



Barth Syndrome and the 2009 H1N1 Influenza Pandemic

Probably the worst aspect of the H1N1 influenza pandemic is that much of what we hear on TV and radio is limited to rumor and the most dramatic stories about H1N1 infection rather than the dispassionate appraisals of the pandemic offered by the Centers for Disease Control and Prevention and the World Health Organization. I shall endeavor in the following paragraphs, therefore, to present first the basic facts about the H1N1 pandemic and then what Barth families need to know about the expected resurgence of H1N1 this fall. For impatient readers who want the bottom line first, however, we can say that, apart from several minor differences, this flu season should be approached no differently than any other flu season.

The Pandemic:

Although the “novel” 2009 H1N1 swine flu virus that erupted in Mexico City in March and April was associated with an unusually high rate of mortality among the healthiest members of the population, those in their 20s and 30s, more recent surveillance data from the CDC indicates that the pattern of morbidity and mortality for 2009 H1N1 has settled down to a more typical age profile, with the highest percentage of hospitalization and deaths being among the very young and those in their 60s and beyond. Those who have read John M. Barry’s detailed and scientifically highly accurate book, “The Great Influenza,” will recognize that the differences between the 1918 “Spanish influenza” and the current pandemic can be explained by how flu viruses evolve and by improved methods of prevention.

H1N1 viruses actually are common, and one H1N1 strain has been included in the regular seasonal trivalent flu vaccine for many years. The 2009 H1N1 virus, however, is different enough from currently circulating H1N1 strains that persons not exposed to earlier H1N1 strains circulating in the 1940 and 1950s are highly susceptible to infection by 2009 H1N1. The high susceptibility of the US and world populations to 2009 H1N1 virus is most evident in the unusual persistence of the virus through the summer with a peak in reported pediatric cases occurring in July. Doubtless there will be a resurgence of 2009 H1N1 in the early fall (compared to usual flu seasons’ beginning in December) as children return to school, and some specialists predict the fall peak of 2009 H1N1 infections will be in late September. However, enough information has been gained from the summer epidemic to substantially reduce, if not eliminate, the possibility that we are in for a replay of the 1918 pandemic.

An important point about influenza viruses to understand is that susceptibility and severity are two unrelated phenomena. The rapid worldwide spread of 2009 H1N1 this spring and the unusual summer flu epidemic we have just been through demonstrate that 2009 H1N1 is a truly novel H1N1 strain, against which few people under the age of 55 have existing protection from prior exposure to similar H1N1 in the 1940s and 1950s. The origin of the 2009 H1N1 virus from a splicing together of four different viruses---US swine flu, European swine flu, bird flu, and human flu---assured its novelty and that most people on the globe are susceptible to infection by it. Severity is judged by the intensity of the clinical illness---principally the rate of hospitalization and mortality---and is independent of susceptibility to 2009 H1N1 infection.

Although the initial outbreak in Mexico caused relatively high and early mortality among healthy young adults, the summer 2009 H1N1 epidemic did not single out young adults as feared and appears to have evolved to have a more typical age-dependency of morbidity and mortality, with children under 5 years and

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the elderly being most severely affected. At the same time, however, the age-susceptibility profile evident in the spring has continued as expected, with highest rates of infectivity in those younger than 55 years. The reason for the change in lethality for young healthy persons probably is the usual one. Individuals who were struck fast and hard by the original, intrinsically more severe strains of 2009 H1N1 were quickly bedridden and removed from the ambulatory population spreading the virus. Those with illness from intrinsically less severe strains of 2009 H1N1 were left to walk about and spread the disease for a while before they took to bed. An important difference between this pandemic and the one in 1918 was that in 1918, ill-informed decisions made by the military enhanced the spread of the most virulent strains of 1918 H1N1 among young recruits by sending almost certainly infected recruits into crowded military camps across the country, and then shipped the infection overseas with them. Crowded cities like Philadelphia with a heavy concentration of military facilities also were hit very severely and had an unusually high rate of mortality.

