MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH
WEEKLY INFLUENZA UPDATE
February 5, 2014

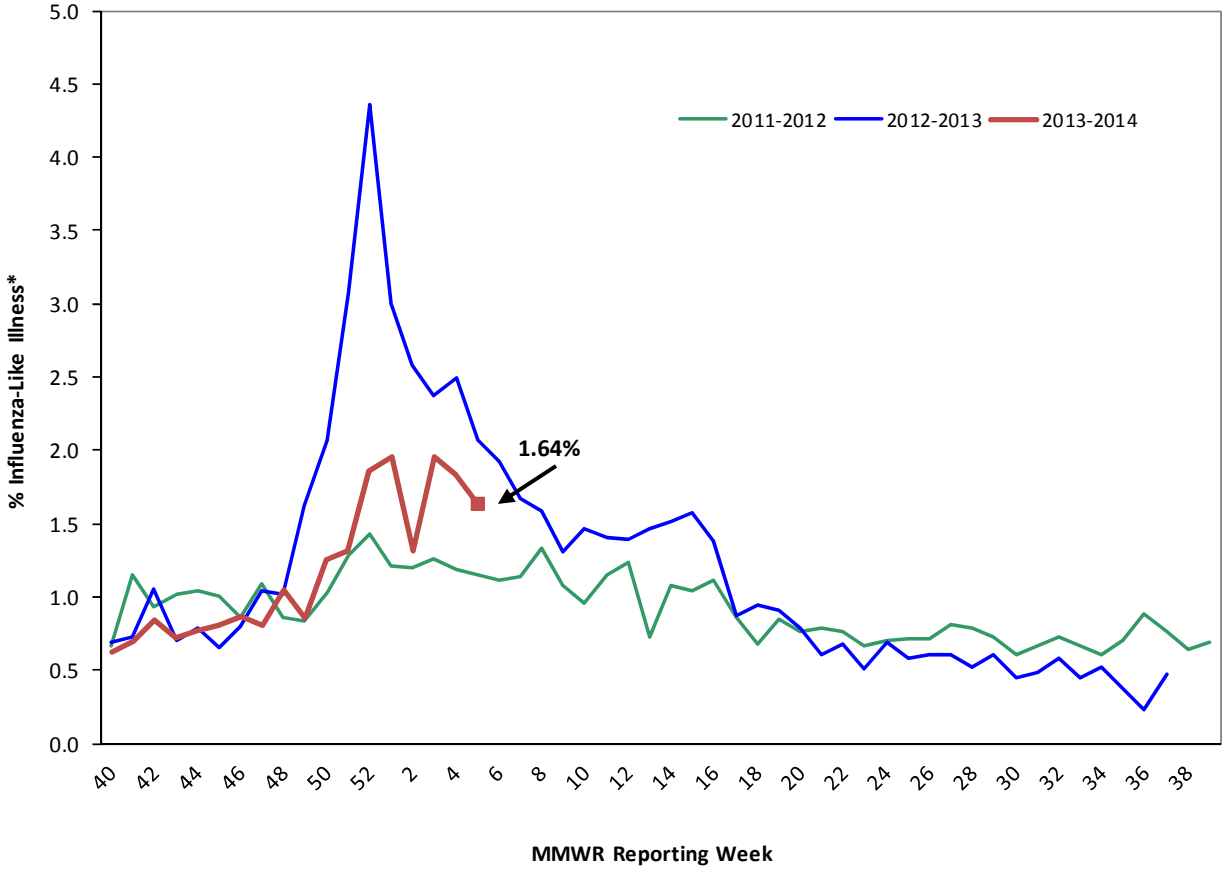
All data in this report are preliminary and subject to change as more information is received.

Sentinel Provider Surveillance: Influenza-like illness activity

Week 05 Activity[1] (representing geographic distribution): Widespread
Week 05 ILI Activity[2] (representing intensity of ILI activity): 3 (Minimal)

Provider offices across the US report the amount of influenza-like illness (ILI) they see in their patients each week during regular flu season. These outpatient providers' offices, which include doctors' offices, school health services, and community health centers, are called 'sentinel sites.' Here we present Massachusetts sentinel site data. Please note that the data represent not only confirmed influenza cases, but also those just with ILI, which may be caused by other viruses. ILI is defined as fever above 100.0[1] in addition to either cough or sore throat. ILI is a marker of influenza and is used throughout the regular influenza season to monitor influenza since most people are not tested for influenza. Figure 1 shows that ILI activity remains elevated and consistent with what we would expect at this time of year. For more information, see CDC's influenza surveillance website at www.cdc.gov/flu/weekly/fluactivitysurv.htm.

