Dear Chairman Wyden and Ranking Member Crapo:

Thank you for the opportunity to respond to your recent proposal to provide a long-term solution to drug shortages. We sincerely appreciate the efforts of this Committee, Congress and the U.S. Food and Drug Administration (FDA) to mitigate this arduous issue over the past several years. In particular, we value the efforts of the FDA Drug Shortages Office which has utilized all of the tools at its disposal to their maximum effectiveness. Further, we appreciate the Finance Committee's approach to address the fundamental market failures creating drug shortages. We write to you as the leading Emergency Medical Services (EMS) organizations representing EMS agencies, physicians, and professionals providing life-saving care, treatment and transport to patients with emergency medical and critical care conditions.

While much of the focus on drug shortages has been on hospitals and oncology specifically, the impact of drug shortages in EMS is just as severe and threatens care for EMS patients when minutes count and medications on the ambulance are unavailable, expired or second tier substitutions. EMS agencies struggle to obtain necessary medications, competing with much larger hospital systems with substantially more purchasing power. EMS physicians face Hobbesian choices in establishing protocols for care of EMS patients whose lives are literally on the line in the face of the never-ending drug shortage crisis including which drug to switch to when the preferred one is unavailable, whether to use expired drugs when there are no available alternatives, how to adjust to a different concentration and dosing and train EMS professionals in making such changes. EMS clinicians face an increased risk of medication dosing errors due to a constantly changing inventory subject to the fluctuations of the marketplace. EMS patients suffer and sometimes die from lack of available emergency medications on ambulances.

Our single most important message to you is that within the drug shortage crisis, EMS is different and requires specifically tailored solutions that will ensure that patients requiring life-saving treatment and transport will be assured of receiving them when minutes count for their survival. In short, ensuring the availability of essential emergency medications (EEMs) and most particularly minutes count medications (MCMs) must be a critical priority of the Congress due to the time-sensitive and mobile nature of the treatment provided by EMS agencies and clinicians. Solutions designed for hospitals and physicians may not assist with medication shortages in EMS. In fact, they could inadvertently hinder our ability to access the EEMs and MCMs needed before reaching the Emergency Department.

We are committed to active participation with our federal, regional, state, and local partners as we collectively work toward a solution. Ultimately, we believe a public/private partnership among all levels of government, clinicians and entities administering EEMs, and manufacturers producing them will be required to bring lasting

resolution to this issue. As Congress considers legislative options to address the drug shortage, our organizations stand ready to work with Members of Congress on a range of solutions to help improve the medication supply and mitigate the effects of shortages on patient care. We urge Congress to ensure that any stakeholder consultation process includes representatives of the EMS and critical care transport communities.

We have provided a White Paper discussing the Impact of Drug Shortages on EMS Patients to provide background on the unique challenges faced by EMS agencies in providing life-saving treatment and transport to emergency medical and critical care patients suffering from a time critical condition. We do not have any or all perfect solutions to this complex problem. Our organizations have not endorsed the potential approaches outlined, but rather offer them to begin the dialogue with you on how to ensure a stable, sufficient and redundant supply of EEMs and MCMs in particular.

Whatever solutions the Congress chooses to employ should specifically prioritize medications used for treatment of patients with emergency medical, critical and life-threatening illness or traumatic injury, promote access to life-saving medications where they are most needed by patients, and seek to identify and remove impediments to the ability of providers to compensate for lack of access to a preferred drug in the best interest of their patients.

Sincerely,

American Academy of Emergency Medicine (AAEM)
Association of Air Medical Services (AAMS)
Association of Critical Care Transport (ACCT)
American College of Emergency Physicians (ACEP)
American Medical Physician Association (AMPA)
National Association of EMS Educators (NAEMSE)
National Association of EMS Physicians (NAEMSP)
National Association of Emergency Medical Technicians (NAEMT)
National Association of State EMS Officials (NASEMSO)
National EMS Management Association (NEMSMA)

WHITE PAPER ON IMPACT OF DRUG SHORTAGES ON EMS PATIENTS

I. Background on Emergency Medical Services

Emergency Medical Services (EMS) is the practice of medicine provided by EMS clinicians in an out-of-hospital setting. It is overseen by EMS physician medical directors and delivered by EMS agencies as part of an emergency medical response system of care outside of a fixed medical facility. The delivery of EMS care includes medical assessment, treatment and transport of patients accessing care through our nation's 911 system. EMS provides a vital component of the health care delivery system, treating conditions that range from car accidents to drownings, heart attacks to pediatric asthma, by ground and by air as well as providing the resources to move patients between healthcare facilities.

