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**PROVINCIAL MEDICAL DIRECTOR'S  
MEDICAL OVERSIGHT QUARTERLY UPDATE  
APRIL 2006**

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**1.0 REVISED POLICIES, PROTOCOLS, PROCEDURES AND MEDICATIONS**

**1.1 The following have been revised and distributed to your bases.**

- 1.2.1
- ▶ Protocol 6214.02: Seizure
  - ▶ Protocol 6220.03: Cardiac Arrest Overview
  - ▶ Protocol 6221.03: Asystole (no shock advised)
  - ▶ Protocol 6222.02: PEA (no shock advised)
  - ▶ Protocol 6223.03: VF/Pulseless VT (shock advised)
  - ▶ Protocol 6311.02: Post Cardiac Arrest - ROSC
  - ▶ Protocol 6226.04: Narrow Complex (stable) Tachycardia
  - ▶ Protocol 6227.03: Wide Complex (stable) Tachycardia
  - ▶ Protocol 6229.03: Suspected Cardiac Origin
  - ▶ Protocol 6254.02: Pediatric Seizure
  - ▶ Protocol 6256.03: Pediatric Cardiac Arrest Overview
  - ▶ Protocol 6257.03: Pediatric Asystole (no shock advised)
  - ▶ Protocol 6258.03: Pediatric PEA no shock advised)
  - ▶ Protocol 6259.05: Pediatric VF/Pulseless VT (shock advised)
  - ▶ Protocol 6280.04: Asthma
  - ▶ Procedure 6614.03: Transcutaneous Pacing
  - ▶ Procedure 6633.05: Manual Defibrillation
  - ▶ Procedure 6634.04: Automated External Defibrillation
  - ▶ Procedure 6641.04: Semi-Automated External Defibrillation - Pediatric
  - ▶ Medication 6900.03: Adenosine
  - ▶ Medication 6921.02: Dimenhydrinate (Gravol)
  - ▶ Medication 6930.03: Epinephrine (Adrenaline)
  - ▶ Medication 6954.03: Midazolam (Versed)
  - ▶ Revised Table of Contents
- 1.2.2 The "Revisions" section at the end of each Policy/Procedure/Medication provides you with a detailed explanation of changes.

**2.0 GENERAL INFORMATION**

**2.1 Apology**

- 2.2.1 I would like to start this quarterly memorandum with an apology to the paramedics for dropping the ball on not providing an explanation behind the new cardiac arrest protocols. With the release of the new AHA Guidelines in December 2005 it was felt that because these were evidenced based we would adopt them to our own system. The major changes you will note are in the

cardiac arrest protocols. We have a cardiac arrest overall protocol which recognizes the three (3) phases of cardiac arrest that I mentioned in the July 2005 memo: 'Early or Electrical Phase'; Middle or Circulatory Phase and Late or Metabolic Phase. As a result if you arrive at a cardiac arrest where no CPR is being performed, you may be giving 5 cycles of PCR before performing defibrillation- depending on the time since collapse. Please refer to the Protocol 6220: Cardiac Arrest Overview to see what I mean.

Also please note only one (1) shock vs stacked shocks under the old guidelines. What makes this even more confusing is that we are in the midst of upgrading our Monophasic Lifepaks to Biphasic Lifepaks capable of 12 lead acquisition and transmission. This means that some of you will be using Biphasic Defibs while others will have Monophasic. The recommended shock energy for Biphasic defibrillation is 200 joules. For now if you are still using one of the Monophasic defibrillators as an ACP you can use it in the manual mode at 360 for the first shock and subsequent shock or paramedics can use it in the automatic mode and allow the three (3) stacked shocks

Other major changes include standardizing CPR to thirty (30) compressions to two (2) ventilations in both adult and children unless there is two (2) rescuers able to do the CPR in which case for children the ratio is fifteen (15) compressions to two (2) breaths. The motto now is push hard and fast then release completely and minimize interruptions of compressions. Coronary perfusion pressure is lost each time CPR is paused and it takes at least 3 - 5 compressions to develop adequate perfusion pressure when CPR is stopped, therefore it is important to minimize interruptions in CPR.

