



HAWAII STATE DEPARTMENT OF HEALTH DISEASE OUTBREAK CONTROL DIVISION 2015–2016 INFLUENZA SEASON SUMMARY

October 4, 2015 – October 1, 2016: MMWR¹ Week 40, 2015 – 39, 2016

SUMMARY:

The 2015–16 influenza season began on MMWR week 40 (October 4, 2015) and ended week 39 (October 1, 2016). This was a mild season when looking at the percentage of positive specimens, influenza-like illness (ILI) rate, pneumonia and influenza (P&I) mortality, and pediatric deaths, in comparison to baseline and historic levels.

The weekly proportion of outpatient visits for ILI recorded by sentinel providers in Hawaii ranged during the season from 0.5% to 6.5%. The data showed rising ILI trend between weeks 4–10, with a peak in visits at week 10 (6.5%). This coincided with increased national ILI rates during weeks 5–14. The median ILI rate for the season was 2.3%, similar to the median for the past 5 seasons (2.2%). Reported ILI rates were most pronounced in the 5–24 year-old age group, constituting 54% of all ILI visits. There were 24 ILI clusters during the season, fewer than the number of clusters in the past 2 seasons (34 in 2014–2015 and 28 in 2013–2014). Of those 24, 18 clusters were influenza-positive.

Pneumonia and influenza (P&I) mortality surveillance monitors the proportion of all reported deaths related to pneumonia and influenza. The Honolulu P&I contributed to a measure of P&I in 122 cities across the United States of America. There were 4,460 total deaths recorded in all of Hawaii for the 2015–16 influenza season; of these, 478 (10.7%) were related to pneumonia or influenza. This is similar to seasonal P&I rates in the past five influenza seasons (median 10.8%). There were a total of 87 influenza-associated pediatric deaths reported nationally to the Centers for Disease Control and Prevention (CDC) during the 2015–2016 season; this is below the median reported over the last five seasons (105). No pediatric influenza deaths occurred in Hawaii this season.

Laboratory data showed that 4,324 (9.5%) of the 45,367 specimens tested for influenza were positive by any method (rapid antigen testing, PCR, and/or viral culture). This has been the lowest percent positivity documented for the past five seasons (median 14.4%). Rapid antigen testing was performed on 25,825 (56.9%) samples, while confirmatory testing was done on 19,542 (43.1%). Of all specimens tested, 3,262 were positive for influenza A (7.2%) and 1,062 were positive for influenza B (2.3%). The 3,262 influenza A specimens included 370 2009 H1N1 specimens and 140 H3 specimens. The remainder (2,752) were not subtyped. When looking by age groups, the >65 year-old age group made up the largest proportion of specimens tested for influenza (23%), but the 5–24 and 45–64 year-old age groups made up the largest proportions of positive influenza tests (22% and 23%, respectively).

Overall, ILI activity remained similar to prior seasons during the 2015–2016 influenza season, while influenza specimen positivity was low, suggesting contribution from circulating non-influenza respiratory pathogens. Notably, the timing of Hawaii's peak ILI activity mirrored that of the mainland; the mainland's ILI activity and peak typically precedes Hawaii's by several weeks. This emphasizes the variability of influenza seasons; each season can vary in timing, severity, and duration. Ongoing surveillance will continue to maintain timely situational awareness of influenza.

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.

I. INFLUENZA LIKE ILLNESS (ILI):

Influenza-like illness surveillance is a primary method used for monitoring influenza activity during the season. The data used to determine the ILI rate in Hawaii originates from sentinel healthcare providers. Each year, sentinel providers register to report ILI data to the Hawaii Department of Health (HDOH) and CDC. A patient with ILI must have the following: fever (temp. of 100°F [37.8°C] or greater) and cough and/or sore throat without a known cause other than influenza. For the 2015–2016 influenza season, 45 sentinel providers registered for the ILINet surveillance program. Of those 45, 20 routinely reported their data to CDC and HDOH during the 2015–2016 influenza season. The distribution of providers by practice type is shown below (Table 1). Internal medicine was the most common practice type, followed by family practice and pediatrics. Student health (2), urgent care (2), and emergency medicine (1) had the lowest representation.

