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Use of Lifesaving Medications by Athletic Trainers

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The athletic trainer's (AT's) emergency management skillset requires competency in the delivery of basic lifesaving medications. Some lifesaving medications have been a part of athletic training practice for decades, but that list has grown as ATs' practice settings have expanded, increasing the types of emergent conditions that the AT may have to treat. The 2020 Commission on Accreditation of Athletic Training Education (CAATE) curricular standards require that athletic training students be trained to administer the following: supplemental oxygen, nitroglycerine, low-dose aspirin, bronchodilators, epinephrine using an automated injection device, glucagon, and naloxone. Clinically, the conditions treated by these medications can be categorized as cardiac, respiratory, hypoglycemia, and anaphylaxis. All ATs should know the indications, contraindications, administration methods, and details of patient monitoring for each medication. Generally, these medications are safe and have clear indications for use and few contraindications. Although ATs are trained to administer these medications, they must consider state laws and local policies governing administration.

Emergency care is a fundamental domain of athletic training and one of the skillsets that differentiates athletic trainers (ATs) from other health care providers who work with active populations. This is in part because ATs are often present at the time of a patient's emergent condition, allowing the AT to implement immediate, lifesaving procedures.[1] Many of the nontraumatic, medically based emergency situations that ATs manage, such as asthma, diabetes, and serious allergic reactions, can quickly escalate, and the immediate administration of a lifesaving medication before emergency medical services (EMS) personnel arrive increases the chance of an optimal outcome.

Medical emergency management has been integral to the profession since its inception, yet the list of lifesaving medications ATs administer has evolved. Additionally, athletic training practice settings have grown to include locations such as industrial facilities and police and fire departments. The larger age range among employees in these settings increases the possibility that ATs may need to manage medical conditions not commonly seen in younger patients. The 2020 Commission on Accreditation of Athletic Training Education (CAATE) curricular standards[2] delineate the skills that professional athletic training educational programs must teach to athletic training students. The current edition of the standards identifies 7 prescription and nonprescription lifesaving medications (Table 1):

- supplemental oxygen,
- nitroglycerine,
- low-dose aspirin,
- bronchodilators,
- epinephrine using an automated injection device,
- glucagon, and
- naloxone.

Only 3 medications were identified in the previous edition of the CAATE curricular standards (ie, oxygen, meter-dosed inhaler, and auto-injectable epinephrine).[3] New entry-level ATs are trained to administer these lifesaving medications, but not all practicing clinicians may have the same knowledge or comfort or proficiency level in administering these medications. Therefore, the purpose of our Current Clinical Concepts article is to describe these lifesaving medications in order to aid all ATs in their administration during an emergency. We have grouped the medications by their clinical application:

- cardiac,
- respiratory,
- hypoglycemia, and
- anaphylaxis.

As we will discuss, even though ATs are trained to administer these medications, they should consult their state's laws and regulations, their employer's policies and procedures, and when applicable, their directing physician's orders. Additionally, the AT should always obtain a complete patient history, including allergies, and check the list of "The 6 Rights of Safe Medication Administration" (Table 2)[4] before administering or assisting with the administration of any medication to ensure this information is appropriately documented. Many of the drugs described in this article can be delivered via a variety of routes and at various doses. No data indicate which route of delivery is most used by ATs, so we have relied upon our collective

Table 1. Commission on Accreditation of Athletic Training Education Standard Related Emergency Care[2]

Standard 70: Evaluate and manage patients with acute conditions, including triaging and conditions that are life threatening or otherwise emergent. These include (but are not limited to) the following conditions:

- cardiac compromise (including emergency cardiac care, **supplemental oxygen**, suction, adjunct airways, **nitroglycerine**, and **low-dose aspirin**),
- respiratory compromise (including use of pulse oximetry, adjunct airways, supplemental oxygen, spirometry, meter-dosed inhalers, nebulizers, and **bronchodilators**),
- conditions related to the environment: lightning, cold, and heat (including use of rectal thermometry),
- cervical spine compromise,
- traumatic brain injury,
- internal and external hemorrhage (including use of a tourniquet and hemostatic agents),
- fractures and dislocations (including reduction of dislocation),
- anaphylaxis (including administering **epinephrine using an automated injection device**),
- exertional sickling, rhabdomyolysis, and hyponatremia,
- diabetes (including use of glucometer, **administering glucagon**, insulin),
- drug overdose (including **administration of rescue medications such as naloxone**),
- wounds (including care and closure),
- testicular injury, and
- other musculoskeletal injuries.