EMS agencies complete nearly 25 million transports annually for more than 8 percent of the U.S. population, predominantly by ground transport but also through air medical services. Of those transports, patients who are critically ill or injured are transported by specialized critical care transport (CCT) providers by ground transport and air medical services, including approximately 400,000 patients flown by fixed and rotor wing air ambulances every year. Most ground ambulances typically provide treatment and transport by paramedics and emergency medical technicians. Air ambulances typically utilize specialized paramedics and nurses.

EMS clinicians administer life-saving care, often through the use of specialized equipment or treatments, while transporting a patient from the scene to a medically appropriate receiving emergency department or between hospitals, typically when patients need access to a higher tertiary care facility. The medication shortage crisis continues to have a direct and adverse impact on extremely vulnerable patients with emergency medical and life-threatening critical care conditions.

II. The Drug Shortage Crisis in EMS

Shortages of "essential emergency medications" (EEMs) used by EMS agencies every day continue to plague our ability to care for patients. Perpetual shortages of these medications, such as IV fluids, pain medications, antibiotics, sedatives, and airway management medications, threaten lives daily. These seemingly simple products are truly the backbone of modern-day emergency medicine. In addition, patients with emergent life-threatening conditions require immediate access to critical emergency medications to prevent death or serious disability. For instance, victims of a major traumatic injury require pain medication to allow for effective treatment and to prevent additional emotional trauma, and medications are required for emergency airway management that means the difference between life and death.

As the Finance Committee has recognized, drug shortages are a market failure, not because the cost of drugs is too high, but most often because the cost of generic sterile injectables is too low for manufacturers to be able to produce a stable, sufficient and redundant supply. Shortages of EEMs are caused by numerous issues, including manufacturing interruptions, supply chain breakdown, and market failures that discourage innovation and competition. EMS agencies, emergency departments, and hospitals across the United States are currently severely restricting use of IV fluids, pain medications, anti-nausea medications, sedatives, and airway management medications on a regular basis.

Shortages of EEMs also impede our nation's ability to respond to public health emergencies, natural disasters, and mass casualty events. Providers of emergency medical care – whether EMS or hospitals – must have sufficient supply of EEMs in order to rapidly respond to these emergent and complex situations. As these

EEMs continue to be in shortage, we are increasingly concerned about our ability respond these scenarios at the same time struggling to treat patients every day.

III. Types of Essential Emergency Medications in Shortage

At least 30 drugs on the FDA's current shortage list are commonly used as part of EMS. Among these drugs are ones used to treat cardiac, stroke, seizure, severe pain and high-risk obstetrical patients in the field. If patients do not have access to these drugs within a very short time window, it can mean the difference between life and death or serious disability. In addition, certain sedatives that are used to treat combative patients are in short supply, putting the transport team and patient at risk as they attempt to treat and transport an agitated or non-compliant patient. Air ambulance providers have had to turn away critical care patient transports due to their inability to secure and maintain life-saving drugs, putting patients at extraordinary risk.

The National Association of EMS Physicians (NAEMSP) has identified 66 EEMs that are essential to have available on every ambulance across the nation. NAEMSP has grouped them into the following categories: drugs used for 1) cardiac arrest; 2) peri-arrest/shock; 3) sedative/anti-seizures; 4) antidotes; 5) pain management; and 6) other antibiotics, anti-parasitic; anti-hypertensive, asthma, antifungal, antivenom and certain vaccines. For the full list of the 30+ EEMs perpetually facing shortages, please see Appendix A. For the full list of 66 EEMs and their significance to responding to mass casualty events, please see Appendix B.

Within the list of 66 EEMs, EMS physicians have identified 9 "minutes count medications" (MCMs) that are the most critical to the practice of EMS medicine.

- Epinephrine (aka "Adrenaline") – Restart the heart, stabilize rhythms. First-line antidote in severe, potentially fatal allergic reactions (anaphylactic shock). Life-saving medication for asthmatics and those with emphysema who cannot breathe. Improves blood pressure in severe heart failure (cardiogenic shock). First-line medicine in cardiac arrest to help restart the heart. Used to increase heart rate when the heart's pacemaker fails (symptomatic bradycardia).

- Lidocaine. Primary medicine is used to stabilize or reverse lethal abnormal heart rhythms. It is an anesthetic and is also used by EMS to blunt the pain of painful procedures.

