

Lessons from the 1918 Spanish Flu

Part I of II

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INTRODUCTION

A pandemic of influenza is inevitable and possibly imminent, warns the World Health Organization and influenza experts, who believe that we are closer to an influenza pandemic than at any time since 1968, the year of the last pandemic (Webby et al., 2003; Monto 2005; WHO 2005 a; and Duncan 2006 a).

WHO and the experts are concerned that the widespread distribution of avian influenza virus, Influenza A/H5N1, has the potential to ignite the next global epidemic. H5N1 is mutating rapidly, it is affecting new hosts (such as cats and tigers), it is rapidly expanding its geographic range, and it is highly pathogenic and can cause severe disease in humans. In fact, since 2003, H5N1 has infected 224 people and killed 127 people (29/05/06) (WHO 2006 b).

Between February 2006 and April 2006, 32 countries, located in Africa, Asia, Europe, and the Middle East, reported their first cases in birds. This spread marks the fastest and most extensive geographical spread of any highly pathogenic influenza virus since the disease was first described in 1878. The virus has now affected some of the world's most densely populated and impoverished regions—areas poorly served by health care and surveillance systems (Duncan 2006 b).

History teaches us that we are due for another fatal flu pandemic. It is therefore appropriate and necessary to look back at past pandemics, such as 1918, 1957, and 1968, in order to prepare for the future. The health minister of Alberta, Canada, Iris Evans, warns, 'What worries me most is the ignorance of the people in the public who assume that if they get sick there'll be something there for them, and they don't realize the devastation this could be (CBC 2005).'

Revisiting the 1918 Spanish flu pandemic sheds light on the destruction of human life and families, the chaos inflicted on the healthcare system, and the disruption to civil society. Perhaps most important, reviewing the worldwide epidemic raises questions (highlighted in *italics* throughout this first installment and tomorrow's second installment) that need answers, and forewarns business, government, and the public regarding the dangers of pandemic influenza, and the urgent need for preparation to reduce cases, hospitalizations, and deaths, and economic and social impacts.

Specifically, today's paper examines Spanish flu, and next discusses lessons from the pandemic, and what they might mean for a future pandemic. The second part focuses

on the possible impacts of a pandemic—mortality, and economic and social impacts—and responsibility—global, public, and organizational accountability.

1918 SPANISH FLU AND H5N1

In the autumn of 1918, the Spanish influenza virus probably mutated causing a pandemic of unprecedented virulence, and signaled the start of the autumn wave of Spanish flu and the most devastating (in terms of total mortality) disease outbreak in recorded history.

Despite the devastation among the world's peoples, most patients developed only a mild flu. Even in the severe autumn wave, 80 percent of patients suffered the usual three- to five-day illness. Patients initially had cough and stuffy nose; later, however, a dreadful ache pervaded every joint and muscle--leaving the patient feeling as if he or she 'had been beaten all over with a club'. If the illness progressed no further, the victim was usually 'back to normal' within one week.

Approximately 20 percent of all influenza patients developed pneumonia; half of those died. The pneumonia often developed rapidly, with some patients experiencing a 'heliotrope coloration of the lips and face'. Men literally choked to death with pulmonary edema, the lungs so swamped with blood, foam and mucous that the faces were grey and the lips purple.

Doctors and scientists from around the world reported a wide range of symptoms, including kidney complaints, nasal hemorrhage, and even 'silent lungs'; Spanish flu seemed to affect so many organs of the body usually untouched by influenza that Dr. Charles Sundell of Britain's Medical Research Council recorded, 'No part of the body is exempt.' Patients with puffy faces and swollen ankles passed only ten ounces of blood-streaked urine each day. Because of acute congestion of the lungs, patients sometimes experienced an absence of breath so complete that it was thought that the stethoscope had failed to function—leading to the term 'silent lungs'.

Today, like the 1918 Spanish flu virus, H5N1 affects multiple organs. H5N1 initially causes fever, usually with a temperature higher than 38°C, and common influenza symptoms. Abdominal pain, bleeding from the gums and nose, chest pain, diarrhea, and vomiting have also been reported as early symptoms in some patients. Almost all patients develop pneumonia; during the Hong Kong outbreak, for example, all severely ill patients had primary viral pneumonia, which did not respond to antibiotics (WHO 2006 a).

LESSONS FROM 1918

All Countries will be Affected (WHO 2006 c)

In the autumn of 1918, the virus probably mutated, and hit three port cities thousands of miles apart—Freetown, Sierra Leone; Brest, France; and Boston, Mass.

(Crosby 1976; and Duncan 2003). *Did the disease originate in one of the three ports, and travel instantaneously to the other two, or were these simultaneous mutations of the virus?* To date, we have no answers to these important questions.

