**Table 8.** Number of reported cases per sentinel, sentinel reporting disease, Japan, 1999-2005.

| | No. of reported cases per sentinel | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1999† | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | Average* | |
| | Influenza sentinel (weekly report)‡ | | | | | | | | |
| Influenza | 15.32 | 167.93 | 65.70 | 159.01 | 247.14 | 165.50 | 330.65 | 189.32 | (193.66) |
| | Pediatric disease sentinel (weekly report)‡ | | | | | | | | |
| Chickenpox | 56.50 | 92.36 | 89.90 | 86.73 | 82.39 | 81.46 | 79.05 | 85.32 | (74.86) |
| Erythema infectiosum | 6.47 | 11.50 | 22.41 | 19.02 | 11.77 | 16.20 | 12.82 | 15.62 | (11.50) |
| Exanthem subitum | 33.30 | 42.57 | 41.48 | 38.43 | 38.39 | 37.53 | 34.72 | 38.85 | (35.46) |
| Group A streptococcal pharyngitis | 31.40 | 53.10 | 51.32 | 51.38 | 54.77 | 68.58 | 60.27 | 56.57 | (31.04) |
| Hand, foot and mouth disease | 17.67 | 68.96 | 42.32 | 29.98 | 56.78 | 29.39 | 28.84 | 42.71 | (36.50) |
| Herpangina | 53.84 | 49.45 | 46.44 | 36.71 | 48.89 | 34.94 | 47.07 | 43.92 | (34.72) |
| Infectious gastroenteritis | 176.55 | 297.57 | 289.58 | 293.12 | 298.19 | 315.56 | 307.32 | 300.22 | (171.07) |
| Measles (excluding adult) | 2.04 | 7.57 | 11.20 | 4.11 | 2.72 | 0.51 | 0.18 | 4.38 | (8.42) |
| Mumps | 24.02 | 44.62 | 84.37 | 59.56 | 27.86 | 42.26 | 61.28 | 53.33 | (47.55) |
| Pertussis | 0.92 | 1.28 | 0.58 | 0.48 | 0.51 | 0.73 | 0.44 | 0.67 | (1.69) |
| Pharyngoconjunctival fever | 3.73 | 6.81 | 8.49 | 5.11 | 13.40 | 20.23 | 16.29 | 11.72 | (5.09) |
| Respiratory syncytial virus infection | ... | ... | ... | ... | § | § | § | § | |
| Rubella | 1.03 | 1.05 | 0.85 | 0.98 | 0.92 | 1.40 | 0.29 | 0.92 | (20.37) |
| | Ophthalmologic disease sentinel (weekly report)‡ | | | | | | | | |
| Acute hemorrhagic conjunctivitis | 1.84 | 2.29 | 2.11 | 1.60 | 1.61 | 1.21 | 1.12 | 1.66 | (5.63) |
| Epidemic keratoconjunctivitis | 40.65 | 65.40 | 62.30 | 54.53 | 48.51 | 44.02 | 45.78 | 53.42 | (57.08) |
| | Sexually transmitted disease sentinel (monthly report)‡ | | | | | | | | |
| Condyloma acuminatum | 3.73 | 5.08 | 5.68 | 6.22 | 6.80 | 7.17 | 7.30 | 6.38 | (3.83) |
| Genital chlamydial infection | 29.28 | 41.28 | 44.83 | 47.73 | 45.59 | 41.65 | 37.66 | 43.12 | (24.68) |
| Genital herpes | 7.68 | 9.97 | 10.22 | 10.54 | 10.69 | 10.67 | 11.02 | 10.52 | (9.72) |
| Gonorrhea | 13.86 | 18.87 | 22.68 | 23.91 | 22.50 | 19.02 | 16.11 | 20.52 | (12.73) |
| | Sentinel hospital (weekly report)‡ | | | | | | | | |
| Acute encephalitis (excluding Japanese encephalitis and West Nile encephalitis) | 0.28 | 0.32 | 0.29 | 0.23 | 0.21 | ... | ... | 0.26 | |
| Aseptic meningitis | 2.47 | 4.08 | 2.67 | 6.31 | 3.45 | 2.16 | 1.64 | 3.39 | (5.24) |
| Bacterial meningitis | 0.52 | 0.56 | 0.59 | 0.63 | 0.63 | 0.80 | 0.66 | 0.65 | (0.48) |
| Chlamydial pneumonia (excluding psittacosis) | 0.28 | 0.39 | 0.39 | 0.52 | 0.43 | 0.51 | 0.68 | 0.49 | |
| Measles in adults | 0.18 | 0.93 | 1.98 | 0.93 | 0.98 | 0.12 | 0.01 | 0.83 | |
| Mycoplasmal pneumonia | 2.49 | 4.55 | 9.07 | 9.05 | 12.08 | 12.66 | 15.03 | 10.41 | |
| | Sentinel hospital (monthly report)‡ | | | | | | | | |
| Methicillin-resistant Staphylococcus aureus infection | 24.92 | 39.42 | 40.19 | 43.47 | 45.52 | 46.64 | 48.01 | 43.88 | |
| Multi-drug-resistant Pseudomonas aeruginosa infection | 0.98 | 1.21 | 1.33 | 1.54 | 1.62 | 1.43 | 1.48 | 1.44 | |
| Penicillin-resistant Streptococcus pneumoniae infection | 4.78 | 9.46 | 11.47 | 13.19 | 13.78 | 14.30 | 13.23 | 12.57 | |

...: Not applicable.

* : Average of the numbers of reported cases per sentinel in 2000-2005, and average in 1993-1998 in parentheses

† : Defined by the Law Concerning the Prevention of Infectious Diseases and Medical Care for Patients of Infections

§ : The cases were reported, but the number of cases per sentinel was not calculated.

## SUMMARY OF REPORTS FROM SURVEILLANCE SYSTEM

In order to understand the reporting situation under the current surveillance system, all the reports after the enactment of the new law were summarized in this section. To illustrate surveillance under the new law, data are compared with those under the old law.

### *Materials and Methods*

Surveillance data in 1999-2005 based on the Infectious Disease Control Law were derived from the annual report of NESID. To compare the situation of surveillance, 6-year data sets in 1993-1998 based on the Communicable Disease Prevention Law are obtained from the Statistics on communicable diseases. Data for syphilis and AIDS are obtained from the statistics based on the report on the Venereal Disease Prevention Law and the annual report for the AIDS Prevention Law, respectively. Data in 1999 are only available in April to December because of the change of the law in April 1999. Finally, data sets of actual case numbers reported and incidence rate per 1,000,000 population are compared before and after the revision. Incidence rates of 1993-1998 are calculated using 1995 census population and those of 1999-2005 are based on the 2002 population.

In order to discuss the value of sentinel surveillance, sentinel surveillance data in 1993-1998 are extracted from the annual report of the national infectious disease surveillance program and compared with the data in 1999-2005 from the annual report of NESID. Annual case numbers per sentinel, and number of sentinels are compared for the two periods. In addition, data are compared with cases reported under the old law, where data on the same diseases are available.

### *Secular Trend in Target Infectious Diseases*

Annual reported number and average incidence rate per 1,000,000 population through 6 years of all notifiable diseases under the old law are shown in Table 1, and data on diseases under the new law in Table 2-4. Data are compared between two periods whenever data on the relevant disease entity are available. Most of the diseases have declining trends in the new law period compared with before, although occasional increases are observed in paratyphoid fever and cholera. Exceptionally, enterohemorrhagic E-coli infection, malaria, tetanus and AIDS showed more cases under the new law. Cases with dysentery decreased under the new law, but dysentery in the old era included both disease entities caused by Shigella dysentery and entamoeba histolytica.

As to the sentinel reporting diseases, the number of sentinels under the new law increased mainly because of the change in selection criteria (Table 5, 6). Influenza sentinels in the old period are the same as pediatric ones, but are expanded in combination with internal medicine clinics mainly for adult patients under the new law. Ophthalmologic and sexually transmitted diseases sentinels increased in number, but hospital sentinels remain in the same level as no major change on selection criteria.

Under such circumstances, many sentinel reporting diseases increased in terms of the number of reports per sentinel, although they fluctuated in epidemicity (Table 7, 8). But several vaccine preventable diseases including measles, rubella and pertussis decreased dramatically in the last 7 years. Continuity of the reported number is considered to be maintained throughout the observed period.

Influenza, measles, pertussis, scarlet fever and infectious diarrhea were mandatory notifiable diseases in the old period (Table 1), but they were monitored by the national sentinel surveillance program as well since 1981 (Table 7, 8). Comparison reveals a far greater number of reported cases in the sentinel system than in the mandatory system. This might be partly caused by the difference in case definition. Reports of influenza and infectious diarrhea in the mandatory system are based on clinical characteristics in the same manner as in the sentinel system; and reports of measles, pertussis and scarlet fever based on the clinical diagnosis were also acceptable in the mandatory system. Since there were no documented reporting criteria under the old law, reports mainly depended upon the clinician's decision irrespective of whether or not laboratory confirmation was made. Similar observations were made for syphilis, where there were 887 reports from 606 sentinels, but only 553 cases were reported from all physicians in 1998.

## DISCUSSION

The Communicable Disease Prevention Law enacted in 1st April 1898 long provided the legal framework for infectious disease control in Japan. Mandatory reporting of national notifiable disease based upon this law was the only system for infectious disease surveillance. The basic policy of the law was the traditional attempt to prevent the massive expansion of infectious disease by disease notification and following isolation and quarantine. In the 1990's, however, the circumstances surrounding infectious diseases showed drastic changes including emerging and re-emerging infectious diseases, globalization of travel and trade, animal diseases crossing into human populations, and accidental or deliberate release of biological agents. These situations made an effective outbreak response more difficult. And lacking appropriate risk communication including effective feedback of infectious disease information, clinicians were discouraged from reporting disease in compliance with the Communicable Disease Prevention Law.

In such circumstances, the Infectious Disease Control Law came into force as a means to emphasize the promotion of infectious disease prevention for society as a whole. As part of the efforts in such a shift, the new law underscored the importance of surveillance and provided the public and medical professionals with the information necessary to prevent infectious diseases based upon data from surveillance.

In the present study we describe the surveillance system and summarize the data reported before and after the overall reform of the surveillance system. An attempt was made to envisage the potential impact of the new surveillance system on disease reporting by comparing data under the new law with data under the old one.

No drastic changes, in other words, no break in continuity was observed in most of the diseases which listed in notifiable diseases in both periods, at least, in the diseases which were perceived as serious among the community in those days. Several reports have indicated that reporting completeness in the disease surveillance varied from 9% to 99% and was most strongly associated with the disease being reported. This may be related to the perceived seriousness of these diseases or to the greater financial and human resources devoted to treating and preventing them.[6,7] Consistent with these observations, most of the notifiable diseases showed a similar incidence rate without any discontinuity of the data between the two periods.

Striking observations are found in the diseases which are perceived to be milder and non-life-threatening. Considerable gaps were noted for influenza, measles, pertussis and infectious diarrhea between the notifiable and sentinel reporting framework. As there were no major gaps throughout the overall observed period of the sentinel reporting framework, it is considered that data from sentinel reporting framework reflect the real situation more than those from the mandatory system. Although scarlet fever is not necessarily the same with group A streptococcal infection, it is curable by antibiotics and no longer life-threatening disease. Therefore, its surveillance is better on a sentinel system. Although no documented case definition was available under the old law, clinicians might have had a different perception of reporting criteria in these two systems.

