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INFECTION PREVENTION & CONTROL UNIT

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RESOURCE PACKAGE NUMBER 24

INFLUENZA (FLU)

INTRODUCTION

Influenza, commonly known as the “flu”, is caused by a virus that attacks mainly the upper respiratory tract – the nose, throat and bronchi. The infection usually lasts for about a week. It is characterised by sudden onset of high fever, myalgia, headache and severe malaise, non-productive cough, sore throat, and rhinitis. Most people recover within one to two weeks without requiring medical treatment. In the very young, the elderly and people suffering from medical conditions such as lung diseases, diabetes, cancer, kidney or heart problems, influenza poses a serious risk. In these people, the infection may lead to severe complications of underlying diseases, pneumonia and death.

The currently circulating influenza viruses that cause human disease are divided into three groups: A, B and C. Influenza A and B are clinically important in human disease. Influenza A has 2 subtypes which are important for humans: A(H3N2) and A(H1N1), of which the former is currently associated with most deaths. Influenza viruses are defined by 2 different protein components, known as antigens, on the surface of the virus. They are spike-like features called haemagglutinin (H) and neuraminidase (N) components.

The genetic makeup of influenza viruses allows frequent minor genetic changes, known as “antigenic drift”, and these changes require annual reformulation of influenza vaccines.

Influenza rapidly spreads around the world in seasonal epidemics and causes a considerable burden in the form of lost productivity, hospital and other health care costs.

HISTORICAL OVERVIEW

The earliest existing descriptions of influenza were written nearly 2,500 years ago by the ancient Greek physician, Hippocrates. Historically, influenza was ascribed to a number of different agents, including "bad air" and several different bacteria. It was not until 1933 that the causative agent was identified as a virus.

Three times in the last century, the influenza A viruses have undergone major genetic changes mainly in their H-component, resulting in global pandemics and large tolls in terms of both disease and deaths.

The most infamous pandemic was the 1918-1919 Spanish flu (named after the early large mortalities in Spain in May 1918) which affected large parts of the world population and is thought to have killed at least 40 million people, including 6,387 in NSW. More servicemen mobilised for World War I died of influenza than in war combat. In recent years the Spanish Flu virus has been reconstructed from the tissue of a dead World War I soldier and been genetically characterised. Scientists have discovered the genetic mixing of pig and human influenza viruses was the most likely trigger for the Spanish Flu. It probably originated in Kansas, spread through the army training camps and carried to Europe as troops mobilised in Europe for the war. The virus spread to the farthest reaches of the globe despite occurring in the days before jet travel.

More recently, two other influenza A pandemics occurred in 1957 (Asian influenza) and 1968 (Hong Kong influenza) that caused significant morbidity and mortality globally. In contrast to current influenza epidemics, these pandemics were associated with severe outcomes also among healthy younger persons, albeit not on such a dramatic scale as the Spanish flu where the death rate was highest among healthy young adults.

RECENT DEVELOPMENTS

Limited outbreaks of a new influenza subtype A(H5N1) directly transmitted from birds to humans have occurred in Hong Kong in 1997, and Thailand and Vietnam since 2003. In the latest outbreaks in 2004/2005 there have been some reports of human-to-human transmission of the avian influenza H5N1 virus, yet this has only been in cases of extreme close contact amongst family members. There have been no reports of avian influenza being transmitted to health care workers from patients at this time.

Among medical epidemiologists and experts of communicable diseases is the fear that an animal influenza could cross species and attach itself to the human influenza, thereby creating a new virus the human race has no immunity to fight, as with the Spanish Flu of 1918-1919.

Today, influenza strains are often named after the place where scientists who first isolated them work, not necessarily where the strain developed. Recent

influenza strains have been named Beijing, Moscow, New Caledonia, Hong Kong and Sydney.

Although difficult to assess, annual influenza epidemics are thought to result in between three and five million cases of severe illness and between 250,000 and 500,000 deaths every year around the world. Most deaths currently associated with influenza in industrialised countries occur among the elderly over 65 years of age or those with pre-existing medical conditions.

TRANSMISSION

The virus is easily passed from person to person through the air by droplets and small particles excreted when infected individuals cough or sneeze. The influenza virus enters the body through the nose, throat or conjunctiva.

Disease spreads very quickly among the population especially in crowded circumstances. Cold and dry weather enables the virus to survive longer outside the body than in other conditions and, as a consequence, seasonal epidemics in temperate areas appear in winter.

TREATMENT

Essentially, a bout of influenza must be allowed to run its course. Symptoms can be relieved with bed rest and by keeping well hydrated. A steam vaporizer may make breathing easier, and pain relievers will take care of the aches and pain. Food may not seem very appetizing, but an effort should be made to consume nourishing food. Recovery should not be pushed too rapidly. Returning to normal activities too quickly invites a possible relapse or complications.

Since influenza is a viral infection, antibiotics are useless in treating it. However, antibiotics are frequently used to treat secondary infections.