An examination of the years preceding 1918, however, suggests that mortality figures for bronchopneumonia increased in the United States between 1914-18, and ‘purulent bronchitis’ occurred in France (1916) and in Britain (1917) (Oxford et al., 1999). The questions that beg to be asked are: *did these early cases represent a seeding of the virus around the world, and are the current human cases of H5N1 similar to the possible cases of influenza between 1914-1918?*

In the future, once a contagious virus emerges, its global spread is considered inevitable. Countries might delay arrival of the virus -- through measures such as border closures and travel restrictions -- but will be unable to stop it (WHO 2006 c).

The pandemics of the previous century circled the Earth in six to nine months, even though most international travel was by ship. Given the speed and volume of international air travel today, the virus could spread more rapidly, possibly reaching all continents in less than three months (Duncan 2003 and 2006 a).

As an example, within four months of the global SARS alert, more than 8,000 people were affected in 30 countries in six continents; 900 people died (Duncan 2006 a).

Widespread Illness will Occur (WHO 2006 c)

In 1918, half the world’s population fell sick to Spanish flu. The disease raged in Africa, Australia, Canada, Europe, New Zealand, the South Pacific, the United States—and even reached as far north as the arctic archipelago of Svalbard, 1000 kilometers north of the Norwegian mainland.

In addition to Spanish flu, another worldwide scourge raged unabated: encephalitis lethargica--the disease depicted in the movie *Awakenings* (1990). During its reign of terror--from 1915 to its disappearance sometime between 1927 and 1930--the disease claimed or ravaged the lives of 5 million people worldwide (Duncan 2003).

Regrettably, no causative agents were identified during the two pandemics; however, circumstantial evidence links Spanish flu and encephalitis lethargica or sleeping sickness. Both pandemics were globally distributed and closely related in time. Local, regional, and national epidemics of Spanish flu preceded ‘similar-sized’ outbreaks of encephalitis lethargica. Deaths were greatest in the 20 to 40 year age group for Spanish flu and in the 20 to 50 year age group for sleeping sickness. A large number of victims of encephalitis lethargica had had influenza in 1918. For example, in Western Samoa, Spanish flu killed 8,000 people, and 79 died of encephalitis lethargica between 1919 and 1922. A hundred miles away, American Samoa escaped flu through strict quarantine, and suffered only two cases of encephalitis lethargica. Past pandemics of encephalitis were recorded in close association with other influenza epidemics; for example, the great

influenza epidemic of 1889-90 preceded the notorious ‘nona’--a somnolent illness that was followed by Parkinsonism in almost all survivors.

Detractors of the theory would argue: the first cases of sleeping sickness preceded Spanish flu by several years; influenza was highly communicable, whereas encephalitis was non-communicable; not all cases of encephalitis lethargica had a history of earlier influenza infection; and not all influenza epidemics were associated with epidemic encephalitis (Duncan 2003). Moreover, new research suggests that encephalitis lethargica may result from an autoimmune (an immune response against the body’s own tissues) infection, possibly post-streptococcal (Duncan 2006 c).

Today, H5N1 causes severe disease in animals and humans, with viral pneumonia and failure of many organs and the central nervous system (Liu et al., 2005; and WHO 2005 a). In 2004 a Vietnamese boy presented with severe diarrhea, followed by seizures, coma, and death. H5N1 was isolated from his cerebrospinal fluid and other specimens. The diagnosis, like his sister’s, was acute encephalitis. ‘These cases suggest that the spectrum of influenza H5N1 is wider than previously thought’ (de Jong et al., 2005).

Recent research shows that the 1918 Spanish flu virus shares genetic similarities with today’s H5N1 (Taubenberger et al., 2005). Moreover, 1918 attacked multiple organs, including the central nervous system, of young healthy people, just as H5N1 appears to do today.

Perhaps experts, preparing for an influenza pandemic, should therefore examine the possibility of a wider spectrum of H5N1, and a longer medical legacy (Duncan 2006 c)?

In the future, most people will have no immunity to a pandemic virus. As a result, infection and illness rates are expected to be higher than during seasonal epidemics of influenza.

Few countries will have the facilities, staff, hospital beds, and equipment needed to cope with large numbers of people who suddenly fall ill (Duncan 2006 a; and WHO 2006 c).

Medical Services and Supplies Will Be Inadequate (WHO 2006 c)

Facilities and Equipment

In 1918, departments of health scrambled to coordinate medical institutions. As people fell ill by the thousands, more and more buildings were pressed into service as hospitals; in fact, even world-famous Sing-Sing Prison did time as a hospital (Duncan 2003).