One of the noteworthy features of the new surveillance system were disease categorization according to the disease impact and surveillance was correspondingly re-organized with the two different frameworks of mandatory and sentinel reporting. Through our current summary, the new surveillance system in combination with the mandatory system for severe diseases and sentinel system for milder diseases seems to be working better.

Although the characteristics of sentinels seem to have changed between the two periods, case reports per sentinels increased after the new law took effect. Exanthema subitum which is considered to be a standard disease to estimate the capture rate by existing sentinel clinics increased in the number of cases per sentinel. This might reflect the increased capture rate from re-designing the sentinel surveillance. But one must recall the increased general awareness of infectious diseases these days.

For most Japanese people, information about infectious diseases is not very familiar and sometimes difficult to understand. The index used in the sentinel system, the reported cases per sentinel, is not easy to understand. There have been several efforts to translate these data into more understandable expressions, and some of them are employed in the national system.[8-11]

It is notable that the new law has clearly stated the importance of dissemination of information for determining the appropriate action to be taken. According to the new law, the national and prefectural/municipal infectious disease surveillance centers have been organized so that these institutions can play a central role in implementing surveillance and information dissemination. Many infectious disease surveillance centers including national one publish infectious disease reports weekly, monthly, and/or when necessary on the web and in document form. In addition to these regular reports, papers in the academic field serve to facilitate the effective feedback of information.[12,13]

The new law classifies target diseases by their health impact, and it appears to improve the overall surveillance performance as the purpose of surveillance becomes clearer, especially for disease perceived to be milder. But since a single surveillance system obviously can not satisfy all the needs for a wide range of infectious disease control activities, disease-specific analysis should be made for further evaluation of the surveillance system and tailoring more specific surveillance to specific objectives.

In conclusion, under the new law different surveillance schemes have been developed suitable to assess disease impact with documented reporting criteria along with the development of systematic information dissemination systems. But continuous efforts are warranted for evaluation and further improvement of the surveillance system and risk communication through ongoing research on data analysis and effective communication methods.

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# Epidemics of Influenza and Pediatric Diseases Observed in Infectious Disease Surveillance in Japan, 1999-2005

Akiko Ohta,[1] Yoshitaka Murakami,[2] Shuji Hashimoto,[3] Masaki Nagai,[1] Miyuki Kawado,[3] Michiko Izumida,[1] Yuki Tada,[4] Mika Shigematsu,[4] Yoshinori Yasui,[4] and Kiyosu Taniguchi.[4]

**BACKGROUND:** A method for determining epidemics in small areas from the sentinel surveillance data has been proposed and applied in the National Epidemiological Surveillance of Infectious Diseases (NESID) in Japan. We observed epidemics of influenza and 11 pediatric diseases by the method in the NESID in Japan during 1999-2005.

**METHODS:** We assumed that an epidemic in a public health center area began in a week when the number of cases reported to the NESID per sentinel clinic and hospital in the area in the week exceeded a given value, and that the epidemic ended when the number was lower than another given value. The proportion of public health center areas with epidemics (epidemic area proportion) by week in fiscal 1999-2005 was calculated. Total public health center area-weeks observed were about 30,000 each year.

**RESULTS:** The mean epidemic area proportion in the 7 years was 6.0% for influenza and 0.2-7.4% for pediatric diseases. The proportion increased in pharyngoconjunctival fever and group A streptococcal pharyngitis, decreased in measles and was less than 1.0% in pertussis and rubella. In influenza, the height of the peak in the weekly epidemic area proportion varied between 6 and 90% in the 7 years and the week of the peak varied widely. In some pediatric diseases, the height of the peak varied, while the week of the peak was relatively constant.

**CONCLUSION:** The frequency and temporal change were described in the epidemics of influenza and pediatric diseases in public health center areas from the NESID data in Japan, 1999-2005.

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Key words: Influenza, Human; Communicable Diseases; Disease Outbreaks; Sentinel Surveillance

Epidemics of infectious diseases generally begin in small areas and subsequently spread widely. For the control and prevention of epidemics in a large area (such as an entire country), observing epidemics in small areas (such as municipalities) is essential, and understanding their characteristics, such as frequency and temporal change, is important.

In many countries, sentinel surveillance of infectious diseases is conducted[1-10] for detecting the epidemic in its early stage. A method has been proposed for determining the epidemics in small areas from the sentinel surveillance data.[11] The method is based on the large number of cases reported in a given week per sentinel clinics and hospitals as mentioned below. In Japan, this method has been applied[11-15] as an alert system for epidemics of influenza and pediatric diseases such as measles in public health center areas since 1999 in the National Epidemiological Surveillance of Infectious Diseases (NESID). Although the characteristics of those epidemics of influenza and pediatric diseases in public health center areas in 1993-1997[11] and those of influenza in 1999[13] were reported, the epidemics of recent years have not been described in detail.

In the present study, we described the frequency and temporal change of the epidemics of influenza and pediatric diseases in

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[1] Department of Public Health, Saitama Medical University Faculty of Medicine.
[2] Department of Health Science, Shiga University of Medical Science.
[3] Department of Hygiene, Fujita Health University School of Medicine.
[4] Infectious Disease Surveillance Center, National Institute of Infectious Diseases.
Address for correspondence: Akiko Ohta, Department of Public Health, Saitama Medical University Faculty of Medicine, 38 Morohongo, Moroyama-machi, Iruma-gun, Saitama 350-0495, Japan. (e-mail: aohta@saitama-med.ac.jp)

public health center areas observed by the proposed method for determining epidemics in the NESID in Japan, 1999-2005.

## METHODS

### *Surveillance of Infectious Diseases in Japan*

The NESID in Japan was enacted by the Law Concerning the Prevention of Infectious Diseases and Medical Care for Patients of Infections in 1999. It has been described in detail elsewhere.[10] The influenza and pediatric disease surveillance system is comprised of sentinel clinics and hospitals for pediatric diseases (about 3,000 pediatric facilities throughout Japan) and sentinels for influenza (3,000 pediatric facilities as mentioned above plus about 2,000 internal medicine facilities). The numbers of sentinels in public health center areas are approximately proportional to their population sizes. The populations covered by public health centers vary widely in size from less than 30,000 to more than 250,000. The sentinels were recruited on a voluntary basis to report the number of cases of influenza and pediatric diseases weekly to public health centers. Reports from public health centers to the local government (prefecture) and the Ministry of Health, Labour and Welfare of Japan are made through an on-line computer network.

### *Surveillance Data and Method for Determining Epidemics*

We used the data from the NESID in Japan for the fiscal years 1999-2005. Fiscal 1999, for example, means the period from April 1999 through March 2000. The numbers of cases of influenza and pediatric diseases per sentinel clinics and hospitals weekly reported in the public health center area were used as indices for the analysis. This analysis targeted influenza and other 11 diseases as shown in Table 1. The public health center areas greatly changed in 1999-2003. When public health center areas were combined or divided during this period, we combined them into one area for the sake of easier analysis. The number of public health center areas for the analysis was 568 in 1999-2003, 547 in 2004, and 545 in 2005.

**Table 1.** Critical values for determining onset and end of epidemic.

| Disease | Critical value for epidemic | |
|---|---|---|
| | onset | end |
| Influenza | 30.0 | 10.0 |
| Pharyngoconjunctival fever | 2.0 | 0.1 |
| Group A streptococcal pharyngitis | 4.0 | 2.0 |
| Infectious gastroenteritis | 20.0 | 12.0 |
| Chickenpox | 7.0 | 4.0 |
| Hand-foot-mouth disease | 5.0 | 2.0 |
| Erythema infectiosum | 2.0 | 1.0 |
| Pertussis | 1.0 | 0.1 |
| Rubella | 1.0 | 0.1 |
| Herpangina | 6.0 | 2.0 |
| Measles | 1.5 | 0.5 |
| Mumps | 6.0 | 2.0 |

Numbers in table indicate no. of cases per week per sentinel clinic and hospital.

In order to determine the occurrence of epidemics in a public health center area, the proposed method was applied as follows. We assumed that an epidemic in a public health center area began in a week when the number of cases per sentinel clinics and hospitals in the area in the week exceeded a certain value for the onset of an epidemic, and that the epidemic ended when the number was lower than another critical value for the end of the epidemic. Table 1 shows critical values for the onset and the end of the epidemic. The critical value was determined according to distribution of the number of cases per week per sentinel clinics and hospitals using the surveillance data.[11, 12]

### *Method of Analysis*

We observed the occurrences of epidemics of influenza and 11 pediatric diseases in public health center area weekly during fiscal year of 1999-2005, based on the method for determining epidemics mentioned above. Total public health center area-weeks observed, which were the number of public health center areas times weeks in each fiscal year from 1999 through 2005, were 30,104, 29,536, 29,522, 29,468, 29,484, 28,965, and 27,795, respectively.

To evaluate the frequency of epidemics, the proportion of public health center areas with epidemics (denoted as epidemic area proportion) was calculated. To describe the temporal change of epidemics, the epidemic area proportion by week was also calculated and figured. We attempted to use some indices of temporal change of epidemics for the diseases with a clear seasonal pattern, including height and week of peak, the first week, the last week, and the duration of the elevation in the weekly epidemic area proportion. The elevation means that the epidemic area proportion is over the 5% level. We considered that the elevation continued even if the epidemic area proportion was less than 5% in an exceptional few weeks. We took the height of the peak in the epidemic area proportion as an index of the geographical spread of the epidemic nationwide, the week of its peak as an index of time or season of the epidemic, and the duration of the elevation over the 5% level of the epidemic area proportion as an index of temporal accumulation of the epidemic.

## RESULTS

Table 2 shows the number of cases per week per sentinel clinics and hospitals in fiscal years of 1999-2005. The number of influenza cases varied between 1.10 and 5.85 during the 7 years. Among 11 pediatric diseases, the number of cases contracting pertussis, rubella and measles was low, but high in infectious gastroenteritis.

Table 3 shows the epidemic area proportion in total public health center area-weeks in each fiscal year of 1999-2005. The epidemic area proportion of influenza varied widely between 0.4 and 10.8% in the 7 years, with a mean of 6.0%. In 11 pediatric diseases, the mean of proportions in the 7 years was between 0.2 and 7.4%. The proportion of pharyngoconjunctival fever and group A streptococcal pharyngitis increased. The proportion of measles decreased and was less than 0.1% since 2004. The proportion of pertussis and rubella was less than 1.0%. The proportion of chickenpox, hand-foot-mouth disease, erythema infectiosum and mumps varied widely in the 7 years, while that of infectious gastroenteritis and herpangina was relatively constant.

Figures 1 to 12 shows the epidemic area proportion of influenza and 11 pediatric diseases by week in fiscal years of 1999-2005, respectively. The seasonal pattern with one peak in a year was observed in the epidemic area proportions of influenza and many pediatric diseases. Two peaks in one year were observed in those of infectious gastroenteritis. Low or no peak was observed in those of pertussis, rubella, group A streptococcal pharyngitis and mumps.