TYPE OF PRACTICE	# OF SENTINEL PROVIDERS ACTIVELY REPORTING
Internal Medicine	7
Family Practice	5
Pediatrician	4
Student Health	2
Urgent Care	1
Emergency medicine	1

Table 1. Practice type distribution of the 20 reporting Hawaii ILI sentinel providers registered for the 2015–2016 season

Sentinel provider geographic representation was not equally distributed among the various counties; the most populous county, Honolulu, had the highest number of sentinel providers. Of the 45 total providers, 37 were located in either Hawaii or Honolulu counties. Maui (6) and Kauai (2) had the fewest sentinel providers. CDC recommends that smaller states maintain at least 10 ILI sentinel providers per state.

LOCATION	# OF ACTIVELY REPORTING SENTINEL PROVIDERS	ACTIVE SENTINEL PROVIDERS PER 100,000 RESIDENTS
Honolulu	17	1.7
Maui	2	1.2
Hawaii	1	.5
Kauai	0	0
Total	20	3.4

Table 2. Geographic distribution of the 20 reporting Hawaii ILI sentinel providers, by county

During the 2015–2016 influenza season, sentinel providers reported a total of 63,584 patient visits (a median of 1,261 per week). Of these total patient visits, 1,470 (2.3%) were for ILI, with a median of 23 visits per week. The median cumulative ILI rate for the past five seasons was 2.2%. For the 2015–2016 season, weeks 4–16 had the highest ILI rates, with a peak of 6.5% occurring in week 10. For the majority (92%) of the season, the weekly proportion of outpatient visits for ILI were statistically comparable to the historical baseline² for Hawaii, the national ILI rate, and the national ILI baseline³ set by CDC (Figure 1). The national ILI rate appeared to peak in weeks 5–14, which was similar to the timing of the peak seen in Hawaii. This was not typical; for the past five influenza seasons Hawaii's ILI peak followed the national peak by about 3–4 weeks.

² The Hawaii historical baseline (%ILI and %P&I) is the average of 3-week moving averages over the preceding five flu seasons of historical data (2008–09, 2009–10, 2010–2011, 2011–2012, and 2012–2013).

³ The National Baseline is calculated by CDC as the mean percentage of visits for ILI during weeks 21–39 with two standard deviations. Because of large variability in regional ILI, comparison of the national baseline with local ILI may not be appropriate. It is provided in this report because no meaningful regional baselines are available for comparison. The national baseline combines all data reported by states to CDC, including ILI in outpatient, ER, urgent care, and inpatient settings.

