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Official publication of the Wisconsin Medical Society

fighting the flu:

what we've learned about H1N1 and more

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COVER THEME
Fighting the flu: What we've learned about H1N1 and more

Effective response to influenza requires background knowledge about the virus as well as up-to-date public health surveillance data. This issue of the Journal *offers a better understanding of the epidemiology, clinical characteristics, diagnosis, prevention, and management of both seasonal and H1N1 influenza –essential elements of effective patient care.*

Cover design by Mary Kay Adams-Edgette.

The mission of the *Wisconsin Medical Journal* is to provide a vehicle for professional communication and continuing education of Wisconsin physicians.

EDITORIAL

COMMENTARY

ORIGINAL CONTRIBUTIONS

CASE REPORTS

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Comments on 'The Worst Doctor in the Worst Clinic'

I liked your editorial entitled "The Worst Doctor in the Worst Clinic." (*WMJ.* 2010;109[3]:123-124.) Even more so, I am glad that you published it. It needs to be said, many times and in many ways.

The primary care environment continues to get worse. In my practice, we were just told that we were getting an "increase in salary at the expense of the specialists." When I looked at the numbers, however, we are in reality seeing approximately 15% to 20% more patients to make 10% more dollars compared to 4 years ago; ie, we are getting paid less per unit of work. Primary care is going to hit a crisis point in this country, and just creating more residency slots and underserved area funding, as highlighted in the new health reform bill, is not going to fix it.

As noted in Dr Frey's article, the solution is not to just pay primary care doctors more, it is to pay them differently. We went into this profession to take care of patients, not do office visits. And we want to do it in a thorough, thoughtful and proactive fashion, rather than a piecemeal, reactive, and recovery fashion.

The best idea I have come up with to accomplish this agrees with Dr Frey's suggestion: pay primary care docs a dependable salary, perhaps through a per-patient-per-month approach, and then allow innovation and time for paperwork, phone calls, e-mails, population health initiatives and other efficient care measures.

We need to get paid to take good care of patients, not just see them in the office. Then we will see real advances in provider and patient satisfaction, costs and outcomes.

Thanks for spreading the word.

Paul Hartlaub, MD, Brown Deer

• • •

I have read the *Wisconsin Medical Journal* since 1946 and am writing to congratulate you on your editorial in the June issue. It ranks first in my opinion of all that I have read, since it pinpoints one of the saddest changes that has occurred during that time.

I look back with pride at when we at the Marshfield Clinic adopted the philosophy that we all worked hard and pay should be based on that, not productivity. So we adopted in 1953 the so-called equal salary plan, with all doctors, after a few years, getting the same salary. It was what made us successful, but outside pressure in radiology brought it to a close in 1980.

The only important thing today is to use your editorial to change or modify the system. The only way I see to accomplish this is by the profession. I would hope that the Wisconsin Medical Society would accept this challenge, set up a study group charged with coming up with a compromise solution and then taking that to government, which is the only organization with the power to make this vital change. Primary care physicians have been the backbone of good medical practice forever, and if we can't work out a program to pay them properly, our quality by all measures will fall.

Congratulations, and thank you for highlighting a vital issue to the future of medicine.

Russell J. Lewis, MD, Marshfield

'The Flu'

John J. Frey, III, MD
Medical Editor, Wisconsin Medical Journal

Before antiviral agents, the diagnosis of influenza was clinical history and physical examination, and management was supportive and symptom-specific. New methods of diagnostic testing for specific Influenza serotypes have made it easier to tell what one ***has*** and to treat it, versus waiting many weeks to find out which virus one ***has***, helping differentiate among the many cough/sore throat/myalgia/nasal congestion symptom clusters we see in primary care.

But the increasing possibility of early diagnosis and treatment, along with the potential for significant morbidity and mortality of newer strains of influenza, has created not only a new mask and hand washing industry but also made primary care clinicians much more inclined to want to look at both what happened in the past year and what to anticipate for the future. This issue of the *Wisconsin Medical Journal (Journal)* has lots of important information based on Wisconsin's H1N1 experience from 2009 to 2010.

