

Influenza Season Approaches

With the approach of the influenza season, many individuals are beginning to think about getting their annual 'flu' shot. Typically, immunizations begin in October for high-risk individuals and then efforts are broadened in November for the remainder of the population. Kansas City Mayor Kay Barnes officially kicked off the Health Department's efforts when she was vaccinated on the 11th of October and the 13th-19th of October was National Adult Immunization Awareness Week. Vaccination efforts should continue into December and later, for as long as vaccine is available. The vaccine supply should be plentiful, with the manufacturers shipping 75 million doses by the end of October, to be followed by another 19 million doses. Last year 77 million doses were produced but only 43 million had been distributed by the end of October resulting in vaccine shortages and many people not getting vaccinated.

Many individuals associate the need for influenza vaccinations with being 'elderly' or with having underlying medical conditions. For some, understanding that the recommendations are for persons ≥ 50 y may mean a personal redefinition of 'elderly'. Furthermore, there is ample evidence to indicate that healthy, younger adults also can benefit from influenza vaccination. For example, in a study from France, 38% of household contacts to influenza cases became infected, with the median duration of illness in the index cases being 8 days and 7 days for the secondary cases (Arch Intern Med 162:1842, 2002). Immunizing younger adults could significantly impact not only the occurrence of primary, but secondary household cases as well. Furthermore, rates of influenza and pneumococcal immunizations are far lower in high-risk younger adults. About 25% of high-risk individuals aged 16-64 receive influenza vaccine.

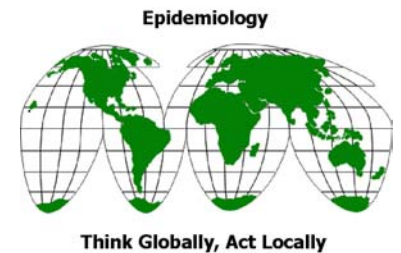
Because young, otherwise healthy children are at increased risk for influenza-related hospitalization, influenza vaccination of healthy children aged 6-23 m is encouraged when feasible. Vaccination of children aged ≥ 6 m who have certain medical conditions

continues to be strongly recommended. Also, administration of influenza vaccine to children or adults with asthma, including severe asthma, is safe and encouraged (NEJM 345:1529, 2001). On the 1st of March 2003, the Vaccines for Children (VFC) Program will cover influenza vaccine for VFC-eligible children 6-23 m old and VFC-eligible children 2-18 y who are household contacts of children < 2 y.

Among the major issues with adult immunization are the racial and ethnic disparities between adult recipients of the influenza and pneumococcal vaccine. In 2000, 67% of white Americans > 65 y had received influenza vaccine, compared to just 48% of black seniors and 56% of Hispanic seniors. The gap was even wider for the pneumococcal vaccine, 57% for white seniors versus 31% for black seniors and 30% for Hispanic seniors. The Centers for Disease Control and Prevention (CDC) conducted focus groups with whites, blacks, and Hispanics to ascertain why minorities are less likely to get immunized. There were few insights: some Hispanics said they would rather rely on home remedies over the 'flu' shot, while both blacks and Hispanics suspected the shot is not safe. In addition, some blacks voiced distrust of the medical system, citing the infamous Tuskegee Institute study where black men with syphilis were left untreated.

In response to these rates, the Department of Health and Human Services (DHSS) announced, on the 31st of July, a two-year Racial and Ethnic Adult Disparities in Immunization Initiative (READII) that will be conducted in 5 demonstration sites. READII seeks to improve influenza and pneumococcal vaccination rates in African-American and Hispanic communities. The 5 READII sites are Rochester NY, Chicago IL, Milwaukee WI, San Antonio TX, and some rural counties in Mississippi. Each site will receive between \$250,000 and \$400,000.

Inadequate vaccine coverage rates in adults are a consequence of inadequate resources devoted to adult immunization across the entire health care system. Funding of strategies that effectively boost adult vaccination rates, along with inclusion of



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adult vaccines in the National Vaccine Injury Compensation Program, would have a huge impact on the numbers of adults immunized. Meanwhile, despite physician complaints about reimbursement levels for influenza and pneumococcal vaccines, the Centers for Medicare and Medicaid Services (CMS) has elected not to increase reimbursement levels in its new Medicare physician schedule for 2003 (Am Med News 8/5/2002).