Bolded words indicate the lifesaving medications in the standard.

Table 2. The 6 Rights of Safe Medication Administration[4]

The Right	What to Check
1. Person	First and last name of patient
2. Medication	Medication administered is what is on the medical order
3. Dose	Strength and dosage are correct
4. Time	Frequency or interval of time between doses is accurate
5. Route	Route of administration is correct
6. Documentation	Documentation is complete and legible

experiences, clinical judgement, and medical training to include the most detailed information on the routes we believe are most likely to be used by an AT. The dose amounts for the medications are listed in Table 3, and the equipment associated with their administration and patient monitoring are identified in Table 4.

The AT is trained in management of medical emergencies and is often the most medically qualified individual available to render care. However, the AT should always consider activating EMS to assist and provide transportation for definitive care when the patient's condition and the situation warrant additional resources and management from a higher-level provider. Often the AT's clinical setting does not supply the ongoing medical support equivalent to the advanced medical care required for some of the conditions that require the medications we will discuss.

CARDIAC-RELATED EMERGENCIES

Historically, ATs have focused on emergency management of sudden cardiac arrest in young athletes caused by anatomic abnormalities (eg, hypertrophic cardiomyopathy or coronary artery anomalies) or trauma (eg, commotio cordis).[5,6] With more ATs working in industrial and tactical (eg, fire, police, military) settings, where patients are more likely to have a history of conditions such as peripheral artery disease, atrial fibrillation, and hypertension, the need for the AT to be competent in the use of nitroglycerine and aspirin is greater.

Aspirin

Introduction and Background. Aspirin is a nonsteroidal anti-inflammatory drug with anti-inflammatory, antipyretic, analgesic, and anticoagulant properties.[7] In the prehospital setting, it is used for patients experiencing chest pain to prevent platelet activation and aggregation associated with blockage of the coronary arteries.[8] It decreased mortality in patients with myocardial infarction when administered within the first few hours of symptoms rather than after arrival at the hospital.[9]

Indications and Contraindications. Aspirin is indicated in the prehospital setting for patients presenting with unstable (ie, unpredictable) angina, acute myocardial infarction, acute coronary syndrome, or nontraumatic chest pain or discomfort.[10] It is contraindicated in patients with a known aspirin allergy, a history of active bleeding disorder, or a recent or current ulcer or gastrointestinal bleeding. Additionally, aspirin should not be administered in patients who have taken aspirin within the last 24 hours or been prescribed anticoagulation therapy or have a possible aortic aneurysm.[10]

Administration and Monitoring. One 325-mg tablet or four 81-mg tablets (324-mg dose) should be administered to address cardiac-related chest pain. The patient should chew and then swallow the pill(s) to enhance absorption.[10] After administration, the AT should continue monitoring the patient's airway, breathing, and circulation; vital signs; and cardiac-related signs and symptoms. It is important to note that, although aspirin has analgesic properties, it is unlikely to affect any of the patient's symptoms, including chest pain.

Adverse Effects and Special Considerations. A single prehospital dose of aspirin is very unlikely to result in serious side effects, and the potential benefits of its use far outweigh the potential risks. Documented aspirin side effects include gastrointestinal distress, increased severity of bleeding or bleeding disorders, ringing in the ears, headache, dizziness, flushing, and tachycardia.[10]

Nitroglycerine

Introduction and Background. Nitroglycerine (also known as *nitro*) is a member of the nitrate drug class. It is primarily used in the treatment of angina pectoris (ie, myocardial ischemia-related chest pain).[11] Nitroglycerine causes vasodilation in both arteries and veins, but it is the venous effects that are believed to be responsible for the resolution of symptoms. Specifically, relaxation of the veins reduces peripheral vascular resistance, left ventricle end-diastolic pressure (preload) and cardiac output, and, ultimately, the oxygen needs of the heart.[12]

Indications and Contraindications. Nitroglycerine is indicated in the prehospital setting for patients experiencing acute-onset angina pectoralis. It is commonly prescribed to patients with a history of angina, and the AT should only

