Sometime in October, an older man shopping for groceries will see a sign at the store’s pharmacy encouraging him to get his flu shot. He’ll say, “Why not?” and 5 minutes later, he’ll be better protected against a major pathogen that produces morbidity and mortality in his over-65 age group.

Sounds simple, right? But that simple flu shot next fall will be the result of steps being taken now—while the current influenza season is still under way—by pharmaceutical companies and their employees, public health officials and laboratories around the world, and the health professionals who order, store, promote, and administer vaccines. It is more important than ever to think about how to help improve immunization rates for the upcoming season. Some statistics on our senior population emphasize this point:

- 65% of flu-related hospitalizations are in seniors
- 90% of flu-related deaths are in seniors; older adults do not respond as well as younger adults to standard-dose vaccine, placing them at higher risk of influenza and its complications
- A higher-dose antigen vaccine has been shown to be more effective among seniors

Vaccination should happen for all seniors, yet the U.S. vaccination rate has remained stalled around 70% for the past 2 decades.

**BIOLOGICAL SCIENCE**

Pharmaceutical manufacturers need several months to prepare influenza vaccine. Before production even starts, the CDC must isolate the vaccine strains that will be used and adapt them to grow in eggs or cell media.

Once the strain arrives at manufacturers’ facilities, most vaccines are still produced using the tried-and-true egg culture method. Strains are grown separately and combined at the end of the process. It essentially takes one egg to produce enough antigen of each strain to make one dose of vaccine—meaning three or four eggs for vaccines with three or four antigens. In addition to egg-based culture methods, there are also two egg-free vaccine formulations that are grown in cell cultures (see table).

During the 2015–16 seasonal influenza vaccine, the two A and two B strains in the influenza vaccine closely matched the circulating antigens. At the February 24 meeting of the CDC’s Advisory Committee on Immunization Practices (ACIP), officials reported 100% match for both A and both B strains. This in turn produced a very high vaccine effectiveness figure of 59% for 2015–16.
Based on these data and those from other countries, the World Health Organization recommended that the 2016–17 influenza vaccine change one A strain and that the 2015–16 preference for the two B strains be reversed. The FDA’s Vaccines and Related Biological Products Advisory Committee approved this recommendation at its meeting on March 4. Thus, next season’s trivalent vaccines will contain A/California/7/2009 (H1N1)pdm09-like virus, A/Hong Kong/4801/2014 (H3N2)-like virus, and B/Brisbane/60/2008-like virus. Quadrivalent vaccines also will contain B/Phuket/3073/2013-like virus.

<table>
<thead>
<tr>
<th>Available Influenza Vaccines Indicated for Use in Seniors</th>
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<tbody>
<tr>
<td>Product</td>
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<tr>
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<tr>
<td><strong>Quadrivalent Intramuscular (QIV IM)</strong></td>
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<tr>
<td>Fluzone Quadrivalent Fluarix FluLaval</td>
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<tr>
<td><strong>Trivalent Intramuscular (TIV IM)</strong></td>
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<tr>
<td>Afluria</td>
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<tr>
<td>Fluid</td>
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<tr>
<td>Fluzone High Dose</td>
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</tbody>
</table>

Source: Centers for Disease Control and Prevention.
Full table available at: [http://www.cdc.gov/flu/protect/vaccine/vaccines.htm](http://www.cdc.gov/flu/protect/vaccine/vaccines.htm)

In addition to knowing which influenza viral strains to grow, pharmaceutical companies need to know how much product to manufacture. Each manufacturer must balance their manufacturing plan with their capacity and their expected sales. All that means that manufacturers need their customers to place orders now for vaccine to be delivered in late summer and fall. Health professionals and health systems must decide on order quantities now, using data from prior seasons and making their own plans for maximizing the uptake of influenza vaccine. They also are increasingly tying this process into promotion of other adult vaccines such as pneumococcal and zoster.

The ACIP recommends routine vaccination of all seniors against influenza and recommends several different formulations and manufacturing processes for providers to consider. All influenza vaccines are covered under Medicare Part B, and access and reimbursement are not an issue for our senior populations.
One in two seniors is now receiving high-dose influenza vaccine, but all need it based on their blunted immunologic response. With 10,000 baby boomers turning 65 every day and people living longer, health professionals must estimate how much high-dose product they will need in the coming season along with the demand for regular-dose trivalent and quadrivalent vaccine.

Health professionals are also making sure that their electronic health record systems will “track, flag, and follow” recommendations made to patients about vaccines. Physicians need to know whether patients have acted on immunization recommendations by receiving vaccines at pharmacies or alternative care settings, and professionals in those settings need to update patient records in their medical homes. Without such communications, health professionals can’t do their jobs in strongly advocating for and providing vaccines to patients.

**BEHAVIORAL/SOCIAL SCIENCE**

While the man mentioned earlier had a why-not reaction to getting his flu shot at the grocery store pharmacy, perhaps his wife won’t respond the same way. She might bring up one of several myths regarding influenza vaccine, and these should be refuted with facts such as these:

**Myth:** The flu shot will give me the flu.

**Fact:** It’s impossible to get the flu from the flu shot. The vaccine is made with viruses that are not infectious or with no viruses at all. However, you can get the flu from another person.

**Myth:** I’m healthy. I don’t need a shot.

**Fact:** Every year, healthy people get sick from the flu, and some even die. Even with a mild case, you can still the pass virus along to the people you love and care about.

**Myth:** It’s okay to go to work feeling sick with flu-like symptoms.

**Fact:** To help protect co-workers, it’s important that people stay home if they aren’t feeling well and aren’t sure whether they are contagious.

Public health officials and pharmaceutical manufacturers are working now on marketing and communications campaigns to counter such flawed arguments. In addition, annual “Have you had your flu shot?” campaigns provide a perfect opportunity for discussions about other adult vaccines. This is the time when caregivers, family members, and health providers should be making sure that everyone—including themselves, their loved ones, and for health professionals, their patients—are up to date on all vaccines, including those against pneumococcal disease, herpes zoster, and tetanus–diphtheria.
Another major area of activity far in advance of flu season is at health facilities, where policies on required vaccines for employees, patients, and residents need to be reviewed before orders are placed. Employers of other types are also getting involved in vaccine advocacy, as they recognize the impact that influenza and other vaccine-preventable diseases have on absenteeism and presenteeism (showing up to work while ill) in the workforce.

Employers who aren’t ready to mandate vaccines might consider at this point whether to encourage vaccinations through health and wellness incentives in benefits packages and by inviting health professionals to administer influenza and other vaccines at worksites. Convenience is a major factor in getting more people immunized. Providing enhanced benefits for immunized workers or allowing employees to get vaccinated on company time right in the workplace both increases the convenience factor as well as sends a powerful message to employees about the perceived importance of protecting oneself and one’s fellow workers against infectious diseases.

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**SOURCES AND RESOURCES**

- Khan Academy lectures on “Influenza”
- CDC Influenza website
- WHO recommendations for 2016–17 influenza vaccine for the northern hemisphere
- FDA Vaccines and Related Biological Products Advisory Committee