

**WVEMS Regional Trauma PI Committee**

Performance Improvement Project: Evaluation of pre-hospital arrest cases

Data Source: Carilion Roanoke Memorial Hospital Trauma Registry

Date Range: March 1, 2009 – February 28, 2010

Inclusion Criteria: CPR performed by pre-hospital providers

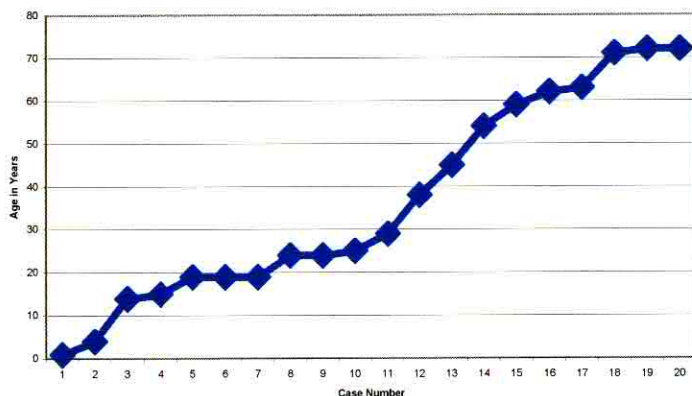
Total cases for review: 20 (100% were ALS Transports)

- \* 5 cases (25%) transferred from outlying hospitals:
  - o Montgomery Regional, Carilion Stonewall Jackson, Greenbrier Valley Medical Center, Carilion Franklin Memorial, Memorial Hospital of Martinsville and Henry County.
  
- \* 15 cases (75%) transported directly from the scene:
  - o Ground transports: 8
    - Incident location: Botetourt County, Floyd County, Moneta, Red Valley, Roanoke City, Roanoke County, Salem.
  - o Air transports: 7
    - Incident location: Bedford County, Botetourt County, Bland County, Henry County, Rockbridge County, Wythe County, Monroe County (WV)

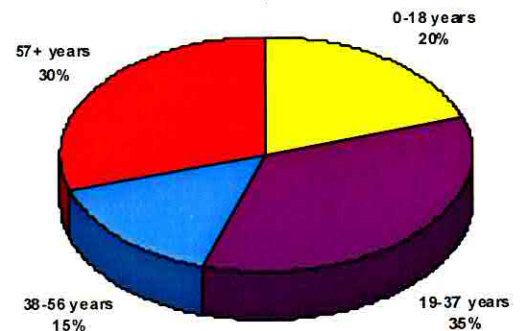
Patient age:

- \* Age range: 1 year – 72 years
  - o Median age: 27 years

Pre-Hospital Cardiac Arrest: Age Distribution



Pre-hospital Arrests by Age Group



### Summary of Review Findings

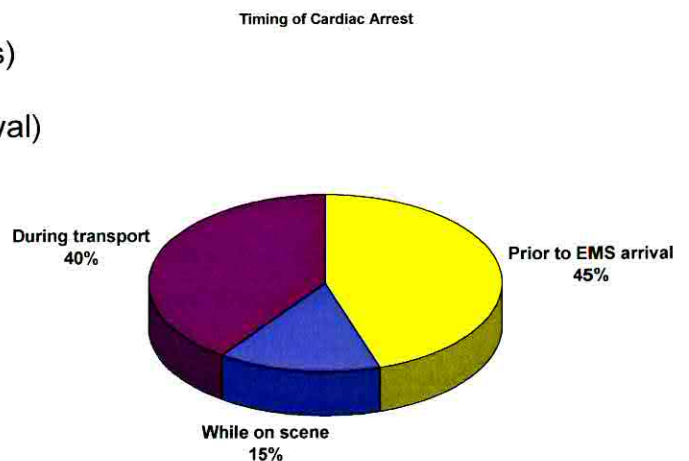
ALS Protocol WVEMS ALS Protocol: AT-4	Total	Percentage	Comment
Met WVEMS A-7 for Determination of Non-Viability	0/20	0	
CPR documented	20/20	100%	
CPR appropriate for rhythm	20/20	100%	
ACLS Medications given	16/20	80%	
* On-scene time 0-10 minutes	2/14	14%	(6 cases no information)
ALS Airway Established	15/20	75%	
Needle Decompression Performed (if indicated)	5/12	42%	
IV Access Obtained	20/20	100%	
1000cc Fluid Bolus	4/12	33%	(4 cases no documentation of fluid amount)
On-line Medical Control Contacted for Termination	1/15	7%	(EMS was denied)

#### Mechanism of Injury:

- \* Blunt: 80% (n= 16)
- \* Penetrating: 15% (n= 3)
- \* Burn (electrocution): 5% (n= 1)

