

HETEROTOPIC OSSIFICATION

Background

This case definition was developed by the Armed Forces Health Surveillance Center (AFHSC) for the purpose of epidemiological surveillance of a condition important to military-associated populations. Heterotopic Ossification (HO) has emerged as a frequent and concerning clinical and rehabilitation problem among service members with severe traumatic injuries sustained in Iraq and Afghanistan. AFHSC designated HO as a deployment-related condition of special surveillance interest because of its incidence among service members wounded in Iraq and Afghanistan and also because of its potential to be an obstacle to an amputation victim's recovery.

Clinical Description

Heterotopic ossification (HO) is the formation of bone tissue outside the skeleton in, or adjacent to, soft tissues that have been injured. It is commonly detected 2 months after injury and is characterized by increasing pain and decreasing range of motion about a joint.¹

Case Definition and Incidence Rules

For surveillance purposes, a case of heterotopic ossification is defined as:

- *One hospitalization* with any of the defining diagnoses of heterotopic ossification in *any* diagnostic position (see ICD9 and ICD10 code lists below); or
- *Two or more outpatient medical encounters, at least 7 days apart*, with any of the defining diagnoses of heterotopic ossification in *any* diagnostic position (see ICD9 and ICD10 code lists below).
- For “*deployment-associated*” incident case counts, the initial case defining encounter must have occurred while the individual was deployed to, or *within 365 days* of returning from, a theater of operations of interest and the deployment must have been for *30 days or longer*.

Incidence rules:

For individuals who meet the case definition:

- The incidence date is considered the date of the first inpatient or outpatient medical encounter that includes a defining diagnosis of heterotopic ossification.
- An individual is considered an incident case only *once per lifetime*.

Exclusions:

- None

¹ Skinner, H.B. 2006. *Current Diagnosis and Treatment in Orthopedics*. 4th ed. United States: McGraw-Hill/Appleton & Lange.



Codes

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

Condition	ICD-10-CM Codes	ICD-9-CM Codes
Heterotropic Ossification	<i>M61.0 (myositis ossificans traumatica)</i>	--
	M61.00 (myositis ossificans traumatica, unspecified site)	728.12 (traumatic myositis ossifications; myositis ossificans (circumscripta))
	M61.01 (myositis ossificans traumatica, shoulder)	
	- M61.011 (myositis ossificans traumatica, right shoulder)	
	- M61.012 (myositis ossificans traumatica, left shoulder)	
	- M61.019 (myositis ossificans traumatica, unspecified shoulder)	
	M61.02 (myositis ossificans traumatica, upper arm)	
	- M61.021 (myositis ossificans traumatica, right upper arm)	
	- M61.022 (myositis ossificans traumatica, left upper arm)	
	- M61.029 (myositis ossificans traumatica, unspecified upper arm)	
	M61.03 (myositis ossificans traumatica, forearm)	
	- M61.031 (myositis ossificans traumatica, right forearm)	
	- M61.032 (myositis ossificans traumatica, left forearm)	
	- M61.039 (myositis ossificans traumatica, unspecified forearm)	
	M61.04 (myositis ossificans traumatica, hand)	
	- M61.041 (myositis ossificans traumatica, right hand)	
	- M61.042 (myositis ossificans traumatica, left hand)	
	- M61.049 (myositis ossificans traumatica, unspecified hand)	
	M61.05 (myositis ossificans traumatica, thigh)	

