

EDITORIAL

Pandemic Preparedness for Swine Flu Influenza in the United States

Richard F. Edlich, MD, PhD,^{1} Shelley S. Mason, BS,² Jill J. Dahlstrom,² Erin Swainston, BA,² William B. Long, III, MD,³ & K. Dean Gubler, DO, MPH⁴*

¹University of Virginia Health System, Charlottesville, VA; ²MS Research Fund, Brush Prairie, WA; ³President and Medical Director, Trauma Specialists, LLP, Portland, OR; ⁴Director of Critical Care Medicine, Trauma Specialists, LLP, Portland, OR

*Address all correspondence to Richard F. Edlich, MD, PhD, 22500 NE 128th Circle, Brush Prairie, WA 98606; richardedlich@gmail.com

In March and early April 2009, Mexico experienced outbreaks of influenza caused by the H1N1 virus, which has spread throughout the world. With the pandemic of H1N1 infections, we have discussed in this scientific article strategies that should limit the spread of the influenza A (H1N1) virus in our country. Specific vaccines against the influenza H1N1 virus are being manufactured, and a licensed vaccine is expected to be available in the United States by mid-October 2009. However, some health-care workers may be hesitant to take a vaccine because it contains a mercury preservative—thimerosal—which can be harmful to their health. When caring for patients with respiratory infections, the health-care worker should be wearing a facial respirator. In a report from the Centers for Disease Control and Prevention (CDC), it was indicated that each health-care professional should be required to do a respiratory fit testing to identify the ideal model. Because it has been well documented that a vitamin D deficiency can precipitate the influenza virus, we strongly recommend that all health-care workers and patients be tested and treated for vitamin D deficiency to prevent exacerbation of a respiratory infection.

KEY WORDS: Influenza A (H1N1), vaccine, N95 respirator, vitamin D deficiency

Introduction

In March and early April 2009, Mexico experienced outbreaks of influenza caused by the H1N1 virus, which has spread throughout the world.¹ On July 31, 2009, the U.S. Centers for Disease Control and Prevention (CDC) updated

the H1N1 situation on its website, saying that as of July 30th, 5514 hospitalized cases and 323 deaths from 47 states and territories have been reported to the agency.² With the pandemic of H1N1 infections, we have discussed in this scientific article three strategies that should limit the spread of the influenza A (H1N1) virus in our

country. These include the following: (1) Influenza H1N1 vaccination; (2) modernization of hospital equipment and protocols to prevent the spread of viral infection within hospitals; and finally (3) diagnosis and treatment of vitamin D deficiencies in patients and health-care workers.²

Vaccination

Influenza vaccination is the most effective method for preventing influenza and influenza-related complications. However, current seasonal influenza vaccines are not likely to provide protection against novel influenza A (H1N1) virus.¹ Specific vaccines against the influenza H1N1 virus are being manufactured, and a licensed vaccine is now available in the United States.² The CDC's Advisory Committee on Immunization and Practices (ACIP) recommends that certain groups at highest risk for infection or influenza-related complications should be the initial targets for the vaccination.² The CDC identified five initial target groups for vaccination: (1) pregnant women, (2) persons who live with or provide care for infants younger than 6 months, (3) health-care and emergency medical services personnel, (4) children and adults aged 6 months to 24 years, and (5) persons aged 25–64 years who have medical conditions that put them at higher risk for influenza-related complications.² The government and hospitals are considering making H1N1 influenza vaccination mandatory for all health-care workers.³

The authors of this article can understand that many health-care workers would be hesitant to have the H1N1 influenza vaccination because this vaccine may contain a thimerosal preservative that contains mercury. We have documented the adverse effects of this mercury preservative in vaccines.⁴

In a report by O'Reilly in Bloomberg.com, it was emphasized that a group of New York doctors and health-care workers who are to be among the first inoculated against swine flu asked a federal judge to void U.S. approval of the vaccine until more safety tests are done.⁵ In this lawsuit, the petitioners claim a state law requires them to get the vaccine, putting their health at risk from an unproven treatment and their livelihoods at risk if they refuse to take

the vaccine. The petitioners asked the judge to issue an immediate order barring approvals of A/H1N1 vaccines until all legally required testing is conducted, and an order preventing New York from firing health-care workers if they refuse to take the vaccine.

