



Continuing Medical Education – News & Information

June 2008 – Volume 14, Issue 6

Multi-Agency Edition

*** Note new REMAC Quarterly registration deadlines on Exam Calendar ***

Inside this issue:
(bold = new content)

From the Editor	1
ePCR Tips	2
Cert & CME info	2
FDNY contacts	3
OLMC physicians	3
CME Article	4
CME Quiz	15
Citywide CME	17
Exam Calendar	14

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REMAC Exam Study Tips

REMAC Exams between January 1 and July 1 refer to either the 2007 or 2008 version of the protocols, so study whichever version you are using in the field.

After July 1, only the 2008 protocols apply. Download at www.nycremsco.org

Candidates have difficulty with:

- * Epinephrine use for peds patients
- * ventilation rates for peds & neonates
- * 12-lead EKG interpretation
- * compensated vs. decompensated shock

Written exams are approximately:

- * 15% Protocol GOP
- * 40% Adult Med. Emerg.
- * 10% BLS
- * 10% Adult Trauma
- * 10% Adult Arrest
- * 15% Pediatrics

From the Editor

The FDNY Bureau of Training hosts the REMAC Written Refresher exams every month and the Quarterly Written and Orals. Led by Chief J.P. Martin, the Academy generously provides much-needed classrooms and parking for REMAC candidates from every sector of EMS – municipal, private, voluntary hospital, and volunteer.

After more than twenty-six years of service, Lt. Arthur Lester is preparing for retirement. He has long been a fixture at the EMS Academy, guiding the education of thousands of EMTs and paramedics not only in New York but internationally, including Russia and India.

On the evening tour at BOT, Lt. Lester has been a tireless resource to the REMAC process in facilitating all the needs of the candidates and staff. This publication thanks Artie for all his efforts and wishes him well on the path ahead.

ePCR Tips

To avoid damaging the LIFEPAK Data Port and Data Cable when transferring EKG data, please remember:

- Keep the LP12 in an upright position; this also ensures continuous data flow to the ePCR Computer.
- Disconnect the Data Cable from the back of the LP12 before walking away from the ePCR Computer.

Uninsured patients may consider refusing care for fear of ambulance fees.

Please direct them to the green Patient Copy sheet of the FDNY ePCR, which advises the availability of free or low-cost health insurance (see figure at right).

FREE & LOW COST HEALTH INSURANCE PROGRAMS

Many working families & individuals are eligible for free or low cost health insurance. You don't have to be a citizen to qualify for health insurance.

Child Health Plus B provides free or low-cost health insurance for children under the age of 19 who are not eligible for Medicaid.

Family Health Plan provides free health insurance for low-income, uninsured adults (ages 19-60) who are not eligible for Medicaid.

Medicaid provides free health insurance for low-income children (Child Health Plus A) and adults. Children under 21 have an added guarantee of all necessary screenings, treatment, assistance with appointments and transportation through the Child/Teen Health Program.

One application is used to apply for all of these programs.

Call HealthStat at 311, TTY 1-212-504-4115, www.nyc.gov/health

Certification & CME Information

- *Of the 36 hours of Physician Directed Call Review CME required for REMAC Refresher recertification, at least 18 hours must be ACR/PCR Review (which may include QA/QI Review). The remaining 18 hours may include ED Teaching Rounds and OLMC Rotation.*
- Failure to maintain a valid NYS EMT-P card will invalidate your REMAC certification.
- By the day of their refresher exam all candidates must present a letter from their Medical Director verifying fulfillment of CME requirements. Failure to do so will prevent recertification.
- FDNY paramedics, see your ALS coordinator or Division Medical Director for CME letters.
- CME letters must indicate the proper number of hours, per REMAC Advisory # 2000-03:
 - *36 hours – Physician Directed Call Review*
 - *ACR Review, QA/I Session (after 6/1/07, minimum 18 hours of ACR/QA review)*
 - *Emergency Department Teaching Rounds, OLMC Rotation*
 - *36 hours – Alternative Source CME – Maximum of 12 hours per Venue*
 - *Online CME* - *Journal CME*
 - *Lectures/Symposiums / Conferences* - *Clinical*
 - *Associated Certifications: BCLS / ACLS / PALS / NALS / PHTLS*

REMAC Refresher Written examinations are held monthly, and may be attended up to 6 months before your expiration date. See the exam calendar at the end of this Journal. To register, call the Registration Hotline @ 718-999-7074 by the last day of the month prior to your exam.

REMAC Quarterly Written and Oral examinations are held every January, April, July & October. Registration is limited to the first 50 applicants. See the exam calendar at the end of this journal.

REMAC CME and Protocol information is available, and suggestions or questions about the newsletter are welcome. Call 718-999-2671 or email swansoc@fdny.nyc.gov

REMSCO: www.NYCREMSCO.org

Online CME: www.EMS-CE.com

www.MedicEd.com

NYS/DOH: www.Health.State.NY.US

www.EMCert.com

www.WebCME.com

www.EMINET.com

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 - Division 2: 718-829-6069 • Bureau of Training: 718-281-8325
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 - Division 3: 718-968-9750 • EMS Pharmacy: 718-571-7620
Paramedics Gary Simmonds & Al Navarro Paramedic Andrew Batho
-

FDNY EMS -Division Medical Directors

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FDNY OLMC Physicians and ID Numbers

Acosta, Juan	80286	Huie, Frederick	80300
Alexandrou, Nikolaos	80282	Isaacs, Doug	80299
Asaeda, Glenn	80276	Jacobowitz, Susan	80297
Ben-Eli, David	80298	Kaufman, Bradley	80289
Cordi, Heidi	80279	Lombardi, Gary	80225
Cox, Lincoln	80305	McIntosh, Barbara	80246
Freese, John	80293	Pascual, Jay	80287
Giordano, Lorraine	80243	Schenker, Josef	80296
Gonzalez, Dario	80256	Schneitzer, Leila	80241
Hansard, Paul	80226	Schoenwetter, David	80304
Hegde, Hradaya	80262	Silverman, Lewis	80249
Hew, Phillip	80267	Soloff, Lewis	80302

Shifting the Curve: Increasing Cardiac Arrest Survival in NYC

Introduction

This month's drill reviews a number of ways to troubleshoot prehospital medical devices, including basic and advanced life support cardiac monitors – specifically the FR2+ AED and the Lifepak 12. So we thought this a good time to review a number of cardiology topics in a question and answer format. We will highlight some common areas of concern regarding cardiac arrest, STEMI, acute coronary syndrome, and cocaine chest pain.

