ARC SAC ADVISORY
First Aid Kit

Overall Recommendation:

Epidemiologic evidence exists for recommending first aid kit components based on injury and illness rates; but limited evidence exists on how first aid kit contents might influence outcomes. Injuries to the musculoskeletal system resulting in open wounds, and painful, swollen, and deformed joints continue to account for a large percentage of the primary diagnoses made related to worksite injuries (BLS, 2004, 2005, 2006, 2008, 2009, 2010; UDSL, 2016, 2016a, 2017, 2017a) emergency departments (Center for Health Statistics, 2012; McCaig et al, 2006; Nawar et al, 2007; Niska et al, 2010; Pitts et al, 2008; Rui et al., 2013, 2014) and outpatient settings (Hing et al, 2008, 2010; Middleton & Hing, 2003). First aid interventions and resources utilized vary depending on the severity of the injury, number of victims involved, and the level of training of the responder. OSHA and ANSI guidelines were examined to understand recommendations, however; there is no apparent published scientific literature examining the basis for the items and quantities recommended by ANSI.

First Aid Kit Recommendations

The following section outlines the recommendations for basic first aid supplies based on the available evidence epidemiological data provided in the literature and the treatment guidelines provided in the 2015 ILCOR first aid recommendation and updates and the scientific reviews completed by the American Red Cross's Scientific Advisory Council (Singletary, 2015a, 2015b).

First aid kits provide a logical place to keep first aid reference materials and emergency contact information. In family kits, prescriptions that may be necessary for providing first aid, along with health history, which then be provided to emergency medical services (EMS) personnel have been encouraged as supplemental items.

Recommendations and Strength

Standards:
N/A

Guidelines:
Because of high probability of specific injuries and illnesses, first aid kits should be provided with the following emergency items based on a trauma or illness to a single individual:

- Latex-free (Nitrile) x 2 pair
- Supplies to control bleeding (sterile 4 x 4 gauze pads) x 8
- Supplies to secure dressing (2 in., 3 in., or 4 in. x 4 yd - roller bandage) x 4
- 3/8" x 2.5 yd. adhesive tape x 1
- Triangular bandages x 2
- Latex free adhesive bandage x 3 each
    - 1 x 3 in.
    - ¾ x 3 in.

    - large fingertip
    - knuckle
- Topical wound gel or ointment, 1/32 oz. (0.9 g) application x 10
- Compact, moldable splitting device with securing mechanism (eg., roller bandage, elastic bandage, triangular bandage, tape) x 1
- Plastic bag 1 qt. and/or 1 gal) for application of ice:water x 4 and/or instant cold packs x 2
- Low does aspirin (81 mg x 4) or adult aspirin (325 mg x 1), chewable
- Oral glucose tablet, minimum of 20 g
- Saline solution, 1 oz x 1
- Utility shears/scissors, 7" x 1
- Alcohol-based hand sanitizer x 1 oz
- Splinter forceps/tweezers x 1
- Latex free-face shield x 1
- First aid guide book x 1

Options:
The following items are optional items to be considered in a first aid kit. These optional items will allow organizations to meet the 2015 recommendations for a Class A first aid kit.

* Antiseptic towelette, 0.14 fl. oz. (0.5g) application x 10
* Trauma pad 5" x 9" x 2
* Topical antibiotic, 0.14 fl. oz. (0.5 g) application x 10
* Tourniquet, manufactured windless x 1
* Eye covering with means of attachment, 2 x 9 sq. in. x 1
* Burn Dressing 4 x 4 in" x 1

Questions to be addressed:
What items are recommended first aid items for a single patient first aid kit?

Introduction/Overview:
A properly-stocked first aid kit is an essential piece of equipment for emergency response, whether at work, home, recreation or an athletic event (American Red Cross, n.d., 2005; National Football League, 2003) (Miller and Berry, 2016). People with first aid training are more likely to have a first aid kit (Arbon, Hayes, & Woodman, 2011) leaving training organizations with a responsibility to identify what first aid materials are most valuable. From a public health or occupational perspective, first aid kits that are accessible and properly stocked serve as resource for emergencies (Feickert, Verma, Plaschka, & Dev, 2006; Ferrer-Roca et al., 2002; Gunderson & Helikson, 2011).

As first aid emergencies differ based on context or a particular environment, recommending items to be placed in a first aid kit can be based on epidemiological evidence but must also be modifiable based on its intended use. This Scientific Review examines the epidemiological evidence to support a common list of items that meet many potential needs of a person providing

first aid in a variety of settings (i.e., workplace and home). It also provides consumers with considerations to adjust and modify a basic kit.

First aid kits are often recommended for general population use, as well as disaster preparedness kits and high-risk environments/activities (ex., sports, outdoor recreation, remote work and travel). The activity of purchasing or making first aid kits lends to educating individuals and groups. Incorporation of kit development, storage, and use should be a part of first aid education and a contextual conversation for instructors with learners (Campbell et al., 2001; Symonette, 2014).

Prior to the 2011 review, only limited information or rationale could be found for current industry standards, set by ANSI, which is comprised of manufactures of first aid kits, as to the criterion for first aid kit content and for locating those kits. Reality is that first aid kits cannot contain every product used in an emergency, but rather should contain those that cannot be easily improvised (i.e., sterile dressings), limit the spread of pathogens, and assist in stabilizing an ill/injured person until advanced medical care can be accessed/ promote self-recovery (International Federation of Red Cross Red Crescent Societies, 2016).

