the patient has some respiratory effort, synchronize ventilations with the patient's own inhalation effort.

ADVANCED AIRWAY SKILLS

Only after basic procedures are deemed inappropriate or have proven to be inadequate should more advanced methods be used. Procedures documenting the use of each device/technique listed below are found elsewhere in this manual.

- **ETT:** The endotracheal tube was once considered the optimal method or "Gold Standard" for airway management during cardiac arrest. It is now clear, however, that the incidence of complications is unacceptably high when intubation is performed by inexperienced providers or monitoring of tube placement is inadequate. The optimal method for managing an airway will, therefore, vary based on provider experience, Emergency Medical Services (EMS) or healthcare system characteristics, and the patient's condition.
- **Bougie:** All providers who attempt ETT placement should become intimately familiar with the use of a Bougie. It is the device used most often by anesthesiologists and emergency physicians for helping guide placement when a difficult airway is encountered.
- **Alternate Devices:** Utilize an alternate device when the clinical indications for intubation still exist but conditions prevent intubation or previous attempts at ETT placement have failed. Each device has its own set of advantages/disadvantages and requires a unique insertion technique. Providers should have access to, and intimate knowledge of, at least one alternate device. Examples include:
  - King LT.
  - Combitube/EasyTube.
  - LMA.
- **CPAP:** Continuous Positive Airway Pressure (CPAP) has been shown to be effective in eliminating the need for intubation and in decreasing mortality in properly-selected patients with acute respiratory distress.

DOCUMENTATION

All efforts toward airway management should be clearly documented and, at the minimum, should include the following:

- Pre/post intervention vital signs including oxygen saturation as well as capnography (if available).
- Procedures performed/attempted, including number of failed attempts and who performed each attempt/procedure.
- Size of device(s) placed, depth of placement (if applicable).
- Placement confirmation: methods should include auscultation, condensation in the ETT, symmetrical chest wall rise, as well as at least one of the following—colorimetric EtCO2, capnography, esophageal tube detector.

GUM ELASTIC BOUGIE/FLEXGUIDE 5.1

PARAMEDIC STANDING ORDERS

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- INDICATIONS
  - Same as orotracheal intubation, but unable to fully visualize vocal cords.
- CONTRAINDICATIONS
  - Use of a 6.0 or smaller ETT.
- PROCEDURE
  1. Lubricate Bougie with water-based lubricant.
  2. Using a laryngoscope (Macintosh or Miller blade) and standard ETT intubation techniques, attempt to visualize the vocal cords.
  3. If the vocal cords are visualized, pass the Bougie through the cords while attempting to feel the signs of tracheal placement (see below). The Bougie is advanced until the black line on the Bougie reaches the lip line.
  4. If the vocal cords are **not** visualized, pass the Bougie behind the epiglottis, guiding the tip of the Bougie anteriorly towards the trachea, and assess for signs of tracheal placement (see below).
  5. With the laryngoscope still in place, have an assistant load the ETT over the Bougie and slide it to the level of the lip line.
  6. Advance the ETT over the Bougie, rotating the ETT about 1/4 turn counterclockwise so that the bevel is oriented vertically as the ETT passes through the vocal cords. This maneuver allows the bevel to gently spread the arytenoids with a minimum of force, thus avoiding injury. If resistance is felt, withdraw the ETT, rotating it in a slightly more counterclockwise direction, and advance the tube again. Advance the tube to a lip-line of 24cm in an adult male, and 22cm in an adult female.
  7. Holding the ETT firmly in place, remove the Bougie.
  8. Remove the laryngoscope.
  9. Inflate the cuff with 5 – 10ml of air.
  10. Assess for adequate placement by auscultation (equal breath sounds over the chest and a lack of sounds over the epigastrium with bagging), condensation in the ETT, symmetrical chest-wall rise, and at least one additional method: colorimetric end-tidal CO2 detector, capnography, or esophageal tube detector. (Note: to be accurate, the tube detector should be used prior to ventilation.) Assessment should be repeated often, especially after movement of the patient.
  11. Secure the ETT.
  12. Ongoing monitoring of ventilation status with waveform capnography is required for all patients.
- SIGNS OF TRACHEAL PLACEMENT
  1. The Bougie is felt to stop or get "caught up" as the airway narrows and is unable to be advanced further. This is the most reliable sign of proper Bougie placement. If the Bougie enters the esophagus, it will continue to advance without resistance.
  2. It may be possible to feel the tactile sensation of "clicking" as the Bougie tip is advanced downward over the rigid cartilaginous tracheal rings.
  3. The Bougie can be felt to rotate as it enters a mainstem bronchus. Usually it is a clockwise rotation as the Bougie enters the right mainstem bronchus, but occasionally it will rotate counterclockwise if the Bougie enters the left mainstem bronchus.
  4. If the patient is not paralyzed, he/she may cough.

