An “Influenza pandemic” is a global disease outbreak that occurs when a new influenza virus emerges. Because this is a new strain, people have no immunity and there would be no vaccine available to fight the new virus. During the flu season, there is always increased media coverage on a potential “pandemic” and its almost inevitable arrival. In this article, I will try to give you the basics of pandemic influenza education, and what you can do to protect you and your family.

The threat of a pandemic never goes away. Since the beginning of 2007, there have been 66 new Avian Flu (human H5N1) cases resulting in 43 deaths. Currently, H5N1 has a 65% mortality rate for the year 2007. About half the cases (32) were in Indonesia, where 28 people have died this year bringing the mortality rate in Indonesia to 85%.

Mortality rates like the ones above are shocking. In 1918, when the Spanish flu ravaged the world killing up to 50 million people, the mortality averaged 2.5%. A pandemic caused by the H5N1 virus at its current mortality could potentially kill one third of the world’s population. If you think that the events of Indonesia have no impact on people in the US and the rural Midwest, think again. Given the efficiency of air travel, one can fly from South Dakota to Indonesia in less than 24 hours. With influenza being transmitted 24 hours before you exhibit symptoms, you have a clearer view of the potential impact.

Seasonal Flu
Every year, strains of influenza begin to infect people as early as October and continue well into the spring. These strains are familiar strains that we see every year. Influenza, being a virus, goes through mutations throughout its existence. This means the common circulating strains change each year. This explains why you need a flu shot every year. The virus may seem the same but because it has mutated a bit, last year’s flu shot will be ineffective in protecting against it. Even though the virus has mutated, your immune system can still recognize parts of the virus and can mount a defense against it, protecting you from the virus’ life threatening effects.

Avian Flu (H5N1)
H5N1 has been efficient in transmitting itself from bird to bird all over Asia, Eastern and Western Europe, and parts of Africa. This disease does not efficiently pass to humans and most of the human cases have resulted from consistent and close contact with birds. There have been some rare cases of humans transmitting the disease to other humans, but these seem to be from very close contact between infected family members. H5N1 is a disease of birds; however, it is causing the major concern in the world because of its potential to become efficient at human transmission.

Pandemic Flu
Pandemic influenza is neither seasonal nor avian. In simplified terms, an influenza pandemic may occur when a new (novel virus) strain of influenza appears. Since the current population would not have been in contact with this strain, our immune systems would not recognize it. With no immune system protection, the infection rate would skyrocket and high mortality rates would be possible. Our own immune systems would react so violently that it would complicate our recovery and, in many cases, hasten death.

Even though H5N1 is not “pandemic influenza,” experts the world over are looking at it as having a great deal of potential to cause the next pandemic. Before this could happen, H5N1 would need to become more efficient in its ability to transmit from person to person. For every new human infection, this virus has a chance to become more efficient. There are 329 confirmed human cases of H5N1 infection, with 329 chances for this to happen.
In the event of a pandemic, 90 million people could potentially become infected with a novel strain of influenza. Of those, half will seek outpatient medical care. Hospitalizations would increase to a point where there will be no beds, no medications, no ventilators, and most importantly no staff to handle the surge of patients. There is a possibility of operating with 40% less staff due to illness, fear, and even death of healthcare providers.

What About a Vaccine?
The seasonal influenza vaccine does not cover an H5N1 outbreak. Since efficient human transmission has not occurred, scientists do not know the genetic blueprint of the specific H5N1 virus. Once that virus is isolated, vaccine production can begin. It is estimated that it could take more than six months before a vaccine is readily available. H5N1 is only one influenza virus that we consider “novel” or new to our system. It is important to note that a pandemic can be caused by any novel strain, not just H5N1.

How About a Prescription For Tamiflu?
There is evidence that an antiviral drug, Tamiflu, may be effective in the battle against H5N1. It inhibits viral replication in the host and therefore reduces the symptoms of influenza. Other experts state that there is a high potential for medication resistance. Also, there is a general misconception that Tamiflu is a cure. Tamiflu does not cure the flu—it merely lessens the impact. There is also discussion to use Tamiflu as a prophylactic medication, that is, pre-medicate high risk groups during a pandemic in hopes to prevent infection. The cost of such an endeavor would be astounding—the current cost of Tamiflu is about $70 per five-day course. It would need to be given for the duration of the influenza wave, which is usually at least eight weeks. Using Sanford USD Medical Center as an example (5000 employees), doing this would require an estimated cost of $4.2 million! This only estimates a single wave of influenza. In 1918, there were three major waves over two years. The cost estimates for just one medication are astronomical.

What Can We Do
Knowledge is power. Influenza is spread by droplets. Learning to cover a cough, hand washing, and observing personal space will prove to be our best weapons in prevention.

Being healthcare workers, we will be expected to be at work. This is our fight and we need to be up for the battle. In order to be ready for a pandemic, we need to have a family preparedness plan. Having things in order at home will assist preparing for the long run of a pandemic, but will also assist in responding to and recovering from other long-term emergencies, like severe winter storms and tornados.

The federal government has an excellent Web site to get additional information on personal preparedness: http://pandemicflu.gov/plan/individual/index.html

What Can Your Organization Do?
Preparing a comprehensive response plan led by physicians, executives, materials managers, respiratory therapists, laboratorians, infection control practitioners, etc. is vital. Ensure that your organization’s plans are consistent with city and county plans to make sure that they all fit together. Focus on: 1) strengthening and identifying response phases, 2) determining when to activate your plan, 3) developing employee education, and 4) looking at how alterations in patient care may occur.