Table 3. Emergency Medications, Indications, and Dosages

Medication	Indication	Dosage
Nitroglycerine	Unstable angina	• Sublingual spray: 1 meter-dosed spray of 400 mcg • Sublingual tablet: 1 tablet at prescribed dose of 0.3, 0.4, or 0.6 mg
Aspirin	Cardiac-related chest pain	• One 325-mg tablet or four 81-mg tablets (324 mg total)
Albuterol	Shortness of breath or difficulty due to bronchoconstriction	• Aerosol and powder meter-dosed inhaler 90 mcg equivalent to 108 mcg of albuterol sulfate
Oxygen	Oxygen saturation below 94%	• Through a nonrebreather mask or bag-valve mask up to 15 L/min
Naloxone	Respiratory depression due to opioid overdose	• Auto-injector: 2 mg/0.4 mL • Nasal spray: 4 mg/0.1 mL
Oral glucose gel	Hypoglycemia with capillary blood glucose level below 60 mg/dL	• 1 tube of oral glucose gel (~15–20 g)
Glucagon	Patient with hypoglycemia unable to ingest oral glucose	• Auto-injector: 0.5 mg/0.1 mL for pediatric or 1 mg/0.2 mL for adolescents and adults • Nasal powder: 3 mg (1 intranasal device in 1 nostril)
Epinephrine	Anaphylaxis	• Auto-injector: 0.15 mg for pediatrics or 0.3 mg for adults

administer the medication to a patient with a prescription. Most of the contraindications to nitroglycerine will be addressed by the prescribing health care provider, and nitroglycerine will not be prescribed if inappropriate for the patient. That said, the AT must consider 2 contraindications: if the patient (male or female) has taken an erectile dysfunction medication within the past 24 hours or the systolic blood pressure is below 90 mm Hg.[13]

Administration and Monitoring. Nitroglycerine can be administered via intravenous (IV), transdermal, or sublingual routes. The AT should only assist the patient with his or her own prescribed nitroglycerine via the sublingual route (tablet or spray). Although the amount of medication may vary based on the patient's prescription, a dose is typically 1 tablet (0.3, 0.4, or 0.6 mg) or 1 meter-dosed spray (400 mcg). The effects of nitroglycerine occur within 1 to 3 minutes, with the maximal effect by 5 minutes after administration. Additional doses may be given every 5 minutes until relief is achieved; however, if relief is not achieved after 3 doses, prompt medical attention is warranted.[11] Before administering the initial and any subsequent doses, the patient's blood pressure must be checked, and the systolic pressure should be above 90 mm Hg and stable.[14]

Adverse Effects and Special Considerations. Most of the adverse effects of nitroglycerine result from vasodilation-induced hypotension. These include dizziness, headache, palpitations, vertigo, nausea, vomiting, orthostatic hypotension, and syncope.[11] Of these adverse effects, orthostatic hypotension and syncope are the most concerning because they can result in falls and fall-related injuries. Given these potential complications, the patient should be seated or lying down when the drug is administered. Subsequent doses of nitroglycerine should be discontinued if the systolic blood pressure drops below 90 mm Hg. It is important to note that some sources and protocols set the lower limit for the systolic pressure at 110 mm Hg.[15]

Table 4. Equipment Needed to Assess or Monitor the Patient Before and After Administration of Lifesaving Medication by Clinical Category

Device	Cardiac	Respiratory	Hypoglycemia	Anaphylaxis
Pulse oximeter	X	X	X	X
Stethoscope	X	X	X	X
Sphygmomanometer	X	X	X	X
Glucometer			X	
Portable oxygen canister with nonrebreather and bag-valve masks	X	X		X

RESPIRATORY-RELATED EMERGENCIES

Athletic trainers must be prepared to care for patients suffering respiratory-related emergencies such as asthma or pneumothorax. The administration of a short-acting bronchodilator via meter-dosed inhaler and emergency oxygen is a longstanding skill of ATs. It is appropriate to note that ATs are expected to understand the indications and use of a nebulizer to deliver a bronchodilator; however, nebulizer use by the AT is extremely uncommon. With the recent increase in opioid abuse and overdoses, ATs should also be prepared to administer the opioid antagonist naloxone to manage respiratory depression or arrest after an opioid overdose.

