INFLUENZA-LIKE ILLNESS (ILI)

Includes Influenza

Background

In the summer of 2007, in recognition of a lack of DoD-wide influenza surveillance data, the Armed Forces Health Surveillance Center (AFHSC), formerly the Army Medical Surveillance Activity developed this case definition to identify cases of influenza and influenza-like illness. The definition was reevaluated and updated in September 2015 to include an alternative case definition for more specific surveillance efforts.

Clinical Description

Influenza-like Illness *(*ILI) is a category of nonspecific respiratory illness defined by the presence of fever (temperature of 100ºF [37.8ºC] or greater) and a cough or a sore throat in the absence of a known cause other than influenza. Synonyms include Acute Respiratory Infection (ARI). Any clinical diagnosis of influenza is considered a diagnosis of ILI, not of influenza, until confirmed by laboratory testing.[1]

Case Definition and Incidence Rules – For Use with Code Sets A and B

For surveillance purposes, a case of *influenza-like illness* is defined as:

- *One hospitalization* with any of the defining diagnoses of "influenza-like illness" (see ICD9 and ICD10 code lists below) in *any* diagnostic position; or

- *One outpatient medical encounter* with any of the defining diagnoses of "influenza-like illness" (see ICD9 and ICD10 code lists 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 influenza-like illness.

- An individual can be an incident case only *once per week*.

Exclusions:

- None

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[1] Centers for Disease Control and Prevention. *Influenza*. http://www.cdc.gov/flu/index.htm; Accessed July 2015.

Code Set A: *Influenza-Like Illness   (For broad, sensitive, surveillance)*

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

Condition	ICD-10-CM Codes	ICD-9-CM Codes
Influenza-Like Illness (ILI)	B97.89 (other viral agents as the cause of diseases classified elsewhere)	079.99 (unspecified viral infection)
	H66.9 (otitis media, unspecified)	382.9 (unspecified otitis media)
	- H66.90 (otitis media, unspecified, *unspecifie*d ear)	
	- H66.91 (otitis media, unspecified, *right* ear)	
	- H66.92 (otitis media, unspecified, *left* ear)	
	- H66.93 (otitis media, unspecified, *bilateral* ear)	
	J00 (acute nasopharyngitis; common cold)	460 (acute nasopharyngitis)
	J01.9 (acute sinusitis, unspecified)	461.9 (acute sinusitis, unspecified)
	- J01.90 (acute sinusitis, unspecified)	
	J06.9 (acute upper respiratory infection, unspecified)	465.8 (acute upper respiratory infections, other multiple sites)
		465.9 (acute upper respiratory infections, unspecified sites)
	J09 (influenza due to certain identified influenza viruses)	--
	J09.X (influenza due to identified novel influenza A viruses)	--
	- J09.X1 (influenza due to identified novel influenza A virus with pneumonia)	488.0 (influenza due to identified avian influenza virus)
		- 488.01 (influenza due to identified avian influenza virus with pneumonia)
		488.8 (influenza due to novel influenza A)
		- 488.81 (influenza due novel influenza A with pneumonia)
	- J09.X2 (influenza due to identified novel influenza A virus with other respiratory manifestations)	- 488.02 (influenza due to identified avian influenza virus with other respiratory manifestations)
		- 488.82 (influenza due to novel influenza A with other respiratory manifestations)
		(continued on next page)

- J09.X3 (influenza due to identified novel influenza A virus with gastrointestinal manifestations)	- 488.09 (influenza due to identified avian influenza virus with other manifestations)
- J09.X9 (influenza due to identified novel influenza A virus with other manifestations)	- 488.1 (influenza due to 2009 H1N1 influenza virus)
	- 488.19 (influenza due to identified 2009 H1N1 influenza virus with other manifestations)
	- 488.89 (influenza due to novel influenza A with other manifestations)
J10 (influenza due to other identified influenza viruses)	--
J10.0 (influenza due to identified novel influenza A viruses)	--
- J10.00 (influenza due to other identified influenza virus with unspecified type of pneumonia)	487.0 (influenza with pneumonia)
- J10.01 (influenza due to other identified influenza virus with the same other identified influenza virus pneumonia)	487.1 (influenza with other respiratory manifestations)
- J10.08 (influenza due to other identified influenza virus with other specified pneumonia)	487.0 (above) 488.11 (influenza due to identified 2009 H1N1 influenza virus with pneumonia)
J10.1 (influenza due to other identified influenza virus with other respiratory manifestations)	487.1 (above) 488.12 (influenza due to identified 2009 H1N1 influenza virus with other respiratory manifestations)
J10.2 (influenza due to other identified influenza virus with gastrointestinal manifestations)	487.8 (influenza with other manifestations)
J10.8 (influenza due to other identified influenza virus with other manifestations)	
- J10.81 (influenza due to other identified influenza virus with other manifestations with encephalopathy)	
- J10.82 (influenza due to other identified influenza virus with other manifestations with myocarditis)	
- J10.83 (influenza due to other identified influenza virus with other manifestations with otitis media)	
- J10.89 (influenza due to other identified influenza virus with other manifestations)	*(continued on next page)*

