

# Influenza

## The Domino Effect

Patients with immune diseases are at high risk of serious health problems resulting from the flu. And, with the pandemic H1N1 flu emerging along with the already dangerous seasonal flu, it is more important than ever to embrace the concept of “herd protection” to halt the chain-reaction spread of influenza.

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Each year, influenza affects from 5 percent to 20 percent of the population, claiming 30,000 to 40,000 lives and requiring hospitalization of more than 200,000 in the U.S. alone. Globally, the death rate exceeds 500,000. And, a study conducted by the Centers for Disease Control and Prevention (CDC) found that there is an upward trend in the rates of flu incidence.<sup>1</sup> The death rate between 1972 and 1992 doubled in just 20 years — an especially alarming trend considering in 1997, flu vaccine coverage had reached 65 percent of those most vulnerable. The intensity of flu epidemics is also increasing. In the 1970s and 1980s, the

average length of an epidemic period was 8 to 10 weeks. Today, it is closer to 16 to 18 weeks.<sup>2</sup> Add to this the new pandemic H1N1 flu, and the number of people who contract the flu this season stands to be far greater than the world has experienced in a very long time.

One of the primary reasons the spread of flu continues to be prevalent is that not enough people get vaccinated. Individuals who have immune diseases should be especially concerned, as they are most at risk of serious health complications resulting from the flu. Educating people about how the flu spreads and convincing them to adopt a herd protection mentality could help immune-compromised patients, as well as the rest of the population.

### Adopting Herd Protection to Halt the Spread

For years, the main thrust of flu vaccination campaigns has focused on the very young and the elderly. This emphasis may be misplaced since the immune systems of the old and infirm don't always respond efficiently to the flu vaccine, nor



are these populations usually responsible for spreading the virus. Some suggest that a better tactic may be to focus vaccination efforts on healthcare workers, school-age children and working adults — those who consistently come in contact with others and are more likely to infect others. Embracing this concept, called “herd protection,” has its roots in the idea that you protect the weakest members of a flock by strengthening the defenses of its strongest members and, in doing so, bolster the herd’s communal defenses.

Paul Glezen, MD, Baylor College of Medicine, Houston, Texas, is one of a growing number of physicians who subscribe to the idea of herd protection with regard to vaccinations for the flu virus. Glezen argues that focusing vaccination efforts on the very young and old, which is the current recommendation, is less effective because these people, while most susceptible to the effects of the flu, are not in contact with mass numbers of the population, and, ironically, may not respond as well to the vaccine. According to Glezen, herd protection is a well-established concept and a reasonable approach to a systematic immunization program.<sup>3</sup>

Another benefit of the approach is that school-age kids and working adults, because of their need to congregate in schools and the workplace, are accessible populations for rapid deployment of the flu vaccine and, in turn, offer the greatest chance for success for the vaccination to actually reduce the incidence of flu in a community.

There are many examples of herd protection working. In a Japanese study from 1977 to 1987, it was mandatory for school-age kids to get the flu vaccine. Most households in Japan at that time were three-generation households and the flu vaccine was not given to the elderly or high-risk. Japan saw a reduction in flu-related mortality of 35,000 to 47,000 per year.<sup>4</sup> Incidentally, after 1987, due to parental concerns about the vaccine being mandatory, the program was ceased and the death rates from the flu reverted back to pre-program levels within a few years.

In the U.S., an ongoing program in Temple, Texas, near Austin, is also proving the herd protection strategy a most effective one. Starting in 2001, school-age children have been receiving the yearly LAIV flu vaccine, and preliminary data from the 2005-2006 school year showed almost no incidents of influenza. In the 2008-2009 school year, Temple, Texas, has so far escaped the flu again, while

nearby cities have had large outbreaks that resulted in school closures, hospitalizations and even deaths.

### **Vaccinations for Healthcare Professionals**

The recommendation of vaccinations for healthcare professionals (HCPs) and those in training is also part of herd protectionism. HCPs are in close contact with those with primary immune and autoimmune diseases, as well as those with decreased immunity — the sick, the young, the old — and even when they have subclinical presentation of the influenza virus, they can spread it. With most on the front line of patient care sharing the physician’s Hippocratic oath: “Do no harm,” it is puzzling to learn that nearly 60 percent of American healthcare workers fail to get an annual flu shot. “I’d like to think we [HCPs] get vaccinated because it is the right thing to do,” says Dr. Andrew Eisenberg, medical director at the Iron Mountain Medical Center, Madisonville, Texas. “We have an obligation to not get patients sick. The mortality and morbidity rates are less at hospitals where vaccination of workers is mandatory.”

