Rady Children's Hospital San Diego	APPROVAL DATE **June 2017**	MANUAL: **Standardized Procedure**
		SECTION: **Pediatric CHET**
		TRACKING # **SP 3-03**
	TITLE: **ENDOTRACHEAL INTUBATION**	
	☐ **GUIDELINE** ☐ **POLICY** ☐ **PROCEDURE** ☐ **STANDARD OF CARE** ☒ **STANDARDIZED PROCEDURE** ☐ **STANDING ORDERS**	

I. PURPOSE

A. This standardized procedure is designed to establish guidelines that will enable the Advanced Life Support (ALS) Registered Nurse (RN) and Advanced Life Support (ALS) Respiratory Therapist (RT) to perform endotracheal intubation while on transport.

B. The competency validated ALS RN or ALS RT may perform endotracheal intubation ON RCHSD's Campus under the direct supervision of the attending physician or designee.

II. **DEFINITIONS**:

A. Endotracheal intubation for the purpose of establishing an artificial airway due to respiratory arrest or impending respiratory failure.

III. **POLICY**

A. Standardized Procedure (SP) Function(s): Endotracheal intubation for patients requiring establishment of an artificial airway in an emergency setting.

B. Circumstances under which an ALS RN may perform Standardized Procedure function(s):

1. Setting: Rady Children's Hospital San Diego Campus. Any setting or outlying facility in the process of transferring a patient to a higher level of care via the Rady Children's Emergency Transport system
2. Scope of Supervision /Collaboration: Overall supervision is provided by the appropriate supervising &/or attending physician
    a. In the event that an Advanced Life Support policy or procedure is altered via a referring physician (verbal or written order) then the ALS nurse will inform the physician that he/she is not competent to carry out the altered plan and must either adhere to the procedure or relinquish responsibility to the physician.
    b. When possible, the PICU attending should be contacted before the procedure. In all emergencies, the primary physician will be notified as soon as possible while advanced life support is being initiated.
    c. Under all circumstances the Advanced Life Support team will carry out urgent resuscitation according to the procedure.
3. Patient conditions requiring physician notification:

a. Existing ET Tube with no air leak, discuss with Critical Care Physician; avoid changing until back at RCHSD.
b. Unsuccessful Procedure
c. If patient's condition is unstable
d. If there are any complications or unexpected outcomes from the procedure
e. In an emergency; as soon as possible while advanced life support is being initiated.
f. Prior to departure from referring facility with patient status information

C. RN/RT requirements:
1. Education/Training/Experience – below will be documented and maintained in the employee file
2. Attend the Advanced Life Support didactic training classes (minimum of 40 hours)
a. Pass all written and performance tests administered during the course with a minimum of 94% accuracy on the final exam.
b. Demonstrate procedure on manikin
3. Initial Competency Assessment: observed and signed off by team manager
a. At completion of ALS Training will demonstrate assessment and proper preparation of the patient and equipment via simulation
b. Will function as the Team Leader in the "mega code" testing scenario
4. Annual competency Assessment:
a. Complete 2 successful endotracheal intubations supervised by a Attending Physician, NP or experienced ALS RN or ALS RT.
b. Attend twice yearly Operating Room experience, under the supervision of an anesthesia MD, perform 4 successful intubations
c. If minimum number of annual procedures not obtained, the following are options for competency maintenance:
- Attend skills lab offered biannually (procedure review & simulation)
- Complete Annual Competency validation test
- 1:1 simulation & demonstration check off
- Participation with mock codes (expected: 2 annually)

a. If consecutive years of failure to obtain minimum number required procedures ALS RN or ALS RT will be required to again complete Initial competency assessment.

D. RN/RTs authorized to perform Standardized Procedure function(s): A written record of initial and ongoing competency will be maintained in the employee file. A list of Competency Validated RNs/RTs will be kept in the CHET office.

IV. PROCEDURE

A. Database
1. Subjective
a. Historical information relevant to present illness.
b. History including reactions/allergies to medications
2. Objective
a. Physical examination with focus on pulmonary and cardiovascular systems
3. Assessment
a. Decision for endotracheal intubation will be based upon subjective and objective data and in collaboration with attending physician when not an emergent life-saving maneuver.
4. Plan

a. Patients and families will be provided with the appropriate information prior to initiation of the procedure if not an emergent lifesaving procedure, and obtain consent as per hospital protocol.
b. Consent procedure per RCHSD Transport Consent.
c. "Time Out" called prior to procedure if not life-saving emergency.
d. A follow up chest x-ray will be obtained upon completion.
e. The physician must be contacted if any of the following complications occur:
    - Inability to intubate the trachea.
    - Pneumothorax/Pneumomediastinum.
    - Inability to oxygenate or ventilate effectively.
f. Documentation of the procedure performed, outcome, and any complications will be recorded on the Transport Record.
g. In all emergencies, the PICU Attending on-call and the transport physician coordinator will be notified as soon as possible while advanced life support is being initiated. When possible the PICU attending on-call should be contacted prior to the procedure.

