

EMS Quality Improvement Made Ridiculously Easy



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www.pitt.edu/~roth1/cqi

Chapter 1

1.1 Goals

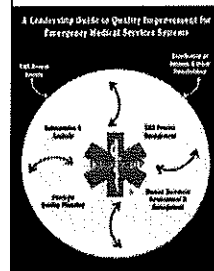
At the end of this discussion, the reader will be able to:

- discuss the importance of quality improvement (QI)
- be able to perform basic quality improvement audits
- customize service specific quality improvement audits
- convince others that quality improvement is important
- understand basic pitfalls in performing quality improvement

1.2 Introduction

There are many books written on quality improvement, and many experts in the field. Most people who attend a lecture on quality improvement expect to hear about the writings of Deming, Juran, and others experts in the field. Most lectures include a brief monologue on how the teachings of Deming transformed the car manufacturing in Japan after WW II. This is often followed by a discussion of the various terms and subtle differences between quality assurance, quality improvement, continuous quality improvement, total quality management, etc. The good news is that this lecture will contain none of that. This will be just the basic nuts and bolts of quality improvement.

If you become overly excited by this lecture, I would strongly suggest that you do a more in depth investigation of quality improvement. An excellent reference is **A Leadership Guide to Quality Improvement for Emergency Medical Services (EMS) Systems**. It can be found on the web at: <http://www.nhtsa.dot.gov/people/injury/ems/leaderguide/index.html> It's easy to read and it's free!



1.3 Quality - What is it?

Defining quality is somewhat easier when you are creating a tangible product, (i.e., an automobile). Think of an assembly line with someone checking items as they come across the end of the line for quality. A quality "checker" could measure how many autos actually run when they reach the end of the assembly line. Obviously, for EMS, quality is somewhat different.

In our hearts, we know what quality is, but sometimes it's hard to define. If you are in charge of buying uniforms for your EMS agency, you would want to buy "quality" uniforms. Think of what items might make for a quality uniform:

- durability
- comfort
- style
- number of pockets

We need to do the same thing with respect to EMS. First we need to figure out what EMS actually does.

QI:
We can always do better!
Not admitting wrong doing
Not saying we are bad

Chapter 2

2.1 What does EMS do?

It seems like a very simple question, but it's actually somewhat complicated. If you watch TV, EMS saves lives on a daily basis, snatching people from the brink of death. While once in a blue moon we actually do "save someone's life", most of the time our calls are much less exciting.

Scientifically, there is very little evidence to "prove" that EMS saves lives. There is, however, evidence that car seats, safety belts, immunizations, fences around swimming pools, and smoke alarms do save lives. Unfortunately, evidence is lacking with respect to EMS. (This does not mean that we don't save lives, it just means that no one has found the evidence to prove that.)

With respect to what EMS does, we're lucky that there are specific stages to every EMS call. These stages include:

1. Call taking/dispatch
2. Travel to the scene
3. Arrival at scene/patient care
4. Transport
5. Hospital arrival and report
6. Miscellaneous (such as training, equipment, vehicles, medical direction)

We can look at each stage of an EMS call and look for areas of improvement. Once we decide what we do as EMS providers we then need to define quality.

2.2 Quality-I know it when I see it!

Regarding quality in EMS, it is often fairly easy to pick out examples of poor quality. If an ambulance runs out of gas en route to a call, that would suggest that there is something is wrong. Ambulance services that have ambulances that constantly break down, lack essential equipment, or harm patients due to poor patient care, would be considered a poor quality ambulance agency.

But, how would you identify a quality EMS agency? Quality improvement can be defined as:

The sum of all activities undertaken to provide confidence that the EMS system meets a standard of excellence.

But who sets the standard? And how do you measure the standards?

There are a couple of ways of setting standards that your EMS agency may meet. First of all, you can look for national, state, or local standards with respect to EMS performance. For example, "the standard" response time is less than 8 minutes in an urban environment. (We'll talk more about response times.)