Thanks to federal legislation passed in December of last year, the first week of June will be National Cardiopulmonary Resuscitation (CPR) and Automated External Defibrillator (AED) Awareness Week. In honor of this, and in recognition of the amazing results that you have produced in this City as discussed below, this month's drill and CME article will focus on the basics of CPR.

There is certainly no group of patients for whom the timeliness of an EMS response is more critical than the out-of-hospital cardiac arrest (OOHCA) patient. But more important than the timeliness, it is the quality of the resuscitation effort that is critical. No drug, machine, airway device or defibrillation will be effective if the quality of the CPR delivered to the patient is ineffective. CPR is not just cardiopulmonary resuscitation, it is without question the critical part of the resuscitation.

Cardiac Arrest Outcomes - Past

In 1994, Dr. Gary Lombardi and his colleagues published the results of the PreHospital Arrest Survival Evaluation (PHASE) study. (And yes, the very same Dr. Lombardi that continues to make serve EMS through his work at the FDNY OLMC site.) One of the first studies of its kind, it was a six-month evaluation of cardiac arrest survival in New York City. They lost not a single patient to follow-up. And what they found was a rather low survival rate.

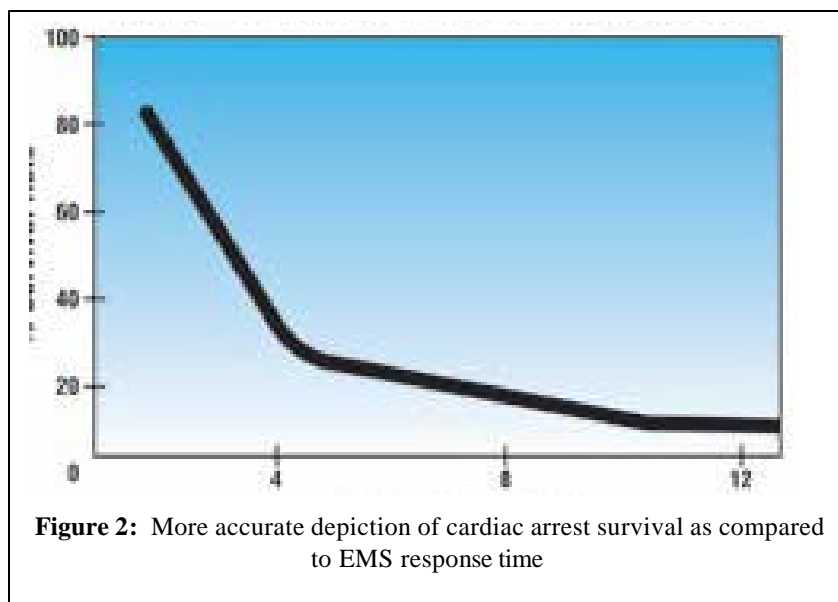
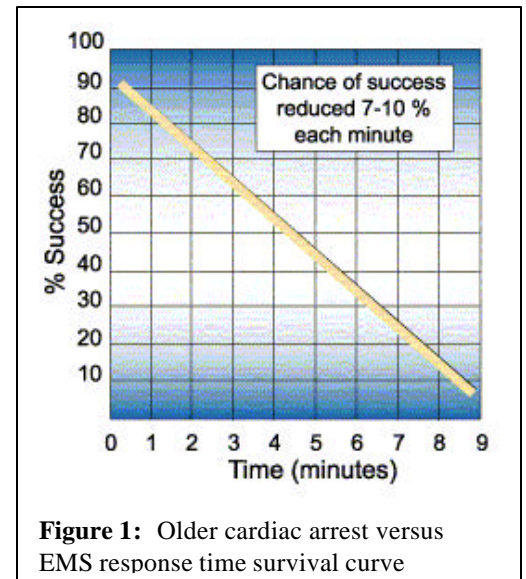
For all cardiac arrests for which resuscitation was attempted in the prehospital setting, only 2.2% survived to hospital discharge. When you set aside those arrests witnessed by EMS and look only at the arrests that occurred prior to EMS arrival, the survival rate dropped to 1.4%. And for the group that was most likely to survive, those patients whose arrest was witnessed by a bystander and who presented in a shockable rhythm upon EMS arrival, the survival rate was 5.3% - nearly one in twenty. At that time, the average EMS response time to a cardiac arrest was 9.3 minutes.

As you all know, some of the benefits that resulted from the merger of the FDNY and EMS in 1996 was the reduction in response times to cardiac arrests and a near doubling of the number of AED-capable units through the expansion of the certified first responder (CFR) program. And for years, the teaching was that every minute that elapsed from the time of an arrest to the arrival of the first EMS unit resulted in a 7-10% decrease in the likelihood that a patient would survive their arrest (Figure 1).

From 2002-2003, Dr. Neal Richmond and colleagues examined cardiac arrest survival rates in a year-long duplication of the PHASE study, this time called the Prehospital Evaluation of New York City Survival (PHENYCS) study. The stated goal of this study was to reassess OOHCA survival in NYC following the implementation of that first responder program, as well as the introduction of 210 defibrillation-capable engine companies and a near doubling of the number of ambulance tours.

The most dramatic finding of the PHENYCS study, in my opinion, was the reduction in EMS response time for OOHCA cases, decreasing from 9.3 minutes in the PHASE (pre-merger) study to 4.6 minutes. This reduction in response time was also associated with increases in survival. Overall OOHCA survival, previously 2.2%, increased to 2.9%. Survival among arrests occurring prior to EMS arrival increased from 1.4% to 2.5%. And survival from bystander-witnessed OOHCA among patients presenting in shockable rhythms increased from 5.3% to 9.6%.

