



MI Flu Focus

Influenza Surveillance Updates
Bureaus of Epidemiology and Laboratories



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Current Influenza Activity Levels:

- **Michigan:** Sporadic activity
- **National:** During May 6-12, activity declined nationally and in most regions, but remained elevated in some areas of the United States

Updates of Interest

- **Research:** The pandemic 2009 H1N1 vaccine can also generate antibodies against other influenza strains including H5N1 and H3N2

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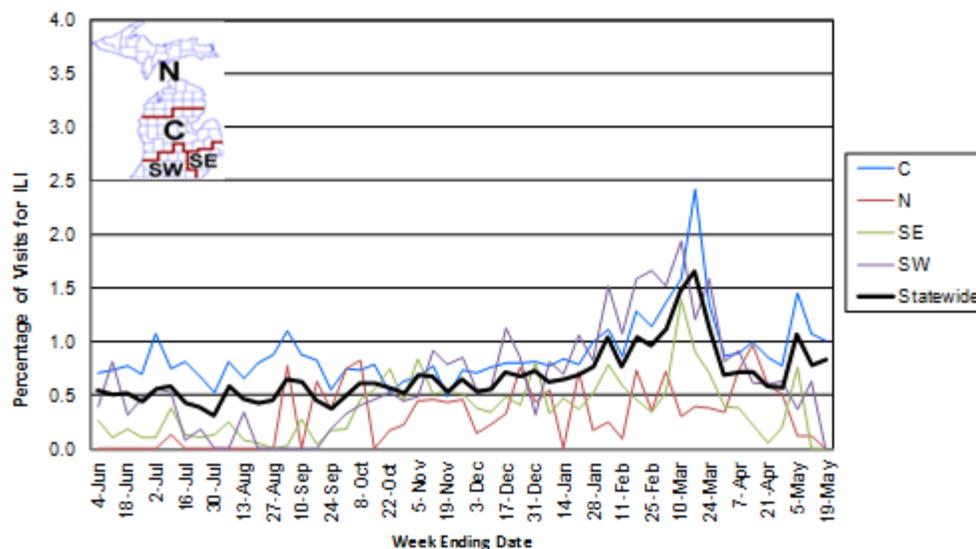
Influenza Surveillance Reports

Michigan Disease Surveillance System (as of May 24): MDSS data for the week ending May 19th indicated that compared to levels from the previous week, both individual and aggregate reports decreased. Individual reports are slightly higher, while aggregate reports are similar, than levels seen during the same time last year.

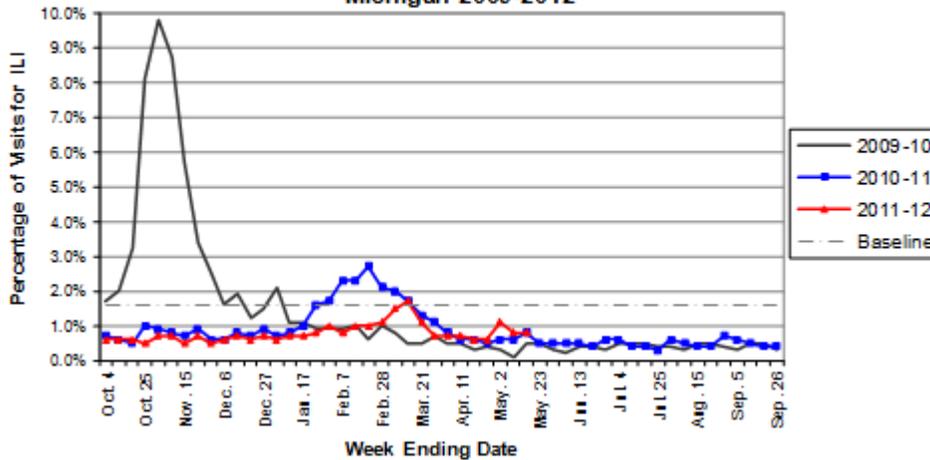
Emergency Department Surveillance (as of May 24): Compared to levels from the week prior, emergency department visits from both constitutional and respiratory complaints remained steady. Both constitutional and respiratory complaints have returned to levels seen at the beginning of last fall and are similar to levels reported during the same time period last year. In the past week, there were seven constitutional alerts in the SW(2), C(4) and N(1) Influenza Surveillance Regions and three respiratory alerts in the SW(1) and C(2) Regions.

