Update: Influenza Activity—United States, 1999-2000 Season

MMWR. 2000;49;173-177

2 figures omitted.

Influenza activity in the United States increased substantially during mid-December 1999 and appears to have peaked during the weeks ending December 25 (week 51) through January 15 (week 2). Predominant viruses isolated this season have been influenza type A(H3N2) viruses, antigenically similar to the viruses that have predominated since the 1997-98 influenza season and were well matched to this season's vaccine. This report summarizes influenza activity in the United States during October 3, 1999-February 26, 2000,* and compares the current season with the 5 previous seasons.

For the week ending February 26 (week 8), 1% of overall patient visits to US sentinel physicians were for influenza-like illness (ILI).† During October 3–February 26, the percentage of patient visits for ILI peaked at 6% during the week ending January 1 (week 52). During the 5 influenza seasons from 1994-1995 through 1998-1999, peak percentages of patient visits to sentinel physicians for ILI ranged from 5% to 7%. The weeks with the highest percentage of patient visits for ILI ranged from week 50 to week 7.

For the week ending February 26, 1 state epidemiologist reported widespread activity, and 10 reported regional activity. During October 3–February 26, the highest combined number of reports of either widespread or regional influenza activity by state and territorial epidemiologists was 44 during the week ending January 15 (week 2). During the previous 5 influenza seasons, the highest total numbers of state and territorial epidemiologists reporting either widespread or regional influenza activity during any week during each of the seasons ranged from 25 to 46. The weeks with the highest number of reports of widespread or regional activity ranged from week 1 to week 10.

The percentage of total deaths attributed to pneumonia and influenza (P&I) in the 122 Cities Mortality Reporting System (MRS) was 8.6% for the week ending February 26. This was above the epidemic thresholds§ of 7.6% for that week. During October 3–February 26, the percentage of deaths attributed to P&I peaked at 11.2% during the week ending January 22 (week 3). During the previous 5 influenza seasons, peak percentages of deaths attributed to P&I in the 122 Cities MRS ranged from 7.6% to 9.1%. The weeks with peak percentages of deaths attributed to P&I ranged from week 3 to week 10. This season, P&I mortality has been above the epidemic thresholds for 20 of the 21 weeks during October 3–February 26.

Since the week ending October 3, 1999, the World Health Organization collaborating laboratories and the National Respiratory and Enteric Virus Surveillance System laboratories in the United States have tested 73,576 respiratory specimens for influenza viruses; 12,651 (17%) tested positive. For the week ending February 26, of 11,118 specimens tested for influenza virus, 1,111 (10%) tested positive. During October 3–February 26, the highest percentage of specimens testing positive for influenza viruses was 33% during the week ending December 25 (week 51). During the previous 5 influenza seasons, peak percentages of specimens testing positive for influenza viruses ranged from 19% to 34%. The weeks with peak percentages of specimens testing positive ranged from week 51 to week 6.

Of the 12,651 positive specimens reported since October 3, 12,622 (99.8%) were type A, and 29 (0.2%) were type B. Of the 3,310 influenza A viruses subtyped as of February 26, 3,266 (99%) were H3N2 viruses and 44 (1%) were H1N1 viruses. CDC has characterized antigenically 380 influenza viruses received from US laboratories since October 3. Of the 359 antigenically characterized influenza A(H3N2) viruses, 336 (94%) were similar to the vaccine strain A/Sydney/05/97, and 23 (6%) showed somewhat reduced titers to ferret antiserum produced against the A/Sydney/05/97 virus. This is the third consecutive winter that the influenza A/Sydney/05/97-like viruses have predominated in the United States and worldwide. All 4 of the antigenically characterized US influenza type B viruses were similar to the B/Beijing/184/93-like virus that is represented in the current vaccine by the B/Yamanashi/166/98 virus. Of the 17 antigenically characterized influenza A(H1N1) viruses, 1 was similar to the vaccine strain A/Berlin/262/95, 8 were similar to the A/Berlin/07/95 virus, and 8 were related more closely to the antigenic variant A/New Caledonia/20/99. A/Berlin/07/95-like viruses are distinct antigenically from the A/Berlin/262/95-like viruses; however, the A/Berlin/262/95 vaccine strain produces high titers of antibodies that cross-react with A/Berlin/07/95-like viruses.