Figure 1: Percentage of ILI visits reported by sentinel provider sites



*Influenza-like illness (ILI, defined by fever >100F and cough and/or sore throat), as reported by Massachusetts sentinel surveillance sites.

[1] CDC activity indicator – indicates how widespread influenza activity level is in the state.
[2] CDC ILI activity indicator – more quantitative indicator of the level of ILI activity across the state.

Table 1 below shows a geographical distribution of reported ILI in Massachusetts. Table 1 shows that sentinel sites in all regions are reporting elevated ILI activity.

Table 1: Percent ILI reported weekly by Massachusetts sentinel sites

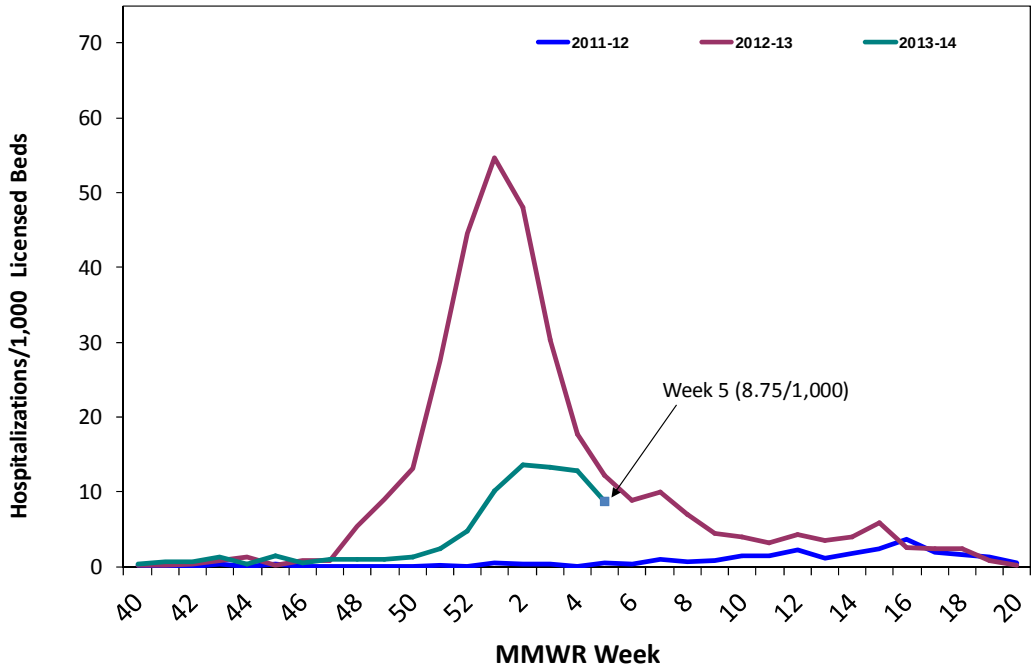
	Regional Baseline % ILI*	2013-2014			2012-2013		
		% ILI	Report. Sites	Total enroll.	% ILI	Report. Sites	Total enroll.
Boston	0.88	1.43	5	6	1.31	6	5
Central	1.26	1.52	8	12	3.00	10	11
Inner Metro Boston	0.87	1.19	9	13	1.75	10	13
Northeast	0.91	1.70	9	11	2.39	11	11
Outer Metro Boston	1.35	1.94	4	5	3.02	4	4
Southeast	3.22	3.42	2	6	1.79	4	3
West	1.52	2.78	5	7	2.98	7	7

*Regional baseline % ILI is calculated weekly using reporting providers' baseline % ILI estimates.

Influenza-Associated Hospitalizations

In 2010, MDPH began to request voluntary reporting of all laboratory-confirmed influenza hospitalizations from hospitals in Massachusetts. As many as 50 acute care hospitals from across the state report these data to MDPH on a weekly basis during flu season. The graph below shows the number of laboratory-confirmed hospitalizations per 1,000 licensed beds represented by reporting hospitals for the current season and two previous seasons.