Fifteen states have regulations regarding vaccination of HCPs in long-term care facilities, six states require that healthcare facilities offer influenza vaccination to HCPs, and four states require that HCPs either receive influenza vaccination or indicate a religious, medical or philosophical reason for not being vaccinated.<sup>5</sup>

***Despite the availability of vaccines, healthcare workers consistently fall short of immunization goals.***

While U.S. statistics regarding healthcare worker immunization are well below the goals established by Healthy People 2010,<sup>5</sup> international statistics are even less encouraging. In England, only 14 percent of healthcare workers were immunized before the 2008-09 flu season. An article published in the *London Times Online* states that the Royal College of General Practitioners in England recently called for hospital doctors, general practitioners, nurses and other staff to have compulsory flu shots or risk being banned from patient contact.

USA Today reported that the National Foundation for Infectious Diseases cites several cases of flu outbreaks that suggest a likely link between healthcare workers and patients. These include:

- 19 babies in a neonatal intensive care unit in Ontario, Canada, infected in 2000; one died. Healthcare workers, only 15 percent of whom were immunized, were the likely source.
- 65 residents of a nursing home in New York got the flu during the 1991-1992 flu season, and two died. Only 10 percent of healthcare workers had been vaccinated before the outbreak, according to a report by the CDC.

And in England, *The London Times* reported that at Royal Liverpool University Hospital, nearly 100 patients caught the flu in late 2008, including those on high-dependency wards treating blood diseases and kidney problems.<sup>5</sup>

### **Vaccinations: Changing Perceptions of Who and How**

The CDC's Advisory Committee on Immunization Practices (ACIP) makes best practice recommendations for administering the flu vaccine.<sup>6</sup> Among those recommendations are:

- The annual vaccination is to be administered to all children ages 5 to 18 years.
- The annual vaccination of all children ages 6 months through 4 years (59 months) will continue to be a primary focus of vaccination efforts because these children are at higher risk for influenza complications compared with older children.
- Either trivalent, inactivated influenza vaccine or live, attenuated influenza vaccine (LAIV) will be used when vaccinating healthy persons ages 2 through 49 years.

Now, with the H1N1 flu season upon us, the CDC has given priority for the H1N1 flu vaccine to approximately 159 million persons in the U.S.<sup>7</sup> These include:

- Five million pregnant women
- Four million parents and caregivers of children younger than 6 months old
- Fourteen million healthcare workers
- One hundred and two million people between ages 6 months and 24 years
- Thirty-four million adults between ages 19 and 64 with chronic diseases

While it is nearly universally accepted that we will never be rid of the flu virus, we can do a better job of helping

our population build antibodies to protect against it, as well as protecting those most at risk from it. "In my view, we have not done a very good job of vaccinating, and the biggest problem that I see is mixed messaging," says Eisenberg. "We've developed rules and procedures as to who is most at risk and [who] should be vaccinated, but everyone is at risk of catching this disease. The success of our vaccination strategy will hinge on getting a large penetration of the population immunized."

***A child with severe combined immune deficiency will not benefit from any vaccines and could be harmed if given a live virus or bacterial vaccine.***

Many choose not to get the flu vaccine, and young healthy adults are chief among them because they feel they are not at high risk, that the vaccine doesn't work and/or they think that getting the flu vaccine will make them sick. Clearly, more education, communication and effort are needed to help dispel some of these common myths surrounding vaccination to ensure it is more widely embraced through our culture.

### **Vaccination Safety for Immune Disease Patients**

A common concern is whether the influenza vaccine is safe. And, while the flu vaccine is not only safe, but recommended, for most patients with an immune disease, for each of the more than 100 types of immune diseases, their response to vaccinations may be different. For example, children with B cell problems have diminished antibody response to vaccines. A child with severe combined immune deficiency will not benefit from any vaccines and could be harmed if given a live virus or bacterial vaccine.<sup>8</sup> Patients with Guillain-Barré syndrome (GBS) and chronic inflammatory demyelinating polyneuropathy (CIDP) are cautioned about the possible risk associated with the flu vaccine. GBS has been known to be triggered by flu shots. According to the ACIP, whether influenza vaccination specifically might increase the risk for recurrence of GBS is unknown, persons who are not at high risk for severe

influenza complications but who are known to have experienced GBS within six weeks generally should not be vaccinated.<sup>9</sup> According to Dr. Todd Levine, director of the department of neurophysiology at Good Samaritan Hospital, Phoenix, Ariz., “Patients with CIDP have an overactive immune system, so in general, we do not want to stimulate their immune system. Flu shots do just that, so I usually recommend patients not get flu shots.”