Reported by: Participating state and territorial epidemiologists and state public health laboratory directors. World Health Organization collaborating laboratories. National Respiratory and Enteric Virus Surveillance System laboratories. Sentinel Physicians Influenza Surveillance System. Surveillance System Br, Div of Public Health Surveillance and Informatics, Epidemiology Program Office; Mortality Statistics Br, Div of Vital Statistics, National Center for Health Statistics; WHO Collaborating Center for Reference and Research on Influenza, Respiratory and Enteric Virus Br, and Influenza Br, Div of Viral and Rickettsial Diseases, National Center for Infectious Diseases, CDC.

CDC Editorial Note: During the 1999-2000 season, influenza A/Sydney/05/97(H3N2)-like viruses have predominated, with peak activity occurring during weeks 51-2. Peak activity for this...
season occurred approximately 4–6 weeks earlier than peak activity during the 1994-1995, 1997-1998, and 1998-1999 influenza seasons but at approximately the same time as the 1995-1996 and 1996-1997 seasons. Nationally, influenza activity appears to be decreasing. This season’s peak percentage of patient visits to sentinel physicians for ILI, peak percentage of respiratory specimens testing positive for influenza viruses, and peak number of state and territorial epidemiologists reporting either widespread or regional influenza activity have been within the range seen during the previous 5 seasons. However, the peak percentage of deaths attributed to P&I in the 122 Cities MRS has been higher than levels seen during the previous five seasons.

The 122 Cities MRS is a voluntary mortality reporting system that provides weekly data throughout the year to estimate the percentage of total deaths attributed to P&I. Factors that affect the percentage of P&I deaths estimated by the 122 Cities MRS include (1) the incidence of influenza in the population, (2) the level of pre-existing immunity to circulating viruses in the general population (as a result of previous natural infection or influenza vaccination), (3) the virulence of circulating influenza viruses, (4) the proportion of the population with conditions placing them at high risk for complications and death attributable to influenza, (5) the incidence and virulence of other respiratory pathogens, and (6) methodological factors. The specific combination of factors contributing to the increased percentage of deaths attributed to P&I this season is not clear; however, I contributing factor has been a change in the P&I case definition for the 122 Cities MRS.

Before the 1999-2000 season, vital statistics offices participating in the 122 Cities MRS were asked to report a death as a P&I death when pneumonia was listed in part I of the death certificate or when influenza was listed anywhere on the death certificate (part I or part II). However, this case definition did not allow P&I mortality cases to be identified easily in computerized mortality systems, and an evaluation of the 122 Cities MRS conducted in 1999 showed that the case definition was not used consistently by all cities (CDC, unpublished data, 1999). Some large cities reported P&I deaths on the basis of underlying causes of death (CDC, unpublished data, 1999). In addition, in January 1999, CDC’s National Center for Health Statistics (NCHS) implemented the International Statistical Classification of Diseases and Related Public Health Problems, 10th Revision (ICD-10). Coding rules for the underlying cause of death for pneumonia in ICD-10 substantially differ from those in International Classification of Diseases, Ninth Revision (ICD-9). Among cities that reported P&I deaths using underlying causes of death coded according to International Classification of Diseases, 10th Revision (ICD-10), a substantial decrease in the number of reported P&I deaths was seen in the second week of January 1999 compared with the previous week (CDC, unpublished data, 1999).

In response to inconsistent use of the old case definition and the impact of the change from ICD-9 to ICD-10 on reporting to the 122 Cities MRS in some cities, CDC modified the 122 Cities MRS case definition for reporting P&I deaths for the 1999-2000 season. Cities were asked to report a death as a P&I death when either pneumonia or influenza was listed anywhere on the death certificate. The new case definition is simpler and more compatible with computerized mortality systems. Many cities have implemented the new 122 Cities MRS P&I case definition; some cities continue to use underlying cause of death data coded according to ICD-10 for reporting to the 122 Cities MRS. For cities using the new reporting case definition, the number of P&I deaths reported to the 122 Cities MRS would have been expected to increase.