Albuterol

Introduction and Background. Albuterol is a short-acting bronchodilator commonly prescribed to patients for a variety of conditions ranging from exercise-induced bronchoconstriction to the common cold. Even though patients may have more than 1 medication to treat their respiratory condition, in emergency situations, the short-acting drug albuterol should be used. Albuterol is the most used medication for acute asthma management and has historically been identified as a "rescue" medication because of its effectiveness in treating acute asthma symptoms.

In an acute asthma exacerbation or asthma attack, albuterol rapidly reduces respiratory smooth muscle constriction in the bronchial tree to open airways. It is classified as a β2 adrenergic agonist and works by activating the β2 adrenergic receptor in the smooth muscle of the respiratory system.[16]

Indications and Contraindications. In emergencies, albuterol is indicated if the patient experiences difficulty breathing, chest tightness, wheezing, or other signs of an asthma attack. It is contraindicated if the patient has a known hypersensitivity to albuterol or its ingredients.[17]

Administration and Monitoring. Albuterol is most often administered via inhalation through either a meter-

dosed inhaler or a nebulizer. Information on proper use of a meter-dosed inhaler can be found in the National Athletic Trainers' Association's position statement on the management of asthma.[16] Unlike EMS personnel, ATs are unlikely to have access to a nebulizer in an emergency, so the focus will be on administration via meter-dosed inhalers. Although clear protocols exist for the administration of nebulized albuterol in emergency situations, the optimal dosages for meter-dosed albuterol are less clear, and the AT or the patient should follow the patient's asthma action plan or instructions previously provided by the prescribing physician.[16]

Adverse Effects and Special Considerations. The most common adverse effects of albuterol are tremors and nervousness due to activation of the β2 receptors on motor-neuron terminals. Less common adverse effects include nausea, headache, dizziness, and cough.[18] Most individuals who have albuterol prescribed as a rescue medication for asthma understand which side effects they may experience, such as a rapid heart rate.

Emergency Oxygen

Introduction and Background. Oxygen may not immediately be thought of as a drug. However, a *drug* is a substance other than food or water that, when taken (or administered), alters physiological function.[19] Athletic trainers most likely will administer *emergency oxygen*, which the US Food and Drug Administration (FDA) defines as delivery of a minimum flow rate of 6 L/min for at least 15 minutes. Oxygen devices that meet these criteria can be distributed over the counter. Devices used to deliver therapeutic oxygen, typically below 6 L/min, require a prescription or physician standing orders.[20] The AT may need to administer emergency oxygen in situations such as an acute spleen rupture, traumatic or spontaneous pneumothorax, asthma attack, exertional sickling, hypertrophic cardiomyopathy, or respiratory distress or arrest.

Indications and Contraindications. The administration of emergency oxygen is indicated for patients with oxygen saturations outside the target range of 94% to 98% for most acutely ill patients.[21] Therefore, it is essential that the AT have a pulse oximeter to measure oxygen saturation levels and administer oxygen if saturation drops below 94%. Emergency oxygen is rarely contraindicated in the athletic training setting.

Administration and Monitoring. Emergency oxygen is most often delivered via a nonrebreather mask which is appropriate for high flow rates between 12 and 15 L/min. It may be appropriate to deliver emergency oxygen to a patient with a simple mask (partial rebreather mask) at a rate of 9 to 10 L/min,[22] but this is uncommon in emergency situations being managed by the AT. Nasal cannulas are not an appropriate mode of oxygen delivery at flow rates of 6 L/min and above. Ideally, all patients given emergency oxygen should be monitored using oximetry and flow rates adjusted as saturation reaches the target range. Emergency oxygen can also be used to provide high concentrations of oxygen to patients receiving rescue breaths from a bag-valve mask. In this situation, the bag-valve mask should be connected to an oxygen supply to provide the patient with near 100% oxygen.