- Calcium. First-line antidote to stabilize the heart from lethally high levels of potassium often seen in dialysis patients and victims of crush syndrome seen in the aftermath of tornados, earthquakes, and hurricanes where building collapse occurs. First-line antidote to reversal of potentially deadly overdoses of a common class of prescribed medications (calcium channel blockers).

- 0.9% saline (aka "normal saline"). First-line intervention for sepsis and septic shock (severe infections) with or without low blood pressure. First-line intervention for low blood pressure due to dehydration (nausea, vomiting, diarrhea, heat exhaustion/stroke).

- Lactated Ringers Solution (aka "Ringers Lactate") First-line intervention for sepsis and septic shock (severe infections) with or without low blood pressures. First-line intervention for low blood pressure due to dehydration (nausea, vomiting, diarrhea, heat exhaustion/stroke). Has buffering properties that are desirable in some disease states.

- Albuterol - Treat life-threatening breathing problems. First-line breathing medication in asthma, chronic bronchitis, and/or emphysema patients. Also used in children with wheezing from bronchiolitis, respiratory syncytial virus (RSV) infection, and other causes of airway passage

constriction. Also used as a treatment for dangerously high levels of potassium, often seen in dialysis patients, crush syndrome patients, and those taking certain diuretics ("water pills").

- Midazolam - Treat life-threatening, prolonged seizures. First-line antidote for seizures in children and adults. Often a first-line sedative to expedite the placement of a breathing tube in people who stop breathing. An excellent sedative for people suffering from panic attacks and overwhelming anxiety. Helps sedate patients being transferred from one hospital to another on a ventilator.

- 10% dextrose solution (aka IV glucose) - Reverse life-threatening low blood sugar. First-line medication for life-threatening drop in blood sugar levels. Much safer than 50% dextrose formulations. 5% dextrose is suitable for use as a carrier for many other medications but too dilute to be of practical use in low blood sugar emergencies.

- Fentanyl - Treat severe pain. Often the preferred prehospital medicine for the treatment of sudden or acute pain given its rapid onset (faster relief for the patient) and rapid offset (allows the hospital to assess pain shortly after arrival). This has fewer adverse side effects (low blood pressure, itching) than morphine. Used as a sedative for patients transported on a ventilator (breathing machine). Also good for kidney failure patients as it is processed mostly in the liver.

IV. Medication Shortage Challenges that are Unique to EMS

EMS agencies and medical directors are working to manage their medication supplies despite ongoing shortages as best they can, but certain stop-gap solutions are particularly difficult for medical and critical care transport providers to implement. Physician medical directors routinely facing difficult choices in directing EMS clinicians in the utilization of suboptimal substitute and expired drugs, as well as having to reserve limited and essential medication supplies for patients with the greatest need. This puts patients at risk and EMS physician medical directors in the untenable position of jeopardizing their medical licenses to best meet the needs of all of their patients with emergency medical, critical and life-threatening illness or traumatic injuries. Below are several challenges that are unique to EMS.

- **EMS Requires Certain Medications in Particular Concentrations.** While therapeutic alternatives may exist for certain drugs, they are often in the form of non-preferred drugs and are sometimes only available in unfamiliar concentrations or vial sizes. Despite additional training, such substitutions can lead to dangerous situations crating the conditions for facilitating medical errors of dosages when using different concentrations, especially in emergency situations when professionals are moving quickly, transport conditions are suboptimal, and time is of the essence.

- **Scope of Practice Issues.** Certain substitutions may involve drugs that can only be administered by a specific level of trained EMS Clinician. For example, in some states the scope of practice delineates the specific drugs an EMS provider may use during patient care. A substitute for that drug may not be included in that state's scope of practice, making it illegal for a paramedic to deliver that substitute drug. These and other "scope of practice" issues are of particular concern in the EMS Critical Care transport setting. This is far less of an issue in hospitals where nurses are administering medications.

- **Mass Casualty Events**. EMS cannot effectively respond to mass casualty events without MCMs. Our nation depends upon EMS as first responders to triage, treat and transport patients to the hospital. Without the proper medications in the correct concentrations, more patients may require transport to the emergency department than may otherwise be required if they can be treated and stabilized at the scene, and those arriving at the hospital are in far worse condition if they survive at all without the necessary medications to stabilize them.

