FYI

What's New With Flu: Understanding Influenza

Influenza occurs every year in the United States. Large numbers of all age groups are affected and almost everyone has had the flu at least once; many have had it every few years. Questions always arise about why it still exists if a vaccine is available and why we are not immune to influenza once we have had it.

Vaccine Subtypes

In order to understand influenza, it is important to understand subtypes of various organisms. Rubeola (measles), rubella, (German measles), and parotitis (mumps) each have only one virus as their cause. The virus is the same from year to year from country to country, and two doses of the vaccine in childhood or having the diseases provide protection to most individuals for life. Other communicable diseases have many different subtypes.

Hepatitis has at least 5 viral subtypes: A, B. C, D, and E. The vaccine for Hepatitis A only protects against that subtype of hepatitis and does not offer any protection against the other types. Hepatitis D cannot exist unless Hepatitis B is present, so actually the Hepatitis B vaccine protects against Hepatitis B and D. Neither the Hepatitis A or B vaccine protect against Hepatitis C, which is now the most common cause of liver transplant.

There are three types of polio virus (type 1, 2, and 3) plus a wild polio virus; this is why we give a trivalent polio vaccine to protect against the three types. Haemophilus influenza has 6 subtypes (a, b, c, d, e, and f). The most dangerous subtype is b and the vaccine only protects against type b. Therefore, children can still get Haemophilus influenza from one of the other subtypes, even after they have been vaccinated with the vaccine.

Meningococcal disease has 12 serotypes, only five of which are associated with disease (A, B, C, Y, W-135). The meningococcal vaccine does not include protection against subtype B, which causes most of the cases of meningococcal disease in children under 1 year of age. Pneumococcal disease (streptococcus pneumoniae) has 90 subtypes. Twenty-five percent cause 90% of the pheumonococcal disease; seven (4, 6B, 9V, 14, 18C, 19 f, and 23F) account for 80%. Pheumovax and Pnuimmune are 23-valent vaccines and are better for adults; Prevnar is the 7-valent vaccine and is used with children. The bottom line is that immunization only protects against certain subtypes of each condition and does no prevent children from contracting different subtypes of a communicable disease.

Influenza

A number of factors make influenza different from the above organisms. First, it is very prone to antigenic drift. This means that the antigenic markers on the outside of the organism change slightly from year to year, perhaps to help the virus survive. Therefore, antibodies made to the organism one year may not work quite as well the following year if the same subtype of influenza is present. "Antibody against one influenza virus type or subtype confers limited or no protection against another type or subtype of influenza." Second is the fact that there are multiple combinations of the various types of vaccine markers.

There are three types of influenza: A, B, and C. Influenza A is responsible for the pandemics and epidemics seen around the world. This type is prone to antigenic drift, resulting in new strains. Influenza A has a high attack rate, increased morbidity and mortality, and is responsible for 80% of the influenza that is present. Influenza B can also result in epidemics, but these are less severe that Type A. There is only one subtype of B and it is only found in humans. Almost 20% of influenza cases are of Type B. Type B is associated with Reyes Syndrome; since it cannot be determined initially which type of influenza a child has, the gold standard is to avoid the use of aspirin to treat the symptoms of influenza, in case it is type B, in order to prevent Reyes. Subtype C is rate; there is only one subtype and outbreaks are mild.

Influenza A consists of an RNA core around which is a nucleoprotein envelope consisting of two types of glycoproteins; hemagglutin (H) and neuraminidase enzyme (N). Hemagglutin allows the virus to be absorbed and engulfed by cells in the respiratory track. While there are 15 known subtypes of hemagglutin, only 3 are common in humans (types 1, 2, and 3). Neuraminidase enzyme facilitates contact of the virus and the cells; therefore, the more N, the faster the virus is transmitted. While there are 9 known subtypes of N, only two are commonly seen in humans (types 1 and 2). H and N change, combine, and mutate, so the antibodies to these only last a year. The most common combinations in humans are H1N1, H1N2, and H3 N2.

Symptoms, Communicability, and Morbidity

The symptoms of influenza have an abrupt onset. There is severe mylagia, headache, nonproductive cough, and fever 102 – 103 F. Some children also present with nausea, vomiting, sore throat, and otitis media. The symptoms are generally self-limiting and resolve in 3 – 7 days, but can progress to development of pneumonia.

The virus is spread by respiratory droplets. The incubation period is short: 1 – 4 days. However, children can be infectious for 10 days after the onset of symptoms and young children may shed the virus before they even present with symptoms. Those who are immunocompromised may shed the virus for many weeks.

Influenza attacks 15% - 42% of preschool and school age children each year. Ten percent of those hospitalized for the flu are children under the age of 5 years. The hospitalization rate is 1 / 1000 for healthy children who get influenza, but is 1 /2 00 for those in high-risk groups under age 2 years. This latter statistic is equivalent to the rate of the elderly who need to be hospitalized as a result of influenza. Ninety percent of the 36,000 flu related deaths in the United States each year are in those over the age o 65; however, there are approximately 150 pediatric deaths annually from influenza.

A number of groups have been identified as being high risk for the complications associated with influenza. These include children (and adults) with cardiovascular and pulmonary conditions, such as asthma. Those on aspirin therapy as well as those who are immunocompromised are also at risk. In addition to these conditions are those household members of high-risk individuals, children ages 6 – 59 months, all adults over 50 (since the immune system begins to decline), pregnant women, and those living in group homes/ nursing homes. Health care providers, including nurse, are also considered to be at high risk because of their increased contact with those infected and their risk of spreading the virus to others who are a high risk for complications.

Treatments for Influenza

Treatment of influenza is based on the symptoms. Acetaminophen or ibuprophen for fever, headache, and myalgias, fluids and rest are the mainstay of treatment. Passive immunization does no work for influenza, and, as mentioned above, aspirin should be avoided.

While adjunct antiviral medications are available, they are not routinely given. Amantadine and Rimantadine are only for Influenza A and Oseltamivir and Zanamivir are for Influenza A or B, although some influenza types are resistant to these medications. These are not substitutes for the influenza vaccine. They must be taken within 48 hours of contact with the virus. They work by interfering with uncoating of the virus in its replication cycle, thus decreasing viral shedding. The result is to shorten the duration and severity of the disease. Of interest, avian influenza is resistant to these medications.

Planning Measures

Nurses, especially those working in the schools and community are often the first to notice an increase in the incidence of influenza. Nurses in the hospitals also will know that influenza is increasing by the number of hospital admissions as a result of it. Departments of Public Health are usually the leaders in identifying an outbreak of influenza, identifying the type of influenza, and recommending community-wide measures that should or might be taken.

Schools, businesses, and hospitals need to engage in planning before there is an outbreak. This included the development of polices related to when to close schools, when to cancel meetings or certain activities, and visiting polices. Policies must also be established regarding staff who are ill and when they can return to work. In addition, information needs to be provided to patients, students, families, and staff about prevention, treatment, and infection control measures, especially good hand washing.

Influenza is guaranteed to be present in society every year. The goals are to prevent it where possible via immunization and infection control measures, and decrease the morbidity and mortality in those who contract it. Nurses in the schools, community, and the hospitals are first responders in identifying that influenza is present, taking measures to decrease its transmission, and teaching the public how to maintain and regain health.