Sentinel Provider Surveillance (as of May 24): During the week ending May 19, 2012, the proportion of visits due to influenza-like illness (ILI) decreased to 0.8% overall; this is below the regional baseline of (1.6%). A total of 46 patient visits due to ILI were reported out of 5,565 office visits. Twenty-two sentinel sites provided data for this report. ILI activity decreased in all four surveillance regions: Central (1.0%), Southeast (0.0%), North (0.0%) and Southwest (0.0%). Please note these rates may change as additional reports are received.

Percentage of Visits for Influenza-like Illness (ILI)
Reported by Sentinel Providers, Statewide and Regions
2010-2011 and 2011-12 Flu Seasons



**Percentage of Visits for Influenza-like Illness (ILI) Reported by the
US Outpatient Influenza-like Illness Surveillance Network (ILINet):
Michigan 2009-2012**



As part of pandemic influenza surveillance, CDC and MDCH highly encourage year-round participation from all sentinel providers. New practices are encouraged to join the sentinel surveillance program today! Contact Cristi Carlton at 517-335-9104 or CarltonC2@michigan.gov for more information.

Hospital Surveillance (as of May 19): The Influenza Hospitalization Surveillance Project provides population-based rates of severe influenza illness in Clinton, Eaton and Ingham counties. For the 2011-12 season, 27 influenza hospitalizations (9 adult, 18 pediatric) have been reported in the catchment area.

The MDCH Influenza Sentinel Hospital Network monitors influenza hospitalizations reported voluntarily by hospitals statewide. 4 hospitals (SE, SW) reported for the week ending May 19, 2012. Results are listed in the table below. Total hospitalizations were adjusted to reflect amended reports from past weeks.

Age Group	Hospitalizations Reported During Current Week	Total Hospitalizations 2011-12 Season
0-4 years	0	21
5-17 years	0	23
18-49 years	1	32
50-64 years	0	28
≥65 years	0	43
Total	1	147

Laboratory Surveillance (as of May 19): During May 13-19, 4 influenza A/H3 (2SW, 2C), and 11 influenza B (8SW, 3N) results were reported by MDCH BOL. For the 2011-12 season (starting October 2, 2011), MDCH has identified 1133 influenza results:

- Influenza A(H3): 1037 (600SE, 89SW, 301C, 47N)
- Influenza A(H1N1)pdm09: 31 (21SE, 3SW, 5C, 2N)
- Influenza B: 64 (25SE, 24SW, 10C, 5N)
- Influenza A(H3) and B co-infection: 1 (SE)
- Parainfluenza: 2 (1SE, 1C)
- Adenovirus: 3 (3SE)
- RSV: 4 (1SW, 1C, 2N)

9 sentinel labs (SE, SW, C, N) reported for the week ending May 19, 2012. 4 labs (SW, C, N) reported sporadic influenza A activity. 3 labs (SW, C) had low influenza B positives. 1 lab (SW) reported sporadic RSV activity. 2 labs (SW) had sporadic parainfluenza activity. Testing volumes are low or sporadic.

Michigan Influenza Antigenic Characterization (as of May 24): For the 2011-12 season, 45 Michigan influenza B viruses have been characterized at MDCH. 8 viruses are B/Brisbane/60/2008-like (included in the 2011-12 influenza vaccine). 37 are B/Wisconsin/01/2010-like (not included in the 2011-12 vaccine).

Michigan Influenza Antiviral Resistance Data (as of May 24): For the 2011-12 season, 23 Michigan influenza A(H1N1)pdm09 specimens and 92 influenza A(H3) specimens have been tested for antiviral resistance at MDCH Bureau of Laboratories; all have tested negative for oseltamivir resistance. 11 Michigan influenza A(H3N2), 2 influenza A(H1N1)pdm09, and 4 influenza B specimens have been tested for antiviral resistance at the CDC; all have tested negative for oseltamivir and zanamivir resistance.

CDC has made recommendations regarding the use of antivirals for treatment and prophylaxis of influenza, which are available at <http://www.cdc.gov/flu/professionals/antivirals/index.htm>.

