

## RHABDOMYOLYSIS; EXERTIONAL

### Background

This case definition was developed by the Armed Forces Health Surveillance Branch (AFHSB) for the purpose of epidemiological surveillance of exertional rhabdomyolysis. The case definition is intended to capture cases that are potentially preventable through well-known measures to safeguard healthy service members who are training or carrying out their duties under conditions associated with heat illness, strenuous exertion, and inadequate hydration.

### Clinical Description

Rhabdomyolysis is the breakdown of striated muscle cells with release into the bloodstream of their potentially toxic contents, particularly myoglobin.<sup>1</sup> In high enough concentrations, the contents of skeletal muscle cells can cause organ and systemic dysfunction, including disseminated intravascular coagulation (DIC), disturbances of fluid, electrolyte, and acid-base balances, compartment syndrome, and renal failure (associated with myoglobinuria, the appearance of myoglobin in the excreted urine). In the United States, case fatality with rhabdomyolysis is less than 5% and depends on the nature of the precipitating cause, the severity and clinical effects of comorbid conditions, and the prior state of health of affected individuals.<sup>2</sup>

### Case Definition and Incidence Rules

For surveillance purposes, a case of exertional rhabdomyolysis is defined as:

- *One hospitalization or outpatient medical encounter* with any of the case defining diagnoses of exertional rhabdomyolysis in *any* diagnostic position PLUS *at least one* associated condition (see ICD9 and ICD10 code list below) in *any* diagnostic position.

#### **Incidence rules:**

For individuals who meet the case definition:

- The incidence date is considered the date of the first hospitalization or outpatient medical encounter that includes a defining diagnosis of exertional rhabdomyolysis.
- An individual is considered an incident case only *once per calendar year*.

#### **Exclusions:**

- Cases of exertional rhabdomyolysis that include any of the complicating diagnoses (see ICD9 and ICD10 code lists below) in *any* diagnostic position.

<sup>1</sup> Armed Forces Health Surveillance Center. Update: Exertional Rhabdomyolysis, Active Component, U.S. Armed Forces 2010. *Medical Surveillance Monthly Report (MSMR)*. 2011 March; Vol 18(3): 9-11.

<sup>2</sup> Armed Forces Health Surveillance Center. Update: Exertional Rhabdomyolysis among U.S. Military Members, 2004-2007. *Medical Surveillance Monthly Report (MSMR)*. 2008 March; Vol 15(2): 8-11.



## Codes

The following ICD9 and ICD10 codes are included in the case definition:

Condition	ICD-10-CM Codes	ICD-9-CM Codes
Exertional rhabdomyolysis	M62.82 (rhabdomyolysis)	728.88 (rhabdomyolysis)
	R82.1 (myoglobinuria)	791.3 (myoglobinuria)

## Associated Conditions

Condition	ICD-10-CM Codes	ICD-9-CM Codes
Dehydration	<i>E86 (volume depletion)</i>	<i>276.5 (volume depletion)</i>
	E86.0 (dehydration)	- 276.51 (dehydration)
	E86.1 (hypovolemia)	- 276.52 (hypovolemia)
	E86.9 (volume depletion, unspecified)	- 276.50 (volume depletion, unspecified)
Effects of heat and light	<i>T67 (effects of heat and light)</i>	<i>992 (effects of heat and light)</i>
	T67.0 (heatstroke and sunstroke...)	992.0 (heat stroke and sunstroke)
	- T67.0XX [A,D,S] (initial encounter, subsequent encounter, sequela)	
	T67.1 (heat syncope...)	992.1 (heat syncope)
	- T67.1XX [A,D,S] (initial encounter, subsequent encounter, sequela)	
	T67.2 (heat cramp...)	992.2 (heat cramps)
	- T67.2XX [A,D,S] (initial encounter, subsequent encounter, sequela)	
	T67.3 (heat exhaustion, anhydrotic...)	992.3 (heat exhaustion, anhydrotic)
	- T67.3XX [A,D,S] (initial encounter, subsequent encounter, sequela)	
	T67.4 (heat exhaustion due to salt depletion...)	992.4 (heat exhaustion due to salt depletion)
	- T67.4XX [A,D,S] (initial encounter, subsequent encounter, sequela)	
	T67.5 (heat exhaustion, unspecified...)	992.5 (heat exhaustion, unspecified)
	- T67.5XX [A,D,S] (initial encounter, subsequent encounter, sequela)	
	T67.6 (heat fatigue, transient...)	992.6 (heat fatigue, transient)
- T67.6XX [A,D,S] (initial encounter, subsequent encounter, sequela)		