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You may ask neighboring agencies to see how you compare. Reviewing the EMS literature may also provide some guidance. Finally, you can use local experts to judge how you are doing. You need to be careful on how you pick your local experts. A person who has been in EMS for 25 years is old, not necessarily an expert.

2.3 Do you do it?

If your EMS agency does not do quality improvement, then you really don't know if you are good or bad. We all like to say that we are one of the best EMS agencies in the region, state, United States, world; however, unless you have statistics to back up those claims, they are just B.S. A good quality improvement program will allow you to collect data to support your claims of greatness.

By saying that we can always improve, we're not admitting that we're doing anything wrong. We are essentially saying that we want to do things better, and find ways of doing things better.

With respect to quality improvement, everyone must accept the concept that we can always do better; whether it's the treatment of a trauma patient, a cardiac arrest, or relieving pain from fractures.

Anyone who believes that they are the best, and there is no room for improvement, is either God's gift to prehospital care, or incredibly stupid. I would suggest that the majority of the people with that attitude belong to the stupid group.

2.4 Why don't all agencies do quality improvement?

Some agencies don't do quality improvement because they simply don't know how. Others have the attitude that if no one is forcing them to do quality improvement, then they aren't going to "waste the time" to do QI. Some say they can't afford to do quality improvement, while others realize that their service is not that great, and don't want to know the truth.

Chapter 3

3.1 In the beginning. - Response times

Let's start with a very simple and basic quality improvement audit. As mentioned before, response times are considered a gauge of quality service. USA Today, IAFF, the federal government, all have proposed standards that EMS agencies should meet to be quality services. However, in reality, are response times important? The truth is, they are, sometimes, (we think).

I don't think it would be a great leap of faith to suggest that it's important for EMS to arrive promptly to patients with multiple trauma, cardiac arrest, or airway problems. The unanswered question is, doesn't make a difference whether we arrive in 8 minutes, 9 minutes, or 10 minutes. The 8 minute response time was extrapolated from cardiac arrest data.

On the other hand, there are many calls where the response time is, essentially, meaningless. The patient with a sprained ankle certainly does not need to have an ambulance on scene with an ice pack in 8 minutes or less.

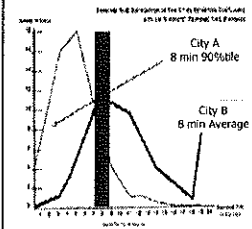
Nevertheless, we are going to be held by standards, and, therefore, need to know our response times. The worst case scenario is that you don't know what your response times are, and someone else, (i.e., the local news reporter), obtains data from your 911 Center, and calculates them on their own.

In the past, we used the **average** response time as our standard. There is a problem with using the average response time. Mathematically, with an average 8 minute response time you can have half the calls with a response time of less than 8 minutes, while the other half has the response time greater than 8 minutes.

More recently, the standard used is the **fractile** response time. When using the fractile response time, you determine what percent of the time you arrive in 8 minutes, or less. The "so called" standard is to reach 90% of calls in 8 minutes or less.

Calculating average response time is easy. You add up response times for X number of calls, then divide that number by X, which provides you with the average response time. Calculating the fractile response time is somewhat more complicated, and does not lend itself to being done by hand. Luckily, spread sheets such as Excel can calculate this response time for you.

I have set up a template for you that you can use to calculate percentile response times. This template can be found at www.pitt.edu/~meddir/cqi/



Calculating 90th percentile		
Average Response Time		0:07:59
90th Percentile		0:13:20
Delete unused ROWS before reading calculations		
Dispatch time	Arrival Time	Response Time
12:04:00	12:10:00	0:06:00
13:55:00	14:01:00	0:06:00
16:23:19	16:40:12	0:16:53
9:02:00	9:05:00	0:03:00
5:03:00	5:11:00	0:08:00

Don't be afraid of Excel spread sheets, they're pretty straight forward. If you have trouble using the spread sheet, find someone in your service that has "computer nerd" tendencies. They should be able to handle a simple Excel spread sheet. You'll save this spread sheet on your computer before entering the calculations. Enter the data in the columns provided. Make sure that you delete any unused rows before reading the calculations. Once you've calculated your fractile response times you may come up with

numbers that you don't like. How can you either fix or rationalize these numbers?

