



ARC SAC SCIENTIFIC REVIEW

First Aid Kit

Questions to be Addressed

Original

1. What is the criterion used for placing first aid kits in occupational settings (i.e., # of people, # of injuries, environment, types of injuries risk analysis)?
2. What first aid kit criteria best prepare an organization to respond to an emergency? (i.e., # of people, # of injuries, environment, types of injuries, risk analysis).
3. What items are recommended first aid items for a single patient first aid kit?

2018 Updated

What items are recommended first aid items for a single patient first aid kit?

Introduction/Overview

Original

A properly-stocked first aid kit is an essential piece of equipment for emergency response, whether at work, home, recreation or an athletic event.^{1,2} A first aid kit needs to be contextual and appropriate for emergencies related to a particular environment. Identifying 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 setting (i.e., workplace and home). It also looks at questions that should be addressed to the consumer to adjust and modify a basic kit.

Prior to this 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. General consensus finds that first aid kits do not need to 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 blood borne pathogen, and assist in stabilizing the patient until advanced medical care can be accessed. First aid kits also 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.

2018 Updated

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).

Review Process and Literature Search Performed

Original

Medline, CINAHL, SPORTDiscuss, and Health Source: Nursing/Academic Edition databases were initially searched using the following search terms “First Aid Kit” and Design (2 hits) and “First Aid Kit” and Construction (2 hits), “First Aid Kit” and Contents (3 hits), and “First Aid Kit” and Equipment (14 –

American Red Cross Scientific Advisory Council First Aid Kit Scientific Review

2 which were repeated from another search). The search was limited peer-reviewed, English only articles, between 1995-2009. In situations where a review article referred a possible source, the abstract and/or article was located and reviewed at www.pubmed.com or at one of the above databases. Based on the above inclusion criteria fourteen articles were examined, while four abstracts were reviewed when the article was not in English.

A second search was conducted using the Medline, CINAHL, SPORTDiscuss, and Health Source: Nursing/Academic Edition databases. The following search terms “Epidemiology AND Accidents AND Nonfatal” (30 hits, reviewed 9) and “Epidemiology AND Injury AND Nonfatal” (40 hits, reviewed 1, many were repeated articles). The search was limited peer-reviewed, English only articles, between 2000-2009. In situations where a review article referred a possible source, the abstract and/or article was located and reviewed at www.pubmed.com or at one of the above databases. Data from the *National Hospital Ambulatory Medical Care Survey (2004, 2005, 2006 Emergency Department and 2003 Outpatient)* was gathered from www.pubmed.com.

Data was also gathered from the following on-line resources.

- Web-based Injury Statistics Query and Reporting System (WISQARSTM) examining the years 2008 and 2001-2008
 - www.cdc.gov/ncipc/wisqars/default.htm
- Bureau of Labor Statistics, Injuries, Illnesses, and Fatalities for the years 2004, 2005, 2006, 2007, 2008
 - <http://www.bls.gov/iif/home.htm>

A third search was conducted using a variety of sources: Medline, CINAHL, SPORTDiscuss, and Health Source: Nursing/Academic Edition databases and www.pubmed.com to assist in identify evidence to support or refute the use of certain first aid supplies. This was a focused search based on workplace and emergency department epidemiological data. Use of other American Red Cross Scientific Advisory Council scientific reviews and advisories contributed to the review.

2018 Updated

A hand and single citation search were conducted for data from:

- *National Hospital Ambulatory Medical Care Survey*
- *Hospital Ambulatory Medical Care Survey*
- United States Department of Labor, Bureau of Labor Statistics
- Web-based Injury Statistics Query and Reporting System (WISQARSTM) examining the years 2010-2015 (available data)
 - www.cdc.gov/ncipc/wisqars/default.htm

Scientific Foundation

Original

The National Hospital Ambulatory Medical Care Survey (NHAMCS), inaugurated in 1992 to gather, analyze, and disseminate information about the health care provided by outpatient physicians and emergency departments (EDs), provided data relative to the types of an frequency of injuries and illnesses reported to EDs.²³ Note, injuries are reported as a disease.

The most frequently diagnosed major disease categories for the calendar years, 2004-2006²⁴⁻²⁶ are found below

Approved by ARC SAC June 2018

Table. Percent Distribution of Emergency Department Visits, by Major Disease Categories.²⁴⁻²⁶

Major Disease Category	2004 - % distribution	2005 - % distribution	2006 – % distribution
Injuries and poisonings	26.4	24.9	24.3
Symptoms, signs, and ill-defined conditions	18.8	19.3	20.1
Diseases of the respiratory system	10.3	11	10

The following conditions/pathologies/diagnoses fell under the major disease category of injuries and poisonings:

- Fractures
- Sprains and strains
- Intracranial injury
- Open wounds
- Superficial injury
- Contusion with intact skin surface
- Foreign body
- Burns
- Trauma complications and unspecified injuries
- Poisoning and toxic effects
- Surgical and medical complications
- Other injuries

The most frequently reported primary diagnoses rendered by ED physicians according to the ICD-9 CM codes²⁴⁻²⁵ are found below.

Table. Reported Primary Diagnoses Rendered by Physicians According to ICD-9 CM Codes.²⁴⁻²⁵

Primary Diagnoses	2004 - % distribution	2005 - % distribution
Contusion with intact skin surface	4.3	4.2
Abdominal pain	4.0	4.0
Fractures, sprains and strains (excluding ankle and back)	4.6	4.2

Emergency department visit data was reclassified during 2006²⁶ by the 10 leading primary diagnosis groups for visit, according to patient age and sex. The table below (Leading Emergency Department Diagnoses by Age and Sex, 2006 and Associated First Aid Kit Items) outlines the leading diagnoses by age and sex related to the potential development of first aid kit materials.

The review of nonfatal occupational injuries and illnesses demonstrated a consistent distribution of injuries and illnesses over a 5-year cycle. Occupational musculoskeletal sprains and strains were consistently the most reported occupational injury sustained in the private sector in the table below (Distribution of Injuries and Illnesses by Nature, Private Industry, 2004-2008)

Table. Leading Emergency Department Diagnoses by Age and Sex, 2006 and Associated First Aid Kit Items.²⁶

Gender	Age	Primary Diagnosis	% (cases)	Expert Opinion of Items Required to Provide Minimal Care in an Emergency
Female	Under 15 y.o.	Contusion with intact skin surface	2.3% (509,000)	Cold packs (commercial or ice bags for crush ice) elastic wraps, triangular bandages, splinting device, adhesive tape
		Open wound of head	1.5% (335,000)	Nitrile gloves, sterile or non-sterile gauze, sterile or non-sterile roller bandages, adhesive tape
		Fractures, excluding lower limb	1.2% (256,000)	Splinting device, elastic bandages, sterile or non-sterile roller bandages.
		Open wound, excluding head	1.2% (256,000)	Nitrile gloves, sterile or non-sterile gauze, sterile or non-sterile roller bandages, adhesive tape
	Over 15 y.o.	Chest pain	2.3% (2.2 million)	Barrier device, aspirin, AED
		Contusion with intact skin surface	2.3% (2.2 million)	Cold packs (commercial or ice bags for crush ice) elastic wraps, triangular bandages, splinting device, adhesive tape
		Sprains and strains, excluding ankle and back	1.3% (1.2 million)	Cold packs (commercial or ice bags for crush ice) elastic wraps, triangular bandages, splinting device, adhesive tape
		Open wound, excluding head	1.3% (1.2 million)	Nitrile gloves, sterile or non-sterile gauze, sterile or non-sterile roller bandages, adhesive tape
Male	Under 15 y.o.	Contusion with intact skin surface	3.1% (673,000)	Cold packs (commercial or ice bags for crush ice) elastic wraps, triangular bandages, splinting device, adhesive tape
		Open wound of head	2.4% (512,000)	Nitrile gloves, sterile or non-sterile gauze, sterile or non-sterile roller bandages, adhesive tape
		Fractures, excluding lower limb	2.2% (477,000)	Splinting devices, elastic bandages, roller bandages
Gender	Age	Primary Diagnosis	% (cases)	Expert Opinion of Items Required to Provide Minimal Care in an Emergency
		Open wound, excluding head	1.9% (419,000)	Nitrile gloves, sterile or non-sterile gauze, sterile or non-sterile roller bandages, adhesive tape
		Asthma	1.3% (285,000)	Personal metered-dose inhaler (MDI)

American Red Cross Scientific Advisory Council First Aid Kit Scientific Review

	Over 15 y.o.	Open wound, excluding head	2.2% (2.1 million)	Nitrile gloves, sterile or non-sterile gauze, sterile or non-sterile roller bandages, adhesive tape
		Chest pain	2.0% (1.9 million)	Barrier device, aspirin, AED
		Contusion with intact skin surface	2.0% (1.9 million)	Cold packs (commercial or ice bags for crush ice) elastic wraps, triangular bandages, splinting device, adhesive tape
		Fractures, excluding lower limb	1.1% (1 million)	Splinting material, elastic bandages, roller bandages
		Sprains and strains, excluding ankle and back	1.1% (1 million)	Cold packs (commercial or ice bags for crush ice) elastic wraps, triangular bandages, splinting device, adhesive tape
		Sprains and strains of neck and back	0.8% (803,000)	Cold packs (commercial or ice bags for crush ice) elastic wraps, triangular bandages, splinting device, adhesive tape

Table. Distribution of Injuries and Illnesses by Nature, Private Industry, 2004-2008.

Injury and Illnesses	2004 - % Injuries and Illnesses	2005 - % of Injuries and Illnesses	2006 - % of Injuries and Illnesses	2007 - % of Injuries and Illnesses	2008 - % of Injuries and Illnesses
Sprains and strains	41.7	40.8	39.9	38.7	38.6
All other	15.6	16.5	16.8	17	16.6
Cuts, lacerations, punctures	9.1	9.6	9.7	9.2	9.3
Bruises, contusions	9.1	8.7	8.6	8.7	8.7
Fractures	7.5	7.8	8.0	8.2	8.3
Soreness, pain	5.3	5.3	5.9	10	10.6
Multiple traumatic injuries	4.0	4.1	3.9	4	4.1
Back pain	3.0	2.9	3.0	3.2	3.4
Thermal burns	1.5	1.4	1.5	1.5	1.4
Carpal tunnel	1.5	1.3	1.1	1	.9
Amputations	.6	.7	.7	.6	.6
Chemical burns	.6	.5	.6	.5	.5
Tendonitis	.6	.5	.4	.4	.4

Approved by ARC SAC June 2018

2018 Updated**NATIONAL AMBULATORY MEDICAL CARE SURVEY**

The National Ambulatory Medical Care Survey (NAMCS) is a national survey designed to meet the need for objective, reliable information about the provision and use of ambulatory medical care services in the United States (Centers for Disease Control and Prevention, n.d.).