The effect of the concurrent ICD-9 to ICD-10 change and reporting case definition change is unclear. To clarify the impact of these changes, CDC will continue to analyze data from the 122 Cities MRS and will compare the data with vital statistics data from the NCHS. In addition, CDC will continue to examine other possible causes of the increased P&I mortality reported to the 122 Cities MRS this season. The increased P&I mortality reported this season must be interpreted with caution because influenza activity levels detected by the other 3 influenza surveillance systems this season have been similar to those seen during the previous 5 seasons.

Influenza surveillance data collected by CDC are updated weekly from October through May. Summary reports are available through CDC’s voice information system, telephone (888) 232-3228, fax (888) 232-3299 (request document number 361100), or through CDC’s National Center for Infectious Diseases, Division of Viral and Rickettsial Diseases, Influenza Branch World-Wide Web site, http://www.cdc.gov/ncidd/diseases/flu/weekly.htm.

REFERENCES

*The 4 components of the influenza surveillance system have been described.†Defined as temperature $\geq 100^\circ F (\geq 37.8^\circ C)$ plus cough or sore throat.‡Levels of influenza activity are (1) no activity; (2) sporadic—sporadically occurring ILI or culture-confirmed influenza with no outbreaks detected; (3) regional—outbreaks of ILI or culture-confirmed influenza in counties with a combined population of $<$50% of the state’s population; and (4) widespread—outbreaks of ILI or culture-confirmed influenza in counties with a combined population of greater than or equal to 50% of the state’s population.§The epidemic threshold is 1.645 standard deviations above the seasonal baseline. The expected seasonal baseline is projected using a robust regression procedure in which a periodic regression model is applied to observed percentages of deaths from P&I since 1983.
Developing and Expanding Contributions of the Global Laboratory Network for Poliomyelitis Eradication, 1997-1999

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1 figure and 1 table omitted

IN 1988, THE WORLD HEALTH ASSEMBLY RESOLVED TO ERADICATE POLIOMYELITIS GLOBALLY BY 2000.1 SUBSTANTIAL PROGRESS TOWARD ACHIEVING THIS GOAL HAS BEEN REPORTED FROM ALL COUNTRIES WHERE POLIO IS ENDEMIC,2,3 AND 3 REGIONS OF THE WORLD HEALTH ORGANIZATION (WHO) (AMERICAN REGION, EUROPEAN REGION, AND WESTERN PACIFIC REGION) APPEAR TO BE FREE OF INDIGENOUS WILD POLIOVIRUS TRANSMISSION.4,6 ONE KEY STRATEGY FOR POLIO ERADICATION IS ESTABLISHING SENSITIVE SURVEILLANCE SYSTEMS FOR POLIO (THROUGH NOTIFICATION OF ACUTE FLACCID PARALYSIS [AFP] CASES) AND POLIOVIRUS.7 TO ENSURE THAT SPECIMENS FROM AFP CASES UNDERGO APPROPRIATE PROCESSING FOR VIRAL ISOLATION, WHO HAS ESTABLISHED A GLOBAL LABORATORY NETWORK. THIS REPORT DESCRIBES THE PROFICIENCY OF THE NETWORK AND PROVIDES UPDATES ON STRUCTURE, ACCREDITATION, PERFORMANCE, EXPANDING ACTIVITIES, AND FUTURE PLANS.

IN DECEMBER 1999, THE NETWORK WAS OPERATIONAL IN ALL 6 WHO REGIONS ENCOMPASSING 148 LABORATORIES, INCLUDING 126 NATIONAL (OR SUBNATIONAL) LABORATORIES, 16 REGIONAL REFERENCE LABORATORIES, AND 6 GLOBAL SPECIALIZED LABORATORIES. STANDARD GUIDELINES, PROCEDURES, CELL LINES, AND REAGENTS HAVE BEEN ESTABLISHED AND IMPLEMENTED IN LABORATORIES AT EACH LEVEL OF THE NETWORK. NATIONAL AND SUBNATIONAL LABORATORIES PERFORM PRIMARY POLIOVIRUS ISOLATION AND TYPING FOR POLIOVIRUS TYPES 1, 2, OR 3. REGIONAL LABORATORIES CONDUCT INTRATYPIC DIFFERENTIATION OF POLIOVIRUS ISOLATES AS WILD OR VACCINE-DERIVED, AND SPECIALIZED LABORATORIES CONDUCT GENOMIC SEQUENCING TO DETERMINE THE MOLECULAR RELATION OF POLIOVIRUS GENOTYPES AND TO DETERMINE WHETHER THE VIRUSES ARE INDIGENOUS OR IMPORTED. A GLOBAL LABORATORY NETWORK COORDINATOR AND REGIONAL COORDINATORS IN EACH REGION ENSURE TECHNICAL AND FINANCIAL SUPPORT AND THE PROVISION OF STANDARD REAGENTS AND EQUIPMENT, IF NECESSARY.