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- M61.051 (myositis ossificans traumatica, <i>right</i> thigh)	
- M61.052 (myositis ossificans traumatica, <i>left</i> thigh)	
- M61.059 (myositis ossificans traumatica, <i>unspecified</i> thigh)	
M61.06 (myositis ossificans traumatica, <i>lower leg</i>)	
- M61.061 (myositis ossificans traumatica, <i>right</i> lower leg)	
- M61.062 (myositis ossificans traumatica, <i>left</i> lower leg)	
- M61.069 (myositis ossificans traumatica, <i>unspecified</i> lower leg)	
M61.07 (myositis ossificans traumatica, <i>ankle and foot</i>)	
- M61.071 (myositis ossificans traumatica, <i>right</i> ankle and foot)	
- M61.072 (myositis ossificans traumatica, <i>left</i> ankle and foot)	
- M61.079 (myositis ossificans traumatica, <i>unspecified</i> ankle and foot)	
M61.08 (myositis ossificans traumatica, <i>other site</i>)	
M61.09 (myositis ossificans traumatica, <i>multiple sites</i>)	
<i>M61.4 (other calcification of muscle)</i>	--
M61.40 (other calcification of muscle, <i>unspecified site</i>)	728.19 (other muscular calcification and ossification)
M61.41 (other calcification of muscle, <i>shoulder</i>)	728.13 (postoperative heterotopic calcification) – <i>maps to M61.41 only</i>
- M61.411 (other calcification of muscle, <i>right</i> shoulder)	
- M61.412 (other calcification of muscle, <i>left</i> shoulder)	
- M61.419 (other calcification of muscle, <i>unspecified</i> shoulder)	
M61.42 (other calcification of muscle, <i>upper arm</i>)	
- M61.421 (other calcification of muscle, <i>right</i> upper arm)	

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- M61.422 (other calcification of muscle, <i>left upper arm</i>)	
- M61.429 (other calcification of muscle, <i>unspecified upper arm</i>)	
M61.43 (other calcification of muscle, <i>forearm</i>)	
- M61.431 (other calcification of muscle, <i>right forearm</i>)	
- M61.432 (other calcification of muscle, <i>left forearm</i>)	
- M61.439 (other calcification of muscle, <i>unspecified forearm</i>)	
M61.44 (other calcification of muscle, <i>hand</i>)	
- M61.441 (other calcification of muscle, <i>right hand</i>)	
- M61.442 (other calcification of muscle, <i>left hand</i>)	
- M61.449 (other calcification of muscle, <i>unspecified hand</i>)	
M61.45 (other calcification of muscle, <i>thigh</i>)	
- M61.451 (other calcification of muscle, <i>right thigh</i>)	
- M61.452 (other calcification of muscle, <i>left thigh</i>)	
- M61.459 (other calcification of muscle, <i>unspecified thigh</i>)	
M61.46 (other calcification of muscle, <i>lower leg</i>)	
- M61.461 (other calcification of muscle, <i>right lower leg</i>)	
- M61.462 (other calcification of muscle, <i>left lower leg</i>)	
- M61.469 (other calcification of muscle, <i>unspecified lower leg</i>)	
M61.47 (other calcification of muscle, <i>ankle and foot</i>)	
- M61.471 (other calcification of muscle, <i>right ankle and foot</i>)	
- M61.472 (other calcification of muscle, <i>left ankle and foot</i>)	

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- M61.479 (other calcification of muscle, <i>unspecified</i> ankle and foot)	
M61.48 (other calcification of muscle, <i>other site</i>)	
M61.49 (other ossification of muscle, <i>multiple sites</i>)	
M61.5 (other ossification of muscle)	--
M61.50 (other ossification of muscle, <i>unspecified site</i>)	728.19 (above)
M61.51 (other ossification of muscle, <i>shoulder</i>)	
- M61.511 (other ossification of muscle, <i>right</i> shoulder)	
- M61.512 (other ossification of muscle, <i>left</i> shoulder)	
- M61.519 (other ossification of muscle, <i>unspecified</i> shoulder)	
M61.52 (other ossification of muscle, <i>upper arm</i>)	
- M61.521 (other ossification of muscle, <i>right</i> upper arm)	
- M61.522 (other ossification of muscle, <i>left</i> upper arm)	
- M61.529 (other ossification of muscle, <i>unspecified</i> upper arm)	
M61.53 (other ossification of muscle, <i>forearm</i>)	
- M61.531 (other ossification of muscle, <i>right</i> forearm)	
- M61.532 (other ossification of muscle, <i>left</i> forearm)	
- M61.539 (other ossification of muscle, <i>unspecified</i> forearm)	
M61.54 (other ossification of muscle, <i>hand</i>)	
- M61.541 (other ossification of muscle, <i>right</i> hand)	
- M61.542 (other ossification of muscle, <i>left</i> hand)	
- M61.549 (other ossification of muscle, <i>unspecified</i> hand)	(continued on next page)



