

Have faith in the flu shot

January 23 2015, by Chris DeFrancesco



A nurse at UConn Health administers a flu shot. Credit: Chris DeFrancesco

Flu season is now peaking. The rate of effectiveness for this year's vaccine has been disappointing, with at least half the states reporting widespread incidence of influenza. Dr. Paul Skolnik, an infectious diseases physician who chairs the Department of Medicine at UConn Health, explains what's happening and what can be done.

We've heard a lot about this being a severe flu season,

and that one reason is that it isn't a great year for the flu shot. How does this happen?

Each year the seasonal [influenza vaccination](#) is derived from the strains of influenza that were prevalent the preceding season. The major culprit this [flu](#) season is the Type A H3N2 strain. It's a known human strain, it just hasn't been circulating in recent years, so when we as a medical community guessed which strains would be prevalent this year – and it is a guess, albeit an educated guess – we didn't include it in this year's vaccine. That's why when people get this year's vaccine, their bodies do not mount an immune response that would protect them from that strain, whereas they will be well protected against the H1N1 strain. H1N1 is circulating, so the vaccine offers protection from that strain and others that are included in the vaccine, but still the overall effectiveness is lower because a major circulating strain, H3N2, is "missing" from the vaccine.

The Centers for Disease Control and Prevention recently estimated the effectiveness of this year's vaccine at 23 percent, and that number might change either up or down as new data become available. In terms of reported cases, about half the states have flu activity considered "very high," but Connecticut is not one of them. Connecticut is ahead of where it was at this time last year in terms of number of cases, but we haven't been hit like other states. Still, the possibility exists that it might increase dramatically and quickly for us.

But the recommendation is still to get the flu shot?

Absolutely, and it's true for a number of reasons. First, some protection is better than no protection. Secondly, while it won't make you immune from H3N2, as we've learned, it may help your body limit the severity of the illness somewhat. Most importantly, for your loved ones and for the

sake of public health, it keeps the other strains – the ones that are in this year's vaccine – from spreading, and also H3N2, if people recover more quickly and therefore limit their contagiousness for others. People seem to forget that this not only is a very contagious illness but also a deadly one, particularly among very young and very old people. Every year between 30,000 and 40,000 people in the United States die from influenza and related illnesses, and that number has been pretty consistent over the years.

And no, you can't get the flu from the influenza vaccine. Some people feel mild aches, pains, and low-grade fever for a day or two following the shot. All that means is the vaccine is doing what it's supposed to do, triggering an immune response in your body that causes some mild symptoms in some people, but it is not the flu.

One thing to watch out for, which I haven't heard talked about much, is what's known as a second phase of illness. Someone is getting over the flu and then gets sick again, with fever, cough productive of yellow or green sputum, and other symptoms. This can indicate a bacterial superinfection that requires antibiotics. This can be a very dangerous situation, in some ways more so than the original bout with influenza, and is often the thing that leads to the deaths that I've mentioned. So if you have the flu and start getting better, then start to feel worse again, see your doctor right away.

For someone who gets the flu shot but still comes down with influenza, now what?

When the vaccine isn't fully protective, antiviral drugs become more important. Oseltamivir (sold under the brand name Tamiflu) and Zanamivir (sold under the name Relenza) both work against influenza types A and B. They're most effective if administered within 24 to 72

hours of onset of symptoms, the earlier the better. These drugs, known as neuraminidase inhibitors – neuraminidase is the "N" in H3N2 (H stands for hemagglutinin) – become crucial because they are the only way to treat patients with severe disease, and they also make patients less contagious for others. We're having a freer hand with the antivirals this year because we know the vaccine is less effective. Also, the problem strain this year, H3N2, is known to cause more severe disease, making the antivirals especially important to prevent poor outcomes and death.

Beyond that, general hygiene is always important, to make sure you don't expose others at home or at work. This includes things like covering your sneeze or cough, not sharing utensils or towels or linens, washing hands frequently, and cleaning surfaces – especially faucets and refrigerator handles – that people touch often.

What else should we know about influenza?

There are many different strains of influenza. Each type of virus has segmented single-strand RNA and these can re-assort, meaning they can mix and match in all different kinds of combinations, and they can mutate to cause changes in proteins, including the external glycoproteins, that elicit immune responses.

Two things we watch for with influenza are what we call drift and shift. Drift is what we're seeing now, new strains of influenza that are still somewhat related to each other and previous strains, so they can still cause epidemic outbreaks of influenza. Shifts are much more serious, they include the introduction of [influenza viruses](#) that are not related to any current strains and are sometimes entirely new. These are the ones that cause true pandemics across the globe.

It's become very clear that influenza viruses can cross species – so-called "zoonotic diseases." Ebola virus, which crossed into humans most likely

from bats, and HIV, which crossed into humans from chimpanzees, are other examples of this. Some of the major changes that have occurred so far with influenza happened when avian flu or swine flu crossed from animals into humans. These are sometimes [strains](#) of influenza that humans have never encountered. Influenza can be most severe when this happens. A few years ago, H5N1 in Southeast Asia crossed from chickens into humans, and that caused a very scary and severe outbreak with many deaths.

Is there any good news?

There are companies that are doing very important work to develop molecular ways to create influenza antigens for vaccines that can be produced much more quickly than growing them on egg yolks, which is the primary method for creating the material for flu shots currently. Once this is perfected and made economically feasible, it will make vaccine quickly available that is tagged to the current season's isolates and not the past year's viruses. Using these newer techniques, a company could create batches of [vaccine](#) that could be used to provide high levels of protection. It's a hopeful look toward the future, especially in those cases in which [influenza](#) crosses species and becomes a true pandemic. This would enable us to protect many people quickly and effectively, to help save lives.

Provided by University of Connecticut

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