- **EMS Struggles to Compete for Access to EEMs and MCMs**. Many EMS agencies -- particularly but not exclusively those that are small, rural and volunteer -- to compete for access to EEMs and MCMs within the supply chain. There is no existing prioritization of EEMs for EMS agencies within the existing supply chain, and health systems are far more likely to obtain needed medications due to their sheer size and scope within the marketplace.

- **EMS Lacks Sufficient Resources for Buffer Stock or Quality Incentives.** The Congress has routinely provided extension of add-on payments for EMS agencies, recognizing that the current payment levels are wholly inadequate to serve patients in need. Within that context, there is no room for EMS agencies to purchase buffer stock, nor are there financial or other resources required to meet the requirements in the Committee's proposal for additional payments. For example, small rural EMS agencies raising funds for day-to-day operations through bake sales and community fundraising drives are simply incapable of meeting such requirements to acquire the drugs they need to provide EMS services for their community.

- **Expiration Date Extensions -** Under medical direction some EMS clinicians are using medications beyond the expiration dates for lack of a better alternative. There is no formal mechanism for extending medication shelf-life in the civilian environment. The lack of regulatory clarity on the usage of expired medications during a shortage crisis creates the difficult position of EMS medical directors left to make individual decisions because about whether is better for their patients to receive an expired drug instead of no drug. The amount of medical director autonomy to adjust to drug shortages are regulated by the states, and there is a wide variety of state regulatory constructs.

V. Drug Shortages in EMS Must Be Prioritized and Addressed Differently: Possible Approaches

EMS is the first line of treatment for patients with emergency medical and critical care conditions. Quite simply, hospitals can't effectively treat patients if we can't keep patients alive and deliver them in the best possible condition during transport to the hospital. EMS access to EEMs and especially MCMs in the correct concentrations specifically for EMS must be prioritized within the supply chain. Amelioration of drug shortages must address the unique nature of mobile treatment and transport and the scope of practice of EMS clinicians that differs from hospitals and physician offices.

We do not profess to have all the solutions at hand and are eager to work with the Committee to find short- and long-term solutions to the drug shortage crisis. There is clearly no one size fits all and we believe a comprehensive market-based approach is most likely to be successful in the long-term. That said, there are several approaches we believe are worthy of consideration and discussion.

A. Prioritize and Create Stable Supply of Essential Emergency Medications and Minutes Count Medications

Advisory Committee on Essential Emergency Medications in Shortage. We suggest the Congress consider establishing an Advisory Committee to specifically address shortages of drugs used by EMS, hospitals and any other situation in which emergency care is provided. Building off the success of other multi-disciplinary Committees at the Department of Health and Human Services, the concept is to establish an Advisory Committee on Essential Emergency Medications in Shortage. Membership would include representatives from

federal agencies, such as the FDA and CMS, and numerous outside stakeholder organizations and industries involved in the EEM supply chain. The Advisory Committee could undertake the following functions:

1. List of Essential Emergency Medications, and Minutes Count Medications (MCMs)

The Advisory Committee could develop a list of EEMs, and a subset of such list of MCMs that are used to treat patients with life-threatening emergent conditions. The purpose would be to ensure that all EEMs are included in prioritization of drugs in shortage, and that MCMs in particular receive the highest priority due to their imperative in saving lives when minutes literally count on an ambulance or in an emergency department. Designating the most essential medications used to treat emergency medical conditions and then as the highest possible priority those medications for patients with life-threatening conditions when minutes count is imperative to enable and promote increased manufacturing capacity for these drugs.

The need for a list that captures all EEMs is underscored by the exclusion of medications critical to prehospital care that are missing from the "essential medicines" list as defined as one of the 86 medicines prioritized in the Assistant Secretary for Preparedness and Response (ASPR) report "Essential Medicines Supply Chain and Manufacturing Resilience Assessment." These medications[1], identified by EMS Medical Director leaders, are critical to protecting individual patients with emergent or acute life-threatening emergency medical conditions and are not included in the ASPR report.

The Committee could also identify all settings and locations in which these EEMs and MCMs are administered to patients. The lists of EEMs an MCMs could be developed through a consensus building process among all providers of emergency medical care, clinically driven and updated every 3 years.

2. Establish an EMS Drug Shortages Collaborative

The Committee could also bring together all stakeholders in the out-of-hospital setting -- EMS medical directors, agencies and professionals, pharmaceutical manufacturers; wholesaler distributers among others -- to collaborate on how to address drug shortages specifically for EMS and provide critical advice to the Secretary, FDA Drug Shortage Task Force, and ASPR. The Collaborative could prioritize MCMs initially, in providing recommendations and solutions.