On the 1st of October 2002, DHSS Secretary Tommy Thompson announced a new Medicare/Medicaid policy that will allow nursing homes, hospitals, and home health agencies to vaccinate clients against influenza when operating under standing order. This policy decision stems from a CDC and CMS 14-state pilot project aimed at increasing influenza and pneumococcal vaccine coverage rates among nursing home residents via standing-orders. According to an article in the 1st August 2002 issue of *Internal Medicine News*, in 44 nursing homes with standing-orders programs for influenza vaccination, 71% of residents received the vaccine during the 2000-2001 influenza season. In 118 nursing homes without standing orders, 57% of residents were vaccinated. Pneumococcal vaccine coverage rates were 74% in facilities with standing orders and 4% in those without standing orders. Analysis of outcomes in 19,505 nursing home residents showed that those who received neither vaccine had a 2.3-fold greater all-cause mortality rate through the end of that influenza season, compared with residents who got both vaccines. The difference was considerable even though vaccinated residents were significantly older and hence at higher risk as a group.

Several other interesting reports related to influenza have appeared recently. Popular wisdom holds that not getting enough sleep increases the propensity of catching a cold or other ailments. In America, sleep duration has steadily declined from nearly 9 h in 1960 to <7 h currently. Although adverse effects of sleep deprivation on immune parameters have been documented, the clinical implications of these findings were unclear. Now it has been demonstrated that sleep deprivation at the time of vaccination can reduce the antibody response to an influenza vaccination despite a prolonged period of sleep recovery after vaccination (JAMA 288:1471, 2002). These results suggest that the response to influenza vaccination may be impaired in individuals with chronic partial sleep restriction. Because adults who show poorer responses to vaccines and other antigenic challenges also experience higher rates of clinical illness, these findings support the concept that adequate amounts of sleep are needed for optimal resistance to infectious challenge.

Aircraft cabins have been reported to be high-risk environments for transmission of infectious agents that cause upper respiratory diseases, including influenza.

The 2002-03 trivalent influenza vaccine for the US contains A/New Caledonia/20/99-like (H1N1), A/Moscow/10/99-like (H3N2), and B/Hong Kong/330/01-like viruses.

Contributing factors were associated with space confinement, limited ventilation, prolonged exposure, and recirculating air. However, a recent study looking at air recirculation on aircraft found no evidence for it contributing to an increased risk of upper respiratory symptoms in passengers (JAMA 288:483, 2002).

Zoonotic infections of humans with swine influenza viruses was first confirmed in Wisconsin in 1976 and subsequently reported from Europe, New Zealand, and Asia. A recent serologic survey in Wisconsin comparing the prevalence of swine H1 influenza antibodies in farm workers and veterinarians to those in urban dwellers, found 23% of the farm/veterinary group to have been infected versus <1% of the urban dwellers (Emerg Infect Dis 8:814, 2002). Because pigs can be infected with both avian and human influenza viruses and can play a role in generating novel influenza viruses, swine farmers may represent an important sentinel population to evaluate the emergence of new pandemic influenza viruses.

Virologists have recovered several genes of the influenza virus responsible for the 1918 pandemic. When the hemagglutinin (HA) and neuraminidase (NA) genes were incorporated into a lethal influenza virus adapted to mice, the virulence of the mouse influenza virus varied dependent on which genes were present (Proc Natl Acad Sci, 4 October 2002). The researchers expected that the genes would reduce the virulence of the mouse-adapted virus. Normally, influenza viruses isolated from people rarely prove lethal for rodents, and genes from human-adapted strains typically weaken rodent-influenza viruses. However, when the 1918 HA and NA genes both were present, the recombinant virus killed mice. When only one of the genes was present, virulence decreased. These findings suggest that the specific combination of HA and NA genes may underlie the 1918 influenza pandemic.

And lastly, the H5N1 poultry influenza virus that infected residents of Hong Kong in 1997, had mutated and was able to evade cellular cytokines that suppress most influenza strains (Nat Med 8:950, 2002). When the mutated gene was inserted into a pig influenza virus, the infected pigs became much sicker than those given unmodified virus; as well as remaining infectious much longer.

Biosolids as Fertilizer: A Health Threat?

For years, the Kansas City Water Services Department has been applying sewage sludge to land that is then leased to local farmers. This widely used practice results, annually, in >3 tons of sewage sludge (biosolids) being used as fertilizer on crop land, pastures, golf courses, and other settings across the US. In 1993, the Environmental Protection Agency (EPA) set standards for the use of sewage sludge on soil, but those health standards are now being questioned. According to a report issued by the National Research Council (NRC) in July 2002, the EPA's standards are based on outdated science. The NRC report stated that the EPA should update its standards using improved methods for assessing health risks, and should further study whether treated sewage sludge causes health problems for workers who apply it to land and for residents who live nearby. More rigorous enforcement of current standards also was encouraged. Furthermore, the NRC found that there is a serious lack of health-related information about populations exposed to treated sewage sludge and recommended that the EPA investigate allegations of adverse health events. In fact, a recent publication from the EPA states that local governments, are increasingly restricting or banning the use of biosolids in response to residents reporting adverse health effects (BMC Public Health 2:11, 2002). When assessing public health risks from applying sewage sludges in residential areas, potential interactions of chemical

Aircraft & Wildlife Collisions

It is widely recognized throughout the civil and military aviation communities that the threat to human health and safety from aircraft collisions (strikes) with wildlife is increasing. Globally, wildlife strikes have killed >400 people and destroyed >420 aircraft (FAA Nat Wildlife Strike Database Rept #7, 1/2002). Other than controlled flight into terrain, wildlife strikes have caused more aviation fatalities than any other single source.