Table 4 shows the indices of temporal change of epidemic in influenza and 7 pediatric diseases excluding 4 diseases with low or no peak as observed in Figures 1 to 12. In influenza, the height of peak in the epidemic area proportions varied widely between 6 and 90% in the 7 years. The height of 90% means that the epidemic occurs at the week of the peak in 90% of the public health center areas across Japan. The week of the peak also varied widely. The durations of the elevation over the 5% level of the epidemic area proportion were 2 weeks in fiscal year of 2000, 14 weeks in 2002, and 7-9 weeks in other fiscal years. In pediatric diseases, the height of peak varied with the year, while the week of peak was relatively constant. In infectious gastroenteritis and herpangina, both the height and week of the peak were relatively constant. The durations of the elevation increased with the height of peak in most pediatric diseases, while low height of peak and relatively long duration were observed in the epidemic area proportion of hand-foot-mouth disease in 2004.

**Table 2.** Number of cases per week per sentinel clinic and hospital in fiscal 1999-2005.

| Disease | Fiscal year | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
| Influenza | 3.64 | 1.10 | 2.78 | 5.09 | 3.19 | 5.85 | 4.11 |
| Pharyngoconjunctival fever | 0.08 | 0.15 | 0.15 | 0.10 | 0.29 | 0.37 | 0.35 |
| Group A steptococcal pharyngitis | 0.83 | 1.11 | 0.98 | 0.95 | 1.19 | 1.21 | 1.33 |
| Infectious gastroenteritis | 5.56 | 5.76 | 5.54 | 5.56 | 5.93 | 5.75 | 5.95 |
| Chickenpox | 1.59 | 1.88 | 1.61 | 1.66 | 1.67 | 1.49 | 1.55 |
| Hand-foot-mouth disease | 0.35 | 1.35 | 0.79 | 0.58 | 1.08 | 0.59 | 0.54 |
| Erythema infectiosum | 0.16 | 0.28 | 0.44 | 0.31 | 0.25 | 0.28 | 0.26 |
| Pertussis | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Rubella | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.01 |
| Herpangina | 1.02 | 0.94 | 0.91 | 0.71 | 0.94 | 0.66 | 0.93 |
| Measles | 0.06 | 0.18 | 0.18 | 0.07 | 0.04 | 0.01 | 0.00 |
| Mumps | 0.58 | 1.12 | 1.61 | 0.92 | 0.52 | 0.93 | 1.27 |

**Table 3.** Proportion of public health center areas with epidemic in total public health center area-weeks in fiscal 1999-2005.

| Disease | Fiscal year | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
| Influenza | 5.5 | 0.4 | 3.3 | 9.8 | 5.6 | 10.8 | 6.3 |
| Pharyngoconjunctival fever | 0.9 | 3.0 | 3.5 | 1.8 | 7.2 | 10.6 | 8.7 |
| Group A steptococcal pharyngitis | 4.6 | 7.7 | 6.5 | 5.3 | 8.3 | 9.2 | 10.4 |
| Infectious gastroenteritis | 6.5 | 7.0 | 6.1 | 5.5 | 6.2 | 5.5 | 6.0 |
| Chickenpox | 2.8 | 4.3 | 2.6 | 2.9 | 3.1 | 2.0 | 2.1 |
| Hand-foot-mouth disease | 1.6 | 10.5 | 5.2 | 2.9 | 8.1 | 3.3 | 2.4 |
| Erythema infectiosum | 1.7 | 3.1 | 6.5 | 4.3 | 2.1 | 3.3 | 2.6 |
| Pertussis | 0.3 | 0.4 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 |
| Rubella | 0.7 | 0.3 | 0.3 | 0.4 | 0.6 | 0.7 | 0.0 |
| Herpangina | 7.8 | 6.2 | 6.6 | 4.3 | 7.3 | 4.2 | 6.6 |
| Measles | 1.2 | 3.8 | 4.6 | 1.3 | 0.5 | 0.0 | 0.0 |
| Mumps | 1.5 | 4.3 | 8.9 | 4.2 | 1.1 | 2.6 | 3.9 |

Figures in table indicate proportion (%).

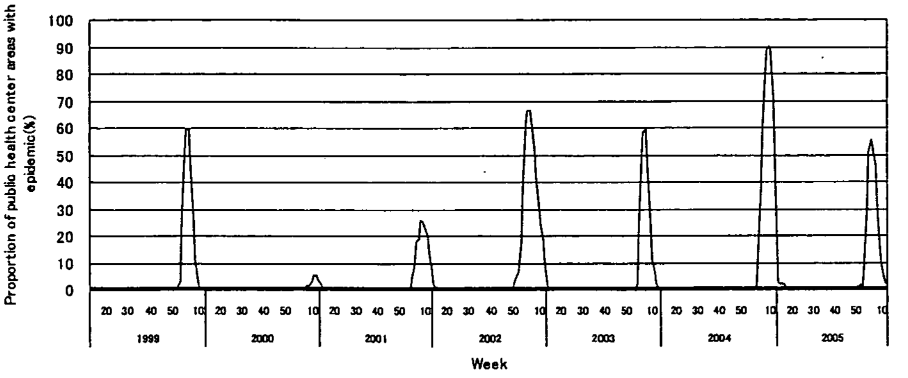


**Figure 1.** Proportion of public health center areas with epidemic of influenza by week in fiscal 1999-2005.

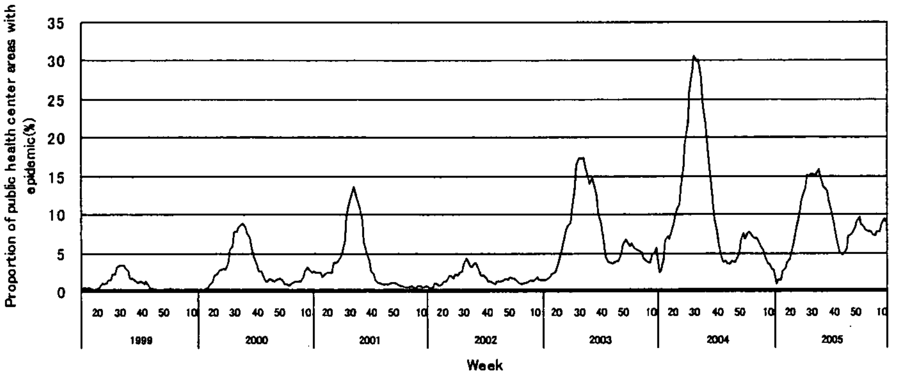


**Figure 2.** Proportion of public health center areas with epidemic of pharyngoconjunctival fever by week in fiscal 1999-2005.

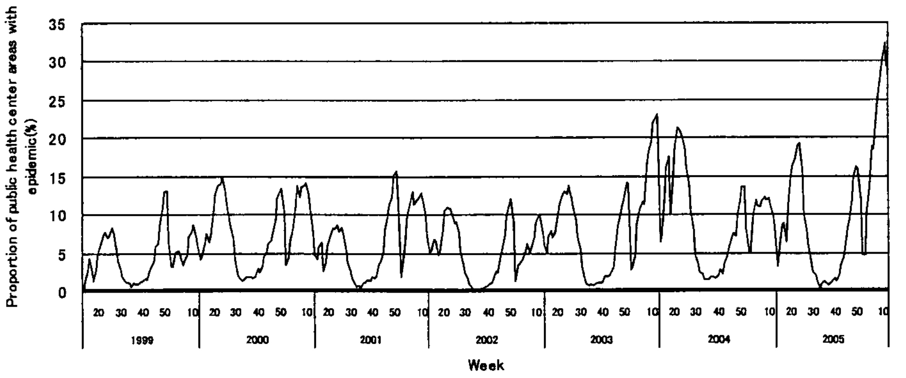


**Figure 3.** Proportion of public health center areas with epidemic of group A streptococcal pharyngitis by week in fiscal 1999-2005.

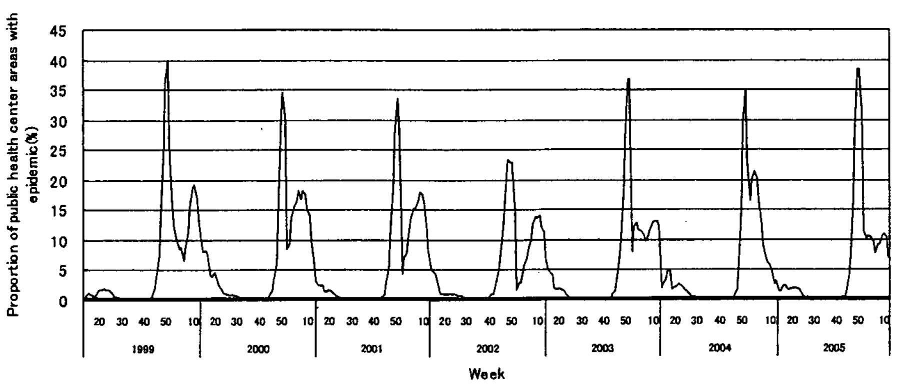


**Figure 4.** Proportion of public health center areas with epidemic of infectious gastroenteritis by week in fiscal 1999-2005.

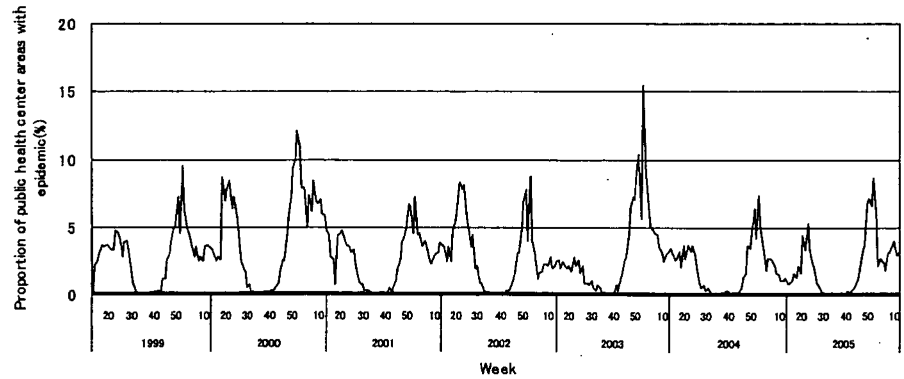


**Figure 5.** Proportion of public health center areas with epidemic of chickenpox by week in fiscal 1999-2005.

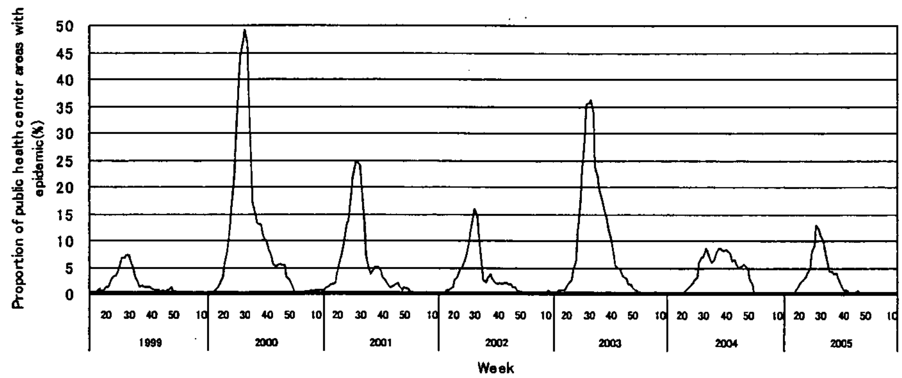


**Figure 6.** Proportion of public health center areas with epidemic of hand-foot-mouth disease by week in fiscal 1999-2005.