	J11 (influenza due to unidentified influenza virus)	--
	J11.0 (influenza due to unidentified influenza virus with pneumonia)	--
	- J11.00 (influenza due to unidentified influenza virus with unspecified type of pneumonia)	487.0 (above)
	- J11.08 (influenza due to unidentified influenza virus with specified pneumonia)	
	J11.1 (influenza due to unidentified influenza virus with other respiratory manifestations)	487.1 (above)
	J11.2 (influenza due to unidentified influenza virus with gastrointestinal manifestations)	487.8 (above)
	J11.8 (influenza due to unidentified influenza virus with other manifestations)	
	- J11.81 (influenza due to unidentified influenza virus with encephalopathy)	
	- J11.82 (influenza due to unidentified influenza virus with myocarditis)	
	- J11.83 (influenza due to unidentified influenza virus with otitis media))	
	- J11.89 (influenza due to unidentified influenza virus with other manifestations)	
	J12.89 (other viral pneumonia)	487.0 (above)
	J12.9 (viral pneumonia, unspecified)	
	J18 (pneumonia, unspecified organism)	486 (pneumonia, organism unspecified)
	- J18.1 (lobar pneumonia, unspecified organism)	
	- J18.8 (other pneumonia, unspecified organism)	
	- J18.9 (pneumonia, unspecified organism)	
	J20.9 (acute bronchitis, unspecified)	466.0 (acute bronchitis)
	J40 (bronchitis, not specified as acute or chronic)	490 (bronchitis, not specified as acute or chronic)
	R05 (cough)	786.2 (cough)
		(continued on next page)

	--	780.6 (fever and other physiologic disturbances of temperature regulation)
	R50.9 (fever, unspecified)	780.60 (fever, unspecified)

Code Set B: *Influenza (For specific surveillance)*

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

Condition	**ICD-10-CM Codes**	**ICD-9-CM Codes**
Influenza	*J09 (influenza due to certain identified influenza viruses)*	--
	J09.X (influenza due to identified novel influenza A viruses)	--
	- J09.X1 (influenza due to identified novel influenza A virus *with pneumonia*)	488.0 (influenza due to identified avian influenza virus) - 488.01 (influenza due to identified avian influenza virus with pneumonia) 488.8 (influenza due to novel influenza A) - 488.81 (influenza due novel influenza A with pneumonia)
	- J09.X2 (influenza due to identified novel influenza A virus *with other respiratory manifestations*)	- 488.02 (influenza due to identified avian influenza virus with other respiratory manifestations) - 488.82 (influenza due to novel influenza A with other respiratory manifestations)
	- J09.X3 (influenza due to identified novel influenza A virus with gastrointestinal manifestations) - J09.X9 (influenza due to identified novel influenza A virus with other manifestations)	- 488.09 (influenza due to identified avian influenza virus with other - 488.1 (influenza due to 2009 H1N1 influenza virus) - 488.19 (influenza due to identified 2009 H1N1 influenza virus with other manifestations) - 488.89 (influenza due to novel influenza A with other manifestations)
	J10 (influenza due to other identified influenza viruses)	--
	J10.0 (influenza due to identified novel influenza A viruses)	--
	- J10.00 (influenza due to other identified influenza virus *with unspecified type of pneumonia*)	487.0 (influenza with pneumonia) *(continued on next page)*