ANTIVIRAL AGENTS

There are currently two antiviral agents for the treatment or prophylaxis of influenza – Relenza (zanamivir) and Tamiflu (oseltamivir phosphate).

Relenza is a viral neuraminidase inhibitor used for the treatment of influenza A and B in adults 5 years or older. It must be used within 48 hours of onset of initial symptoms. Relenza is indicated for prophylaxis of infection due to influenza A or B viruses in circumstances where prophylaxis of healthy young adults is justified, such as a pandemic with a strain that is not included in the annual vaccine or when vaccine is unavailable. Relenza is delivered as an inhalation powder.

Tamiflu is also a viral neuraminidase inhibitor for influenza A and B treatment in adults and children 1 year or older. It is also used as influenza prevention in adults and those 13 years or older. Treatment with Tamiflu should commence as soon as possible but no later than 48 hours post onset of symptoms. Use

should be limited to patients who have characteristic symptoms of influenza when influenza A or B virus infections have been documented locally.

INFLUENZA VACCINES

Vaccination is the principal measure for preventing influenza and reducing the impact of epidemics. Various types of influenza vaccines have been available and used for more than 60 years. They are safe and effective in preventing both mild and severe outcomes of influenza. Because of the ongoing mutations, known as “antigenic drift”, on the surface of the virus, the strain composition of influenza vaccines is changed each year. The World Health Organisation’s (WHO) Global Influenza Surveillance Network writes the annual vaccine recipe, which is reviewed by the Australian Influenza Vaccine Committee.

All the influenza vaccines currently available in Australia are prepared from purified inactivated influenza virus which has been cultivated in embryonated hens eggs. For this reason individuals with anaphylactic hypersensitivity to eggs should not be given influenza vaccine.

Influenza vaccines normally contain three strains of virus, two current influenza A subtypes and influenza B, representing recently circulating viruses. The final product contains 15 µg of viral haemagglutinin, the principal surface antigen, for each virus strain.

Other forms of influenza vaccines (such as live attenuated intranasal vaccine) are being developed, but have not yet been licensed in Australia.

After vaccination, most vaccinated adults develop antibody titres that are likely to protect them against the strains of virus represented in the vaccine. However, the effectiveness of influenza vaccine depends primarily on the age and immunocompetence of the vaccine recipient and the degree of similarity between the virus strains in the vaccine and those circulating in the community. In healthy persons under 65 years of age, influenza vaccine is 70 to 90% effective when the antigenic match between vaccine and circulating viruses is close. Among elderly persons, the vaccine is 30 to 70% effective in preventing all hospitalisation for pneumonia and influenza for those living outside nursing homes or similar chronic care facilities. For those residing in nursing homes, influenza vaccine is most effective in preventing severe illness, secondary complications and 80% effective in preventing deaths.

The best time to be vaccinated against influenza is in autumn, prior to the winter influenza outbreaks. The vaccine is usually available from March onwards each year.

Annual vaccination is recommended for individuals who are at increased risk of influenza-related complications, including all individuals aged 65 years and older. In Australia, the vaccine is free to persons 65 years or older, or are Aboriginal or Torres Strait Islanders. Influenza vaccine should also be

administered to any person who wishes to reduce the likelihood of becoming ill with influenza.

Persons who provide essential community services should be considered for vaccination to minimise disruption of essential activities during influenza outbreaks.

Influenza vaccine is recommended for pregnant women who will be in the second or third trimester during the influenza season, including those in the first trimester at the time of vaccination.

INCUBATION PERIOD

Influenza has a short incubation period, usually 1-3 days.

PERIOD OF COMMUNICABILITY

Probably 3-5 days from clinical onset in adults; up to 7 days in young children.

STANDARD PRECAUTIONS

Standard Precautions should be practiced at all times.

DROPLET PRECAUTIONS

Droplet Precautions should be used in addition to Standard Precautions for persons being nursed with influenza. Ideally the person should be nursed in a single room.

The patient should be educated in basic personal, hand and respiratory hygiene, especially the danger of unprotected coughs and sneezes.

NOTIFICATION TO THE PUBLIC HEALTH UNIT

Influenza is a notifiable disease under the Public Health Act 1991. Influenza should be notified by laboratories (Category 3, Schedule 1, Public Health Act). Notification should be directed to the local Public Health Unit. All infectious diseases notification forms are available from Public Health Units and on the NSW Health website www.health.nsw.gov.au/public-health/forms

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WEBSITES

www.who.int/csr/disease/influenza/en/

www.cdc.gov/flu/protect/vaccine.htm

www.cdc.gov/flu/

www.findarticles.com/cf_dls/q2601/0007/2601000761/p1/article.ihtml

SUGGESTED VIDEOS – AVAILABLE THROUGH THE IPCU

- **# 36 The Cold War (20 minutes)**
- **# 52 Confronting Epidemics**