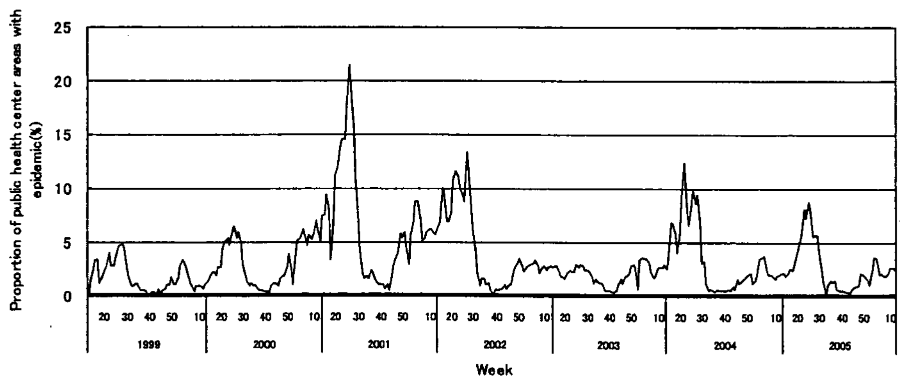


**Figure 7.** Proportion of public health center areas with epidemic of erythema infectiosum by week in fiscal 1999-2005.

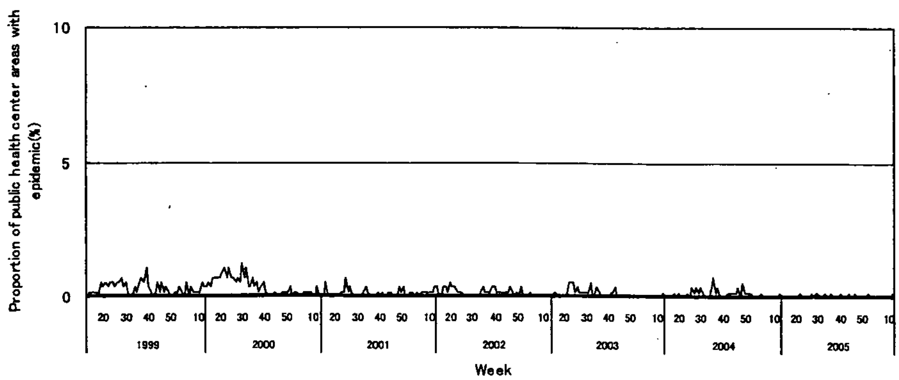


**Figure 8.** Proportion of public health center areas with epidemic of pertussis by week in fiscal 1999-2005.

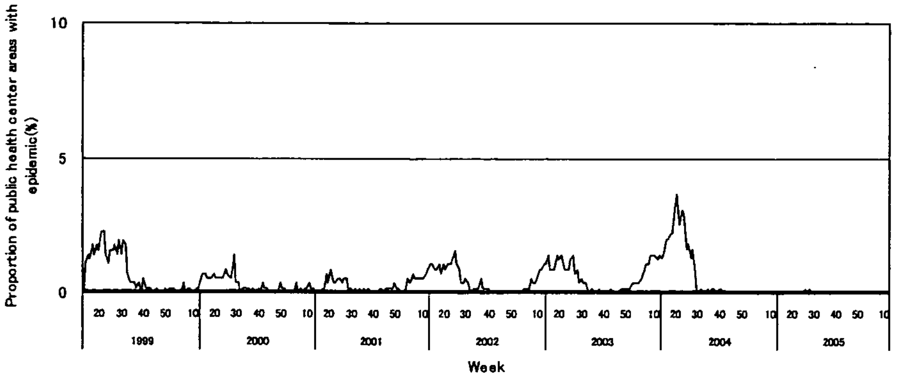


**Figure 9.** Proportion of public health center areas with epidemic of rubella by week in fiscal 1999-2005.

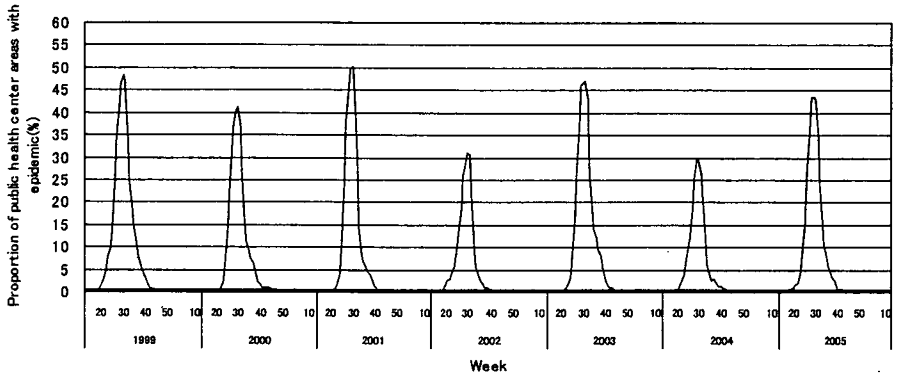


**Figure 10.** Proportion of public health center areas with epidemic of herpangina by week in fiscal 1999-2005.

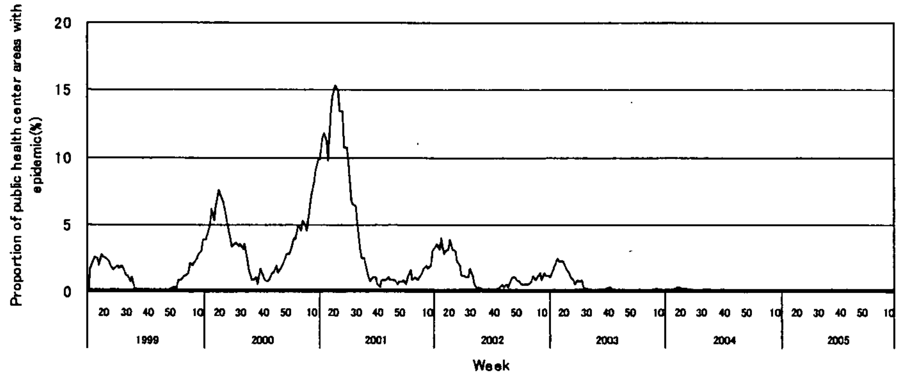


**Figure 11.** Proportion of public health center areas with epidemic of measles by week in fiscal 1999-2005.

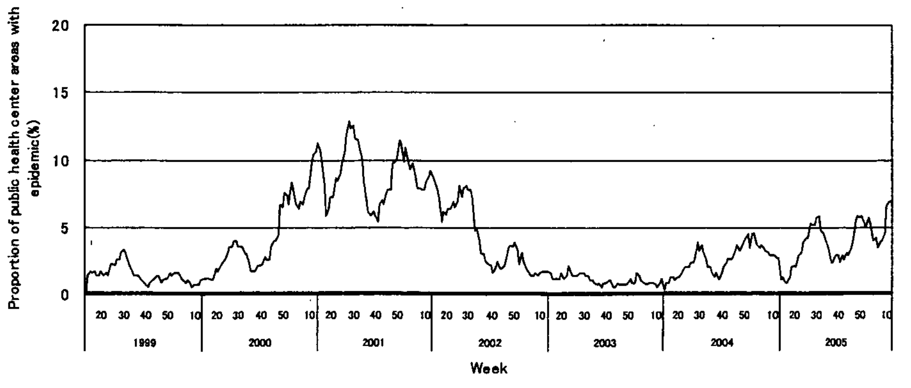


**Figure 12.** Proportion of public health center areas with epidemic of mumps by week in fiscal 1999-2005.

**Table 4.** Indices of temporal change of epidemic in fiscal 1999-2005.

| Disease | Fiscal year | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
| Influenza | | | | | | | |
| Height of peak (%)* | 59.5 | 5.5 | 25.7 | 66.7 | 59.5 | 90.1 | 55.4 |
| Week of peak* | 5th, 6th | 11th, 12th | 8th | 5th | 7th | 10th | 5th |
| First week†,‡ | 3rd | 11th | 5th | 52nd | 4th | 5th | 2nd |
| Last week†,‡ | 9th | 12th | 13th | 13th | 11th | 13th | 10th |
| Duration (in weeks) † | 7 | 2 | 9 | 14 | 8 | 9 | 9 |
| Pharyngoconjunctival fever | | | | | | | |
| Height of peak (%)* | - | 8.8 | 13.6 | - | 17.4 | 30.7 | 16.0 |
| Week of peak* | - | 34th | 32nd | - | 30th, 32nd | 30th | 33rd |
| First week†,‡ | - | 28th | 27th | - | 22nd | 17th | 22nd |
| Last week†,‡ | - | 38th | 38th | - | 41st | 41st | 43rd |
| Duration (in weeks)† | - | 11 | 12 | - | 20 | 25 | 22 |
| Infectious gastroenteritis | | | | | | | |
| Height of peak (%)* | 39.8 | 34.5 | 33.6 | 23.2 | 36.8 | 34.7 | 38.5 |
| Week of peak* | 51st | 51st | 51st | 49th | 52nd | 52nd | 50th, 51st |
| First week†,‡ | 47th | 48th | 47th | 45th | 47th | 49th | 47th |
| Last week†,‡ | 2000.17th | 13th | 2002.14th | 2003.14th | 13th | 10th | 12th |
| Duration (in weeks)† | 23 | 18 | 20 | 22 | 19 | 15 | 18 |
| Chickenpox | | | | | | | |
| Height of peak (%)* | 9.5 | 12.1 | 7.2 | 8.8 | 15.5 | 7.3 | 8.6 |
| Week of peak* | 1st | 1st | 2nd | 2nd | 2nd | 1st | 1st |
| First week†,‡ | 50th | 49th | 51st | 50th | 48th | 52nd | 50th |
| Last week†,‡ | 2nd | 13th | 2nd | 2nd | 5th | 1st | 2nd |
| Duration (in weeks)† | 5 | 17 | 4 | 5 | 10 | 3 | 5 |
| Hand-foot-mouth disease | | | | | | | |
| Height of peak (%)* | 7.2 | 49.3 | 24.6 | 16.0 | 36.1 | 8.8 | 12.8 |
| Week of peak* | 29th, 30th | 30th | 29th | 30th | 31st | 38th | 28th |
| First week†,‡ | 26th | 21st | 21st | 25th | 24th | 28th | 26th |
| Last week†,‡ | 31st | 48th | 33rd | 33rd | 42nd | 49th | 33rd |
| Duration (in weeks)† | 6 | 28 | 13 | 9 | 19 | 22 | 8 |
| Erythema infectiosum | | | | | | | |
| Height of peak (%)* | - | 6.5 | 21.5 | 13.4 | - | 12.4 | 8.8 |
| Week of peak* | - | 26th | 26th | 27th | - | 22nd | 25th |
| First week†,‡ | - | 22nd | 2001.3rd | 2001.49th | - | 16th | 22nd |
| Last week†,‡ | - | 28th | 30th | 30th | - | 29th | 29th |
| Duration (in weeks)† | - | 7 | 28 | 34 | - | 14 | 8 |
| Herpangina | | | | | | | |
| Height of peak (%)* | 48.4 | 41.2 | 50.2 | 30.6 | 47.0 | 29.8 | 43.3 |
| Week of peak* | 30th | 30th | 30th | 31st | 31st | 29th | 28th, 29th |
| First week†,‡ | 23rd | 24th | 25th | 24th | 25th | 24th | 24th |
| Last week†,‡ | 38th | 38th | 36th | 34th | 39th | 34th | 36th |
| Duration (in weeks)† | 16 | 15 | 12 | 11 | 15 | 11 | 13 |
| Measles | | | | | | | |
| Height of peak (%)* | - | 7.6 | 15.3 | - | - | - | - |
| Week of peak* | - | 20th | 21st | - | - | - | - |
| First week†,‡ | - | 17th | 2001.6th | - | - | - | - |
| Last week†,‡ | - | 23rd | 31st | - | - | - | - |
| Duration (in weeks)† | - | 7 | 26 | - | - | - | - |

* : The peak in proportions of public health center areas with epidemic in a given year.

