Influenza Virus: Evolution of a Deadly Virus in our World

Cathy M. St. Pierre, PhD, APRN, FNP-BC, FAANP
ENRM. VA HOSPITAL
Bedford, Massachusetts, USA
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• KEN LINK - Director of Social Services
• DR P. BEN CIPOLLONI, M.D. - ACOS for Research at ENRM VA Hospital, Bedford, Massachusetts, USA
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The Objectives of this presentation are:
1) Discuss the evolution of Influenza virus worldwide.
2) Describe current strategies to prevent and treat Influenza in all age groups.
3) Provide the World Health Organization (WHO) current health policies guidelines on Influenza Virus.
Audience Survey

• In the past year, how many of you received an Influenza vaccine?

• How many of you recommended the vaccine for your patients?
Statistics on Influenza

- Since the 1918 Spanish Flu Epidemic, some type of surveillance has occurred.
- Since 1969, the World Health Organization (WHO) set up the Global Surveillance Network. And was renamed the Global Influenza Surveillance System in 2008.
- 110 countries participate.
- Influenza is still listed in the top 10 causes of death today
- 3-5 million people contract Influenza annually.
- Up to 1/2 million lives are lost to Influenza worldwide.
Economic burden of Influenza illness

Influenza Virus

• The Question is **not if** but when:

• **A PANDEMIC FLU OUTBREAK IS INEVITABLE!**
Anyone can become infected but most vulnerable populations:

- Elderly
- Pregnant women
- Children less than 5 years of age
- People with certain chronic diseases:
  - HIV/AIDS, Heart Disease, Diabetes, Lung Disease including Asthma & Chronic Lung Disease.
- Health Care Workers
- Obesity
Symptoms of Influenza

** Taken from: http://influenza-contageousdisease.weebly.com/symptoms.html - Retrieved on 6-12-17.**
Worldwide Influenza Virus Evolution

- Three types of Influenza: A, B and C.
- Type A and B virus are responsible for seasonal flu outbreaks.
- Type A is the most prevalent and can infect both humans and animals.
- Animals that can be infected with A includes: pigs, domestic birds, water fowl, horses, whales and seals.
- Type B Influenzas Viruses is known as: B-Yagamata or B-Victoria and has no sub-types.
- Type C virus is less virulent and causes a mild form of Flu and is does not cause epidemics.
Evolution of Influenza Virus

- The **Influenza A virus** is noted as Haemagglutin (H), Neuraminidase (N): for example H#N#.
- This virus over time has mutated and today: H1N1, H3N2, H5N1, & H7N9 currently can infect humans.
- The different # corresponds to the order in which this subtype was discovered.
Influenza Virus Cell**

**Taken from :https://micro.magnet.fsu.edu/cells/viruses/influenzavirus.html
Evolution of Influenza Virus
Levels of Prevention for Influenza

- **PRIMARY** - prevention includes good hand hygiene, avoidance of contagious exposure and Influenza vaccine
- **SECONDARY** - Early screening and intervention - symptom control, isolation of contagious exposure and use of medications that may help avert serious sequelae:
  - Meds: Relenza- Zanamivir- 1 inhalation QD for 10 days.
- **TERTIARY** - Treatment of the Sequelae such as Pneumonia or complications of Influenza virus.
Complications of Influenza Illness*

SYMPTOMS
- Neurological: Fever, Headache, Confusion
- Respiratory: Dry cough, Sore throat, Nasal congestion
- Gastrointestinal: Nausea, Vomiting, Diarrhoea
- Musculoskeletal: Myalgia, Fatigue

COMPLICATIONS
- Neurological: Febrile convulsions*, Reyes syndrome*, Meningitis/encephalitis, Transverse myelitis, Guillain-Barré syndrome
- Cardiac: Pericarditis, Myocarditis, Exacerbation of cardiovascular disease
- Respiratory: Otitis media*, Croup*, Sinusitis/bronchitis/pharyngitis, Pneumonia (viral or secondary bacterial), Exacerbation of chronic lung disease
- Pregnancy: Increased maternal complications, Increased infant perinatal mortality, Increased risk of prematurity, Smaller neonatal size, Lower birth weight
- Musculoskeletal: Myositis, Rhabdomyolysis

*More common in children

*BMJ 2016; 355 doi: https://doi.org/10.1136/bmj.i6258 (Published 07 December 2016) Cite this as: BMJ 2016;355:i6258
Risks, efficacy and benefits of Influenza Vaccine

• Risks:
• Efficacy of various vaccines
• Benefits based on age groups
• Vaccine Adverse Events Reports:
Influenza Virus types and doses

• WHO convenes an expert panel annually to predict which virus strains are most likely to be virulent.
• Vaccines are then produced annually based on these predictions.
• Three types of Vaccine at this time:
  • Standard dose: .05 ml IM
    – Trivalent- Two subtypes of A, One subtype of B
    – Quadrivalent- Two of subtype A and two of subtype B.
• High dose:
• Nasal spray
World Health Organizations
Guidelines On Treatment By Age Group

- Infants > 6 months of age
- Children:
- Adults
- Adults 65+
- Chronic disease risk factors:
*Influenza is still a cause of significant morbidity and mortality today.
*One of the major Infectious diseases in our world that can be mediated by early, effective immunization.
*Evolution of the virus is ongoing and effective strategies at prevention need to take into consideration the evolving virus and ongoing development of effective vaccines.
*Targeting all vulnerable populations for immunization is paramount to trying to prevent a pandemic influenza outbreak worldwide.
References/Bibliography

• To be distributed at presentation