



HAWAII STATE DEPARTMENT OF HEALTH DISEASE OUTBREAK CONTROL DIVISION

2007-08 Influenza Season Summary

September 30, 2007 – May 17, 2008: MMWR¹ Week 40, 2007 – 20, 2008

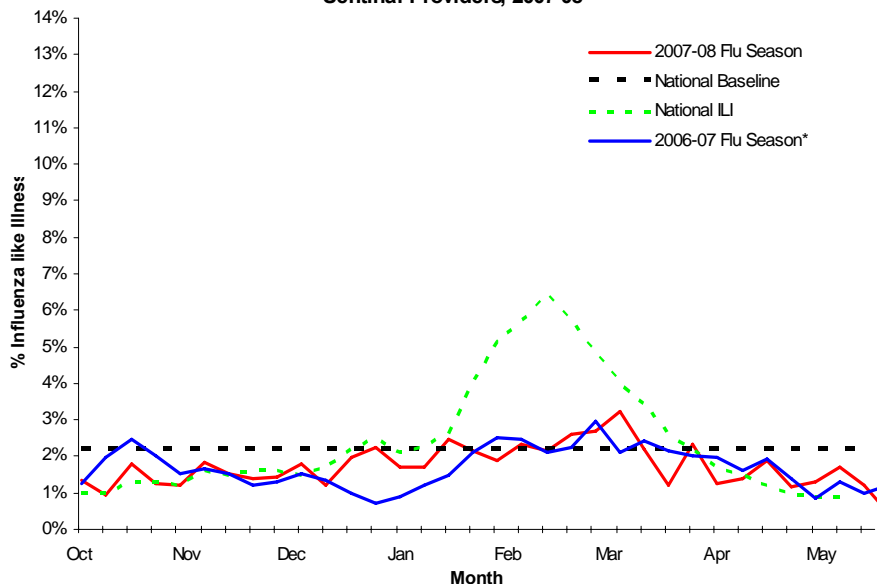
Summary:

During the 2007-08 traditional flu season, which extended from MMWR week 40 (September 30, 2007) – week 20 (May 17, 2008; total 33 weeks), influenza-like illness (ILI) activity in Hawaii occurred at low levels with only a brief elevation above baseline in March 2008. Testing at the Hawaii State Laboratories Division (SLD) demonstrated that approximately equal proportions of influenza A(H1), A(H3), and influenza B circulated during the season; influenza A(H1) predominated in the first half but continued to circulate throughout the season. Influenza A(H3) and influenza B activity began at low levels in January 2008 and continued throughout the remainder of the season. Overall, the 2007-08 traditional flu season in Hawaii was mild in intensity.

Influenza like Illness (ILI):

The percentage of outpatient visits for ILI, as reported by Hawaii’s sentinel physicians, was below the national baseline² for the majority of the flu season. Visits for ILI occurred at low levels (mean 1.8%) between October 2007 and May 2008. ILI was elevated slightly above the national baseline for 2 weeks, peaking at 3.2% during the second week of March, but returned to levels below the baseline soon thereafter. Overall, visits for ILI reported during the past traditional flu season was lower than that reported during the previous (2006-07) season.

Percentage of Visits for Influenza Like Illness (ILI) Reported by Hawaii Sentinel Providers, 2007-08



¹ MMWR stands for ‘Morbidity and Mortality Weekly Report,’ conventionally used by the Centers for Disease Control and Prevention (CDC). The weeks of a flu season are often referred to by their respective MMWR week. See appendix 1 for interpretation of MMWR weeks.