Adverse Effects and Special Considerations. Little evidence exists that emergency oxygen delivered to patients with low saturation levels and provided at the appropriate levels has any negative effects, and it is rarely contraindicated.[23]

Naloxone

Introduction and Background. In 2017, the US Department of Health and Human Services declared the opioid epidemic a public health emergency and initiated efforts to address it.[24] Although the extent of the problem in the athletic setting is unclear, the authors[25] of 1 study reported that adolescents participating in high school sports had 50% higher odds of nonmedical use of prescription opioids versus students not participating in athletics. Additionally, because of the expansion of patient settings and the fact that ATs often provide services at large community gatherings, ATs must be trained to manage an opioid overdose. An individual who overdoses on an opioid experiences respiratory depression and eventually respiratory arrest. Naloxone is a competitive opioid receptor antagonist that effectively moves the drug off the receptor, blocking the binding site, and reversing the respiratory depression associated with opioid overdose.[26]

Indications and Contraindications. Naloxone is indicated in the prehospital setting when respiratory depression is observed due to a known or suspected opioid overdose. It is most often used to treat heroin, fentanyl, carfentanil, hydrocodone, oxycodone, and methadone overdoses but is ineffective for nonopioid drugs, such as cocaine or methamphetamine.[27] The primary contraindication is when the patient has a known hypersensitivity to naloxone or its ingredients.[28]

Administration and Monitoring. Naloxone can be delivered via injection (IV, intramuscular [IM], or subcutaneous) or as a nasal spray. Naloxone is one of the emergency medications that, if administered, necessitates calling 911. In the prehospital setting, it is commonly administered through 1 of 2 ways:

- a prefilled auto-injector that can easily be administered in the outer thigh (commonly known by its brand name Evzio, 2 mg/0.4 mL (kaléo, Inc) or
- a prepackaged nasal spray that requires no assembly and can easily be administered in the nostril of the patient (commonly known as Narcan 4 mg/0.1 mL; Emergent Devices Inc).[27] This is likely the administration route used most often by the AT due to its availability.

To administer naloxone nasally, the nostrils should be inspected and be clear of excessive mucus or blood.[22] A dose should be administered into 1 nostril, and if the patient does not respond in 2 minutes, a second dose should be administered in the other nostril, and rescue breathing should be given as needed. It is important to note that some patients become combative when being revived from an opioid overdose, and the AT should be prepared for this type of reaction. The effects of an opioid overdose can exceed the 30- to 90-minute effective period of naloxone, highlighting the importance of 911 activation even if the patient has responded positively to the treatment.

Adverse Effects and Special Considerations. Adverse effects of naloxone are most seen in patients who are

dependent on opioids, resulting in acute withdrawal symptoms after administration. Symptoms may include headache, rapid heart rate, sweating, nausea, vomiting, and tremors. Naloxone has no effect on an individual without opioids in his or her system and should not be used as a treatment medication for those struggling with opioid use.[27]

HYPOGLYCEMIA

Athletic trainers often provide care for patients with diabetes. Emergency situations can develop in which a patient's blood glucose becomes critically low, requiring the AT to assess capillary blood glucose (CBG) with a glucometer. Oral glucose gel is a lifesaving medication ATs should be comfortable providing aid in administering (ie, helping the patient hold and squeeze the tube) to a conscious patient who is able to swallow and follow directions to raise the blood glucose level.[29] Interestingly, oral glucose is not listed in the CAATE standards but is included here because of its utility in treating the conscious patient with hypoglycemia. In the hypoglycemic diabetic patient who is unconscious or unable to swallow or follow directions, glucagon is indicated to quickly raise blood glucose levels. Family members of patients with diabetes and school staff including the AT should be trained to administer glucagon to unconscious patients with diabetes in a hypoglycemic emergency. The CAATE standards also require ATs to know how to administer insulin. Hyperglycemia is not considered an emergent situation, and insulin will not be covered in this review.

Oral Glucose Gel

Introduction and Background. Oral glucose gel is used to quickly increase blood glucose levels by providing a source of simple, easily digestible carbohydrates.[30] It is available in tubes of flavored gel that typically contain either 15 or 20 g of carbohydrates.

Indications and Contraindications. Although some protocols vary, the administration of oral glucose gel is indicated when the blood glucose level is $<$60 mg/dL and the patient is demonstrating signs of hypoglycemia. The patient may present with tachycardia, sweating, palpitations, hunger, nervousness, headache, trembling, or dizziness.[5] It is contraindicated if the patient is unable to swallow or follow commands. In most cases, a glucometer is used to assess CBG level before administration of oral glucose gel; however, in a patient who is known to have diabetes and is demonstrating signs of hypoglycemia, it is appropriate to administer oral glucose gel without having a definitive CBG measurement.

