

K. Treatment

General Overview: Treatment

The State of Maryland has established "The Maryland Medical Protocols for Emergency Medical Services Providers" to standardize the emergency patient care that EMS providers, through medical consultation, deliver at the scene of illness or injury and while transporting the patient to the closest appropriate hospital. Chapter III Treatment Protocols, Section I number 4 outlines the algorithm for an Adult Asystole Patient. In addition, Chapter III, Section FF discusses Carbon Monoxide/Smoke Inhalation and refers to Cyanide Poisoning in Chapter V Jurisdictional Optional Supplemental Programs/Protocols Section A Cyanide Poisoning.

The National Fire Protection Association (NFPA), under NFPA 1710 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments, and more specifically Section 5.3 Emergency Medical Services (EMS) the Authority Having Jurisdiction (AHJ) shall provide standards for the delivery of EMS by the department.

Policies and Standards Applicable to Howard County Department of Fire and Rescue Services: Treatment

The Howard County Department of Fire and Rescue Services (HCDFRS) under [General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines](#), establishes that two transport units be dispatched on box alarm assignments. Additionally, HCDFRS has [General Order 320.08 Medical Duty Officer](#) that establishes operational supervision and quality assurance in all areas of Emergency Medical Services.

Woodscape Drive Incident Overview: Treatment

On the morning of July 23, 2018, Howard County Fire and Rescue (HCDFRS) Paramedic 56 was the first Advanced Life Support (ALS) transport unit dispatched on box alarm 5-62 at 7005 Woodscape Drive in Clarksville, Maryland for smoke in the house after a lightning strike. Paramedic 56D assumed the role of Initial Rapid Intervention Crew (IRIC) for the incident.

The second transport unit, HCDFRS Paramedic 105 also responded and positioned outside of the immediate area in order to allow suppression vehicles access to the scene. Reporting to the front yard of the home, the crew of Paramedic 105 observed the conditions and surroundings of the incident. Upon hearing the MAYDAY activation, the crew of Paramedic 105 immediately retrieved the stretcher and oxygen bag from the unit and positioned near the corner of Side A and Side D of the structure. The crew of Paramedic 105 then reported to lower level Side C, waiting for the removal of FF Flynn from the building.

When rescue crews removed FF Flynn from the basement, P105A assumed the role of lead provider. To remove FF Flynn's turnout gear, P105A immediately positioned FF Flynn's breathing apparatus between his legs and then removed the regulator from FF Flynn's face-piece. Then, with the aid of Tower 10D, P105A removed FF Flynn's face-piece. After removing FF Flynn's face-piece, P105A shouted FF Flynn's name but found him unresponsive. P105A then checked for a carotid pulse, discovering that FF Flynn did not have a detectable pulse. P105A then directed nearby personnel to provide FF Flynn high performance Cardio-Pulmonary Resuscitation while he administered two mouth-to-mouth ventilations prior to FF Flynn being ventilated with a Bag Valve Mask with high flow oxygen. While P105A directed the removal of turn-out gear and patient care, P105D moved the stretcher to lower level Side C and repositioned Paramedic 105 to the end of the driveway. Once the remainder of the turn-out gear was removed, FF Flynn was transferred to the stretcher and moved to Paramedic 105 while receiving bag valve ventilations and Cardio-Pulmonary Resuscitation.

After FF Flynn was loaded into the transport unit, P115A and EMS-1 continued ALS care while P105A proceeded to intubate FF Flynn. During the procedure P105A reported that FF Flynn's airway was clear of any soot, debris, or burns, additionally there was no swelling or abnormalities that would hinder intubation. Concurrent with intubation, FF Flynn was connected to a cardiac monitor and a rhythm check was conducted, with the results interpreted as asystole.

P115A secured two interosseous access points in FF Flynn's lower extremities, one for medication and fluid challenge administration and one for the Cyanokit®. All care provided to FF Flynn followed Maryland Medical Protocols and Advanced Cardiac Life Support (ACLS) guidelines. Howard County General Hospital was notified of a medical transport via local radio channels. During the transport, ALS and Basic Life Support (BLS) care was continued until arrival at Howard County General Hospital, where FF Flynn's care was transferred to the Emergency Room physician. HCDFRS personnel continued assisting in FF Flynn's care under the direction of hospital staff. Treatment of FF Flynn continued at Howard County General Hospital until the

physician determined that all efforts of resuscitation had been exhausted. An HCFDRS Chaplain offered prayer and FF Flynn's body was draped with the American Flag.

Through the process of removing FF Flynn's turn-out gear and during treatment, the following injuries were noted by EMS providers:

- FF Flynn's skin appeared red in color, similar to a First-degree burn, over a majority of his body
- Both of FF Flynn's arms--from approximately mid forearm distally to the fingers— were covered with Second degree burns.
- FF Flynn's hands had almost all skin removed.
- FF Flynn's left arm was positioned outwardly and unable to be positioned to his side.