NASOTRACHEAL INTUBATION 5.2

PARAMEDIC STANDING ORDERS

- INDICATIONS
  - Impending respiratory failure with intact gag reflex, or jaw is clenched and unable to be opened.
- CONTRAINDICATIONS
  - Apnea.
  - Nasal obstruction.
  - Suspected basilar skull fracture.
  - Patient fits on a pediatric length-based resuscitation tape (Broselow Tape).
- PROCEDURE
  1. Pre-medicate nasal mucosa with 2% lidocaine jelly and nasal decongestant spray, if available.
  2. Select the largest and least obstructed nostril and insert a lubricated nasal airway to help dilate the nasal passage.
  3. Pre-oxygenate the patient.
  4. Lubricate the ETT with water-based lubricant.
  5. Remove the nasal airway and gently insert the tube, keeping the bevel toward the septum (a gentle rotation movement may be necessary at the turbinates).
  6. Continue to advance the ETT while listening for maximum air movement.
  7. At the point of maximum air movement, indicating proximity to the level of the glottis, gently and evenly advance the tube through the glottic opening on inspiration.
  8. If resistance is encountered, the tube may have become lodged into the pyriform sinus and you may note tenting of the skin on either side of the thyroid cartilage. If this happens, slightly withdraw the ETT and rotate it toward the midline and attempt to advance tube again with the next inspiration.
  9. Upon entering the trachea, the tube may cause the patient to cough, buck, strain, or gag. This is normal. Do not remove the ETT. Be prepared to control the cervical spine and the patient, and be alert for vomiting.
  10. Placement depth should be from the nares to the tip of the tube: approximately 28cm in males and 26cm in females.
  11. Inflate cuff with 5 – 10ml of air.
  12. Assess for adequate placement by auscultation (equal breath sounds over the chest and a lack of sounds over the epigastrium with bagging), condensation in the ETT, symmetrical chest-wall rise, and at least one additional method: colorimetric end-tidal CO2 detector, capnography, or esophageal tube detector. (Note: to be accurate, the tube detector should be used prior to ventilation.)
  13. Secure the ETT.
  14. Document the ETT size, time, results, and placement depth (in cm at the level of the patient's nare) on the PCR. Also, include in documentation the procedures and devices used for confirmation of tube placement (e.g., bilateral, equal breath sounds and absence of epigastric sounds, end-tidal CO2, etc.).
  15. Ongoing monitoring of ventilation status with waveform capnography is required for all patients.

P

OROTRACHEAL INTUBATION 5.3

PARAMEDIC STANDING ORDERS

- INDICATIONS
  - Apnea/respiratory failure.
  - Impending respiratory failure.
  - Impaired gag reflex.
- CONTRAINDICATIONS
  - Epiglottitis.
  - Facial or neck injuries that prohibit visualization of airway anatomy—relative.
- PROCEDURE
  1. Prepare all equipment and have suction ready.
  2. Pre-oxygenate the patient, if time permits.
  3. Open the patient's airway. While holding the laryngoscope in the left hand, insert the blade into the right side of the patient's mouth, sweeping the tongue to the left.
  4. Use the blade to lift the tongue and the epiglottis, either directly with the straight (Miller) blade, or indirectly with the curved (Macintosh) blade.
  5. Once the glottic opening is visualized, insert the tube through the vocal cords and continue to visualize while passing the cuff through the cords.
  6. Remove the laryngoscope and then the stylet from the ETT.
  7. Inflate the cuff with 5 – 10ml of air.
  8. Assess for adequate placement by auscultation (equal breath sounds over the chest and a lack of sounds over the epigastrium with bagging), condensation in the ETT, symmetrical chest-wall rise, and at least one additional method: colorimetric end-tidal CO2 detector, capnography, or esophageal tube detector (Note: to be accurate, the tube detector should be used prior to ventilation).
  9. Secure the tube.
  10. Document the ETT size, time, results, and placement depth (in cm at the level of the patient's teeth or gums) on the PCR. Also, include in documentation the procedures and devices used for confirmation of tube placement (e.g., bilateral, equal breath sounds and absence of epigastric sounds, end-tidal CO2, etc.).
  11. Reassess tube placement frequently, especially after movement of the patient.
  12. Ongoing monitoring of ventilation status with waveform capnography is required for all patients.