NATIONAL HOSPITAL AMBULATORY MEDICAL CARE SURVEY

The National Hospital Ambulatory Medical Care Survey (NHAMCS) is designed to collect data on the utilization and provision of ambulatory care services in hospital emergency and outpatient departments, and in ambulatory surgery centers (Center for Health Statistics, 2017).

**Data Extraction - National Hospital Ambulatory Medical Care Survey
And National Ambulatory Medical Care Survey**

In 2007, most injury-related visits were the result of unintentional injuries, accounting for 7.3 million of the 11 million injury-related visits (Hing et al., 2010). There were 991,000 visits for adverse effects of medical care, which include both surgical complications and adverse effects of medications, as well as 457,000 visits with intentional injuries (Hing et al., 2010). Note, injuries are reported as a disease. Table below (Percent Distribution of Outpatient Department Visits, by Major Disease Categories) provides the percent distribution of outpatient department visits, by major disease categories not previously provided.

Table, Percent Distribution of Outpatient Department Visits, by Major Disease Categories. (Hing et al, 2008, 2010).

Major Disease Category % distribution	2006	2007
Unintentional injuries and poisonings	64.6	66.2
Intentional injury or poisonings ¹	2.6	4.2
Injury or poisoning of undetermined intent ²	17.2	20.6

¹Includes assault, self-inflicted, and other causes of violence. ²Includes illegible entries and blanks.

The leading primary diagnosis groups for visits, according to patient age and sex while related to the potential development of first aid kit materials for 2006 (Pitts et al., 2008) and 2007 (Niska et al., 2010) is below. Emergency department visit data was reclassified during 2010 and resulted in a reclassification of and description of the collected data.

Table. Number and percent distribution of emergency department visits, by the 10 leading primary diagnosis groups perceived treatable by first aid provider with resources by age and sex, 2007 and 2014 and associated first aid kit items.

Gender	Primary Diagnosis*	2007 (visits in thousands)	2014 (visits in thousands)	SAC Expert Opinion of Items Required to Provide Minimal Care in an Emergency
Female < 15 y.o.		Total visits 10,072	Total visits 13,167	
	Contusion with intact skin surface	451 2%	438 1.6%	<i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, adhesive tape</i>

American Red Cross Scientific Advisory Council First Aid Kit Scientific Review

	Open wound of head	370 1.7%	386 1.4%	<i>Nitrile gloves, sterile or non-sterile dressing, sterile or non-sterile roller bandages, adhesive tape</i>
	Fractures, excluding lower limb	20 .09%	254 .9%	<i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, sterile or non-sterile roller bandages, adhesive tape</i>
	Superficial injuries		254 .9%	<i>Nitrile gloves, sterile or non-sterile dressing, sterile or non-sterile roller bandages, adhesive tape</i>
	Sprains and strains, excluding ankle and back		216 .8	<i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, sterile or non-sterile roller bandages, adhesive tape</i>
	Open wound, excluding head		193 .7%	<i>Nitrile gloves, sterile or non-sterile dressing, sterile or non-sterile roller bandages, adhesive tape</i>
	Pyrexia of unknown origin	433 1.9%	818 2.9%	<i>Antipyretic</i>
	Asthma		292 1.1%	<i>Metered dose inhaler</i>
Female 15-64 y/o		Total visits 42,559	Total visits 51,676	
	Chest pain	1,572 2.0%	2,125 2.3%	<i>Barrier device, aspirin (ASA), AED</i>
	Contusion with intact skin surface	1,503 2.0%	1,482 1.6%	<i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, adhesive tape</i>
	Sprains and strains, excluding ankle and back	896 1.2%	891 1.0%	<i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, adhesive tape</i>
	Sprains and strains of back	1,187 1.5%	964 1.0%	<i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, adhesive tape</i>
	Open wound, excluding head	N/A	694 .8%	<i>Nitrile gloves, sterile or non-sterile dressing, sterile or non-sterile roller bandages, adhesive tape</i>
Female >65		Total visits 10,539	Total visits 12,573	
	Chest pain	576 3.3%	664 3.0%	<i>Barrier device, aspirin (ASA), AED</i>

American Red Cross Scientific Advisory Council First Aid Kit Scientific Review

	Contusion with intact skin surface	548 3.1%	480 2.2%	<i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, adhesive tape</i>
	Fractures, excluding lower limb	293 1.7%	302 1.4%	<i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, sterile or non-sterile roller bandages, adhesive tape</i>
	Fractures, lower limb	233 1.3%	222 1.0%	<i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, adhesive tape</i>
	Open wound, excluding head	NA	181 .8%	<i>Nitrile gloves, sterile or non-sterile gauze, sterile or non-sterile roller bandages, adhesive tape</i>
Male < 15 y.o.		Total visits 12,236	Total visits 14,572	
	Contusion with intact skin surface	583 2.6%	552 2.0%	<i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, adhesive tape</i>
	Open wound of head	651 2.9%	494 1.8%	<i>Nitrile gloves, sterile or non-sterile dressing, sterile or non-sterile roller bandages, adhesive tape</i>
	Fractures, excluding lower limb	364 1.6%	381 1.4%	<i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, sterile or non-sterile roller bandages, adhesive tape</i>
	Pyrexia of unknown origin	541 2.4%	919 3.3%	<i>Antipyretic</i>
	Open wound, excluding head	434 1.9%	369 1.3%	<i>Nitrile gloves, sterile or non-sterile gauze, sterile or non-sterile roller bandages, adhesive tape</i>
	Superficial injuries		312 1.2%	<i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, adhesive tape, devices to control bleeding</i>
	Asthma	375 1.7%	528 1.9%	<i>Personal metered-dose inhaler (MDI)</i>
Male 15-64 y.o.		Total visits 34,400	Total visits 40,227	
	Open wound, excluding head	1,816 2.4%	1,699 1.8%	<i>Nitrile gloves, sterile or non-sterile dressing, sterile or non-sterile roller bandages, adhesive tape</i>
	Chest pain	1,421 1.8%	2,010 2.2%	<i>Barrier device, aspirin, AED</i>
	Contusion with intact skin surface	1,425 1.9%	1,040 1.1%	<i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular</i>

American Red Cross Scientific Advisory Council First Aid Kit Scientific Review

				<i>bandages, splinting device, sterile or non-sterile roller bandages, adhesive tape</i>
	Fractures, excluding lower limb	911 1.2%	711 .8%	<i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, sterile or non-sterile roller bandages, adhesive tape</i>
	Sprains and strains, excluding ankle and back	1,025 1.3%	1,083 1.2%	<i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, sterile or non-sterile roller bandages, adhesive tape</i>
	Sprains and strains of neck and back	948 1.2%	884 1.0%	<i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, sterile or non-sterile roller bandages, adhesive tape</i>
	Drug dependence and non-dependence abuse of drugs	690 .9%	1,065 1.2%	
	Asthma	N/A	571 .6%	
>65		Total visits 6,996	Total visits 9,205	
	Chest pain	422 2.4%	409 1.9%	<i>Barrier device, aspirin, AED</i>
	Contusion with intact skin surface	168 1.0%	235 1.1%	<i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, sterile or non-sterile roller bandages, adhesive tape</i>
	Fractures, excluding lower limb	N/A	Non-reliable data	<i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, sterile or non-sterile roller bandages, adhesive tape</i>
	Open wound, excluding head	197	Non-reliable data	<i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, adhesive tape, devices to control bleeding</i>

* Selective primary diagnosis groups and ICD-9-CM code were selected based on diseases treatable by a lay first aid provider in the pre-hospital setting.

The number and percent distribution of emergency department visits, by the leading primary diagnosis groups perceived treatable by first aid provider by Age and Sex, 2012, 2013, 2014 and possible associated first aid kit items to be used by a lay first aid provider is provided below.

Approved by ARC SAC June 2018

Table. Number and percent distribution of emergency department visits, by the leading primary diagnosis groups perceived treatable by first aid provider with equipment by age and sex and associated first aid kit items; U.S., 2012, 2013, 2014.

Gender	Age	Primary Diagnosis*	2012 % distribution (# of visits in thousands)	2013 % distribution (# of visits in thousands)	2014 % distribution (# of visits in thousands)	SAC Expert Opinion of Items Required to Provide Minimal Care in an Emergency
Female	Under 15 y.o.	Fever	7.0% (1,640)	7.6% (1,791)	7.8% (2,165)	
		Injury, other and unspecified type-head, neck, and face	1.4% (323)	1.0% (232)	1.5% (405)	Nitrile gloves, sterile or non-sterile dressing, sterile or non-sterile roller bandages, adhesive tape
		Labored or difficult breathing (dyspnea)	1.2% (291)	N/A		Personal metered- dose inhaler (MDI), Epi-pen if prescribed
		Injury, other and unspecified type: hand and finger(s)	.7% (175)	.8% (183)		Nitrile gloves, sterile or non-sterile dressing, sterile or non-sterile roller bandages, adhesive tape Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, sterile or non- sterile roller bandages, adhesive tape
	15-64 y.o.	Chest pain and related symptoms (not referable to body systems)	3.1% (2,710)	2.9% (2,517)	2.9% (2,691)	Barrier device, aspirin, AED
		Back symptoms	1.7% (1,509)	1.9% (1,647)	1.9% (1,791)	Cold packs (commercial/ice bags for crush ice or ice

American Red Cross Scientific Advisory Council First Aid Kit Scientific Review

						<i>slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, sterile or non-sterile roller bandages, adhesive tape</i>
		Shortness of breath	1.3% (1,105)	1.4% (1,205)	1.1% (1,033)	<i>Personal metered-dose inhaler (MDI), Epi-pen if prescribed</i>
	65-years and older	Chest pain and related symptoms (not referable to body systems)	4.3% (902)	3.5% (718)	3.6% (783)	<i>Barrier device, aspirin, AED</i>
		Shortness of breath	4.1% (850)	3.3% (684)	3.3% (706)	<i>Personal metered-dose inhaler (MDI), Epi-pen if prescribed</i>
		Back symptoms	1.7% (353)		1.3% (286)	<i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, sterile or non-sterile roller bandages, adhesive tape</i>
		Accident, not other specified	1.5% (311)	2.6% (583)		<i>Nitrile gloves, sterile or non-sterile dressing, sterile or non-sterile roller bandages, adhesive tape</i> <i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, sterile or non-sterile roller bandages, adhesive tape</i>