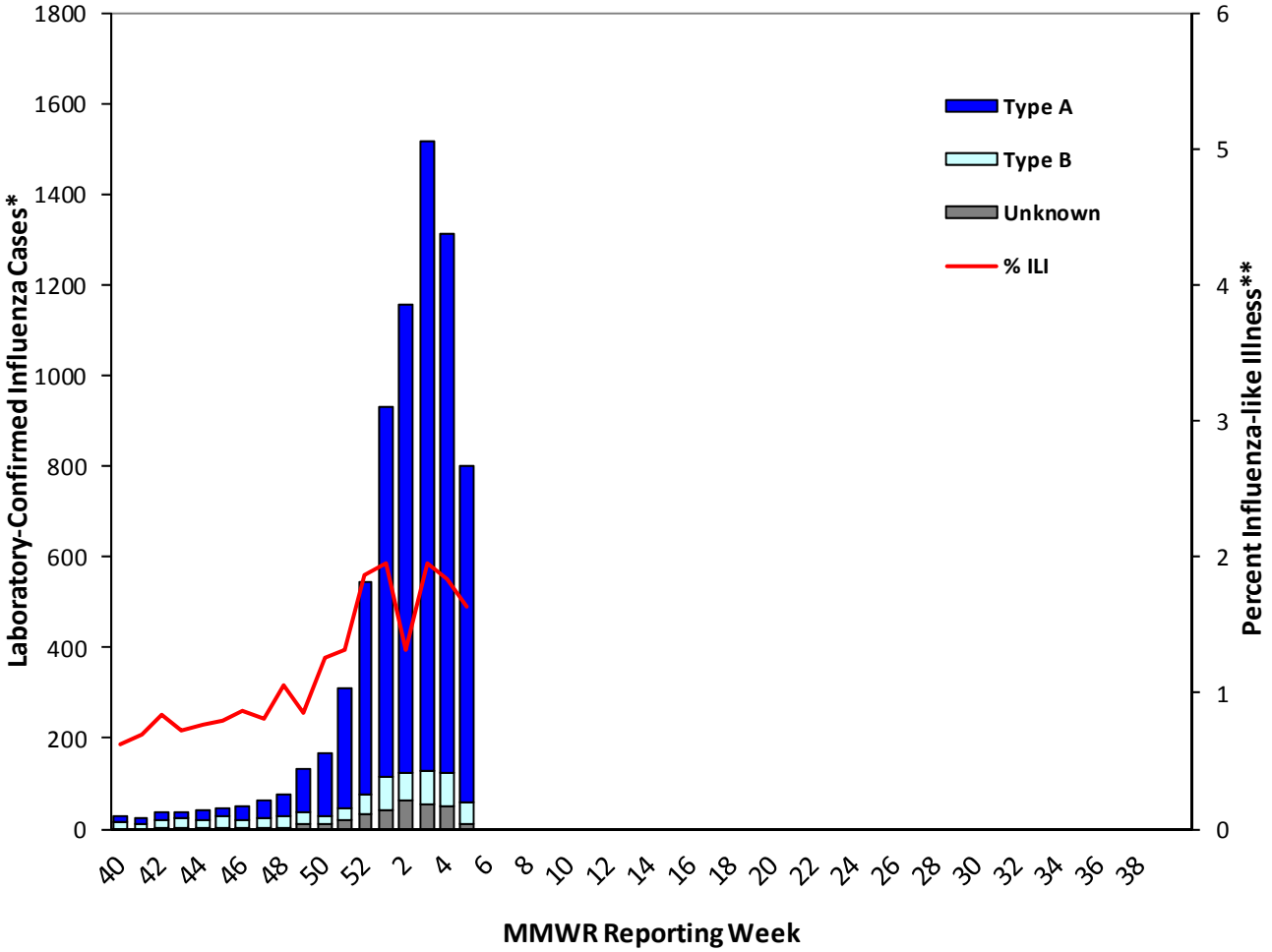
Figure 2: Massachusetts laboratory-confirmed influenza hospitalizations



Laboratory testing for influenza

Laboratories in Massachusetts report all positive influenza laboratory tests to MDPH, including viral culture, polymerase chain reaction (PCR) and rapid influenza diagnostic tests. Because the majority of cases are not tested, the number of 'confirmed' cases does not reflect the overall incidence of influenza; however, this information is essential to track the types of influenza circulating in Massachusetts and can be a useful indicator of the presence and distribution of influenza in the state. Figure 3 illustrates the number of laboratory confirmed cases in Massachusetts by week, shown along with Massachusetts ILI. Table 2 reflects the number of laboratory-confirmed influenza cases by region and influenza type.