Note: If initial intubation attempt is unsuccessful or ETT placement cannot be verified, monitor oxygen saturations and end-tidal CO2 and ventilate the patient with 100% oxygen via a BVM until ready to attempt re-intubation. If continued intubation attempts are unsuccessful or BVM ventilation is not adequate, consider placing alternative airway.

RAPID SEQUENCE INTUBATION (RSI)—ADULT ONLY 5.4

PARAMEDIC STANDING ORDERS

PREREQUISITES REQUIRED

This procedure is only to be used by paramedics who are trained and credentialed to perform RSI by the NH Bureau of EMS. Either 2 RSI paramedics or 1 RSI paramedic and 1 RSI assistant must be present.

- INDICATION
  - Immediate, severe airway compromise in the context of trauma, drug overdose, status epilepticus, etc., where respiratory arrest is imminent.
- CONTRAINDICATION
  - Extensive recent burns or crush injuries >24 hours old.
  - History of malignant hyperthermia.
- PROCEDURE: THE SEVEN "Ps"

P

1. PREPARATION: The time frame is limited, but the operator must have adequate Ambu Mask/oxygen sources, two laryngoscope handles, an assortment of blades, one working IV or IO, rescue airway devices, oxymetry and capnography monitoring, bulb-style tube checker.
2. PREOXYGENATION: When possible, use a non-rebreather mask for at least 3 minutes to effect nitrogen washout and establish an adequate oxygen reserve. In emergent cases, administer 8 vital capacity mask breaths with 100% oxygen.
3. PREMEDICATION
   - Consider lidocaine (1.5mg/kg) given 2 minutes before intubation to control Intracranial Pressure (ICP) in patients with possible head injury or CNS pathology (hypertensive crisis or hemorrhage).
   - Consider atropine for bradycardia at 0.5mg IV.
4. PARALYZE
   - Etomidate (0.3mg/kg IV; maximum 40mg). Apply cricoid pressure and maintain until ETT is placed, confirmed, and secured.
   - Succinylcholine (1.5mg/kg IV) immediately after etomidate (maximum 150mg).
5. PASS THE TUBE
   - Observe for fasciculations approximately 90 seconds after succinylcholine to indicate imminent paralysis.
   - After paralysis is achieved, follow procedure outlined in Orotracheal Intubation Protocol 5.3 to place the ETT.
6. PROOF OF PLACEMENT—Assess for adequate placement by:
   - Auscultation (equal breath sounds over the chest and a lack of sounds over the epigastrium with ventilations).
   - Condensation in the ETT.
   - Symmetrical chest-wall rise, **AND**
   - At least one additional method: colorimetric end-tidal CO2 detector, capnography, or esophageal tube detector (Note: to be accurate, the tube detector should be used prior to ventilation).

Reassess tube placement often, especially after movement of the patient.

Rapid Sequence Intubation continued on next page ⇨

RAPID SEQUENCE INTUBATION (RSI)—ADULT ONLY continued *5.4*

⇦*Rapid Sequence Intubation continued from previous page*

P

7. POST INTUBATION CARE
   - ◊ Sedation:
     - ✦ Midazolam (0.05 – 0.10mg/kg IV), every 5 – 10 minutes as needed, **OR**
     - ✦ Lorazepam 1 – 2mg IV every 15 minutes as needed for sedation (maximum: 10mg).
   - ◊ Paralysis (via on-line Medical Control only):
     - ✦ Vecuronium 0.1mg/kg IV, **OR**
     - ✦ Rocuronium 1mg/kg IV.

Continuous capnography required for post intubation.

SUCTIONING (ADVANCED) 5.5

INDICATIONS

- Obstruction of the airway (secondary to secretions, blood, and/or any other substance) in a patient currently being assisted by an airway adjunct such as an endotracheal tube, Combitube, tracheostomy tube, or a cricothyrotomy tube.

PROCEDURE

1. Ensure the suction device is operable.
2. Pre-oxygenate the patient.
3. While maintaining aseptic technique, attach the suction catheter to the suction unit.
4. If applicable, remove ventilation device from the airway.
5. Insert the sterile end of the suction catheter into the tube without suction. Insert until resistance is met; pull back approximately 1 – 2cm.
6. Once the desired depth is met, apply suction by occluding the port of the suction catheter and slowly remove the catheter from the tube using a twisting motion.
7. Suctioning duration should not exceed 10 seconds.
8. Saline flush may be used to help loosen secretions and facilitate suctioning.
9. Re-attach the ventilation device and oxygenate the patient.