Summary of Scientific Foundation:

Since most first aid events involve a single person, the following recommendations for the development of a first aid kit are based on a single-patient. Tables 1, 2, and 3 outline the basic first aid supplies for a single patient based upon the epidemiological review of the workplace and ED injury and illness trend.

Table 1 outlines first aid supplies for soft tissue and musculoskeletal injury.

Table 2 outlines first aid supplies for respiratory and cardiac illness.

Table 3 outlines first aid supplies for other injuries and illnesses.

Table 1. First Aid Kit Recommendations – Single-Patient Use of Soft Tissue Injuries (Bleeding, Burns) and Musculoskeletal Injuries (Painful, Swollen Deformed Joint).

Item (Latex free)	Purpose	Minimal Quantity	Quantity Logic	References for Items and Quantity	Evidence
Nitrile gloves	Prevention of blood-borne pathogens and prevention adverse reactions to latex.	2 pairs	Allows a responder to change gloves at least once or in case glove rips a spare is available. Or, a second first aider is one scene	ARCSAC scientific review on latex gloves CDC, 2002	LOE-5 LOE-5
Hand sanitizer	Alcohol-based products, whether liquids or gels (minimum 60% alcohol))	10 - 1/32 oz (0.9g) packs or 1- 3 oz bottle	While hand washing with clean (potable) water and soap has been reported to decrease bacterial counts by as much as 99% with a 30 sec wash, alcohol-based products, whether liquids or gels, are recommended waterless hand sanitizing agents when soap and water are unavailable following the provision of care.	ARCSAC scientific review Kampf, 2004 Todd, 2010	LOE -5 LOE-3b LOE-5
Antiseptic, 0.14 fl. oz. (0.5g) application		10 packs			
4 x 4 - gauze pads (dressings). Prefer sterile due to cleanliness, but non-sterile is acceptable assuming debris free.	Minimize blood loss in conjunction with direct pressure for larger wounds. If splinting, non-sterile gauzes can be used to pad the injury and to fill voids.	8 pads	Depending on the severity (minor or moderate) of bleeding several layers of dressing and a pressure bandage may be necessary. A sterile, dry dressing is recommended to provide care to cover a thermal burn.	Singletary et al, 2015a, 2015b Markenson et al, 2010	LOE-5 LOE-5
2 x 2 or 3 x 3 - gauze pads (dressings). Prefer sterile due to cleanliness, but non-sterile is acceptable assuming debris free.	Minimize blood loss in conjunction with direct pressure or larger wounds. If splinting, non-sterile gauzes can be used to pad the injury and to fill voids.	8 pads	Depending on the severity (minor or moderate) of bleeding several layers of dressing and a pressure bandage may be necessary. A sterile, dry dressing is recommended to provide care to cover a thermal burn.	Singletary et al, 2015a, 2015b Markenson et al, 2010	LOE-5 LOE-5

Approved by ARC SAC January 2018

Item (Latex free)	**Purpose**	**Minimal Quantity**	**Quantity Logic**	**References**	**Evidence**
2 in. or 3 in. x 4 yd - roller bandage	Bandage to secure dressings, as bulky dressing to control bleeding, cover burn injuries, secure a splinting device.	4 rolls	Depending on the severity of injury or the size of the patient multiple roller bandages may be necessary to secure a variety of items.	ARC, 2005, 2017 Markenson et al, 2010 Miller & Berry, 2016 No specific evidence available as to the number needed.	LOE-Text LOE-5 LOE-6
4 in. x 4 yd. - roller bandage	Secure dressings to control bleeding for medium to large wounds, bulky dressing to control bleeding, secure splinting material and to cover burn injuries.	4 rolls	Depending on the severity of injury or the size of the patient multiple roller bandages may be necessary to secure a variety of items.	ARC, 2005, 2017 Markenson et al, 2010 Miller & Berry, 2016 No specific evidence available as to the number needed.	LOE-6 LOE-Review LOE-Text
Adhesive bandages of varying sizes (non-latex). Types ▪ 1 x 3 in. ▪ ¾ x 3 in. ▪ large fingertip ▪ knuckle	Dress minor wounds.	3-4 of each size or 12-16	Exact shape, type, or quantity of adhesive dressings is dependent on the location and severity of the wound.	ARCSAC scientific review on adhesive bandages. No specific evidence is available as to the number or shape needed.	LOE 5-Review
3/8” x 2.5 yd. -adhesive tape	Secure dressings, bandages, splinting material, as well as other potential useses.	1 roll	One roll of 2.5 yd adhesive should adequately secure any number of dressing	ARC, 2005, 2017 Miller & Berry, 2016 No specific evidence available as to the number needed.	LOE-6 LOE-6
36 in – malleable radiolucent splint (waterproof, reusable, lightweight & compact)	Restrict joint and limb motion of an extremity.	1 splint	One 36 inch can be formed to variety of shapes to limit movement of a painful, swollen, deformed limb.	Miller & Berry, 2016 McGarth & Murry, 2009 Scheinberg, 2005 Deyle & Nagel, 2007 Thompson, 2009	LOE-6 LOE 2a LOE-6 LOE-3b LOE-3b