All of this is to explain why, apart from the high percentage of at-risk individuals for 2009 H1N1 infection, the influenza epidemic this fall will likely be neither more severe nor more enjoyable than previous epidemics. Although influenza is one of the more most debilitating illnesses, many if not most individuals with Barth syndrome have had flu infections in the past without precipitating cardiac disease and, as far as I am aware, without being followed by an unusually high incidence of bacterial pneumonia. Nevertheless, children and adults with Barth syndrome should be included among the high-risk groups recommended for immunization against influenza.

General Prevention Measures:

Because flu-infected individuals can spread the virus for 24 hours or more before symptoms develop, isolation at home from all potential flu sources is the best way to prevent transmission to an at-risk individual. Flu viruses can be transmitted both by droplet (from coughing) and by direct contact with contaminated sources. If there is an outbreak of 2009 H1N1 in your area, hand washing with soap and water or an alcohol-based sterilizing gel should be done regularly, especially after coughing or touching the mouth or nose. Those who have flu or a flu-like illness should remain at home and isolated until a full 24 hours after full resolution (i.e., off any fever-reducing medication) of the fever. In most cases, fever lasts from 3 to 5 days. Masks other than those certified for infection control (large, heavy, and very hot) have not been proven effective in limiting the spread of flu. The CDC is not currently recommending closing of regular schools with outbreaks of 2009 H1N, because, once there has been an outbreak in a school, the illness is assumed to be or shortly to be widespread in the community, and closing the school would have little effect on the spread of the virus in the community. However, you may want to have your child's physician write a letter or complete the necessary forms allowing a child with Barth syndrome to stay home secluded from all contact outside the family for the duration of the outbreak, especially if there have been recent cardiac problems.

Influenza Vaccines:

The standard trivalent "seasonal" influenza vaccine is now available and should be given to all Barth individuals for whom such vaccination is otherwise safe (e.g., no egg allergy). The new 2009 H1N1 vaccine will not be available until mid October, which could be after most susceptible individuals in the population have had the illness. The last week of August saw a sharp increase in the number of reported 2009 H1N1 cases in several regions, so the 2009 H1N1 vaccine may indeed come too late for most. When it is ready, however, the 2009 H1N1 vaccine should be given just like the seasonal trivalent vaccine. Assuming there will be limited supplies when first available, the priority of administration of the 2009 H1N1 vaccine will be 1) healthcare workers, 2) pregnant women, 3) children under 5 years, 4) children and young adults 6 to 24 years, and 5) adults from 25 to 65 years.

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There are many who have not forgotten the last “swine flu” epidemic of 1976 and the reported increased incidence of the neurological disorder, Guillain-Barr syndrome, in those given the 1976 H1N1 vaccine that was prepared for an anticipated epidemic that never materialized (again, viruses evolve rapidly). Although that experience has increased concern in the public about the safety of the 2009 H1N1 vaccine, such concern is unfounded, and the reality of a 2009 H1N1 pandemic this time has already materialized. Experts still debate whether or not the 1976 H1N1 vaccine caused Guillain-Barr syndrome, and, at most, there was only one additional case of Guillain-Barr syndrome per million individuals vaccinated. Vaccine technology has advanced greatly since then, and in no other years has there been an association between flu vaccination and any neurological disease. Moreover, while the 2009 H1N1 vaccine will be “new,” it is produced exactly the same way that the regular seasonal flu vaccine has been prepared for many years. The need for a separate 2009 H1N1 vaccine is that the new virus emerged after the standard trivalent vaccine for the 2009-2010 season was in production. The late arrival of the 2009 H1N1-specific vaccine is due to slow growth of the 2009 H1N1 virus and the need to conduct thorough field-testing of the five different 2009 H1N1 vaccines being produced.