American Red Cross Scientific Advisory Council First Aid Kit Scientific Review

		Hip symptoms	1.4% (293)	2.9% (651)		<i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, sterile or non-sterile roller bandages, adhesive tape</i>
		Leg symptoms		1.6% (364)		<i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, sterile or non-sterile roller bandages, adhesive tape</i>
		Injury, other and unspecified type-head, neck, and face		2.4% (541)		<i>Nitrile gloves, sterile or non-sterile dressing, sterile or non-sterile roller bandages, adhesive tape</i>
Male	Under 15 y.o.	Fever	7.5% (1,761)	7.5% (1,778)		
		Injury, other and unspecified type-head, neck, and face	2.1% (494)	2.2% (519)		<i>Nitrile gloves, sterile or non-sterile gauze, sterile or non-sterile roller bandages, adhesive tape</i>
		Labored or difficult breathing (dyspnea)	1.4% (327)			<i>Personal metered-dose inhaler (MDI), Epi-pen if prescribed</i>
		Laceration/cut of facial areas		1.3% (314)		<i>Nitrile gloves, sterile or non-sterile dressing, sterile or non-sterile roller bandages, adhesive tape</i>
		Injury, other and	.9% (208)			<i>Nitrile gloves, sterile or non-sterile gauze,</i>

Approved by ARC SAC June 2018

American Red Cross Scientific Advisory Council First Aid Kit Scientific Review

		unspecified type: hand and finger(s)				<i>sterile or non-sterile roller bandages, adhesive tape</i>
	15-64 y.o.	Chest pain and related symptoms (not referable to body systems)	3.1 % (2,693)	2.7% (2,280)		<i>Barrier device, aspirin, AED</i>
		Back symptoms	1.7% (1,455)	1.8% (1,531)		<i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, sterile or non-sterile roller bandages, adhesive tape</i>
		Laceration or cut of upper extremity	.9% (740)			<i>Nitrile gloves, sterile or non-sterile dressing, sterile or non-sterile roller bandages, adhesive tape</i>
		Shortness of breath		.8% (648)		<i>Personal metered-dose inhaler (MDI)</i>
		Injury, other and unspecified type: head, neck, and face	.8% (709)	.8% (640)		<i>Nitrile gloves, sterile or non-sterile dressing, sterile or non-sterile roller bandages, adhesive tap</i>
		Knee symptoms	.7% (640)			<i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, sterile or non-sterile roller bandages, adhesive tape</i>

American Red Cross Scientific Advisory Council First Aid Kit Scientific Review

	65- years and older	Chest pain and related symptoms (not referable to body systems)	3.1% (642)	3.4% (701)		<i>Barrier device, aspirin, AED</i>
		Shortness of breath	3.1% (636)	3.2% (653)		<i>Personal metered- dose inhaler (MDI), Epi-pen if prescribed</i>
		Labored or difficult breathing (dyspnea)	1.3% (273)			<i>Personal metered- dose inhaler (MDI), Epi-pen if prescribed</i>
		Leg symptoms	.9% (192)			<i>Cold packs (commercial/ice bags for crush ice or ice slurry [50:50, ice:water]) elastic wraps, triangular bandages, splinting device, sterile or non- sterile roller bandages, adhesive tape</i>
		Fever	.9% (187)			
		Injury, other and unspecified type-head, neck and face		.8% (167)		<i>Nitrile gloves, sterile or non-sterile dressing, sterile or non-sterile roller bandages, adhesive tape</i>

* Selective primary diagnosis groups were selected based on diseases treatable by a lay first aid provider in the pre-hospital setting.

Centers for Health Statistics. 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

Rui P, Kang K, Albert M. 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, Kang K. 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.

The twenty leading principal reasons for office visits in the United States, 2014 and 2015 are found below.

Table. Twenty leading principal reasons for office visits: United States, 2014, 2015.

Approved by ARC SAC June 2018

American Red Cross Scientific Advisory Council First Aid Kit Scientific Review

Primary Diagnoses	2014 % distribution	2015 % distribution
Progress visit, not otherwise specified	13.4	14.2
General medical examine	7.1	7.6
Postoperative visit	2.9	2.6
Medication, other and unspecified kinds	2.4	3.6
Counseling, not otherwise specified	2.1	2.7
Cough	2.1	2.1
For other and unspecified test results	1.7	1.5
Knee symptoms	1.4	1.6
Hypertension	1.4	1.6
Diabetes mellitus	1.4	1.3
Gynecological examination	1.3	2.1
Stomach and abdominal pain, cramps and spasms	1.2	1.5
Low back symptoms	1.2	
Well baby examination	1.2	1.3
Prenatal examination, routine	1.1	1.8
Back symptom	1.1	1.6
Skin rash	1.1	1.0
Preoperative visit for specified and unspecified types of surgery	1.0	1.0
Symptoms referable to throat	.9	.9
Depression	.9	

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.

Leading Causes of Nonfatal Injury, United States

CDC's WISQARS™ (Web-based Injury Statistics Query and Reporting System) is an interactive, online database that provides fatal and nonfatal injury, violent death, and cost of injury data from a variety of trusted sources. Researchers, the media, public health professionals, and the public can use WISQARS™ data to learn more about the public health and economic burden associated with unintentional and violence-related injury in the United States.

Approved by ARC SAC June 2018

American Red Cross Scientific Advisory Council First Aid Kit Scientific Review

According to WISQARS, the leading cause of nonfatal injury, 2010-2015 across all ages except for 15-24-year olds was unintentional falls (all ages, Unintentional Fall, n=54,682,591).

The second leading cause of nonfatal injury, 2010-2015 for all ages was Unintentional Struck by/Against, (n=26,096,163)

In fact, the top five leading causes of nonfatal injury, 2010-2015 for all ages were:

1. Unintentional Fall, n=54,682,591
2. Unintentional Struck by/ Against, n=26,096,163
3. Unintentional Overexertion, n=19,766,226
4. Unintentional MV-Occupant, n=15,514,650
5. Unintentional Cut/Pierce, n=12,533,491

Expert opinion (DCB) suggests that four or these five leading causes of nonfatal injury would likely result in soft tissue injury (ie., wounds, and external bleeding) and musculoskeletal (ie., sprain, strains, fractures, dislocations).

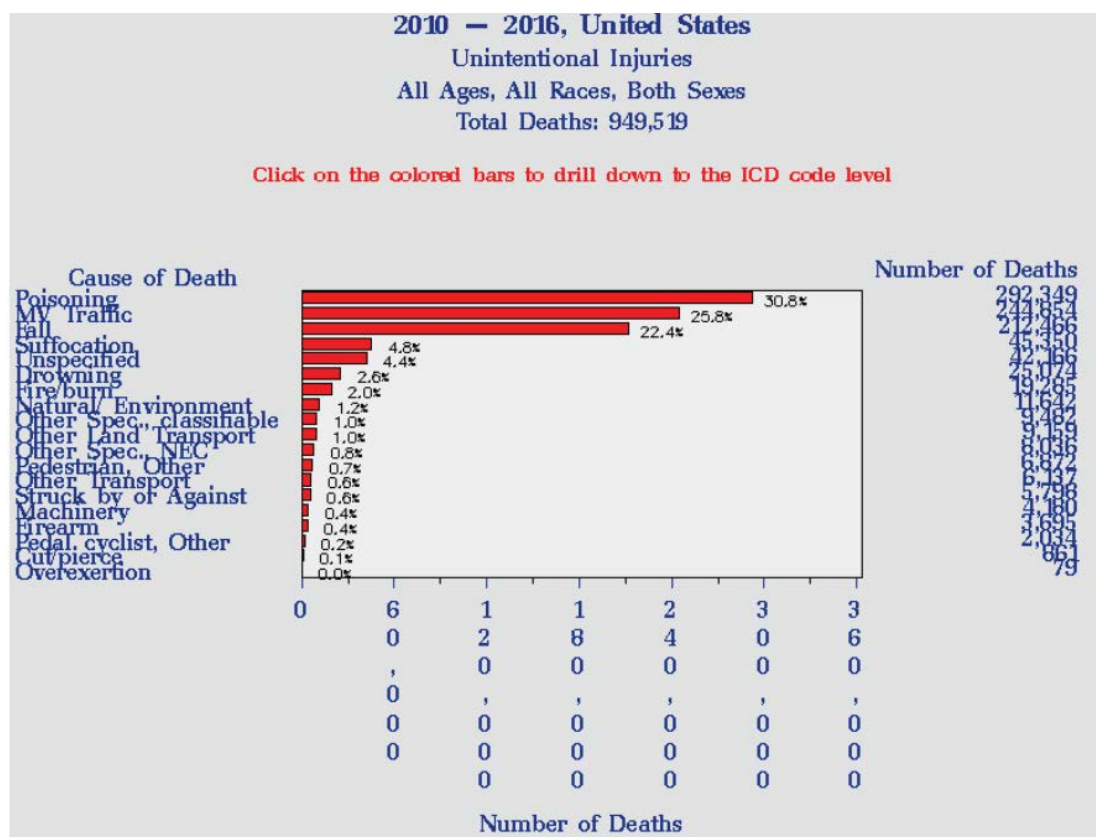
Leading Causes of Fatal Injury, United States

In comparison, unintentional injury was the leading fatal cause of death in ages, 1-44 and the third leading cause of death in 45-64-year olds (figures below). Finally, unintentional injury (n=949,519), was the fourth leading cause of death in ALL age groups.

10 Leading Causes of Nonfatal Injury, United States
2010 - 2015, All Races, Both Sexes, Disposition: All Cases

To obtain the percentage of all injuries by cause, select the age group category at the top of each column.