After each shock it is recommended that CPR be immediately started and a pulse check not done until two (2) minutes of CPR has been completed at which time a rhythm is looked for on the monitor and a pulse check can be done. In relation to this, of note is the stoppage of the auto pulse assisted pre hospital international resuscitation (ASPIRE) trial. This trial was testing the effectiveness of the Autopulse CPR assisted device for persons who have experienced a cardiac arrest outside of hospital. It was stopped after a data monitoring board's analysis suggested that there was a potential negative affect in patients treated with the Autopulse. Of note survival to hospital discharge was 9.9% for patients treated with manual CPR and 5.9% for Autopulse treated patients.

There is still little evidence regarding the use of vasopressors and antiarrhythmia drugs. As they remain in the Guidelines we will continue to use them in our protocols for now.

In keeping with the new AHA Guidelines which recommends the acquisition of a 12 Lead ECG in the pre-hospital setting as a Class I recommendation, we are rolling out Biphasic Lifepaks capable of acquisition and sending 12 lead ECGs. The training for these devices has already begun and EMC is in the process of hiring paramedic champions criteria to ensure the success of this program. A systematic review of the literature regarding pre-hospital 12 leads show that there was an average of 36 minute decrease in door to needle time for STEMI patients and in one study a decrease in mortality from 15 - 8% - while increasing scene time by 1.2 minutes.

It is extremely important to keep the scene time to its briefest as the new guidelines for treatment of fibrinolytic therapy is 30 minutes from first medical contact which in your case will mean when you arrive at the patients side until the drug is given. This requires that you do an extremely efficient job of multi-tasking that will include acquiring a 12 lead ECG and transmitting any positive ECGs to the hospital you will be transporting the patient to. Once the patient is loaded and on the way to the hospital you can then radio the hospital to say that you have just transmitted a 12 lead ECG to them and you are on your way in with a patient whose ECG is comparable with a STEMI. For hospital s we can not transmit to we will present the 12 Lead and the Fibrinolytic checklist on arrival at the ED.

We and the Safer Health Care Now Program will monitor the results and effects of this program.

The second phase of this pre-hospital STEMI management strategy would involve looking at the provision of TNK with either Lovenox (for patients <75y/o and Heparin for >75). This will not happen before at least six months has passed by the time 12 leads are placed in an area. Reasons for this are that we need to be sure that the acquisition and transmission of 12 leads is accurate and reliable and we need to earn the support of the medical community.

## **2.2 Versed**

Since the changeover from Haldol I've had at least five (5) reports of patients who were quickly and adequately sedated with Versed. The one concern that is in the literature and that has come up at least once in our patients is that Versed can cause hypoxia. Please monitor any patient who receives Versed for sedation at least with an oxygen monitor probe and - if possible- a heart monitor. Another change to the protocols is in morphine administration where if you can't get an IV Morphine can be given subcutaneously.

### **3.0 FAQs**

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**3.1** The battle is heating up in the endotracheal intubation and RSI debate. I think it is focusing too much on whether endotracheal intubation is appropriate or not in the pre hospital setting. Rather I think we need a philosophy change in the pre-hospital environment and that is success should **not** be measured by whether you can get an endotracheal tube in place. Success should be measured by whether you successfully manage the airway and breathing in the patient as measured by their oxygen saturation. It would appear that in the studies that presented a very negative picture of both RSI and endotracheal intubation there were high incidents of hypoxia and in some cases hypotension as a result of prolonged or failed intubations. We will be changing our protocols regarding airway management shortly. The annual airway refresher will centre around management of the airway not intubation.

#### **3.2 Fluid Bolus**

For some reason this practice still persists in cardiac arrest patients. If the patient has a pulse with CPR then there is not much point giving a fluid bolus. If he has bled out, normal saline will not revive him.

#### **3.3 IVs for PCPs**

I see support is swelling and I must say my resolve is weakening. However, there is no evidence to say this will improve outcomes although I will grant you that it will help ACPs who are partnered with PCPs. I will present the idea to the Registration Committee as well as sit down with Q&L and discuss a training package or for some, a refresher package. I also see that there is discussion of PCPs getting tubes. This is something I am not in favor of. The present literature emphasizes that good basic management of the airway and breathing should be emphasized.