First of all, since response times are less important to lower priority calls, do the audit looking at only the highest priority calls, (i.e., cardiac arrest, CVA, multiple trauma, etc.). See if your response times improve by looking at just these calls. While this seems like you are "playing" with statistics, I think in this particular instance, you are justified.

Next, look for potential areas of delay. Are there delays at the 911 Center? Are there delays with the crew getting out of the station? Are there delays due to the crews not finding the scene properly? I suggest that you do not request that your crews "drive faster." This would lead to another set of problems.

Do you have adequate number of units and are these units placed in the proper location? Knowing that most people don't have the luxury of adding more units or moving units around, other options include using other responders that may be able to get on scene quicker. Consider a QRS unit, fire police, or first responders. Placing AEDs throughout your community also reduces the time of defibrillation for patients in cardiac arrest.

3.2 Two approaches to Quality Improvement

There are two basic approaches to quality improvement. The easiest way is **retrospective**. This takes a look at problems and complaints, and tries to identify the underlying cause. This type of QI is somewhat easy, because the cases tend to be easily identified. Investigating the problem does take work. It is important to approach the problem with the attitude "how can we keep this from happening again?" What problems with the system helped this event occur? What can we do system wide to prevent this problem from happening again?"

It's best that these activities are not witch hunt. Don't single out individuals, but search for system wide problems. Use the attitude that if it happened to Paramedic X, it can certainly happen to Paramedics Y and Z. I'm not suggesting that there aren't some bad apples that just need to be thrown out of the barrel, but start by looking at what's causing the bad apples.

The other way of looking at QI is **prospective**. This requires significantly more mental work. You need to sit down and think, how can we do "better"? For example, how can we care for chest pain patients better? How can we care for patients with long bone fractures better? Patients in cardiac arrest? Patients with CVA, etc.?

3.3 Retrospective

Many QI programs begin after a crisis occurs. Pittsburgh EMS initiated an airway audit after a receiving facility identified that one of our patients was delivered with an esophageal intubation. In reviewing the trip sheet, the documentation was very poor, and while the investigation led to a lot of "she said", "he said", the bottom line was that we had a problem.

The next question was how big of a problem is this? How many patients are

Retrospective
Vs.
Prospective

we delivering to the hospital with the endotracheal tube in the wrong place? At the time, we had no data to tell us how many intubations we were doing, how many successful intubations we had, and how many times we were having unrecognized esophageal intubations.

If we were doing a million intubations per year, (I'm just exaggerating to make a point), and only had 1 esophageal intubation, I'd say that 1 in a million is pretty good. On the other hand, if we only had 10 intubations a year, and 1 was an esophageal intubation, we would have a significant problem.

Medical Directors in Florida were faced with a similar problem. They noted an occurrence of misplaced intubations. They looked at 108 prehospital intubations. They found that 27 out of 108, (25%), of patients were delivered with the endotracheal tube in the wrong place. This is one of the first articles to suggest that there may be a problem with paramedics and intubations. This was a big wake up call for the EMS community.

Reference - Katz SH,
Annals of Emergency
Medicine 2001

Every service should know how many intubations are being done, who is doing the intubations, and what is the success rate. If you are not auditing all intubations, your medical director is asleep at the wheel!

What are the solutions to identifying poor intubation success rate? Well, one solution would be to fire all the paramedics that placed a tube in the esophagus. This seems superficially logical, but doesn't really solve the problem.

Another option is to re-educate each medic with a misplaced tube, which may be somewhat helpful. However, the real issue is to identify the underlying problem.

In Florida, they identified that paramedics were not confirming tube placement. By mandating capnography for tube placement confirmation, the medical directors in Florida markedly reduced the number of misplaced endotracheal tubes. The group took advantage of new technology, (i.e., capnographers), to solve their problem.