The medications used in EMS are critical to saving lives before and during transport to a hospital. We lack the buying power of large hospital systems, especially among smaller and volunteer EMS agencies in rural areas, to receive priority in the distribution of limited drugs. We need different concentrations than hospitals, and we need them consistently to avoid switching medications and doses to prevent medical errors. We cannot repurpose larger concentrations as hospitals can. We are confident that convening all stakeholders to discuss the unique impacts on drug shortages on EMS will help us all to better collaborate on how to ameliorate these shortages.

B. Payment Incentives Specific to EEMs and MCMs, Perhaps Through CMMI Demonstration.

We appreciate the Committee's efforts to address the market failures causing drug shortages. It is essential however, that the solution not inadvertently make the problem worse for EMS. As noted above, the EMS enterprise is simply not equipped to fit within the construct of the Committee's proposal to provide quarterly payments for providers that meet certain requirements. We worry that driving hospitals as the largest providers

[1] Cefotaxime, Bupivacaine 1% w/ Epi, Calcium Chloride, Cefazolin, Sincalide, Bumetanide, Dextrose 5%, Milrinone, and Potassium Phosphate.

to have buffer stock may inadvertently exhaust the available and exacerbate the challenges EMS currently faces in obtaining the EEMs and MCMs we need.

We agree that the market failures must be tackled, including the market failures that have contributed to shortages of critical medications that are essential for everyday life-saving care and emergency preparedness. We suggest the discussion of payment enhancements that should contribute to a more stable, sufficient, and redundant supply of critical medications for patients and providers, consistent with the recommendations in a published *report by the* Food and Drug Administration and the Centers for Medicare and Medicaid Services (CMS) *entitled* Drug Shortages: Root Causes and Potential Solutions. We believe that distinguishing EEMs and MCMs is an essential component of any effort to address drug shortages more broadly, again due to the time-sensitive and mobile nature of the care and treatment we provide that saves lives.

Pursuant to the concept of establishing an Advisory Committee on EEMs described above, once the Committee has established the EEM list, and pursuant to regular updates, to correct market failures, there could be three targeted and limited payment modifications under the Medicare and Medicaid programs as identified below specifically for EEMs and MCMs. <u>These payments would need be new funding, and not come from existing ambulance reimbursement which is wholly inadequate in covering our current costs.</u> For example, the following construct is worthy of discussion specifically for EEMs, beyond the larger approaches contemplated by the Committee, and might be best developed and effectuated as a demonstration program through CMMI.

- Essential Emergency Medications Administered in *EMS* Settings: An add-on ambulance payment for essential emergency medications at a benchmark level set by the Secretary. Currently, ambulance agencies are not paid separately for drugs used to treat emergency situations even though this is one of the most common and most needed instances for EEMs to be utilized. This payment could help ensure that ambulance agencies are empowered to purchase products from quality manufacturers.

- Essential Emergency Medications Administered in *Inpatient* Settings: A pass-through payment, set by the Secretary as a benchmark, for medications on the list established by the Advisory Committee. These payments can be capped by the Secretary, and terminated if the payments do not have the desired policy outcomes.

- Essential Emergency Medications Administered in *Outpatient* Settings: A separate payment classification for medications on the list established by the Advisory Committee, allowing for them to be paid on under the same formulas as other drugs and not as hospital supplies.

One major challenge in addressing the market failures is the degree to which altering Medicare and Medicare payments is sufficient to drive the needed stability and redundancy in the supply chain. ***We suggest that the Congress consider how to ensure that the commercial insurers and group health plans contribute to the solution.*** If manufacturers raise prices to meet demand created by Medicare and Medicaid payment increases, EMS agencies could not afford to pay higher prices if commercial payers and plans do not follow suit. The solution to drug shortages most likely requires all payers to be aligned in realigning the market incentives for manufacturers to produce a sufficient and secure sourcing of all needed medications, particularly those essential for life-saving treatments.

C. Buffer Stock

EMS agencies do not currently have sufficient resources for a buffer stock or to choose among manufacturers meeting quality metrics. To enable us and other providers of emergency medical care to develop a buffer stock

will take a separate investment of federal resources to ensure their availability. That would certainly be ideal with regard to all EEMs, but is absolutely imperative for MCMs. This could be potentially accomplished through the establishment of an all-payer fund, to which commercial insurers and group health plans along with the federal government would be contributing, and from which all providers of EEMs would be compensated for EEMs, thus creating a clear market and sufficiency in pricing for manufacturers to increase supply and redundancy in the supply chain.