† : First week, last week and duration over the 5% level of the proportion of public health center areas with epidemic.

‡ : Week preceding or following given fiscal year is mentioned if the elevation continued across the fiscal years.

## DISCUSSION

In influenza, the mean epidemic area proportion in the 7 years was 6.0%. It means that the epidemic occurred an average 3.1 weeks in a year in a public health center area. The seasonal pattern with one peak in a year was observed in the weekly epidemic area proportions, corresponding to the well-known characteristic of influenza.[16] The height of peak in the weekly epidemic area proportions was 90% in a week of fiscal year of 2004. The epidemic in this year was regarded to be very large from the viewpoint of the number of cases reported. Our result suggested that the epidemic was widespread in Japan. The duration of the elevation over the 5% level of the epidemic area proportion was around 8 weeks in all but in 2000 with the small epidemic, against 14 weeks in fiscal year of 2002. The reason would be that a relatively large epidemic of type B virus followed after the epidemic of type A virus in the year.[17]

In pediatric diseases, the epidemic area proportion was low in rubella and pertussis, and decreased in measles. These results would be mainly associated with the vaccination program against these diseases in Japan. The vaccination coverage for rubella in children has been considered nearly complete as well as that for diphtheria pertussis tetanus vaccine.[18] The coverage for measles recently increased with the well-developed vaccination program thanks to the amendment of the Immunization Law in Japan.[19]

The epidemic area proportion has increased in pharyngoconjunctival fever and group A streptococcal pharyngitis, possibly in connection with the introduction of rapid detection kits for their diagnosis. For example, although the criteria for reporting pharyngoconjunctival fever to the NESID in Japan include three principal symptoms (fever, pharyngeal rubor, and conjunctival hyperemia), kit detection of cases with upper respiratory tract inflammation without conjunctival hyperemia might result in incorrectly reported disease.

In many pediatric diseases, the seasonal pattern with one peak in a year was observed in the weekly epidemic area proportions as well as in influenza. This is consistent with the well-known findings.[16] Two peaks in a year were observed in the weekly epidemic area proportions of infectious gastroenteritis. It could be explained by the two different agents: noroviruses for the former peak and rotaviruses for the latter.[20]

There are some limitations in the present study. One of the key issues is the determination of an epidemic, which can be done by several methods and is not yet standardized.[5,11] The method used in the present study has been applied as an alert system for epidemics in the NESID in Japan since 1999. Certainly, determination of the frequency of epidemics depends heavily on the method employed, and is affected by the critical values in the method used. If the critical value for the onset of an epidemic was lowered, the frequency of epidemics and height of the epidemic peak increased, and the duration of the epidemic was lengthened. If the critical value for the end of the epidemic was lowered, the week of epidemic peak was delayed.[15] However, the temporal change of epidemics might not change substantially according to some changes in the critical values. Other issues would be possible bias due to the use of data from reports to the NESID in Japan, such as accuracy of disease diagnosis, coverage of reporting and representativeness of sentinels for all medical institutions.

In conclusion, although there are some limitations, the present study is, to our knowledge, the first to report the frequency and temporal change in the epidemics of influenza and pediatric diseases in public health center areas from NESID data in Japan for the fiscal years of 1999-2005. Further analyses with mapping techniques are expected to provide additional information on the geographical and temporal spread of disease epidemics.

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# Wide-area Epidemics of Influenza and Pediatric Diseases from Infectious Disease Surveillance in Japan, 1999-2005

Yoshitaka Murakami,[1] Shuji Hashimoto,[2] Akiko Ohta,[3] Miyuki Kawado,[2] Michiko Izumida,[3] Yuki Tada,[4] Mika Shigematsu,[4] Yoshinori Yasui,[4] Kiyosu Taniguchi,[4] and Masaki Nagai.[3]

**BACKGROUND:** Epidemics of infectious diseases usually start in small areas and subsequently become widespread widely. Although a method for detecting epidemics in public health center (PHC) areas has been proposed and used in the National Epidemiological Surveillance of Infectious Diseases in Japan, wide-area epidemics have not been fully investigated.
**METHODS:** Using the abovementioned method, we defined an epidemic as that occurring for a week in at least one PHC area in a prefecture and a wide-area epidemic as that when the number of people living in epidemic PHC areas exceeds 30% of the prefectural population. The number of weeks of an epidemic or wide-area epidemic for influenza and 11 pediatric diseases was observed in 47 prefectures in Japan from 1999 through 2005.
**RESULTS:** Epidemics and wide-area epidemics of influenza occurred for an average of 7.0 and 4.3 weeks in a year in a prefecture, respectively. The proportion of wide-area epidemics in epidemic weeks was 62%. The average number of wide-area epidemic weeks for pediatric diseases varied among diseases; it was more than 4 weeks for infectious gastroenteritis and herpangina and less than 1 week for pertussis, rubella, and measles. The proportion of wide-area epidemics in epidemic weeks was 28-41% for infectious gastroenteritis, hand-foot-mouth disease, and herpangina and less than 20% for other diseases.
**CONCLUSIONS:** The frequency of wide-area epidemics of influenza and pediatric diseases in various prefectures was observed. Epidemics of infectious diseases such as influenza and herpangina occurring in small areas were likely to spread to wide areas.
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Key words: Communicable Diseases; Sentinel Surveillance; Disease Outbreaks; Influenza, Human.

Epidemics of infectious diseases usually start in small areas and subsequently become widespread widely. To control and prevent epidemics in a wide area, such as a prefecture or nation, it is essential to observe epidemics in small areas, such as municipalities, and to determine whether these epidemics can occur over a wide area (a wide-area epidemic). Hence, infectious disease surveillance systems have been implemented in many countries,[1-6] and several methods have been used for detecting epidemics.

In Japan, a method for detecting epidemics in public health center (PHC) areas has previously been proposed,[7,8] evaluated,[9,10] and used in the National Epidemiological Surveillance of Infectious Diseases (NESID).[6] No criteria have been established for wide-area epidemics, and these types of epidemics have not been fully investigated.

In the present study, we attempted to determine the occurrence of wide-area epidemics in various prefectures using the information on epidemics in PHC areas in the prefectures by the abovementioned method. Based on the NESID data of Japan obtained from 1999 through 2005, we found wide-area epidemics of influenza and pediatric diseases in these prefectures.

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[1] Department of Health Science, Shiga University of Medical Science.
[2] Department of Hygiene, Fujita Health University School of Medicine.
[3] Department of Public Health, Saitama Medical University Faculty of Medicine.
[4] Infectious Disease Surveillance Center, National Institute of Infectious Diseases.
Address for correspondence: Dr. Yoshitaka Murakami, Department of Health Science, Shiga University of Medical Science, Seta Tsukinowa-cho, Otsu City, Shiga 520-2192, Japan. (ymura@belle.shiga-med.ac.jp)

## METHODS

### *Epidemiologic Surveillance of Infectious Diseases in Japan*

The NESID in Japan is organized by the Ministry of Health, Labour and Welfare, and it is controlled by the Infectious Disease Surveillance Center, National Institute of Infectious Diseases, Japan.[5,6] The NESID has targeted influenza and pediatric diseases for sentinel surveillance. According to the NESID guidelines, local governments (prefectures) select sentinel clinics and hospitals for influenza and pediatric diseases from pediatric and internal medicine departments.[11] The number of sentinel clinics and hospitals in a PHC area is approximately proportional to the population size. The sentinel clinics and hospitals send information on the numbers of patients with targeted diseases to the PHCs on a weekly basis. These data are then used to monitor trends and variations in the number of cases of influenza and pediatric diseases, to detect epidemics in the PHC areas, and to estimate incidence rates in the entire country.[6,12]

### *Surveillance Data and Method for Detecting Epidemics in PHC Areas*

We used the data obtained from the NESID in Japan for fiscal years 1999-2005. Fiscal year 1999 in Japan means the period from April 1999 through March 2000. The numbers of cases of influenza and pediatric diseases per sentinel clinic and hospital reported weekly in the PHC area were used as indices for the analysis. The list of the diseases is shown in Table 1. Following the integration of PHCs in Japan, the number of centers has changed drastically. Table 2 shows the number of PHCs for fiscal years 1999-2003, 2004, and 2005, and distribution of PHC population size in each prefecture. In fiscal year 1999-2003, the number of PHCs was 568, which was the number of PHCs operational on April 1, 2003. Furthermore, the number of PHCs for fiscal years 2004 and 2005 was 547 and 545, respectively.

**Table 1.** Critical values for epidemics in public health center areas.

| | Critical value* | |
|---|---|---|
| Disease | onset | end |
| Influenza | 30 | 10 |
| Pharyngoconjunctival fever | 2 | 0.1 |
| Group A streptococcal pharyngitis | 4 | 2 |
| Infectious gastroenteritis | 20 | 12 |
| Chickenpox | 7 | 4 |
| Hand-foot-mouth disease | 5 | 2 |
| Erythema infectiosum | 2 | 1 |
| Pertussis | 1 | 0.1 |
| Rubella | 1 | 0.1 |
| Herpangina | 6 | 2 |
| Measles | 1.5 | 0.5 |
| Mumps | 6 | 2 |

* : Units indicate the number of cases in sentinel clinics and hospitals in an area over the course of a week.

The method for detecting epidemics in the PHC areas in the NESID has been described previously.[8,9] A brief description of this method is as follows. The method is based on an index calculated from the number of cases per sentinel clinic and hospital in a PHC area over a week. An epidemic in a PHC area was considered to occur when the index in the area exceeded the critical value for epidemic onset and continued until the index in that area was lower than the critical value for the end of the epidemic. Table 1 shows the critical values for the onset and end of epidemics of various diseases. The critical values were determined according to the distribution of the number of cases per week per sentinel clinic and hospital using the surveillance data.[8,10]

### *Method for Detecting Epidemics in Prefectures and Method of Analysis*

When an epidemic occurred in at least one PHC area in a given prefecture, the prefecture was considered to have an epidemic. The proportion of people living in PHC areas with epidemics in a prefecture was selected as the index for wide-area epidemics. When this index exceeded 30% of the prefectural population, the prefecture was considered to have a wide-area epidemic. These epidemics were considered to have ended if the index decreased to below 30%. The population size of each PHC area and prefecture was calculated from the year 2000 census in Japan (Table 2).