A sample airway audit form can be found at www.pitt.edu/~meddir/cqi/. This form is somewhat complex since it is used for research. You are encouraged to simplify the form. Once we gather the data from the form, we enter the information into an Access database. We have > 300 intubations a year. If you have significantly less intubations, you can tally the data by hand or create a simple Excel spread sheet.

3.4 Prospective

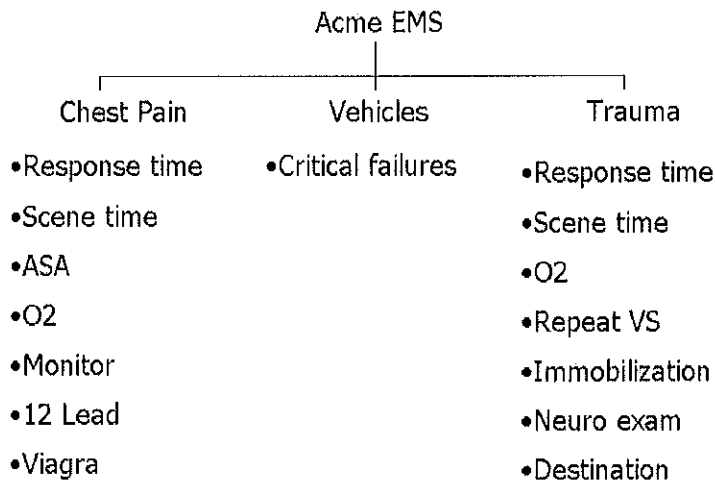
The prospective approach to quality improvement is somewhat more difficult, but more rewarding. The prospective approach prevents problems from happening, which is certainly preferable to reacting to problems that have occurred.

Prospective approach requires you to think about ways of improving your system. First think about what you do as an EMS agency; you do things like

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drive to places, take care of people with chest pain, shortness of breath, trauma, etc. you also use equipment and perform training.

It's best to pick a topic and then dissect the various stages that occur with that activity. These stages, or steps, are sometimes called "key clinical indicators". These are factors that determine quality on a specific call.



3.5 Chest Pain Audit

Take for example, a patient with chest pain. What are some key factors on this call that would be indicators of quality? If we are concerned that a patient is having a myocardial infarction, then response times and scene times are important. We know that giving aspirin to chest pain patients is an important factor in reducing morbidity and mortality. We can make an educated guess that placing the patient on O2 is a good thing. Also, the patient should be on a monitor to watch for arrhythmias. Some services believe that a 12 lead EKG should be done on chest pain patients. This would be a quality indicator for that service.

Finally, we know that there is interaction between Viagra, (and many of the other ED drugs) and nitroglycerin, therefore paramedics should document whether or not a male patient has taken Viagra within the past 24 hours. Armed with a list of these quality indicators, we can create an audit form that we will use to review chest pain trip sheets. If you use a computerized trip sheet program, it's fairly easy to print out multiple chest pain trip sheets; otherwise, you'll need to go through a stack by hand.

Our simple audit form has the date of the call, the call number, the crew, the scene time, whether O2 was used, whether a 12 lead EKG was done, was aspirin given, was a male patient was asked about the Viagra. Prior to initiating an audit, you must come up with goals. Our goal for scene time is less than 30 minutes. We expect that 100% of our chest pain patients receive oxygen, 50% of our patients receive a 12 lead EKG, 100% of

patients without contra indications receive aspirin, and 100% of male patients are asked about Viagra. It's important that you set these goals before you are biased by the actual results of the audit.

Date _____ Call # _____ Crew _____

		Goal
1. Scene Time	_____	<30min
2. Oxygen	Y N	100%
3. 12 Lead	Y N	50%
4. ASA	Y N	100%
5. ? Viagra	Y N	100%

After you complete the audit, it's important to share your results with your crews. If you are happy with the results, congratulate the crews on a job well done. If the results are less than stellar, it's important that you do an intervention to improve the results. Interventions may range from continued education; nasty grams from the medical director, begging and pleading by the EMS Chief, or another course of action.