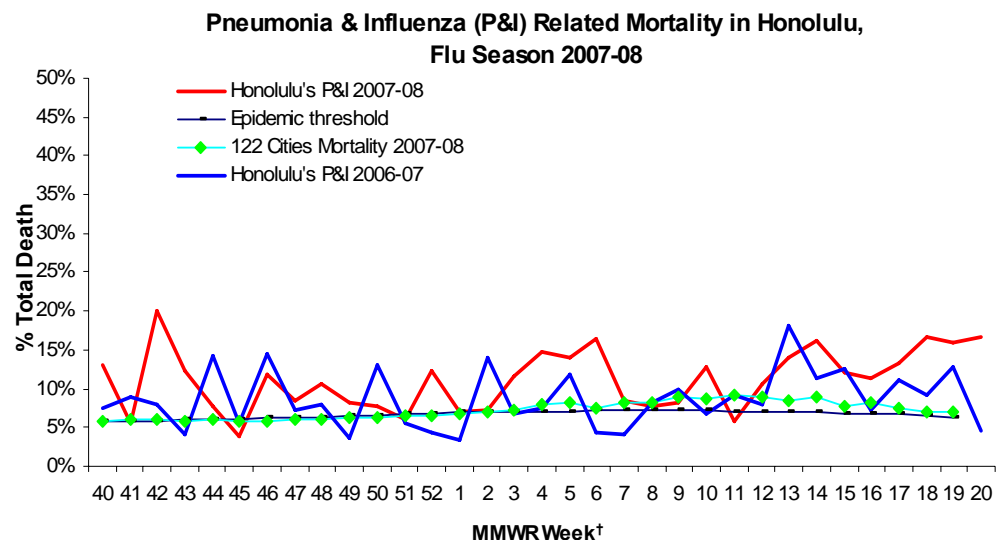
²The national and regional percentage of patient visits for ILI is weighted on the basis of state population. However, due to wide variability in regional level data, the CDC does not consider it appropriate to apply the national baseline to regional level data.

* Previous ILI charts for the 2007-08 influenza season erroneously displayed the 2005-06 ILI trend as the 2006-07 ILI trend. This chart correctly displays the 2006-07 ILI.

Pneumonia & Influenza Mortality:

The proportion of deaths in Honolulu due to pneumonia and influenza (P&I)³ surpassed the epidemic threshold and national average for 122 cities for the majority of 2007-08 traditional flu season⁴ (21 out of 33 [63%] weeks).

Peak mortality (20%) occurred during the third week of October, followed by the mortality during the third week of May, 2008 (16.7%). Two hundred fifty-eight (11.2%) P&I related deaths of 2,298 total deaths were recorded in Honolulu during the past flu season; the average P&I mortality during the 2007-08 influenza season (11.2%) was higher than the season's national average (8.6%) and the 2006-07 seasonal average (8.8%). No influenza-related pediatric mortalities were recorded.



³ These data were reported by the Hawaii State Department of Health Vital Statistics Office.

⁴ National data presented in this report are obtained from the CDC's Weekly Influenza Summary.

Laboratory Surveillance:

During the 2007-08 flu season, the Hawaii Department of Health (HDOH) received 7,703 specimens for influenza testing. Specimen submissions have steadily increased over the last several years. To accommodate the high specimen volume, reduce turnaround time, optimize data quality, and improve utilization of limited resources, the Disease Outbreak Control Division (DOCD) and SLD used criteria⁵ implemented during the 2005-06 influenza season to prioritize specimens for testing. Specimens that do not meet criteria for testing are archived and stored until the next flu season should more comprehensive analysis be required. Altogether, 3,571 (46.4%) of the submitted specimens were tested for influenza at SLD.

The 2007-08 season also marked the beginning of RT-PCR testing at commercial laboratories in Hawaii. As a result of an extraordinary public-private partnership, all 3 laboratory service providers obtained funding from HDOH and subsequently implemented RT-PCR in February, 2008. With this establishment of flu diagnostic capacity among the clinical commercial laboratories, SLD is now able to focus on serving as the regional reference laboratory for these laboratories and retire from frontline diagnostic services⁶.

⁵ Specimens from underrepresented populations, those positive for influenza by rapid antigen testing, and other urgent specimens (including those submitted by sentinel physicians, specimens related to suspected influenza outbreaks, airport surveillance specimens, and samples from very ill hospitalized patients or patients with a travel history to any international destination) were prioritized for testing.