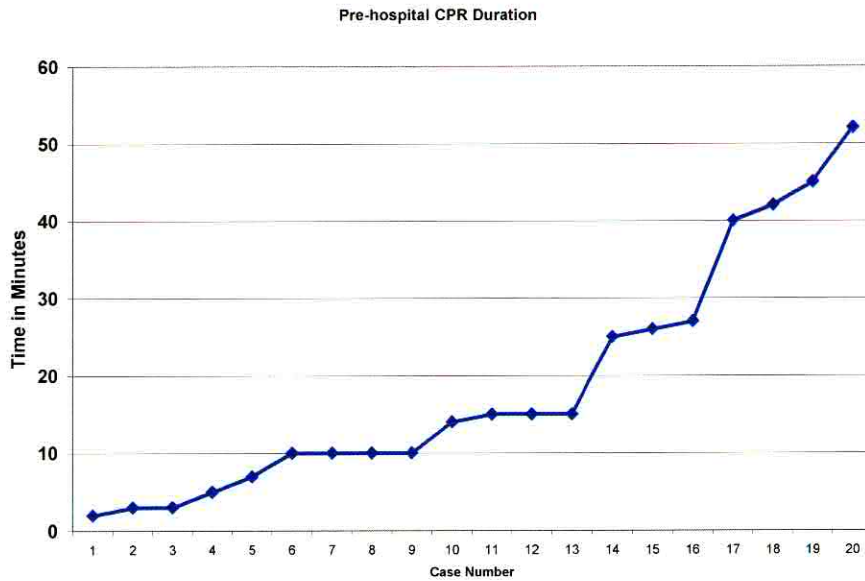
#### Timing of Arrest:

- \* Unknown downtime PTA: 6
- \* 3 cases downtime PTA: 5, 10, 20 (minutes)
- \* Initial EKG rhythm (For arrests prior to arrival)
  - o Asystole: 67% (n= 6)
  - o V-fib: 22% (n= 2)
  - o PEA: 11% (n= 1)



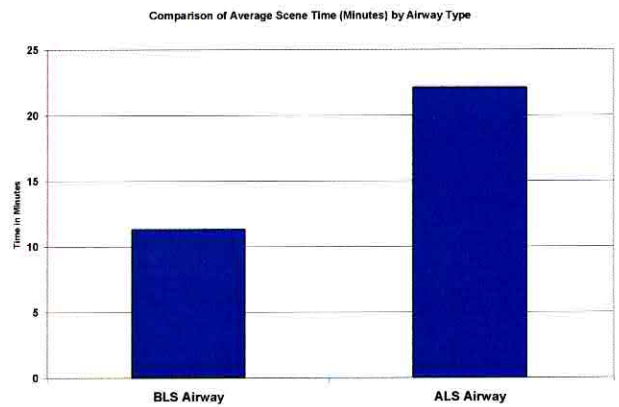
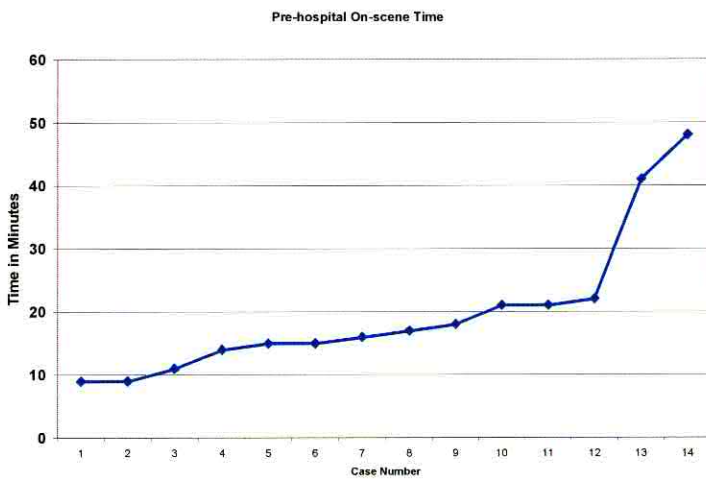
Pre-hospital CPR duration:

- \* Ranged from 2 minutes to 52 minutes.
  - o Median: 15 minutes



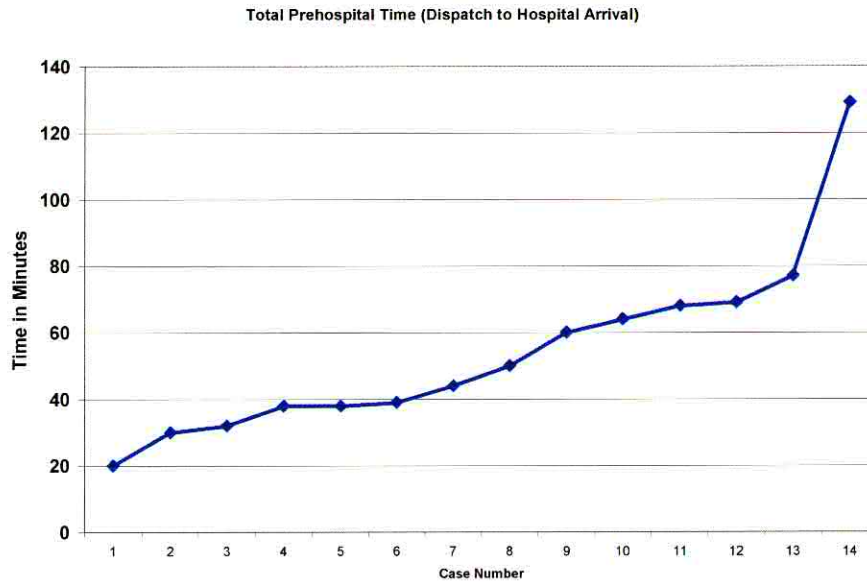
Pre-hospital on-scene time:

- \* Ranged from 9 minutes to 48 minutes.
  - o Median: 17 minutes
  - o Shortest on scene times were in BLS airway patients
- \* Complete EMS reports not available for 6 cases.



Total pre-hospital time (from dispatch to arrival at hospital):

- \* Ranged from 20 to 129 minutes.
  - o Median: 47 minutes
- \* Complete EMS reports not available for 6 cases.



Outcome:

- \* 9 patients (56%) regained a pulse prior to ED arrival.
  - o 56% (n= 5) of these patients expired.
  
- \* Survived to hospital discharge: 20% (n= 4)
  - o All had pre-hospital CPR of 3-10 minutes, and regained a pulse prior to ED arrival.
  - o 1 patient was in arrest on arrival (electrocution, found in v-fib)
  
  - o 75% (3 of 4 cases) had BLS airway (BVM)
  - o 1 patient regained pulse after defibrillation (electrocution with v-fib)
  - o 2 patients regained pulse after needle decompression (both had tension Ptx)
  - o 1 patient was hypovolemic from exsanguination and responded to hemorrhage control, fluids).
  
  - o Average hospital length of stay was 18 days.
  - o Only 1 patient was well enough for discharge home, 3 patients were sent to inpatient rehabilitation centers for ongoing therapy.
  
- \* Deceased: 80% (n= 16)
  - o 31% (n= 5) regained a pulse prior to ED arrival.
  - o 63% (n= 10) had lethal head injuries
  
- \* Death Location:
  - o Emergency Department: 69% (n= 11)
  - o Operating Room: 6% (n=1)
  - o Intensive Care Unit: 25% (n= 4)
  
  - o All deaths occurred within 24 hours of arrival.