Findings and Recommendations: Treatment

In reviewing the entire incident, the ISRB reached the following findings and recommendations. Although there were injuries reported during the incident beyond FF Flynn's, these additional injuries did not contribute to FF Flynn's Line of Duty Death and are not discussed in this report.

First, several personnel reported difficulty in removing FF Flynn's turnout gear while continuing treatment and some turn out gear was transported with FF Flynn. It was noted during the investigation that HCDFRS has neither a policy nor training on how personnel can remove PPE from an incapacitated firefighter. Training on the best procedures to remove PPE from a firefighter unable to do so themselves would greatly increase the speed in which medical aid could be administered to an injured firefighter.

Second, although General Order 310.01 does not pre-assign EMS-1 a function unless they are the First Arriving Chief or Command Officer, EMS-1 followed best practices in preparing for any medical needs. EMS-1 staged along Woodscape Drive, retrieved the Cyanokit, and made his way to the area of the command post. EMS-1 assisted with getting E101A away from the structure and then returned to assist with treatment of FF Flynn.

Third, EMS-1 operated on the incorrect channel during the incident at 7005 Woodscape Drive. EMS-1 transmitted on Bravo 4 during the initial stages of the incident and then switched over to Alpha 4 (HCGH Adult Notification Channel) to contact Howard County General Hospital to advise them of a transport. While it is not believed to have any contributing factor on the treatment of FF Flynn, EMS-1 did request additional ALS personnel at 02:46 and attempted to reach command at 02:49 on Bravo 4, of which both transmissions on Bravo 4 went unheard.

Fourth, Emergency Medical Services Providers followed the Maryland Medical Protocols for Adult Asystole Patients. FF Flynn's patient care report and interviews with responding personnel confirmed minimally interrupted high-performance Cardio Pulmonary Resuscitation (CPR) was completed for the duration of FF Flynn's treatment. Crews treating FF Flynn considered and treated for causes of cardiac arrest. Additionally, all medications administered were consistent with the Adult Asystolic Algorithm.

Fifth, crews were able to provide additional care in accordance with Howard County's Jurisdictional Optional Protocol Supplement. HCDFRS requested from the Maryland Institute for Emergency Medical Services System (MIEMSS) to participate in the optional protocol for Cyanide Poisoning. Cyanide can enter the body through inhalation, ingestion, or absorption. Based upon signs and symptoms it was determined that FF Flynn met the criteria for the administration of Hydroxocobalamin (Cyanokit®) from a possible smoke inhalation after a rescue from a fire. The administration was in accordance with all protocols and completed during transport to the hospital.

Sixth, the Medical Duty Officer completed a Quality Assurance Review of FF Flynn's care in accordance with [General Order 320.08 Medical Duty Officer](#). EMS-1 worked with the HCDFRS Medical Director and completed a Quality Assurance review of the care provided by HCDFRS

personnel. These findings determined that all protocols and treatment provided to FF Flynn were in accordance with Maryland Medical Protocols and ACLS guidelines. Additionally, an external Quality Assurance review was completed by the Medical Director of Anne Arundel County Fire Department.

Lastly, the EMS unit that transported FF Flynn from the scene was the only transport unit on scene at the time. When FF Flynn was transported, there was no longer a transport unit on the scene despite over 50 HCDFRS personnel on the incident, with many working in an IDLH environment. HCDFRS should ensure that there are additional EMS units on the scene, proportionate to the number of personnel on the scene.

Findings	Recommendations
K.1 Several personnel reported difficulty in removing FF Flynn’s turnout gear while continuing treatment and some turn out gear was transported with FF Flynn.	K.1.1 A standardized process for removal of turnout gear of a downed fire fighter in breathing apparatus, as well as a process to initiate and secure a chain of custody of the gear, must be developed. This process needs to be in the form of a policy with an associated department-wide training completed to ensure competency.
K.2 Although General Order 310.01 does not pre-assign EMS-1 a function unless they are the First Arriving Chief or Command Officer, EMS-1 followed best practices in preparing for any medical needs.	K.2.1 HCDFRS must revise General Order 310.01 and assign EMS-1 and/or EMS-2 functional duties for preparing EMS and rehabilitation early into an incident. K.2.2 Should EMS-1 be used as command staff, HCDFRS must alert EMS-2 to fulfill the EMS supervisory functions. K.2.3 HCDFRS must have an on-call EMS officer.
K.3 Although the Medical Duty Officer was able to complete the Quality Assurance review, there is not a process for any external review of an incident.	K.3.1 HCDFRS must develop a policy that allows for and has a predetermined flow path for external QA.
K.4 The transport of FF Flynn used the only dedicated EMS transport unit.	K.4.1 Add an additional transport unit per alarm to ensure quick and effective treatment of civilian and fire service personnel.