Rank	Age Groups										All Ages
	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	
1	Unintentional Fall 825,194	Unintentional Fall 5,321,562	Unintentional Fall 3,855,973	Unintentional Fall 3,471,344	Unintentional Struck by/Against 5,722,891	Unintentional Fall 4,700,823	Unintentional Fall 4,468,835	Unintentional Fall 5,708,364	Unintentional Fall 5,854,882	Unintentional Fall 15,500,024	Unintentional Fall 54,682,591
2	Unintentional Struck by/Against 186,585	Unintentional Struck by/Against 2,113,595	Unintentional Struck by/Against 2,431,917	Unintentional Struck by/Against 3,455,785	Unintentional Fall 5,173,778	Unintentional Overexertion 3,822,715	Unintentional Overexertion 3,256,795	Unintentional Overexertion 2,814,424	Unintentional Overexertion 1,800,175	Unintentional Struck by/Against 1,884,271	Unintentional Struck by/Against 26,096,163
3	Unintentional Other Bite/Sting 78,970	Unintentional Other Bite/Sting 985,864	Unintentional Cut/Pierce 661,242	Unintentional Overexertion 1,785,834	Unintentional Overexertion 4,139,285	Unintentional Struck by/Against 3,728,707	Unintentional Struck by/Against 2,740,040	Unintentional Struck by/Against 2,445,838	Unintentional Struck by/Against 1,588,058	Unintentional Overexertion 1,297,763	Unintentional Overexertion 19,766,226
4	Unintentional Foreign Body 62,308	Unintentional Foreign Body 811,388	Unintentional Other Bite/Sting 658,647	Unintentional Cut/Pierce 731,853	Unintentional MV-Occupant 3,902,125	Unintentional MV-Occupant 3,323,499	Unintentional MV-Occupant 2,382,589	Unintentional MV-Occupant 2,173,558	Unintentional MV-Occupant 1,418,604	Unintentional MV-Occupant 1,187,821	Unintentional MV-Occupant 15,514,650
5	Unintentional Other Specified 59,110	Unintentional Cut/Pierce 506,335	Unintentional Overexertion 517,006	Unintentional Pedal Cyclist 555,557	Unintentional Cut/Pierce 2,595,900	Unintentional Cut/Pierce 2,437,725	Unintentional Cut/Pierce 1,817,958	Unintentional Other Specified 2,120,423	Unintentional Cut/Pierce 1,130,880	Unintentional Cut/Pierce 919,400	Unintentional Cut/Pierce 12,533,491
6	Unintentional Fire/Burn 55,301	Unintentional Overexertion 469,777	Unintentional Pedal Cyclist 456,933	Unintentional Unknown/Unspecified 600,531	Other Assault ^A Struck by/Against 2,495,422	Other Assault ^A Struck by/Against 2,053,184	Unintentional Other Specified 1,724,270	Unintentional Cut/Pierce 1,693,041	Unintentional Other Specified 1,130,593	Unintentional Poisoning 625,959	Unintentional Other Specified 9,947,096
7	Unintentional Inhalation/Suffocation 49,923	Unintentional Other Specified 402,647	Unintentional Foreign Body 368,272	Unintentional MV-Occupant 456,257	Unintentional Other Specified 1,837,190	Unintentional Other Specified 1,901,196	Other Assault ^A Struck by/Against 1,267,916	Unintentional Poisoning 1,456,545	Unintentional Poisoning 894,749	Unintentional Other Bite/Sting 556,548	Other Assault ^A Struck by/Against 7,960,653
8	Unintentional Cut/Pierce 38,856	Unintentional Fire/Burn 311,275	Unintentional MV-Occupant 364,977	Other Assault ^A Struck by/Against 397,156	Unintentional Other Bite/Sting 1,111,425	Unintentional Poisoning 1,141,837	Unintentional Poisoning 1,121,723	Other Assault ^A Struck by/Against 1,010,381	Unintentional Other Bite/Sting 501,753	Unintentional Other Specified 499,008	Unintentional Other Bite/Sting 7,206,968
9	Unintentional Overexertion 32,201	Unintentional Unknown/Unspecified 247,876	Unintentional Dog Bite 255,583	Unintentional Other Bite/Sting 395,724	Unintentional Poisoning 971,628	Unintentional Other Bite/Sting 1,102,839	Unintentional Other Bite/Sting 850,231	Unintentional Other Bite/Sting 874,872	Other Assault ^A Struck by/Against 414,036	Unintentional Other Transport 449,015	Unintentional Poisoning 6,504,855
10	Unintentional Unknown/Unspecified 29,140	Unintentional Dog Bite 218,124	Unintentional Other Transport 215,453	Unintentional Other Transport 282,536	Unintentional Unknown/Unspecified 889,877	Unintentional Unknown/Unspecified 882,605	Unintentional Unknown/Unspecified 555,762	Unintentional Unknown/Unspecified 535,779	Unintentional Unknown/Unspecified 340,668	Unintentional Unknown/Unspecified 388,898	Unintentional Unknown/Unspecified 4,388,869



EMPLOYER-REPORTED WORKPLACE INJURIES AND ILLNESSES

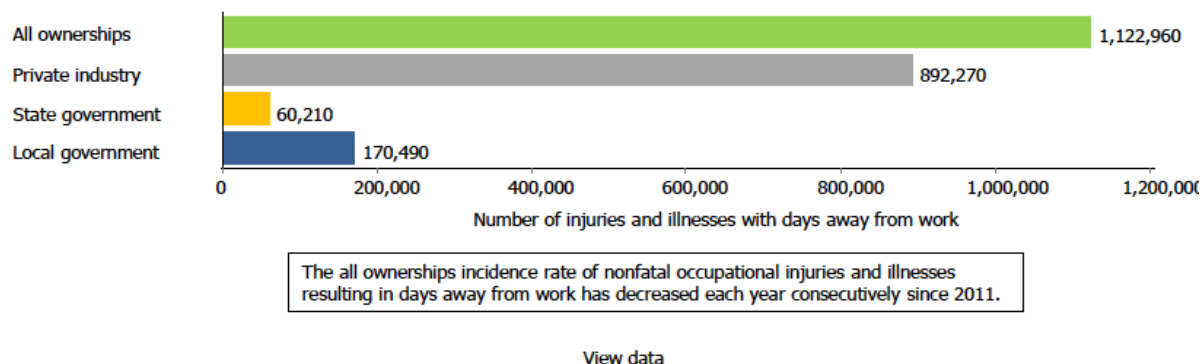
There were approximately 2.9 million nonfatal workplace injuries and illnesses reported by private industry employers in 2016, which occurred at a rate of 2.9 cases per 100 full-time equivalent (FTE) workers (Bureau of Labor Statistics, 2017b).

In the private sector, the incidence rate per 10,000 full-time workers was 93.9 cases in 2015, down from 97.8 cases in 2014 (Bureau of Labor Statistics, 2016).

The overall incidence rate of nonfatal occupational injury and illness cases requiring days away from work to recuperate was 107.1 cases per 10,000 full-time workers in 2014, down from the 2013 rate of 109.4 (Bureau of Labor Statistics, 2015).

The all ownerships incidence rate of nonfatal occupational injuries and illnesses resulting in days away from work has decreased each year consecutively since 2011 (Figure 1).

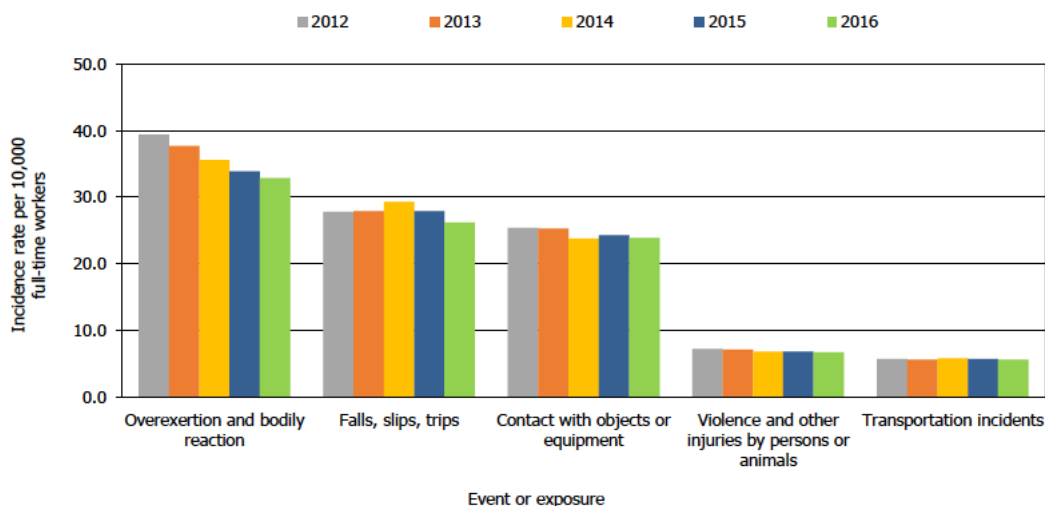
Figure 1. Number of nonfatal occupational injury and illness cases with days away from work, by ownership, United States, 2016. (Bureau of Labor Statistics, 2017a).



Source: U.S. Bureau of Labor Statistics, U.S. Department of Labor, November 2017

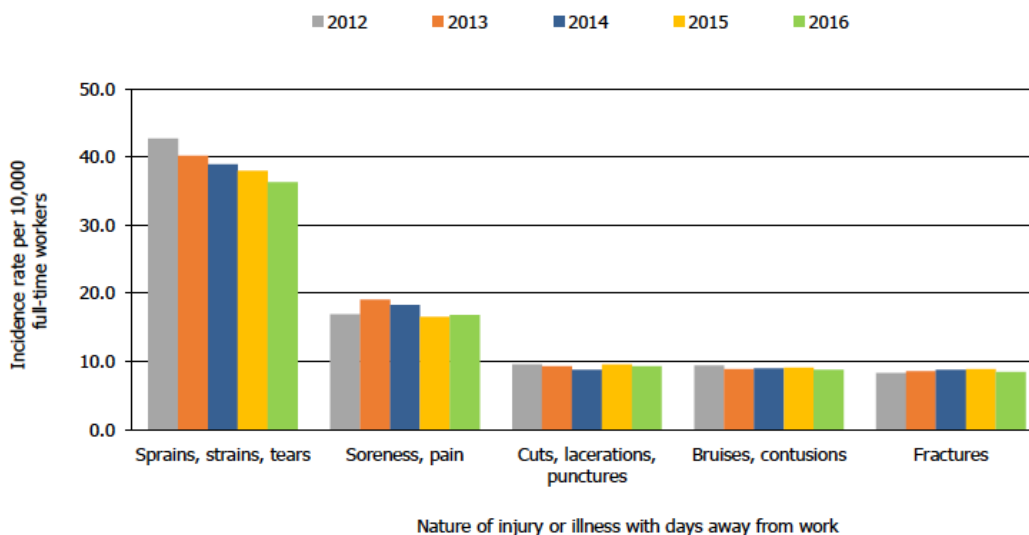
Across the five-year period 2012 to 2016, the rate of occupational injuries and illnesses resulting from overexertion and bodily reaction decreased from 39.4 cases per 10,000 full-time equivalent workers in 2012 to 32.9 cases in 2016 (Figure 2).