Figure 1 shows influenza epidemics in a specific prefecture. In this prefecture, epidemics started occurring in each PHC at the beginning of the year. Because there were many epidemics in the PHC areas in week 2 of 2006, a wide-area epidemic commenced. After 4 weeks, the number of epidemics in the PHC areas decreased, and the wide-area epidemic was terminated by the end of week 6. Thus, in this prefecture, wide-area epidemics occurred for 5 weeks, while epidemics occurred for 9 weeks from week 52 of 2005 through week 8 of 2006.

With regard to influenza and pediatric diseases, we determined the number of weeks for which epidemics/wide-area epidemics occurred in prefectures in fiscal years 1999-2005. We also determined the average number of weeks for which epidemics/wide-area epidemics occurred and the proportion of wide-area epidemics (the number of weeks for which wide-area epidemics occurred divided by those for which epidemics occurred and multiplied by 100).

## RESULTS

### *Epidemics of Influenza in Prefectures*

Figure 2 shows the influenza epidemics in 47 prefectures in the 2005/2006 season. The prefectures are listed in order from the northern to the southern/western prefectures of Japan. In some northern prefectures, epidemics occurred for several weeks; however, wide-area epidemics did not. In many other prefectures, wide-area epidemics occurred for 4 or 5 weeks, while epidemics occurred for around 7 weeks.

Table 3 shows the number of epidemic weeks/wide-area epidemic weeks for influenza in 47 prefectures in fiscal years 1999-2005. Many epidemics occurred in 1999, 2002, 2003, 2004, and 2005, with the average number of weeks of epidemics ranging from 6.7 to 11.1. During these years, many wide-area epidemics were also observed, and the average number of weeks of wide-area epidemics ranged from 4.3 to 7.9, with a proportion of more than 50%. In contrast, both epidemics and wide-area epidemics were not observed to occur with considerable frequency in 2000 and 2001. The average number of epidemic weeks was 6.2 and below. In these 2 years, the average number of weeks of wide-area epidemics was below 2.3, and the proportion of epidemics decreased to below 50%. When the proportion of epidemics in the prefectures over the 7-year period was compared, a variability ranging from 20% to almost 90% was found. A total of 2299 and 1427 weeks of epidemics and wide-area epidemics, respectively, were recorded. On average, 7.0 epidemic weeks and 4.3 wide-area epidemic weeks were observed in the prefectures during the total observation period. The proportion of wide-area epidemics in epidemic weeks was 62.1%.

*Epidemics of Pediatric Diseases in Prefectures*

Table 4 shows the variability in the annual number of weeks for epidemics and wide-area epidemics of pediatric diseases in fiscal years 1999-2005. The number of epidemic weeks, the number of wide-area epidemic weeks, and the proportion of wide-area epidemics are shown. The average number of epidemic weeks in a year in a prefecture was 1.1-5.4 weeks for pertussis, rubella, and measles and more than 10 weeks for other diseases.

The average number of wide-area epidemic weeks ranged from several weeks to very few. It was less than 1 week for chickenpox, pertussis, rubella, and measles; 1.0-2.9 weeks for pharyngoconjunctival fever, erythema infectiosum, and mumps; and 3.0-4.3 weeks for group A streptococcal pharyngitis, infectious gastroenteritis, hand-foot-mouth disease, and herpangina. The trends

| PHC number | Population in PHC area | Week 50 | 51 | 52 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 151,602 | – | – | – | – | – | – | ○ | ○ | – | – | – | – | – | – | – |
| 2 | 180,722 | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| 3 | 243,039 | – | – | – | – | – | ○ | ○ | ○ | – | – | – | – | – | – | – |
| 4 | 203,656 | – | – | – | – | ○ | ○ | ○ | ○ | ○ | ○ | ○ | – | – | – | – |
| 5 | 269,307 | – | – | – | – | – | ○ | ○ | ○ | ○ | ○ | – | – | – | – | – |
| 6 | 166,676 | – | – | – | – | ○ | ○ | ○ | ○ | ○ | ○ | – | – | – | – | – |
| 7 | 126,468 | – | – | – | – | – | ○ | ○ | ○ | ○ | – | – | – | – | – | – |
| 8 | 1,011,471 | – | – | ○ | ○ | ○ | ○ | ○ | ○ | ○ | – | – | – | – | – | – |
| 9 | 138,629 | – | – | – | – | – | ○ | ○ | ○ | ○ | – | – | – | – | – | – |
| 10 | 145,208 | – | – | – | – | ○ | ○ | ○ | ○ | ○ | – | – | – | – | – | – |
| 11 | 147,834 | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| 12 | 250,753 | – | – | – | – | ○ | ○ | ○ | ○ | ○ | – | – | – | – | – | – |
| 13 | 399,329 | – | – | – | – | ○ | ○ | ○ | ○ | ○ | – | – | – | – | – | – |
| 14 | 95,040 | – | – | – | – | ○ | ○ | ○ | ○ | ○ | – | – | – | – | – | – |
| 15 | 146,494 | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| 16 | 463,939 | – | – | – | – | ○ | ○ | ○ | ○ | – | – | – | – | – | – | – |
| 17 | 93,581 | – | – | – | – | ○ | ○ | ○ | ○ | ○ | – | – | – | – | – | – |
| 18 | 143,816 | – | – | – | – | ○ | ○ | ○ | ○ | ○ | – | – | – | – | – | – |
| 19 | 123,320 | – | – | – | – | ○ | ○ | ○ | ○ | – | – | – | – | – | – | – |
| 20 | 195,573 | – | – | – | – | ○ | ○ | ○ | ○ | – | – | – | – | – | – | – |
| 21 | 119,403 | – | – | – | – | ○ | ○ | ○ | ○ | – | – | – | – | – | – | – |
| 22 | 199,839 | – | – | – | – | – | ○ | ○ | ○ | – | – | – | – | – | – | – |
| Prefecture | 5,015,699 | – | – | □ | □ | ■ | ■ | ■ | ■ | ■ | □ | □ | – | – | – | – |

**Figure 1.** Influenza epidemics in a specific prefecture in the 2005/2006 season.

The figure shows the occurrence of epidemics in one prefecture and its public health center (PHC) areas from week 50 of 2005 through week 12 of 2006. Each PHC number shows the PHC area in the prefecture, and the symbol in each week represents the presence or absence of an epidemic.

○ Epidemic in a PHC area.
– No epidemic in a PHC area or prefecture.
□ Epidemic in the prefecture.
■ Wide-area epidemic in the prefecture.

**Table 2.** Population and number of public health centers in various prefectures.

| Prefecture | Population | Population in the PHC area | | | | Number of public health centers (Fiscal year) | | |
|---|---|---|---|---|---|---|---|---|
| | | Minimum | % | Maximum | % | 1999-2003 | 2004 | 2005 |
| Hokkaido | 5,683,062 | 27,340 | 0.5 | 1,822,368 | 32.1 | 29 | 30 | 30 |
| Aomori | 1,475,728 | 87,366 | 5.9 | 355,214 | 24.1 | 6 | 6 | 6 |
| Iwate | 1,416,180 | 69,222 | 4.9 | 490,736 | 34.7 | 10 | 10 | 10 |
| Miyagi | 2,365,320 | 84,947 | 3.6 | 429,051 | 18.1 | 12 | 12 | 12 |
| Akita | 1,189,279 | 45,419 | 3.8 | 317,625 | 26.7 | 9 | 9 | 9 |
| Yamagata | 1,244,147 | 95,410 | 7.7 | 581,488 | 46.7 | 4 | 4 | 4 |
| Fukushima | 2,126,935 | 34,988 | 1.6 | 518,385 | 24.4 | 8 | 8 | 8 |
| Ibaraki | 2,985,676 | 75,793 | 2.5 | 493,888 | 16.5 | 12 | 12 | 12 |
| Tochigi | 2,004,817 | 207,899 | 10.4 | 473,435 | 23.6 | 6 | 6 | 6 |
| Gunma | 2,024,852 | 67,724 | 3.3 | 385,951 | 19.1 | 11 | 11 | 11 |
| Saitama | 6,938,006 | 117,777 | 1.7 | 1,269,216 | 18.3 | 22 | 22 | 22 |
| Chiba | 5,926,285 | 86,210 | 1.5 | 887,164 | 15.0 | 16 | 16 | 16 |
| Tokyo | 12,064,101 | 27,640 | 0.2 | 912,138 | 7.6 | 31 | 31 | 31 |
| Kanagawa | 8,489,974 | 52,253 | 0.6 | 605,561 | 7.1 | 38 | 38 | 38 |
| Niigata | 2,475,733 | 56,409 | 2.3 | 527,324 | 21.3 | 14 | 14 | 14 |
| Toyama | 1,120,851 | 134,411 | 12.0 | 325,700 | 29.1 | 5 | 5 | 5 |
| Ishikawa | 1,180,977 | 89,323 | 7.6 | 456,438 | 38.6 | 5 | 5 | 5 |
| Fukui | 828,944 | 63,546 | 7.7 | 278,755 | 33.6 | 6 | 6 | 6 |
| Yamanashi | 888,172 | 67,022 | 7.5 | 299,972 | 33.8 | 8 | 8 | 8 |
| Nagano | 2,215,168 | 42,159 | 1.9 | 424,883 | 19.2 | 11 | 11 | 11 |
| Gifu | 2,107,700 | 116,723 | 5.5 | 402,751 | 19.1 | 8 | 8 | 8 |
| Shizuoka | 3,767,393 | 52,431 | 1.4 | 763,855 | 20.3 | 11 | 11 | 9 |
| Aichi | 7,043,300 | 62,625 | 0.9 | 499,664 | 7.1 | 32 | 31 | 31 |
| Mie | 1,857,339 | 45,045 | 2.4 | 358,572 | 19.3 | 9 | 9 | 9 |
| Shiga | 1,342,832 | 55,451 | 4.1 | 309,793 | 23.1 | 7 | 7 | 7 |
| Kyoto | 2,644,391 | 11,917 | 0.5 | 290,538 | 11.0 | 23 | 18 | 18 |
| Osaka | 8,805,081 | 250,806 | 2.8 | 2,598,774 | 29.5 | 17 | 18 | 18 |
| Hyogo | 5,550,574 | 22,337 | 0.4 | 1,493,398 | 26.9 | 29 | 17 | 17 |
| Nara | 1,442,795 | 45,565 | 3.2 | 452,652 | 31.4 | 6 | 6 | 6 |
| Wakayama | 1,069,912 | 44,015 | 4.1 | 386,551 | 36.1 | 9 | 8 | 8 |
| Tottori | 613,289 | 116,686 | 19.0 | 249,385 | 40.7 | 3 | 3 | 3 |
| Shimane | 761,503 | 25,239 | 3.3 | 256,819 | 33.7 | 7 | 7 | 7 |
| Okayama | 1,950,828 | 38,492 | 2.0 | 626,642 | 32.1 | 10 | 11 | 11 |
| Hiroshima | 2,878,915 | 56,870 | 2.0 | 1,126,239 | 39.1 | 10 | 10 | 10 |
| Yamaguchi | 1,527,964 | 43,473 | 2.8 | 289,829 | 19.0 | 10 | 9 | 9 |
| Tokushima | 824,108 | 27,166 | 3.3 | 448,770 | 54.5 | 6 | 6 | 6 |
| Kagawa | 1,022,890 | 36,014 | 3.5 | 425,996 | 41.6 | 5 | 4 | 4 |
| Ehime | 1,493,092 | 69,713 | 4.7 | 473,379 | 31.7 | 9 | 7 | 7 |
| Kochi | 813,949 | 62,566 | 7.7 | 330,654 | 40.6 | 6 | 6 | 6 |
| Fukuoka | 5,015,699 | 93,581 | 1.9 | 1,011,471 | 20.2 | 22 | 22 | 22 |
| Saga | 876,654 | 81,457 | 9.3 | 362,090 | 41.3 | 5 | 5 | 5 |
| Nagasaki | 1,516,523 | 33,538 | 2.2 | 423,167 | 27.9 | 10 | 10 | 10 |
| Kumamoto | 1,859,344 | 59,261 | 3.2 | 662,012 | 35.6 | 11 | 11 | 11 |
| Oita | 1,221,140 | 28,689 | 2.3 | 436,470 | 35.7 | 10 | 10 | 10 |
| Miyazaki | 1,170,007 | 26,367 | 2.3 | 305,755 | 26.1 | 9 | 9 | 9 |
| Kagoshima | 1,786,194 | 13,875 | 0.8 | 552,098 | 30.9 | 15 | 14 | 14 |
| Okinawa | 1,318,220 | 48,705 | 3.7 | 446,403 | 33.9 | 6 | 6 | 6 |
| Total | 126,925,843 | | | | | 568 | 547 | 545 |

