Observations on the influenza epidemic of November/December 1989

D M FLEMING

D L CROMBIE

C A NORBURY

K W CROSS

SUMMARY. This paper reports on the surveillance of influenza by the weekly returns service of the Royal College of General Practitioners during the epidemic of November/December 1989.

An epidemic of influenza became evident in mid-November and incidence peaked in the week beginning 6 December. The increase in incidence of influenza-like illness and of aggregated data for all respiratory disease to above the levels for non-epidemic years occurred one week before that attributed to influenza. The pattern of incidence was similar in the three geographic regions of England and Wales. The peak was first achieved in the age group 5–14 years and last in age 65+ years. The pattern of deaths from all causes closely followed the pattern of respiratory disease with an interval of between one and two weeks. During the period 15 November to the end of the year there were approximately twice as many people reporting respiratory disease than was usual for this time of year.

The peak weekly incidence was the highest recorded for 12 years but it was substantially less than the peaks for the winters of 1969/70, 1972/73 and 1975/76. Further research is in progress to establish the most effective means of monitoring influenza epidemics.

Introduction

INFLUENZA epidemics are sporadic in nature and difficult to predict. The epidemic occurring at the end of 1989 focussed attention on disease monitoring systems[1] and in particular on the surveillance network of practices linked to the Royal College of General Practitioners in its weekly returns service.[2]

This paper reports on the events surrounding the influenza epidemic of 1989.

Weekly returns service

The weekly returns service is funded by the Department of Health and organized by the Birmingham research unit of the RCGP. It is currently based on returns from 62 practices throughout England and Wales covering a population of 445 000. The practices contributing to the service record and index all new episodes of illness as they occur and send them every week to the Birmingham research unit where they are analysed to provide incidence data (new episodes per 100 000 registered persons).

For several reasons there are no imposed diagnostic criteria: a monitoring system operating in the normal working situation must be sensitive to new events which do not fit the customary pattern; the consultation, history and findings at the time presents the doctor with a snapshot of an illness and there is rarely an additional opportunity to assess the reliability of the diagnosis; diagnostic criteria may change with time (for example the difficulty of interpreting data about asthma[3] relates to changing attitudes towards this diagnosis); criteria require to be validated both in definition and use, and we do not consider this practicable; and finally it can be argued that the consensus of a large number of doctors accurately reflects current views on diagnosis.

The necessity to assign a label to all new episodes prevents selective exclusion of episodes in which the diagnosis is less certain. A count of all persons presenting with respiratory disease can be provided using the aggregated statistic for all respiratory diseases which include the following diagnostic labels: common cold, influenza-like illness, tonsillitis, acute sinusitis, laryngitis, epidemic influenza, pneumonitis, acute bronchitis, pleurisy, asthma and others not elsewhere classified.

Influenza

The name influenza, is very old[4] and precedes the first identification of an influenza virus[5] by several centuries. The clinical syndrome which is labelled influenza is not exclusively caused by the influenza virus either A or B. Nor can this ever be, because virus infections are so variable in their clinical manifestation, and routine virological investigation of patients with influenzal illnesses is not justifiable. It is commonly agreed however that there was no substantial epidemic of influenza in England and Wales between 1978 and 1989. Figure 1 shows the mean weekly incidence for each four weekly period over the years 1967 to 1989. The maximum weekly incidence recorded by the weekly returns service was 918 per 100 000 in 1969: the maximum in the recent epidemic was 272 per 100 000 (week beginning 6 December 1989).

Influenza epidemics can be serious: a large number of people need to stay in bed; there is considerable loss of time from work and school; many people die. In general, deaths occur among people otherwise affected by chronic respiratory and cardiac disease, but for a few, influenza leads to premature death. Clifford and colleagues[6] estimated that there were approximately 15 000 excess deaths attributable to influenza during epidemic years, one third in persons under 65 years of age. During the period 15 November to 31 December 1989 the Office of Population Censuses and Surveys reported 112 697 deaths from all causes compared with an expected value of 89 900. Of the 22 797 excess deaths, only 1919 were directly attributed to the influenza or influenzal pneumonia (*OPCS Monitor,* registrar general's weeky return for England and Wales).