A team effort will ensure that little is left to chance in examining our response to the inevitable. Our response will require 110% effort on the part of all employees. This effort will ensure that we continue to maintain a safe work environment throughout the pandemic wave.

Should a pandemic occur, we will almost certainly be facing a historic event of a magnitude unseen by our generation. A well-defined response plan and steps in prevention will be our best weapons. Understanding the disease and how it spreads are vital elements in prevention.

By Greg Santa Maria
Emergency Preparedness Manager
Sanford Health

Prior to joining Sanford Health, Greg Santa Maria was the emergency preparedness coordinator for St. Vincent’s Hospital in lower Manhattan. He responded to the September 11, 2001 terrorist attacks on the World Trade Center and received a distinguished service award for his participation in the World Trade Center response and rescue effort.

To facilitate your phone call, please provide your 6-digit Sanford Laboratories’ account number to our Client Support Representative.

Thank you for your assistance.
HEPARIN-PLATELET FACTOR 4 ANTIBODIES

Heparin-induced thrombocytopenia (HIT) is a complication caused by antibodies directed to the heparin-platelet factor 4 (PF4) complexes with a seemingly contradictory high risk of thrombosis. Sanford Laboratories is pleased to offer testing for Heparin-Platelet Factor 4 Antibodies to assist in early detection of HIT.

Overview
Thrombocytopenia, a reduction in platelets, is a relatively common and usually benign complication of heparin therapy. In some patients receiving heparin and heparin-based products, platelet counts are slightly reduced and then return to normal while on heparin; sometimes termed HIT Type I is not antibody-mediated.

On the contrary, patients with HIT Type II have an antibody-mediated adverse drug reaction with potential serious effects (HIT Type II is referenced as HIT in the remainder of this article). Unlike other drug-induced thrombocytopenias, HIT does not usually cause bleeding; however, it paradoxically is associated with a brief but dramatically increased risk for venous and arterial thrombosis. The risk of immune HIT varies depending on the type of heparin used (unfractionated heparin greater risk than low-molecular-weight heparin) and patient population (surgical patients greater risk than medical patients). Therefore, HIT should be suspected in patients who experience thrombotic events despite adequate anticoagulation therapy. Early recognition of HIT is vital since stopping heparin and administrating an alternative anticoagulant is important in prevention of catastrophic thrombosis, such as increased morbidity (limb loss), stroke, and possibly death.

The diagnosis of HIT requires careful assessment of clinical evidence that thrombocytopenia is attributed to heparin and cannot otherwise be explained, along with laboratory test results.

Antibody Mediation/Platelet Response
HIT is mediated by antibodies that recognize heparin bound to PF4 on the platelet surface and then binds to the heparin-PF4 complexes on the platelet. These complexes induce intense platelet activation and aggregation (clumping), the production of thrombin, and simultaneously activate blood-coagulation pathways.

The intensity of platelet count monitoring depends on the clinical situation. Platelet count monitoring should focus on the period of highest risk (usually days 5 to 10 after starting heparin) using an appropriate platelet count baseline. However, earlier platelet count monitoring is appropriate if the patient received heparin within the past 100 days, as already circulating HIT antibodies can cause rapid onset of HIT with heparin reexposure.

Laboratory Testing
Both functional and antigenic tests are used to detect antibodies relevant to HIT. Functional assays evaluate platelet activation and/or platelet aggregating capacity of what are presumed to be heparin-dependent, anti-platelet antibodies. Examples include: the platelet aggregation test, the serotonin release assay (SRA), and the heparin induced platelet activation assay. Unfortunately, functional assays are labor-intensive, technique dependent, and cannot be performed quickly.

Immunoassays detect antibodies associated with HIT that react with PF4 complexed to heparin or other polyanions. These tests include enzyme-linked immunosorbent assays (ELISA) that only require patient serum and are easier to perform.

ELISA heparin-PF4 assays are rapid and widely available, and are specifically designed to detect antibodies reactive with heparin-PF4 complexes. The ELISA assay offers rapid and sensitive detection (98%) of the heparin-PF4 antibodies, but has lower specificity (about 90%) than the functional serotonin release assay (SRA). A positive ELISA assay indicates the presence of heparin-induced antibodies, but is not diagnostic of HIT. Some patients may have naturally occurring antibodies to PF4. Other clinical and laboratory findings should be considered prior to diagnosis. A negative ELISA result suggests the absence of heparin-PF4 antibodies, with about a 90% negative predictive value. Additional testing using the functional SRA increases the specificity of laboratory testing for HIT, but SRA requires longer turnaround time of test results.

Ordering Information:
Test Name: Heparin-Platelet Factor 4 Antibodies (Heparin-PF4 Abs.) by ELISA
Test Code: 5990
CPT Code: 86022
Specimen Requirements: 1.0 mL frozen serum (0.5 mL minimum). THIS TEST REQUIRES ITS OWN FROZEN ALIQUOT.
Stability: Frozen only
Reference Range: See report

References:
As another year draws to a close, we thank you for your friendship and goodwill and sincerely wish you all the happiness that a prosperous and successful New Year can bring.