Administration and Monitoring. To administer the gel, the patient must be able to swallow, maintain his or her own airway, and follow commands. In most cases, the patient self-administers the gel, but the AT may have to assist if the patient is not able to do so. After administration, the patient's blood glucose level should be immediately checked and then checked again in 15 minutes. If the level remains low, another dose of carbohydrate gel should be consumed, and the blood glucose level should be assessed 15 minutes later. If the blood glucose level does not return to the normal range after the second gel dose, then EMS should be activated.[5]

Adverse Effects and Special Considerations. No adverse effects are associated with the use of oral glucose gel.[31] It should be noted that an increase in blood glucose levels may be temporary due to the quick utilization of simple sugars, and complex carbohydrate feeding should be initiated as soon as the patient is able to tolerate it.[5]

Glucagon

Introduction and Background. Glucagon is an FDA-approved drug used to treat severe hypoglycemia (ie, the patient is unconscious or cannot follow commands or swallow). It is a hormone produced in the pancreas that stimulates glycogenolysis in the liver (ie, the process of converting stored glycogen into glucose). The glucose then enters the bloodstream to raise the blood glucose levels. Blood glucose levels typically rise to $\geq$70 mg/dL within 5 minutes after injection.[32]

Indications and Contraindications. Glucagon is indicated when blood sugar is $<$50 mg/dL and the patient is unable to eat or drink due to confusion or disorientation, an altered state of consciousness, seizure, or all of these.[33] It is contraindicated if the patient has a known hypersensitivity to glucagon or known insulinoma, pheochromocytoma, or lactose allergy.[31]

Administration and Monitoring. Glucagon administration by the AT will likely be via either a nasal spray or the IM route using an auto-injector. After the patient becomes alert and can swallow, he or she should be given an additional source of simple and complex carbohydrates to improve blood levels. When glucagon is delivered, EMS should be activated, and the patient's blood glucose levels should continue to be monitored.

Adverse Effects and Special Considerations. Adverse effects after glucagon administration are uncommon but include mild nausea, vomiting, or both.[34]

ANAPHYLAXIS

Anaphylactic emergencies have always been a concern for ATs, and education associated with their management has been in place for decades. Epinephrine injections are the standard of care for severe allergic reactions that have progressed to anaphylaxis.

Epinephrine

Introduction and Background. Epinephrine is used to treat anaphylaxis and is both an α- and β-adrenergic receptor agonist. Anaphylaxis is a life-threatening condition produced by the overreaction of the body to an antigen. Common causes are bee stings, peanut allergies, and medication allergies.[22] Epinephrine works by reducing allergy-related inflammation and other physiological effects on the heart and blood vessels.[35] Specifically, epinephrine downregulates the release of mast cells, increases vasoconstriction, decreases mucosal edema, and increases bronchodilation.[36]

Indications and Contraindications. The administration of epinephrine is indicated in patients presenting with the signs and symptoms of anaphylaxis, such as swelling of the airways, tongue, lips, and throat.[22] It should be given as soon as the patient experiences shortness of breath, repetitive coughing, generalized hives, tightness in the