The weekly returns service reports episodes of influenza-like illness which have occurred every winter with a different epidemic pattern to that of influenza. The data is also aggregated for all respiratory disease: the peak weekly incidence was never less than 700 per 100 000 and in years of influenza epidemics it has always exceeded 1000 per 100 000.

The 1989 experience

Weekly incidence rates for influenza, influenza-like illness, these two diagnoses combined, and for respiratory disease from

D M Fleming, FRCGP, deputy director, D L Crombie, MD, FRCGP, director, and C A Norbury, principal administrative officer, Royal College of General Practitioners' Birmingham research unit. K W Cross, PhD, senior lecturer, Department of Social Medicine, University of Birmingham.
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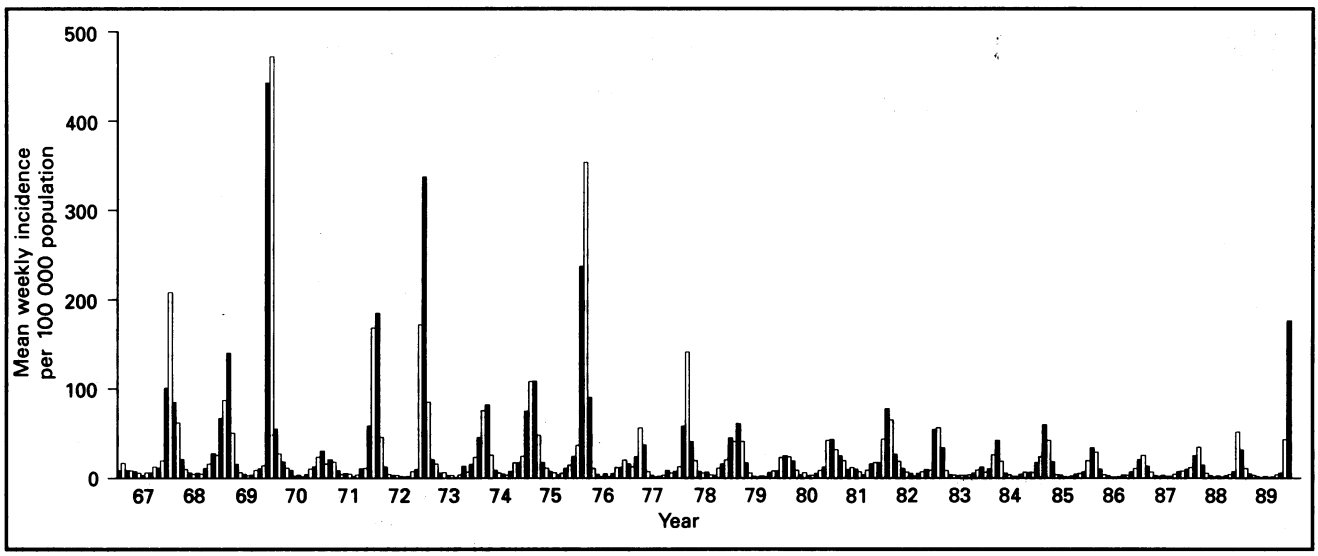

Figure 1. *Mean weekly incidence of influenza for four weekly periods per 100 000 population.*

November 1989 to January 1990 are displayed using a logarithmic scale in Figure 2. All rates were relatively low for the last week of the year because patients are less likely and have less opportunity to consult during the Christmas and New Year holidays.

During the first two weeks of November (weeks 44 and 45) rates for influenza were very low (less than 10 per 100 000). The rate for week 46 was three times as great as that of the preceeding week, but this was not unusual for non-epidemic years. Furthermore, the rate (30 per 100 000) did not suggest an influenza epidemic. It was not until week 48 (beginning 29 November) that the recorded rate of 109 per 100 000 clearly indicated that an epidemic was in progress. The peak was reached the next week and the weekly rate returned to a value of less than 10 per 100 000 in the fourth week of 1990.

Rates for influenza-like illness increased over the four weeks of November but even the rate in week 46 (52 per 100 000), was not unusual for this time of year. The rate of 80 per 100 000 in week 47 was the first definite indication of an epidemic. The combined data for influenza and influenza-like illness can be interpreted similarly, although the maximum rate of increase occurred between weeks 45 and 46. The combined rate of 76 per 100 000 for week 46 (week commencing 15 November), was very suggestive of an epidemic and the rate for the following week (110) provided confirmation.