Figure 2. Nonfatal occupational injury and illness incidence rates for cases with days away from work by selected event or exposure, all ownerships, United States, 2012-16. (Bureau of Labor Statistics, 2017a).



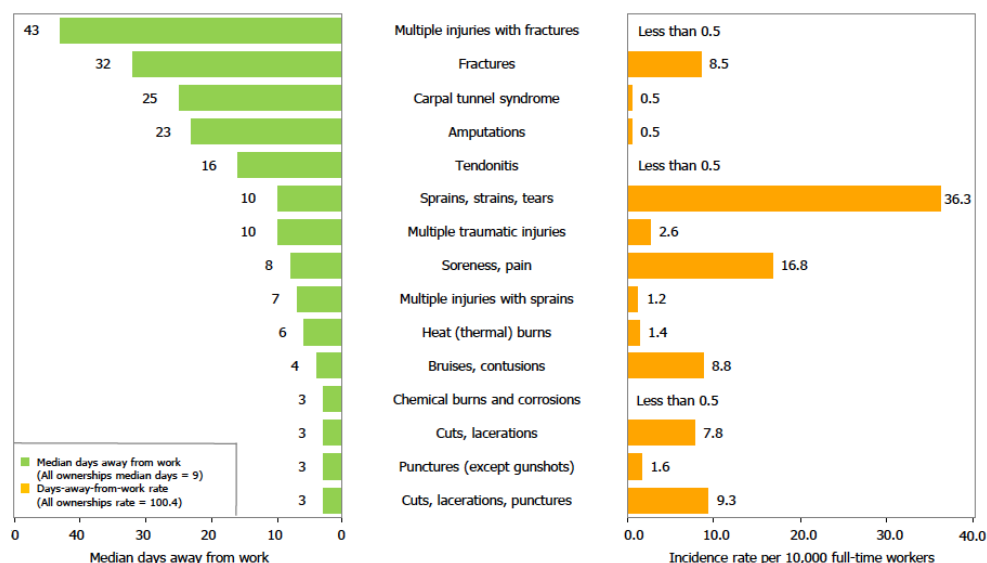
Across the five-year period 2012 to 2016, the rate of occupational injuries and illnesses resulting in sprains, strains, or tears decreased from 42.7 cases per 10,000 full-time equivalent workers in 2012 to 36.3 cases in 2016 (Figure 3).

Figure 3. Nonfatal occupational injury and illness incidence rates for cases with days away from work by selected nature of injury or illness, all ownerships, United States, 2012-16. (Bureau of Labor Statistics, 2017a).



In 2016, fractures and multiple injuries with fractures were the most severe types of nonfatal injuries or illnesses resulting in medians of 32 and 43 days away from work, respectively. Sprains, strains, and tears occurred at a rate of 36.3 cases per 10,000 full-time equivalent workers in 2016, down from 38.0 cases in 2015 (Figure 4).

Figure 4. Median days away from work and incidence rates of nonfatal occupational injuries and illnesses by nature, all ownerships, United States, 2016. (Bureau of Labor Statistics, 2017a).



Musculoskeletal disorders accounted for 32% of days-away-from-work cases in 2016 in private industry and occurred at a rate of 29.4 cases per 10,000 full-time equivalent workers. This rate was essentially the same as reported for 2015.

Musculoskeletal disorders (MSD) accounted for 31% of cases in 2015 across all ownerships and occurred at a rate of 32.2 cases per 10,000 full-time workers. The incidence rate for MSDs in 2015 decreased from 2014 across all ownerships by 4.7 percent (Figures 5 and 6, respectively).

Figure 5. Musculoskeletal disorders, United States, 2016. (Bureau of Labor Statistics, 2017a)

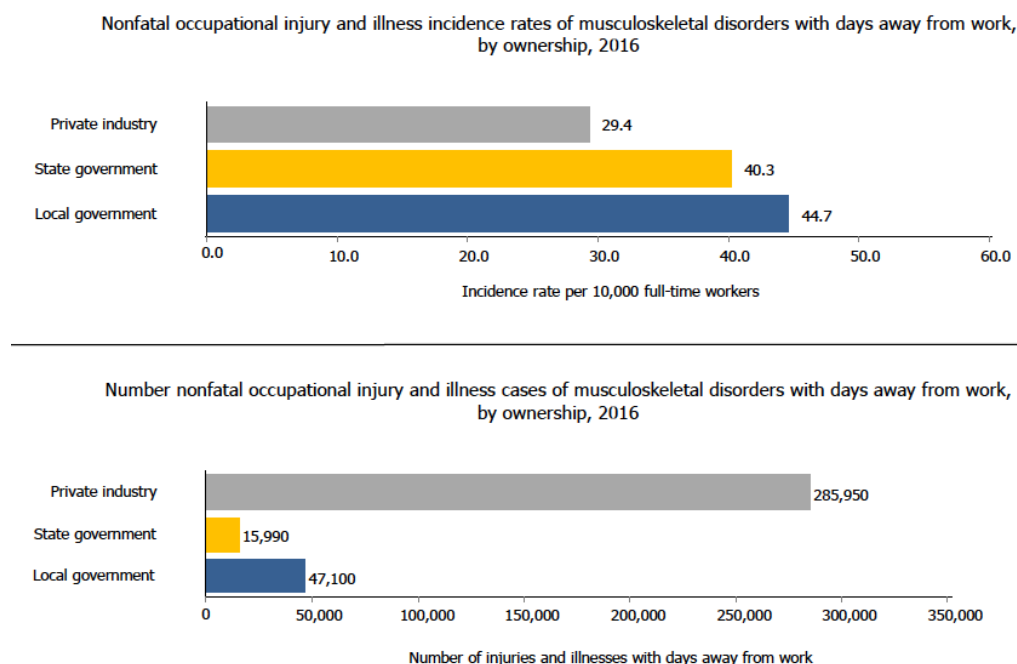
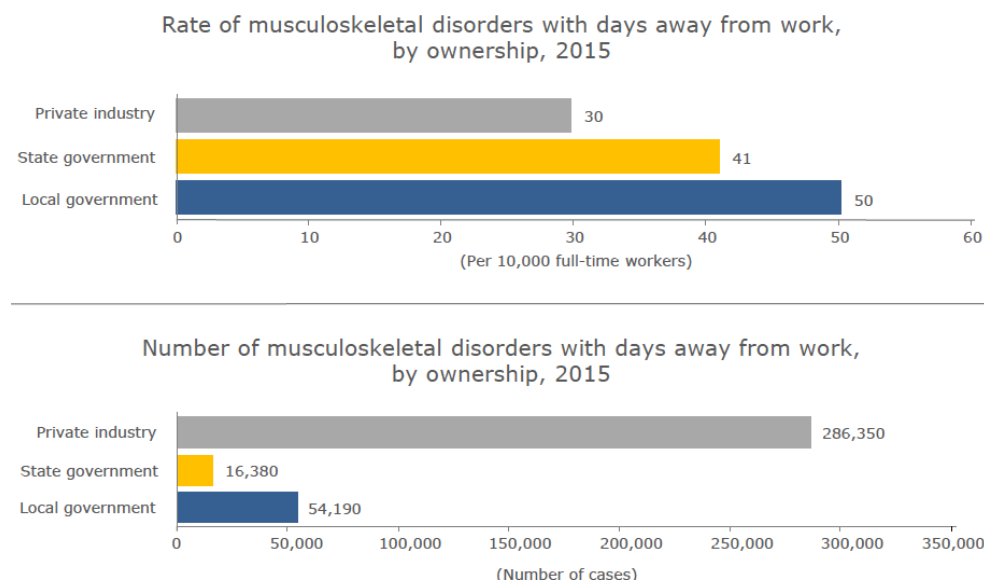


Figure 6. Musculoskeletal disorders, United States, 2015. (Bureau of Labor Statistics, 2017a)



Occupational musculoskeletal sprains and strains were consistently the most reported occupational injury sustained in the private sector (see below) and is consistent with data from 2012-2015 (Bureau of Labor Statistics, 2017a)

Table. Distribution of injuries and illnesses: U.S., 2004-2008. (Bureau of Labor Statistics, 2004, 2005, 2006, 2008, 2009, 2010).

American Red Cross Scientific Advisory Council First Aid Kit Scientific Review

Injury and Illnesses	2004 % Injuries and Illnesses	2005 % Injuries and Illnesses	2006 % Injuries and Illnesses	2007 % Injuries and Illnesses	2008 % Injuries and Illnesses	2009 % Injuries and Illnesses
Sprains and strains	41.7	40.8	39.9	38.7	38.6	39.8
All other	15.6	16.5	16.8	17	16.6	16.9
Cuts, lacerations, punctures	9.1	9.6	9.7	9.2	9.3	7.9
Bruises, contusions	9.1	8.7	8.6	8.7	8.7	9.1
Fractures	7.5	7.8	8.0	8.2	8.3	7.3
Soreness, pain	5.3	5.3	5.9	10	10.6	7.8
Multiple traumatic injuries	4.0	4.1	3.9	4	4.1	4.2
Back pain	3.0	2.9	3.0	3.2	3.4	2.4
Thermal burns	1.5	1.4	1.5	1.5	1.4	1.4
Carpal tunnel	1.5	1.3	1.1	1	.9	.9
Amputations	.6	.7	.7	.6	.6	.5
Chemical burns	.6	.5	.6	.5	.5	.4
Tendonitis	.6	.5	.4	.4	.4	.3

Severe Bleeding

The following section is a summative review related to the topic of severe bleeding which was not included in 2011.

Trauma is global health problem and therefore it is a particular challenge for those who deal with it. Worldwide, the incidence of trauma mortality continues to rise against the other two leading causes of death (Shosholcheva, Jankulovski, Kuzmanovska, & Kartalov, 2015). It is estimated that by 2020, 8.4 million people will die annually secondary to trauma (Murray & Lopez, 1997; World Health Organization, 2008).