Item (Latex free)	Purpose	Minimal Quantity	Quantity Logic	Reference	Evidence
3 x 5 yd or 4 x 5 yd - elastic bandage	Direct pressure over dressings for maintaining hands-free control of bleeding or securing a splint and managing snakebites. In the case of a snake bit, the pressure immobilization technique was found to be effective but not feasible for laypeople. Therefore, evidence supporting a first aid guideline used in daily practice is limited to supportive therapy until professional help arrives (Avau, 2016)	1 bandage	One 3 x 5 yd or 4 x 5 elastic bandage will adequately maintain hands-free control of bleeding or secure a splint.	Naimer, 2000 Naimer, 2004a Naimer, 2004b Miller & Berry, 2016 Scheinberg, 2005 Avau, 2016	LOE-5 LOE-3b LOE-4 LOE-6 LOE-6 LOE-5
40 x 40 x 56 in. - Triangular bandage	Secure an anatomical, soft, or rigid splint, as well as secure a dressing.	3-4 bandages	A minimum of 4 would be necessary to immobilize a forearm injury or lower leg injury, while 2-3 needed for sling and swathe depending on torso size.	ARC, 2005, 2017 Miller & Berry, 2016 No available evidence as to the number needed.	LOE-6 LOE-6
Wound gel ointment	Wounds heal better with less infection if they are covered with an ointment and a clean dressing.[67, 68]	1 tube	Apply ointment only if the wound is an abrasion or a superficial injury and only if the victim has no known allergies to the antibiotic.	ACFASP scientific review on adhesive bandages – June 2010. Beam, 2007 Beam, 2008 Claus et al, 1998	ACFASP – LOE 5 LOE-5 LOE-1b LOE-1b
4 mil thickness 1-qt sealable plastic bags.*	Fill with a mixture of ice and water. Do not use contaminated material (gloves, bandages, etc). *Instant chemical cold packs may be added to the first aid kit but should be used with caution and used when ice is not available.	4 bags or 2 chemical cold packs	"There are limited data from the hospital setting demonstrating a benefit from application of localized cold therapy compared to direct pressure alone to closed bleeding, such as a bruise or hematoma.[85,86] Local cold therapy, such as an instant cold pack, can be useful for these types of injuries to the extremity	Singletary et al, 2015a, 2015b Merrick et al, 2003 Dykstra et al, 2009	LOE-5 LOE 1b LOE-1b

			or scalp (Class IIa, LOE C-LD).” “Cold therapy should be used with caution in children because of the risk of hypothermia in this population (Class I, LOE C-EO).”		
Utility shears or scissors	Used to cut roller bandages, splints, tape.	1 pair		Miller & Berry, 2016	LOE-6
Tourniquet	Uncontrollable limb bleeding	1, windless, manufactured	A tourniquet may be considered for initial care when a first aid provider is unable to use standard first aid hemorrhage control, such as during a mass casualty incident, with a person who has multisystem trauma, in an unsafe environment, or with a wound that cannot be accessed (Class IIb, LOE C-EO). It is reasonable for first aid providers to be trained in the proper application of tourniquets, both manufactured and improvised (Class IIa, LOE C-EO) (Singletary, et al, 2015b).	Singletary et al, 2015a, 2015b	LOE-5

Supplemental First Aid Supplies for Consideration – Applicable Environments and Level of Training

The American Red Cross recognizes that each work/community/home environment is unique and first aid kit containing the minimum required first aid supplies will be augmented with additional items or additional quantities of required supplies based upon the specific hazards or considerations existing in the environment. The selection of such items should be based on the recommendation and consultation of a person competent in first aid and cognizant of the hazards and on the number of people found in the particular environment or mix of environments (i.e., cars, public transport) (Puretz, 1992; Welch, 1997).

Augment kits with the following first aid supplies, as applicable for soft tissue injuries (Bleeding, Burns) and musculoskeletal injuries (Painful, Swollen Deformed Joint).

- Trauma Pad, 5” x 9”, (uncontrollable bleeding)

- Hemostatic agent, (compromised clotting or uncontrollable truncal bleeding)

  - Hemostatic dressings may be considered by first aid providers when standard bleeding control (direct pressure with or without gauze or cloth dressing) is not effective for severe or life-threatening bleeding (Class IIb, LOE C-LD). Hemostatic dressings are likely of greatest use for severe external bleeding in locations where standard hemorrhage control is not effective, when a tourniquet cannot be applied (trunk or junctional areas such as the abdomen or axilla/groin), when a tourniquet is not available, or when a tourniquet is not effective to stop bleeding. Proper application of hemostatic dressings requires training (Class I, LOE C-EO). (Singletary, et al, 2015b).

- Dental injuries, (Hank's Balanced Salt Solution to preserve tooth)
  - In situations that do not allow for immediate reimplantation, it can be beneficial to temporarily store an avulsed tooth in a variety of solutions shown to prolong viability of dental cells (Class IIa, LOE C-LD). The following solutions have demonstrated efficacy at prolonging dental cell viability from 30 to 120 minutes, and they may be available to first aid providers (listed in order of preference based on the C2015 evidence review): Hank's Balanced Salt Solution (containing calcium, potassium chloride and phosphate, magnesium chloride and sulfate, sodium chloride, sodium bicarbonate, sodium phosphate dibasic and glucose), propolis, egg white, coconut water, Ricetral, or whole milk.[118–128"](Singletary, et al, 2015a, 2015b).

