

***UC Davis Medical Center
Emergency Medicine Airway Equipment:
Contents, Cleaning and Stocking***

Introduction: Due to the large volume of critically ill patients who present for care at the U.C. Davis Emergency Department (E.D.) we have developed a mechanism for equipment maintenance that provides for rapid processing and restocking. What follows is a description of the equipment maintained in the E.D. for use in routine and difficult airway management in both adults and children.

Airway boxes

Rationale: We have developed a standard equipment list for both adult and pediatric airway supplies. These supplies are maintained in a compact and efficient kit which is distributed in a tackle box. This box is portable and reliably supplied to the E.D. from central processing.

Process: The routinely used equipment is cleaned and stocked in the hospital central processing. A total of twenty boxes and their respective contents are maintained in this manner. The senior emergency medicine resident is ultimately responsible for verifying the box contents and including the “*Airway Medication Packet*” (see below) in the readied boxes. After use, the boxes are placed in the “dirty” utility room along with the unused medications for pick-up by central processing. Importantly, to avoid contamination of the unused box contents, the used laryngoscope is placed in a plastic zip lock bag before it is replaced into the box. The box is then left for pick-up in the designated area within the E.D.



Figure 1. Airway box.

Equipment Content: Certain redundancy has been designed into the stocking system to provide a fail safe for the possibility of critical equipment failure.

Adult boxes:

Laryngoscope handles (2 each)

Laryngoscope blades: Miller size 2 and 3. MacIntosh size 2, 3 and 4.

Tubes -- cuffed endotracheal tubes in the following sizes:

8.0 pre-styletted (two each)

7.5 pre-styletted (two each)

7.0, 6.5, 6.0 pre-styletted (one each)

Replacement 14 fr. stylette

Colorimetric end-tidal CO2 detector (1)

Twill tape (60 in.) (two each)

Syringe 20 ml (two each)

Syringe 60 ml with taper tip (1)

Magill forceps, large (1)

Cricothyrotomy kit (scalpel #20, Trousseau dilator, tracheal hook)

Tracheostomy Tube (Portex Blue Line, cuffed, 6.0 (I.D.))

Transtracheal catheter, 14 gauge (1).

Medication, standard (1 packet). For contents and processing, see below.



Figure 2. Contents of the adult airway box (medications not shown).



Figure 3. Contents of adult airway box, including medication packet.

Pediatric boxes:

Laryngoscope handles (2 each)

Laryngoscope blades: Miller size 0, 1, 2, and 3. MacIntosh size 1, 2 and 3.

Tubes – cuffed endotracheal tubes in the following sizes (1 each):

7.0, 6.5, 6.0, 5.5, 5.0, 4.5, 4.0, 3.5, 3.0

Tubes – un-cuffed in the following sizes (1 each):

2.5, 2.0

Stylettes (1 each): 6 fr., 8 fr., 14 fr.

Colorimetric end-tidal CO₂ detectors: pediatric (1), adult (1)

Twill tape (60 in) (two each)

Syringes 10 ml (two each)

Magill forceps, large (one) and Magill forceps, small (one)

Transtracheal catheter, 14 gauge (1)

Cricothyrotomy kit (scalpel #20, Trousseau dilator, tracheal hook)

Broselow tape.

Needle, 18 gauge (2), needle-less adapters (2)

Adhesive tape

Medication, standard (1 packet). For contents and processing, see below.



Figure 4. Example of pediatric airway box (medications are not shown).

Medication Process – the *Airway Medication Packet* is filled by pharmacy and stored in the refrigerated Pyxis system. Upon removal from the Pyxis system, the packages are dated and stored inside the airway box. Due to the potential for succinylcholine degradation, the packet can only remain un-refrigerated for a maximum of 2 weeks. After stocking medications inside the airway boxes, the previously placed red (i.e. “stop”) tie-lock is replaced with the green tie-lock. The green tie-lock then signifies that the contents of the box have been verified and that the medication bag has been added. Further, a green tie-lock with a date written on it signifies that the medications have been drawn up into syringes and are ready for use. After use, all remaining medications are replaced in the original zip lock bag and stored in the box where it will be transported to central processing. In the hospital processing area the medications will be sorted and sent back to pharmacy for storage and restocking purposes.

