Flublok Vaccine

Patients Given Flublok (GMT)

<table>
<thead>
<tr>
<th>Subtype A</th>
<th>Type B</th>
</tr>
</thead>
<tbody>
<tr>
<td>44.6</td>
<td>23.1</td>
</tr>
</tbody>
</table>

Patients Given Other Flu Vaccine (GMT)

<table>
<thead>
<tr>
<th>Subtype A</th>
<th>Type B</th>
</tr>
</thead>
<tbody>
<tr>
<td>44.8</td>
<td>37.2</td>
</tr>
</tbody>
</table>

Each year in the United States, 5% to 20% of the population becomes infected with influenza (flu) and more than 200,000 are hospitalized because of flu-related complications. The CDC Advisory Committee on Immunization Practices (ACIP) recommends influenza vaccines for everyone older than 6 months.

A Revolution in Flu Vaccine Technology

Flublok represents a new class of influenza vaccine and is the world’s first protein-based flu vaccine. It is approved by the FDA for adults 18 years and older. Unlike other flu vaccines, Flublok does not use the influenza virus or eggs in its production. Hemagglutinin (HA) is a part of the virus that is essential for entry of the virus into cells in the body. HA is the primary component in all inactivated vaccines and the novel manufacturing technology of Flublok allows for the production of large quantities of this protein. The majority of antibodies that prevent influenza virus infection are directed against HA. Although the technology is new to flu vaccine production, it is used to make vaccines that have been approved by the FDA to prevent other infectious diseases.

Flublok is highly pure as it is manufactured without:
- the use of eggs (making it ideal for individuals with egg allergies)
- preservatives, such as thimerosal
- live or inactivated flu virus
- latex
- formaldehyde
- gelatin
- antibiotics

Flublok is manufactured using the genetic information derived from the wild-type influenza virus and is not subject to the mutations sometimes introduced into vaccines during the process of egg adaptation. This reduces the possibility of decreased effectiveness due to a mismatch between the wild-type virus and an egg-adapted vaccine, as was repeatedly reported in the literature most recently during the 2012-2013 season.

During that same flu season, vaccine effectiveness against the H3N2 strain for egg-based influenza vaccines was estimated at 9% for individuals 65 years and older.

Flublok’s production technology has other advantages as well. The vaccine manufacturing process can be started quickly if an unexpected need arises, such as an influenza pandemic or during seasons when flu is particularly widespread. The process is also important if egg supplies are compromised or an influenza virus is particularly dangerous. Additionally, some flu strains do not grow well in eggs, or Flublok’s technology can speed vaccine production and availability.

Thus, Flublok offers the advantage and flexibility of providing vaccination against an evolving strain of flu virus in a short period of time. The pharmaceutical formulation of Flublok allows for a quick response according to the demands of healthcare professionals and organizations.

Potential of Increased Efficacy

Currently, Flublok is a trivalent formulation, offering protection against two influenza A strains (H1N1 and H3N2) and one influenza B strain, and contains 3 times the amount of antigen than standard flu vaccines (3x45 mcg versus 3x15 mcg HA protein). In adults 18 to 49 years of age, studies showed Flublok to be 75.4% effective against matched strains of flu and 44.6% effective against all circulating strains of flu (Table 1). Studies in adults 50 years of age and older showed a higher rate of immunogenicity against A strains in people administered Flublok compared with conventional trivalent flu vaccine; immunogenicity rates were comparable for the B strain (Table 2). A quadrivalent formulation of Flublok protecting against two A strains and two B strains is being studied in more than 10,000 adults 18 years of age and older. The absence of mutations introduced during the traditional egg adaptation manufacturing process and higher antigen content in Flublok are expected to positively impact efficacy, as was seen with the trivalent formulation; results will be available before summer 2015.