We were not happy with our initial results from 2001. We did an intervention, which consisted of providing ACLS training to all of our paramedics, emphasizing the importance of aspirin and 12 lead EKGs. We saw some moderate improvements with this intervention, however, a second intervention turned out to be more helpful.

One of our crews performed a 12 lead EKG on a 35yo patient suffering from an acute MI. This patient was taken to the cath lab, based on the 12 lead EKG done in the field. The EKG done in the emergency department was actually normal. However, based on the prehospital EKG, the patient was taken to the cath lab. At cath he was found to have a significant occlusion of his left anterior descending artery. The patient did fine and the hospital was impressed. (So was the Medical Director.) The crew was recognized and the case was distributed amongst all of our crews.

Our next intervention was to put stickers on our Nitroglycerin bottles with the letters "ASA", (representing aspirin), and "V?," (representing ask about Viagra). This intervention was associated with a marked improvement in our compliance quality indicators. I have also learned that other groups have attached packets of baby aspirin to their Nitroglycerin spray, therefore, serving as a reminder to give aspirin when using Nitroglycerin.

3.6 Picking Your Topic

How do you pick topics for quality improvement audits? First, the topics should be important. Consider a topic that you believe EMS might make a difference. Next, the event must occur frequently enough that it is worth auditing. While childbirth may be a very important EMS topic, it may not occur frequently enough in your community to make an adequate audit.

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There may be some exceptions for events that are so critically important that they must be audited, even though they don't happen very often, (i.e., intubation, IO placement, etc.)

After performing an audit, it is important that you analyze the data, and think about ways of improving the system. Once you have reviewed the results, you should make change within the system, re-audit the problem, and identify new issues, as needed. This quality cycle is also known as continuous quality improvement.

Potential audits may include:

- altered mental status
- use of the pulse ox, glucose check, and Narcan
- medication usage, (Valium, Adenosine, Verapamil, Morphine)
- cardiac arrest, (although it's difficult to audit cardiac arrest without obtaining hospital data.)
- tachycardia/ bradycardia
- CHF
- non-transport
- falls

Also think about non-clinical audits, such as vehicle maintenance, etc.

3.7 They call it Emergency MEDICAL Services for a reason

The QI process is a good way of getting your medical director involved. There are many ways of getting a medical director involved in your EMS service: food, money, radios, wacker lights, are all ways of getting a medical director involved. However, presenting a convincing argument for a quality improvement audit may be more ethical. Remember that EMS stands for emergency **medical** services, and it is important that a **medical** doctor be involved, especially in the quality improvement process. The quality improvement process is a good way of manipulating your medical director to get what you want.

Recently, our paramedics felt that we, as a service, did a poor job of caring for patients with pain. There was no disagreement from the medical director; however, we were unsure of how to solve this problem.

Many people call EMS because they are in pain. A literature search or an audit of your own trip sheets will reveal that EMS agencies do a bad job treating pain. Our initial audit confirmed that we are very poor at treating pain.

People call us because they're having pain, and we don't treat it. That doesn't sound like we're doing a quality job. Often the command physician is part of the problem and an audit may identify this problem. One OI committee felt that by placing analgesia above the double line, (i.e., allowing paramedics to give pain medications through standing orders), our quality would improve. We hope that a future audit with our new protocols will show that we are doing a better job of treating pain.

Chapter 4

4.1 Now the Bad News

What are some potential pitfalls with respect to the QI process? Unfortunately, for most audits we rely on trip sheet review as a source of our information. For some calls, the trip sheet only fairly resembles what actually happened on the call. Quality improvement can result in a "buffed" chart, but no actual improvement in patient care.

Data is difficult to collect. If an item is not a typical data point, (i.e., condition on discharge from the hospital), then it's sometimes difficult to gather. Often, we would like to know the outcome of patients that we transport to the hospital. Theoretically, we should be privileged to have that information for our quality improvement audits.