While these were significant improvements, they may be less than one might expect based on Figure 1 and the nearly five minute reduction in response time. The reason that these numbers are still low is likely due to two facts. First, among arrests witnessed by bystanders, the number of patients presenting in shockable rhythms decreased from 33.5% (PHASE) to 24.3% (PHENYCS). This represents a significant drop in the number of patients who are most likely to survive and in increase in the number not expected to survive. Despite that fact, survival still increased. Second, the graph in Figure 1 is misleading. While the principle is true (on average, a patient's chances of survival drop 7-10% for each minute that EMS arrival is delayed), the actual graph looks much different (Figure 2).



The disturbing thing about this graph would seem to be the steep drop from zero to four minutes, and the nearly flat curve that lies beyond the four minute mark. For most EMS systems, arriving in less than four minutes at the side of a patient whose arrest resulted in a 911 call is nearly impossible.

To put this in perspective, let's imagine that I was to suffer a cardiac arrest in my apartment, which just happens to sit only five blocks south of FDNY EMS Station 10, and imagine a best-case scenario for a timeline:

I collapse – Time = 0:00

Ten seconds for my girlfriend to get her phone, dial 911, and allow for two rings – 0:10

Thirty seconds for PD to process the call, for EMS to verify the address, and the call to be assigned – 0:40

Fifteen seconds for a crew to leave the station, get into their truck, and mark '63' – 0:55

With no traffic, forty seconds to drive from their station to my door – 01:35

Thirty seconds to get out, unload their equipment and secure the vehicle – 2:05

Ten seconds to walk to the elevator – 2:15

Even if the elevator is waiting on them, one second per floor – 2:43

Thirty seconds to find my door and enter the apartment – 3:13

Twenty seconds to open my airway, look/listen/feel, check for a pulse – 3:33

Fifteen seconds to get out the AED, expose my chest, apply the AED pads, and turn the AED on – 3:43

Twenty-seven seconds from AED turned on to first shock (that's our average last year) – 4:10

The point is that, even in the best circumstances, it is very difficult to get to a patient within that idealized four minute window. As a result, it means that we (like most every other EMS system in the world) are operating in the flat part of the survival curve. But that doesn't mean that things can't get better. While the changes in the EMS system and as a result of the FDNY / EMS merger may have optimized our position on the curve shown in Figure 2, what if we were able to shift the curve? In fact, we can and we have.

Shifting the Curve

As you know, over the course of the past five years, we have made a number of changes that affect the way that out-of-hospital cardiac arrest (OOHCA) cases are managed in the prehospital setting. Some of these changes were made in conjunction with REMAC and have affected the entire EMS system, while others have been implemented by the FDNY and impact only the 911 system or the Department. What follows is a timeline of those changes:

- **2004:** In an effort to improve bystander CPR rates, the Department implemented compression-only CPR instructions. These instructions are given to 911 callers who are not trained in CPR and who are in the presence of a cardiac arrest patient. This change was implemented over four years in advance of the American Heart Association's recent "Hands-Only CPR" campaign.
- **2005:** The FDNY announces the creation of the FDNY CPR Training Unit, a program staffed with FDNY-EMS instructors who offer free life-saving CPR training to schools and various community organizations.
- **Spring 2006:** The FDNY worked alongside the New York City Regional Emergency Medical Advisory Committee (REMAC) to incorporate the latest international resuscitation guidelines into the Regional EMS Protocols and provided its educational materials for use throughout the Region.
- **November – December 2006:** The FDNY trained its 800 paramedics, 2,200 EMTs and 10,000 certified first responders / firefighters in the latest CPR methods. Paramedics were also required to use certain medications to treat cardiac arrest patients.

- **May 2007:** The FDNY began to require that one of its EMS Officers be assigned to every cardiac arrest in order to oversee the resuscitation efforts.
- **May 2007:** The FDNY assumed a lead role in the SmartCPR Trial, an international study designed to evaluate the impact of a cutting-edge defibrillator technology on cardiac arrest survival.
- **October 2007:** The FDNY began training its paramedics in the use of a new airway device for use in cardiac arrest patients for whom another airway device cannot be easily placed.
- **October 2007:** The FDNY implements a new program in the 911 system to allow for the selective transport of patients with certain types of heart attacks directly to hospitals capable of performing cardiac catheterization. This program provides patients in New York City with a benefit not yet available in many other cities or states.

Of these changes, perhaps the most important are the changes that we have made that altered the way that we perform CPR. Our increased understanding of cardiopulmonary resuscitation (compressions and ventilation) on an anatomic and physiologic level has allowed us to make changes that affect the way CPR is delivered. And to emphasize the importance of this skill, EMS Officers are being dispatched to every cardiac arrest for the purpose of overseeing the CPR that is being delivered. It is this focus on the basic and essential elements of each resuscitation that have helped to shift the cardiac arrest survival curve in New York City.

In order to assess the impact that these changes have had on immediate outcomes among OOHCA patients, we analyzed six months (November 1, 2007 – April 30, 2008) of cardiac arrest data for all arrests Citywide. This data, derived from the SmartCPR Trial, was compared to the results of the PHASE and PHENYCS studies.

Because return of spontaneous circulation (ROSC) in the field has been shown to be strongest predictors of a patient’s likelihood to survive, it was felt that an increase in ROSC would be indicative of the immediate benefit of these changes. What we found indicated just that.

Table 1 shows the impact of these changes in resuscitative care. Response times remained unchanged when compared to the PHENYCS and so show continued improvement over the PHASE (pre-merger) time period. Likely due to the more effective medical management of coronary disease and the use of implanted defibrillators, the incidence of presenting shockable rhythms (ventricular fibrillation) continued to decline (less than half of the incidence described during the PHASE study). And yet the benefit of the changes described above is clear – a nearly 70% increase in the number of patients for whom pulses are restored in the field.