Buffer stock requires subsidization of hospitals, EMS agencies and all other providers of emergency medical care that administer EEMs. However, any solution for hospitals and physicians cannot inadvertently worsen the problem for EMS. If a hospital is required to stockpile drugs, it can cause a facility to be left with excess inventory, which is costly and might not be absorbed if the shortage is averted or is not as severe as anticipated. Further, drugs have a limited shelf life, and holding excess inventory could exacerbate shortages in other critical care settings outside the hospital. Accordingly, we suggest rebuilding the supply chain in a sustainable way that will not adversely impact providers outside of the hospital setting – including EMS – in part by advancing a glide path for buffer stock. This approach would help allocate medicines to locations most needed while in shortage.

We would note as an alternative to pass-through payments for EEMs an all payer fund is also a potential vehicle for distribution of payments to providers utilizing EEMs for life-saving care to incentivize manufacturers to produce them with a sufficient and redundant supply.

D. Tax Credits

We recognize that tax incentives may facilitate production of medications and sourcing of active pharmaceutical ingredients in the United States. We understand the challenges facing manufacturers of the medications upon which we depend in producing a stable and redundant supply of all drugs in shortage. While we do not have specific recommendations, we support necessary alterations to a broken market to enable manufacturers to produce all drugs in shortage in the United States where we know we will have access to them without the effects from global disruption.

VI. Conclusion.

As Congress considers legislative options to address the medication shortage issue, our organizations stand ready to work with Members of Congress on a range of solutions to help improve the supply of emergency medications and mitigate the effects of shortages on patient care. We urge the Congress to ensure that any stakeholder consultation process include representatives of the EMS and critical care transport communities.

Appendix A

MEDICATIONS USED FOR EMS and CRITICAL CARE TRANSPORT PATIENTS PERSISTENTLY IN SHORTAGE

- Amiodarone – for lethal heart arrhythmias that left untreated will stop the heart
- Atropine – to increase a heart rate which is too slow to sustain life
- Calcium Chloride and Calcium Gluconate – antidote for life threatening high potassium that threatens our dialysis patients
- Dexamethasone – for life threatening allergic reactions and asthma. Additionally for adrenal crisis that can lead to severe shock, death and disability
- Diazepam, Midazolam, Lorazepam – to stop active seizures and for sedation
- Diltiazem – to slow a very fast heart rate, which compromises cardiac function
- Diphenhydramine – for severe allergic reactions
- Epinephrine – (adrenaline) used for life threatening allergic reactions and acute pediatric asthma (intermittent shortages)
- Etomidate – sedative used to facilitate emergent intubation before placing someone on a ventilator
- Fentanyl – pain relief (similar to morphine)
- Forphenytoin – to prevent and stop seizures
- Furosemide – diuretic for serious heart failure
- Haloperidol – major sedative for combative patients
- Labetalol – to treat high blood pressure in patients with life threatening conditions
- Lidocaine – used in cardiac arrest - major stoppage of the heart as well as a local anesthetic
- Magnesium – to treat life threatening cardiac arrhythmias and also used as an adjunct in the treatment of emergent asthma conditions
- Mannitol – reduces brain swelling in serious head injury
- Morphine – pain medication
- Nicardipine – to treat dangerously high blood pressure in medical conditions such as stroke
- Nitroglycerin – used in the treatment of patients with heart attacks and angina
- Ondansetron – prevents vomiting. Significant during transport of a head injured patient
- Oxytocin – after delivery of a baby to prevent maternal uterine bleeding
- Phenylephrine – to increase blood pressure if the blood pressure is dangerously low
- Pancuronium – muscle relaxant used to facilitate ventilation and oxygenation in a patient with a breathing tube in place
- Phytonadione – to reverse the effects of oral blood thinning drugs in patients with life threatening bleeding
- Potassium – to increase the blood potassium level which left untreated can produce life threatening cardiac arrhythmias
- Procainamide – heart drug for life-threatening rhythm problems
- Prochlorperazine and Promethazine – to prevent vomiting
- Terbutaline – for pre-term labor and severe asthma
- Vasopressin – to restart the heart in cardiac arrest
- Vecuronium – muscle relaxant used to facilitate ventilation and oxygenation in a patient with a breathing tube in place