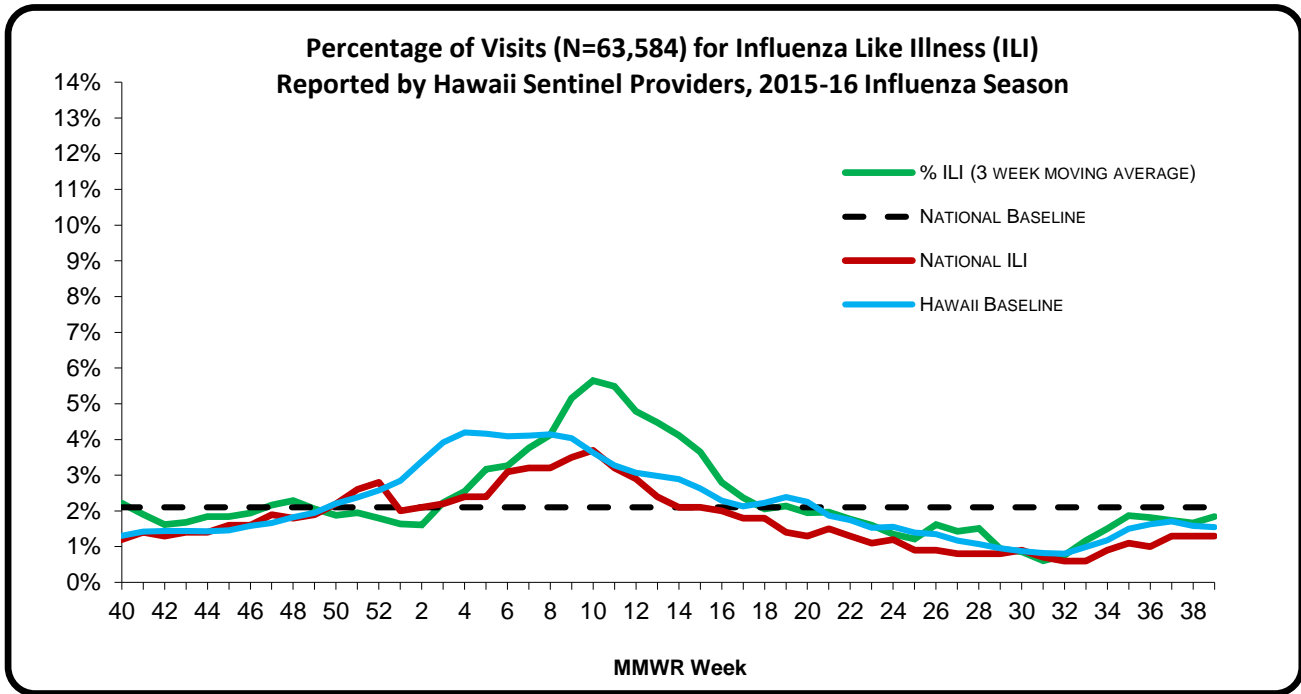


Figure 1. Comparison of the weekly Hawaii ILI rate, national baseline, national ILI rate, and Hawaii baseline by MMWR week, 2015–2016

The age group distribution of recorded ILI patients can be seen in Figure 2. About half of all reported ILI patients were in the 5–24 year-old age group. Differences in distribution by age group may not only reflect differences in infection rates, but may also be impacted by the practice types of the sentinel providers in our surveillance program as well as differential care-seeking behaviors in different age groups. About 3% of reported ILI patients were in the >65 age group. However, this population may be seen by non-sentinel providers (e.g., nursing home providers) or because of age and comorbidities may have more severe presentations meriting emergency room care.