M61.55 (other ossification of muscle, thigh)	
- M61.551 (other ossification of muscle, right thigh)	
- M61.552 (other ossification of muscle, left thigh)	
- M61.559 (other ossification of muscle, unspecified thigh)	
M61.56 (other ossification n of muscle, lower leg)	
- M61.561 (other ossification of muscle, right lower leg)	
- M61.562 (other ossification of muscle, left lower leg)	
- M61.569 (other ossification of muscle, unspecified lower leg)	
M61.57 (other ossification of muscle, ankle and foot)	
- M61.571 (other ossification of muscle, right ankle and foot)	
- M61.572 (other ossification of muscle, left ankle and foot)	
- M61.579 (other ossification of muscle, unspecified ankle and foot)	
M61.58 (other ossification of muscle, other site)	
M61.59 (other ossification of muscle, multiple sites)	
M61.9 (calcification and ossification of muscle, unspecified) – <i>*evaluate code when data is available</i>	728.10 (calcification and ossification, unspecified) – <i>*not in existing code set</i>

Development and Revisions

- In July of 2015 the case definition was updated to include ICD10 codes.
- This case definition was developed in August of 2007 by the Medical Surveillance Monthly Report (MSMR) staff for use in a MSMR article on heterotopic ossification.² The definition was developed based on reviews of the ICD9 codes, the scientific literature, and previous AFHSC analyses. Surveillance of the condition dates back to January 2002.³

² Armed Forces Health Surveillance Center. Heterotopic Ossification, U.S. Armed Forces, 2002-2007. *Medical Surveillance Monthly Report (MSMR)*, 2007 Aug; Vol 14(5): 7-9.

³ Armed Forces Health Surveillance Center. Heterotopic Ossification, U.S. Armed Forces, 2002-2007. *Medical Surveillance Monthly Report (MSMR)*, 2007 Aug; Vol 14(5): 7-9.



Case Definition and Incidence Rule Rationale

- In order to increase the specificity and positive predictive value of the case definition, a 7 day period between the two outpatient encounters was chosen.

Deployment-Associated Incident Cases of Heterotopic Ossification

For deployment-associated incident case counts, AFHSC includes Department of Defense defined operations associated with deployment in its analyses, (i.e., Operation Freedom's Sentinel (OFS); Operation Inherent Resolve (OIR) Operation Enduring Freedom (OEF), Operation Iraqi Freedom (OIF), and Operation New Dawn (OND)). The specification of "within 365 days of returning" represents the best judgment of a reasonable time frame to allow for post-deployment screening and/or medical evaluations that result in the diagnosis of heterotopic ossification. When estimating "deployment-associated" incident cases, it should be noted that a causal association for heterotopic ossification due to an event that occurred during a deployment or direct combat cannot be determined using data available to AFHSC.

Reports

AFHSC reports on heterotopic ossification in the following reports:

- Monthly: Armed Forces Health Surveillance Center. *Deployment-related conditions of special surveillance interest, U.S. Armed Forces, by month and service*. Medical Surveillance Monthly Report (MSMR).

Review

Jul 2015	Case definition reviewed and updated by the AFHSC Surveillance Methods and Standards (SMS) working group
Feb 2011	Case definition reviewed and adopted by the Surveillance Methods and Standards (SMS) working group.
Aug 2007	Case definition developed and reviewed by AFHSC MSMR staff.

Comments

None