SUPRAGLOTTIC AIRWAY DEVICES 5.6

This protocol is intended for commercially available blind airway devices. Examples are Combitube, KING-LT-D, EasyTube, and LMA (Intermediate and Paramedic only).

Whereas each device will have its own idiosyncrasies, each provider must be trained, knowledgeable, and experienced with the manufacturer's recommendations for the particular device used.

INDICATIONS

BASIC/INTERMEDIATE STANDING ORDERS

B/I

- Cardiac arrest.

PARAMEDIC STANDING ORDERS

P

- When immediate airway control is desired in the absence of endotracheal intubation.
- Airway control in the absence of other effective methods (e.g., failed airway).
- Situations involving a difficult mask (BVM) fit.

CONTRAINDICATIONS

- The patient has an intact gag reflex or is not profoundly unconscious and may resist the insertion.
- Severe maxillofacial or oropharyngeal trauma.
- Any allergy or sensitivity to latex (the Combitube's pharyngeal balloon contains latex).
- Inappropriate sizing (follow the manufacturer's recommendations).
- The following contraindications apply to devices that are inserted into the esophagus.
  - The patient has known esophageal disease.
  - The patient has ingested a caustic substance.
  - The patient has burns involving the airway.

Note: Not all contraindications are absolute.

- PROCEDURE
  - Each device is unique; follow each manufacturer's specific recommendations for the proper procedure for insertion and use.
  - Assess for adequate placement by auscultation (equal breath sounds over the chest and a lack of sounds over the epigastrium with bagging).
  - In addition to auscultation, confirm tube placement by using either a colorimetric end-tidal CO2 detector or capnography.
  - Secure the device.
  - Reassess tube placement frequently, especially after movement of the patient.
  - After tube placement, continuous waveform capnography is required for all paramedic level units.

TRACHEOSTOMY CARE—ADULT & PEDIATRIC 5.7

BASIC/INTERMEDIATE STANDING ORDERS

B/I

- Routine Patient Care.
- Consult with the patient's caregivers for assistance.
- Assess tracheostomy tube: Look for possible causes of distress which may be easily correctable, such as a detached oxygen source.
- Assist ventilations using bag valve mask device with high-flow oxygen.
- If on a ventilator, remove the patient from the ventilator prior to using bag valve mask device as there may be a problem with the ventilator or oxygen source.
- Suction if unable to ventilate via tracheostomy or if respiratory distress continues. Use no more than 100mm/Hg suction pressure. If the tracheostomy tube has a cannula, remove it prior to suctioning. Determine proper suction catheter length by measuring the obturator. If the obturator is unavailable, insert the suction catheter approximately 2 – 3 inches into the tracheostomy tube. **Do not use force!** 2 – 3ml saline flush may be used to help loosen secretions.
- If the patient remains in severe distress, continue ventilation attempts using bag valve mask with high-flow oxygen via the tracheostomy. Refer to Asthma Protocol 2.2, if indicated.
- If the patient's breathing is adequate but exhibits continued signs of respiratory distress, administer high-flow oxygen via non-rebreather mask or blow-by, as tolerated over the tracheostomy.

PARAMEDIC STANDING ORDERS

P

- If the patient continues in severe respiratory distress:
  - Remove tube and attempt bag valve mask ventilation.
- If another tube is available from caregivers, insert into stoma and resume ventilation (a standard endotracheal tube may be used or the used tracheostomy tube, after being cleaned).
  - If unable to replace tube with another tracheostomy tube or endotracheal tube, assist ventilations with bag valve mask and high-flow oxygen.