The rates for respiratory disease in the first two weeks of November were somewhat higher than those usually seen at this time in non epidemic years (500–600 per 100 000). The value in week 46 (894 per 100 000) suggested an epidemic year and this was confirmed in the following week (1080 per 100 000). Between 15 November and the end of the year (weeks 46–52), approximately 8% of the registered population consulted with an episode of respiratory disease (which is approximately twice the number expected for this period).

Age specific incidence rates for respiratory disease (Figure 3) were maximal in the age group 0–4 years. The peak weekly rate for the age groups 0–4, 15–44 and 45–64 years occurred in week 49. The peak rate for age group 5–14 years occurred one week earlier and that for the age group 65+ years one week later. Interestingly the weekly returns service data relating to the epidemics of 1969/70, 1972/73 and 1976 also showed peaks for children preceeding those in adults by one or two weeks.

Weekly returns service data are disaggregated into three main regional groups, (north, central and south), defined roughly by

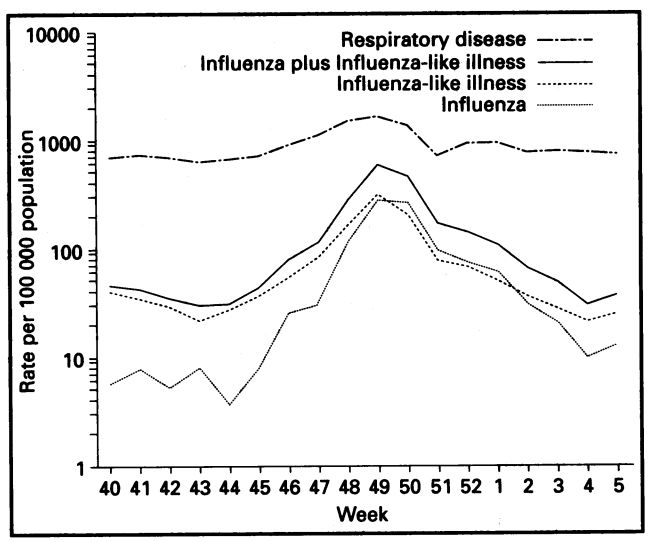

Figure 2. *Weekly rates per 100 000 population for influenza, influenza like illness and aggregated data for all respiratory disease.*

lines linking Liverpool with Hull and Bristol with Ipswich. The peak incidence for respiratory disease occurred in all three regions during week 49, though the peak in the north was less than those for the other two regions (Figure 4).

Weekly returns service data for respiratory disease were compared with weekly notifications of death from all causes in England and Wales for the period October 1989 to January 1990 inclusive (Figure 5). In the critical period of the 1989 influenza epidemic, the pattern of death notifications followed that of respiratory disease by two weeks.

Discussion

An epidemic of upper respiratory disease in the UK occurred during the last seven weeks of 1989. This was almost certainly due to influenza virus A/England/H3N2. During the epidemic there were almost 22 000 more deaths than expected for this time of year but only one tenth of them were attributed on death certificates to influenza. A total of 31 541 episodes of respiratory disorder were reported to the weekly returns service and this was about twice the number expected for this time of year, but only

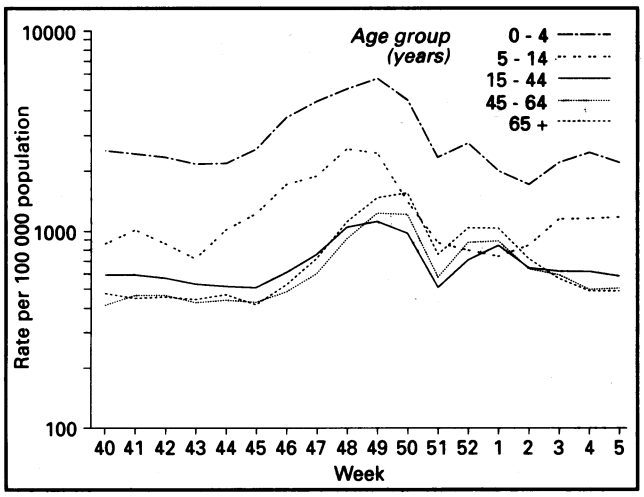

Figure 3. *Weekly rates per 100 000 population by age group for aggregated data for all respiratory disease.*