Date	Age	MOI	Sending Hospital	Transport Mode from Scene	Met WVEIMS A-7 Determination of Non-Viability	Time of Arrest	Estimated Downtime if PTA	Prehospital CPR Duration	Initial Rhythm	ACLS Meds	Airway Type	Needle Decompression	W/O Access	Fluid Bolus 1000cc	Regained Pulse	Online Med Control for Termination	On-scene time	Total Prehospital Time	Outcome	Diagnoses
3/24/2009	19	Stabbing	Montgomery Regional	Ambulance	No	Transport		3	unk	No	BVM	n/a	Yes	No	Yes	No	16	32	Alive	Transsected femoral artery complex laceration r leg
6/28/2009	72	Stabbing		Ambulance	No	Transport		5	SR	No	BVM	Yes	Yes	No	Yes	No	9	38	Alive	L PFX Rib fx, 1 rib, closed Lac. mandibular lac abdomen Lac chest
9/2/2009	45	MVC	Greenbrier Valley	Helicopter	No	Transport		10	ST	Yes	ETT	Yes	Yes	Yes	Yes	No	unk	unk	Alive	Right hemopneumothorax Tension Ptx Myocardial contusion Periorbital hematoma R small L scalp hematoma Multiple bruises and abrasions to chest/extremities
9/23/2009	24	Electrocution	Franklin Memorial	Ambulance	No	PTA	5	10	VF	Yes	BVM	No	Yes	No	Yes	No	unk	unk	Alive	Diffuse axonal injury Rib fx, multiple 2nd/3rd degree burns L arm, hand
3/21/2009	72	Fall		Helicopter	No	PTA	20	26	Aystole	Yes	ETT	Yes	Yes	No	Yes	n/a	17	64	Dead	Bilateral pneumothorax Bilateral pulmonary contusion Hypoxic brain injury Coma
4/7/2009	29	MVC		Helicopter	No	Transport		27	SR	Yes	ETT	No	Yes	Yes	No	No	48	129	Dead	Hemoperitoneum (2 liters); Posterior liver laceration grade III; Bilateral hemopneumothorax; Splenic contusion; Multiple bilateral posterior rib fractures; Right pulmonary contusion
4/11/2009	24	ATV		Helicopter	No	Transport		7	ST	No	BVM	Yes	Yes	No	No	No	unk	unk	Dead	Hypoxic brain injury Cerebral edema Coma Abrasions neck
5/1/2009	38	Hanging	Stonewall Jackson	Ambulance	No	PTA	unknown	2	PEA	Yes	ETT	n/a	Yes	Yes	Yes	n/a	21	39	Dead	Bruiing chest Crush injury chest Crush injury abdomen
5/18/2009	62	Pedestrian		Ambulance	No	PTA	10	40	Aystole	Yes	ETT	No	Yes	unk	No	No	22	44	Dead	SDH, SAH Cerebral edema Coma Hypoxic brain injury Fracture frontal bone; nasal bone; maxillary, ethmoid, & sphenoid sinuses; mastoid Bilateral pulmonary contusions Soft tissue hematoma to neck Open right tibia fibula fracture
5/30/2009	19	Motorcycle		Helicopter	No	On scene		10	unk	Yes	ETT	No	Yes	No	Yes	n/a	unk	unk	Dead	
6/26/2009	59	Motorcycle		Helicopter	No	Transport		15	SB	Yes	ETT	Yes	Yes	No	No	No	18	50	Dead	

Date	Age	MOI	Sending Hospital	Transport Mode from Scene	Met WVIENS A-Z Determination of Non-Viability	Time of Arrest	Estimated Down-time if PTA	Prehospital CPR Duration	Initial Rhythm	ACLS Meds	Airway Type	Needle Decompression	N/O Access	Fluid Bolus	Regained Pulse	Online Med Control for Termination	On-scene time	Total Prehospital Time	Outcome	Diagnoses
7/14/2009	4	Drowning		Ambulance	No	PTA	unknown	42	Asystole	Yes	ETT	n/a	Yes	No	No	No	11	60	Dead	4 years Hypoxic brain injury Coma
7/17/2009	14	Pedestrian		Ambulance	No	Transport		15	unk	Yes	ETT	No	Yes	Yes	No	No	unk	unk	Dead	Occipital condyle fx; temporal bone fx; comminuted occipital skull fx; Blow out fx to left orbit, maxillary sinus fx, nasal spine fx, diffuse cerebral edema with descending transtentorial herniation and coma; multiple bilateral posterior rib fxs, C6/C7 spinous process fx, bilateral pulmonary contusions
7/24/2009	1	Pedestrian		Ambulance	No	PTA	unknown	14	Asystole	Yes	BVM	No	Yes	unk	No	No	9	20	Dead	Crush injury head and chest Left scalp abrasions Coma
10/4/2009	71	GSW		Helicopter	No	On scene		45	SB	Yes	ETT	n/a	Yes	No	No	No	41	77	Dead	GSW to chin Coma Intracerebral hemorrhage
12/5/2009	15	Hanging		Ambulance	No	PTA	unknown	25	Asystole	Yes	ETT	n/a	Yes	No	No	No	15	30	Dead	Abrasions to neck Hypoxic brain injury Coma
1/16/2010	25	Stabbing		Ambulance	No	Transport		15	unk	No	ETT	No	Yes	unk	No	No	15	38	Dead	Tension ptx Tracheal transection Complex stab wound zone 2 anterior neck
1/24/2010	54	Hanging	Martinsville Memorial	Ambulance	No	PTA	unknown	10	Asystole	Yes	ETT	n/a	Yes	No	Yes	n/a	unk	unk	Dead	Coma Left occipital scalp hematoma Hypoxic brain injury
1/29/2010	63	MVC		Ambulance	No	PTA	unknown	52	VF	Yes	ETT	n/a	Yes	unk	No	Yes (denied)	21	68	Dead	Bilateral SAH IVH with cerebellar and cerebral edema; anoxic brain injury Transtentorial descending herniation Atlantal axis dislocation Open left humerus fracture
2/27/2010	19	MVC		Helicopter	No	On scene		3	ST	Yes	ETT	n/a	Yes	No	Yes	n/a	14	69	Dead	