Influenza

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Influenza Virus Nomenclature

- Influenza virus $A$, $B$ & $C$
- Influenza A:
  - Haemagglutinin (H), neuraminidase (N)
  - $A$ H3N2, $A$ H1N1
    - A/New Caledonia/20/99 (H1N1)
    - A/Beijing/262/95 (H1N1)
    - A/Fujian/411/2002 (H3N2)
    - A/Moscow/10/99 (H3N2)
Signs & Symptoms

Abrupt onset of fever & chills
+ headache, sore throat, myalgia, malaise, anorexia, dry cough

- Young children:
  - Non-specific febrile illness, GI complaints, otitis media, seizures, croup, conjunctivitis

- Adults:
  - Hoarseness, dizziness, arthralgia, chest pain, insomnia

- Elderly:
  - Sputum production, dyspnoea
Influenza – Transmission & Infection Control

Droplet

Avian Flu

Airborne ??

Faecal shedding

1 m
• Direct contact with respiration secretion / excretion-contaminated items

  – survival in environment ~ 8-12 hr. (up to 48 hr)
  – easily to disinfect ~ >56°C, hypo6, hibiscrub, alcohol, soap
  – gowns, masks, gloves & careful handwashing
Influenza – Transmission & Infection Control

Two most important defences
Influenza Vaccine
Properties of Influenza Vaccines

• **Tri-valent inactivated vaccine**
  – Flu A H1N1
  – Flu A H3N2
  – Flu B

• **Repeat each year**
  – Short duration of protection 9-12 months

• **Efficacy**
  – Matching between vaccine strains and circulating strains
Vaccine Efficacy

- Healthy adults:
  - 70-90% preventing illness

- High-risk group:
  - 50% reduction in severe disease and death

Matching of Strains
Vaccination Priority Groups

- Persons living or working in personal care institutes
- Elderly persons aged >= 65 yr living in community
- Persons with chronic illness
- Health care workers
- Poultry workers
- Children aged 6-23 months
- Pregnant women 2nd or 3rd trimester

# All other individuals not included above also benefit from vaccination
Anti-flu agents: Neuraminidase inhibitor

**Zanamivir : Relenza™**
- Dry powder, inhalation
- Targeted delivery
- Dosage adjustment not required
- Bronchospasm

**Oseltamivir : Tamiflu™**
- Capsule, oral suspension
- Systemic administration
- Cr 10-30 ml/min, BD to QD
- Mild GI symptoms
What is Influenza Pandemic?
**Seasonal**
Usual types A H3N2, A H1N1, B
Severe disease for high-risk group
Generally mild for healthy adults

**Pandemic**
Novel type in human
Global involvement
High-mortality in general population
Species Barrier of Influenza Strains

Haemagglutinin H
Neuraminidase N

Genetic Reassortment
Direct Transmission
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Concept of Reassortment of Influenza Viruses

Co-infection of 2 subtypes in the same cell

Avian
H5N1

Cell cytoplasm

Intermediate Host
Pig
Human

Progeny reassortants
256 different combinations

H5N2
H5N1
H3N1
H3N2

Human

H3N2
Human
How close is the next Influenza Pandemic?

- Emergence of a potential strain in avian species
- Wide-spread transmission in avian species
- Occasional transmission to human / mixing vessels
- Efficient human-to-human transmission
- **Pandemic**

> 120 human influenza H5N1
> 60 human deaths
Spread of H5N1 Influenza in Asia 2004/05

100s of millions of birds culled

(As at 31 Oct 2005)

Human Cases: 121
Human Deaths: 62

Vietnam:
41 deaths

Thailand:
13 deaths

Cambodia:
4 deaths

Indonesia:
4 deaths
How serious is influenza pandemic?

1918 : 40-50 million deaths
1957 : 1 million deaths
1968 : 0.75 million deaths

Present estimates :
>15% of population infected
Death rate > 50%
Time-frame of Pandemic

Yellow Alert
- Human avian flu is occurring as isolated cases

Red Alert
- Efficient human-to-human transmission

Pandemic 1st phase
- Focal / regional
- 100s-1000s cases
- No vaccine
- Antiviral prophylaxis
- Antiviral treatment
- Last for wks - months

Pandemic 2nd phase
- Regional / global
- ≥ few % of population
- Vaccine may be available
- Antiviral: resistant?
- Last for months
Influenza Pandemic Preparedness

**Government Level**

- Education & awareness
- Healthcare facilities
- Minimize spread of infection
- Maintain order of society
- Vaccine production & delivery
- Antiviral stockpiling

**Department / Unit Level**

**Individual Level**