Table 1: Return of Spontaneous Circulation			
Outcome	PHASE (1990-1991)	PHENYCS (2002-2003)	2007-2008
Mean Response Time	9.3 minutes	4.7 minutes	4.7 minutes
Bystander CPR	36.5%	32.8%	33.8%
VF – bystander witnessed	33.5%	24.3%	15.3%
ROSC – bystander witnessed	28.2%	20.2%	33.9%

These data clearly indicate a shift in the curve. With a response time that has remained steady, immediate outcomes have improved (as shown with the red dot in Figure 3). If you extend those changes out among all response times, the end result is a curve that has shifted higher on the graph – suggesting better outcomes for all patients (the new curve drawn in the second part of Figure 3). In essence, by making these changes in the way we manage out-of-hospital cardiac arrest, we have shifted the curve to our patients’ advantage.

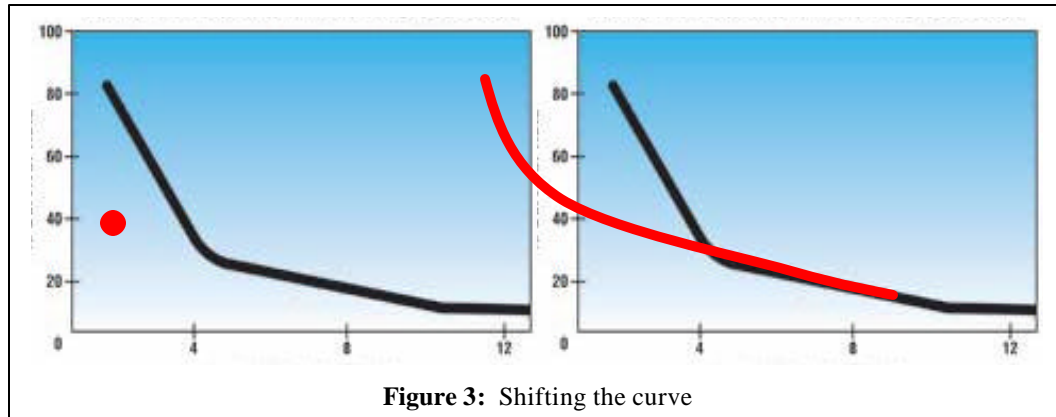


Figure 3: Shifting the curve

The Keys to Successful CPR

Maintaining this survival improvement for our patients requires continued attention to the details of each resuscitation. Successful CPR depends on seven key components: compression depth, compression rate, complete recoil, duty cycle, proper rotation of personnel, ventilation rate and limited interruptions. In the coming pages, we will address each of these and attempt to point out why they are so important to the resuscitation effort.

Depth of Compressions

There are two mechanisms by which the delivery of chest compressions causes blood flow during CPR. The first of these is dependent upon the depth of compressions. By compressing the heart directly between the sternum and the spine (Figure 4), blood is forced from the heart and out to the body. This mechanism requires that the

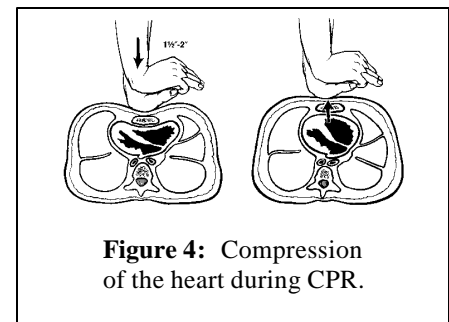


Figure 4: Compression of the heart during CPR.

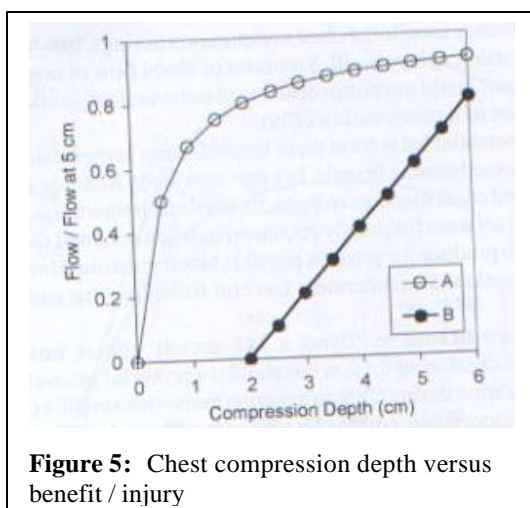


Figure 5: Chest compression depth versus benefit / injury

compressions be deep enough to accomplish this task while avoiding the injury that may result from compressions that are too deep or the inadequate compression of the heart that may result from compressions that are too shallow.

Figure 5 depicts the benefits and risks associated with the depth of adult chest compressions. As you move up the curve toward the recommended 1 ½ to 2 inches, you see greater and greater flow rates that are produced (curve A). But once you exceed 2 inches, each additional inch produces less and less additional blood flow while significantly increasing the risk of associated injuries. Because

the injuries that result from chest compressions (rib fractures, pneumothorax or “collapsed lung”, mediastinal hemorrhage, and liver lacerations) can themselves be life-threatening, it is important to ensure adequate chest compression depth while not exceeding the recommendations. For adults, 1 ½ to 2 inches is sufficient, while for children the recommendation is for chest compressions that equal one-third to one half of the depth of the chest.

Compression Rate

The rate at which you provide chest compressions is meant to balance the time spent compressing the heart (to ensure that blood flow is maintained) with the time spent allowing the heart to relax (to ensure that the heart has time to fill prior to the next compression). If compressions are too slow, blood flow from the heart will not be sufficient to keep the patient alive. If compressions are too fast, the heart will be inadequately filled before each compression so the result will be the same – insufficient output from the heart to keep the patient alive. Figure 6

shows this balance. As you can see, the peak for both curves lies at nearly 100 compressions per minute, as indicated by the red line. This is true for both children and adults, which is why the recommended compression rate for both is 100 per minute.