Massive hemorrhage is the most frequent cause of early death in trauma patients (Shosholcheva et al, 2015). A loss of 50% of blood volume without resuscitation is usually fatal and can occur within minutes (Shosholcheva et al, 2015). Approximately 30 to 50% of deaths occurring immediately (as little as 5 minutes) (Lenworth M. Jacobs & Joint Committee To Create A National Policy To Enhance Survivability From Intentional Mass Casualty Shooting Events, 2015)(American College of Surgeons [ACS], 2015; Hartford Consensus, 2015) to within a few hours (the first 4 hours) after injury are due to acute blood loss and hemorrhagic shock (Hoyt, 2004).

When hemorrhage does not respond to medical or surgical therapy it is considered as uncontrolled bleeding which is a life-threatening condition and is associated with a high mortality rate (Shosholcheva et al, 2015). Uncontrolled bleeding might be due to acquired coagulopathy as a result of trauma or surgery and due to defect of thrombin generation. By definition, life-threatening hemorrhage is a loss of entire

Approved by ARC SAC June 2018

blood volume within 24 hours, loss of 50% blood volume within 3 hours or blood loss exceeding 150 ml/min in 20 min or more (Dutton & Carson, 2006; Stainsby, MacLennan, & Hamilton, 2000).

For the reasons above, controlling bleeding (of all types) has become an essential important first aid skill. Standard first aid bleeding control includes applying direct pressure with or without gauze, based on the 2015 ILCOR consensus on science and treatment recommendations, which compared it to the use of pressure points, elevation, local application of ice, tourniquets, and hemostatic dressings for the control of bleeding compared with direct pressure (Singletary, Zideman, et al., 2015).

There continues to be no evidence to support the use of pressure points or elevation of an injury to control external bleeding. The use of pressure points or elevation of an extremity to control external bleeding is not indicated (Class III: No Benefit, LOE C-EO) (Singletary, Charlton, et al., 2015). The standard method for first aid providers to control open bleeding is to apply direct pressure to the bleeding site until it stops. Control open bleeding by applying direct pressure to the bleeding site (Class I, LOE B-NR) (Singletary, Charlton, et al., 2015).

Tourniquets can be effective for severe external limb bleeding. As cited in Singletary, Charlton, et al (2015) “the use of tourniquets in the prehospital setting for severe external limb bleeding has been studied in the military setting⁸⁷⁻⁹⁴ and civilian EMS setting.^{95,96} Tourniquets have been found to control bleeding effectively in most cases.^{87,89,93,95} Potential complications include compartment syndrome,⁸⁸ nerve damage,^{88,90,93,95} damage to blood vessels,⁹⁵ and amputation or limb shortening.^{87,88,90,93}” Furthermore, because the rate of complications is small and the rate of hemostasis is high, a tourniquet should be considered by first aid providers when standard first aid hemorrhage control does not control severe external limb bleeding (Class IIb, LOE C-LD) (Singletary et al, 2015b).

According to Singletary et al (2015b) “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).” Thus, first aid providers can be and should be trained in the proper application of tourniquets, both manufactured and improvised.

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).” (Singletary et al, 2015b). Hemostatic dressings are of greatest use for severe external bleeding in locations where standard hemorrhage control is ineffective or not accessible (i.e., a tourniquet cannot be applied [trunk or junctional areas]), when a tourniquet is not readily available as part of a first aid kit, or when a tourniquet is not effective to stop bleeding.

Many first aid kits are designed to handle minor medical emergencies such as contusions, minor open wounds, minor musculoskeletal injuries (sprains and strains), and sudden illnesses (ARC, 2017; Setness & Beusekom, 2006). However, lessons learned from active shooter, terrorism, and mass casualty incidents have demonstrated that bystanders with little to no medical training will act as civilian first responders and provide first aid before the arrival of emergency medical services (EMS) (Butler 2015; Ahern, DiNoto, Maloney, Mynatt, Peerbolte, & Snider, N.D.). The Stop the Bleed Campaign's motto is, “If you see something, do something” (ACS, 2015; Hartford Consensus, 2015). The campaign encourages training the public in methods to control bleeding by learning how to apply direct pressure, pack wounds, and use emergency tourniquets.

The Hartford Consensus Group initiative recommends installing bleeding control stations placed in plain view in airports, federal buildings, heavily populated public areas, malls, and sports arenas, next to or near the automated external defibrillator (ACS, 2015; Hartford Consensus, 2015). These bleeding control stations will house bleeding control kits. Like AED, these bleeding control kits contain should contain

gloves, scissors, emergency tourniquets for single or multiple casualty use, and hemostatic gauze, which is placed over the wound or into the wound cavity (Doyle & Taillac, 2008; Hartford Consensus, 2015; Singletary et al, 2015a, 2015b; Markenson, 2010). The Hartford Consensus Group states that this minimal equipment is all that's needed for civilian first responders to control or stop uncontrolled hemorrhage.

Design and Contents

Original

To preserve the integrity of first aid kit contents, it is recommended to store kits in a clean, cool, dry place such as a dark kitchen cabinet or bedroom closet³⁻⁶ or in the case of the workplace in a identifiable work cabinet. If stored in a wet or humid environment (i.e., boat) keep inside a waterproof container.^{1,6}

Many first aid kits are designed to handle minor medical emergencies such as contusions, minor open wounds, minor musculoskeletal injuries (sprains and strains), and sudden illnesses.^{1, 3} First aid kits used in the workplace and regulated by the Occupational Safety and Health Administration (OSHA) must adhere to certain government requirements,⁴⁻⁷ while first aid kits used by athletic coaches and athletic trainers and for traveling abroad will be very specific and designed based on the sport's, player's, and medical staff's^{2, 8, 9} and/or individuals specific needs.^{10, 11} Personal home first aid kits and athletic first aid kits are often designed based on past experiences and situations which have occurred.¹²

Occupational Safety and Health Administration and American National Standards Institute

According to the Occupational Safety and Health Administration (OSHA) Standard number 1926.50(d) (1), title: Safety and Health Regulations for Construction, sub-part title: Medical services and first aid, an employer shall have "First aid supplies shall be easily accessible when required." Appendix A to § 1926.50 -- First aid Kits (Non-Mandatory)¹⁹ outlines the basic requirements of a first aid kit. The standard states:

"First aid supplies are required to be easily accessible under paragraph Sec. 1926.50(d) (1). An example of the minimal contents of a generic first aid kit is described in American National Standards Institute (ANSI) document Z308.1-1978 "Minimum Requirements for Industrial Unit-Type First-aid Kits." The contents of the kit listed in the ANSI standard should be adequate for small work sites. When larger operations or multiple operations are being conducted at the same location, employers should determine the need for additional first aid kits at the worksite, additional types of first aid equipment and supplies and additional quantities, and types of supplies and equipment in the first aid kits."

ANSI Z308.1-2009 included the following required and recommended (optional) basic first aid kit contents (Table 5).²²

Overall Recommendations

First Aid Kit Design

Epidemiologic evidence exists for selecting 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 account for a large percentage of the primary diagnoses made related to worksite injuries^{14, 17, 21} or in emergency departments.²⁴⁻²⁶ 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

American Red Cross Scientific Advisory Council First Aid Kit Scientific Review

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.

Table 5. ANSI Z308.1-2009 Industrial First Aid Kit Basics.

Item and Minimum Size or Volume	Quantity
Required	
Absorbent Compress, 32 sq. in. (206 s. cm), no side smaller than 4 in. (10 cm)	1
Adhesive Bandages, 1 x 3 in.	16
Adhesive Tape, 3/8" x 2.5 yd. (2.3 m total)	1
Antibiotic, 0.14 fl. oz. (0.5 g) application	1
Antiseptic, 0.14 fl. oz. (0.5g) application	10
Burn Treatment, 1/32 oz. (0.9 g) application	6
Medical Exam Gloves	2 pair
Sterile Pads, 3 x 3 in.	4
Triangular bandage, 40 x 40 x 56 in.	1
First aid guide	1
Recommended	
Analgesic (oral)	
Bandage Compress	
2 x 2 in.	4
3 x 3 in.	2
4 x 4 in.	1
Breathing Barrier	1
Burn Dressing 4 x 4 in"	1
Eye covering with means of attachment, 2 x 9 sq. in.	2
Eye/Skin Wash, 4 fl. oz.	1
Eye/Skin Wash and Covering, with means of attachment, 4 fl. oz., 2.9 sq. in.	1/2
Cold pack – 4 in. x 5 in	1
Roller bandage	
2 in. x 4 yd.	2
4 in. x 4 yd.	1

American Red Cross Scientific Advisory Council First Aid Kit Scientific Review

The following section outlines the recommendations for basic first aid supplies based on the available evidence epidemiological data provided in the literature^{9, 13-26} and the treatment guidelines provided in the 2010 First Aid Guidelines³⁰ and the scientific reviews completed by the American Red Cross's Scientific Advisory Council. 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 6, 7, 8 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 6 outlines musculoskeletal injury, table 7 outlines respiratory and cardiac illness, and table 8 outlines equipment for other injuries and illnesses.

2018 Updated

American National Standards Institute. In 2015, ANSI revision introduced two classes of first aid kits (1) class A kits with contents designed to deal with most common types of workplace injuries, and (2) class B kits with a broader range and quantity of supplies to deal with injuries more complex or high-risk environments.

ANSI Z308.1-2015 Required Contents. In order to be ANSI compliant, first aid kits must contain the items listed in the three tables below.

Table. ANSI Z308.1-2015 Minimum Class A First Aid Kit Supplies.

Items	Minimum Size or Volume
Adhesive Bandages, 1 x 3 in.	16
Adhesive Tape, 3/8" x 2.5 yd. (2.3 m total)	1
Antibiotic, 0.14 fl. oz. (0.5 g) application	10
Antiseptic, 0.14 fl. oz. (0.5g) application	10
Breathing Barrier	1
Burn Treatment, 1/32 oz. (0.9 g) application	10
Burn Dressing 4 x 4 in"	1
Medical Exam Gloves	4 pair
Cold pack – 4 in. x 5 in	1
Sterile Pads, 3 x 3 in.	2
Triangular bandage, 40 x 40 x 56 in.	1
First aid guide	1
Hand Sanitizer, 1/32 oz (0.9g) application	6
Scissors	1
Roller Bandage 2 x 4" yd	1
Sterile Pads 3 x 3"	2
Trauma Pads 5 x 9"	2

Table. ANSI Z308.1-2015 Minimum Class B First Aid Kit Supplies.