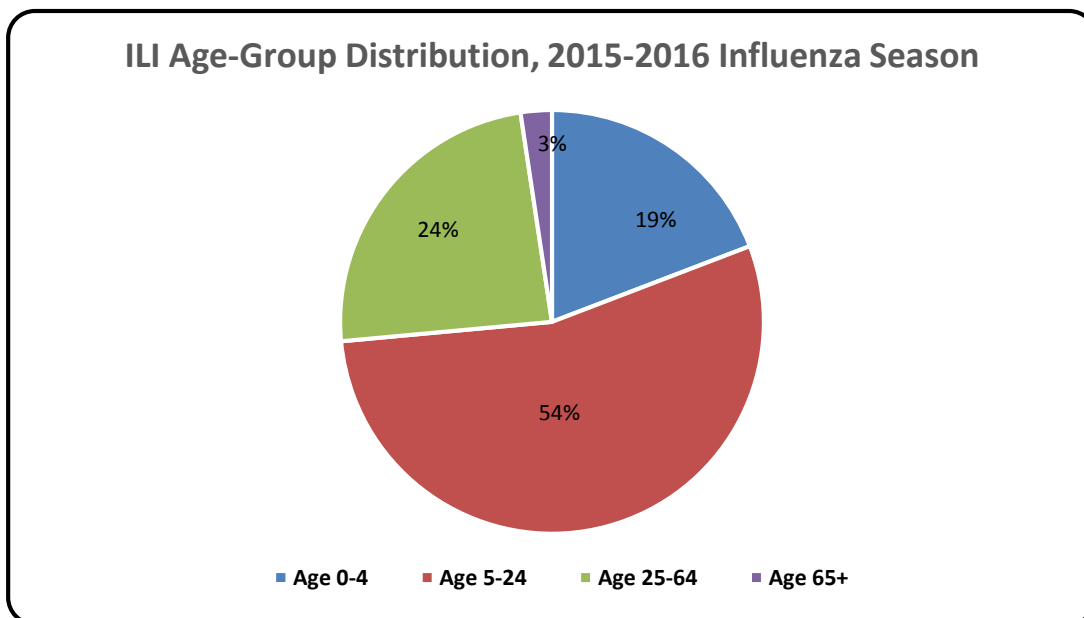


Figure 2. Age-group distribution of ILI visits for the 2015–2016 influenza season

There were 24 ILI or confirmed influenza clusters reported during the 2015–2016 season. This is fewer than the clusters reported in the last two influenza seasons; 34 were reported in the 2014–2015 season and 28 in the 2013–2014 season. The 2015–2016 season clusters were either associated with long-term care facilities (18) or schools (6). Typing of clusters, where known, can be seen in Figure 3. Nearly two-thirds of clusters occurred between February and May (62.5%).

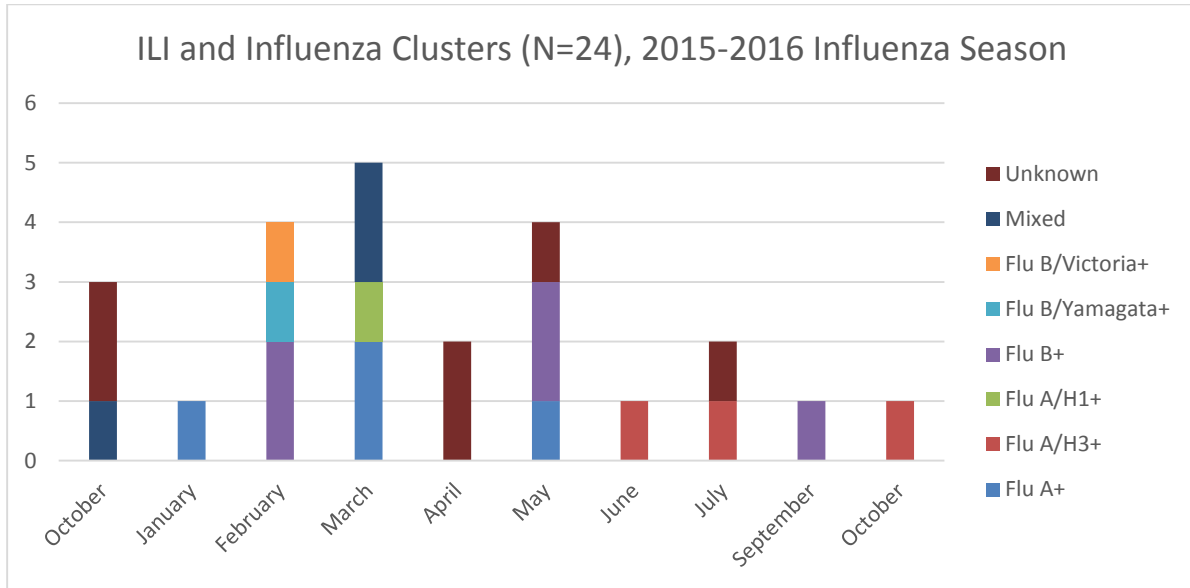


Figure 3. ILI and influenza clusters, by influenza type and MMWR week, for the 2015–2016 season

II. PNEUMONIA & INFLUENZA MORTALITY:

Pneumonia and influenza-related mortality is another method used to track influenza activity during the season. The data for pneumonia and influenza mortality comes from the Office of Vital Statistics at HDOH. The P&I rate is calculated by dividing the number of deaths related to P&I by the number of deaths from any cause.