Medication contained in packet:

- Etomidate (1) – prefilled syringe (40 mg/ 20 ml)
- Succinylcholine (1) – vial (200 mg/ 10 ml)
- Rocuronium (2) – 5 ml vials (10 mg/ ml)
- Atropine – (1) prefilled syringe (0.5 mg/ 5 ml)
- Lidocaine – (1) prefilled syringe (100 mg/ 5 ml)

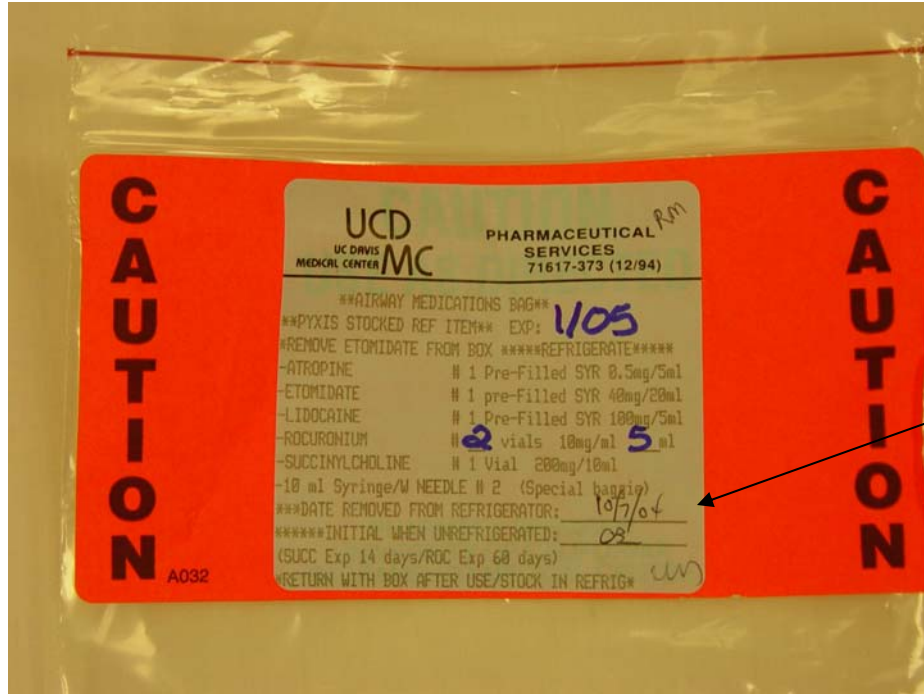


Figure 5. Medication packet label. Note the date of removal from refrigeration must be included on the label before placing in the airway box.



Figure 6. Contents of medication packet (tie-lock not shown).

Tie-Lock Color Coding: The color system is used to rapidly identify a box that is ready for use. The boxes arrive in the E.D. from central processing with a red tie-lock. When they are stocked with medications by the emergency medicine resident the green tie-lock (which comes with the medication packet) is used to replace the red tie-lock. A box with a green tie-lock has been stocked with medications and its content verified by the resident. Upon opening a box for use, the green tie-lock is discarded. Hence, a box without a tie-lock is assumed to have been used and must be sent back to processing for stocking and cleaning. Please note, that there are significant costs for inadvertently sending an un-used box back for processing simply because it does not have a tie-lock. If a box is opened but not used, a new green tie-lock must be placed on the box. There is a supply of green tie-locks stored in Area One for this purpose. The color system is summarized as follows:

Red = Stop. The box is clean but has not been stocked with medication nor its contents verified.

Green = Go. The box has been previously stocked with the medication packet and its contents have been verified. It is ready for use.



Green + Date = Go, as above, but with the medications drawn into syringes.



Please note, only boxes in the resuscitation bays should have medications drawn into syringes.

None = Un-usable. The absence of a tag assumes that the box has been opened and must be assumed to now be incompletely stocked and/or contain contaminated equipment.