#### **3.4 College of Paramedics**

As you are aware the Act establishing the College of Paramedics was passed last fall, however it has yet to be enacted and it is waiting on the development of the regulations. We have a committee working on this as well as a structure and a business case being put together for the College of Paramedics. We would like to do a road show to further explain the differences between a College and association of the Union. Please look for postings shortly.

- 3.5** Please be aware that Lifeflight will do scene missions for traumatic incidents only. Patients with medical problems who you feel need to be transported to Halifax should first go to the local or regional hospital and then be transferred. When transporting patients please stay within your essential competencies. This does not mean you have to follow the protocols we have as this is a different population of patients and you will be getting direct orders from the physician in charge of that patient.

The responsibility of care for that patient is shared between the sending institution , the sending physician, ourselves, the receiving institution and the receiving physician. It is important that they have a say in the care of this patient. The bigger question will be not be whether you can take the patient given your registration level but rather should you take the patient meaning that should there be more than one attending in the back with the patient. I am working on a draft policy for this. I would appreciate feedback on what the criteria should be for when there should be more than one attending in the back with the patient.

**3.6 Audits**

The Quality Control Medics audited 29,006 calls last year. Overall it appears the paramedics continue to conduct good assessments, documentation and have excellent compliance with the protocols.

- 3.7** Work continues to develop a partnership between the Mobile Crisis Intervention Service, Halifax Regional Police, CDHA, IWK and EHS for the Halifax Region. This would see people with mental health issues who call 911 being call conferenced to a mental health crisis worker if no priority symptoms are present. The same can be said for paramedics who get on scene and find that the patient is stable and not a danger to self or others.

- 3.8** Long turnaround times continue to be a source of frustration and concern at the QEII and Dartmouth General Hospital. A submission was made to the Minister of Health last fall and another presentation made to senior leadership at the Department of Health just a few weeks ago. At this point I am frustrated to say that little has been done to alleviate the major cause which is alternate level of care patients occupying acute care beds.

- 3.9** The present numbers for registered EMDs, Paramedics, MFRs is as follows: 16 EMDs; 570 PCPs; 198 ICPs; 245 ACPs; 15 CCPs for a total 1044 registered in Nova Scotia. As well there are 2600 MFRs registered in Nova Scotia.

#### **4.0 MEDICAL QUALITY PERFORMANCE ANNUAL REPORT**

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- 4.1 Please see attached the 2005 Overall Quality Assurance. Again the concerns remain with our Cardiac Arrest outcomes and our pediatric endotracheal intubation success rates.

#### **5.0 RESEARCH**

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##### **3.1 WEST Study**

- 3.1.1 The WEST Study was completed late last summer and was a tremendous success. The results were released last fall at the Canadian Cardiology Congress in Montreal. Hopefully the major articles will be published very shortly.

##### **3.2 CPAP Study**

- 3.2.1 Congratulations to all who participated in this tremendous undertaking. It ended just a few weeks ago and should be a landmark study when it is written up and published.

##### **3.3 C-Spine Study**

- 3.3.1 The C-Spine Study continues to struggle. We now have 7 areas enrolling patients. These include Oxford, Truro, Windsor, Kentville, Bridgewater, Sydney and Glace Bay. I have just learned that this study will be stopped on June 30, well short of its enrollment of 8,000 patients.

##### **3.4 Airway Registry**

- 3.4.1 In January Dr. David Petrie, Saleema Karim and myself presented the results of our Airway registry in Arizona at the National Association of EMS Physicians meeting. The numbers certainly compared to any other systems not using RSI. A copy of the poster is attached.

Finally I will leave you with these words.....