Modernization of Hospital Equipment and Protocols To Prevent the Spread of Viral Infection Within Hospitals

The outbreak of influenza H1N1 infections has come as a surprise to many health-care professionals and has focused considerable attention on respiratory protection preparedness for health-care workers. Hospitals have been implementing a formal CDC and Occupational Safety and Health Administration (OSHA) required respiratory program throughout the country. The CDC recorded 48 reports of confirmed or probable influenza H1N1 infections among health-care professionals from 18 states.⁶

When caring for patients with respiratory infection, the health-care worker should be wearing a facial respirator. Respirators should not be confused with surgical masks. Respirators decrease exposure to airborne contaminants, whereas surgical masks do not. Surgical masks are merely a physical barrier for large particles and body fluid. The most widely used respiratory device is the N95 model, which is disposable and costs \$1.⁷ In the report from the CDC, it was indicated that every health-care professional should be required to do a respiratory fit testing to identify the ideal model. A fit test is used to assess whether a specific type, model, and size of respirator can adequately fit a specific individual. In all cases, the individual should be fit tested in the same make, model, and size of respirator that they will actually use later. OSHA requires the fit test to be repeated annually for each health professional.⁸

Diagnosis and Treatment of Vitamin D Deficiency in Patients and Health-Care Workers

In 1981, R. Edgar Hope-Simpson was the first to document that influenza epidemic in temperate

latitudes peaks in the month following the winter solstice.⁹ In both hemispheres, influenza rates increase significantly for about two months on either side of its peak.⁹ Cannell et al.¹⁰ pointed out that solar radiation triggers robust seasonal vitamin D production in the skin, which explains why vitamin D deficiency is common in the winter. Sun exposure activates vitamin D, 1,25(OH)₂D (Fig. 1), a steroid hormone that has profound effects on human immunity.¹⁰ Activated vitamin D acts as an immune system modulator, preventing excessive expression of inflammatory cytokines and increasing the activity of macrophages.¹⁰ In volunteers inoculated with live attenuated influenza virus, Cannell et al. noted that they are more likely to develop fever and serologic evidence of immune response in the winter.¹⁰ They emphasize that ultraviolet radiation (either from artificial sources or from sunlight) decreases the incidence of viral respiratory infection.¹⁰

Ginde et al.¹¹ studied the relationship between 25(OH) D levels and recent upper respiratory tract infections in 18883 participants in the Third National Health and Nutrition Examination. Compared to individuals with serum 25(OH) D levels > 30 ng/mL, they reported that those with levels > 10 ng/mL had 55% higher chances of a recent upper respiratory tract infection. In addition, very recent evidence indicated that a 25(OH) D level of even 30 ng/mL often indicates chronic substrate starvation.¹²

The blood vitamin D levels that are considered to be optimal to prevent vitamin D deficiency are 50–75 ng/mL of 25(OH)D.¹³ According to Heaney,¹⁴ the optimal dose of vitamin D for adults is 4000–5000 IUs daily in an effort to maintain the optimal D level. When our patients go to have their measurements of blood vitamin D levels, we refer them to LabCorp (Burlington, NC), which uses the reliable DiaSorin® tests for checking vitamin D levels.

Discussion

It has been well documented that a pandemic of H1N1 influenza will challenge our health-care system in 2009. Fortunately, our health-care system is getting ready to meet this challenge with exciting scientific innovations. A vaccine will be developed and certified by the Food and Drug Administration (FDA) to be administered to persons at risk in our country. Many health-care workers may be hesitant to get the vaccine because most vaccines contain a mercury preservative that can be harmful to their health. It is uniformly agreed that there should be facial respirators for all health-care workers who may be exposed to the H1N1 influenza virus. A fit test for the respirator is mandatory annually for all personnel utilizing this device to ensure optimal protection against the influenza virus.

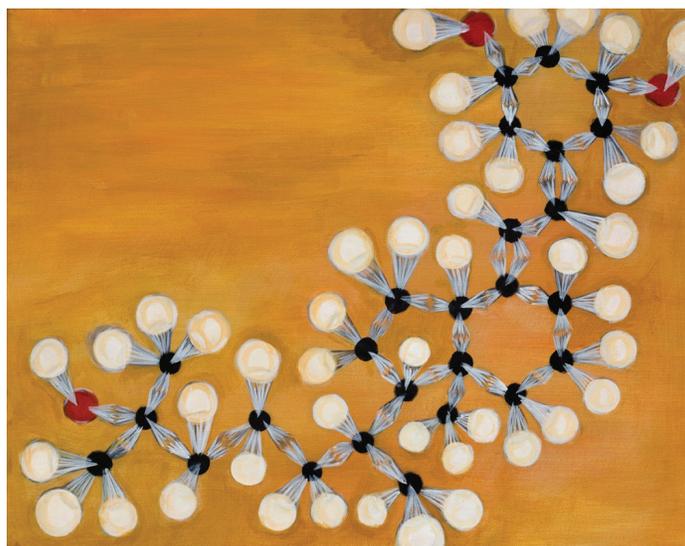


FIGURE 1. Scientific rendition of 1,25(OH)₂D by Shelley S. Mason.

It is important to acknowledge the scientists and physicians who have awakened our health professionals to the association of vitamin D deficiency and the individual's susceptibility to dangerous viral respiratory infections. Monitoring the blood concentration of vitamin D is being encouraged to detect vitamin D deficiency and treat this condition with a vitamin D supplement.

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