- Analgesics, oral and/or topical/anti-inflammatory (pain management; swelling control)

- Antibiotic, 0.14 fl. oz. (0.5 g) packages, (cleansing soft tissue)

- Foil blanket, (treat shock and/or cold-stress related injuries)
- For remote situations telemedicine may offer directions and use various tools (Ferrer-Roca et al., 2002).

Table 2. Respiratory and Cardiac Emergencies.

Item (Latex free)	Purpose	Minimal Quantity	Quantity Logic	Reference	Evidence
81mg chewable aspirin Adult 325-mg, non-coated	Treatment of potential cardiac symptoms.	4	When early aspirin administration (ie, in the first few hours after onset of symptoms) is compared with late aspirin administration (eg, after hospital arrival) for chest pain due to myocardial infarction, a reduction of mortality is found. Patients with potential cardiac symptoms should chew 1-325 mg non-coated adult aspirin or 2 to 4 low dose aspirin providing they have no history of aspirin allergy.	Singletary et al, 2015a, 2015b Savino et al, 2015 Freimark et al, 2002 Verheugt et al, 1990 Funk et al, 2000 Hayes et al, 1999 Barbash et al, 2002 Quan, 2004	LOE-Review LOE-Review LOE-1a LOE-1a LOE-2a LOE-2a LOE-2a LOE-2b
Breathing Barrier device	Assisted ventilation in a patient in respiratory or cardiac arrest.	1	If available, rescuers may use a barrier device. Safety precautions should be taken if the victim is known to have a serious infection (e.g., HIV, tuberculosis, hepatitis B virus, or SARS) (Soar et al, 2010). Studies (Belenkharn et al, 1990; Cydulka et al, 1991; Lightsey et al, 1992) have demonstrated that that barrier devices can decrease transmission of bacteria in controlled laboratory settings but care should not be delayed in setting one up (Berg et al, 2010).	Soar et al, 2010 Belenkharn et al, 1990 Cydulka et al, 1991 Lightsey et al, 1992 Berg et al, 2010	LOE-5 LOE-4 LOE 4 LOE-4 LOE-5

- Metered Dose Inhaler, (Prescribed, asthma or acute patients with shortness of breath)
    - According to Singletary et al's (2015b) review, "inhaled bronchodilators have been shown to be effective in patients with asthma and acute shortness of breath.[26–36]) and that it is It is reasonable for first aid providers to be familiar with the available inhaled bronchodilator devices and to assist as needed with the administration of prescribed bronchodilators when a person with asthma is having difficulty breathing (Class IIa, LOE B-R)."

- Epi-Pen, (Prescribed, severe anaphylactic reaction)
    - According to Singletary et al's (2015b) review, "the recommended dose of epinephrine is 0.3 mg intramuscularly for adults and children greater than 30 kg, 0.15 mg intramuscularly for children 15 to 30 kg, or as prescribed by the person's physician.)" Additionally, "a second dose of epinephrine has been found to be beneficial for persons not responding to a first dose.[67–75] When a person with anaphylaxis does not respond to the initial dose, and arrival of advanced care will exceed 5 to 10 minutes, a repeat dose may be considered (Class IIb, LOE C-LD)."

Table 3. Other Medical Injuries and Illnesses.

Item (Latex free)	Purpose	Minimal Quantity	Quantity Logic	Reference	Evidence
Oral glucose tablet, 15-20 g Mentos (5-10 mints Skittles (20-25 candies)	Diabetic emergency (hypoglycemia)	2 tubes 1 package 1 bag	As cited by Singletary et al (2015b), "systematic review demonstrates more rapid clinical relief of symptomatic hypoglycemia with glucose tablets compared with various evaluated dietary sugars, such as sucrose- or fructose-containing candies or foods, orange juice, or milk (**Table 1**).[76–78]" Hypoglycemia may be reversed with administration of rapid-acting glucose (15 to 20 g). Glucose (15 to 20 g) is the preferred treatment for conscious persons with hypoglycemia (glucose alert value of ≤3.9 mmol/L [70 mg/dL]), although any form of carbohydrate that contains glucose may be used. Glucose (15 to 20 g) is the preferred treatment for conscious persons with hypoglycemia (glucose alert value of ≤3.9 mmol/L [70 mg/dL]), although any form of carbohydrate that contains glucose may be used.	Singletary et al, 2015a, 2015b Chamberlain et al, 2016, 2017	LOE-5 LOE- 5

Item (Latex free)	**Purpose**	**Minimal Quantity**	**Quantity Logic**	**Reference**	**Evidence**
Splinter forceps/tweezers	Multipurpose, used to remove splinters and ticks.	1	Splinters commonly occur from wood, thorns, or spines from plants, but may be also from plastic or glass and must be removed from wounds because they are associated with increased inflammation and risk of infection. Experts recommend a blunt, medium-tipped, angled mosquito or splinter forceps when removing a tick or very fine-tipped tweezers.	Expert Opinion Howard & Loiselle, 2006 Chan & Salam, 2003 Aberer, 2009 Review Haalas, 2007 Couch et al, 1992 Gammon et al, 2002 Prospective study Ghirga & Ghirga, 2010	LOE-7 LOE-5 LOE-2a
Diphoterine or Cederroth eye wash solution*	Emergency treatment of eye burns.	1	As cited by Singletary et al (2015b) “Chemical injury to the eye occurs most commonly from chemicals in powder and liquid form. Evidence limited to a single study of eye exposure to an alkali showed improvement in ocular pH following irrigation with tap water compared with normal saline. In this study, irrigation with 1.5 L of solution occurred over 15 minutes.[84] It can be beneficial to rinse eyes exposed to toxic chemicals immediately and with a copious amount of tap water for at least 15 minutes or until advanced medical care arrives (Class IIa, LOE C-LD). If tap water is not available, normal saline or another commercially available eye irrigation solution may be reasonable (Class IIb, LOE C-LD). First aid providers caring for	Singletary et al, 2015a, 2015b	LOE-5