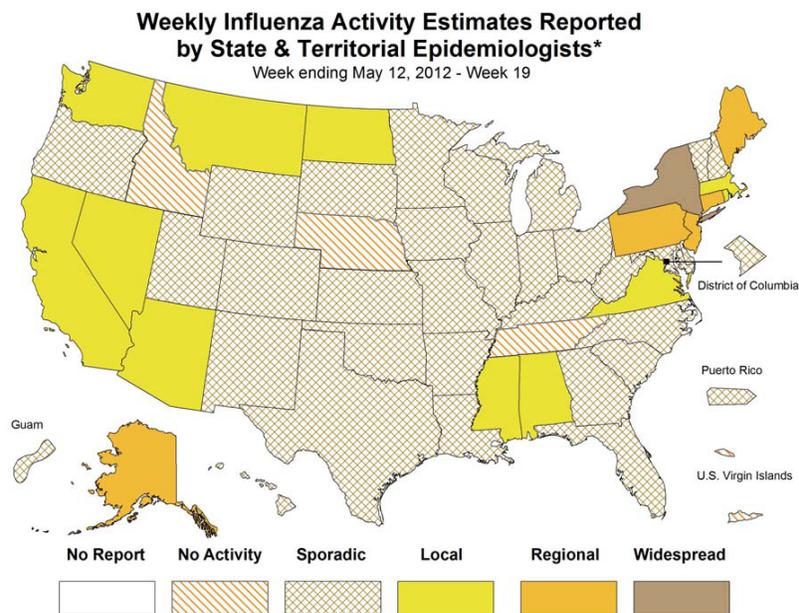
Influenza-associated Pediatric Mortality (as of May 24): No pediatric influenza-associated influenza mortalities have been reported to MDCH for the 2011-12 season.

CDC requires reporting of flu-associated pediatric deaths (<18 yrs), including pediatric deaths due to an influenza-like illness with lab confirmation of influenza or any unexplained pediatric death with evidence of an infectious process. Contact MDCH immediately for proper specimen collection. The MDCH protocol is at www.michigan.gov/documents/mdch/ME_pediatric_influenza_guidance_v2_214270_7.pdf.

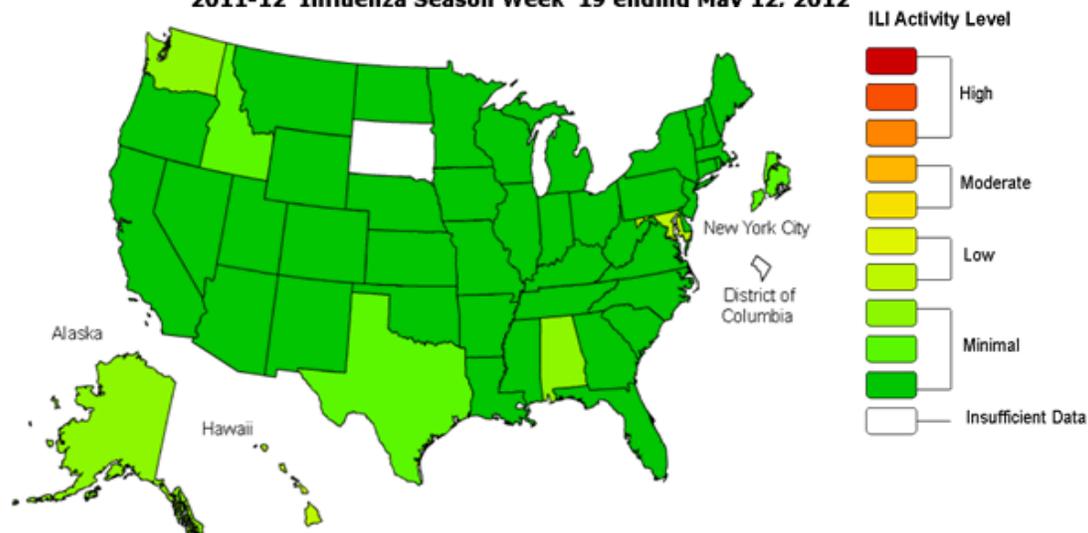
Influenza Congregate Settings Outbreaks (as of May 24): 28 respiratory outbreaks (6SE, 2SW, 19C, 1N) have been reported to MDCH during the 2011-12 season; testing results are listed below.

