Absenteeism among hospital staff during an influenza epidemic: implications for immunoprophylaxis

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The 1980–81 epidemic of influenza A/Bangkok 79 was responsible for increased absenteeism (1.7 times the rate for the corresponding period of the subsequent nonepidemic year) among selected hospital staff in Winnipeg's Health Sciences Centre. Retrospective study of employment records for 25 of the centre's largest departments showed excess sick-leave costs of about $24 500 during the 2-week period of peak absenteeism that included the epidemic. Although the centre was sampling prospectively for the virus the first positive results became available too late for chemoprophylactic measures to have been effective. The greater increase in absenteeism among nursing staff caring for patients with chronic respiratory disease and nurses working on general medical or pediatric acute infection/isolation wards suggested that these groups be targeted for influenza vaccination in hospitals.

L'épidémie d'influenza A/Bangkok 79 de 1980–81 a produit une augmentation du taux d'absentéisme parmi des membres choisis du personnel hospitalier du Health Sciences Centre de Winnipeg, soit 1,7 fois le taux observé pendant la période correspondante l'année suivante, où une telle épidémie n'a pas eu lieu. On démontre rétrospectivement sur dossiers d'emploi, dans 25 des principaux services, une majoration des coûts en congés de maladie de l'ordre de 24 500$ pour les 2 semaines où l'absentéisme a culminé au plus fort de l'épidémie. Bien qu'on eût recherché prospectivement le virus par échantillonnage, les premiers résultats positifs étaient revenus trop tard pour une chimioprophylaxie efficace. L'augmentation de l'absentéisme ayant surtout touché les infirmières rattachées à des malades respiratoires chroniques et celles des salles de médecine générale d'adultes et d'enfants souffrant d'infections aiguës ou en isolement, on propose que ces groupes d'infirmières soient électivement vaccinés.

The prevention of influenza type A virus infections in hospital staff before each influenza season remains a difficult problem. Such practices as restricting the admission of patients and visitors thought to be ill with influenza, isolating cohorts of ill patients and staff, and carrying out chemoprophylaxis have been suggested[1] but not proven as preventive measures. Nosocomial influenza among patients has been well documented,[2-7] but its impact on hospital personnel has been little studied,[8] and no specific recommendations have been made for their protection.[9] The balance of costs, risks and benefits should be considered, of course, before embarking on a program of influenza vaccination of those who provide essential services in the community, including those medical care workers at increased risk of exposure.[10] Currently, only general guidelines exist for medical personnel who may be at increased risk of exposure.[10]

In many localities the epidemic of influenza A/Bangkok/79(H3N2) that swept through North America in 1980–81 was severe. In 121 cities in the United States excess mortality rates extended over a 13-week period, and in 32 states widespread illness was attributed to influenza.[11] To assess the impact of this epidemic on the staff of a hospital, we retrospectively evaluated absenteeism recorded among staff at the Health Sciences Centre in Winnipeg in comparison with the same period in 1981, when there was no influenza epidemic.

Methods

The Health Sciences Centre in Winnipeg, a complex of interconnected hospitals with more than 1200 beds, is the principal teaching hospital of the University of Manitoba's faculty of medicine. We studied 25 of the 58 largest hospital departments, or approximately 30% of the centre's employees (over 1600 individuals), choosing so as to have approximately equal numbers of both support personnel and those involved directly in nursing care and so as to have a sample representative of employee activities.

From the computerized records we obtained summary figures on the total number of hours of employment and the number of hours of paid sick leave in each department for the relevant 2-week pay periods (of 77.5 hours per employee). In conjunction with this we calculated the sick-leave salaries for the pay periods extending from Nov. 23 to Dec. 20, 1980, which bracketed most of the local epidemic. Similar data for a "control" period when no influenza A was documented were obtained for the corresponding pay periods in 1981, from Nov. 22 to Dec. 19.

To make a comparison with a baseline of the remainder of the year excluding the epidemic we also examined the pattern of absenteeism between Aug. 16, 1980 and Nov. 22, 1980 and also between Dec. 21, 1980 and Aug. 1, 1981 for the six departments that had shown the highest rates and costs of absenteeism during the influenza epidemic.

There was no policy of routine immunization for the staff of the Health Sciences Centre before or during the period of observation. About 500 doses of vaccine were being given annually to outpatients with chronic respiratory diseases. Whether other patients complied with the recommendations for annual immunization depended on their own initiative and the actions of their physicians.

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The appearance of influenza in the community was established by both active (prospective) and passive methods of surveillance. In the former system the outpatient department of the Children's Hospital usually selected one specimen each day from a child with an acute febrile respiratory illness for diagnostic virologic studies. In the latter system 20 to 40 specimens (mainly throat swabs) were routinely sent every day from throughout the province to the virus detection laboratory of Cadham Provincial Laboratory. These specimens were treated with antibiotics and inoculated into the amniotic and allantoic cavities of 11-day-old embryonated eggs, into cultures of kidney cells from rhesus monkeys (Connaught Laboratories) and into HEP-2 cells. A negative result was recorded only if a repass of the culture yielded no virus. When found, influenza viruses were identified by the hemagglutination inhibition test with standard procedures[12] and with reagents provided by the Laboratory Centre for Disease Control in Ottawa. Two isolates of influenza virus cultured from specimens obtained during the epidemic were forwarded for reference typing to the influenza branch of the Centres for Disease Control (CDC) in Atlanta, Georgia.

