

Influenza's Influence: Is an Early Warning System Possible?

MANITOBA CENTRE FOR HEALTH POLICY AND EVALUATION



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You wake up one morning and you ache all over. It might be from shovelling all that snow out of the driveway yesterday, except that you also have a cough, your nose is stuffed up, and by evening, you have a fever. These are symptoms known to many as the flu, or influenza. And there are times of the year when it seems like everyone has it.

For some, bed-rest and lots of fluid are all that's required and things return to normal within a few days. For others, however, especially those with weakened immune systems or other medical conditions, the flu can cause serious complications, including pneumonia, bronchitis, asthma, croup and bronchiolitis.

A report called *Seasonal Patterns of Winnipeg Hospital Use*, published in 1999 by the Manitoba Centre for Health Policy and Evaluation (MCHPE), concluded that flu-like illness is at least partly responsible for periods of increased hospital use. With hospital over-crowding an on-going issue, is it possible to identify early warning signs of an influenza outbreak, signs which might give hospitals time to prepare for the increased number of patients? At the request of Manitoba Health, MCHPE has produced a new study which addresses this question, as well as others, about the effect of flu-like illness on the Winnipeg health care system.

Methods

For this study we developed an indicator called a *hospital flu pressure period* which occurs when the number of patients in

hospital with flu-like illness, or the number of *inpatients*, has reached a high level for an extended period of time. (Technically, it's when the number of inpatients is at least two standard deviations above the mean for at least one week, but it also includes the time before and after this peak when the number of inpatients was at least one standard deviation above the mean.) The rest of the time is referred to as a *non-flu pressure period*. We determined hospital flu pressure periods from 1995 to 1999.

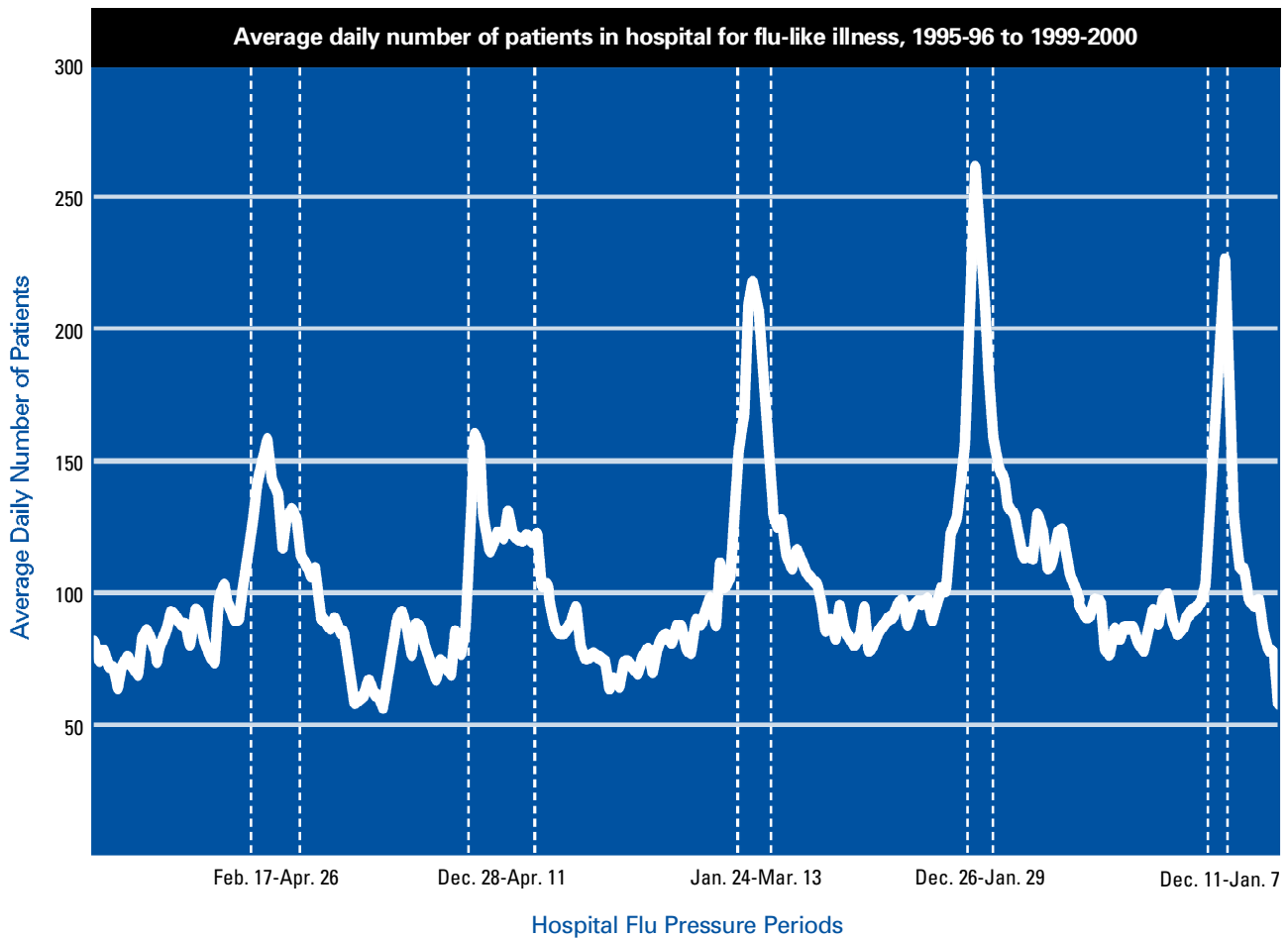
An outbreak of the flu may actually start in the community before the hospital flu pressure period is reached. This study considers other indicators which might identify an outbreak in the community and sound the alarm to hospitals to prepare for more patients with flu-related illnesses. For instance, was there an increase in visits to doctors' offices or hospital emergency rooms for flu? Was there an increase in the number of prescriptions for antibiotics and amantadine (a drug used, among other things, in the prevention and treatment of influenza)? We also looked for changes in the number of requests for viral tests for influenza (collected from swabs), and the number that were positive.