			individuals with chemical eye injury should contact their local poison control center or, if a poison control center is not available, seek help from a medical provider or 9-1-1 (Class I, LOE C-EO)."		
Eye covering with means of attachment, 2 x 9 sq. in. (Foreign object, rupture globe)	Emergency treatment of eye burns.	1			
Biohazard bag, 1 qt capacity	Used to store biohazard waste material.	1	OSHA requires bloodborne pathogen material to be disposed of appropriately in the workplace settings when there is an occupation risk.[1,8]	ARC, 2005, 2017 Miller & Berry, 2017 OSHA, 2001	LOE-6 LOE-6 LOE-Gov Document
1 qt or 1 gallon Ziplock bag	Used to store items, such as amputated limbs or hold ice.	2		Miller & Berry, 2016 Singletary et al, 2015a, 2015b	LOE-6 LOE-5
First aid guide book	Used as a reference guide in the event of an emergency.	1			LOE 7

* Optional item

Wilderness and remote settings, where EMS or definitive care is not available for 30 minutes or more, require more attention to risks and preparation of first aid kits. This may include additional pharmaceuticals and equipment, including a report form to track person's changes over time and treatments. Training for this environment is recommended and ARC courses include building appropriate first aid kits.

References (Updated 1-20-18)

Aberer E. What should one do in case of a tick bite? *Curr Probl Dermatol.* 2009;37:155-166.

Ahern S, DiNoto E, Maloney S, Mynatt J, Peerbolte S, Snider J. Public access bleeding control: an implementation strategy. National Preparedness Leadership Initiative (NPLI Cohort XIII). https://cdn2.sph.harvard.edu/wp-content/uploads/sites/8/2015/10/Team-You-Can-Act-Team-Report.pdf.

American College of Surgeon. (2015). The Hartford Consensus III: Implementation of Bleeding Control. Available: http://bulletin.facs.org/2015/07/the-hartford-consensus-iii-implementation-of-bleeding-control/#.WlpjCZM-e34Retrieved December 28, 2017.

American National Standards Institute. *Minimum Requirements for Industrial Unit- Type First-aid Kits.* Washington, DC 1978.

American National Standards Institute. *Minimum Requirements for Industrial Unit- Type First-aid Kits.* Washington, DC 1998.

American National Standards Institute. *American National Standard- Minimum Requirements for Industrial Unit- Type First-aid Kits.* Washington, DC 2009.

American National Standards Institute. *American National Standard- Minimum Requirements for Industrial Unit- Type First-aid Kits.* Washington, DC 2015.

American Red Cross. (n.d.). Make a First Aid Kit | Supplies & Contents | American Red Cross. Retrieved January 10, 2018, from http://www.redcross.org/get-help/how-to-prepare-for-emergencies/anatomy-of-a-first-aid-kit

American Red Cross. (2005). *American Red Cross first aid: responding to emergencies.* Yardley, PA: Staywell.

American Red Cross. (2017). *Emergency Response.* Yardley, PA: Staywell.

Avau B, Borra V, Vandekerckhove P, De Buck E. The Treatment Of Snake Bites In A First Aid Setting: A Systematic Review. *PLoS Negl Trop Dis*. 2016 Oct 17;10(10):e0005079. doi: 10.1371/journal.pntd.0005079. eCollection 2016 Oct.

Barbash I, Freimark D, Gottlieb S, et al. Outcome of myocardial infarction in patients treated with aspirin is enhanced by pre-hospital administration. *Cardiology.* 2002;98:141-147.

Beam JW. Occlusive dressings and the healing of standardized abrasions. *J Athl Train*. 2008;43:600–607.

Beam JW. Management of superficial to partial-thickness wounds. *J Athl Train. 2007* Jul-Sep;42(3):422-4.

Berg RA, Hemphill R, Abella BS, Aufderheide TP, Cave DM, Hazinski MF, et al. Part 5: adult basic life support: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation*. 2010;122(18 Suppl 3):S685-705.

Blenkharn JI, Buckingham SE, Zideman DA. Prevention of transmission of infection during mouth-to-mouth resuscitation. *Resuscitation* 1990;19:151–7.