	T67.7 (heat edema...)	992.7 (heat edema)
	- T67.7XX [A,D,S] (initial encounter, subsequent encounter, sequela)	
	T67.8 (other effects of heat and light...)	992.8 (other specified heat effects)
	- T67.8XX [A,D,S] (initial encounter, subsequent encounter, sequela)	
	T67.9 (effect of heat and light, unspecified...)	992.9 (unspecified effects of heat)
	- T67.9XX [A,D,S] (initial encounter, subsequent encounter, sequela)	
Water deprivation and exhaustion	T73.1 (deprivation of water)	994.3 (effects of thirst; deprivation of water)
	- T73.1XX [A,D,S] (initial encounter, subsequent encounter, sequela)	
	T73.2 (exhaustion due to exposure)	994.4 (exhaustion due to exposure)
	- T73.2XX [A,D,S] (initial encounter, subsequent encounter, sequela)	
	T73.3 (exhaustion due to excessive exertion)	994.5 (exhaustion due to excessive exertion)
	- T73.3XX [A,D,S] (initial encounter, subsequent encounter, sequela)	

### Exclusions: Complicating Diagnoses

#### ICD-10-CM Codes (^ = all digits)

#### ICD-9-CM Codes (\* = all digits)

S00.^ - T88.^ (injury, poisoning and certain other consequences of external causes)	800.*- 999.* (injury, poisoning, toxic effects)
<i>EXCEPT</i>	<i>EXCEPT</i>
- T67.0-T67.9 (effects of heat and light)	- 992.0-992.9 (effects of heat and light)
- T73.1^ (deprivation of water)	- 994.3 (effects of thirst)
- T73.2^ (exhaustion due to exposure)	- 994.4 (exhaustion due to exposure)
- T73.3^ (exhaustion due to excessive exertion)	- 994.5 (exhaustion due to excessive exertion),
<i>EXCEPT</i>	<i>EXCEPT</i>
S03.4^ (sprain of jaw)	840.* - 848.* (sprains and strains of joints and adjacent muscles)
S03.8^ (sprain of joints and ligaments of other parts of head)	
S03.9^ (sprain of joints and ligaments of unspecified parts of head)	
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S09.11^ (strain of muscle and tendon head)	



<p>-----</p> <p>S13.4^ (sprain of ligaments of cervical spine)</p> <p>S13.8^ (sprain of joints and ligaments of other parts of neck)</p> <p>S13.9^ (sprain of joints and ligaments of unspecified parts of neck)</p> <p>-----</p> <p>S16.1^ (strain of muscle, fascia and tendon at neck level)</p> <p>-----</p> <p>S23.3^ (sprain of ligaments of thoracic spine)</p> <p>S23.4^ (sprain of ribs and sternum)</p> <p>S23.8^ (sprain of other specified parts of thorax)</p> <p>S23.9^ (sprain of unspecified parts of thorax)</p> <p>-----</p> <p>S29.01^ (strain of muscle and tendon of thorax)</p> <p>-----</p> <p>S33.5^ (sprains of ligaments of lumbar spine)</p> <p>S35.6^ (sprain of sacroiliac joint)</p> <p>S35.8^ (sprain of other parts of lumbar spine and pelvis)</p> <p>S33.9^ (sprain of unspecified parts of lumbar spine and pelvis)</p> <p>-----</p> <p>S39.01^ (strain of muscle, fascia and tendon of abdomen, lower back and pelvis)</p> <p>-----</p> <p>S43.4^ (sprain of shoulder joint)</p> <p>S43.5 (sprain of acromioclavicular joint)</p> <p>S43.6 (sprain of sternoclavicular joint)</p> <p>S43.8 (sprain of other specified parts of shoulder girdle)</p> <p>S43.9 (sprain of unspecified parts of shoulder girdle)</p> <p>-----</p> <p>S46.01^ (strain of muscle(s) and tendon(s) of the rotator cuff and shoulder)</p> <p>S46.11^ (strain of muscle, fascia and tendon of long head of biceps)</p> <p>S46.21^ (strain of muscle, fascia and tendon of other parts of biceps)</p> <p>S46.31^ (strain of muscle, fascia and tendon of triceps)</p> <p>S46.81^ (strain of muscle, fascia and tendons at shoulder and upper arm level)</p> <p>S46.91^ (strain of unspecified muscle, fascia and tendons at shoulder and upper arm level)</p> <p>-----</p> <p>S53.4^ (sprain of the elbow)</p> <p>S63.5^ (other and unspecified sprain of wrist)</p>	
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<p>S63.6^ (other and unspecified sprain of finger(s))</p> <p>S63.8^ (sprain of other part of wrist of hand)</p> <p>S63.9^ (sprain of unspecified part of wrist and hand)</p> <p>-----</p> <p>S73.1^ (sprain of hip)</p> <p>-----</p> <p>S76.01^ (strain of muscle, fascia and tendon of hip)</p> <p>S76.11^ (strain of muscle, fascia and tendon of</p> <p>S76.21^ (strain of adductor muscle, fascia and tendon of thigh)</p> <p>S76.31^ (strain of muscle, fascia and tendon of the posterior muscle group at thigh level)</p> <p>S76.81^ (strain of other specified muscles, fascia and tendons at thigh level)</p> <p>S76.91^ (strain of unspecified muscles, fascia and tendons at thigh level)</p> <p>-----</p> <p>S83.4^ (sprain of collateral ligament of knee)</p> <p>S83.5^ (sprain of cruciate ligament of knee)</p> <p>S83.6^ (sprain of the superior tibiofibular joint and ligament)</p> <p>S83.8^ (sprain of other specified parts of knee)</p> <p>S83.9^ (sprain of unspecified site of knee)</p> <p>-----</p> <p>S93.4^ (sprain of ankle)</p> <p>S93.5^ (sprain of toe)</p> <p>S93.6^ (sprain of foot)</p> <p>-----</p> <p>S96.01^ (strain of muscle and tendon of long flexor muscle of toe at ankle and foot level)</p> <p>S96.11^ (strain of muscle and tendon of long extensor muscle of toe at ankle and foot level)</p> <p>S96.21^ (strain of intrinsic muscle and tendon at ankle and foot level)</p> <p>S96.81^ (strain of other specified muscles and tendons at ankle and foot level)</p> <p>S96.91^ (strain of unspecified muscles and tendons at ankle and foot level)</p>	
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### Development and Revisions