To sum up, we determined hospital flu pressure periods each year from 1995/96 to 1998/99. Then we calculated the weekly average number of visits to the doctor and emergency rooms, as well as drug prescriptions for influenza-related illness.

Findings

By examining these indicators, this is what we found:

- There was a seasonal increase in the number of patients in or admitted to the hospital with flu-like illness (Figure). The hospital flu pressure periods occurred anytime between late December and April and lasted between five weeks (1998/99) and 15 weeks (1996/97). Since the completion of this study, we've been able to look at more recent data; the flu pressure period for 1999/2000 lasted four weeks.
- The peaks in the number of patients with flu-like illness increased steadily over the study period. The average daily number of patients in the hospital with flu-like illness during a high-pressure period rose from 156 in 1996/97 to 217 in 1997/98 and 258 in 1998/99. In 1999/2000 it was also quite high at 227.
- More than half (54%) of the patients admitted for flu-like illness were aged 65 and over. In fact, in 1998/99, 40% of those in hospital were 75 years and older, compared to 30% in 1995/96. This suggests that the increasing peak of patients with flu-like illness was driven by those who were 75 years of age and older.
- A majority of seniors (65+) admitted to hospital for flu-like illness live on their own (75% in 1998/99), followed by patients living in seniors' apartments (18%), and nursing homes (7%). This is not surprising given that most seniors live in their own homes. But if you consider only those living in seniors' apartments, a higher proportion of them were admitted, than among those



living on their own, and the proportion was as high or even higher than those in nursing homes. To do this comparison, we had to take into account that seniors in nursing homes are generally older. We levelled the playing field, as it were, by standardizing the age and gender of the seniors across these three groups.

- ❑ The number of patients with flu-like illness in addition to other serious medical conditions also increased to 18% in 1998/99 from 13% in 1995/96. These are not just people with the sniffles, but those for whom the flu can cause serious—even life-threatening—complications.
- ❑ The number of patients seen in doctors' offices, outpatient clinics and nursing homes for treatment of flu-like illness was also higher during the flu season. For example, in 1998/99 the weekly number of visits for flu-like illness reached 14,046 in January, up from an average of 7,821.
- ❑ Visits to emergency rooms, as well as prescriptions for antibiotics and amantadine, were also higher during flu pressure periods. In 1998/99 the number of emergency room visits was more than three times higher during the peak week. Similarly, prescriptions for antibiotics increased 76% during the flu pressure period.
- ❑ Due to limitations of the data, we were unable to determine how many Manitobans had received a flu shot, or even whether those who were hospitalized had had a flu shot. This is partly because fewer patients are receiving flu shots from their physicians, and during the study years, no system was in place to record vaccinations given by anyone except physicians. However, in 1996/97 the National Population Health Survey by Statistics Canada showed that only 52% of Manitobans 65 and over received a flu shot. These numbers are low and may well have contributed to the flu pressure periods hospitals have experienced.