Results

Influenza virus, strain A/Bangkok/79(H3N2), was isolated from specimens taken from 32 people in Manitoba during the 1980–81 epidemic (Fig. 1). Ten of the 24 specimens from Winnipeg were from patients or staff of the Health Sciences Centre. One of the two isolates sent to the CDC was identified as an influenza A/Bangkok/79-like strain, and the other as a strain intermediate between A/Texas/77 and A/Bangkok/79.

In Manitoba the strain of virus responsible for the epidemic was first detected in a patient in a nursing home 105 km west of Winnipeg at the end of November 1980.[13] This was the earliest documentation of the epidemic in Canada. All the isolates subsequently obtained in Manitoba came from specimens taken between Dec. 3 and 29, 1980 (Fig. 1). The earliest date of virus isolation from specimens collected in Winnipeg did not precede the early peak of increased absenteeism.

The total salary paid out in the 25 departments for sick leave in the 2-week period of peak absenteeism during the epidemic was much greater than that paid out in the comparable period the next year when no influenza A epidemic occurred (Table I). The net excess cost of paid sick leave for the 25 departments was $24 486 (in 1981 dollars). All but 5 of the 25 departments showed an increase in the rate of absenteeism as calculated from the hours of paid sick leave (Fig. 2).

Comparisons between the peak 2-week periods of absenteeism during the epidemic and baseline "control" period (the remainder of the year excluding the period of maximal absenteeism during the epidemic) showed similar increases in absenteeism in the six departments with the highest rates and costs of absenteeism during the epidemic (Table II).

Table I—Impact of the 1980–81 influenza epidemic relative to a 1981 "control" period on the staff of 25 departments of the Health Sciences Centre, Winnipeg

Measure	Corresponding 2-week pay period* 1980	1981	1980:1981 ratio
Total hours of employment	129 892	125 192	–
Hours of paid sick leave	7 616	4 330	–
Rate of absenteeism	0.0586	0.0346	1.694
Payment for sick leave†	$60 776.13	$36 290.00	1.675

*That is, 77.5 hours per individual.
†In 1981 dollars.

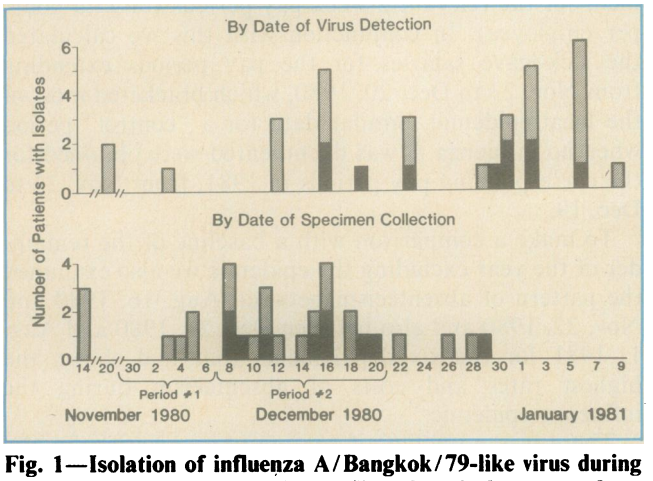

Fig. 1—Isolation of influenza A/Bangkok/79-like virus during 1980 virus epidemic in Manitoba. First three isolates were from outside Winnipeg; solid bars represent specimens from patients or staff of Health Sciences Centre, stippled bars specimens from elsewhere in Manitoba. Pay periods #1 and #2 were considered to bracket peak of epidemic. They extended from Nov. 23 to Dec. 20.