*The task of medicine is to cure sometimes, to relieve often and to care always.*

Sincerely,

**Ed Cain, MD**

Provincial Medical Director

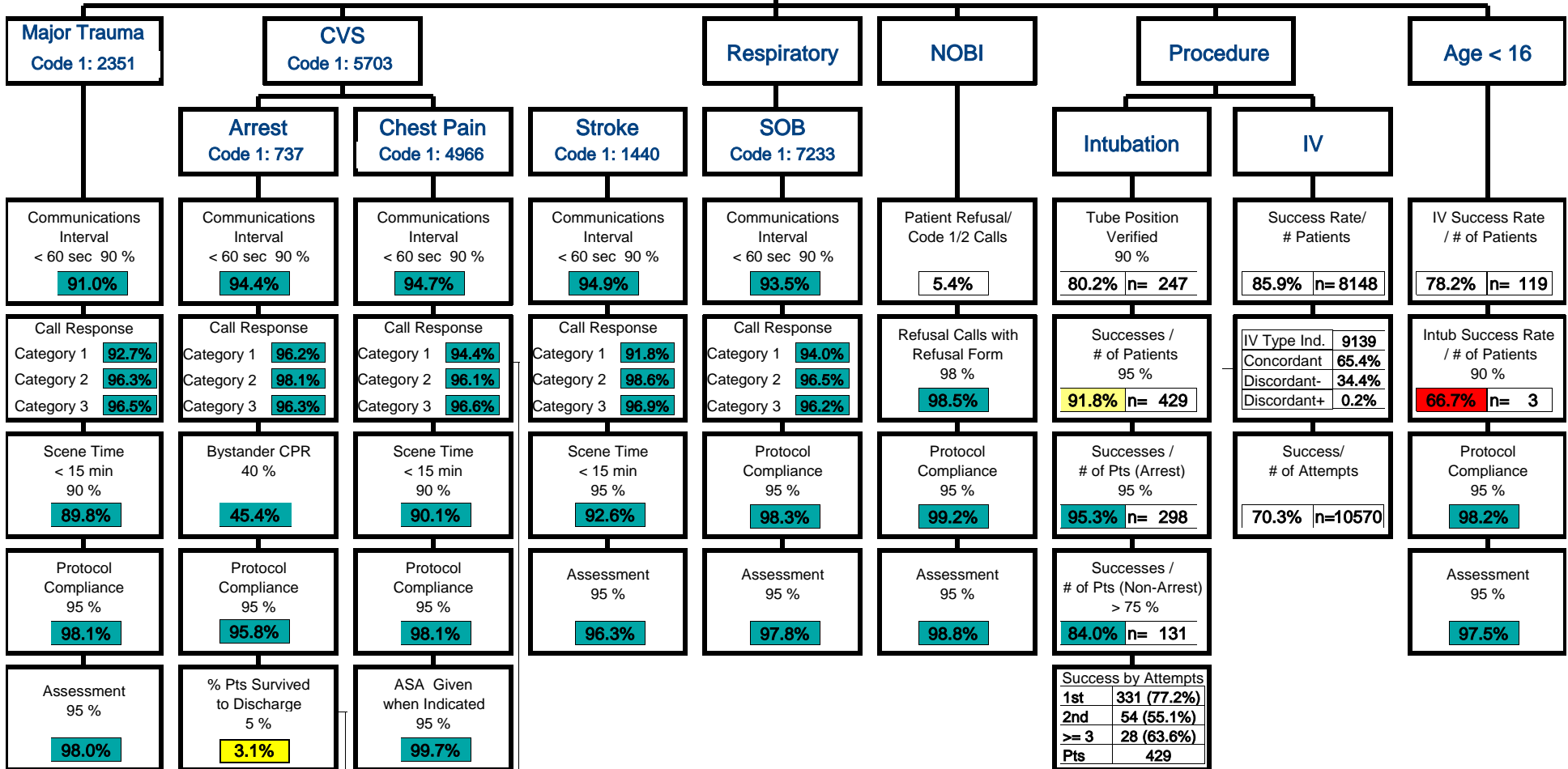
Attached: 2005 Overall Quality Assurance  
Airway Registry Poster

Period Year to Date 12/31/05  
 Provincial  
 Total Calls: 103,546 Code 1: 44,207

# Nova Scotia Emergency Health Services

## Medical Quality Performance Measure Report

■	Achieved or above target
■	Within 10% of target
■	Below target by more than 10%
■	No data available



% Patients...  
 \* Arrest Confirmed  
 \* Resuscitation attempted  
 \* Etiology Confirmed

Call Response Interval (call recieved 'til unit arrive scene)  
 Category 1 - Response interval <9 min. - 90 %  
 Category 2 - Response interval <15 min. - 90 %  
 Category 3 to 5 - Response interval <30 min. - 90 %

\* (Concordant) - Actual method is the same as the indicated method.  
 \* (Discordant +) - Actual method is greater than the indicated method.  
 \* (Discordant -) - Actual method is less than the indicated method.