Sometimes it is difficult for busy paramedics to document all data points, i.e., BP every 5 minutes. One approach would be to have the medics radio/call information to the command center. The command center can document the data points.

Another problem is the "us vs. them" mentality that can occur when a group of individuals get together to do quality improvement. It is important that when you put a group together to do quality improvement, the team is multi-disciplinary, and the team includes supervisors, field medics, new medics, old medics, and, (based on your service), EMTs and first responders.

It is important to show the data as a positive. For example, if, on an audit, 70% of chest pain patients do not receive aspirin, present the data as 30% of patients did receive aspirin. Use the glass is half full approach.

It's also better to show aggregate data, (i.e., show what the entire service is doing), vs. picking out individuals.

Finally, it's important to focus on the process, not the individual. If a medic unit arrives on scene of a cardiac arrest, and finds out that all of their Epinephrine is expired, it's probably not a good idea to chastise the paramedic that was on the call, but to identify what problems in the system failed to identify expired meds prior to going on a call.

4.2 How About a Cool Slogan?

Slogans, mottos, buttons, etc. are sometimes used to get everyone in the quality improvement mode. These tend to often be seen as childish, stupid, and a waste of time. Think of other ways to rally your troops together to become part of the quality improvement system. The easiest way is let your actions speak louder than your words. Do a simple audit, make changes and show improvement (hopefully).

Ideally, you can put together a multi-disciplinary team to do quality

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Improvement. I realize that not all agencies have this luxury, and this task may be assigned to one individual. If you are this one individual, be creative. If crews have down time in between calls, have them audit each other's calls. This may be an incredible eye-opening for some. Often feedback from peers is more powerful than feedback from a quality improvement officer.

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**Trip Sheet Audit Form
CONFIDENTIAL CQI ACTIVITY**

CCR# _____	Pt. Age _____	Pt. Sex <input type="checkbox"/> M <input type="checkbox"/> F	Date _____
Etiology of Pain			
<input type="checkbox"/> Suspected Fracture	<input type="checkbox"/> Abd pain	<input type="checkbox"/> Back Pain	<input type="checkbox"/> Other _____
- Area involved <input type="checkbox"/> Upper ext <input type="checkbox"/> Lower ext <input type="checkbox"/> Chest <input type="checkbox"/> Back <input type="checkbox"/> Head <input type="checkbox"/> Neck <input type="checkbox"/> Other _____			
Trauma involved			
<input type="checkbox"/> Yes <input type="checkbox"/> No			
Was Pain Severity documented?			
<input type="checkbox"/> Yes <input type="checkbox"/> No			
-Pain scale used	<input type="checkbox"/> 1-10	<input type="checkbox"/> Mild, Mod, Severe	
Initial Pain Rating			
1 2 3 4 5 6 7 8 9 10		Mild, Mod, Severe	
Initial Vitals			
Pulse _____	BP _____ / _____	Resp _____	GCS _____ SPO2 _____
Analgesic Used			
<input type="checkbox"/> None			
<input type="checkbox"/> Nitrous oxide			
<input type="checkbox"/> Morphine-> Initial dose _____ mg Route <input type="checkbox"/> IM only <input type="checkbox"/> IM and IV <input type="checkbox"/> IV only			
-> Total dose _____ mg			
Final Pain Rating			
1 2 3 4 5 6 7 8 9 10		Mild, Mod, Severe	
Final Vitals			
Pulse _____	BP _____ / _____	Resp _____	GCS _____ SPO2 _____
Were there contraindications to analgesics?			
<input type="checkbox"/> Altered LOC		<input type="checkbox"/> Head injury	<input type="checkbox"/> Allergy
<input type="checkbox"/> Altered VS		<input type="checkbox"/> Multi-system trauma	<input type="checkbox"/> Short transport <5min
<input type="checkbox"/> COPD		<input type="checkbox"/> Suspected Pneumothorax	<input type="checkbox"/> Other
<input type="checkbox"/> Intoxication			
Did any complications occur as a result of analgesia?			
<input type="checkbox"/> No	<input type="checkbox"/> Yes ->	<input type="checkbox"/> Altered LOC	<input type="checkbox"/> Altered VS <input type="checkbox"/> Vomiting
<input type="checkbox"/> Other			
Was Command Contacted?			
<input type="checkbox"/> Yes <input type="checkbox"/> No			
Does the reviewer believe this patient should have received analgesics?			
<input type="checkbox"/> Yes <input type="checkbox"/> No			