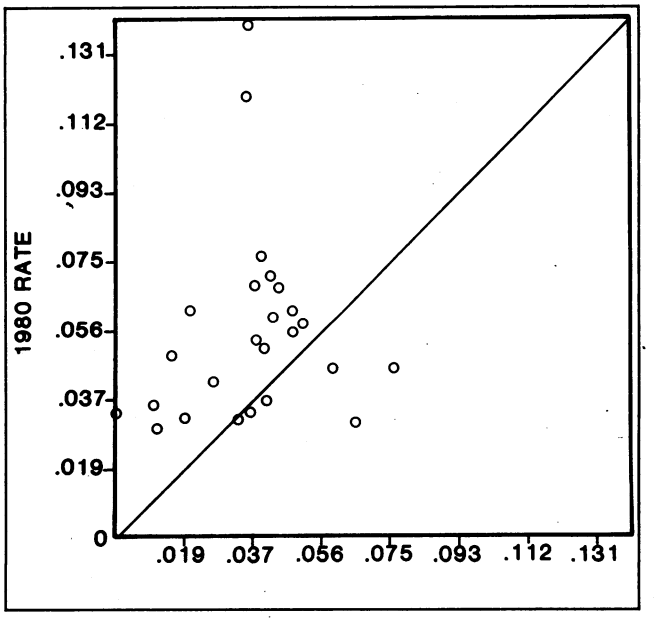

Fig. 2—Rates of absenteeism (paid hours of sick leave divided by total paid hours of employment including absenteeism hours) in peak 2-week period of absenteeism during 1980 influenza A epidemic and same period of nonepidemic year of 1981 for staff of 25 departments of Health Sciences Centre.

Discussion

Our study showed that there was increased absenteeism among many hospital staff during the time of the epidemic in Winnipeg, irrespective of their patient care responsibilities. However, the greatest rates of absenteeism were recorded among nurses in the acute infection/isolation ward of the Children's Hospital (7%), the medical nursing wards (8%) and the respiratory centre (14%). Nurses caring for children may have been at increased risk for influenza because children shed more virus for a longer period.[14-16] The high risk of influenza among patients with chronic respiratory problems and those of advanced age[16] may account for the increased use of sick leave by the staff of the general medical wards. Recent reports have shown influenza vaccine to be less effective than previously thought in an elderly population.[17-19]

If the Health Sciences Centre had counted on the first isolation of the virus from someone in the city to give it sufficient warning to implement control measures, then its efforts clearly would have had no chance of success. With conventional laboratory techniques too much time would have elapsed between when the specimen was taken and when the virus was identified. Waiting for the epidemic to start would have served no useful purpose: the rate of absenteeism rose too abruptly. The explosive nature of an urban outbreak of influenza A/Victoria/75 in Houston had been observed several years earlier.[14] However, in Manitoba the isolation of the influenza virus in a rural area in November 1980 could have provided adequate warning. (In retrospect, a Manitoba isolate from May 1980 typed by the CDC to be of the same strain[20] may have heralded the epidemic that hit 7 months later.) Active surveillance by culturing for the virus may produce advance notice of an influenza A outbreak 3 to 4 weeks before the disease peaks clinically.[21] However, even active methods must yield results sooner if practical chemoprophylactic measures are expected to substantially reduce the incidence of influenza in a hospital environment.

Table II—Absenteeism relative to the remainder of the year and to the subsequent nonepidemic year of the staff of the six departments that showed the highest rates and costs of absenteeism during the 1980 influenza epidemic

Department	Hours of paid sick leave per 2-week pay period		Ratio of hours of paid sick leave in peak 2-week period during epidemic	
	In peak period of absenteeism during epidemic	Mean during remainder of year	To mean hours during remainder of year	To hours in control period a year later
Clinical chemistry	233	101.5	2.30	1.81
Dietetics	1225	696	1.76	3.04
Acute infection/isolation (children)	224	103	2.17	1.75
Nursing, respiratory medicine	488	145	3.37	3.51
Ambulatory care (adults)	198	135	1.47	3.27
Nursing, medicine (adults)	608	346	1.76	1.92
Total	2976	1526.5	1.95	2.55

The isolation of patients and restrictions on patients' visitors are unlikely to prevent influenza in hospital staff who have no direct contact with patients. These members of the staff probably become infected in the general community or, perhaps, from other personnel who are dealing with patients. Staff without direct patient contact may, of course, be an important source of influenza within the hospital, for the virus can spread as an aerosol.

The cost of influenza vaccine (at $1.53 per dose in 1981 dollars) for the approximately 190 members of the nursing staff of the three departments with the greatest increases in absenteeism during the epidemic would have been $291. Assuming that the vaccine would be efficacious in 70% of cases and that it could be administered within existing hospital programs, we estimate the net sayings during the influenza A(H3N2) epidemic as follows: [70% × ($1412.38 + $2410.40 + $3248.20)] − $291.00 = $4658.75. Thus, a program of influenza vaccination targeted on the three departments that showed the highest rates of absenteeism would have been cost-efficient during that moderately severe influenza epidemic, although the savings in sick-leave payments would have been minimal in such a small group.

Continuing clinical and virologic surveillance for influenza among hospital staff would be needed to determine the occupational risk of influenza. However, immunoprophylaxis is probably the most practical way to reduce absenteeism, lessen the risk of nosocomial transmission of the virus from staff to patients and protect staff. Our study suggests that selected nurses (those caring for patients with chronic respiratory disease or general medical conditions and those caring for children in acute infection/isolation wards) should be appropriate target groups for vaccination against influenza.

We thank Ms. Doreen Prokopchuk and Mr. Brian Anderson for their efforts and support in retrieving data from the records of the comptroller's office at the Health Sciences Centre, as well as the influenza branch and Dr. Alan P. Kendal of the CDC for providing the reference typing of influenza isolates.

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