Items	Minimum Size or Volume
Adhesive Bandages, 1 x 3 in.	50 (16)*
Adhesive Tape, 3/8" x 2.5 yd. (2.3 m total)	2 (1)
Antibiotic, 0.14 fl. oz. (0.5 g) application	25 (1)
Antiseptic, 0.14 fl. oz. (0.5g) application	50 (10)
Breathing Barrier	1
Burn Dressing 4 x 4 in"	2 (1)
Burn Treatment, 1/32 oz. (0.9 g) application	25 (6)

American Red Cross Scientific Advisory Council First Aid Kit Scientific Review

Cold pack – 4 in. x 5 in	2 (1)
Eye covering with means of attachment, 2 x 9 sq. in.	2
Eye/Skin Wash, 4 fl. oz.	1
First aid guide	1
Hand Sanitizer, 1/32 oz (0.9g) application	10
Medical Exam Gloves	4 pairs (2 pairs)
Padded Splint	1
Roller bandage, 2 in. x 4 yd.	2
Roller bandage, 4 in. x 4 yd.	1
Sterile Pads, 3 x 3 in.	4
Scissors	1
Triangular bandage, 40 x 40 x 56 in.	2 (1)
Trauma Pad, 5” x 9”	4
Tourniquet	1

* Items in the () were the recommendations from 1998. Information contained in this publication is intended for general information purposes only and is not a substitute for review of the applicable government regulations and standards and should not be construed as legal advice or opinion.

Table. ANSI Z308.1-2015 Minimum Class A and B First Aid Kit Supplies.

Items	Minimum Quantity Class A	Minimum Quantity Class B
Adhesive Bandages, 1 x 3 in.	16	50
Adhesive Tape, 3/8” x 2.5 yd. (2.3 m total)	1	2
Antibiotic Application, 0.14 fl. oz. (0.5 g)	10	25
Antiseptic Application, 0.14 fl. oz. (0.5g)	10	50
Breathing Barrier	1	1
Burn Treatment, 1/32 oz. (0.9 g) application	10	25
Burn Dressing 4 x 4 in”	1	2
Medical Exam Gloves	2 pair	4 pair
Cold pack – 4 in. x 5 in	1	2
Sterile Pads, 3 x 3 in.	2	4
Triangular bandage, 40 x 40 x 56 in.	1	2
First aid guide	1	1
Hand Sanitizer, 1/32 oz (0.9g) application	6	10
Scissors	1	1
Splint (4”x24”)	N/A	1
Roller Bandage 2” x 4 yd	1	2
Roller Bandage 4” x 4 yd	N/A	1
Sterile Pads 3 x 3”	2	4
Trauma Pads 5 x 9”	2	4
Eye covering, with means to attach	2	2
Eye and Skin wash	1 fl oz	4 fl oz

Supplemental First Aid Supplies for Consideration – Applicable Environments

ANSI recognizes that each work environment is unique, and it is expected that a 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 existing in a workplace 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 workplace. Federal, state, and local requirements should be consulted, where appropriate. Individuals and organizations may consider augmenting first aid kits with the following first aid supplies, as applicable:

- Hemostatic agent, (individuals with compromised clotting or uncontrollable bleeding)
- Electrolyte replacement, (heat-stress related injuries)
- Analgesics: oral and/or topical/anti-inflammatory (pain management; swelling control)
- Hydrocortisone (itchiness and skin-related reactions including rashes)
- Antihistamine (allergic reactions)
- Foil blanket (treat shock and/or cold-stress related injuries).

Original

First Aid Kit Recommendations – Single-Patient Use

Table 6. Musculoskeletal Injuries - Open Wounds and Immobilization.

Item (Latex free)	Purpose	Minimal Quantity	Quantity Logic	Reference	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	ACFASP scientific review on latex gloves - 12/2010.	LOE 5
4 x 4 – gauze pads (dressings) = sterile is preferred due to cleanliness	Minimize blood loss in conjunction with direct pressure ³⁰ for larger wounds. If a splint is non-sterile gauzes can be used to pad the injury. ³⁰	8	Depending on the severity of bleeding two or more layers of pressure bandages may be necessary, requiring additional dressings.	Markenson et al ³⁰	LOE 5
2 x 2 – gauze pads (dressings) = sterile if preferred due to cleanliness	Minimize blood loss in conjunction with direct pressure ³⁰ for smaller wounds. If a splint is non-sterile gauzes can be used to pad the injury. ³⁰	8	Depending on the severity of bleeding two or more layers of pressure bandages may be necessary, requiring additional dressings.	Markenson et al ³⁰	LOE 5
2 in. or 3 in. x 4 yd - roller bandage	Bandage to secure dressings, as bulky dressing to control bleeding ^{1,8} , and to cover burn injuries. ³⁰	4	Depending on the severity of injury or the size of the patient multiple roller bandages may be necessary to secure a variety of items.	No specific evidence available as to the number needed.	LOE 7

American Red Cross Scientific Advisory Council First Aid Kit Scientific Review

Item (Latex free)	Purpose	Minimal Quantity	Quantity Logic	Reference	Evidence
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 ^{1,8} and to cover burn injuries. ³⁰	4	Depending on the severity of injury or the size of the patient multiple roller bandages may be necessary to secure a variety of items.	No specific evidence available as to the number needed.	LOE 7
Adhesive bandages of varying sizes (non-latex). Types ▪ 1 x 3 in. ▪ ¾ x 3 in. ▪ large fingertip ▪ knuckle	Dress minor wounds.	3 of each size	The exact shape, type, or quantity of adhesive dressings is dependent on the location and severity of the injury.	ACFASP scientific review on adhesive bandages - 12/2009, however no specific evidence is available as to the number needed.	LOE 5
3/8" x 2.5 yd. - adhesive tape	Secure dressings, bandages or splints. ⁸	1	One roll of 2.5 yd adhesive should adequately secure any number of dressings.	No available evidence as to the number needed.	LOE 7
36 in – malleable radiolucent splint (waterproof, reusable, lightweight and compact)	Restrict motion of an extremity. ^{8,31,35}	1	One 36 inch can be formed to variety of shapes to restrict motion.	Prentice ⁸ McGarth ³¹ Scheinberg ³⁵	31 – LOE 2a 8, 35 –LOE 6
3 x 5 yd or 4 x 5 yd - elastic bandage	To apply direct pressure over gauze pads for maintaining hands-free control of bleeding ³²⁻³⁴ or securing a splint ^{8,35} and for the	1	One 3 x 5 yd or 4 x 5 elastic bandage will adequately maintain hands-free control of bleeding or secure a splint.	Naimer ³² Naimer ³³ Naimer ³⁴ Prentice ⁸ Scheinberg ³⁵ Howarth ⁶⁰ German ⁶¹ Bush ⁶²	60 – 1b 33 – LOE 3b 34, 61-62 – LOE 4 32 – LOE 5

American Red Cross Scientific Advisory Council First Aid Kit Scientific Review

	management of snakebites. ⁶⁰⁻⁶²				8,35 - LOE 6
Item (Latex free)	Purpose	Minimal Quantity	Quantity Logic	Reference	Evidence
40 x 40 x 56 in. - Triangular bandage	Secure an anatomical, soft, or rigid splint, ^{1,8,35} as well as secure a dressing.	3-4	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.	No available evidence as to the number needed.	LOE 7
Wound gel ointment.	Wounds heal better with less infection if they are covered with an ointment and a clean dressing. ^{67, 68}	1	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.	67, 68 – LOE 1b ACFASP – LOE 5
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.	Cold application decreases hemorrhage, edema, pain, and disability.	Merrick et al ³⁶ Dykstra et al ³⁷ American Heart Association and American Red Cross ³⁸	36, 37 – LOE 1b 38 – LOE 5
Utility shears or scissors	Used to cut roller bandages, splints, tape. ⁸	1			8 – LOE 6

Table 7. Respiratory and Cardiac Emergencies.

Item (Latex free)	Purpose	Minimal Quantity	Quantity Logic	Reference	Evidence
81mg chewable baby aspirin	Treatment of potential cardiac symptoms.	4	Patients with potential cardiac symptoms chew 324 mg of aspirin providing they have no history of aspirin allergy. ³⁹⁻⁴⁴	Freimark et al ³⁹ Verheugt et al ⁴⁰ Funk et al ⁴¹ Hayes et al ⁴² Barbash et al ⁴³ Quan ⁴⁴	39, 40 – LOE 1a 41, 42, 43 – LOE 2a 44 – LOE 2b
CPR mouth barrier	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). ⁵²	Studies ⁵³⁻⁵⁵ 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. ⁷¹	53, 54, 55 – LOE 4 52, 71 – LOE 5

Table 8. Other Injuries and Illnesses.

Item (Latex free)	Purpose	Minimal Quantity	Quantity Logic	Reference	Evidence
Oral glucose tablet, 20 mg	Diabetic emergency (hypoglycemia)	2	Oral glucose tablets (15–20 g) are the recommended treatment for the conscious patients with hypoglycemia ^{56,69, 70} however, any form of carbohydrates containing glucose may be utilized but may be if a tablet is not available, however, it may be less effective. ⁷⁰	American Diabetic Association position papers ^{56,69} International Red Cross First Aid Guidelines ⁷⁰	56, 69, 70 – LOE 5
Splinter forceps/tweezers	Multipurpose, used to remove splinters ⁵⁰ and ticks. ^{47-48,51}	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 ⁴⁵ Experts recommend a blunt, medium-tipped, angled mosquito or splinter forceps when removing a tick ⁴⁶⁻⁴⁸ or very fine-tipped tweezers. ⁴⁹	Expert Opinion Howard ⁴⁶ Chan ⁵⁰ Aberer ⁵¹ Review Haalas ⁴⁵ Couch et al ⁴⁷ Gammon et al ⁴⁸ Prospective study Ghirga ⁴⁹	49 – LOE 2a 45, 46, 47, 58 50, 51 – LOE 5
Diphoterine or Cederroth eye wash solution*	Emergency treatment of eye burns.	1	Animals model studies have demonstrates that isotonic saline solutions were ineffective ⁵⁷⁻⁵⁹ in the emergency treatment of severe alkali eye burns. Solution with a high buffer capacity ⁵⁷⁻⁵⁹ (Diphoterine or Cederroth Eye) for the initial post-trauma irrigation of alkali eye burns when water is not available.	Markenson et al ³⁰ Rihawi ⁵⁷⁻⁵⁸ Kompa ⁵⁹	30 – LOE 5 57-59 – LOE 4

American Red Cross Scientific Advisory Council First Aid Kit Scientific Review

Item (Latex free)	Purpose	Minimal Quantity	Quantity Logic	Reference	Evidence
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 ¹ Prentice ⁸	1, 8 – LOE 6
Hand sanitizer	Alcohol-based products, whether liquids or gels (minimum 60% alcohol))	1 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 second 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.	ARC ⁷³	72, 73 – LOE 5
1 qt or 1 gallon Ziplock bag	Used to store items, such as amputated limbs ^{1,8} or hold ice.	2		ARC ¹ Prentice ⁸	1, 8 – LOE 6
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. Training for this environment is recommended and ARC courses include building appropriate first aid kits.