	- J10.01 (influenza due to other identified influenza virus *with the same other identified influenza virus pneumonia*)	487.1 (influenza with other respiratory manifestations)
	- J10.08 (influenza due to other identified influenza virus *with other specified pneumonia*)	487.0 (above) 488.11 (influenza due to identified 2009 H1N1 influenza virus with pneumonia)
	J10.1 (influenza due to other identified influenza virus with other respiratory manifestations)	487.1 (above) 488.12 (influenza due to identified 2009 H1N1 influenza virus with other respiratory manifestations)
	J10.2 (influenza due to other identified influenza virus with gastrointestinal manifestations)	487.8 (influenza with other manifestations)
	J10.8 (influenza due to other identified influenza virus with other manifestations)	
	- J10.81 (influenza due to other identified influenza virus with other manifestations *with encephalopathy*)	
	- J10.82 (influenza due to other identified influenza virus with other manifestations *with myocarditis*)	
	- J10.83 (influenza due to other identified influenza virus with other manifestations *with otitis media*)	
	- J10.89 (influenza due to other identified influenza virus *with other manifestations*)	
	J11 (influenza due to unidentified influenza virus)	--
	J11.0 (influenza due to unidentified influenza virus with pneumonia)	--
	- J11.00 (influenza due to unidentified influenza virus *with unspecified type of pneumonia*)	487.0 (above)
	- J11.08 (influenza due to unidentified influenza virus *with specified pneumonia*)	
	J11.1 (influenza due to unidentified influenza virus with other respiratory manifestations)	487.1 (above)
	J11.2 (influenza due to unidentified influenza virus with gastrointestinal manifestations)	487.8 (above)
	J11.8 (influenza due to unidentified influenza virus with other manifestations)	*(continued on next page)*

	- J11.81 (influenza due to unidentified influenza virus *with encephalopathy*)	
	- J11.82 (influenza due to unidentified influenza virus *with myocarditis*)	
	- J11.83 (influenza due to unidentified influenza virus *with otitis media*))	
	- J11.89 (influenza due to unidentified influenza virus *with other manifestations*)	

Development and Revisions

- In October of 2015 the case definition was updated to include ICD10 codes.

- In August of 2015, in an effort to continually improve the Center's case definitions and taking into consideration changes in coding practices, AFHSC conducted an analysis of the current ILI case definition and three alternative case definitions to determine their sensitivity, specificity, and positive predictive value (PPV) in identifying "true" cases of influenza.[2] Based on the results of these analyses AFHSC determined the Center would continue to use the original case definition (Code set A), minus most of the fever codes included in the original code set (see *Code Set Determination and Rationale* below) for broad, sensitive, surveillance efforts. In addition, AFHSC adopted an alternative case definition (Code set B) for more specific epidemiologic investigations. Code set B includes only those codes with >75% influenza positivity for the matched laboratory test which limits the number of false positive results.

- The original case definition was developed in July 2007 by the Deputy Science Director and the Chief of the Army Medical Surveillance Activity. The definition was developed based on reviews of the ICD9 codes, the scientific literature, and previous AFHSC analyses.

Case Definition and Incidence Rule Rationale

- The two case definitions included in this document use the same case finding criteria and incidence rules. The code sets for the two definitions are different.

Code Set Determination and Rationale

- In a study of emergency department disease codes that best correlate with confirmed cases of influenza, Moore, *et al*[3] determined the following ICD10 codes were associated with confirmed cases of influenza. These have not been evaluated either Marsden-Haug or by Eick-Cost[2] and are *not included* in the AFHSC code set at this time; they will be evaluated when additional ICD10 data are available.

    - ICD10 B34[0-9] (viral infection of unspecified site [adenovirus, enterovirus, coronavirus, parvovirus, papovavirus, other viral infections])

    - ICD10 J22 (unspecified acute lower respiratory infection)

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[2] Eick-Cost, A. Hunt, D. Assessment of ICD-9-CM based Case Definitions for Influenza-like Illness Surveillance. *Medical Surveillance Monthly Report (MSMR).* 2015 V22(9): 2-5.
[3] Moore, K, Black, J, Rowe, S, Fanklin, L. Syndromic surveillance for influenza in two hospital emergency department. Relationships between ICD-10 codes and notified cases, before and during a pandemic. *BMC Public Health*, 2011, 11:338.

