Appendix I – Christiana Care Protocol: Esophageal Catheter to Guide Ventilation

Procedure:

1. Placement of the Esophageal Catheter
   a. Insert the catheter orally to a depth of 60 cm at the lip with head in neutral position or flexed slightly forward
   b. Attach the “Y” connector of the stylet/catheter to the transducer
   c. Connect a syringe to the transducer 3-way stopcock

2. Confirmation of Placement
   a. Turn the stopcock off to the transducer (open to the syringe and catheter)
   b. Evacuate all the air from the balloon by pulling back on the syringe and then allowing the plunger to return to a non-vacuum position
   c. Turn the stopcock off to the catheter, remove the syringe and “zero” the transducer
   d. Attach the syringe to the stopcock and turn the stopcock off to the transducer
   e. Inject 1.5 ml of air into the balloon
   f. Turn the stopcock off to the syringe (open to the catheter and transducer) to read pressure from catheter
   g. Confirm the catheter is in the stomach by observing pressure increase with abdominal compression
   h. Disconnect the transducer from the stylet “Y” connector and remove the stylet assembly from the catheter (do not re-insert stylet)
   i. Re-attach the extension tubing to the catheter and repeat steps a-e above
   j. Withdraw the catheter to approximately 40 cm, observing cardiac oscillations pressures.
   k. Secure the catheter to the endotracheal tube after verifying proper position

3. Obtaining Measurements
   a. Place the patient in semi-fowlers or reverse Trendelenburg (if not contraindicated) before making measurements to avoid false readings from the heart and abdominal contents pushing against the lungs
   b. NOTE – catheter measurements need to be converted from mmHg to cmH2O by multiplying by 1.36

Calculation of End Expiratory PL to Assess PEEP Setting:
   - Perform expiratory hold maneuver at end exhalation on the ventilator.
   - Note the catheter pressure (PES) during the maneuver
   - Calculate PL as follows: End-Expiratory PL = PEEP - PES
   - End Expiratory PL should be 0+2

Calculation of End Inspiratory PL to Assess Tidal Volume Setting:
   - Perform plateau pressure maneuver on the ventilator.
   - Note the catheter pressure (PES) and PPLAT during the maneuver
   - Calculate PL as follows: End-inspiratory PL = PPLAT - PES
Tidal Volume should be adjusted to keep PL < 20 cmH2O