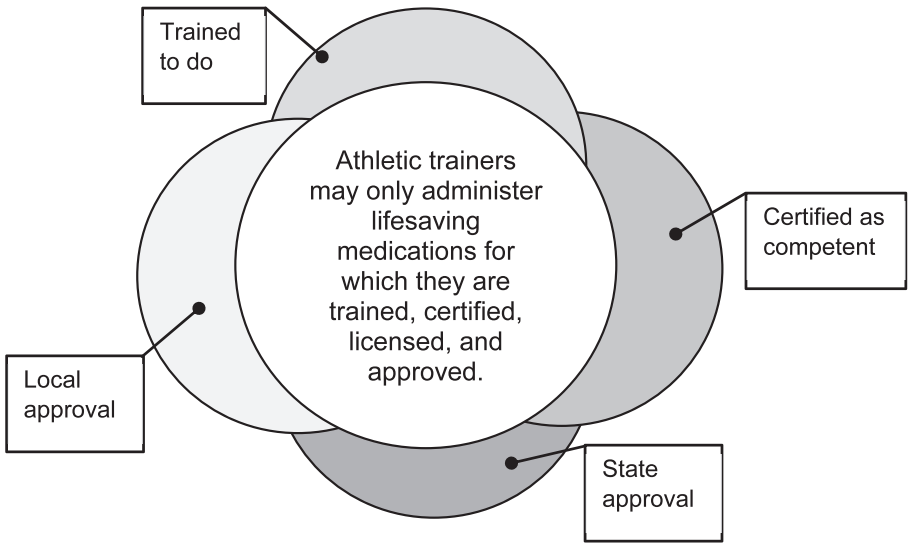

Figure. Interrelationship between training, certification, state licensure, and directing physician approval. Modified from the National Emergency Medical Services Scope of Practice Model. The National Highway Traffic Safety Administration (https://www.ems.gov/pdf/education/EMS-Education-for-the-Future-A-Systems-Approach/National_EMS_Scope_Practice_Model.pdf).

throat, or a combination of symptoms from multiple organ systems. No contraindications exist to the use of epinephrine in the treatment of anaphylaxis.[36]

Administration and Monitoring. Epinephrine is typically administered as an IM injection via an auto-injector or needle and syringe. (According to the CAATE standards, the minimum training for athletic training students is administration via an auto-injector.) An auto-injector should be applied to the lateral thigh near the midpoint between the hip and the knee. It may be administered through clothing, but directly to the skin is preferred. Patients should be monitored even after symptoms have resolved: because epinephrine does not neutralize the allergen,[37] symptoms may reappear and a second dose may be needed.

Adverse Effects and Special Considerations. The adverse effects of administering epinephrine are similar to those that occur when endogenous epinephrine is released, such as transient pallor, tremor, anxiety, and palpitations.[38]

LEGAL AND REGULATORY CONSIDERATIONS

Although the entry-level standard, as defined by the 2020 CAATE curricular standards,[2] is that ATs are trained to administer the lifesaving medications outlined in this review, it does not mean that ATs in all settings and jurisdictions are allowed to administer these medications. In some cases, the AT may need to assist patients in self-administration of medication if they are not physically capable. Before legally administering these lifesaving medications, the AT needs to

- be trained to administer the medications,
- demonstrate competence in administering the medication,
- have the legal authority based on the state's laws and rules to perform the skill, and
- obtain approval based on his or her employer's policies and procedures, the directing physician (in states requiring physician oversight), or both (Figure).

Although variations in state regulations exist, unless each of these criteria is met, the AT likely cannot legally administer the medication. Therefore, this review is not intended to be legal advice, and ATs should consult their state's statutes, rules, and regulations; their employer's policies and procedures; and their directing or collaborating physician for guidance (when physician oversight is required).[20]

Considering that the administration of these lifesaving medications is now an entry-level skill for ATs, it is essential to determine the legality of ATs performing these skills in each state. If it is currently illegal for or unclear whether the AT can perform these potentially lifesaving skills, state athletic training organizations should work to ensure that ATs have the legal authority to administer these medications in all appropriate settings. Then individual ATs can work to obtain local authority from their employer, directing or collaborating physician, or both as appropriate.

When advocating to state regulators or legislators that ATs should be legally allowed to administer these emergency medications, it will be helpful to highlight that these are entry-level skills, that the entry-level degree will soon be at the master's level, and that ATs have the knowledge and skills to make critical, possibly lifesaving, decisions.

CLINICAL BOTTOM LINE

Every day, ATs face the potential of having to manage life-threatening situations. A critical component of providing emergency care is the administration of lifesaving medications. All ATs must be prepared to administer the small collection of lifesaving medications delineated in the 2020 CAATE standards.[2] This preparation includes knowing the indications for, contraindications to, and procedures for administering each medication. Additionally, the AT needs to understand the details of patient monitoring for each drug and use clinical judgment to determine when 911 should be activated. It also involves ensuring that policies

and procedures—consistent with state laws and regulations—are established to help guide the AT in the administration of these medications. Importantly, these medications

(1) are relatively safe to administer,
(2) have clear indications for use,
(3) have few contraindications, and
(4) can have significantly beneficial effects on patient outcomes.

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