Table 1. Efficacy of Flublok (Trivalent) vs Culture-Confirmed Influenza in Healthy Adults 18-49 Years of Age

<table>
<thead>
<tr>
<th>Case definition</th>
<th>Flublok Vaccine Efficacy (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive culture with a strain represented in the vaccine</td>
<td>75.4</td>
</tr>
<tr>
<td>CDC-ILI: all matched strains</td>
<td>74.6</td>
</tr>
<tr>
<td>Any ILI: all matched strains</td>
<td>67.2</td>
</tr>
</tbody>
</table>

Table 2. Immunogenicity of Flublok (Trivalent) vs Another Standard Flu Vaccine in Adults 50 Years and Older

<table>
<thead>
<tr>
<th>Study of Patients 50-64 Years</th>
<th>Patients Given Flublok (GMT)</th>
<th>Patients Given Other Flu Vaccine (GMT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A strain (H1N1)</td>
<td>181.3</td>
<td>139.7</td>
</tr>
<tr>
<td>A strain (H3N2)</td>
<td>105.4</td>
<td>60.9</td>
</tr>
<tr>
<td>B strain</td>
<td>110.9</td>
<td>116</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Study of Patients &gt;65 Years</th>
<th>Patients Given Flublok (GMT)</th>
<th>Patients Given Other Flu Vaccine (GMT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A strain (H1N1)</td>
<td>176.8</td>
<td>148.1</td>
</tr>
<tr>
<td>A strain (H3N2)</td>
<td>338.5</td>
<td>199.2</td>
</tr>
<tr>
<td>B strain*</td>
<td>149.6</td>
<td>194.8</td>
</tr>
</tbody>
</table>

GMT=geometric mean titers
* B immunogenicity comparison is confounded as the B-component differed in this study.

Comparable Safety

Flublok has a safety profile similar to that of inactivated influenza vaccines, with pain at the injection site the most commonly reported adverse reaction. Headache, fatigue, and muscle aches were also reported in clinical trials.

Individuals having any known severe allergic reactions to any of the components in Flublok should not receive the vaccine. Flublok does not contain any egg protein, preservatives, latex, antibiotics, or gelatin, and is safe and recommended by the CDC ACIP for adults 18 years of age and older, including those with known or suspected egg allergies.

If patients have experienced Guillain Barré Syndrome within 6 weeks of a prior flu vaccine, the decision to administer Flublok should be made with careful consideration of the potential benefits and risks. Further, the immune response of Flublok may be diminished if given to an immunocompromised person.

Reimbursement

Flublok is fully covered for all adults 18 years and older by most insurance providers, including Medicare. Under the Affordable Care Act, individuals may receive ACIP-recommended influenza vaccines without any cost sharing requirements when administered by an in-network provider. Pharmacists should check with the patient’s medical or pharmacy benefits administrator to determine coverage for the vaccine and its administration by your practice. Effective January 1, 2014, Flublok has a specific CPT code, which should be used when submitting reimbursement claims: 90673. (This is a code specific for Flublok and will ensure compensation occurs at an appropriate rate.)

How to Order

Flublok is available as single-dose vials in boxes of 10. To order Flublok, please contact one of the following distributors:

- FFF Enterprises: 800-843-7477 or www.myfluvaccine.com
- ASD Healthcare: 866-281-4FLU or www.asdhealthcare.com
- Cardinal Health: 866-677-4844 or www.cardinalhealth.com
- McKesson: 888-MCK-4FLU or https://mms.mckesson.com/index.mck
- Besse Medical: 800-543-2111 or www.besse.com

Please see complete Package Insert information at www.flublok.com or call 203-686-0800 for more information.
The flu (influenza) is a serious respiratory illness that causes fever and chills; cough; sore throat; runny nose; muscle or body aches; headache; and fatigue. Diarrhea and vomiting may also occur but are more common in children. Each year, the Centers for Disease Control and Prevention (CDC) estimate that 5% to 20% of people in the United States get the flu and more than 200,000 are hospitalized because of flu-related complications. These complications can include pneumonia and inflammation of the heart, and can be serious enough to result in death. This is why the best protection against the flu is to get a flu shot (vaccine) every year. It is recommended that everyone older than 6 months of age receive a flu shot.