- Influenza A/H3: 14 (4SE, 10C)
- Influenza A: 2 (2C)
- Human metapneumovirus: 1 (SW)
- Negative or not tested: 11 (1SE, 1SW, 8C, 1N)

National (CDC [edited], May 18): During week 19 (May 6-12, 2012), influenza activity declined nationally and in most regions, but remained elevated in some areas of the U.S. Of the 2,171 specimens tested by U.S. WHO and NREVSS collaborating laboratories and reported to CDC/Influenza Division, 288 (13.3%) were positive for influenza. The proportion of deaths attributed to P&I was below the epidemic threshold. 2 influenza-associated pediatric deaths were reported. 1 was associated with an influenza B virus and 1 was associated with an influenza A virus for which the subtype was not determined. The proportion of outpatient visits for influenza-like illness (ILI) was 1.2%, which is below the national baseline of 2.4%. All regions reported ILI below region-specific baseline levels. 2 states experienced low ILI activity; New York City and 47 states experienced minimal ILI activity, and the District of Columbia and 1 state had insufficient data to calculate ILI activity. 1 state reported widespread geographic activity; 5 states reported regional influenza activity; 11 states reported local activity; the District of Columbia, Guam, Puerto Rico, and 30 states reported sporadic activity, and the U.S. Virgin Islands and 3 states reported no activity.



Influenza-Like Illness (ILI) Activity Level Indicator Determined by Data Reported to ILINet
2011-12 Influenza Season Week 19 ending May 12, 2012



This map uses the proportion of outpatient visits to healthcare providers for influenza-like illness to measure the ILI activity level within a state. Therefore, outbreaks occurring in a single city could cause the state to display high activity levels. Data collected in ILINet may disproportionately represent certain populations within a state, and therefore, may not accurately depict the full picture of influenza activity for the whole state. Data displayed on this map are based on data collected in ILINet, whereas the State and Territorial flu activity map are based on reports from state and territorial epidemiologists.

The entire weekly report is available online at <http://www.cdc.gov/flu/weekly/fluactivity.htm>.

International (WHO [edited], May 10): The seasonal peak for influenza has passed in most countries in the temperate regions of the northern hemisphere. Different viruses have predominated in different parts of the world in the northern hemisphere 2011-12 influenza season. In North America, Canada had a slight predominance of influenza B over A(H3N2) (67% vs. 33% respectively) particularly later in the season, while in the USA, the proportions were reversed and A(H3N2) was more common. Mexico's season was almost all related to A(H1N1)pdm09. In Europe, the large majority of viruses have been A(H3N2) with only very small numbers of A(H1N1)pdm09 and B. In Asia, northern China and Mongolia reported mostly influenza B early in the season with A(H3N2) appearing later, though this sequence was reversed in the Republic of Korea and Japan where A(H3N2) was predominant initially and influenza B appeared later. At the beginning of the season, most viruses tested were antigenically closely related to those found in the current trivalent seasonal vaccine. However, by mid-season, divergence was noted in both the USA and Europe in the A(H3N2) viruses tested and significant numbers of A(H3N2) viruses tested in recent months have shown reduced cross reactivity with the vaccine viruses. Influenza B virus detections have been both from the Victoria and Yamagata lineages with the former slightly more common in China and parts of Europe. Resistance to neuraminidase inhibitors has been low or undetectable throughout most of the season; however, a slight increase in levels of resistance to oseltamivir has been reported in A(H1N1)pdm09 isolates in the USA. Most (11/16) of these oseltamivir resistant cases have been from the state of Texas, where A(H1N1)pdm09 has been the most common virus circulating.

The entire WHO report is available online at www.who.int/influenza/surveillance_monitoring/updates/latest_update_GIP_surveillance/en/index.html.

MDCH reported **SPORADIC ACTIVITY** to the CDC for the week ending May 19, 2012.

For additional flu vaccination and education information, the MDCH *FluBytes* newsletter is available at http://www.michigan.gov/mdch/0,1607,7-132-2940_2955_22779_40563-125027--,00.html.

Novel Influenza Activity and Other News

WHO Pandemic Phase: Post-pandemic – Influenza disease activity has returned to levels normally seen for seasonal influenza. It is expected that the pandemic virus will behave as a seasonal influenza A virus. It is important to maintain surveillance and update pandemic preparedness/response plans accordingly.

National, Research (Influenza and Other Respiratory Diseases abstract, May 14): Coleman *et al.* (2012) Evaluation of obesity as an independent risk factor for medically attended laboratory-confirmed influenza. *Influenza and Other Respiratory Viruses* DOI: 10.1111/j.1750-2659.2012.00377.x.

Background: The relationship between obesity and susceptibility to influenza infection in humans is unclear. Morbidly obese people were at an increased risk of complications from 2009 pandemic H1N1 influenza [A(H1N1)pdm09].