Complete Recoil

As was mentioned above, one of the mechanisms by which blood is pumped from the heart to the body during chest compressions is through the direct compression of the heart between the sternum and the spine. The other method, termed the billows method, uses the positive pressure created in the chest during the compression to drive blood from the chest into the rest of the body.

What is likely more important about this billows method is the relaxation of the chest wall as each compression is released. During this time, negative pressure is created within the chest that draws blood back into the chest from within the body’s large veins. It is this blood that fills the heart and makes blood available for the next compression. Without this negative pressure, each compression would be attempting to pump blood from an empty heart resulting in ineffective chest compressions.

For this reason, it is critical that each compression (of proper depth and rate) be combined with a relaxation that allows for complete chest wall recoil. Said another way, as you relax after each compression, you should be putting no weight or pressure on the patient’s chest. Even the slightest amount of pressure (far less than even your upper body weight) can result in a complete lack of blood return to the heart.

As you press down upon the chest, focus on the proper depth and rate of your compressions. But as you relax, focus on removing all pressure from the chest (without removing your hands from their proper position). For the perfect compression, you should end with the heel of your hand still able to feel the patient’s chest and without feeling any pressure being applied.

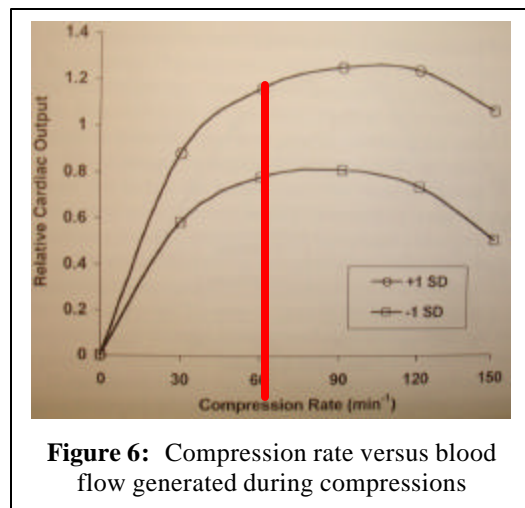


Figure 6: Compression rate versus blood flow generated during compressions

Duty Cycle

What the heck is a duty cycle? Well, in short, it is the ratio of the time spent compressing the chest and the time spent relaxing. As shown in Figure 7, the ideal duty cycle is one where just less than half of each compression is spent pressing on the chest, while a little more than half is spent relaxing. It is no coincidence that a verbal reminder (or mental, since most of us don't count out loud except during CPR classes) "one-and-two-and-three-and-four-and-five-and..." results in compressions that meet this criteria.

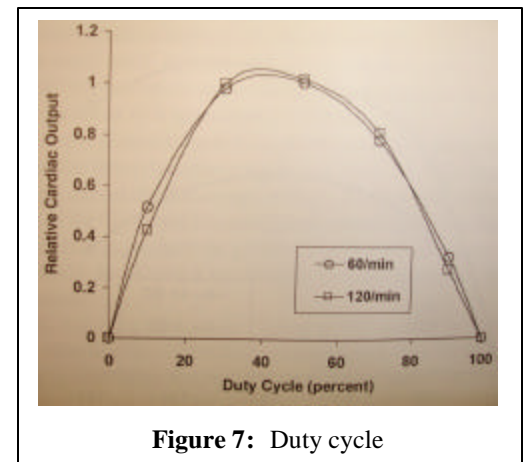


Figure 7: Duty cycle

Personnel Rotation

Very few people believe that they provide bad CPR. Yet these past sections have described four very important aspects of chest compressions. Over time, as the provider tires, it becomes more and more difficult to provide these type of compressions effectively, continuously, and repeatedly. There is existing data to show that the adequate delivery of chest compressions, particularly at the newly recommended rates and ratios, fades over time. In fact, for the average provider, chest compressions become more erratic and typically less effective after two minutes.

This is why, after every two minute cycle, it is important to rotate the responsibility for chest compressions. Every provider on the scene must spend time providing compressions to ensure that one or a portion of the providers is not overburdened. For the patient, this is essential to their survival. It is for this reason that, even if BLS and ALS arrive prior to a CFR company, the presence of that engine company increases the patient's opportunity for survival by supplying additional providers to share the work of compressions.

Ventilation Rate

Remember that just a few sentences ago we said that the negative pressure created between each compression was important to allow blood return to the heart before the next compression. And you will, no doubt, recall that another term bag-valve-mask ventilation is "positive pressure ventilation." Therefore, it is important that we deliver sufficient ventilations during CPR to accomplish the task while limiting the delivery of any unnecessary positive pressure that would only serve to limit blood return to the heart. Which leads to the question – how much ventilation is sufficient?

The act of breathing accomplishes two tasks – delivery of oxygen to the body and removal of carbon dioxide. The delivery of oxygen is a product of the volume of air delivered and the percentage of oxygen it contains. The removal of carbon dioxide depends upon volume of air delivered per minute (volume per breath multiplied by rate).

The average adult (which is what we are trying to simulate during CPR) breathes 21% oxygen, takes 12 breaths per minute, and moves 500cc (or ½ liter) of air in and out of the chest with each breath. This means that they require 1.2 liters of oxygen (½ liter x 21% x 12) and 6 liters of ventilation (½ liter x 12) per minute to survive.

Now recall that we are providing patients, via a bag-valve-mask, with 100% oxygen and that each ventilation routinely provides 800cc to the patient. This means that, if you were to breathe for the patient only once every seven seconds (eight times per minute), you would be providing sufficient ventilation for the removal of carbon dioxide (800cc x 8 = 6.4 liters) and over five times the necessary oxygen (100% x 800cc x 8 = 6.4 liters).