Figure 3: Laboratory-confirmed Influenza Cases and Influenza-like Illness
Massachusetts, September 29, 2013 – February 01, 2014



*Influenza cases confirmed via viral culture, PCR or rapid test by specimen collection date.
**Influenza-like illness (ILI, defined as fever>100F and cough and/or sore throat), as reported by Massachusetts sentinel surveillance sites by CDC week date.

Table 2: Laboratory-confirmed Influenza by Region – 2013-2014 and 2012-2013 Influenza Seasons

	2013-2014						2012-2013					
	A		B		Untyped		A		B		Untyped	
Region	Week	YTD	Week	YTD	Week	YTD	Week	YTD	Week	YTD	Week	YTD
Boston	55	597	1	35	0	2	33	1564	11	80	0	25
Central	71	546	17	137	8	63	65	2524	37	372	10	106
Inner Metro Boston	95	934	2	36	1	31	119	3158	37	282	8	137
Northeast	145	1367	20	261	2	88	130	3741	52	320	24	712
Outer Metro Boston	73	645	0	26	0	17	92	2460	40	275	12	218
Southeast	132	1229	3	86	0	82	180	3469	49	356	35	440
Unknown	30	205	4	18	0	0	25	904	8	88	1	12
West	141	743	0	7	0	25	79	1353	57	311	31	86
Total	742	6,266	47	606	11	308	723	19,173	291	2,084	121	1,736

Testing at the Hinton State Laboratory Institute

MDPH's Bureau of Laboratory Sciences (MDPH-BLS) performs confirmatory testing, typing and subtyping of influenza using PCR and viral culture primarily for samples submitted by ~60 outpatient healthcare providers (ILINet) as well as for early influenza positives and unusual cases from clinical hospital diagnostic laboratories across Massachusetts. For the 2013-2014 season, Figure 4 and Table 3 summarize virologic surveillance testing conducted by MDPH-BLS beginning MMWR week 40 (week ending October 5, 2013). MDPH-BLS performs influenza surveillance testing year round. During MMWR week five, 10 additional cases of A (2009 H1N1) and one case of A/H3N2 were identified. Cumulatively, A (2009 H1N1) remains the predominant strain identified to date by MDPH with 57 total cases.

Figure 4: Influenza positive tests reported to CDC by MDPH-BLS, September 29, 2013 – February 01, 2014