- ❑ When looking at whether certain indicators preceded the flu period, we discovered that results from swabs analysed for influenza preceded hospital flu pressure periods by one to 14 weeks. Similarly, increased activity in physician visits and emergency departments due to flu-like illness, as well as increases in antibiotic prescriptions to prevent or treat it, occurred one to 13 weeks prior to flu pressure periods.

Is A Warning System Possible?

These findings suggest a warning system may be possible. It won't be precise, but with more information and a better tracking system, it may be possible to give hospitals more warning. Since the beginning of this study, Manitoba Health has already taken steps to improve the process of tracking flu-like illness and providing more accurate data. There are two areas in particular that are being developed.

We could not accurately determine how many people received the flu vaccine, but improvements to the Manitoba Immunization Monitoring System (MIMS) will help change that. MIMS has been expanded to include information about adults as well as children and will capture information on flu vaccinations given by physicians and public health nurses.

Improvements are also being made to the tracking and surveillance of influenza outbreaks. The number of *sentinel physicians*—doctors who volunteer to take viral samples from patients with flu symptoms—is increasing. Viral testing in schools is also being emphasized. Children often get the flu before adults, so when the number of children absent from school reaches 10%, the public health nurses take swabs for viral testing on a weekly basis.

Conclusions

So what have we learned? Flu-like illness has a huge impact on the health care system. With improved tracking methods and equipment, a warning system would help predict an outbreak of the flu and give hospitals time to

prepare for an increased number of patients; for example, discharging patients who are no longer acute or enhancing home care services.

"An ounce of prevention is worth a pound of cure." It's an old saying but it's still true.

Vaccination programs play a key role in the prevention of flu-like illness. New vaccination campaigns by the Regional Health Authorities have recently been launched. One of the many goals of these campaigns, which are funded by Manitoba Health, is to raise awareness in the community through local advertising.

We also saw that a higher proportion of those living in seniors' apartments were admitted to the hospital for flu-like illness than those living on their own. This is not surprising given that those who live in close quarters are at higher risk of getting the flu. Once one resident has the flu, the possibility of it spreading is higher. On-site vaccine clinics for seniors' apartments are another new development which is part of the larger vaccination campaign.

Health care workers, especially those who work with seniors, have also been targeted. Immunization of health care workers is essential, not only to protect the workers themselves, but also to prevent spreading the flu to those who are more vulnerable.

At the moment, seniors 65 and over are still the primary focus of vaccination campaigns in Manitoba and most of the other provinces. But in the U.S., immunization of all adults over the age of 50 is now recommended. Young children, who are also at high risk for flu-like illness, might also be considered. This year in Ontario flu shots were free for anyone who wanted one, not just those at high risk. How effective this will be in preventing or decreasing the number of patients in hospital for flu-like illness is yet to be determined.

Over the four-year study period we were also struck by the drop in the number of patients seen in physicians' offices, outpatient clinics and nursing homes around Christmas time. During Christmas week, there were up to

31,000 fewer patients seen than the week before, and at the same time, there was an increase in visits to hospital emergency rooms. With limited access to physicians over the Christmas holidays, these numbers suggest that emergency rooms, and hospitals in general, might bear the brunt of the flu season should it hit during the week of Christmas. Whether flexibility can be built into the system to take this into account is worth further consideration.

Even after studying and analyzing the data there are still questions which have not been fully addressed. The number of people with flu-like illness is increasing. In 1997/98 the increase may have been due to a poor match between the vaccine and the actual strain of the flu. However, the vaccine-to-strain match the following year was good but the number of people with flu-like illness still increased. More seniors aged 65 and over in the general population are unlikely to be the reason, because the numbers aren't increasing that rapidly. In other words, the population considered in this study won't have aged enough over the four-year period to influence this trend.

The one thing we do know is that the flu keeps coming back. This offers little comfort if you're the one in bed hugging a bowl of soup and watching out the window as the snow falls. If you're concerned about the flu, talk to your doctor. If you're also one of those at high risk for getting the flu—if you're over 65, have chronic medical conditions, or live in a seniors' complex—perhaps you'd better think next fall about getting a flu shot.

Summary written by Alison Maclean, based on the report: The Impact of Influenza-Like Illness on the Winnipeg Health Care System: Is an Early Warning System Possible? by Verena Menec, Charlyn Black, Leonard MacWilliam, Fred Aoki, Sandra Peterson, and David Friesen

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