Today all hospitals should be prepared to meet the surge in demand for healthcare during a flu pandemic. Hospitals should also participate in regional planning for the

medical care of flu patients, since hospitals, individually and jointly, must be able to provide care for flu victims, while maintaining other essential medical services, during and after a pandemic. In addition, every hospital should stockpile, or assure access to a stockpile of, personal protective equipment for a sustained time period—perhaps eight weeks (Toner et al., 2006).

Staff and Volunteers

In 1918, frontline health workers were the first to succumb to influenza. The *Toronto Daily Star* reported on October 23rd that 54 of the 319 Toronto public health staff members were sick with flu. On October 26th, Dr. Swenerton, a prominent surgeon, succumbed while waiting on patients; he was 31 years old. By the end of October, 814 patients were hospitalized in Toronto, including 157 nurses.

As doctors and nurses sickened and died, urgent appeals rang out for additional health-care workers, volunteers, and help from the public.

Today the connection between emergency management and the public's health has never been more important. If a pandemic occurs, it will be imperative to determine the number of available healthcare workers, to triage, to determine patient flows, and to identify suitable organizations to train volunteers for healthcare roles (Duncan 2005).

Each community must be prepared. This includes: developing demographic profiles for communities, including special needs populations and language minorities; developing containment measures (e.g. cancelling public transportation, closing schools and other public venues); and maintaining a current register of all active and once-active healthcare personnel available for emergency services (PandemicFlu.gov 2006 b).

Medical Supplies

Therapies

Dr. Robert Parry of The Middlesex Hospital in London complained that doctors did little more than direct traffic; physicians simply guided people to the emergency wards or to the mortuary. When there was a possibility of helping, doctors without therapeutic drugs could suggest only their time-honoured cures of rest, liquids, and a great deal of hope to cure very ill patients.

Goose-grease poultices, bran poultices, lard and turpentine poultices, and compresses of fir-tree spills, mutton tallow and mustard were among the concoctions applied to the chests of the sick. Drinks of warm milk, ginger, sugar, pepper, and soda were given to soothe the ill, and cough elixirs were administered to strengthen, heal, and make the flu-stricken well (Duncan 2003).

Today, antiviral agents will be the principal medical intervention for reducing morbidity and mortality should a pandemic occur. In October, 2005, the Canadian

national antiviral stockpile was comprised of 16 million doses of oseltamivir (Tamiflu), although some provinces and territories might have purchased additional stores. The supply fell far short of one dose for each Canadian, and in May, 2006, the Canadian government announced that 55 million doses would be available for the population (CTV 2006).

A critical problem remains, namely that the drug needs to be administered shortly after the onset of symptoms, yet cases tend to be detected late in the course of illness (Duncan 2006 b).

In addition to stockpiling drugs, government should also make the public aware of the means by which individual citizens can lessen the impacts on their families. For example, families might have medicines, non-prescription drugs, and other health supplies (e.g. fluids with electrolytes, pain relievers, and prescribed medical supplies, such as glucose monitoring equipment) on hand (PandemicFlu.gov 2006 c).

Preventive Measures

Vaccines

In 1918, desperate people tried totally useless, and in many cases dangerous, vaccines. Some physicians recommended one of the many available vaccinations against Spanish flu on the market; all vaccinations had their advocates, all had their detractors, and all were useless.

A key public health issues for today will be the public's desperation for a vaccine and its fair distribution. The greatest challenge is that it could take six to twelve months to produce enough vaccine to protect citizens. Previous pandemics swept the Earth in six to nine months despite the fact that most international travel was by ship—unlike the rapid travel of today (Duncan 2006 a and b; and WHO 2006 a and c).

Other Preventive Measures

In 1918, practitioners rightly assumed that the disease could be spread through the air by coughing or sneezing. Therefore many governments enforced the closure of public places where people might come in close contact with one another. They closed dance halls, libraries, and schools.

In Canada, citizens closed their doors to the outside world. Instead of visiting family and friends, they communicated via letter, but prior to opening their mail, careful recipients often baked the envelopes to kill any incoming germs.

If people did venture outside, many wore masks. In fact, in some states, it was illegal to go outside without a mask, which incidentally was useless against flu. Police in many cities had orders to enforce the wearing of masks and to charge offenders, who were fined.

In any future pandemic, individual businesses will need to protect their employees, while working to maintain critical infrastructure services such as power and telecommunications.

State and local governments must consider reliable crowd-control measures, enforcement of quarantine, restriction of travel, and use of privately owned buildings for hospitals, and must consider compulsory vaccination to control the spread of the outbreak (Duncan 2005).

SUMMARY

The second and third decades of the twentieth century experienced two great plagues: Spanish flu, the deadliest disease in recorded history, and encephalitis lethargica. The two claimed the lives of millions worldwide, and both changed families, and the course of history.

History teaches us that we are due for another fatal flu in the future. We must be prepared. The more we know about pandemics, the greater the probability that we will be able to mitigate their deadly effects.

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