Several factors are contributing to this increasing threat. Most airlines are replacing their older 3 or 4 engine aircraft with more efficient and quieter 2 engine planes. It is estimated that by 2008, only ~10% of planes will have 3 or 4 engines, compared to 30% in 1998. This reduction in engine redundancy increases the probability of life-

contaminants with low levels of pathogens must be considered. An increased risk of infection may occur when allergic and non-allergic reactions to endotoxins and other chemical components irritate skin and mucus membranes and thereby compromise normal barriers to infection.

The 30th of September issue of the *USA Today* newspaper ran a story about a family in Pennsylvania that believed their 17 y old son died of a massive bacterial infection acquired from the biosolids used on neighboring farms. Meanwhile, the *BMC Public Health* article found that people living near sludge application sites run a 25% higher risk of getting infected with *Staphylococcus aureus*, the bacterium that killed this young man. In addition, Cornell University's Waste Management Institute has collected information on 328 people from 15 states who allege illness after exposure to biosolids.

Under a 1993 Clean Water Act rule designed to protect public health and the environment, sewage sludge can be applied to land if it is sufficiently treated to limit concentrations of certain chemicals and reduce disease causing pathogens. Sewage sludge that meets these standards is referred to as class B biosolids. Depending on the extent of treatment, biosolids may be applied as fertilizer where there is limited public exposure to it, such as farms or forests, or on sites with more public contact such as parks, golf courses, lawns, and home gardens. Since 1992, when a ban on ocean dumping was instituted, applying biosolids to land has reduced the amount of sewage sludge that would otherwise have to be buried in landfills or incinerated. About 5.6 million tons of sewage sludge are use or disposed of each year in the US, and 60% of that is used for land application.

threatening situations resulting from wildlife strikes. In addition, many wildlife species involved in strikes have increased dramatically in recent years and commercial air traffic increased from 18 million flights in 1980 to 30 million in 2000.

Between 1990 and 2000, 34,370 wildlife strikes were reported to the FAA. There was a 16% increase in the number of strikes reported in 2000 compared to 1999, and 3.4 fold increase in the number of strikes reported in 2000 compared to 1990. About 83% of the strikes involved commercial aircraft. Fifteen percent and 62% of the bird and mammal strikes, respectively, had an adverse effect on flight.

Birds accounted for 97.4% of the 34,370 wildlife strikes over the 11 y period, mammals represented 2.5%, and the balance were caused by reptiles. Half of the bird strikes (51%) occurred between July and October and 64% occurred during the day. Fifty-four percent of the bird strikes occurred when the aircraft was on approach or during the landing roll, and 39% occurred during take off and climb. Of the 5,129 engines struck by birds, 39% were damaged.

There were 255 incidents in which ≥ 2 engines on a single plane were struck by birds. The FAA received 76 reports describing bird strikes that resulted in 79 human injuries and 5 fatalities.

Most mammal strikes (41%) occurred between September and November with 63% occurring at night. Fifty-two percent occurred during the landing roll compared to 35% on take off. About 10% of the mammal strikes occurred while the aircraft was still in the air, such as when the aircraft struck deer with the landing gear or encountered bats. About 68% of mammal strikes resulted in damage to

the planes. The FAA received 17 reports that described 21 human injuries and 1 fatality.

For the 11 y period, bird strikes resulted in 158,886 hours of aircraft down time and cost \$102.9 million. Mammal strikes resulted in 106,846 hours down time and \$11.7 million in expenses. The FAA estimates that <20% of wildlife strikes are reported. Furthermore, it estimates that the total cost to civilian aviation to be >532,451 h/y of aircraft down time, \$291.3 m/y in direct monetary losses, and \$42.8 m/y in associated costs.

Anthrax vs West Nile Virus

A Gallup poll released on the 3rd of October, showed that fewer Americans (27%) are worried about anthrax exposure than are worried about being affected by further acts of

terrorism (38%). But concern (53%) about contracting West Nile virus (WNV) exceeds both of these terrorism-related worries. Even at the height of publicity surrounding anthrax incidents last Fall, only $\frac{1}{3}$ of the public said they were very or somewhat worried about being affected. Women are slightly more worried than men about themselves or someone in their family contracting WNV. While persons >50 y of age tend to have a higher risk of the more serious forms of WNV, young adults expressed higher levels of acute fear of contracting the infection.



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