



# TRAINING REPS



## The ABCs of Wheelchairs EMS Captain David R. Snyder, MS, NRP

### Introduction

In the United States there is an estimated 3.3 million wheelchair users, with estimated 1.825 million of those users aged 65 and older, and the number increasing every year with an expected 2 million new wheelchair users every year. EMS frequently encounters patients in wheelchairs. A transport or manual wheelchair is easily accommodated and can be transported to the hospital with the patient. However, scooters and power wheelchairs cannot. This brief article shows the different types of wheelchairs, their average weight, and alternatives to consider when encountering a patient with a motorized wheelchair that cannot be transported with the patient.

### Transport/Manual Wheelchairs

A transport wheelchair is designed for caregivers to push, while manual wheelchairs are designed for the person in the chair to navigate themselves. Transport wheelchairs have four small wheels, while manual wheelchairs have two smaller wheels in front and two larger wheels in back. The smaller front wheels give the chair good turning radius, while the larger wheels in back provide the propulsion necessary to push oneself while sitting in the chair.

Average weight of a transport wheelchair: 15 to 30 pounds

Average weight of a standard manual wheelchair: 35 to 40 pounds

Example of a transport wheelchair:



Example of a standard manual wheelchair:



These wheelchairs are easily folded and can be transported with the patient.

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## Scooters

Scooters are either three-wheel or four-wheel. The average weight of a three-wheel and four-wheel scooter can range between 95 to 110 pounds. They are not easily disassembled in the field. The decision as to whether either of these styles can be transported with the patient will depend on whether or not they can be easily loaded and unloaded through the side door of the medic unit and properly secured during transport.

Example of a three-wheel scooter:



Example of a four-wheel scooter:



## Power Wheelchairs

Power wheelchairs are battery powered by an electric motor. They have a speed range between four and eight miles per hour with a driving range between seven and twenty plus miles. The average weight of these chairs is approximately 300 pounds. They cannot be accommodated in the medic unit.

## Transport Considerations

There are instances when EMS is called to the scene of a medical emergency or traumatic injury outside of the home for a patient with a power wheelchair. Power wheelchair prices can range from a few thousand dollars to over ten thousand dollars. Patients who have these chairs are not willing to leave them in areas that are unattended or unsecured. As well, the power wheelchair may be the person's only means of mobility. This can often present a dilemma when encountering such a patient. The person will want the chair to accompany them to the hospital.



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There are options to accommodate this. Both career and volunteer stations within the Baltimore County Fire Department operate All-Terrain Vehicles (ATV's). These vehicles are transported on trailers that are ideally suited to transport a power wheelchair.

Stations that have ATVs are: Stations 11, 29, 35, 44, 48, 50, 53, and 85. If it becomes necessary to have a power wheelchair transported via this option, the Administrative Duty Officer (ADO) can facilitate the request. Depending upon the nature and severity of the illness or injury to the patient, an engine or support unit can be requested to remain with the power wheelchair until the ATV trailer arrives. The power wheelchair can then be transported to the hospital.

Example of an ATV on a trailer.



Other options that may be available to transport a patient *with* the chair would be the use of a Baltimore County Department of Aging County Ride Bus or a State of Maryland Mass Transit Administration Mobility Link Bus. The use of either County Ride or Mobility will depend on availability and location. The most important consideration with the use of either of these two services will be the priority and stability of the patient (the patient must be a Priority 3 to consider this option). If the patient is a Priority 1 or Priority 2 patient and/or it is not feasible to wait, the patient should be transported and the use of an ATV trailer should be utilized. It may take an extended amount of time to secure one of these two buses. The ADO can facilitate securing either a County Ride Bus or Mobility Link Bus. If one of these options is used, a provider will accompany the patient in the bus. As well, the patient should be transported to the closest appropriate hospital in order to minimize disruption of the bus service.

Example of a County Ride Bus



Example of a Mobility Link Bus



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## Other Considerations

### Injuries

Most injuries from wheelchairs occur due to the patient falling from the chair. Common wheelchair injuries include soft tissue and nerve damage, sprains and strains, abrasions, and contusions, as well as injuries to the shoulder, arm, elbow, forearm, and wrist. Head injuries cannot be ruled out however.

Power wheelchairs are much heavier with some weighing 300 pounds. Since these chairs are self-propelled (four to eight miles an hour), the operator could inadvertently drive the chair off of a ramp or curb, causing considerable injury.



### Dead Battery

Instances have occurred where a motorized chair is in a public area and the battery dies. Any suppression unit with either a fixed or portable generator can charge the battery. These chairs can be pushed; however, the wheels move slower as they are mechanized.



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## Fires

Most electric scooters on the market use either lithium-ion batteries or lead-acid batteries. While both types of batteries have their own pros and cons, lithium-ion batteries are generally considered the better option. However, there are some downsides to using lithium-ion batteries in scooters. One is that they are extremely sensitive to temperature and are inherently flammable. This means that lithium-ion batteries tend to degrade much faster when exposed to temperature extremes- either hot or cold. Exposure to temperatures outside the operating condition can lead the lithium battery to fail and may also become fire hazards.

Fire incidents involving mobility scooters are most frequently caused by the unattended overcharging of their lithium-ion batteries. The electrical mismanagement of the lithium-ion battery, which may have already been damaged from the mechanical shocks and vibrations during everyday use of the scooter can trigger a thermal runaway event. The resulting fire and explosions can develop temperatures in excess of 1472F within minutes, allowing almost no time for action. The fire risk as well as the health risk from the toxic off-gases released during electrolyte decomposition can prove to be potentially life threatening. Those who depend upon a power wheelchair for mobility may be compromised in their ability to escape from such an event.



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