⁶ Please note that costs for diagnostic services are at the discretion of the clinical laboratories and not determined by SLD or DOCD.

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In addition to increasing the State’s RT-PCR testing capacity, electronic reporting of RT-PCR results to DOH was established. A total of 765 specimens were screened by RT-PCR in commercial laboratories during the 2007-08 traditional influenza season. Influenza RT-PCR was performed at the commercial laboratories upon request by the healthcare provider or to confirm a negative rapid influenza test⁷.

A specimen submission algorithm was successfully implemented and required all specimens positive for influenza by rapid influenza tests or RT-PCR to be forwarded to SLD. Exceptions were made for very ill hospitalized patients, patients with a travel history to any international destination, and patients who were identified to be part of an outbreak cluster; specimens from these cases were forwarded to SLD per these enhanced surveillance requirements for further testing despite a negative RT-PCR result. Of specimens that were sent directly to SLD for a negative or absent rapid antigen test and no RT-PCR confirmation, those meeting the same enhanced surveillance criteria described above as well as specimens submitted by influenza sentinel providers and those collected by Hawaii’s airport surveillance program were prioritized for testing.

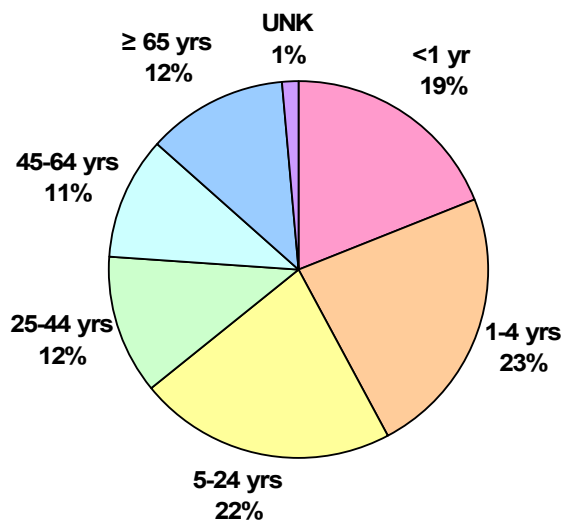
The online specimen submission and management system (Flu Online) introduced in November, 2006, continued to be utilized extensively during the 2007-08 influenza season. A total of 21 providers utilized the system to submit approximately 4,500 respiratory specimens during the 2007-08 influenza season.

⁷Clinicians who choose to utilize rapid influenza tests are reminded that while positive results tend to be truly positive, negative results should be confirmed with further diagnostic testing.

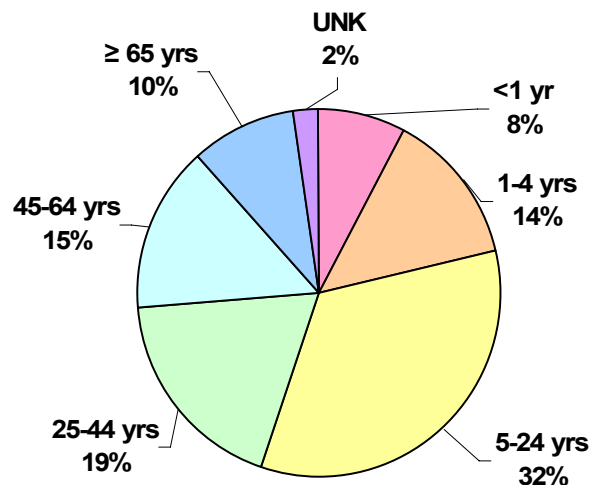
Influenza Trends, 2007-08:

A total of 3,147 specimens meeting HDOH criteria were tested using RT-PCR, and another 363 by viral culture during the 2007-08 traditional flu season. Select specimens positive for influenza by RT-PCR (n=524) were also evaluated by viral culture for confirmation, sub-typing, and subsequent strain characterization. Therefore, 3,571 (mean 108 specimens/week) specimens were evaluated by SLD during the 2007-08 season.