- In March of 2017 the case definition was updated to include ICD10 codes
- This case definition was developed in 2008 for by the AFHSC *Medical Surveillance Monthly Report (MSMR)* staff for an article on exertional rhabdomyolysis.<sup>2</sup>



### *Case Definition and Incidence Rule Rationale*

- The intent of this case definition is to count cases of exertional rhabdomyolysis, which is induced by exercise or extreme physical exertion. Cases of rhabdomyolysis associated with trauma, intoxications, and adverse drug reactions (see complete, detailed list under *Exclusions: Complicating Diagnoses* [above]) are excluded from this definition. The exclusionary conditions have been expanded for this case definition and are more numerous than the conditions previously used for this definition.
- The diagnosis of rhabdomyolysis by itself does not indicate the cause. In an attempt to distinguish cases that are exertional and/or heat-related from those due to other causes, the case defining diagnosis must be accompanied by a condition associated with dehydration or heat illness.

### *Code Set Determination and Rationale*

- The diagnostic code specific for rhabdomyolysis” (ICD9 728.88) was added to the ICD-9-CM in 2004. Therefore, it is difficult to document the occurrence of cases prior to that time.
- The case definition includes codes with 7<sup>th</sup> digits “A” (initial encounter), “D” (subsequent encounter) and “S” (sequela). Analyses using these codes might increase the sensitivity of case-finding in health care records. Given that the incidence rules permit an individual to be considered an incident case *only once per calendar year*, it would be unlikely for combinations of diagnoses with A, D, and S 7<sup>th</sup> digits in a patient’s record to be counted as repeat events.

## **Reports**

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AFHSB reports on heat illness in the following reports:

- Annual *MSMR* update. The most recent update was in March 2017.<sup>3</sup>

## **Review**

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Mar 2017	Case definition reviewed and updated by the AFHSB Surveillance Methods and Standards (SMS) working group.
Jul 2011	Case definition reviewed and adopted by the AFHSC Surveillance Methods and Standards (SMS) working group.
Mar 2011	Case definition developed and reviewed by the AFHSC <i>MSMR</i> staff.

## **Comments**

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None

<sup>3</sup> Armed Forces Health Surveillance Branch. Update: Exertional rhabdomyolysis, active component, U.S. Armed Forces, 2001-2016. *Medical Surveillance Monthly Report (MSMR)*. 2017 March; Vol 24(3): 14-18.