Category	Number
Total deaths (all causes)	4,460
<i>Average/week</i>	85.8
Total deaths related to pneumonia/influenza	478
<i>Average/week</i>	9.2
Cumulative average P&I rate	10.7%
Peak P&I rate	17.2% (week 11)

Table 3. Pneumonia and influenza mortality statistics for the 2015–2016 influenza season

The table above shows cumulative P&I rate for the 2015–2016 season (10.7%) which is similar to P&I rates in the past 5 influenza seasons (median: 10.9%). The figure below (Figure 4) depicts the trends for the Hawaii P&I mortality 3 week moving average alongside three additional measures: a Hawaii historic baseline⁴, an epidemic threshold, and the 122-cities mortality rate⁵. The peak for the Hawaii P&I rate occurred in week 11 (17.2%).

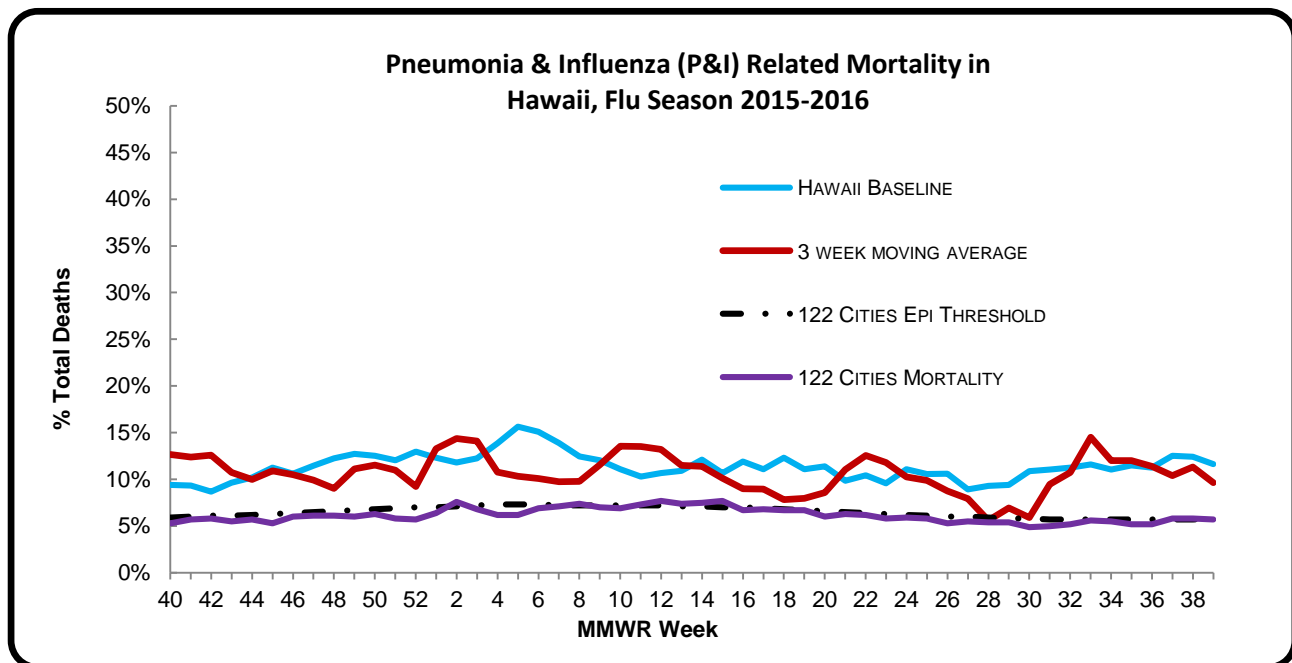


Figure 4. Pneumonia and influenza (P&I) related mortality in Honolulu by MMWR week for the 2015–16 influenza season

Additionally, influenza-associated pediatric deaths have been a nationally notifiable condition since 2004. There were a total of 87 influenza-associated pediatric deaths reported nationally to CDC during the 2015–2016 season, below the median for the past five seasons (105).⁶ None were reported from Hawaii.