Bureau of Labor Statistics. (2004). Nonfatal occupation injuries and illnesses with days away from work, by the nature of the disabling condition, 2004. *United States Department of Labor*. Available at: https://www.bls.gov/iif/oshwc/osh/os/osbl0031.pdf Accessed January 19, 2018

Bureau of Labor Statistics. (2005). Distribution of injuries and illnesses, by nature. *United States Department of Labor*. Available at: http://www.bls.gov/iif/oshwc/osh/os/osh05_28.pdf. Accessed January 19, 2018

Bureau of Labor Statistics. (2006). Distribution of injuries and illnesses, by nature, private industry, 2006. *United States Department of Labor*. Available at: http://www.bls.gov/iif/oshwc/osh/os/osh06_28.pdf. Accessed January 19, 2018

Bureau of Labor Statistics. (2008). 2007 Nonfatal Occupational Injuries and Illnesses Case and Demographics. Available at: https://www.bls.gov/iif/oshwc/osh/case/osch0038.pdf Accessed January 19, 2018

Bureau of Labor Statistics. (2009). 2008 Nonfatal Occupational Injuries and Illnesses, Private Industry. Available at: https://www.bls.gov/iif/oshwc/osh/case/osch0040.pdf Accessed January 19, 2018

Bureau of Labor Statistics. (2010). 2009 Nonfatal Occupational Injuries and Illnesses: Private Industry, State Government, and Local Government. Available at: https://www.bls.gov/iif/oshwc/osh/case/osch0043.pdf Accessed January 19, 2018

Butler FK. Military history of increasing survival: the U.S. military experience with tourniquets and hemostatic dressings in the Afghanistan and Iraq conflicts. *J Spec Oper Med*. 2015;15(4):149–152.

Centers for Disease Control and Prevention. (n.d.). NAMCS/NHAMCS – Ambulatory Health Care Data Homepage. Retrieved January 10, 2018, from https://www.cdc.gov/nchs/ahcd/index.htm

Centers for Disease Control and Prevention. Recommendations from the CDC Guideline for Hand Hygiene in Healthcare Settings. (2002). Available: https://multimedia.3m.com/mws/media/309799O/cdc-guidelines-reprint.pdf Retrieved December 28, 2017

Centers for Disease Control and Prevention. Ambulatory Health Care Data. National Center for Health Statics. (n.d.) Available: https://www.cdc.gov/nchs/ahcd/about_ahcd.htm Retrieved December 28, 2017

Centers for Health Statistics (2012). Ambulatory Health Care Data. National Hospital Ambulatory Medical Care Survey: 2012 emergency department summary tables. Available: https://www.cdc.gov/nchs/data/ahcd/nhamcs_emergency/2012_ed_web_tables.pdf Retrieved December 28, 2017

Chamberlain JJ, Rhinehart AS, Shaefer CF Jr, Neuman A. Diagnosis and Management of Diabetes: Synopsis of the 2016 American Diabetes Association Standards of Medical Care in Diabetes. Ann Intern Med. 2016 Apr 19;164(8):542-52. doi: 10.7326/M15-3016. Epub 2016 Mar 1.

Chamberlain JJ, Kalyani RR, Leal S, Rhinehart AS, Shubrook JH, Skolnik N. Treatment of Type 1 Diabetes: Synopsis of the 2017 American Diabetes Association Standards of Medical Care in Diabetes. *Ann Intern Med*. 2017 Oct 3;167(7):493-498. doi: 10.7326/M17-1259. Epub 2017 Sep 12.

Chan C, Salam G. Splinter removal. *Am Fam Physician.* 2003;67(12):2557-2562.

Claus EE, Fusco CF, Ingram T, Ingersoll CD, Edwards JE, Melham TJ. Comparison of the effects of selected dressings on the healing of standardized abrasions. *J Athl Train*. 1998;33:145–149.

Couch P, Johnson C. Prevention of Lyme disease. *Am J Hosp Pharm.* 1992;49(5):1164-1173.

Gammons M, Salam G. Tick removal. *Am Fam Physician.* 2002;66:643-646.

Ghirga G, Ghirga P. Effective tick removal with a fishing line knot. *Wilderness Environ Med.* 2010;21(4).

Howard J, Loiselle J. A clinician's guide to safe and effective tick removal. *Contemporary Pediatrics.* 2006;23(5):36-38, 40, 41-42.

Hoyt, DB. A clinical review of bleeding dilemmas in trauma. *Semin haematol*. 2004;41(Suppl 1)-40-43.

Cydulka RK, Connor PJ, Myers TF, Pavza G, Parker M. Prevention of oral bacterial flora transmission by using mouth-to-mask ventilation during CPR. *J Emerg Med*. 1991;9:317–21.

Deyle GD, Nagel KL. Prolonged immobilization in abduction and neutral rotation for a first-episode anterior shoulder dislocation. *J Orthop Sports Phys Ther*. 2007;37:192–198.

Doyle GS, Taillac PP. Tourniquets: a review of current use with proposals for expanded prehospital use. *Prehosp Emerg Care*. 2008;12:241–256.

Dutton RP, Carson JL. Indications for early erytrocites transfusion. *J Trauma*. 2006;60(6 Suppl)-S35-40. 9.

Dykstra J, Hill H, Miller M, Cheatham C, Michael T, Baker R. Comparisons of cubed ice, crushed ice, and wetted ice on intramuscular and surface temperature changes. *J Athl Train.* 2009;44:136-141.

Hartford Consensus. Strategies to enhance survival in active shooter and intentional mass casualty events: a compendium. *American College of Surgeons Bulletin*. 2015;100(1S). https://http://www.facs.org/~/media/files/publications/bulletin/hartford%20consensus%20compendium.ashx.

Hing E, Hall MJ, Xu J. National Hospital Ambulatory Medical Care Survey: 2006 outpatient department summary. *Natl Health Stat Report*. 2008;(4):1-31.