For the patient without a secured airway (endotracheal or tracheostomy tube), the recommended 30:2 ratio provides sufficient ventilation. It is once the patient’s airway is secured that it becomes essential for the person providing ventilations to appropriately limit their actions to once every six to eight seconds, delivering ventilations during on-going, continuous compressions. Any ventilations provided in excess of this provide no benefit and, because they provide additional positive pressure that may limit blood return to the heart, can actually be harmful.

Limited Interruptions

The last component essential for quality CPR is limited interruptions. To put a picture to these words, consider a diagram that shows the effect of chest compressions (done at the old 15:2 ratio) and interruption on blood flow. Figure 8 shows that, when chest compressions are absent, so is blood flow. Once chest compressions are resumed, it takes several compressions to “build up” to the maximum possible blood flow that can be achieved with external compressions. And the minute compressions are interrupted, blood flow both immediately stops and again requires several compressions to fully restore.

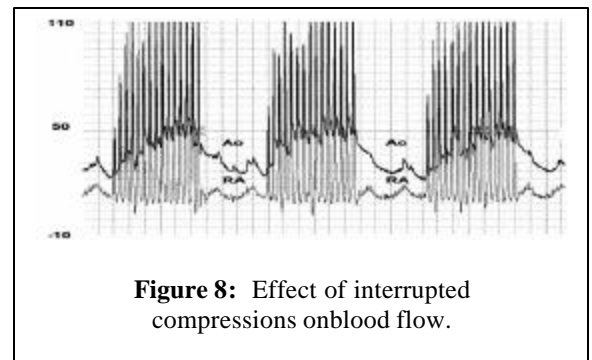


Figure 8: Effect of interrupted compressions on blood flow.

For this reason, frequently interrupted compressions have been associated with worsened outcomes. It has been estimated that every interruption that lasts 15 seconds or longer results in a 1-2% decline in a patient’s chances of survival. Intubation, pulse checks, rhythm checks, and other common causes for “holding” CPR are therefore unacceptable. Quality chest compressions, appropriately limited ventilation, and uninterrupted CPR (when possible) are the keys to a quality resuscitation effort and to giving patients every possible chance at survival.

Shifting the Curve Again

As we continue to try to ensure that every aspect of the prehospital care of OOHCA patients is optimal, it is important to understand that getting patients to the hospital alive is not the goal. Rather the goal of any

resuscitation is to provide the patient with the care necessary to allow them to leave the hospital alive and in the best possible neurologic condition.

Among the patients who achieve ROSC in the field, the vast majority (>80%) remain comatose upon their arrival in the emergency department. Until recently, the prognosis for those patients remained poor - 80% would die within six months. But this has begun to change with a realization of what it is that results in such poor outcomes among these patients.

In recent years, it has become evident that both the prehospital resuscitation efforts and the care that the patient receives from the hospital during the post-resuscitative period are critical to a patient's survival. Standardized in-hospital care and, in particular, the use of something called therapeutic hypothermia has been shown to result in both improved survival and better neurologic outcomes for OOHCA patients.

Although therapeutic hypothermia involves the intentional lowering of the patient's core body temperature by just a few degrees, the effects are dramatic. After lowering the patient's body temperature, the patient is given medications to maintain sedation, prevent shivering, and optimize blood pressure and other vital signs. After 24 hours, the patient's body is allowed to rewarm itself. This rather simple task, acting through a variety of affects on chemical and physical properties within the body, has resulting in some impressive changes in outcome.

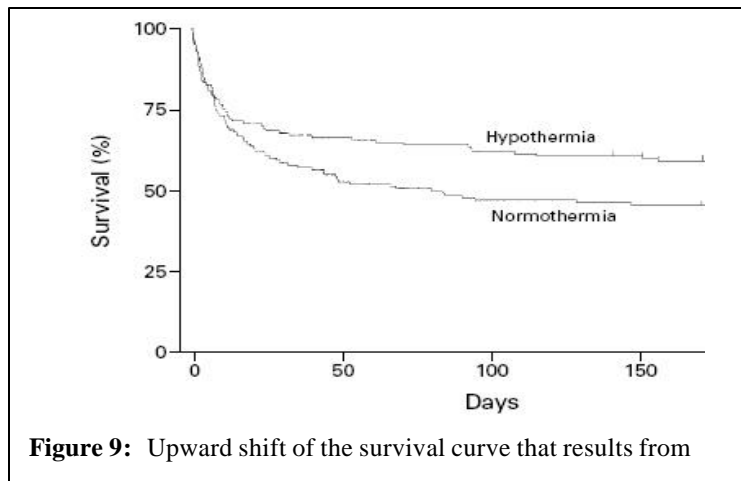
On February 21, 2002, there were two articles published in the New England Journal of Medicine that addressed the use of therapeutic hypothermia in the post-resuscitation management of the cardiac arrest patient. In the HACA trial, survival among patients treated with standard post-resuscitation care had a 39% rate of neurologically-intact survival at six months. In comparison, 55% of patients treated equally but with the addition of therapeutic hypothermia survived. In a separate study from Australia, only 26% of patients treated with standard post-resuscitation care survived to discharge with a good neurologic outcome. The addition of therapeutic hypothermia nearly doubled the survival rate, raising it to 49%.

At present, the majority of patients who achieve ROSC in our system do not receive therapeutic hypothermia once they arrive at the hospital. While this is common throughout the United States and England, it is considered by many (particularly those in Europe) to be the standard of care for such patients. And it is about to become the standard in this City.

In the coming months, the FDNY and the New York City 911 system will initiate a program that will ensure that all patients who are appropriate for this treatment will have the opportunity to receive it. Once the program is put in place, OOHCA patients who achieve ROSC in the field will be transported only to centers who have partnered with the FDNY as resuscitation centers. Whether OOHCA patients presented in a shockable or nonshockable rhythms, whether their arrest was witnessed or unwitnessed, regardless of age, and even if only BLS personnel are on scene – all OOHCA patients who achieve ROSC in the field will be eligible for transport to these regional resuscitation centers and will have the potential to benefit from this therapy.

