1977 may give a clue. This virus was first isolated in Anshan in northern China on 4 May 1977. It spread along the railway lines and, after 9 months, reached Hong Kong and spread to the rest of the world where it became known as 'Russian flu'.

This virus was almost identical, in all its genes, with a virus that had been isolated in 1950. Where had it been hiding, frozen in time, for 27 years? The usual explanation is that the Chinese were carrying out live virus vaccine trials and the virus escaped. There is not a shred of evidence for this, in fact what evidence there is says this did not happen. We do not know where H1N1 was hiding. We do not know where the H2N2 virus that disappeared in 1968, when the H3N2 virus appeared, might be hiding. We do not even know if viruses from past pandemics are still hiding somewhere waiting for a chance to re-assort, by some unknown mechanism, with a human influenza virus and cause a pandemic.

Currently there is a fear that the lethal H5N1 avian influenza virus that has killed millions of chickens, some other mammals and so far 134 people, will acquire the ability to spread easily in humans by mutation or re-assortment. At the time of writing (August 2006) this has not happened and some say it will never happen. If it does, the resulting pandemic might eclipse that of 1918-19, in which "Spanish Influenza" killed 20 to 40 million people world-wide. A series of extraordinary and painstaking experiments have now lead to the complete sequence of all of the genes of the extinct1918 virus, it has been almost completely re-constructed and the three-dimensional structure of one of its proteins (the haemagglutinin) has been determined.

However, despite this enormous amount of work, there is still no clue as to the origin of the 1918 virus or what caused its extreme virulence. Statements have been made many times, mainly in the media, that the 1918 virus was a lethal avian influenza virus that suddenly jumped from birds to people. There is not a scrap of evidence to support this idea. Although the virus probably had its origin in birds at some time in the past, to maintain that such an event happened in 1918 and to imply that therefore the H5N1 "bird flu" virus might do the same, is as regrettable as it is irresponsible.

In conclusion, we can be certain that an influenza pandemic will occur at some time in the future, caused by a virus with a haemagglutinin to which no-one in the world has any immunity. Such a virus might be formed by mutation of an avian influenza virus or by re-assortment between avian and human influenza viruses. Or it might emerge by a so far undiscovered mechanism. Which option is correct, only time will tell.

Pandemic planning: the Australian response

If the world comes face to face with a rapidly spreading novel virus like the one that emerged in 1918, then the rapid detection of human to human transmission, early and intensive implementation of containment measures, and the development and deployment of effective vaccine are our best strategy for responding.

Since 2003, the Australian government has committed over A$600m to pandemic preparedness. This includes A$156m to the Asian-Pacific region to develop capacity for response. The Australian health response plan is detailed in the Australian Health and Management Plan for Pandemic Influenza (AHMMPI). This document is aimed at the general public. It is accompanied by several technical annexes covering clinical care, infection control, laboratory guidelines and also management in particular settings such as primary care. A 'communications strategy overview' details important considerations and actions for each phase of an influenza pandemic. The AHMMPI, the annexes (as they are finalised), the communications strategy and additional information are available on the Department of Health and Ageing website, www.health.gov.au

Moira McKinnon

Senior Medical Adviser
Office of Health Protection
Australian Department of Health and Ageing

Key initiatives

In addition to the regional initiatives and the planning process, the Australian government has devoted significant resources to:

- Establishing the national medical stockpile, which has one of the largest per capita supplies of influenza antivirals in the world, as well as personal protective equipment and other essential health supplies to deploy during an influenza pandemic.
- Strengthening Australia's communicable disease surveillance networks and laboratory capacity.

- Contracting two influenza vaccine manufacturers for a guaranteed pandemic vaccine supply to protect the Australian population.
- Funding CSL Limited to fast-track production of an H5N1 candidate.
- Providing substantial research grants to help solve some of the basic questions around pandemic influenza.
- Funding an upgrade of the WHO Collaborating Centre on Influenza in Melbourne.

The main strategies

The findings of pandemic modelling studies commissioned by the Australian government indicate that a pandemic can be controlled [1]. Similar findings have been repeated in studies overseas [2-5]. The reproductive rate of influenza is considered to be around 1.5-2, i.e. one person on average infects one or two other people. This is far less infectious than, for example, polio or measles, which are thought to have reproductive rates of 6 and above 10 respectively [6]. The rapidity of spread is due to the short incubation period. A potential for control is in rapid detection and timely implementation of actions to prevent transmission.

The key strategy in Australia's health response is 'containment' – to delay the spread of disease until an effective vaccine can be produced. It includes actions to reduce the likelihood of the virus entering the country and to ensure that, once cases or clusters occur, they are isolated.

Actions at the border will include positive pratique (pilots of planes radioing in the condition of their passengers and crew), use of thermal scanners, clinical assessment of symptomatic passengers by nurses stationed at the border, and short-term quarantine of arriving passengers potentially exposed to the virus. All passengers will be required to fill out health declaration cards which detail symptoms and also request contact details. This will facilitate timely contact tracing.

The antiviral stockpile, almost entirely the neuraminidase inhibitors, oral oseltamivir Tamiflu [Roche] and the inhalant zanamivir Relenza [GlaxoSmithKline], will contain 8.7 million courses by mid 2007. The antivirals, in seasonal influenza studies, have been shown to reduce the duration and severity of disease if given early, and are effective at preventing infection [7, 8].

Antivirals will be provided to cases of suspected pandemic influenza for treatment. The treatment will be ceased if tests are negative. Antivirals will be provided to close contacts of proven cases to prevent the infection spreading. Contact and cases will be required to remain in quarantine at home for up to a week. Continuous antiviral prophylaxis will be provided to health care workers who are dealing on a day to day basis with influenza patients.

Infection control activities, such as hand hygiene and cough etiquette, as well as 'social distancing' will be strongly encouraged in all settings, including home, workplace, health care practices and in the community. 'Social distancing' refers to reducing person to person contact and keeping, where possible, a metre away.

Exercises

Exercise Cumpston will have been held (16-19 October) by the time this goes to print. The 4 day exercise aims to test national arrangements for responding to a simulated human influenza pandemic. The evaluation of this exercise will inform further planning.

Whole of government approach

The emergence of effective human-to-human transmission of a pandemic strain virus will trigger immediate action across a broad cross-section of all governments. In addition to the health committees, the Australian government will immediately convene a taskforce of federal government agencies. The authority and decision making arrangements are set out in the National Action Plan for Human Influenza Pandemic, which can be found at www.pmc.gov.au

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MICRO-FACT

In the event of an influenza pandemic, security at airports will play a major role in early containment.