



Flu season guide for patients with Inborn Errors of Metabolism

What is seasonal flu?

Seasonal influenza or “the flu,” is caused by influenza viruses, which infect the nose, throat, lungs. In contrast to other viral respiratory infections, such as the common cold caused by rhinovirus, the flu can result in severe illness with life-threatening complications. Complications that can occur with flu include pneumonia, bronchitis, sinus and ear infections.

When is flu season?

Flu viruses circulate throughout the population all throughout the year. An increase above baseline flu activity occurs in the United States during the **Fall and Winter** and is known commonly as the “flu season”. Flu activity **usually peaks in January or February**, but it can occur as **early as October** and as **late as May**.

What are the symptoms of flu?

- Fever or chills
- Cough
- Sore throat
- Runny/stuffy nose
- Muscle/body aches
- Headaches
- Tiredness

How does flu spread?

People with flu can infect others up to 6 feet away. Flu viruses are spread mainly by droplets made when people with flu cough, sneeze or talk. These droplets land in the mouths or noses of people who are nearby. A person might also get flu by touching a surface or object that has flu virus on it followed by touching their mouth or nose. Healthy adults are infectious beginning **1 day before symptoms develop** and **up to 5 to 7 days after becoming sick**. Children may pass the virus for more than 7 days. Symptoms start 1 to 4 days after the virus enters the body.

Tips for flu prevention in patients with IEM:

- 1) **Get vaccinated.** This includes not only IEM patients but family members as well. Seasonal flu vaccination is available as early as September for a given flu season.
- 2) **Avoid contact with sick people.** Sick individuals should avoid contact with others for at least 24 hours after the fever has gone.
- 3) **Cover your mouth with a tissue when you cough or sneeze.** Younger children can cough or sneeze into their elbow.
- 4) **Prevent the spread of germs.** Avoid touching your eyes, nose and mouth.
- 5) **Wash your hands with soap and water or a hand sanitizer.**
- 6) **Clean and disinfect surfaces and objects that may be contaminated by flu or other germs.**

Why should individuals with IEM get vaccinated this season?

In addition to the complications mentioned above that are associated with flu (e.g. pneumonia), patients with IEM have an additional concern. Many patients with IEM, including organic acidemias, fatty acid oxidation defects, urea cycle disorders and mitochondrial disease may experience an acute deterioration in their metabolic status during an infectious illness. This “acute decompensation” is due in part to the catabolic stress associated with illness. With fever, caloric needs are greatly increased. At times, these caloric needs may not be met due to decreased food/fluid intake, nausea and vomiting. To keep up with this increased need for calories during infection, body fuels including carbohydrate, fat and protein are utilized. For patients with IEM, this may lead to the build up of toxic metabolites or energy failure due to their underlying enzyme deficiency.

How do flu vaccines work?

Each year, Public Health Professionals need to predict which flu strains will be prominent in the coming flu season. These strains then form the basis for that season’s flu shot. The flu shot is an inactivated vaccine (containing killed virus) based on these predictions. For patients with IEM, the vaccine is given via a needle in the arm. This vaccination causes the immune system to produce protective antibodies against the flu strains contained in the vaccination. It takes 2 weeks to develop these protective antibodies. It should be noted, however, that the flu shot does not protect against other respiratory viruses such as the common cold caused by rhinovirus.

Why do patients with IEM need to get vaccinated for flu every year?

A flu shot is needed every year due to the fact that flu viruses are constantly changing. New flu viruses may appear each year. The flu vaccine is formulated each year to keep up with these changing flu viruses.

When is flu vaccine available?

The CDC advises that people get vaccinated against influenza as soon as the vaccine becomes available. Influenza seasons can be unpredictable, and can even start as early as October. At the NIH Clinical Center, flu shots are available via the NIH MINI Study (see below), **beginning in September.**

How effective is the flu vaccine?

In general, studies have supported that flu vaccination benefits public health, especially when the flu vaccine matches circulating flu viruses.

Do vaccines offer protection in patients with IEM?

This is really an unanswered question. Since infections can trigger life-threatening acute metabolic crises in children and adults with IEM, we have decided to characterize the function of the immune system in patients with IEM. The standard of care for IEM patients is routine vaccination for influenza. However, there have been

no studies to investigate whether the response to vaccination is normal in IEM patients. Vaccination represents a challenge to the immune system and can tell us how well it may be functioning. IEM patients may have enzyme deficiencies in their immune cells, a build-up of toxic metabolites, nutritional deficiencies, and energy deficiencies, all of which may impact immune system function.

The NIH MINI Study: Metabolism Infection and Immunity in Inborn Errors of Metabolism (www.genome.gov/mini) is an exciting study at the NIH Clinical Center (clinicalcenter.nih.gov). The main goal of our study is to learn about the function of the immune system in metabolic disorders. To learn whether you or your child develops immune protection to the flu vaccine or to learn more about your/your child's immune function, please contact us below.

For more information about the study please visit our Web site:

<http://www.genome.gov/MINI> or contact the study coordinator, Janet Shiffer, C-RNP by phone at (301) 451-9145 or by email at ministudy@mail.nih.gov.