⁴ The Hawaii historical baseline (%ILI and %P&I) is the average of 3-week moving averages over the preceding five flu seasons of historical data (2009–09, 2009–2010, 2010–2011, 2011–2012, and 2012–2013).

⁵ Each week, the vital statistics offices of 122 cities across the United States report the total number of death certificates processed and the number of those for which pneumonia or influenza was listed as the underlying or contributing cause of death by age group (Under 28 days, 28 days–1 year, 1–14 years, 15–24 years, 25–44 years, 45–64 years, 65–74 years, 75–84 years, and ≥85 years). The percentage of deaths related to pneumonia and influenza (P&I) are compared with a seasonal baseline and epidemic threshold value calculated for each week.

⁶ FluView, accessed 11/29/2016: <http://gis.cdc.gov/GRASP/Fluview/PedFluDeath.html>

III. LABORATORY SURVEILLANCE:

During the 2015–16 influenza season, the State Laboratories Division (SLD) of the Hawaii Department of Health (HDOH) tested 1,187 specimens for influenza. Specimen submissions have steadily increased over the past several years, and an algorithm was developed to accommodate the high specimen volume, reduce turnaround time, optimize data quality, and improve utilization of limited resources. DOCD drafted a list with criteria⁷ to prioritize specimens for confirmatory testing at SLD. Within the constraints of resources and funding, specimens meeting these criteria were forwarded to SLD for confirmatory testing.

TOTAL SPECIMENS TESTED FROM ALL LABORATORIES, 2015-2016: 45,367			
SPECIMENS TESTING POSITIVE, 2015-2016: 4,324 (9.5%)			
MEDIAN SPECIMEN POSITIVITY FOR THE PAST FIVE SEASONS: 5,216 (14.4%)			
TESTING TYPE	RAPID ANTIGEN ONLY	25,825	56.9%
	CONFIRMATORY	19,542	43.1%
INFLUENZA TYPING	A	3,262	7.2%
	B	1,062	2.3%
INFLUENZA A SUB-TYPING	2009 H1N1	370	0.8%
	OTHER SEASONAL A (H1)	0	0%
	INFLUENZA A (H3)	140	0.3%

Table 4. Testing, typing and subtyping for influenza during the 2015–2016 season

The distribution by age group for the specimens tested and positive specimens is shown below (Figure 6). For the 45,350 specimens tested, the distribution by age group was fairly uniform, although the >65 year-old age group represented the highest proportion (23%). The 5–24 and 45–64 age groups made up the largest proportion of positive influenza specimens (23% each).