Discrepancy with ANSI

One piece of controversial first aid equipment includes the use of agents to rapidly cool thermal burns. The current recommendation in the 2010 First Aid Guidelines (Class I, LOE B) is to cool thermal burns with the use of cold (15° to 25°C) tap water as soon as possible and continue cooling at least until pain is relieved.³⁰ Cooling thermal burns with cold tap water aids in the reduction of pain, edema, depth of injury and speeds the healing time. An alternative to the use of cold tap water are commercial water-based, water-soluble gel dressings.

The commercial dressing Water-Jel⁶³ was “...scientifically designed to draw the heat out of a burn.” “At the outer surface of the gel, the heat is released by transfer into the air. The buffer effect of the Water-Jel layer leads to rapid heat transfer out of the burn wound without losing temperature around the area of usage.” “Water-Jel is primarily composed of deionized water, thickened to help it stay in place, and a small amount of Tea Tree Oil, a natural bacteriostatic.” However, use of topical antibiotics or naturopathic medicine is not currently accepted standard first aid treatment for thermal burns.³⁰

Approved by ARC SAC June 2018

As a bacteriostatic agent, the Water-Jel system in one study limited infection rates (89% demonstrated no signs of infection on their burn wound after 48) when used for 24–48 hours in 74 burned patients with superficial partial and deep partial skin thickness burns.⁶⁴ An earlier study of the Water-Jel system (dressings) found it protected the burn wound from microbial contamination (15 microorganisms tested, including yeasts) and had analgesic and cooling effects when used as the first-aid dressing.⁶⁵

One animal model⁶⁶ examined the effects of the Water-Jel system on second-degree burn wound healing in a porcine (swine) model. Researchers produced 48 second-degree burn wounds to the paravertebral and thoracic area of the swine using specially designed cylindrical brass rods weighing 358g each that were heated in a boiling water bath to 100°C. Independent variables untreated, treated sterile gauze, treated with Water-Jel dressings. After 90 minutes of treatment application, the treatment materials were removed and then treated with a Silverlon dressing (as recommend by manufacturer). The superficial skin temperature before burning the model was approximately 89.7°F. After wounding, the wound's superficial temperature increased to an average of 91.4°F. Superficial temperatures after treatment in wounds treated with Gauze, Water-Jel and untreated controls were 83.4°F, 79.4°F and 81.88°F, respectively. However, the authors failed to produce a statistical analysis of the data, offering only raw descriptive data.

Water-based, water-soluble gel dressings have not been shown to provide superior, or even equivalent cooling of thermal burns. Until clinical studies demonstrate the efficacy of these dressings, they should be used only when cold water is unavailable, or circumstances make its use impractical (such as combat situations). Inclusion of these products in first aid kits risks appearing as an endorsement of their use as an alternative to standard treatment. Until further research clarifies the role of these dressings, American Red Cross first aid programs should continue to teach the currently recommended treatment of using cold water on thermal burns as outlined 2010 First Aid Guidelines.³⁰

2018 Updated

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.

Table 8 outlines first aid supplies for soft tissue and musculoskeletal injury.

Table 9 outlines first aid supplies for respiratory and cardiac illness.

Table 10 outlines first aid supplies for other injuries and illnesses.

Table 8. 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	New References for Items and Quantity	Evidence
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American Red Cross Scientific Advisory Council First Aid Kit Scientific Review

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))	1/32 oz (0.9g) packs x 10 or 1 oz	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 towelette	Cleansing	0.14 fl. oz. (0.5g) application x 10			
4 x 4 – Sterile gauze pads.	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 - Sterile gauze pads.	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
2 in. or 3 in. x 4 yd -	Bandage to secure dressings, as bulky	4 rolls	Depending on the severity of injury or	ARC, 2005, 2017	LOE-Text LOE-5

American Red Cross Scientific Advisory Council First Aid Kit Scientific Review

roller bandage	dressing to control bleeding, cover burn injuries, secure a splinting device.		the size of the patient multiple roller bandages may be necessary to secure a variety of items.	Markenson et al, 2010 Miller & Berry, 2016 No specific evidence available as to the number needed.	LOE-6
Item (Latex free)	Purpose	Minimal Quantity	Quantity Logic	References	Evidence
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 uses.	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
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	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

American Red Cross Scientific Advisory Council First Aid Kit Scientific Review

	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).				
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
Topical wound gel or ointment	Wounds heal better with less infection if they are covered with an ointment and a clean dressing. ^{67, 68}	1/32 oz. (0.9 g) application x 10	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 or scalp	Singletary et al, 2015a, 2015b Merrick et al, 2003 Dykstra et al, 2009	LOE-5 LOE 1b LOE-1b

American Red Cross Scientific Advisory Council First Aid Kit Scientific Review

			(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, 7” blade		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 may 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 9. Respiratory and Cardiac Emergencies.

Item (Latex free)	Purpose	Minimal Quantity	Quantity Logic	Reference	Evidence
81mg chewable aspirin	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.	Singletary et al, 2015a, 2015b	LOE- Review
Adult 325- mg, non- coated		1		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-1a LOE-1a LOE-2a LOE-2a LOE-2a LOE-2b
			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.		
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, (when 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).”
- Epinephrine Auto-Injector (when 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).”

American Red Cross Scientific Advisory Council First Aid Kit Scientific Review

			Experts recommend a blunt, medium-tipped, angled mosquito or splinter forceps when removing a tick or very fine-tipped tweezers.	Prospective study Ghirga & Ghirga, 2010	LOE-2a
Saline solution	Emergency treatment of eye injuries, rinsing and safe storage of contact lenses, as well as nasal irrigation and wound care	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 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).”	Singletary et al, 2015a, 2015b	LOE-5
Eye covering with means of attachment, 2 x 9 sq. in. (Foreign object, rupture globe)	Emergency treatment of eye burns.	1			

American Red Cross Scientific Advisory Council First Aid Kit Scientific Review

Item (Latex free)	Purpose	Minimal Quantity	Quantity Logic	Reference	Evidence
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.

Original Recommendations and Strength

Guidelines:

Because of high probability of specific injuries and illnesses, first aid kits should be supplemented with the following emergency items based on a trauma or illness to a single individual (Class II) (based on the quantity of the items above):

- Latex-free (Nitrile) x 2 pair
- Supplies to control bleeding (4 x 4, 2 x 2 sterile or non-sterile 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 3-4
- Latex free band aids and non- adhesive bandage alternatives x 3 each
 - 1 x 3 in.
 - ¾ x 3 in.
 - large fingertip
 - knuckle
- Wound gel ointment x 1
- Compact, moldable splitting device with securing mechanism (roller bandage, elastic bandage, 3-4 triangular bandage, tape) x 1
- Plastic bag 1 qt. and/or 1 gal) for application of crushed ice x 4 and/or instant cold packs x 2
- Irrigation solution x 1 (optional)
- Baby aspirin, 81 mg x 4
- Utility shears/scissors x 1
- Alcohol-based hand sanitizer x 1 bottle
- Splinter forceps/tweezers x 1
- Latex free-face shield x 1
- First aid guide book x 1

2018 Updated

Recommendations and Strength

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, 40 x 40 x 56" x 2
- Latex free adhesive bandage x 3 each
 - 1 x 3 in.
 - ¾ x 3 in.
 - large fingertip

American Red Cross Scientific Advisory Council First Aid Kit Scientific Review

- o 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

Options: none

Class	Description	Implication	Level of Evidence
I	Convincingly justifiable on scientific evidence alone.	Usually supports Standard	One or more Level 1 studies are present (with rare exceptions). Study results consistently positive and compelling
II	Reasonably justifiable by scientific evidence and strongly supported by expert opinion.	Usually supports Guideline but if volume of evidence is great enough and support from expert opinions is clear may support standard	Most evidence is supportive of guideline. Level 1 studies are absent, or inconsistent, or lack power. Generally higher levels of evidence. Results are consistently supportive of guideline.
III	Adequate scientific evidence is lacking but widely supported by available data and expert opinion. Based on	Usually supports Option.	Generally lower or intermediate levels of evidence. Generally, but not consistently results are supportive of opinion.
IV	No convincing scientific evidence available but supported by rational conjecture, expert opinion and/or non peer-reviewed publications	Usually does not support standard, guideline, or option. Statement may still be made which presents what data and opinion exists. In some cases and in conjunction with rational conjecture may support option.	Minimal evidence is available. Studies may be in progress. Results inconsistent, or contradictory.

Summary of Key Articles/Literature Found and Level of Evidence/Bibliography

See attached file – entitled FAKITDESIGN_REF

Level of Evidence	Definitions (See manuscript for full details)
Level 1a	<u>Experimental and Population based studies</u> - population based, randomized prospective studies or meta-analyses of multiple higher evidence studies with substantial effects
Level 1b	<u>Smaller Experimental and Epidemiological studies</u> - Large non-population based epidemiological studies or randomized prospective studies with smaller or less significant effects
Level 2a	<u>Prospective Observational Analytical</u> - Controlled, non-randomized, cohort studies
Level 2b	<u>Retrospective/Historical Observational Analytical</u> - non-randomized, cohort or case-control studies
Level 3a	<u>Large Descriptive studies</u> – Cross-section, Ecological, Case series, Case reports
Level 3b	<u>Small Descriptive studies</u> – Cross-section, Ecological, Case series, Case reports
Level 4	<u>Animal studies or mechanical model studies</u>
Level 5	<u>Peer-reviewed Articles</u> - state of the art articles, review articles, organizational statements or guidelines, editorials, or consensus statements
Level 6	<u>Non-peer reviewed published opinions</u> - such as textbook statements, official organizational publications, guidelines and policy statements which are not peer reviewed and consensus statements
Level 7	<u>Rational conjecture</u> (common sense); common practices accepted before evidence-based guidelines
Level 1-6E	<u>Extrapolations</u> from existing data collected for other purposes, theoretical analyses which is on-point with question being asked. Modifier E applied because extrapolated but ranked based on type of study.

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