Hing E, Hall MJ, Ashman JJ, Xu J. National Hospital Medical Care Survey: 2007 outpatient department summary. *Natl Health Stat Report*. 2010;23;(28):1-32.

Ferrer-Roca, O., Díaz De León, R., De Latorre, F. J., Suárez-Delgado, M., Di Persia, L., & Cordo, M. (2002). Aviation medicine: Challenges for telemedicine. *Journal of Telemedicine and Telecare*. https://doi.org/10.1258/1357633021937352

Freimark D, Matetzky S, Leor J, et al. Timing of aspirin administration as a determinant of survival of patients with acute myocardial infarction treated with thrombolysis. *Am J Cardiol.* 2002;89:381-385.

Funk D, Groat C, Verdile V. Education of paramedics regarding aspirin use. *Prehosp Emerg Care.* 2000;4(62-64).

Haynes B, Pritting J. A rural emergency medical technician with selected advanced skills. *Prehosp Emerg Care.* 1999;3:343-346.

International Federation of Red Cross and Red Crescent Society. International first aid and resuscitation guidelines 2011. For National Society First Aid Programme Managers, Scientific Advisory Groups, First Aid Instructors and First . available at: http://www.google.com/url?sa=t&source=web&cd=1&ved=0CBYQFjAA&url=http%3A%2F%2Fwww.instructorscorner.org%2Fmedia%2Fresources%2FSAC%2FFirstAidGuidelines.pdf&rct=j&q=%22international%20first%20aid%20guidelines%22&ei=1t_KTfjCKo_UgAfur62LBg&usg=AFQjCNGBYteMCblGuLGUjHjkgItdS7JgXQ&cad=rjaResponders

Kampf G, Kramer A. Epidemiologic background of hand hygiene and evaluation of the most important agents for scrubs and rubs. *Clin Microbiol Rev.* 2004 Oct;17(4):863-93.

Liberman MM, Mudler DS. Airway injuries in the professional ice hockey player. *Clinical Journal of Sport Medicine* 2007;17:61-67.

Lightsey DM, Shah PK, Forrester JS, Michael TA. A human immunodeficiency virus-resistant airway for cardiopulmonary resuscitation. *Am J Emerg Med.* 1992;10:73–7.
5.

Markenson D, Ferguson JD, Chameides L, Cassan P, Chung K-L, Epstein J, Gonzales L, Herrington RA, Pellegrino JL, Ratcliff N, Singer A. Part 17: first aid: 2010 American Heart Association and American Red Cross Guidelines for First Aid. *Circulation*. 2010;122(suppl 3):S934 –S946.

Markwalder K. First aid kit for travelers. *Therapeutische Umschau. Revue Thérapeutique.* 2001;58(6):376-380.

McCaig LF, Nawar EW. National Hospital Ambulatory Medical Care Survey: 2004 emergency department summary. *Advance Data*. 2006;(372):1-29.

McGarth T, Murphy C. Comparison of SAM splint-molded cervical collar with Philadelphia cervical collar. *Wilderness Environ Med.* 2009;20(2):166-168.

Metules TJ. Here's a way to safeguard a knocked-out tooth. *RN*. 2004;67(2):72-72.

Merrick M, Jutte L, Smith M. Cold modalities with different thermodynamic properties produce different surface and intramuscular temperatures. *J Athl Train.* 2003;38:28-33.

Middleton K, Hing E. National Hospital Ambulatory Medical Care Survey: 2003 outpatient department summary. *Adv Data.* 2005;(366):1-36.

Miller MG, Berry DC. *Emergency Response Management for Athletic Trainers*. Baltimore, MD: Lippincott, Williams, and Wilkins, 2016.

Murray CJ, Lopez AD. Alternative projections of mortality and disability by cause 1990-2020: Global Burden of Disease Study. *Lancet*. 1997;349(9064)-1498-1504.

Naimer S, Chemla F. Elastic adhesive dressing treatment of bleeding wounds in trauma victims. *Am J Emerg Med.* 2000;18:816-819.

Naimer S, Nash M, Niv A, Lapid O. Control of massive bleeding from facial gunshot wound with a compact elastic adhesive compression dressing. *Am J Emerg Med.* 2004a;22:586-588.

Naimer S, Anat N, Katif G. Evaluation of techniques for treating the bleeding wound. *Injury.* 2004b;35:974-979.

Nawar E, Niska R, Xu J. National Hospital Ambulatory Medical Care Survey: 2005 emergency department summary. *Adv Data.* 2007;(386):1-32.

National Football League. *Book 1: First aid.* Vol 2009. New York, NY: National Football League; 2003.

Niska R, Bhuiya F, Xu J. National Hospital Medical Care Survey: 2007 emergency department summary. *Natl Health Stat Report*. 2010;(28):1-32.

Occupational Health and Safety Administration. Medical services and first aid. *United States Department of Labor*. Available: http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9806#1910.151%28a%29. Retrieved January 11, 2017

Occupational Safety and Health Administration. (2011). Appendix A to § 1910.151 -- First aid kits (Non-Mandatory) - 1910.151 App A | Occupational Safety and Health Administration. Retrieved January 7, 2018, from https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9807

Pitts SR.,Niska RW, Xu, J, Burt CW. *National Hospital Ambulatory Medical Care Survey: 2006 emergency department summary*. *Natl Health Stat Report*. 2008;6;(7):1-38.