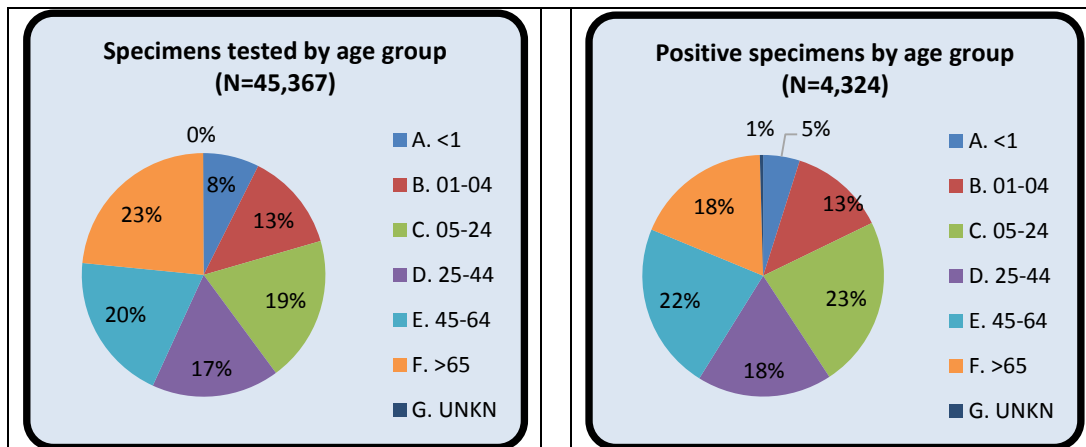


Figure 5. Age group distribution of influenza specimens tested and positive cases during the 2015–2016 season

⁷ The list of priority specimens includes: hospitalized patients with acute respiratory distress syndrome [ARDS] or x-ray confirmed pneumonia; travelers with international travel history within 10 days of onset; specimens submitted by sentinel providers; specimens collected from healthcare workers, pregnant women, or women up to 6 weeks post-partum; those with underlying medical conditions; and patients presenting with unusual or severe manifestations of influenza infection.

IV. AIRPORT SURVEILLANCE:

HDOH introduced passive airport influenza surveillance in collaboration with CDC's Honolulu International Airport Quarantine Station and Honolulu International Airport Medical Response staff during the 2005–06 influenza season. Travelers meeting clinical criteria⁸ were swabbed at the airport, and specimens were tested at SLD by RT-PCR for influenza as well as for other respiratory viruses via a Luminex xTAG respiratory virus panel (Luminex Corporation, Austin, TX). During the 2015–2016 season, a total of 6 air travelers⁹ meeting clinical criteria were swabbed and tested. Of these, one was positive for influenza A (H1N1), one was positive for respiratory syncytial virus (RSV), one was positive for adenovirus, two were positive for rhinovirus, and the last specimen was negative for influenza or other respiratory pathogens¹⁰ tested.

V. AVIAN INFLUENZA:

No cases of avian influenza infection in humans were identified in the United States during the 2015–2016 influenza season. As of the end of the 2015–16 influenza season, human cases of avian influenza A (H5N1) have been detected in 16 countries since surveillance began in 2003. A total of 856 cases and 452 deaths have been identified globally; the countries with the highest numbers of cases were Egypt, Indonesia, Vietnam, Cambodia, and China. These five countries represented 791 (92.4%) of the total cases and 418 (92.5%) of the total deaths reported. Of the 10 patients with WHO-confirmed avian influenza during the 2015–2016 season, 3 (30.0%) died.

Country	2003-2009*		2010-2014**		2015		2016		Total	
	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths
Azerbaijan	8	5	0	0	0	0	0	0	8	5
Bangladesh	1	0	6	1	1	0	0	0	8	1
Cambodia	9	7	47	30	0	0	0	0	56	37
Canada	0	0	1	1	0	0	0	0	1	1
China	38	25	9	5	6	1	0	0	53	31
Djibouti	1	0	0	0	0	0	0	0	1	0
Egypt	90	27	120	50	136	39	10	3	356	119
Indonesia	162	134	35	31	2	2	0	0	199	167
Iraq	3	2	0	0	0	0	0	0	3	2
Lao People's Democratic Republic	2	2	0	0	0	0	0	0	2	2
Myanmar	1	0	0	0	0	0	0	0	1	0
Nigeria	1	1	0	0	0	0	0	0	1	1
Pakistan	3	1	0	0	0	0	0	0	3	1
Thailand	25	17	0	0	0	0	0	0	25	17
Turkey	12	4	0	0	0	0	0	0	12	4
Viet Nam	112	57	15	7	0	0	0	0	127	64
Total	468	282	233	125	145	42	10	3	856	452

Table 5. Laboratory-confirmed avian influenza cases, by year and county, as reported to the World Health Organization, 2003–2016¹¹

⁸ Clinical criteria were 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.

