THE WALL STREET JOURNAL. ONLINE

October 6, 2006

SCIENCE JOURNAL

By SHARON BEGLEY

If We Must Ration Vaccines for a Flu, Who Calls the Shots?

October 6, 2006

You have 100 doses of a vaccine against a deadly strain of influenza that is sweeping the country, with no prospect of obtaining more. Standing in line are 100 schoolchildren and 100 elderly people.

The elderly are more likely to die if they catch the flu. But they also have fewer years left to live and don't get out enough to easily spread or catch the disease. The kids are more likely to act like little Typhoid Marys, sneezing virus over anyone they encounter, and have almost their whole life ahead of them. But they're also less likely to die if they get sick.

Whom do you vaccinate?

This dilemma is haunting experts concerned that avian influenza might start spreading from person to person instead of (as far as we know) mainly from birds to people. But it also applies to regular old flu, which always has the potential to reach pandemic proportions. In response, studies now are shedding light on the ethical issues and the most effective strategy for reducing illness and death if vaccine must be rationed. Sadly, they make a pretty good case that current U.S. policies leave a lot to be desired.

First, ethics. In May, scientists at the National Institutes of Health stirred things up with a paper calling into question the policy that aims to save the most lives by first vaccinating the old, the very young and the sick, putting last those who are two to 64 years of age.

The value of a life, they argued, depends on age. A 60-year-old has invested a lot (measured by education and experience) in his life, but has also reaped most of the returns. A child has minimal investment. A 20-year-old has great investment but has reaped almost none of the returns. Conclusion: To maximize investment in a life plus years of life left, 13- to 40-year-olds should have first claim on rationed vaccine, explains NIH's Ezekiel Emanuel.

Second, efficacy. Let's leave aside the fraught question of the value of a life. Evidence keeps accumulating that vaccinating the elderly might not even be the best strategy for minimizing deaths. The reason is that during some flu pandemics, the mortality rate among the elderly is hardly higher than during nonpandemic years. The flu certainly kills some old people, says Dr. Emanuel, but many would

have died anyway. In addition, they may not benefit from flu vaccines as much as is assumed: A 2006 study found that the antibody response by people over 65 is less than half that in young adults.

Critics reply that the elderly are more likely to die if they get the flu, so ethics requires you protect them, the most vulnerable, first. Indeed, in the 1957 and 1968 pandemics, the very young and very old had the highest flu-mortality rates. But in the 1918 pandemic, 20- to 40-year-olds and children under five had the highest mortality rate. The elderly were more likely to either not become infected or to survive if they did, perhaps because only someone with a sturdy immune system lived to a ripe old age back then.

The common-sense notion that vaccinating the elderly is the best way to save the elderly also deserves scrutiny, according to a study this week in the journal PLoS Medicine. Infants and the elderly don't spread the flu as much as, say, a schoolchild or business traveler. Might you decrease both illness and death, including among the old, by vaccinating other age groups first?

As it happens, that is what doctors did in Tecumseh, Mich., in 1968. They vaccinated school-age kids, whose lower natural immunity and many contacts (not to mention a tendency to sneeze all over the place) makes them high transmitters of infectious disease. That tactic slowed the spread of disease and cut the death rate from flu to below that in a matching community.

Last year, scientists showed in a model that if you vaccinate about 60% of U.S. schoolchildren, flu deaths among the *elderly* would fall to 6,600 from the typical 34,000. "It's not necessarily true that the best way to protect someone is to vaccinate that person," says Ira Longini of the Fred Hutchinson Cancer Research Center, Seattle. "In the case of the elderly, flu vaccine doesn't protect them very well, so breaking the chain of transmission provides greater protection."

In the PLoS study, mathematician Lauren Ancel Meyers of the University of Texas, Austin, and colleagues analyzed patterns of flu transmission under different assumptions about how likely a carrier is to infect other people. Using data on household size, age distribution and other factors, they compared a strategy that targets infants and the elderly with one targeting those most likely to catch flu: school-age kids.

For moderately contagious strains, says Prof. Meyers, the optimal strategy is to vaccinate the kids. "This severs the transmission chain," she says, thereby indirectly protecting the old. For very contagious strains, it is better to vaccinate those most likely to die if they catch flu, such as the elderly. "Highly contagious strains can find their way around this buffer of immunized schoolkids," she explains.

The flu season began this month, and is expected to peak between Christmas and March. As usual, scientists took an educated guess about which strain would show up this year and made vaccine against New Caledonia, Wisconsin and Malaysia. Now, all they can do is hope that they guessed right -- and that there is enough vaccine to go around -- so that the need to ration shots remains theoretical.

- **Email me** at sciencejournal@wsj.com[1].

URL for this article:
http://online.wsj.com/article/SB116008629662084219.html

Hyperlinks in this Article:
(1) mailto:sciencejournal@wsj.com