Reviewer	Date reviewed	Trip sheet author
	/ /	

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Demographics Date: _____ EMS Unit _____ CCR # _____ Patient sex: M F Patient age: _____		Glasgow Coma Score (GCS) at time of intubation Eye _____ + Verbal _____ + Motor _____ = _____ 3	
Place of intubation attempt (check one): <input type="checkbox"/> Indoors (house, building) <input type="checkbox"/> Outdoors <input type="checkbox"/> Entrapped (-i.e. in vehicle) <input type="checkbox"/> Ambulance <input type="checkbox"/> Hospital /Care facility <input type="checkbox"/> Stadium/auditorium (Mellon, PNC, Heinz, Convention Ctr) <input type="checkbox"/> Other: _____		Indication for intubation (check one): <input type="checkbox"/> Cardiopulmonary Arrest <input type="checkbox"/> Respiratory Arrest <input type="checkbox"/> Respiratory Failure (Pulm Edema, Asthma, etc.) <input type="checkbox"/> Altered Mental Status <input type="checkbox"/> Suspect CVA/Intracranial Bleed	
		<input type="checkbox"/> Seizure <input type="checkbox"/> Overdose <input type="checkbox"/> Trauma <input type="checkbox"/> Choking/Airway <input type="checkbox"/> Other: _____	

Information about each individual attempting intubation:

Name	Medic MD Other:	Name	Medic MD Other:
Person A		Person C	
Person B		Person D	

Data for each intubation attempt (circle data for each attempt - EACH INSERTION OF BLADE IS AN ATTEMPT):

Attempt	Who	method	Method	Rescue method	Confirmation*	Successful ?
#1	A B C D E	Oral Nasal Via existing trach	No Meds Sedation RSI	Combitube Trach digital other	A B C D E F G H I J K	Y N
#2	A B C D E	Oral Nasal Via existing trach	No Meds Sedation RSI	Combitube Trach digital other	A B C D E F G H I J K	Y N
#3	A B C D E	Oral Nasal Via existing trach	No Meds Sedation RSI	Combitube Trach digital other	A B C D E F G H I J K	Y N
#4	A B C D E	Oral Nasal Via existing trach	No Meds Sedation RSI	Combitube Trach digital other	A B C D E F G H I J K	Y N
#5	A B C D E	Oral Nasal Via existing trach	No Meds Sedation RSI	Combitube Trach digital other	A B C D E F G H I J K	Y N

Confirmation of tube placement* A Visualized through cords B Tube fog C Chest rise D Auscultation of Lungs E Auscultation of Stomach F End-tidal CO ₂ color G End-tidal CO ₂ digital/wave H Pulse ox I Esoph Detector Device Bulb J Esoph Detector Device Syringe K MD confirm w/ direct visualization	Was the patient intubated? <input type="checkbox"/> Yes Total Attempts? _____ <input type="checkbox"/> No Intubation not performed because <input type="checkbox"/> Arrest called <input type="checkbox"/> Patient responded to Rx <input type="checkbox"/> Short transport/Load & Go <input type="checkbox"/> Arrived at ED before completed <input type="checkbox"/> Intact gag/Clenched teeth/ <input type="checkbox"/> Failed attempts <input type="checkbox"/> Tracheostomy in place	Disposition (check one): <input type="checkbox"/> Survived to admission <input type="checkbox"/> Expired in ED <input type="checkbox"/> Unknown <input type="checkbox"/> Not transported
	Was the patient extubated during the call? <input type="checkbox"/> Yes <input type="checkbox"/> No	