Specimens Tested by Age Group



Positive Cases By Age Group

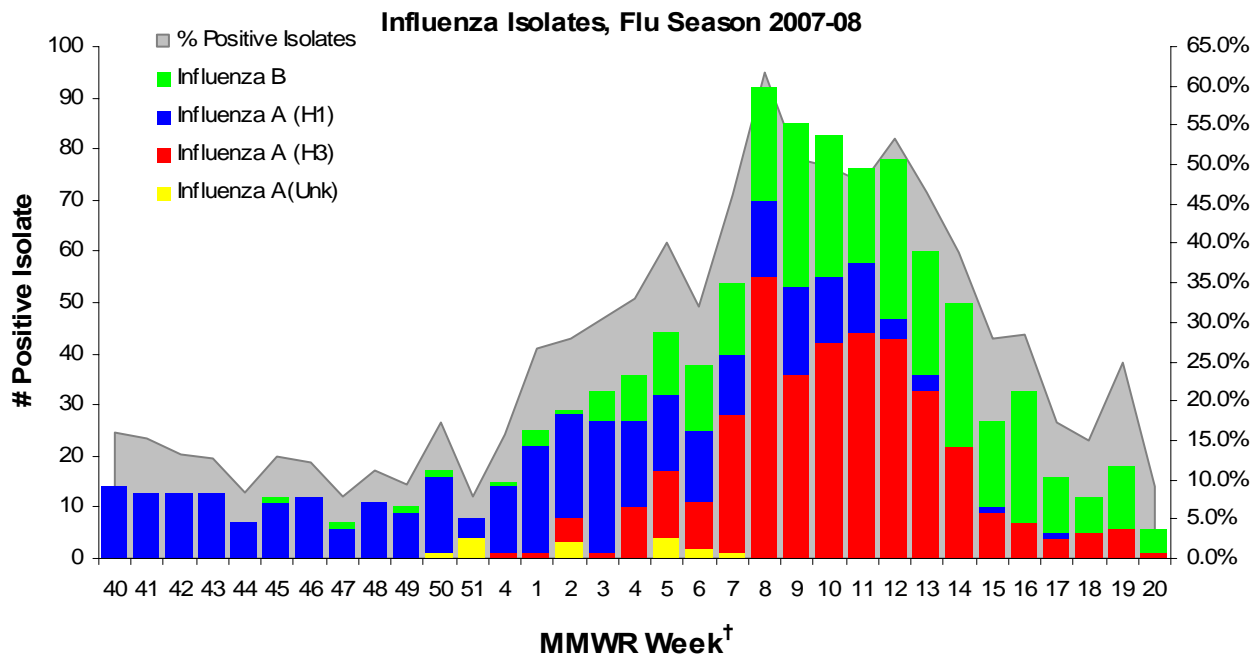


The pie charts above indicate the age group distributions of specimens tested in Hawaii and all positive influenza cases for the 2007-08 flu season. Based on these data, school children and young adults (age group 5-24) seemed most likely to test positive when influenza was suspected (32% of positive influenza cases versus 22% of specimens tested), whereas infants (age group <1 year) were least likely to be positive for influenza and likely to have other etiologies for their respiratory illness (8% of positive influenza cases versus 19% of specimens tested). These trends are similar to observations during the 2005-06 and 2006-07 influenza seasons⁸.

⁸These are observed trends and have not been analyzed for statistical significance.

In Hawaii, the proportion of respiratory specimens positive for influenza viruses peaked at 61.7% during MMWR week 8 (week ending February 23, 2008). The exceptionally high isolation rates may be at least in part influenced by HDOH’s specimen prioritization methods.