The exact details of this project have yet to be finalized. At the time that this article is being written, the FDNY has held meetings with all interested hospitals and additional meetings with those interested in becoming a regional resuscitation center. We have presented this project to the REMAC and received approval to move forward with a formal presentation to the SEMAC (which will occur at the end of May). We have received positive feedback from various persons in leadership positions within EMS on a state level. And we have received support from the Greater New York Hospital Association and will meet with their membership in the month of June. Throughout all of these endeavors, we have also received a great deal of support from Dr. Stephan Mayer of New York Presbyterian – Columbia Hospital University Medical Center, a well-known expert in neurocritical care and therapeutic hypothermia.

Based on the previously mentioned studies and other scientific results, we expect this project to result in yet another positive shift in the survival curve. Figure 9 is a survival curve from one of those studies. Knowing that most patients in our system today are not receiving hypothermia, you can consider our City to be represented by the “normothermia” curve. As you can see, with therapeutic hypothermia, we will be shifting the curve once again.



Even with all of this in place, we will still not yet have achieved our goal. Based on some early literature, there may be further benefit if hypothermia is initiated even earlier, as part of the resuscitation effort. For this reason, plans are already underway to develop procedures, protocols, and necessary equipment to allow our ALS providers to initiate hypothermic treatment during the out-of-hospital resuscitation. We hope to begin providing this type of care by next summer. If that is the case, paramedics and paramedic students within our service can expect to begin their training specific to these changes in the Spring 2009 session of Core. Dr. Doug Isaacs at FDNY BOT has already laid a good foundation for this education during this past Core cycle. And as we look to begin the use of “preservative hypothermia” in the field, further training and, no doubt, future articles on the subject will follow.

Summary

Though a series of changes brought about in the New York City EMS system and within the FDNY, we continue to see improvements in cardiac arrest survival. While more work remains to be done, each and every one

of you should take pride in the fact that you have made an amazing difference in true life and death situations. Patients who suffer cardiac arrest in New York City have a better chance than ever at survival. And it is your attention to detail, your focus on the basics of cardiopulmonary resuscitation, and the quality of care that you provide that has achieved this. Patients owe their lives to you – can there be any more rewarding a feeling for any healthcare professional?

Written by: John Freese, M.D.
Medical Director of Training/OLMC
Director of Prehospital Research

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JUNE 2008 JOURNAL CME QUIZ – “Shifting the Curve”

Quiz (all ten questions should be answered by all providers)

1. Which is true regarding the rate of chest compressions during CPR?
 - a. Chest compressions should be delivered at a rate of 100 per minute for adults.
 - b. Chest compressions should be delivered at a rate of 120 per minute for children
 - c. Chest compressions delivered at rates faster than recommended result in increased injury.
 - d. Chest compressions delivered at rates faster than recommended result in less injury.
 - e. None of the above are correct.
2. Which correctly describes the appropriate chest compression depth in adults and children?
 - a. adults = 1 ½ to 2 inches, children = 1 ½ to 2 inches
 - b. adults = 1 ½ to 2 inches, children = 1 to 1 ½ inches
 - c. adults and children = one third to one half of the chest depth
 - d. adults = 1 ½ to 2 inches, children = one third to one half of the chest depth
 - e. adults = 1 ½ to 2 inches, children = one fourth to one third of the chest depth
3. At 800cc per ventilation, how many breaths per minute effectively replicate normal breathing in adults?
 - a. five
 - b. six
 - c. seven
 - d. eight
 - e. ten
4. Which is true regarding blood return to the heart during CPR?
 - a. Blood return occurs because of the negative pressure created during chest recoil.
 - b. Blood return is diminished by positive pressure ventilation.
 - c. Pressure applied to the chest between chest compressions diminishes blood return.
 - d. Diminished blood return will result in ineffective blood flow during CPR.
 - e. All of the above are true.
5. The average provider can deliver continuously effective chest compressions for how many minutes?
 - a. one
 - b. two
 - c. three
 - d. four
 - e. five
6. Return of spontaneous circulation following an out-of-hospital cardiac arrest is one of the weakest predictors of a patient's likelihood of surviving to hospital discharge.
 - a. True
 - b. False
7. In one study, the use of therapeutic hypothermia resulted in a near-doubling of neurologically-intact survival from out-of-hospital cardiac arrest.
 - a. True
 - b. False
8. In the coming months, which cardiac arrests will be selectively transported to regional resuscitation centers?
 - a. Patients who present in shockable rhythms and achieve ROSC.
 - b. Patients who achieve ROSC with only BLS maneuvers.
 - c. Any patients who achieve ROSC.
 - d. Patients who achieve ROSC so long as ALS is on scene.
 - e. None of the above is true.
9. Future plans within the NYC 911 system include hypothermic therapy during resuscitation efforts in the field.
 - a. True
 - b. False
10. Under recent changes in resuscitation management brought about by FDNY and the NYC REMAC :
 - a. ROSC rates have increased despite a decrease in the number of patients presenting in shockable rhythms.
 - b. ROSC rates have increased while bystander CPR rates changed very little.
 - c. ROSC rates have increased and EMS response times to cardiac arrests have remained steady.
 - d. ROSC rates have increased nearly 70% over those seen during the PHENYCS study.
 - e. All of the above are true.