Objective: The goal of this study was to determine whether medically attended, laboratory-confirmed influenza is independently associated with obesity in adults with acute respiratory illness.

Patients/Methods: Adults ≥ 20 years with a medical encounter for acute respiratory illness were recruited from a population cohort during the 2007–2008 ($n = 903$), 2008–2009 ($n = 869$), and 2009 pandemic ($n = 851$) season. Nasopharyngeal swabs were tested for influenza by real-time reverse-transcription polymerase chain reaction. Body mass index (BMI) was calculated using data from the electronic medical record. Logistic regression evaluated the association between influenza and obesity, adjusting for gender, vaccination, age, and high-risk medical condition.

Results: Influenza was detected in 50% of patients in 2007–2008, 15% in 2008–2009, and 14% during the 2009 pandemic. Predominant seasonal viruses in this population were A/H3N2 in 2007–2008, and A/H1N1 and B in 2008–2009. Mean (\pm SD) BMI was 30.58 (± 7.31) in patients with influenza and 30.93

(±7.55) in test-negative controls during all seasons. Mean BMI of patients with influenza did not vary by season. After adjusting for confounders, neither obesity nor extreme obesity were associated with influenza by season or for all years combined (OR 0.95: 95% CI 0.75, 1.20 and 1.10: 0.80, 1.52, respectively, for obesity and extreme obesity, all years).

Conclusions: Obesity was not associated with medically attended influenza among adults with acute respiratory illness in this population.

The abstract is available at <http://onlinelibrary.wiley.com/doi/10.1111/j.1750-2659.2012.00377.x/abstract>.

National, Research (Emory University press release, May 21): The pandemic 2009 H1N1 vaccine can generate antibodies in vaccinated individuals not only against the H1N1 virus, but also against other influenza virus strains including H5N1 and H3N2. This discovery adds an important new dimension to the finding last year that people infected with pandemic 2009 H1N1 virus produced high levels of antibodies that were broadly cross-reactive against a variety of flu strains.

Development of a "universal" influenza vaccine that protects against multiple viral subtypes has long been the goal of immunologists working to overcome the requirement for a new vaccine during each flu season and the need for a rapid response to potentially dangerous mutations.

The new discovery brings the researchers closer to being able to design a pan-influenza vaccine that reliably induces broadly cross-reactive antibodies at sufficiently high levels to protect against different influenza subtypes.

The findings are published this week in the *Proceedings of the National Academy of Sciences* (PNAS). The researchers are from Emory University, the University of Chicago, and the National Institute of Allergy and Infectious Diseases (NIAID) of the National Institutes of Health (NIH).

The researchers analyzed B cell (antibody) responses in 24 healthy adults immunized with the inactivated pandemic 2009 H1N1 vaccine. Vaccination caused a rapid increase in production of monoclonal antibodies that were capable of neutralizing multiple flu strains. Three of the antibody types also were able to stick to the "stalk" region of the virus that does not change as much as other regions and thus could provide a basis for a vaccine with broader and more reliable protection.

Antibodies that are broadly reactive against multiple influenza strains are rarely seen in people after infection or vaccination with seasonal flu, the authors note. In the 24 vaccinated individuals in the current study, the majority of flu antibodies neutralized more than one influenza strain and also seemed to be the result of B-cell memory resulting from previous exposure to other flu strains.

"Since discovering last year that people infected with the H1N1 2009 virus produced antibodies against multiple flu strains, our goal has been to test this ability in vaccinated individuals," says senior author Rafi Ahmed, PhD, director of the Emory Vaccine Center and a Georgia Research Alliance Eminent Scholar. "Our new finding is a key step in the development of a vaccine that can produce high levels of antibodies that protect against multiple flu strains, including challenging mutations that have the potential for widespread illness and death."

The next step for the research team will be to improve on their results and develop a vaccine that produces high levels of antibodies and can reliably protect against multiple flu subtypes.