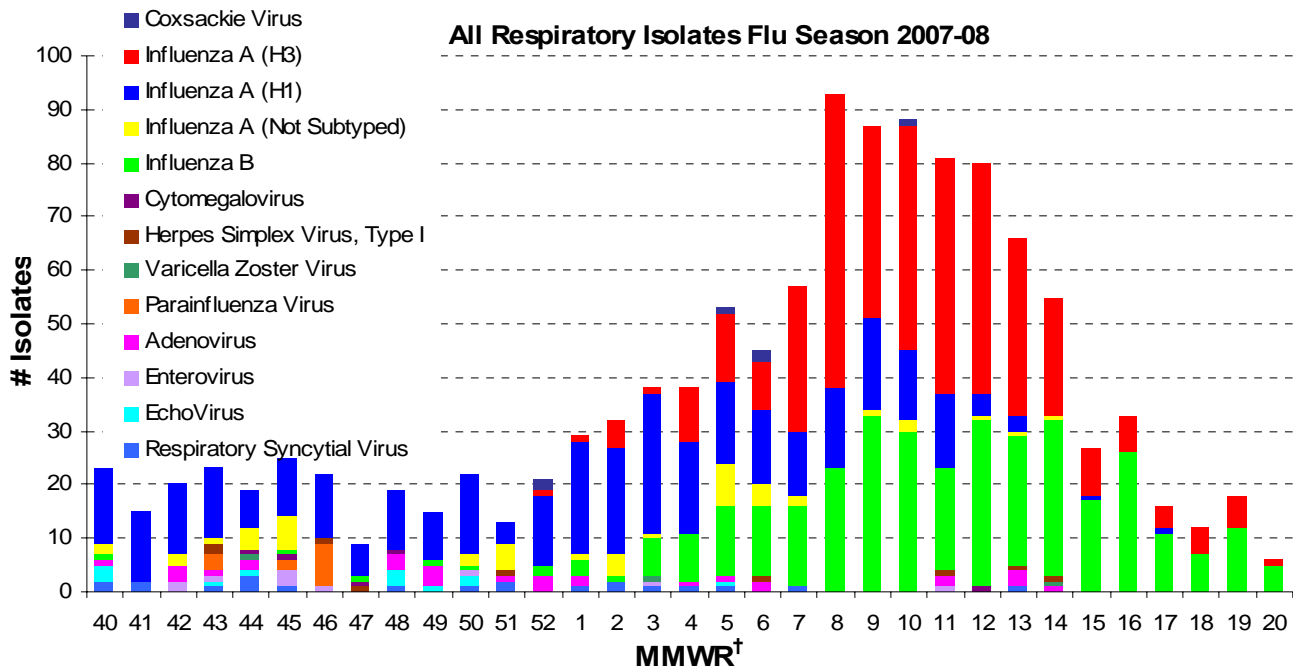
The majority of specimens cultured by SLD during the 2007-08 flu season tested positive for influenza A; influenza A(H3) and influenza A(H1) occurred in relatively equal proportions; influenza A(H1) predominated between October 2007 – mid February 2008, while influenza A(H3) was the predominant subtype during the remainder of the influenza season. Beginning in January 2008, HDOH detected increasing numbers of influenza B isolates.



Data courtesy of State Laboratories Division

A total of 1,047 (29.3%) of the 3,571 specimens tested by SLD were confirmed influenza positive during the recent flu season; 374 (36%) of these were influenza A(H3), and 334 (32%) were influenza A(H1). Fifteen influenza A (1%) isolates were not sub-typed. There were 324 (31%) influenza B cases. Select isolates were sent to CDC for sub-typing confirmation. In addition to influenza, SLD screened specimens for other respiratory viruses. Data obtained from SLD and the Tripler Army Medical Center are presented in the graph below.

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Data courtesy of SLD and Tripler Army Medical Center, Honolulu, Hawaii.