DURING 1998-1999, THE NETWORK’S MAJOR FOCUS WAS IMPLEMENTING AN ANNUAL ACCREDITATION PROCESS FORMULATED IN 1997 TO ENSURE HIGH-QUALITY LABORATORY SUPPORT TO THE POLIO ERADICATION INITIATIVE. SIX ACCREDITATION CRITERIA WERE USED INITIALLY: (1) TIMELINES (PROPORTION OF TEST RESULTS REPORTED WITHIN 28 DAYS AFTER RECEPTION OF SPECIMENS); (2) WORKLOAD (PROCESS GREATER THAN 150 STOOL SPECIMENS PER YEAR); (3) NONPOLIO ENTEROVIRUS (NPEV) ISOLATION RATE; (4) SEROTYPING OF POLIOVIRUS ISOLATES CONFIRMED BY REGIONAL REFERENCE LABORATORIES; (5) PROFICIENCY TESTING; AND (6) ON-SITE REVIEW OF OPERATING PROCEDURES AND WORK PRACTICES. RECOGNIZING THAT THE NPEV ISOLATION RATE IS AFECTED BY LATITUDE, ALTITUDE, HYGIENE, AND CLIMATE, THIS ACCREDITATION CRITERION WAS REMOVED, BUT DOCUMENTING APPROPRIATE INTERNAL CONTROL ACTIVITIES FOR CELL CULTURE SENSITIVITY WAS ADDED TO THE LIST. AS OF DECEMBER 1999, 108 LABORATORIES (73%) WERE FULLY ACCREDITED, 16 (11%) WERE PROVISIONALLY ACCREDITED, 14 (9%) HAVE BEEN REVIEWED AND COULD NOT BE ACCREDITED, AND 10 (7%) WERE PENDING REVIEW. TO ENSURE THAT ALL SPECIMENS FROM AFP CASES ARE PROCESSED IN ACCREDITED LABORATORIES, INCLUDING THOSE FROM COUNTRIES WITHOUT A LABORATORY, SPECIMENS SHOULD BE SHIPPED AND PROCESSED IN PARALLEL IN ACCREDITED LABORATORIES. ONLY THE DEMOCRATIC PEOPLE’S REPUBLIC OF KOREA HAS NO ACCREDITED LABORATORY NOT ACCESS TO SUCH A LABORATORY OUTSIDE THE COUNTRY.

TO IMPROVE COORDINATION AMONG THE LABORATORIES IN THE NETWORK AND TIMELINESS OF REPORTING RESULTS, ANOTHER MAJOR FOCUS WAS TO ENSURE THAT EACH LABORATORY HAS ADEQUATE COMMUNICATION, INCLUDING LOCAL COMMUNICATION TO THE RESPECTIVE MINISTRIES OF HEALTH, AND INTERNATIONAL COMMUNICATION BY TELEPHONE, FAX, OR E-MAIL TO OTHER NETWORK LABORATORIES AND TO THE REGIONAL OFFICES AND HEADQUARTERS OF WHO. IN DECEMBER 1999, 123 (83%) LABORATORIES HAD INTERNATIONAL TELEPHONE OR FAX LINES AND/OR ACCESS TO E-MAIL, BUT 25 (17%) LABORATORIES HAD INADEQUATE COMMUNICATION FACILITIES.

