

Influenza:

It's one of the most important diseases.

Pandemic vs epidemic:

Pandemic: a global outbreak of disease that occurs when a new influenza A virus appears in a human population, it causes serious illness and spreads easily.

Epidemic: it causes seasonal outbreaks.

Virology:

There are 3 types: A, B, C.

It has spikes:

HA: attaches to cell receptor.

NA: releases the virus.

Subtypes depending on HA or NA:

HA: H1-15.

NA: N1-N9.

Eg. H1N1, H2N2, etc.

It's an RNA virus and has 8 RNA segments.

Nomenclature:

Type/Source/City/Number/Year (H#N#).

Influenza is present in many animals, however there are strains that infect humans and infect animals:

A: animals only, humans only, or both.

Antigenic Drift:

Point mutation.

Responsible for annual epidemics.

No pandemics because of herd immunity.

Antigenic Shift:

It's larger than the drift.

It's gene assortment: gains new genes.

It causes pandemics.

New genes are usually from non-human viruses.

Sudden.

No immunity.

The influenza virus is always changing.

Eg.

New virus:

Pandemic in the first year, then decreases with each each (it becomes epidemic).

This continues for roughly 30 years (Pandemic Period).

Now the pandemic period is decreasing unfortunately.

Pandemics:

1890: H2N2.

1900: H3N8.

1918: H1N1 → Spanish Flu (40M died)

1957: H2N2

....

2009: H1N1.

(another slide came up for this).

Antigenic Shift:

By chance, two viruses (animal + human) infect one animal → there will be antigenic shifting → human virus acquires new genes → re-infects humans.

4 pandemics per century (last 300 years).

Avian Influenza:

The virus was present in birds, but it didn't cause them any disease, then the virus broke through the species barrier and infected humans due to migration of birds where these infected birds transmitted the virus to other birds capable of transmitting the virus to humans.

H5 Disease:

Mortality rate is 50%.

It didn't spread because of low infectivity.

H1N1:

Human virus + Swine virus.

2009.

Signs: Fever, cough, sore throat, runny nose, headache, muscle aches, etc.

Severe respiratory disease and death.

Mortality was low → less than 1%, so it wasn't a scary pandemic.

Bacterial superinfection is possible.

Sensitive to..

Pandemic:

Young people are usually infected.
It comes in non-influenza typical seasons.

H5N1:

....

CXR: the lung might become white within few days.

Graph: showing that H5N1 is still circulating until this moment, but we don't hear much about it because the reported cases are few, and its human-human transmission is low.

Dx:

Fever, myalgia, nasal congestion, etc.

PCR gold standard: get tracheal aspirate, throat, nasal swab.

Rapid Antigen: poor sensitivity, getting nasal swab and looking for the antigen.

Serum studies: not for diagnosis because antibodies appear late, so it's used for research.

Treatment:**Antibiotics:**

They will not help or affect the outcome (should be given).

A stable influenza patient (no other co-morbidities) shouldn't be given antibiotics.

Oseltamavir:

Early therapy is important (within 48 hours), delayed therapy might be useless.

Double the dose and the duration

Resistance was reported with fatal outcomes.

Zanamivir:

Major concern of bioavailability in extra-pulmonary or pneumonic sites.

Inhaler.

Vaccine:

Available for circulating strains and need to be manufactured for each new strain.

Should be taken monthly.

Mechanism:

Viruses need NA to be released.

These drugs are NA inhibitors so they prevent release and propagation.

Zanamavir:

Inahler.

Oseltamavir:

Oral: more preferred.

Cough Etiquette:

Don't cough on other people, cover your nose and mouth when coughing.

Use a tissue.

If you don't have a tissue, cough onto your proximal arm.

Wash your hands.

Wear a mask to prevent infecting other people.

Don't visit immuno-compromised patients (BM transplant, cancer patients, etc).