# Out of Hospital Endotracheal Intubation by Air and Ground Ambulance Paramedics in a Provincial EMS System



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## INTRODUCTION

There is great debate in the literature as to the appropriateness and safety of prehospital endotracheal intubation<sup>1-10</sup> and in particular patients with closed head injury<sup>11-19</sup>. Still endotracheal intubation remains one of the more frequently performed "low-volume high-risk" procedures in terms of an EMS system. For the individual paramedic however, it is often an infrequently performed procedure<sup>20-22</sup>. Given the above debate, it is essential that EMS systems monitor and provide feedback regarding the appropriateness, safety and success of this procedure<sup>23</sup>.

The province of Nova Scotia has a single ground ambulance service that is integrated with the Air Medical Transport program. All endotracheal intubation attempts (laryngoscope blade in mouth) by air or ground paramedics are documented on a patient care report (PCR). These are faxed within 24 hrs for entry into a Provincial registry (the CAINT - Cardiac Arrest and Intubation - Database).

There are three levels of paramedics (Primary Care, Intermediate Care, and Advanced Care) as well as Critical Care paramedics on air medical transports. Most Nova Scotia paramedics have had at least 15 live intubations in their training programs. All paramedics undergo an annual advanced airway review that emphasizes the approach to airway management using mannequins and/or simulators. Air Medical Transport paramedics undergo additional initial training, a semi annual review and OR time that includes RSI.

Confirmation of correct endotracheal tube (ETT) placement is done by a series of checks including colormetric ET<sub>CO</sub><sub>2</sub> detection as well as esophageal detector device (EDD) for cardiac arrests. Paramedics are required to have the receiving physician sign off on the PCR regarding tube position for any patients transported to hospital. If this is not documented, the patient's hospital chart is reviewed for documentation of tube position. All patients who can not be intubated in the field are followed up to identify if and how their airway was secured in the Emergency Department.

## PURPOSE

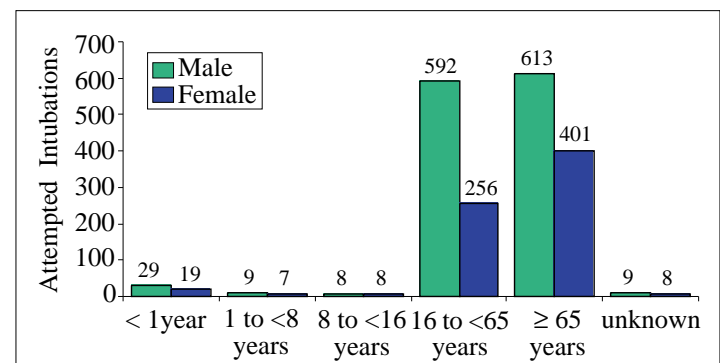
To report on the demographics, success rates and complications of out of hospital endotracheal intubation as well as the Emergency Department management of any patients who could not be intubated in the field.

## METHODS

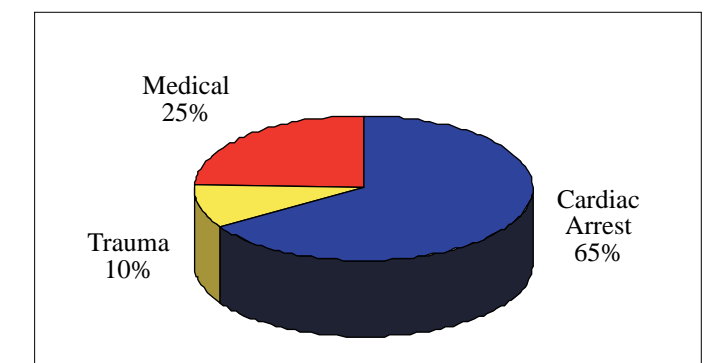
A retrospective review of the CAINT registry data for the interval Jan 1<sup>st</sup>, 2003 to Aug 17<sup>th</sup>, 2005 was conducted by one of the authors, who has had training and experience in data abstraction. The definitions and reporting guidelines recommended by the NAEMSP were followed<sup>24</sup>. The other author reviewed all tables and graphs. For missing data, the original PCR was reviewed by the first author.