Complications

<input type="checkbox"/> None <input type="checkbox"/> Gag present <input type="checkbox"/> Clenched/trismus <input type="checkbox"/> Inadequately relaxed <input type="checkbox"/> Combative <input type="checkbox"/> Anterior vocal cords <input type="checkbox"/> Small mouth <input type="checkbox"/> Big tongue <input type="checkbox"/> Large neck <input type="checkbox"/> Poor neck flexibility <input type="checkbox"/> Overbite/underbite <input type="checkbox"/> Could not visualize cords	<input type="checkbox"/> Epistaxis (nose bleed) <input type="checkbox"/> Oral bleeding <input type="checkbox"/> Vomiting <input type="checkbox"/> Foreign body <input type="checkbox"/> Dental trauma by intubation (broken tooth) <input type="checkbox"/> Laryngospasm (cord spasm or closure) <input type="checkbox"/> Could not pass tube through cords <input type="checkbox"/> Mainstem intubation <input type="checkbox"/> Esophageal intubation detected immediately <input type="checkbox"/> Esophageal intubation delayed detection <input type="checkbox"/> Oral/facial trauma	<input type="checkbox"/> Esophageal intubation detected in ED <input type="checkbox"/> Could not confirm tube placement <input type="checkbox"/> Tube dislodged during transport/patient care <input type="checkbox"/> Hypoxia during intubation (SaO ₂ < 90%) <input type="checkbox"/> Hypotension during intubation (SBP < 100) <input type="checkbox"/> Bradycardia during intubation (HR < 60) <input type="checkbox"/> Suspected pneumothorax after intubation attempt <input type="checkbox"/> Cardiac arrest on or soon after intubation attempt <input type="checkbox"/> Equipment failure specify: _____
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Was the following information documented? This information lessens the chance of an airway error!

Was the capnographer used? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA <input type="checkbox"/> Failed	Initial capnographer reading documented? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	Additional Capnographer readings <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Method used to secure the tube documented? <input type="checkbox"/> Yes <input type="checkbox"/> No	Tube position checked after pt. movement <input type="checkbox"/>	Tube depth @ teeth <input type="checkbox"/> Yes <input type="checkbox"/> No

2004-b

Follow up requested Y N	Letter Sent Y N Date _____	Completed Y N
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Quality Improvement For EMS



A very basic, no nonsense guide.

Ron Roth, MD

Medical Director

City of Pittsburgh

Department of Public Safety

Quality Improvement does not have to be an major endeavor. It does take some time and effort, however it is time well spent. If you are looking for an in depth review of the works of W. Edwards Deming, Joseph Juran and the Baldrige categories, you have come to the wrong place. If you have never heard of Deming or want "just the facts," then welcome.

This site contains a simple overview of the Quality Improvement process and several sample audit forms. I encourage you to "borrow" our audit forms and modify them as you se fit. Please give us credit if you become rich and famous.

If you are interested in a more detailed document on Quality Improvement for EMS, take a look at **A Leadership Guide to Quality Improvement for Emergency Medical Services (EMS) Systems**. It's on the web at <http://www.nhtsa.dot.gov/people/injury/ems/leaderguide/>

Links

[Overview](#)

-This is an outline that will provide an overview of Quality Improvement for EMS (PDF Format)

[Pittsburgh EMS Links](#)

-An overview of our Medical Direction and links to protocols

Audit forms

[Chest Pain](#)
[Chest Pain Tally sheet](#)

[Fractile Response Time](#)

[Seizures](#)

[Intubation](#)
[Intubation Tally sheet](#)

[Abdominal Pain](#)

[ALS trip review -Generic](#)

[Pain](#)

[Fall Audit](#)

[BLS trip review](#)

[Head injury](#)

Other Information

<u>Tips for EMS Families</u>	- A pamphlet to help EMS providers and their families
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