Commented [SS1]: Added time out back in recommended by AHP/IDC

B. Indication
1. When continued positive pressure ventilation or mechanical ventilation is required
2. To resolve a critical upper airway obstruction or protect airway due to inability to clear secretions
3. Presence of respiratory failure or impending failure

C. Special Considerations
1. For suspected or confirmed cervical spine fracture and/or injury DO NOT use the "Sniff Position". Must utilize in-line traction during intubation by assigning one person to grasp the head and immobilize in a neutral position and jaw thrust. If an additional practitioner is available, assign that person to grasp both arms and pull.
2. In the presence of massive facial trauma, the ALS team is to support the airway and request an in-house anesthesiologist and/or ENT physician to the bedside.

D. Procedure
1. <u>Initial Set Up</u>
    a. CPAP bag to high flow O2 with peep valve adjusted
    b. Turn on wall suction to 80-100mm of Hg. and attach tubing to a Yankauer suction Suction will be needed to clear oral secretions.
    c. Connect patient to a cardiac monitor and pulse oximeter
    d. Check to be sure that a functioning secure IV is in place. If IV is not functional, obtain IV equipment and proceed to next step. Do not start IV at this point. Should deterioration of patient occur while IV is being started, all equipment, meds and flushes will be ready and accessible.
    e. Obtain ETCO2 detector
    f. Check laryngoscope blade light. Light must be bright. If dim, batteries and /or fiberoptic should be changed.
    g. Ensure appropriate size Laryngoscope blade; a larger blade will ensure reaching the epiglottis. In older children visualization may be enhanced with a curved blade.
    h. Obtain recommended size ETT. Include ½ size above and below the calculated size

ETT Guideline -- Preferences		
Age	Size	Cuffed vs Uncuffed
Newborn	3.0-3.5	Uncuffed
6 months	3.5-4.0	Cuffed
at 1 Year	4.0-4.5	Cuffed
at 2 Years	4.5	Cuffed

at 4 Years	5.0	Cuffed
at 6 Years	5.5	Cuffed
at 8 Years	6.0	Cuffed
at 10 Years	6.5	Cuffed
at 12 Years	7.0	Cuffed

i. Insert a stylette in the tube to make the tube more rigid. Stylette should not penetrate out of tip of the endotracheal tube. This can cause perforation when inserting into trachea. Keep stylette1cm from distal end of ETT tube. It should be secure in the adapter so that will not advance further during intubation. Place in sterile package and set aside until ready for use.

2. Position: Position patient for maximal visualization and easy access. The patient should be on a flat surface with the head in a midline sniffing position.
    a. Maintain in a supine position, making sure the patient's neck is not hyperextended. Hyperextension of the head can obstruct the airway, because of relatively soft, pliable trachea, thus making the cords more difficult to visualize.
    b. A small pillow under the head will align the oral pharynx and the vocal cords.
3. Oxygen: Pre-oxygenate for 3 minutes with 100% 02 with tight fitting mask or 5 deep crying breaths. Decreases incidence of hypoxia and bradycardia
4. Medications: Administer medications per CHET SP3-02
    a. Full muscle relaxation should occur within to 30 to 45 seconds.
    b. Wait one full minute for optimal intubation conditions.
    c. Preferable no ventilation is performed during this time in order to prevent gastric distention, thereby increasing the possibility of regurgitation.
    d. If mask ventilation is required, only low volume or pressure ("panting") breaths will be administered at pressures less than 20 cm H20
5. IV Access: Start new IV now if needed
6. Intubation: After 45 seconds to one minute assess for adequate relaxation by opening the jaw and assessing resistance. Jaw relaxation indicated that the vocal cords are paralyzed and that it is time to proceed with intubation.
    a. During intubation, listen to and/or watch the cardiac monitor for bradycardia due to vagal stimulation. Bradycardia may make it necessary to stop the procedure and restabilize the patient with bag and mask ventilation before beginning again.
    b. If possible assistant may pull down right corner of mouth. The groove in the laryngoscope blade is for visualization, not a guide for the ET tube to follow.
    c. Advance tip of blade so it comes to rest on the vallecula. The vallecula is a wedge-like space situated between the epiglottis and base of the tongue.
    d. Suction secretions if obscuring vision
    e. Lift the blade slightly upward to expose the opening of the trachea. Identify landmarks. If blade is in the esophagus withdraw slowly so glottis and epiglottis will fall into view. If blade is not in far enough, advance slowly in the vallecula. Lifting the blade upward exposes the glottis. When lifting the blade, raise the entire blade by pulling up in the direction the handle is pointing. Do not let handle and blade rock back onto teeth
        - Anatomy looking into mouth: Trachea is anterior to the esophagus
        - Esophagus is round or oval and the trachea is an anterior-posterior slit-like opening
        - The epiglottis appears as a pink, arched rim, which often tapers to a rounded point.
    f. With the glottis and cords exposed, take ETT in right hand and insert gently into trachea. Pass the endotracheal tube through the right corner of the mouth lateral to the laryngoscope blade so that the view of the vocal cords is not obscured. If the