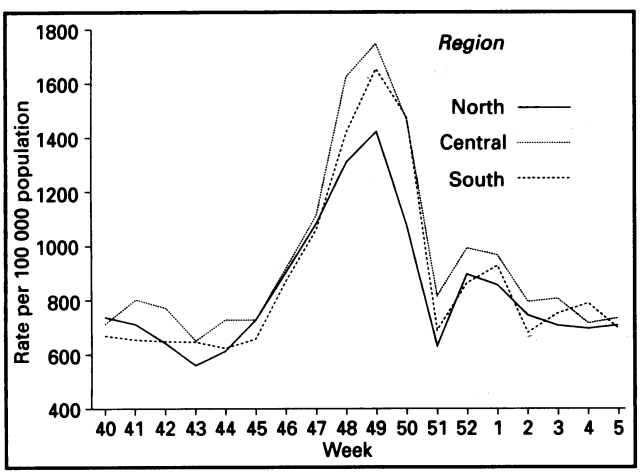

Figure 4. *Weekly rates per 100 000 population by region for aggregated data for all respiratory disease.*

7100 of these were attributed to infuenza or influenza-like illness. Up to and including the week of peak incidence 130 virus isolations of influenza A had been reported to the Communicable Disease Surveillance Centre: by the end of 1989 there were 442 and these were followed by greater numbers during the early weeks of 1990 when the epidemic was virtually over. Isolations of respiratory syncytial virus followed a remarkably similar pattern as that for infuenza A, increasing about the same time and to the same degree, though in total there were more than four times as many. During this recent epidemic, we reported the highest ever values for respiratory disease among children aged up to four years in the 23 year history of the weekly returns service. Some of these children almost certainly were suffering illnesses caused by respiratory syncytial virus.

These facts exemplify the problems for monitoring influenza. Central to them all is the basis of diagnosis. The data from the 1989 epidemic suggests that recorders preferred other diagnostic labels (including influenza-like illness) at the commencement of the epidemic and changed to the term epidemic influenza once the epidemic was established. We have studied the use of these terms in the practices and found that the recognition of the arrival of an epidemic locally was important to the recorders' choice. This study has also shown that aggregated data for respiratory disease may be valuable for the identification of epidemics and we intend to study this further. The weekly in-

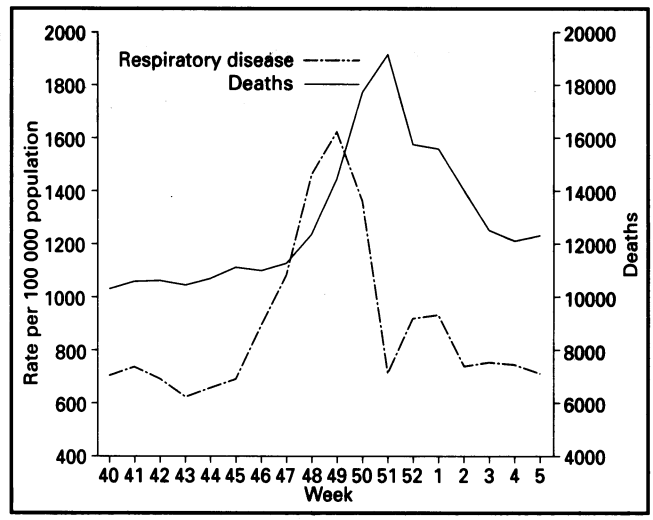

Figure 5. *Weekly rates per 100 000 population for aggregated data for all respiratory disease and number of deaths per week from all causes.*

cidence of respiratory disease followed a similar pattern and peaked simultaneously in the three geographic regions. However, incidence did not peak simultaneously in all age groups. Given the unpredictability of influenza epidemics we cannot say that these are invariable features but would suggest that a marked increase in rates for children is an amber if not red, warning signal of acute medical admissions to hospital of both children and adults.

In the analysis of the 1976 epidemic[8] we reported a similarity between the incidence of influenza in the weekly returns service and the pattern of death notifications. This similarity is confirmed here with an interval of one to two weeks. Since increased death rates over a short period have enormous consequences for the organization of health services, any monitoring system which can effectively predict morbidity is especially valuable.

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Address for correspondence

Dr D M Fleming, RCGP Birmingham Research Unit, Lordswood House, 54 Lordswood Road, Harborne, Birmingham B17 9DB.