Antigenic Characterization:

Isolate information for 114 specimens were received from CDC. Eight (7%) were influenza A(H3) viruses. Based upon this limited information, it appears that the principal circulating strains of H3 viruses in Hawaii was A/Brisbane/10/2007-like (62.5%) followed by a virus that demonstrated reduced titers to A/Brisbane/10/2007 ferret antisera. One (13%) influenza A(H3) was characterized as A/Wisconsin/67/2005-like. A/Wisconsin/67/2005 was the H3 component in the 2007-08 influenza vaccine, and A/Brisbane/10/2007 will be the H3 component of the 2008-09 influenza vaccine.

The majority of specimens sent for strain characterization during the 2007-08 season were influenza A(H1) (N=83, 73%). The data suggested that more of the A/Solomon Islands/03/2006-like (H1N1) (65.1%) than the A/Brisbane/59/2007-like (H1N1) (33.7%) circulated in Hawaii during the 2007-08 season, although this data may be skewed by submission criteria established by CDC. One isolate (1.2%) produced decreased titers to the A/Brisbane/59/2007 strain. A/Solomon Islands/03/2006 was the H1 component in the 2007-08 influenza vaccine, while A/Brisbane/59/2007 will be the H1 component in the upcoming 2008-09 vaccine.

Data on 23 (20.1%) influenza B isolates revealed that the majority (87%) of influenza B strains circulating in Hawaii were B/Florida/04/2006-like, an influenza B virus from the B/Yamagata lineage. Only three (13%) isolates in Hawaii originated from the B/Victoria lineage. Strain characterization for influenza B may be skewed, as no strain-typing data from late season isolates has been returned. B/Florida/04/2006 will serve as the influenza B component of the 2008-09 vaccine, while B/Ohio/01/2005, of B/Victoria lineage, was the B component of the 2007-08 influenza vaccine.

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Airport Surveillance:

HDOH has been conducting passive airport surveillance in collaboration with CDC’s Quarantine Station at the Honolulu International Airport (HQS) and Honolulu International Airport Medical Staff since the 2005-06 traditional flu season. Travelers meeting clinical criteria⁶ were swabbed at the airport, and specimens were tested by RT-PCR and viral culture at SLD. A total of 7 air travelers⁷ meeting clinical criteria for flu (none of whom met avian influenza criteria) were swabbed and tested; 4 (57%) were positive for influenza virus.

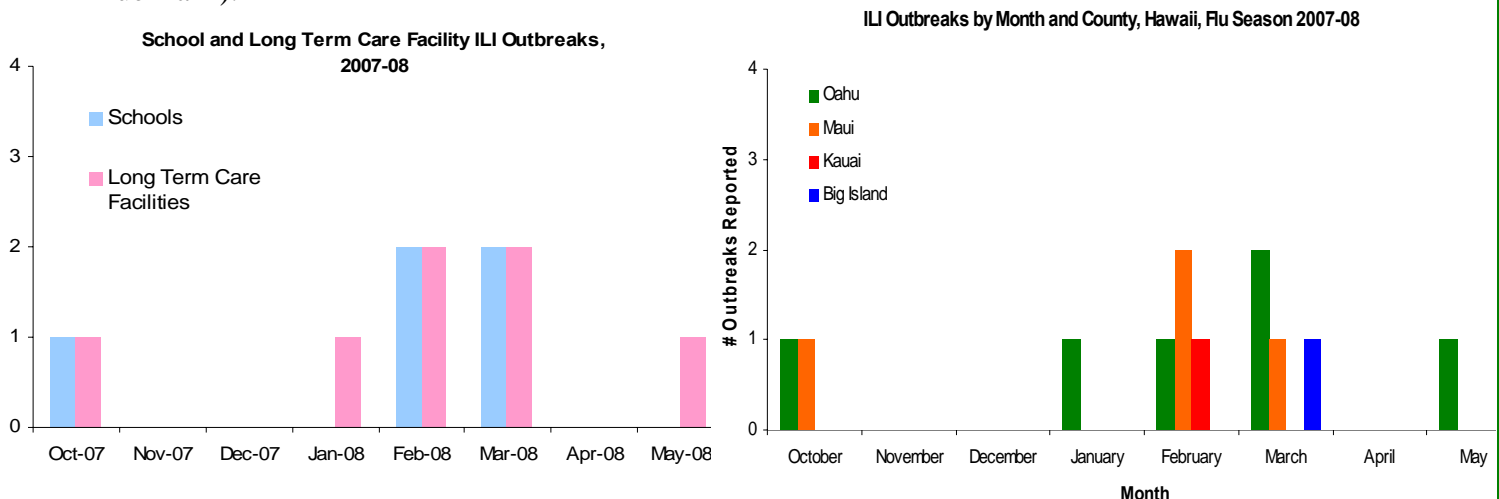
In 2008, HDOH piloted an active influenza surveillance program at the Honolulu International Airport. This active surveillance entails screening incoming passengers using a questionnaire distributed in-flight. The first trial screening involved English-speaking passengers traveling from Sydney, Australia and was conducted in June 2008 with promising results. Plans to expand the surveillance project are currently underway. No specimens for influenza testing have been collected from the active airport surveillance program at this time.