person intubating is unable to insert the tube in 20 seconds, remove the laryngoscope and ventilate the patient with bag and mask until the patient is stabilized, then begin procedure again.

g. Do not insert the ET tube too deeply into the trachea. Advance only about 2 cm past glottis in the infant and up to 5 cm in the older child. The black vocal cord guide should align at the level of or just past the cords. The ET tube cm marking at the teeth should be: age (Yrs) + 10 cm up to 8 years old.

h. With the right hand held against the face, hold the tube firmly at the lips. Use left hand to carefully remove the laryngoscope without displacing the tube. Remove stylet.

7. Verifying Placement: Keep patient's head in midline position to prevent dislodging tube until the tube can be fixed securely.
    a. Listen with stethoscope to determine placement of the tube. Listen to stomach first and then both sides of chest. Breath sounds should be equal bilaterally. The breath sounds should be louder over the chest than over the stomach. The chest should rise equally with each ventilation.
    b. Confirm placement by placing an end tidal carbon dioxide (ETCO2) detector on end of tube, attach a ventilation bag, t-piece resuscitator or mechanical ventilator and assess for color change when giving positive pressure ventilation (PPV).
    c. Observe a slight rise of the chest with each ventilation and no abdominal distension.
    d. Vapor might be noted in the ET tube. It may be necessary to move the ET tube in or out slightly (1 cm maximum) while auscultating the chest to be sure that both lungs are being ventilated adequately.
8. Once proper ventilation has been established, ventilate patient with anesthesia bag at appropriate rate and pressure with a continuous in-line ETCO2 detector in place.
9. Securing Device: Verify tube depth. Once verified, secure the tube to the patient's face using adhesive tape or other endotracheal tube securing device. Suturing ETT to Fast-trac tape is preferred method of securing ETT for transport.
10. X-rays help to confirm placement of the ET tube. This may be deferred until arrival at RCHSD.

E. Documentation
1. A written consent per hospital protocol will be obtained and placed in the patient's medical record prior to procedure if not a lifesaving procedure. If consent not obtained in advance, parent/guardian to be notified as soon as possible after procedure.
2. Document on transport notes, time of intubation, reason for intubation, size of tube, tolerance of procedure, number of attempts, any trauma and where the tube is sutured/secured (cm marker).
3. A copy of the transport record will be scanned (or paper copy placed) into the patient's record as soon as possible upon final disposition.

V. DEVELOPMENT & APPROVAL

A. Method - Development and approval of this standardized procedure as stated in Policy CPM -1-12
B. Review Schedule – Review every 3 years. Revision process should begin 30 months after most recent approval date and entire review process to be completed within 36 months of last approval date.
C. Required Approval(s)
    1. Pediatric Critical Care CHET team and CHET team leadership (review, revise, approve and provide education and dissemination of changes)
    2. PICU CHET Medical Director (review, revise and approve)
    3. Allied Health Professional/Interdisciplinary Practice Committee (AHP/IDC)
    4. MSEC: Final approval, modification or rejection. ,

VI. REFERENCES:

Curley, M. et al (2007). Critical Care Nursing of Infants and Children 2nd Ed. Philadelphia: Saunders.

Insoft, R.. et al (2016). Guidelines for Air and Ground Transport of Neonatal and Pediatric Patients. 4th Ed. Elk Grove, IL: American Academy of Pediatrics

Nichols, D. (2012). Rogers Textbook of Pediatric Intensive Care 4th Ed. Baltimore: Lippincott Williams and Wilkins

Samson, R. et al (2016). *Pediatric Advanced Life Support*. Dallas: American Heart Association.

VII. CROSS REFERENCES:

A. Development and Approval of Standardized Procedures, Protocols and Standing Orders. CPM 1-12

VIII. ATTACHMENTS: N/A

IX. APPROVALS

A. Pediatric Children's Emergency Transport Team – May 2017
B. Pediatric Transport Team Medical Director – May 2017
C. Allied Health Professional/Interdisciplinary Practice Committee (AHP/IDC) June 2017
D. Medical Staff Executive Committee – June 2017