For patients for whom flu vaccine is safe, they should know that the injectable vaccines that have been created to help prevent both the seasonal flu and the H1N1 flu are inactivated, meaning they are killed. Inactivated vaccines are different from live vaccines that are made from live viruses or bacteria that have been weakened. Live vaccines, such as FluMist, have a possibility of causing the disease itself, especially in primary immune disease patients who lack the immune defenses necessary to fight certain diseases. Inactivated vaccines, on the other hand, are made from viruses or bacteria that have been killed, and therefore, cannot cause the disease that it is given to prevent.<sup>10</sup>

Whether flu vaccine is safe or unsafe for certain immune disease patients, it is important that family members, friends and co-workers of this population be vaccinated to prevent infecting them. And it's essential for those who come in contact with patients who are unable to be vaccinated.

### **Improving Access and Distribution — Just Part of the Solution**

Multiple companies manufacture flu vaccines, and there are increasing numbers of vaccine administration sites — from physician offices and retail pharmacy outlets, to schools and the workplace. If utilized, ample supply and efficient administration will protect large numbers of people in a short amount of time and reduce our rates of infection. Says Eisenberg, “Even if we can get 60 percent vaccinated, we'll protect that 40 percent who either shouldn't or won't be vaccinated.”

It's important to remember that seasonality is a misnomer when it comes to the flu, because the flu is always circulating throughout the globe year-round, mutating, infecting and, in many cases, killing those who are not vaccinated or treated in time. Accurate diagnosis is also necessary if we are to effectively win the battle against the flu virus. “We have a diagnostic problem,” says Eisenberg, referring to the U.S.' ability to determine whether a person has the flu and, if so, what strain they have. “Our tests are sensitive but not too specific, and we don't have a great test to determine the strain. Many can have a relatively mild case of the flu,

though not be identified as having it because they confuse the flu with something else.” Misdiagnosis is a problem because as people are sent home from emergency rooms and doctors' offices, they are inadvertently spreading the flu when they should be isolating themselves.

### **Vaccination of the Fittest for the Survival of All**

We live in a uniquely egocentric time. For many, looking out for “number one” is a way of life that is rarely questioned. When it comes to influenza control, however, a “live and let live” mentality translates to: “Infect and allow to infect.” Better to reorient the national consciousness so the strong and active segments of the population step up to be immunized to protect themselves, and give indirect protection to the vulnerable. This shift may offer the most efficient and effective use of the influenza vaccine. And with the threat of a pandemic ever looming, our very survival may depend on it. ■

### **References**

1. Thompson, WW, Shay, DK, Weintraub, E, Brammer, L, Bridges, CB, Cox, NJ, Fukuda, K. Influenza-Associated Hospitalizations in the United States. *Journal of the American Medical Association*, 2004;292:1333-1340.
2. Glezen, WP. The Changing Epidemiology of Respiratory Syncytial Virus and Influenza. *The Pediatric Infectious Disease Journal*, 2004; Vol 23, #11, page 2.
3. Glezen, WP. Herd Protection Against Influenza. *Journal of Clinical Virology*, 2006, 37.
4. Richert, TA, Sugaya, N, Fedson, DS, Glezen, WP, Simonsen, L, Tashiro, M. The Japanese Experience with Vaccinating School Children Against Influenza. *New England Journal of Medicine*, 2001, 344:889-96.
5. Health Care Personnel (HCP) and Others Who Can Transmit Influenza to Those at High Risk. Accessed at <http://cdc.gov/flu/professionals/acip/specificpopulations.htm#HCP>.
6. Centers for Disease Control and Prevention. Prevention and Control of Influenza: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *Morbidity and Mortality Weekly Report*, 2005;54(RR-8):1-40.
7. Centers for Disease Control and Prevention. Novel H1N1 Vaccination Planning Q&A. Accessed at [www.cdc.gov/h1n1flu/vaccination/state-local/qa.htm](http://www.cdc.gov/h1n1flu/vaccination/state-local/qa.htm).
8. ImmuneDisease.com. Should Children with PI Receive Immunizations? Accessed at [www.immunedisease.com/patients-and-families/about-pi/healthy-living/staying-healthy/immunizations.html](http://www.immunedisease.com/patients-and-families/about-pi/healthy-living/staying-healthy/immunizations.html).
9. Centers for Disease Control and Prevention. Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices (ACIP).
10. Organization of Teratology Information Specialists. Vaccines and Pregnancy. Available at [www.otispregnancy.org/pdf/vaccines.pdf](http://www.otispregnancy.org/pdf/vaccines.pdf).

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