⁹ Denominator data are currently unavailable.

¹⁰ Luminex Corporation, Austin, TX. Luminex RVP detects: adenovirus, human metapneumovirus, influenza A (Matrix/H1/H3), influenza B, RSV A, RSV B, rhinovirus, coronavirus 229E, coronavirus HKU1, coronavirus NL63, coronavirus OC43, parainfluenza 1-4, and bocavirus.

¹¹ WHO, accessed on 12/7/2016: http://www.who.int/influenza/human_animal_interface/2016_10_03_tableH5N1.pdf

APPENDIX 1: ADDITIONAL INFORMATION

For more information regarding local and national influenza surveillance programs, visit the following sites.

Centers for Disease Control and Prevention	General Influenza: http://www.cdc.gov/flu/about/disease/index.htm National ILI and P&I Data: http://www.cdc.gov/flu/weekly/fluactivitysurv.htm Vaccine Virus Selection: http://www.cdc.gov/flu/about/season/vaccine-selection.htm
Flu.gov	General Influenza Information: flu.gov
HDOH Flu and Pneumonia	General Influenza: http://health.hawaii.gov/docd/flu-hawaii/general-info/ Surveillance: http://health.hawaii.gov/docd/flu-hawaii/surveillance/ To find out more information or join the sentinel physician program, email: DOH.Influenza.Surveillance@doh.hawaii.gov
World Health Organization	General Global and Local Influenza: http://www.who.int/topics/influenza/en/ Avian Influenza: http://www.who.int/influenza/human_animal_interface/avian_influenza/en/

APPENDIX 2: MMWR WEEK

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

MMWR WEEK	2015	2016
1	1/10/2015	1/9/2016
2	1/17/2015	1/16/2016
3	1/24/2015	1/23/2016
4	1/31/2015	1/30/2016
5	2/7/2015	2/6/2016
6	2/14/2015	2/13/2016
7	2/21/2015	2/20/2016
8	2/28/2015	2/27/2016
9	3/7/2015	3/5/2016
10	3/14/2015	3/12/2016
11	3/21/2015	3/19/2016
12	3/28/2015	3/26/2016
13	4/4/2015	4/2/2016
14	4/11/2015	4/9/2016
15	4/18/2015	4/16/2016
16	4/25/2015	4/23/2016
17	5/2/2015	4/30/2016
18	5/9/2015	5/7/2016
19	5/16/2015	5/14/2016
20	5/23/2015	5/21/2016
21	5/30/2015	5/28/2016
22	6/6/2015	6/4/2016
23	6/13/2015	6/11/2016
24	6/20/2015	6/18/2016
25	6/27/2015	6/25/2016
26	7/4/2015	7/2/2016
27	7/11/2015	7/9/2016
28	7/18/2015	7/16/2016
29	7/25/2015	7/23/2016
30	8/1/2015	7/30/2016
31	8/8/2015	8/6/2016
32	8/15/2015	8/13/2016
33	8/22/2015	8/20/2016
34	8/29/2015	8/27/2016
35	9/5/2015	9/3/2016
36	9/12/2015	9/10/2016
37	9/19/2015	9/17/2016
38	9/26/2015	9/24/2016
39	10/3/2015	10/1/2016
40	10/10/2015	10/8/2016
41	10/17/2015	10/15/2016
42	10/24/2015	10/22/2016
43	10/31/2015	10/29/2016
44	11/7/2015	11/5/2016
45	11/14/2015	11/12/2016
46	11/21/2015	11/19/2016
47	11/28/2015	11/26/2016
48	12/5/2015	12/3/2016
49	12/12/2015	12/10/2016
50	12/19/2015	12/17/2016
51	12/26/2015	12/24/2016
52	1/2/2016	12/31/2016
53		