Some people have been worried about the addition to the H1N1 vaccine of the “adjuvant” (an immune system stimulator) “squalene” thinking that it is a foreign chemical, something akin to Thimerosal used in other vaccines. Squalene, however, happens to be one of the most abundant lipids in human skin (specifically the epidermis), and some squalene gets poked beneath the surface with every mosquito bite. In addition, although there was a single case last year of child with an intrinsically unstable mitochondrial disorder very different from Barth syndrome who worsened after getting FluMist (a live attenuated [weakened] flu virus given by mist inhalation), there is no proof that FluMist caused deterioration in that child, and no similar events have been reported since. While this unexplained event have caused some to avoid FluMist, if a Barth individual had an egg allergy and, therefore, could not get the regular 2009 H1N1 vaccine, he should be given FluMist if an H1N1 form is cleared for use later this fall. However, FluMist is approved for use only in children older than 9 years.

Antiviral Medications

Oseltamivir (Tamiflu) and zanamivir (Relenza) remain effective against most strains of 2009 H1N1, but they are not benign medications and should be given only when there has been direct exposure to a laboratory proven or physician-confirmed case of influenza. Both Tamiflu and Relenza have a not insignificant incidence of central nervous system and allergic reactions, and some who start a course of one of these antivirals stop after a few days because of the side effects. Although all circulating H1N1 viruses other than 2009 H1N1 are resistant to Tamiflu, either Tamiflu (capsule) or Relenza (mist) can be given if the virus strain is unknown, at least in the early months this fall, since the resistant strains of H1N1 usually do not appear until December. Currently, Relenza is not approved for children less than 8 years, and Tamiflu is not approved for those less than one year. However, for the current epidemic, the FDA has approved the use of Tamiflu for infants less than 12 months, if medically indicated.

As recommended by the CDC and WHO, antiviral medications should be prescribed to children under age 5 years and individuals of all ages with existing medical problems that increase their risk for morbidity and mortality from influenza. In all situations, however, the ultimate decision whether or not to treat a child with an antiviral drug rests with the child’s primary physician, who will be best able to make such a decision based on up-to-date regional information and CDC guidelines for antiviral use. The only certainty about antiviral treatment is that after 2009 H1N1 has arrived in a community, any flu-like illness in a high-risk individual should be treated with an antiviral drug before laboratory confirmation of influenza. Prophylactic treatment after direct contact of an at-risk patient with a flu-infected individual also is advisable, but, again, one’s local physician rather than a specialist is one who should determine if a certain exposure carries sufficient risk to warrant treatment.

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Other sources of information.

For those who have not yet bookmarked www.flu.gov, that is the portal to sound epidemiologic and medical information about the epidemic in the US. Some of the following specific links can be reached through www.flu.gov, whereas others are directly from the CDC and WHO websites.

<http://www.flu.gov/professional/school/k12techreport.html> - Guidelines for how schools should prepare for and handle a 2009 H1N1 outbreak

<http://www.flu.gov/whereyoulive/index.html> - Links to regional flu information. Quality of information varies greatly by state.

<http://www.cdc.gov/h1n1flu/update.htm> - Frequently updated basic information on the status of the H1N1 influenza pandemic in the US.

<http://www.cdc.gov/flu/weekly/> - A more detailed, weekly statistical summary of 2009 H1N1 – (for those who like charts and graphs)

http://www.cdc.gov/h1n1flu/vaccination/public/vaccination_qa_pub.htm - Regular updates on the 2009 H1N1 vaccine

http://www.who.int/csr/disease/swineflu/notes/h1n1_use_antivirals_20090820/en/index.html - Use of antiviral medications.

For those outside the US, the best starting point for information is the World Health Organization:

WHO Influenza website: <http://www.who.int/csr/disease/swineflu/en/> (language picks at the top)

European region: <http://www.euro.who.int/influenza/ah1n1>

African Region: <http://www.afro.who.int/ddc/influenzaa/index.html>

BSF does not endorse any drugs, tests, or treatments that we may report. This document is for informational purposes, always check with your physician before adopting any medical treatment.

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