However, research has shown less than half of people in the United States receive a flu shot. This may be due to several reasons, including having an egg allergy (conventional flu vaccines are grown in eggs and are not suitable for people with egg allergies) or they do not wish to get a shot that contains preservatives, such as the mercury-based preservative called thimerosal, or the flu virus. Some choose not to get a flu shot for reasons that are not true: they believe they can get the flu from the vaccine, or they believe that the vaccine is not very effective.

**A New Class of Flu Vaccine**
Flublok is a new class of flu vaccine that is approved by the FDA for adults 18 years and older. Flublok is different than conventional flu vaccines as it is the world’s first protein-based flu vaccine. Conventional flu vaccines are grown in eggs or sometimes in cell culture. Using revolutionary production technology, Flublok is highly pure as it is made without:
- the use of eggs
- preservatives, such as thimerosal
- live or inactivated flu virus
- latex
- formaldehyde
- gelatin
- antibiotics

Flublok is made with just the protective ingredients needed (called hemagglutinin [HA] protein) without growing the flu virus. This makes Flublok ideal for people who have allergies to or concerns with any of those ingredients listed above or who are vegan. This HA protein is what the body needs so it can make antibodies to protect against flu infection. It is important to note that flu vaccines grown in eggs can mutate, or change, resulting in a mismatch between the vaccines that grew in the eggs and the flu viruses that are actually circulating that season. This leads to a less effective flu vaccine. Flublok is different and does not contain egg-based mutations.

This new technology has other advantages as well. The manufacturing process that Flublok utilizes can be started quickly (unlike processes that use eggs) in case of an increased demand, such as a pandemic or during seasons when flu has become widespread.

**How Does Flublok Work?**
Flublok is a trivalent formulation, which means it offers protection against two influenza A strains (H1N1 and H3N2) and one influenza B strain. Importantly, Flublok contains 3 times the amount of antigen (the HA protein) than standard flu vaccines. Studies have shown that in adults 18 to 49 years of age, Flublok was 75.4% effective in preventing flu against matched strains of flu (the strains included in the vaccine) and 44.6% effective against all circulating strains of flu (not just the flu strains included in the vaccine, but all strains present during that flu season). Studies in adults 50 years of age and older showed more antibodies were produced against A strains of the flu in people who received Flublok compared with conventional trivalent flu vaccine; antibody levels were comparable for the B strain. A quadrivalent formulation is being studied in clinical trials (this formulation includes two A strains and two B strains), for adults 18 years and older as well as children 6 to 17 years of age.

**Safety of Flublok**
Flublok is just as safe as conventional flu vaccines. The most commonly reported side effect is pain at the injection site. Other side effects include headache, fatigue, and muscle aches.

Anyone with a known severe allergic reaction to any of the ingredients in Flublok should not receive the vaccine. Flublok does not contain any egg protein, preservatives, latex, antibiotics, or gelatin, and is safe and recommended for use in all adults 18 years and older, including those with known or suspected egg allergies.

If a person has experienced Guillain Barré Syndrome (severe muscle weakness) within 6 weeks of a prior flu shot, patients should talk with their doctor or pharmacist about the potential benefits and risks of receiving Flublok. The immune response of Flublok may be less if given to a person with a weakened immune system.

**How Can I Find Flublok?**
You can ask your doctor or pharmacist to order Flublok or visit our Flublok Finder at www.flublok.com to find a location that carries Flublok near you.

**Cost/Reimbursement**
Flublok is fully covered by most insurance providers, including Medicare.

Contact your insurance provider, employer, or school to find out more information on your specific flu vaccine coverage.

For more information on Flublok, visit www.flublok.com or call 203-686-0800.

**References**