The population size is calculated from the year 2000 census.
In the population in the PHC area, each number shows the minimum/maximum PHC population size in a given prefecture.
The percentage of minimum/maximum PHC shows proportion of population size in a given prefecture.

| Prefecture | Week | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 50 | 51 | 52 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Hokkaido | – | – | – | – | – | – | □ | □ | □ | ■ | ■ | □ | □ | □ | □ |
| Aomori | – | – | – | – | – | – | □ | □ | □ | □ | – | – | – | – | – |
| Iwate | – | – | – | – | – | – | □ | □ | □ | □ | □ | – | – | – | – |
| Miyagi | – | – | – | – | – | □ | □ | □ | □ | □ | □ | – | – | – | – |
| Akita | – | – | □ | – | – | □ | □ | ■ | ■ | ■ | □ | – | – | – | – |
| Yamagata | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Fukushima | – | – | – | – | – | □ | □ | □ | □ | □ | □ | □ | – | – | – |
| Ibaraki | – | – | – | – | – | – | □ | □ | □ | □ | □ | – | – | – | – |
| Tochigi | – | – | – | – | – | □ | ■ | ■ | ■ | ■ | □ | – | – | – | – |
| Gunma | – | – | – | – | – | □ | ■ | ■ | ■ | ■ | ■ | □ | – | – | – |
| Saitama | – | – | – | – | – | □ | ■ | ■ | ■ | ■ | ■ | □ | – | – | – |
| Chiba | – | – | – | – | – | □ | ■ | ■ | ■ | ■ | ■ | – | – | – | – |
| Tokyo | – | – | – | – | – | □ | ■ | ■ | ■ | ■ | ■ | □ | – | – | – |
| Kanagawa | – | – | – | – | – | □ | ■ | ■ | ■ | ■ | ■ | □ | □ | – | – |
| Niigata | – | – | – | – | – | – | □ | □ | □ | □ | □ | □ | □ | □ | □ |
| Toyama | – | – | – | – | – | – | ■ | ■ | ■ | ■ | ■ | ■ | □ | – | – |
| Ishikawa | – | – | – | – | – | – | ■ | ■ | ■ | ■ | ■ | ■ | ■ | □ | □ |
| Fukui | – | – | – | – | – | ■ | ■ | ■ | ■ | ■ | ■ | ■ | □ | □ | – |
| Yamanashi | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Nagano | – | – | – | – | – | □ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | □ |
| Gifu | – | – | – | – | – | – | □ | ■ | ■ | ■ | ■ | ■ | – | – | – |
| Shizuoka | – | – | – | – | ■ | ■ | ■ | ■ | ■ | ■ | ■ | □ | □ | – | – |
| Aichi | – | – | – | – | – | □ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | □ | – |
| Mie | – | – | – | – | – | ■ | ■ | ■ | ■ | ■ | ■ | ■ | □ | – | – |
| Shiga | – | – | – | – | ■ | ■ | ■ | ■ | ■ | ■ | □ | – | – | – | – |
| Kyoto | – | – | – | – | – | □ | ■ | ■ | ■ | ■ | □ | □ | – | – | – |
| Osaka | – | – | – | – | – | □ | ■ | ■ | ■ | ■ | □ | – | – | – | – |
| Hyougo | – | – | – | – | □ | ■ | ■ | ■ | ■ | ■ | □ | – | – | – | – |
| Nara | – | – | – | – | – | ■ | ■ | ■ | ■ | ■ | ■ | – | – | – | – |
| Wakayama | – | – | – | – | – | ■ | ■ | ■ | ■ | ■ | – | – | – | – | – |
| Tottori | – | – | – | – | □ | ■ | ■ | ■ | ■ | ■ | – | – | – | – | – |
| Shimane | – | – | – | – | – | □ | ■ | ■ | ■ | ■ | ■ | □ | □ | – | – |
| Okayama | □ | ■ | ■ | ■ | ■ | ■ | ■ | □ | – | – | – | – | – | – | – |
| Hiroshima | – | – | – | – | □ | ■ | ■ | ■ | ■ | ■ | □ | – | – | – | – |
| Yamaguchi | – | – | – | – | □ | ■ | ■ | ■ | ■ | □ | □ | – | – | – | – |
| Tokushima | – | – | – | – | – | ■ | ■ | ■ | ■ | ■ | □ | □ | – | – | – |
| Kagawa | – | – | – | – | – | ■ | ■ | ■ | ■ | – | – | – | – | – | – |
| Ehime | – | – | – | – | – | ■ | ■ | ■ | ■ | ■ | ■ | □ | □ | □ | □ |
| Kouchi | – | – | – | – | – | – | – | – | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Fukuoka | – | – | □ | □ | ■ | ■ | ■ | ■ | ■ | □ | □ | – | – | – | – |
| Saga | – | – | – | – | ■ | ■ | ■ | ■ | ■ | □ | – | – | – | – | – |
| Nagasaki | – | – | – | – | □ | □ | ■ | ■ | ■ | ■ | ■ | – | – | – | – |
| Kumamoto | □ | □ | □ | – | □ | ■ | ■ | ■ | ■ | □ | □ | – | – | – | – |
| Oita | – | – | – | – | □ | ■ | ■ | ■ | ■ | ■ | □ | □ | □ | – | – |
| Miyazaki | – | □ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | □ | – | – | – | – | – |
| Kagoshima | – | – | – | – | ■ | ■ | ■ | ■ | □ | – | – | – | – | – | – |
| Okinawa | – | – | – | – | – | □ | □ | □ | □ | □ | – | – | – | – | – |

**Figure 2.** Influenza epidemics in various prefectures in the 2005/2006 season.

The figure shows the occurrence of epidemics and wide-area epidemics in various prefectures from week 50 of 2005 through week 12 of 2006.

– No epidemic.

□ Epidemic.

■ Wide-area epidemic.

