Every Year Is an Influenza Pandemic for Children: Can We Stop Them?

The annual attack rate for influenza in children is high, the highest of any age group. It is estimated that 10% to 40% of children are infected with influenza each winter, a figure similar to the attack rate reported for children during the 2009 H1N1 pandemic.1–4 Children with underlying medical conditions bear a disproportionate burden of influenza-related morbidity and mortality.5–7 Two studies in this issue of Pediatrics add to the compelling body of evidence that children with neurologic conditions are at particularly high risk of complications resulting from influenza infection. In the first, Tran and colleagues report that children with underlying neurologic conditions in Canada had an increased risk of ICU admission after either seasonal or pandemic influenza A infection.8 In the second, Blanton et al report that neurologic disorders were identified in nearly half of all pediatric deaths associated with 2009 H1N1 pandemic influenza in the United States.9 An equally important observation from these studies, however, is the significant morbidity associated with influenza infection among children without known risk factors. Half of all hospitalizations from seasonal influenza A during 2004–2009 and almost a third of all deaths during the 2009–2010 pandemic occurred in children with no underlying medical conditions.8,9 Recent surveillance data from the United States indicate this trend continued through the 2010–2011 influenza season when 49% of pediatric deaths and 52% of pediatric hospitalizations occurred in children without a high-risk medical condition, as defined by the Advisory Committee on Immunization Practices.10,11 So while it is clear that children with certain underlying conditions are at higher risk of complications, a substantial proportion of the morbidity and mortality associated with seasonal influenza each year occurs in healthy children.10 The considerable burden of influenza disease in previously healthy children is a consequence of the high attack rate in this cohort and the fact that very young children are hospitalized from influenza illness at rates similar to other groups considered at high risk for influenza-related complications, ie adults with underlying medical conditions and those aged ≥65 years.5 It has been estimated that each year nearly one in every 1000 children under 5 years of age will be hospitalized with seasonal influenza, and that for every child admitted to a hospital another 50 are seen as outpatients.12 In recognition of this, in 2004 the Advisory Committee on Immunization Practices recommended that all children aged 6 to 23 months be vaccinated against seasonal influenza; this recommendation was subsequently expanded to include children aged 24 to 59 months in 2006, and, in 2008, ultimately extended to all persons ≥6 months to 18 years of age.13
The low rate of seasonal influenza vaccination among US children reported in the Blanton study is disappointing. Only 23% of children with a neurologic disorder and 12% of children with no high-risk condition who died during the 2009–2010 pandemic had received contemporaneous seasonal influenza vaccine. Although it is not possible to generalize vaccination rates from children who suffered an influenza-related adverse outcome to the broader population, the seasonal influenza vaccination rates reported here are not dissimilar to the US national coverage estimate (24%) for children aged 6 months to 17 years during the period just before the pandemic in 2009.

It is fair to say that influenza vaccine uptake among both at-risk and healthy children has been slow to build but that rates increased appreciably in response to heightened concern surrounding the 2009 H1N1 pandemic. With memories of the pandemic still fresh in the public’s mind, the vaccination rate among US children aged 6 months to 17 years rose to 51% in 2010–2011. Although the increase over pre-pandemic vaccination levels is to be lauded, it must be acknowledged that influenza coverage for this age group is still well below the Healthy People 2020 target of 80%.

Continual improvements in childhood influenza vaccination rates will require that providers remain convinced of the benefit of vaccination for their patients. It is therefore noteworthy that 2 recent comprehensive reviews of the efficacy of influenza vaccines have highlighted the paucity of data from randomized controlled clinical trials that support the use of inactivated influenza vaccine in children. Although both reviews found the evidence of benefit for live attenuated influenza vaccine in children to be more robust, it is currently not recommended for use among the cohort of children who arguably need protection from influenza infection the most: children <2 years of age and children with neurologic disorders or other chronic medical conditions.

In their review, Jefferson and colleagues make the point that if influenza immunization of children is to be recommended as national policy, large-scale studies that directly compare vaccine types are urgently needed. Randomized placebo-controlled trials that assess laboratory-proven influenza infections would provide the most persuasive evidence of vaccine efficacy, but such trials cannot be conducted ethically among groups already recommended for annual influenza vaccination. In their absence, observational studies using different methods and measuring different outcomes have been conducted, producing mixed results. Adequately powered, multicenter observational studies that span multiple influenza seasons and use standardized criteria for laboratory and clinical endpoints could help address gaps and disparities in the existing data. Comprehensive data-linkage systems analogous to those currently used to ensure the ongoing safety of licensed childhood vaccinations may provide an appropriate model.

Immunization remains our most promising strategy for preventing the “annual pandemic” of influenza among children. Given the high rates of influenza-related morbidity among the pediatric population, additional studies that firmly establish the impact of current vaccine recommendations should be a priority.

REFERENCES


PEDIATRICS Volume 130, Number 3, September 2012


15. Seasonal influenza vaccination coverage among children aged 6 months–18 years—eight immunization information system sentinel sites, United States, 2009–10 influenza season. *MMWR Morb Mortal Wkly Rep* 2010;59(39);1266–1269


**LIONS AND TIGERS AND BEARS AND HORSES?:** My wife and I were recently hiking in the Southern California desert. At one of the trailheads, a large sign had warned us of the dangers of rattlesnakes. After a few hours of hiking my wife looked around a bit anxiously and asked me if there were mountain lions in the area. By this time, we had climbed about 2,300 feet and were miles from the trailhead. We had not seen another human on the trail and had seen lots of bighorn sheep scat. Since I am not allergic to bees, I tend not to worry about the dangers of wildlife while hiking. However, my wife’s anxiety got me to thinking about what animals really posed the most danger to humans. Interestingly enough, according to an article published in the journal Wilderness & Environmental Medicine (June 2012), hiking, walking, or working in Vermont may be more dangerous than hiking in the remote California high desert. Researchers queried the CDC WONDER Database for all animal-related fatalities between 1999 and 2007. The WONDER Database is a compilation of mortality and other epidemiologic data from death certificates in the United States. Inclusion criteria included all mortalities that were a result of bite, contact, attack, or envenomation. Animal attacks resulting in fatalities were divided into those resulting from nonvenomous and venomous causes. Between 1999 and 2007, animals fatally injured 1,802 people: approximately 60% were nonvenomous and 40% were venomous animals. More than one-third of all deaths were due to “other mammals,” which consist primarily of farm animals such as horses, cows, and pigs. Hornets, wasps, and bees (28.2%) were the next most common, followed by dogs (13.9%). Venomous snakes and lizards only accounted for 3.3% of fatalities. The data are fairly clear that the biggest danger to humans is posed by those animals with whom we are in the most contact. The likelihood of running into a mountain lion while hiking is exceedingly remote. However, being kicked, crushed, or bitten by a farm animal or dog is much more likely given that so many of us are in close proximity to those animals every day. So, I reassured my wife that we were safer on this remote hilltop than back on our little farm in Vermont and we pushed on with our hike.

*Noted by WVR, MD*
Every Year Is an Influenza Pandemic for Children: Can We Stop Them?
Paul V. Effler

Pediatrics 2012;130;554; originally published online August 29, 2012;
DOI: 10.1542/peds.2012-1171
Every Year Is an Influenza Pandemic for Children: Can We Stop Them?
Paul V. Effler

*Pediatrics* 2012;130;554; originally published online August 29, 2012; DOI: 10.1542/peds.2012-1171

The online version of this article, along with updated information and services, is located on the World Wide Web at:
/content/130/3/554.full.html