## RESULTS

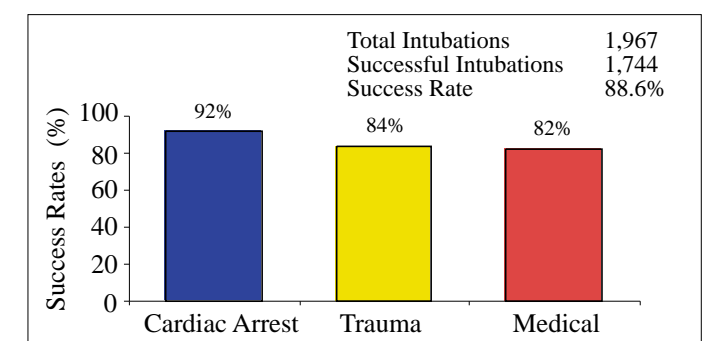
There were 1967 patients with attempted out of hospital endotracheal intubation entered in the database for the interval selected.



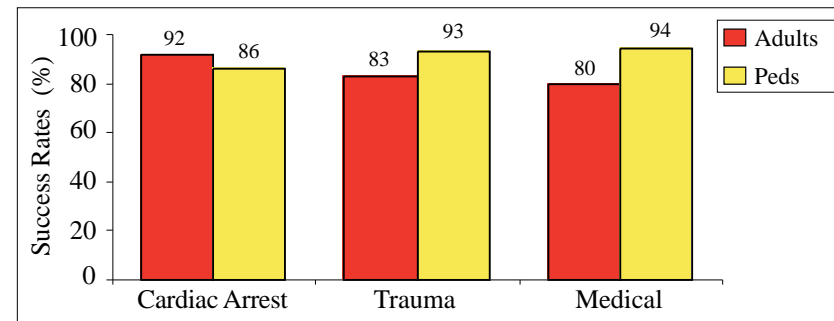
**Figure 1:** The majority of these were male, over the age of 65 and in Cardiac Arrest. Of note is the higher number of males than females under one (1) year of age. This appears due to the higher percentage of males who suffer SIDS.



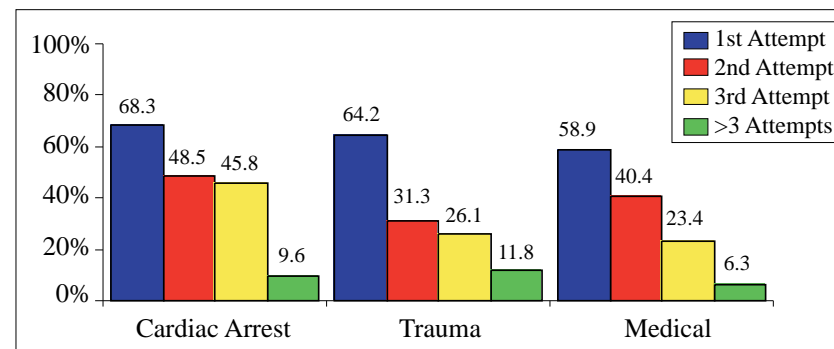
**Figure 2:** Most attempted endotracheal intubations occurred in Cardiac Arrest patients.



**Figure 3:** Overall endotracheal success rate was 88.6%. For Cardiac Arrest, Medical and Trauma patients the success rate was 92, 81.5 and 84% respectively. These are very similar to the success rates published by Wang<sup>25</sup>.



**Figure 4:** The distribution of success rates for adults and pediatrics by clinical impression. The lowest ETI success rates occurred in adult patients with the clinical impression of medical. This category would include overdoses, patients in respiratory failure and coma.



**Figure 5:** Shows the success rates for individual attempts broken down by clinical impression. After three (3) attempts there is a marked drop in chance of success.