**** SEND ANSWER SHEET (next page) BY LAST DAY OF JUNE 2008****

Journal CME Credit Answer Sheet

After reading the article, place your answers to the following quiz on this answer sheet

Paramedics receiving a minimum grade of **80%** will receive **1 hour** of Online/Journal CME

Please submit this page **only once**, by one of the following methods:

- FAX to **718-999-0119**
- U.S. MAIL to **FDNY OMA, 9 MetroTech Center 4th flr, Brooklyn, NY 11201**

Direct inquiries to the Journal CME Coordinator at 718-999-2790

You are strongly advised to keep a copy for your records

All respondents: * Info required to receive your CME

*Name

NY State / REMAC #

*Work Location

*Email address

**Please submit answer sheet by
the last day of June 2008**

June 2008 CME

“Shifting the Curve”

Quiz Answers

1.		<u>Required for</u> <u>BLS & ALS</u> <u>Providers</u>
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Citywide CME – June 2008

Boro	Facility	Date	Time	Topic	Location	Host	Contact
BK	Brooklyn	1 st Wed	0730-0830	Lecture	Mazur Conf near ED	Dr. de Souza	Don Cardone 718-763-8888x506
BK	Kingsbrk JMC	6/19/08	1530	Lecture: Environmental	ED Conference Room	Dr Hew	Manny Delgado 718-363-6644
BK	Kingsbrk JMC	7/17/08	1530	Lecture: Pediatrics	ED Conference Room	Dr Hew	Manny Delgado 718-363-6644
BK	Kingsbrk JMC	8/21/08	1530	Lecture: Abdominal [next: 9/18]	ED Conference Room	Dr Hew	Manny Delgado 718-363-6644
BK	Lutheran	2 nd Wed	0900-1100	Call Review	ER Conference Room	Dr Chitnis	Dale Garcia 718-630-7230
BK	Lutheran	4 th Wed	1700-1900	Call Review	Station 2-20	Dr Chitnis	Dale Garcia 718-630-7230
BX	Montefiore	1 st Tues	1930-2230	Call Review	Cherkasky Auditorium	Dr Wollowitz	Don Cardone 718-763-8888x506
QN	FDNY-BOT	6/18/08	1030-1400	Call Review or Lecture [next: 7/16]	Fort Totten Bldg 325	Dr Gonzalez	swansoc@fdny.nyc.org
QN	FDNY-BOT	7/16/08	1030-1400	Call Review or Lecture [next: 7/16]	Fort Totten Bldg 325	Dr Kaufman	swansoc@fdny.nyc.org
QN	FDNY-BOT	8/13/08	1030-1400	Call Review or Lecture [next: 7/16]	Fort Totten Bldg 325	Dr Asaeda	swansoc@fdny.nyc.org
QN	Flushing Hosp	3 rd Thur	1330-1530	Call Review	Board Room	Dr Crupi	Mordechai Lax 718-240-5570
QN	NYH Queens	Mondays	1600-1800	Call Review/Trauma Rounds	East bldg, courtyard flr	Dept of Surgery	Lisa Galati 718-670-2501
QN	Mt Sinai Qns	6/24/08	1800-2100	Lecture: Environmental Emerg.	25-10 30 Ave, conf room	TBA	Donna Smith-Jordan 718-267-4390
QN	Mt Sinai Qns	7/29/08	1800-2100	Lecture: To Be Announced	25-10 30 Ave, conf room	TBA	Donna Smith-Jordan 718-267-4390
QN	Mt Sinai Qns	8/26/08	1800-2100	Lecture: TBA [next: 9/30]	25-10 30 Ave, conf room	TBA	Donna Smith-Jordan 718-267-4390
QN	Parkway Hosp	3 rd Wed	1830-2130	Call Review	Board Room, 1st flr		pabruzzo@capitolhealthmgmt.com
QN	Queens Hosp	6/12/08	1615-1815	Call Review	Emergency Dept		718-883-3070
QN	Queens Hosp	6/26/08	1615-1815	Call Review [next: 7/10+24]	Emergency Dept		718-883-3070
SI	RCA	6/18/08	1800-2000	Call Review & 12-lead EKG	1355 Castleton Ave (side entr.)	Dr. Hashmi	Kevin Mullaney 718-273-3555 x202
SI	RUMC	6/19/08	1000-1230	Call Review & Glucometer	355 Bard Ave, SIPP Conf	Dr. Ben-Eli	William Amaniera 718-818-1364
SI	RUMC	7/16/08	1700-1930	Call Review & Skills Practice	355 Bard Ave, MLB Conf	Dr. Ben-Eli	William Amaniera 718-818-1364
SI	RUMC	8/21/08	1000-1230	Call Review	355 Bard Ave, SIPP Conf	Dr. Ben-Eli	William Amaniera 718-818-1364

2008 NYC REMAC Examination Schedule

Month	REMAC Refresher Exam (written only - CME letter required)		REMAC Quarterly Exam (written & 3 oral scenarios)			NYS/DOH Written Exam
	Registration Deadline	Exam Date (on Wednesdays)	Registration Deadline	Written @18:00	Orals @09:00	
January	12/31/07	1/16/08	Thursday 1/17/08	Thursday 1/24/08	Thursday 1/31/08	1/17/08
February	1/31/08	2/20/08				
March	2/29/08	3/19/08				3/13/08
April	3/31/08	4/16/08	New: Tuesday 4/8/08	Tuesday 4/22/08	Tuesday 4/29/08	
May	4/30/08	5/14/08				5/15/08
June	5/31/08	6/18/08				6/19/08
July	6/30/08	7/16/08	New: Wednesday 7/9/08	Wednesday 7/23/08	Wednesday 7/30/08	
August	7/31/08	8/13/08				8/21/08
September	8/31/08	9/17/08				
October	9/30/08	10/22/08	New: Thursday 10/9/08	Thursday 10/23/08	Thursday 10/30/08	
November	10/31/08	11/19/08				11/20/08
December	11/30/08	12/17/08				12/18/08

Call 718-999-7074 before the registration deadline for the **REMAC Refresher Written examination**, offered monthly for paramedics who meet CME requirements **and** whose REMAC certifications are either current or have expired **less** than 30 days. Candidates may attend an exam no more than 6 months prior to expiration. Refresher exams are held at 07:00 or 18:00 hours at FDNY-EMS Bureau of Training, Fort Totten, Queens.

Email swansoc@fdny.nyc.gov ASAP for details to register for the **REMAC Quarterly Written and Orals examination** for initial certification, **or** for paramedics with either inadequate CME or whose certifications have expired **more** than 30 days. **You are encouraged to register at least 30 days prior to the exam as seating is limited. A \$50 exam fee by money order is required.** The Quarterly exam is held at FDNY-EMS Bureau of Training, Fort Totten, Queens.