DURING 1997-1999, THE WORKLOAD OF THE NETWORK MORE THAN DOUBLED. THE NETWORK PROCESSED APPROXIMATELY 50,000 SPECIMENS FOR VIRAL ISOLATION DURING 1999 (INCLUDING 48,370 STOOL SPECIMENS FROM AFP CASES ONLY), ISOLATED APPROXIMATELY 5000 POLIOVIRUSES AND APPROXIMATELY 10,000 NPEVS, CARRIED OUT SEROTYPING AND INTRATYPIC DIFFERENTIATION ON ALL POLIOVIRUS ISOLATES, AND PROVIDED GENOMIC SEQUENCING INFORMATION ON MOST WILD POLIOVIRUS ISOLATES. INDIA AND NIGERIA ILLUSTRATE THE DRAMATIC INCREASE IN LABORATORY WORKLOAD (IN INDIA, FROM 5864 SPECIMENS IN 1997 TO 15,800 SPECIMENS IN 1999, AND IN NIGERIA, FROM 71 SPECIMENS IN 1997 TO 2534 SPECIMENS IN 1999).

CDC Editorial Note: During 1997-1999, the global laboratory network for polio eradication improved substantially. During 1999, almost all stool specimens from AFP cases were processed in WHO-accredited laboratories. The network exchanges information, standardizes techniques, and develops strategies to improve the information provided to eradication efforts. The accreditation process particularly has been useful in ensuring the quality of the procedures performed by network laboratories. Through these reviews, laboratories improve their adoption of standard procedures, improve data management, and identify methods to improve performance. The polio laboratory network continues to evolve as the demands of the
program change. To enhance further the timeliness of laboratory results, and recognizing the increased level of proficiency of many national laboratories, intratypic differentiation as wild or vaccine-derived poliovirus also has been carried out in selected national laboratories. These national laboratories have been provided with appropriate training and laboratory equipment and additional accreditation requirements. Whether a poliovirus isolate is wild has considerable implications in polio-free countries, and early institution of control measures is critical to prevent or minimize subsequent poliovirus transmission. Similarly, in countries where polio is endemic and poliovirus transmission is reduced increasingly to focal areas, early notification of wild virus can target resources to the most appropriate areas.

At the final stages of polio eradication, in addition to the timeliness of intratypic differentiation, the rapid availability of genomic sequencing data is another priority. Arrangements are being made by WHO to ensure that wild poliovirus isolates are shipped in a timely manner to specialized laboratories where the capacity to sequence the isolates. Viral isolation, serotyping, intratypic differentiation, and genomic sequencing data have become increasingly relevant and important to guide programmatic action.

Despite the progress achieved in the network, additional efforts will be necessary to absorb the increasing workload anticipated once countries reached the minimum level of AFP performance (≥ 1 case of nonpolio AFP per 10000 population aged <15 years). Nigeria has demonstrated that laboratories need to be prepared to process huge numbers of additional specimens when surveillance activities improve substantially. Laboratories in Bangladesh and Ethiopia, where polio is endemic, have not yet been accredited. Although specimens from these countries can be processed in accredited laboratories elsewhere, these large countries should obtain the virologic capacity to process stool specimens.

The priorities in the network for 2000 are to establish intratypic differentiation in selected national laboratories, to sequence all wild-type poliovirus isolates, to complete the accreditation process, to improve the timeliness of all virologic procedures, and to contain wild poliovirus, a process that requires substantial, ongoing attention. The polio network has become a model for planning laboratory networks for other infectious disease-control initiatives. A measles laboratory network, functioning in the Region of the Americas, has an elimination target date of December 2000. Efforts are being made to develop such a network in the other regions of WHO, especially in the European and Eastern Mediterranean regions, both of which have adopted regional measles elimination target dates. Many of the laboratories selected for the polio eradication network will participate in the measles efforts. Similar efforts will be extended to rubella and other priority diseases.

Progress achieved by the network has demonstrated that high-quality virology in support of public health activities can be made accessible to all areas of the world, including war-torn countries and countries without organized government or health infrastructure. Although further development of the network is needed, the global capacity to process stool specimens can compensate for any national or regional bottlenecks. The improving capacity and performance quality of the network and accelerated vaccination efforts will provide critical data when wild poliovirus transmission has been interrupted globally.

REFERENCES


*Financial support for the network is provided by WHO; United Nations Children’s Fund (UNICEF); Rotary International; UN Foundation; Department for International Development (DFID); United Kingdom; Japan International Cooperation Agency (JICA); the governments of Canada, Finland, Netherlands, Italy, the Republic of Korea, and the United States (through CDC and the US Agency for International Development [USAID]); and American Association for World Health.