	Success/Patient			
	Cardiac Arrest	Trauma	Medical	Overall
Nasotracheal	0	0/1 (0%)	6/11 (54.5%)	6/12 (50.0%)
Oral	1,186/1,303 (91.0%)	83/105 (79.0%)	172/242 (71.1%)	1,441/1,650 (87.3%)
Oral RSI	0	37/37 (100%)	25/25 (100%)	62/62 (100%)
Oral Topical/Sedation	0	10/12 (83.3%)	48/54 (88.8%)	58/66 (87.9%)
Oral with Sedation	0	22/35 (62.9%)	124/163 (76.0%)	146/199 (73.4%)
Oral with Topical	0	5/7 (71.4%)	24/31 (77.4%)	29/38 (76.3%)

**Table 1:** As in other systems<sup>26</sup> the highest success rates are achieved by RSI and in Cardiac Arrest patients. Our data shows the use of topical and sedation achieved higher success rates than either sedation or topical alone.

Clinical Impression	Medical	Trauma	Total
# of Unsuccessful Intubations	89	30	119
Where O <sub>2</sub> sat documented post attempt	36 (40%)	8 (10%)	44 (37%)
O <sub>2</sub> sat <90% after attempt (hypoxic)	8 (22%)	1 (13%)	9 (20%)
O <sub>2</sub> sat <90% after attempt (hypoxic after ventilation)	2 (5.5%)	0 (0%)	2 (4.5%)

**Table 2:** Only 37% (44) of failed intubations had documentation of a post attempt oxygen saturation. Of these, 20% (8) had a documented episode of hypoxia (less than 90% saturation) and 4.5% (2) were documented as not being able to attain 90% oxygen saturation after ventilating the patient (our definition of unable to intubate, unable to ventilate). Due to the lack of documentation, it is impossible to say if 4.5% is accurate or approximate or erroneous. Rescue ventilation was performed by using a BVM with an OPA or a NPA.

Population	Ground	
	Adults	Peds
Injury or Trauma to Patients with airway management effort	0	0
Adverse Event from facilitating drugs	0	0
Esophageal Intubation-delayed detection after tube was secured	3	0
Esophageal Intubation - detected in ED	2	0
Tube Dislodged	8	0
Other	1	0

**Table 3:** Of the 1744 successful intubations, 5 (0.28%) were found to be esophageal and 8 (0.46%) tubes were dislodged. These percentages are very close to those reported by Wang<sup>27</sup>.

	Patients
Combitube	1
Cricothyotomy-Surgery	1
Nasotracheal	1
Oral	62
Oral RSI	24
Oral with Sedation	14
Oral with Topical	2
Other	6

**Table 4:** In the Emergency Department, the majority of attempts in arrested patients with failed intubation in the field were by oral ETI (OTI) only. For non-arrested patients RSI was used most often. Of the 223 unsuccessful intubations only 111 are listed as the remaining did not have an ETI attempt or were lost to followup.

## DISCUSSION

Reports from the CAINT Registry are major components of the continuous quality improvement process for EHS. Several years ago it was noted that the success rate of ETI in non arrested patients was seventy percent (70%). Two actions were taken to address this: the introduction of the GUM bougie and a mandatory annual advanced airway refresher emphasizing the approach to airway management. The success rate for non arrested patients is now 77%.

The missing data makes it impossible to present an accurate incidence of "unable to oxygenate, unable to ventilate". We defined "unable to ventilate" a patient after ETT failure as a persistent SaO<sub>2</sub> of less than 90%, despite supplemental oxygen and BMV ventilation. The lowest possible incidence would be 2 of 223 or 0.9%. The protocols call for needle cryorchotomy for this scenario. This procedure was not performed on any patient during this study period and there have only been 3 documented in the last 5 years. Although the procedure is reviewed at the Annual Airway Refresher, inexperience would appear to be a major factor in the paramedics' reluctance to attempt this procedure.

## LIMITATIONS

The largest limitation is that about half our cardiac arrests are pronounced at the scene and although we employ a series of confirmation checks, these tube placements are never confirmed by a 3<sup>rd</sup> party. As a result we do not know the true incidence of esophageal intubations. We did not look at indication for intubation, failed intubations nor outcomes. We did not look at the patients' final outcomes nor does the Registry capture the indication(s) for intubation. Many of the pre and the majority of post ETI O<sub>2</sub> sat values were missing. We purposely did not report on ETI success by paramedic level, choosing to evaluate the system as a whole.

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