**Table 3.** Annual number of epidemic weeks for influenza in various prefectures in fiscal years 1999-2005.

| | Fiscal year | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Prefecture | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 1999-2005 |
| Hokkaido | 3 / 11 | 0 / 2 | 0 / 14 | 3 / 19 | 3 / 12 | 7 / 8 | 2 / 13 | 18 / 79 |
| | | | | | | | | |
| Aomori | 5 / 6 | 0 / 2 | 0 / 9 | 5 / 8 | 3 / 10 | 6 / 6 | 0 / 6 | 19 / 47 |
| Iwate | 4 / 8 | 0 / 4 | 5 / 10 | 8 / 9 | 5 / 6 | 6 / 8 | 0 / 10 | 28 / 55 |
| Miyagi | 5 / 13 | 0 / 3 | 4 / 7 | 6 / 10 | 4 / 6 | 6 / 11 | 0 / 6 | 25 / 56 |
| Akita | 6 / 7 | 2 / 4 | 4 / 7 | 9 / 10 | 6 / 9 | 5 / 7 | 3 / 12 | 35 / 56 |
| Yamagata | 5 / 7 | 0 / 0 | 0 / 7 | 8 / 10 | 0 / 7 | 7 / 8 | 0 / 0 | 20 / 39 |
| Fukushima | 4 / 6 | 0 / 3 | 4 / 7 | 8 / 8 | 6 / 7 | 7 / 9 | 0 / 7 | 29 / 47 |
| | | | | | | | | |
| Ibaraki | 0 / 4 | 0 / 0 | 0 / 0 | 4 / 9 | 3 / 5 | 7 / 8 | 0 / 5 | 14 / 31 |
| Tochigi | 4 / 6 | 0 / 0 | 5 / 8 | 7 / 8 | 3 / 4 | 8 / 8 | 4 / 6 | 31 / 40 |
| Gunma | 4 / 6 | 0 / 0 | 7 / 10 | 5 / 10 | 4 / 8 | 7 / 9 | 5 / 7 | 32 / 50 |
| Saitama | 5 / 9 | 0 / 2 | 5 / 8 | 7 / 8 | 5 / 6 | 8 / 9 | 5 / 7 | 35 / 49 |
| Chiba | 4 / 7 | 0 / 2 | 3 / 8 | 7 / 11 | 5 / 5 | 7 / 8 | 5 / 6 | 31 / 47 |
| Tokyo | 3 / 6 | 0 / 0 | 0 / 6 | 5 / 8 | 3 / 5 | 7 / 9 | 5 / 7 | 23 / 41 |
| Kanagawa | 4 / 8 | 0 / 0 | 2 / 8 | 6 / 10 | 5 / 5 | 6 / 10 | 5 / 8 | 28 / 49 |
| | | | | | | | | |
| Niigata | 6 / 9 | 0 / 3 | 5 / 6 | 9 / 12 | 6 / 8 | 8 / 10 | 0 / 12 | 34 / 60 |
| Toyama | 6 / 9 | 0 / 0 | 0 / 6 | 8 / 9 | 5 / 5 | 7 / 9 | 6 / 7 | 32 / 45 |
| Ishikawa | 7 / 7 | 0 / 2 | 4 / 6 | 11 / 12 | 5 / 7 | 7 / 8 | 7 / 9 | 41 / 51 |
| Fukui | 5 / 6 | 0 / 0 | 0 / 3 | 12 / 12 | 8 / 8 | 7 / 7 | 7 / 13 | 39 / 49 |
| | | | | | | | | |
| Yamanashi | 5 / 6 | 0 / 3 | 0 / 5 | 8 / 8 | 4 / 6 | 5 / 7 | 0 / 0 | 22 / 35 |
| Nagano | 6 / 7 | 0 / 0 | 1 / 6 | 8 / 13 | 6 / 7 | 8 / 8 | 8 / 10 | 37 / 51 |
| Gifu | 4 / 7 | 0 / 0 | 3 / 4 | 5 / 6 | 4 / 5 | 7 / 9 | 5 / 6 | 28 / 37 |
| Shizuoka | 6 / 7 | 0 / 4 | 6 / 7 | 8 / 10 | 5 / 7 | 8 / 10 | 7 / 9 | 40 / 54 |
| Aichi | 4 / 11 | 0 / 0 | 7 / 9 | 7 / 9 | 5 / 11 | 8 / 9 | 7 / 13 | 38 / 62 |
| Mie | 5 / 9 | 0 / 4 | 4 / 10 | 6 / 11 | 5 / 6 | 9 / 10 | 7 / 12 | 36 / 62 |
| | | | | | | | | |
| Shiga | 4 / 4 | 0 / 0 | 0 / 0 | 8 / 9 | 5 / 6 | 6 / 7 | 6 / 7 | 29 / 33 |
| Kyoto | 4 / 6 | 0 / 0 | 0 / 4 | 5 / 13 | 3 / 8 | 6 / 8 | 4 / 7 | 22 / 46 |
| Osaka | 0 / 4 | 0 / 4 | 0 / 0 | 0 / 9 | 4 / 5 | 6 / 8 | 4 / 6 | 14 / 36 |
| Hyogo | 4 / 10 | 0 / 6 | 0 / 10 | 5 / 15 | 4 / 9 | 7 / 8 | 5 / 7 | 25 / 65 |
| Nara | 3 / 8 | 0 / 3 | 0 / 0 | 7 / 9 | 4 / 5 | 5 / 7 | 6 / 6 | 25 / 38 |
| Wakayama | 4 / 6 | 0 / 5 | 0 / 0 | 9 / 12 | 4 / 7 | 6 / 8 | 5 / 5 | 28 / 43 |
| | | | | | | | | |
| Tottori | 5 / 6 | 0 / 0 | 8 / 8 | 10 / 11 | 5 / 7 | 7 / 7 | 5 / 6 | 40 / 45 |
| Shimane | 5 / 7 | 0 / 0 | 0 / 0 | 5 / 12 | 0 / 5 | 6 / 8 | 5 / 13 | 21 / 45 |
| Okayama | 5 / 6 | 0 / 0 | 0 / 0 | 9 / 11 | 5 / 6 | 6 / 8 | 6 / 8 | 31 / 39 |
| Hiroshima | 4 / 5 | 0 / 0 | 4 / 5 | 5 / 8 | 5 / 5 | 6 / 7 | 5 / 7 | 29 / 37 |
| Yamaguchi | 6 / 8 | 0 / 1 | 0 / 11 | 12 / 13 | 4 / 10 | 8 / 9 | 4 / 7 | 34 / 59 |
| | | | | | | | | |
| Tokushima | 4 / 8 | 3 / 7 | 0 / 5 | 10 / 11 | 5 / 6 | 6 / 7 | 5 / 7 | 33 / 51 |
| Kagawa | 0 / 3 | 0 / 0 | 0 / 0 | 10 / 10 | 0 / 0 | 6 / 6 | 4 / 4 | 20 / 23 |
| Ehime | 6 / 7 | 2 / 3 | 4 / 9 | 6 / 11 | 5 / 7 | 6 / 6 | 6 / 10 | 35 / 53 |
| Kochi | 5 / 8 | 3 / 6 | 0 / 8 | 10 / 11 | 0 / 4 | 7 / 8 | 7 / 7 | 32 / 52 |
| | | | | | | | | |
| Fukuoka | 6 / 10 | 0 / 0 | 0 / 10 | 14 / 17 | 5 / 8 | 8 / 9 | 5 / 9 | 38 / 63 |
| Saga | 4 / 6 | 0 / 2 | 0 / 0 | 14 / 17 | 0 / 5 | 9 / 9 | 5 / 6 | 32 / 45 |
| Nagasaki | 5 / 7 | 0 / 4 | 7 / 11 | 9 / 13 | 7 / 10 | 8 / 9 | 5 / 8 | 41 / 62 |
| Kumamoto | 4 / 7 | 0 / 0 | 4 / 9 | 11 / 16 | 3 / 7 | 7 / 9 | 4 / 10 | 33 / 58 |
| Oita | 7 / 8 | 0 / 0 | 10 / 11 | 12 / 16 | 6 / 9 | 6 / 9 | 5 / 10 | 46 / 63 |
| Miyazaki | 6 / 7 | 0 / 2 | 0 / 12 | 8 / 12 | 7 / 9 | 9 / 9 | 7 / 10 | 37 / 61 |
| Kagoshima | 5 / 6 | 0 / 4 | 4 / 6 | 12 / 12 | 7 / 7 | 8 / 10 | 4 / 5 | 40 / 50 |
| | | | | | | | | |
| Okinawa | 4 / 5 | 0 / 0 | 0 / 0 | 12 / 12 | 5 / 7 | 6 / 7 | 0 / 9 | 27 / 40 |
| | | | | | | | | |
| Total | 210 / 334 | 10 / 85 | 110 / 290 | 373 / 520 | 201 / 317 | 323 / 388 | 200 / 365 | 1,427 / 2,299 |
| | | | | | | | | |
| Mean | 4.5 / 7.1 | 0.2 / 1.8 | 2.3 / 6.2 | 7.9 / 11.1 | 4.3 / 6.7 | 6.9 / 8.3 | 4.3 / 7.8 | 4.3 / 7.0 |
| | | | | | | | | |
| Proportion | 62.9 | 11.8 | 37.9 | 71.7 | 63.4 | 83.2 | 54.8 | 62.1 |

PHC: Public health center

The columns show the total number of wide-area epidemics/epidemics in various prefectures for each year and for the total observation period. Mean is the average number of wide-area epidemics/epidemics. Proportion is the percentage of wide-area epidemic weeks divided by epidemic weeks.

**Table 4.** Annual number of epidemic weeks for pediatric diseases in fiscal years 1999-2005.

| | Fiscal year | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Disease | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 1999-2005 | |
| Pharyngoconjunctival fever | | | | | | | | | |
| Wide-area epidemic weeks | 7 | 81 | 78 | 29 | 204 | 352 | 200 | 951 | (2.9) |
| Epidemic weeks | 240 | 543 | 558 | 424 | 1,107 | 1,300 | 1,216 | 5,388 | (16.4) |
| Proportion (%) | 2.9 | 14.9 | 14.0 | 6.8 | 18.4 | 27.1 | 16.4 | 17.7 | |
| Group A streptococcal pharyngitis | | | | | | | | | |
| Wide-area epidemic weeks | 58 | 138 | 140 | 100 | 203 | 188 | 230 | 1,057 | (3.2) |
| Epidemic weeks | 825 | 1,193 | 979 | 880 | 1,095 | 1,282 | 1,063 | 7,317 | (22.2) |
| Proportion (%) | 7.0 | 11.6 | 14.3 | 11.4 | 18.5 | 14.7 | 21.6 | 14.4 | |
| Infectious gastroenteritis | | | | | | | | | |
| Wide-area epidemic weeks | 224 | 196 | 152 | 156 | 204 | 212 | 223 | 1,367 | (4.2) |
| Epidemic weeks | 691 | 801 | 684 | 652 | 679 | 694 | 635 | 4,836 | (14.7) |
| Proportion (%) | 32.4 | 24.5 | 22.2 | 23.9 | 30.0 | 30.5 | 35.1 | 28.3 | |
| Chickenpox | | | | | | | | | |
| Wide-area epidemic weeks | 59 | 66 | 30 | 31 | 27 | 46 | 16 | 275 | (0.8) |
| Epidemic weeks | 547 | 720 | 491 | 523 | 536 | 376 | 425 | 3,618 | (11.0) |
| Proportion (%) | 10.8 | 9.2 | 6.1 | 5.9 | 5.0 | 12.2 | 3.8 | 7.6 | |
| Hand-foot-mouth disease | | | | | | | | | |
| Wide-area epidemic weeks | 40 | 346 | 156 | 56 | 268 | 75 | 77 | 1,018 | (3.1) |
| Epidemic weeks | 240 | 855 | 522 | 407 | 696 | 435 | 348 | 3,503 | (10.6) |
| Proportion (%) | 16.7 | 40.5 | 29.9 | 13.8 | 38.5 | 17.2 | 22.1 | 29.1 | |
| Erythema infectiosum | | | | | | | | | |
| Wide-area epidemic weeks | 25 | 33 | 151 | 96 | 13 | 53 | 64 | 435 | (1.3) |
| Epidemic weeks | 373 | 538 | 906 | 675 | 402 | 479 | 414 | 3,787 | (11.5) |
| Proportion (%) | 6.7 | 6.1 | 16.7 | 14.2 | 3.2 | 11.1 | 15.5 | 11.5 | |
| Pertussis | | | | | | | | | |
| Wide-area epidemic weeks | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | (0.0) |
| Epidemic weeks | 87 | 104 | 36 | 40 | 31 | 37 | 11 | 346 | (1.1) |
| Proportion (%) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Rubella | | | | | | | | | |
| Wide-area epidemic weeks | 2 | 0 | 0 | 8 | 15 | 5 | 0 | 30 | (0.1) |
| Epidemic weeks | 137 | 73 | 67 | 86 | 136 | 138 | 2 | 639 | (1.9) |
| Proportion (%) | 1.5 | 0.0 | 0.0 | 9.3 | 11.0 | 3.6 | 0.0 | 4.7 | |
| Herpangina | | | | | | | | | |
| Wide-area epidemic weeks | 284 | 186 | 220 | 122 | 261 | 140 | 199 | 1,412 | (4.3) |
| Epidemic weeks | 616 | 492 | 460 | 404 | 553 | 434 | 514 | 3,473 | (10.6) |
| Proportion (%) | 46.1 | 37.8 | 47.8 | 30.2 | 47.2 | 32.3 | 38.7 | 40.7 | |
| Measles | | | | | | | | | |
| Wide-area epidemic weeks | 47 | 117 | 116 | 16 | 15 | 0 | 0 | 311 | (0.9) |
| Epidemic weeks | 246 | 601 | 569 | 236 | 101 | 11 | 0 | 1,764 | (5.4) |
| Proportion (%) | 19.1 | 19.5 | 20.4 | 6.8 | 14.9 | 0.0 | 0.0 | 17.6 | |
| Mumps | | | | | | | | | |
| Wide-area epidemic weeks | 20 | 84 | 260 | 75 | 0 | 32 | 133 | 604 | (1.8) |
| Epidemic weeks | 276 | 675 | 1,278 | 722 | 211 | 482 | 763 | 4,407 | (13.4) |
| Proportion (%) | 7.2 | 12.4 | 20.3 | 10.4 | 0.0 | 6.6 | 17.4 | 13.7 | |

PHC : Public health center
The columns show the total number of weeks for which a wide-area epidemic or an epidemic occurred each year.
The proportion is the percentage of wide-area epidemic weeks divided by epidemic weeks. The number of weeks per year per prefecture is given in parentheses.