International, Research (CIDRAP, May 21): About 6% of poultry workers in and around Pune, India, had antibodies to H9N2 avian flu in their bloodstreams, according to a study in *PLoS One*. Researchers from the National Institute of Virology in Pune, located in Maharashtra state, analyzed serum samples from 338 poultry workers in a region known to have had H9N2 outbreaks in poultry. Workers from farms and live-bird markets responded to an invitation to participate in the study. The investigators found that 21 workers (6.2%) had antibodies to H9N2, by either hemagglutination inhibition (HI) or microneutralization (MN) assay and using a titer of 40 or higher as the cutoff. If test results were taken separately, 4.7% of workers had antibodies by HI and 3.8% by MN. Serum samples from 249 members of the general public were all negative for H9N2 antibodies. The authors said the study "showed low prevalence of antibodies against A/H9N2 virus, which is comparable with reported studies from South-East Asia." Nonfatal illnesses caused by H9N2 viruses have been reported in a few children in Hong Kong and elsewhere in China in recent years.

International, Research (CIDRAP, May 23): In a laboratory study, the canine influenza virus (CIV) H3N2 spread from dogs to cats via respiratory droplets, suggesting that cats could be another host for the virus, according to a report published today in *Influenza and Other Respiratory Viruses*. CIV H3N2 originated in birds and was first reported in 2007, says the report by a team of South Korean and US scientists. The team assessed interspecies aerosol transmission by infecting four dogs intranasally with the virus and then housing cats and ferrets in cages a few inches away. In addition, the team infected two cats and three ferrets intranasally and then placed them in cages with uninfected animals of the same species. All the intranasally infected animals got sick with respiratory signs, but the illness was milder in the ferrets than in the cats and dogs. The cats housed near the infected dogs showed respiratory signs and shed virus after 9 days of exposure, but the ferrets housed near the dogs stayed healthy. Uninfected cats caged with infected cats got sick, but the naive ferrets housed with infected ferrets stayed well. "These data suggest that cats, in addition to dogs, can be another susceptible host of CIV H3N2; ferrets may not be susceptible host but may be susceptible after viral adaptation," the researchers write. They say the transmission of the virus between dogs and cats "underscores the concern that these same viruses might also be able to infect humans who come in contact with the animals."

The abstract is online at <http://onlinelibrary.wiley.com/doi/10.1111/j.1750-2659.2012.00379.x/abstract>.

Michigan Wild Bird Surveillance (USDA, as of May 24): For the 2012 season (April 1, 2012-March 31, 2013), no samples have currently been tested for highly pathogenic avian influenza H5N1. For more information, visit <http://www.nwhc.usgs.gov/ai/>.

To learn about avian influenza surveillance in Michigan wild birds or to report dead waterfowl, go to Michigan's Emerging Disease website at <http://www.michigan.gov/emergingdiseases>.

International Poultry and Wild Bird Surveillance (OIE): Reports of avian influenza activity, including summary graphs of avian influenza H5N1 outbreaks in poultry, can be found at the following website: http://www.oie.int/download/AVIAN%20INFLUENZA/A_AI-Asia.htm.

For questions or to be added to the distribution list, please contact Susan Peters at peterss1@michigan.gov

Contributors

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Table. H5N1 Influenza in Humans – As of May 2, 2012. http://www.who.int/influenza/human_animal_interface/EN_GIP_20120502_CumulativeNumberH5N1cases.pdf. Downloaded 5/7/2012. Cumulative lab-confirmed cases reported to WHO. Total cases includes deaths.

Country	2003-2005		2006		2007		2008		2009		2010		2011		2012		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Azerbaijan	0	0	8	5	0	0	0	0	0	0	0	0	0	0	0	0	8	5
Bangladesh	0	0	0	0	0	0	1	0	0	0	0	0	2	0	3	0	6	0
Cambodia	4	4	2	2	1	1	1	0	1	0	1	1	8	8	2	2	20	18
China	9	6	13	8	5	3	4	4	7	4	2	1	1	1	1	1	42	28
Djibouti	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Egypt	0	0	18	10	25	9	8	4	39	4	29	13	39	15	9	5	167	60
Indonesia	20	13	55	45	42	37	24	20	21	19	9	7	12	10	6	6	189	157
Iraq	0	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0	3	2
Lao PDR	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	2	2
Myanmar	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
Nigeria	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1
Pakistan	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	3	1
Thailand	22	14	3	3	0	0	0	0	0	0	0	0	0	0	0	0	25	17
Turkey	0	0	12	4	0	0	0	0	0	0	0	0	0	0	0	0	12	4
Vietnam	93	42	0	0	8	5	6	5	5	5	7	2	0	0	4	2	123	61
Total	148	79	115	79	88	59	44	33	73	32	48	24	62	34	25	16	603	356