Rapid Sequence Intubation

Candidate;_____ Date:_____

_____**INITIAL** _____**RETEST** Evaluator:_____

Time allowed: 10 minutes Start:_____

Stop:_____

Total Time:_____

SCENE SIZE UP & BSI (scene information will be provided by the evaluator)	Points Possible	Points Awarded
Performs ABC's opens / suctions airway as needed. Attempts airway adjunct if indicated.	1	
Starts high-flow O2 by BVM or Non-Rebreather Mask as appropriate	1	
Verbalizes difficult airway assessment, 1 or 2 running IV's, vital signs, etc	1	
Indicates the need for RSI. Verbalizes any anticipated difficulties.	1	
Directs preoxygenation of the patient using a BVM or NRB as is appropriate for the scenario.	1	
May administer lidocaine at this time if appropriate.	1	
Laryngoscope: Selects and attaches blade, check light.	2	
Prepares BVM and connects to high-flow O2 if not previously done.	1	
ET tube: Selects appropriate size, checks cuff integrity, and properly inserts stylette.	1	
Suction: Prepares Yankauer suction, indicates suction is running.	1	
Backup Airways: Has backup airway adjuncts readily available.	1	
Medications: Selects appropriate medications, Draws up correct amount of each for patient's size.	2	
Administers lidocaine prn unless already done. Allows time and observes patient between medications	1	
Administers etomidate.	1	
Directs partner to hold cricoid pressure. Able to explain procedure to partner.	1	
Administers succinylcholine. Allows approximately 45 seconds for medications to take effect.	1	
Supports ventilations if not already being done.	1	
Intubates the patient using good technique. (Recognizes the need to stop and ventilates the patient if not successful after 30 seconds.)	1	
Selects appropriate backup airway adjunct if not successful after 2 attempts.	1	
Confirms tube placement by auscultation of lung sounds/gastric flush.	1	
Recognizes and immediately corrects esophageal or right main stem placement.	1	
Also uses waveform capnography to confirm tube placement.	1	
Secures tube.	1	
TOTAL	25	

Critical Criteria

- ☐ Does not assess ABC's. Does not immediately correct airway problems.
- ☐ Does not stabilize the C-spine of a trauma patient
- ☐ Does not preoxygenate the patient
- ☐ Does not call for cricoid pressure or releases cricoid pressure before the airway has been secured
- ☐ Does not successfully intubate the manikin within 2 attempts
- ☐ Does not verify tube placement
- ☐ Does not prepare suction equipment
- ☐ Administers incorrect does of medication or gives medications in incorrect order

You must factually document on the back of this sheet the reason(s) for not awarding points or for checking any critical criteria.

RSI Education
Competency Check Sheet

Name:_____

Requirement	Date	Verifying Signature
Number of years as a paramedic?		
Documentation of at least 5 un-proctored endotracheal intubations on human, non-cadaver tissue.		
Completion of the Airway Assessment Module		
3 – 3 – 2 Assessment		
Mallampati Classification		
Laryngoscopic View Grading		
Completion of the Backup Airway Module		
Combitube		
King LD-T		
LMA		
Completion of the Pharmacology Module		
Atropine		
Lidocaine		
Etomidate		
Succinylcholine		
Lorazapam		
Midazalom		
Vecuronium		
Rocuronium		
Completion of the Malignant Hyperthermia Competency		
Completion of the Rapid Sequence Intubation Module (aka Putting it all Together)		
Successfully completion RSI SimLab with the EMS Medical Director		Requires signature from Medical Director

Rapid Sequence Intubation
Quality Management

I. Review by EMS Unit's QM Committee/Officer each RSI, Intubation, and Supraglottic Airway for
   A. Appropriateness
   B. Failed attempts
   C. Difficulties
   D. Patients that were not intubated that should have been
   E. Thorough documentation
   F. Feedback to providers
   G. Scheduled review training, as needed

II. Review by Medical Director
   A. Standardized review process using EMSIR and airway review form
   B. Follow up with providers linkage to patient outcome
   C. Remediation if necessary

III. Minimum requirements for each RSI patient entered in TEMSIS
   A. Minimum Procedure Data Elements
      1. Time to patient
      2. Patient age
      3. Patient weight
      4. Provider Impression
      5. Protocol Used: RSI

   B. Required Procedures Documentation
      1. Airway – Insertion: Rapid Sequence Intubation
         a. Document each attempt separately
         b. 2 attempts maximum
         c. Attempt means once blade is placed in the mouth
      2. Any rescue airways, if applicable (KING, Combitube, etc.)
      3. Airway – Confirmation: ETCO2

   C. Minimum Narrative Documentation (see Best Practice samples)
      1. Indications for RSI
      2. Pretreatment/Preparation/Airway pre-assessment
      3. Procedure performed
      4. Observed during procedure
         a. Airway grading
         b. FBAO, fluids, trauma, etc.
      5. Confirmation methods
      6. Post care
         a. Securing method
         b. Tube location
         c. Medications

d. Reassessment

7. Physician tube confirmation
8. Or complete documentation of the 7 Ps of RSI

IV. Report to NH Bureau of EMS

A. On the 1st of the odd months, report Definitive Airway Statistics Report (see template) for the previous 2 months, via email to the Advanced Life Support Coordinator