⁶Clinical criteria are defined as a fever or history of fever (i.e., body temperature 100°F or greater) PLUS one or more of the following symptoms: headache, muscle aches, sore throat, cough, chills, malaise, and/or vomiting.

⁷Denominator data are currently unavailable. The collection of denominator data was not standardized in the past, and mechanisms for quickly accessing existing data are not established.

Clustered ILI Activity:

During the 2007-08 influenza season, HDOH received 12 reports of ILI outbreaks; this is higher than the 9 received during the previous season. Of these, 7 (58%) reports were from long term care (LTC) facilities; the remainder were from schools. Specimens were collected for influenza testing from 7 institutions (7 LTC and 0 schools). The presence of influenza was excluded in 2 (28.5%) facilities and was confirmed through RT-PCR testing and viral culture isolation in 5 (71.5%) locations (1 influenza A[H1], 3 influenza A[H3], and 1 influenza B).



Avian Influenza:

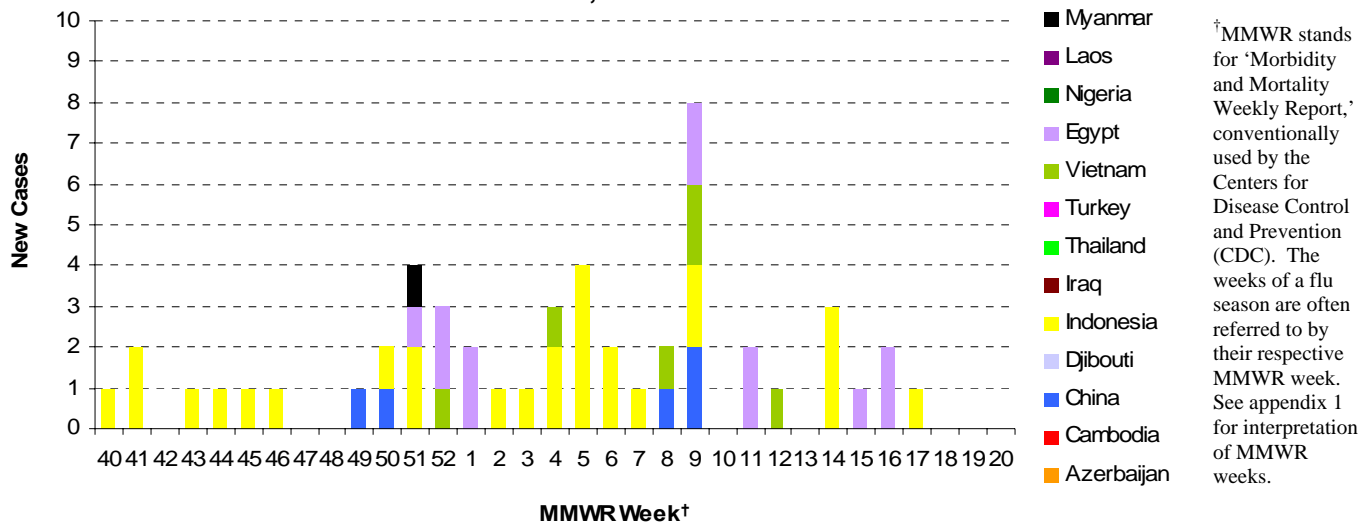
No cases of avian influenza infection in humans have been identified in the United States, including Hawaii. At the end of the 2007-08 traditional flu season, human cases of avian influenza A(H5N1) have been detected in 15 countries. A total of 385 cases (79 new cases during the 2007-08 season) were confirmed by WHO. Of all patients to date who have become ill with WHO-confirmed avian influenza, 243 (63%) died.