- The following ICD9 codes that correspond to ICD10 codes were evaluated by Marsden-Haug , *et al*[4] and found *not to be* well associated with confirmed cases of influenza. They are *not included* in the AFHSC case definition.

  - ICD9 462 / ICD10 J02.9 (acute pharyngitis)

  - ICD9 464.1 / ICD10 J04.1 (acute tracheitis)

  - ICD9 464.10 / ICD10 J04.10 (acute tracheitis without obstruction)

  - ICD9 464.2 / ICD10 J04.2 (acute laryngotracheitis)

  - ICD9 464.20 / ICD10 J04.20 (acute laryngotracheitis)

  - ICD9 465 / ICD10 J06 (acute upper respiratory infections of multiple and unspecified sites)

  - ICD9 465.0/ ICD10 J06.0 (acute laryngopharyngitis)

- ICD9 code 466.0 (acute bronchitis) corresponds to ICD10code J20.9 (acute bronchitis, unspecified). ICD10 codes J20[1-8] refer to non-influenza type *specific* organisms and are not included in the code set. They may be evaluated when additional ICD10 data are available.

- ICD9 code 461.9 (acute sinusitis, unspecified) corresponds to ICD10 code J01.9 (acute sinusitis, unspecified). ICD9 461.0-8] / J01.[1-8] refer to *sinus specific* infection and are not included in the code set. They may be evaluated when additional ICD10 data are available.

- In August of 2015 the following fever codes were removed from the original code set: 780.61 (fever presenting with conditions classified elsewhere),780.62 (post procedural fever), 780.63 (post vaccination fever), 780.64 (chills, without fever), 780.65 (hypothermia not associated with low environmental temperatures) and 780.66 (febrile nonhemolytic transfusion reaction). Analyses[2] of the codes showed many of the codes were not related to influenza infections and therefore it was not appropriate to include them in the ILI definition.

- In November of 2009 ICD9 code 488.xx (Influenza due to certain identified influenza viruses) was added to the case definition to identify cases caused by other influenza strains, such as the avian influenza (H5N1) (488.0x) or novel pandemic (H1N1) (488.1x) strains.

- The code set used by ESSENCE (Electronic Surveillance System for the Early Notification of Community-based Epidemics) for influenza was considered during the development of this case definition and differs from the code set included in this document. The ESSENCE code set includes nine ICD9 codes that are not in this case definition because studies by Marsden-Haug and Eick-Cost showed them not to be well associated with influenza.

- The original code set was developed based on an analysis done by Marden-Haug, *et al* that determined which ICD9 codes had the highest correlation with culture-confirmed influenza cases in the DoD.[4] The original code set included specific diagnostic codes for influenza as well as symptom codes (e.g., fever, cough) and codes for non-specific respiratory illness.

Reports

AFHSC reports on influenza-like illness in the following reports; all reports use Code set A for data analyses:

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[4] Marsden-Haug N, Foster VB, Gould PL, Elbert E, Wang H, Pavlin JA. Code-based syndromic surveillance for influenza-like illness by International Classification of Diseases, Ninth Revision. *Emerging Infectious Disease,* 2007. 13(2):207-16.

- Weekly: Armed Forces Health Surveillance Center, Military Health System (MHS) Influenza Surveillance Report, Weekly Report of Activity

- Weekly: AFHSC DoD Seasonal Influenza Surveillance Summary

- Weekly: Influenza Weekly Report for the Veteran's Administration

- Periodic: Armed Forces Health Surveillance Center, Military Health System (MHS) Report, Influenza Season, Final Report

Review

Oct 2015   Case definition reviewed and updated by the Senior Managing Epidemiologist and approved by the AFHSC Surveillance Methods and Standards (SMS) working group.

Dec 2010   Case definition reviewed and adopted by AFHSC Surveillance Methods and Standards (SMS) working group.

Jan 2008   Case definition and report reviewed and approved by the Director of the AFHSC.

Jul 2007   Case definition developed and reviewed by the Deputy Scientific Director and the Chief of the Army Medical Surveillance Activity.

Comments

Results of analysis: [2]

Code Set		Sensitivity	Specificity	Positive Predictive Value (PPV)
A	Current DOD ILI code set; includes fever codes 780.6 and 780.60 only	92%	30%	63%
B	Code set uses codes with >75% influenza positivity for the matched laboratory test	62%	96%	96%