Difficult Airway Cart

Rationale: In order to accommodate certain important but infrequently used devices and equipment, we have created a difficult airway cart. The cart is portable and has a large working surface for equipment set up. This cart generally resides in the main resuscitation room. The E.D. nursing staff assists in stocking of contents. However, the ultimate responsibility for the contents resides with the senior emergency medicine resident who is required to check the cart at the beginning of each shift.



Figure 7. Difficult airway cart.

The contents of the cart are as follows:

Side: Portable battery operated bronchoscope.

This scope is secured with a combination lock (combo 0911). After each use the scope must be immediately wiped down and the operating channel irrigated. It must then be immediately given to the E.D. technician for proper cleaning. Do NOT place the scope into a bag, as it may be inadvertently discarded. The initial irrigation of the channel is of vital importance as secretions can dry in the channel and make subsequent cleaning very difficult. This initial cleaning and irrigation is the responsibility of the physician using the scope. Ultimately, the senior emergency medicine resident is responsible for the care and handling of this fragile piece of equipment.



Figure 8. Bronchoscope case on the difficult airway cart.

1st drawer: Topical anesthetic agents: Lidocaine (4%), Viscous lidocaine (2%), Benzocaine (20%). Topical vasoconstrictor: Oxymetazoline (.05%). Small equipment: mucosal atomizer device (MAD) with syringes, cricothyrotomy kits, wire cutters, bite blocks, BAMB caps.



Figure 9. The first drawer of the difficult airway cart.

2nd drawer: Trachlight (assembled and ready for use). Tracheostomy Tubes (Portex Blue Line, cuffed, 6.0 (I.D.)). Difficult airway manual (equipment references).

3rd drawer: Nasal intubation equipment: *Endotrol* (cuffed 7.0), *Endo-Flex* directional tubes (various sizes), Chenoweth stylette, headless stethoscope. Trach equipment: *Shiley* cuffed tracheostomy tubes (sizes 4, 6, 8), *Bivona* armored tracheostomy tubes (cuffed, 6.0). *Flex-It* articulating stylette.

4th drawer: Intubating LMA (sizes 3, 4, 5 with armored tubes and stabilizing bars), Classic LMA (various adult). *Eschmann* Introducers (“gum elastic bougies”).

5th drawer: Percutaneous cricothyrotomy kit (*Cook Melker*, cuffed). Jet insufflator (high pressure tubing and regulator).

6th drawer: Surgical Tracheostomy trays (1 each – pediatric and adult).

Additional equipment

Pediatric LMAs are located in the “Broselow cart” in the pediatric resuscitation room. The sizes included in the cart: 1, 1.5, 2, 2.5, 3. Note these are not “intubating” LMAs.



Figure 10. The pediatric Broselow cart.

Jet insufflator is located in both the pediatric Broselow cart and the difficult airway cart.

Glidescope is located in the peds resuscitation room. Please note, that the handle of the Glidescope must be thoroughly cleaned after each use. The intubator must cap the cable-port and insert the handle into a clear zip lock bag. The bagged handle must then be given to the E.D. technician for cleaning.

Eschmann introducers (bougies) in addition to being located in the difficult airway cart, are frequently maintained at the head of the resuscitation room bays. The variable bedside placement is up to the discretion of the senior emergency medicine resident. Please note, however, that the bougies are a special purchase item and cannot be restocked during the evening shift. It is, therefore, incumbent on the day shift resident to verify that sufficient quantities of the bougies exist. If the bougies are in short supply, notify the day shift clerk to order more. Finally, remember that the bougies are NOT disposable. After use they are to be replaced into their case or bag and returned to central processing by placing them in the utility room for pick up.

Video Mac is located in the adult resuscitation room. It is available for all adult intubations that are appropriate given the Mac 3 and 4 blade sizes. Please, be aware that the fiberoptic bundle is fragile. When done with the equipment the handle is to be removed, placed into a clear plastic bag and given to the E.D. technician for cleaning.

Oral/Nasal airways are located in all of the patient bedside stands as well as the peds resuscitation room.

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