Cumulative Number of Confirmed Human Cases of Avian Influenza A(H5N1)

Country	2003		2004		2005		2006		2007		2008		Total	
	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths
Azerbaijan	0	0	0	0	0	0	8	5	0	0	0	0	8	5
Bangladesh	0	0	0	0	0	0	0	0	0	0	1	0	1	0
Cambodia	0	0	0	0	4	4	2	2	1	1	0	0	7	7
China	1	1	0	0	8	5	13	8	5	3	3	3	30	20
Djibouti	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Egypt	0	0	0	0	0	0	18	10	25	9	7	3	50	22
Indonesia	0	0	0	0	20	13	55	45	42	36	18	15	135	110
Iraq	0	0	0	0	0	0	3	2	0	0	0	0	3	2
Laos	0	0	0	0	0	0	0	0	2	2	0	0	2	2
Myanmar	0	0	0	0	0	0	0	0	1	0	0	0	1	0
Nigeria	0	0	0	0	0	0	0	0	1	1	0	0	1	1
Pakistan	0	0	0	0	0	0	0	0	3	1	0	0	3	1
Thailand	0	0	17	12	5	2	3	3	0	0	0	0	25	17
Turkey	0	0	0	0	0	0	12	4	0	0	0	0	12	4
Viet Nam	3	3	29	20	61	19	0	0	8	5	5	5	106	52
Total	4	4	46	32	98	43	115	86	73	58	34	26	385	243

* Laboratory-confirmed avian influenza cases are report by the World Health Organization (WHO). Total number of cases includes number of deaths. WHO reports only laboratory-confirmed cases. All dates refer to onset of illness.

New HPAI H5N1 Cases, Flu Season 2007-08



Appendix 1: MMWR Week

Please refer to the table below to interpret data presented by MMWR week.

Week Ending	MMWR	Week Ending	MMWR
10/6/2007	40	4/5/2008	14
10/13/2007	41	4/12/2008	15
10/20/2007	42	4/19/2008	16
10/27/2007	43	4/26/2008	17
11/3/2007	44	5/3/2008	18
11/10/2007	45	5/10/2008	19
11/17/2007	46	5/17/2008	20
11/24/2007	47	5/24/2008	21
12/1/2007	48	5/31/2008	22
12/8/2007	49	6/7/2008	23
12/15/2007	50	6/14/2008	24
12/22/2007	51	6/21/2008	25
12/29/2007	52	6/28/2008	26
1/5/2008	1	7/5/2008	27
1/12/2008	2	7/12/2008	28
1/19/2008	3	7/19/2008	29
1/26/2008	4	7/26/2008	30
2/2/2008	5	8/2/2008	31
2/9/2008	6	8/9/2008	32
2/16/2008	7	8/16/2008	33
2/23/2008	8	8/23/2008	34
3/1/2008	9	8/30/2008	35
3/8/2008	10	9/6/2008	36
3/15/2008	11	9/13/2008	37
3/22/2008	12	9/20/2008	38
3/29/2008	13	9/27/2008	39