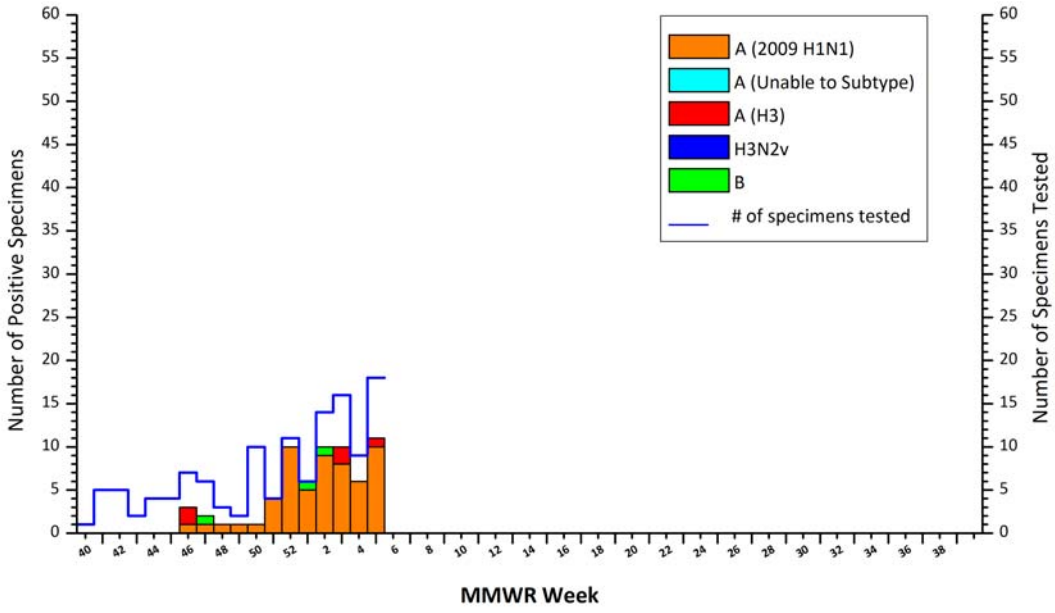


Table 3: Weekly Summary of MDPH-BLS Influenza Surveillance Test Results

2013-2014 Season: Influenza Surveillance MA Department of Public Health's Bureau of Laboratory Sciences (MDPH-BLS)									
MMWR Week: (Specimen Collected)	2009 H1N1	seasonal A/H3N2	B	H3N2v	A unsub	No. Flu Pos (%)	Unsat	Total Tested	Total Rec'd
02 (01/05- 01/11/2014)	9	0	1	0	0	**10(71%)**	2	**14**	**16**
03 (01/12- 01/18/2014)	8	2	0	0	0	**10(63%)**	0	**16**	**16**
04 (01/19- 01/25/2014)	6	0	0	0	0	**6(67%)**	1	**9**	**10**
05 (01/26- 02/01/2014)	10	1	0	0	0	**11(61%)**	3	**18**	**21**
Prior 4 wk Total	**33**	**3**	**1**	**0**	**0**	**37(65%)**	**6**	**57**	**63**
Cumulative Season total	**57**	**5**	**3**	**0**	**0**	**65(51%)**	**27**	**127**	**154**

All data are subject to change as test results become finalized. The 2013-2014 influenza season began MMWR 40 (09/29- 10/05/2013).

At the start of the 2013-2014 season, the first 10 isolates and thereafter 5 representative isolates every two weeks will be sent by MDPH-BLS to a CDC contract lab performing National Routine Surveillance to include antigenic characterization by hemagglutination inhibition (HI), genetic analysis (sequencing) and sensitivity to FDA-approved drugs for identification of resistance. As samples are received, MDPH-BLS will screen additional samples every two weeks to detect point mutations within the neuraminidase gene of H3N2 viruses (E119, R292, and N294) and influenza A (2009) viruses (H275 and I223) to assess resistance trends. This information will be reported locally and captured nationally in FluView.

Two influenza A(H3N2) specimens, four 2009 A(H1N1) specimens, and one influenza B specimen have been characterized for the 2013-2014 season to date. All four 2009 A(H1N1) specimens, one influenza A(H3N2) specimen, and the influenza B specimen were consistent with strains in the 2013-2014 seasonal influenza vaccine. One A(H3N2) specimen was not consistent with the strain included in the vaccine.

There were three 2009 A(H1N1) isolates from MA during the 2009-2010 season with a mutation conferring oseltamivir-resistance (H275Y) and none during the 2010-2011, 2011-2012 and 2012-13 seasons. There have been no specimens identified with mutations associated with Oseltamivir resistance for the 2013-2014 season to date.

Table 4: DPH-BLS Influenza Antiviral Resistance Screening: 2013-2014 Season

DPH-BLS Influenza Antiviral Resistance Screening: 2013-2014 Season

Virus Collection Period: September 29, 2013- ongoing				
	Oseltamivir		**Zanamivir**	
	Samples Tested	**Resistant Viruses, Number (%)**	**Samples Tested**	**Resistant Viruses, Number (%)**
Influenza A (H3N2) [i]	4	0 (0)	4	0 (0)
Influenza A (H1N1)pdm09 [ii]	52	0 (0)	0	0 (0)

[i] Samples tested by pyrosequencing at position E119, R292, and N294 within the neuraminidase (NA) gene.
[ii] Samples tested by pyrosequencing at position H275 and I223 within the NA gene.

Additional information on national antiviral resistance testing can be found at http://www.cdc.gov/flu/weekly/. Recommendations for antiviral treatment and chemoprophylaxis of influenza virus infection can be found at http://www.cdc.gov/flu/professionals/antivirals/index.htm.