Quan D, LoVecchio F, Clark B, Gallagher JI. Prehospital use of aspirin rarely is associated with adverse events. *Prehosp Diaster Med.* 2004;19:362-365.

Rotter M. Handwashing and Hand Disinfection In: Mayhill CG (ed). *Hospital Epidemiology and Infection Control*. 3 ed. Philadelphia: Lippincott Williams & Wilkins; 2004:1727-46.

Rui P, Kang K. (2014). National Hospital Ambulatory Medical Care Survey: 2014 Emergency Department Summary Tables. Available from: http://www.cdc.gov/nchs/data/ahcd/nhamcs_emergency/2014_ed_web_tables.pdf.

Rui P, Kang K, Albert M. (2013). National Hospital Ambulatory Medical Care Survey: 2013 Emergency Department Summary Tables. Available from: http://www.cdc.gov/nchs/data/ahcd/nhamcs_emergency/2013_ed_web_tables.pdf.

Rui P, Hing E, Okeyode T. National Ambulatory Medical Care Survey: 2014 State and National Summary Tables. Available from: http://www.cdc.gov/nchs/ahcd/ahcd_products.htm.

Rui P, Okeyode T. National Ambulatory Medical Care Survey: 2015 State and National Summary Tables. Available from: http://www.cdc.gov/nchs/ahcd/ahcd_ products.htm.

Savino PB, Sporer KA, Barger JA, Brown JF, Gilbert GH, Koenig KL, et al. Chest Pain of Suspected Cardiac Origin: Current Evidence-based Recommendations for Prehospital Care. *West J Emerg Med*. 2015;16(7):983-95. doi: 10.5811/westjem.2015.8.27971. Epub 2015 Dec 11.

Scheinberg S. *SAM SPLINT User Guide*: SAM Medical Product; 2005.

Shosholcheva M, Jankulovski N, Kuzmanovska B, Kartalov A. Management of critical bleeding in trauma patients: between recommendations and reality. *J Anesth Crit Care Open Access*. 2015;3(6): 00118. DOI: 10.15406/jaccoa.2015.03.00118

Setness P, Van Beusekom M. Patient notes: putting together a home first-aid kit. *Postgraduate Medicine.* 2006;119(2):100-100.

Singletary EM, Zideman DA, De Buck ED, Chang WT, Jensen JL, Swain JM. (2015a). Part 9: First Aid: 2015 International Consensus on First Aid Science With Treatment Recommendations. *Circulation*. 2015;132(16 Suppl 1):S269-311. doi: 10.1161/CIR.0000000000000278.

Singletary EM, Charlton NP, Epstein JL, et al. (2015b) Part 15: First Aid: 2015 American Heart Association and American Red Cross Guidelines Update for First Aid. *Circulation*. 2015;132(18 suppl 2):S574–S589.

Soar J, Mancini M, Bhanji F, et al. Part 12: Education, implementation, and teams 2010 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations. *Resuscitation.* 2010;81S(e288-e330).

Stainsby M, MacLennan S, Hamilton PJ. Management of massive blood loss: a template guide. *British Journal of Anaesthesia* 2000;85(3)-467-491.

Tessier D. [First aid kits: for whom and why?]. *Médecine Tropicale: Revue Du Corps De Santé Colonial.* 1997;57(4 Bis):473-477.

Thompson KD. Scapula fracture secondary to static line injury in a 22 year-old active duty soldier. *Journal of Special Operations Medicine.* 2009;10(4), 41-44.

Todd EC, Michaels BS, Holah J, Smith D, Greig JD, Bartleson CA. Outbreaks where food workers have been implicated in the spread of foodborne disease. Part 10. Alcohol-based antiseptics for hand disinfection and a comparison of their effectiveness with soaps. *J Food Prot*. 2010 Nov;73(11):2128-40.

United States Department of Labor. (2017). Employer-Reported Workplace Injuries And Illnesses – 2016. Bureau of Labor Statistics. Available: https://www.bls.gov/news.release/archives/osh_11092017.pdf Retrieved December 28, 2017.

United States Department of Labor. 2016 Survey Of Occupational Injuries & Illnesses Charts Package (2017a) Bureau of Labor Statistics. Available: https://www.bls.gov/iif/osch0060.pdf Retrieved December 28, 2017.

United States Department of Labor. Nonfatal Occupational Injuries And Illnesses Requiring Days Away From Work, 2015. (2016). Bureau of Labor Statistics. Available: https://www.bls.gov/news.release/archives/osh2_11102016.pdf Retrieved December 28, 2017.

United States Department of Labor. Nonfatal Occupational Injuries And Illnesses Requiring Days Away From Work, 2015. (2016a). Bureau of Labor Statistics. Available: https://www.bls.gov/news.release/archives/osh2_11192015.pdf Retrieved December 28, 2017.

Verheugt F, van der Laarse A, Funke-Kupper A, Sterkman L, Galema T, Roos J. Effects of early intervention with low-dose aspirin (100 mg) on infarct size, reinfarction and mortality in anterior wall acute myocardial infarction. *Am J Cardiol.* 1990;66:267-270.

World Health Organization: Violence, Injuries, and Disability: Biennial 2006–2007 Report. Geneva: World Health Organization; 2008.