Temte and Prunuske offer a current review of influenza that updates both old and new information for physicians and learners alike.[1] Rezkala and Kloner offer a review of viral myocarditis,[2] a complication of influenza that has been important and continuing and, if there were to be another pandemic, might take a more significant place in both hospital and outpatient care. We think more often of pulmonary complications but, as they point out, the diagnosis and management of myocarditis can be delayed and should be on the minds of all of us in the coming season.

In an important "first look" paper, Davis and colleagues[3] report the factors that predisposed patients to being hospitalized with H1N1 in the most recent flu season. Their work has important ramifications for the entire health system, not just primary care. Their finding that a disproportionate number of minorities of all types were hospitalized compared to white patients is another area of health disparities in the state. Fortunately, the morbidity and mortality of H1N1 hospital admissions was no worse among all subpopulations. But along with being under 1 year of age and from a minority group, comorbitidies such as asthma, lung disease of any type, and obesity raise access issues for immunizations and management of chronic illness for those most vulnerable for hospitalization. In an era where every practice in the state could use basic practice population data from their billing and EHR to target high risk populations for outreach and early care, we should be finding those at risk in our practices and our communities ***now***, not after the fact. The result would be not only a decrease in hospitalization but a very large savings in unnecessary hospital costs.

Finally, in the *Journal's* new "Health Innovations" section, Young describes an effort to use the EHR[4] to get the most up-to-date management suggestions in front of primary care clinicians that, if used properly, can improve quality and decrease variability in treatment of H1N1. He demonstrates how clinicians, with the proper education and support, can change behavior in their practices. Health Innovations is where we will publish similar ideas for quality improvement and patient care.

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WISCONSIN MEDICAL JOURNAL

Seasonal Influenza in Primary Care Settings: Review for Primary Care Physicians

Jonathan L. Temte, MD, PhD; Jacob P. Prunuske, MD, MSPH

ABSTRACT

Context: Influenza is a common and significant respiratory pathogen in primary medical care. Better understanding of influenza epidemiology, clinical characteristics, prevention, and management is essential for effective ambulatory care.

Evidence Acquisition: Review of the current literature was performed through PubMed queries and based on the authors' background and experience with influenza. In addition, summary data were presented from existing surveillance of influenza in Wisconsin.

Results: Seasonal influenza presents in annual epidemics with significant features of fever and cough. Prevention can be achieved through avoidance, influenza vaccine, and chemoprophylaxis. Diagnoses can be made on clinical grounds when appropriately supported by public health surveillance. Other diagnostic methods have limited use in primary care. Antiviral medications can have significant effects on illness course if started early, but may be limited by resistance.

Conclusions: Influenza is commonly prevented, diagnosed, and treated in the primary care arena. A combined approach to influenza response requires background knowledge on influenza epidemiology, prevention, diagnosis, and management, coupled with up-to-date information based on public health surveillance.

INTRODUCTION

Influenza is a significant and ubiquitous respiratory pathogen in humans. Despite great familiarity with this common infection, influenza never fails to surprise even the most seasoned observer. Primary care clinicians are on the front line for implementing influenza prevention and control efforts. An understanding of the basic concepts[1] will enhance the primary care physician's ability to better anticipate, provide prophylaxis against, and respond to seasonal and pandemic influenza, thereby contributing to public health efforts.

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BASIC EPIDEMIOLOGY OF INFLUENZA

Influenza A and B viruses consist of 8 single strands of RNA enveloped in a lipid/glycolprotein membrane studded with 2 dominant and antigenic proteins.[2] Hemaglutinin (H), with 16 known antigenic types in human influenza A, allows attachment of the virus to host respiratory mucosa. Neuraminidase (N), with 9 antigenic types, allows the budding and separation of newly formed influenza viruses from the host cell.

Antigenic Drift

Influenza A viruses are prone to mutation.[3,4] Conversely, the genome of influenza B is more highly conserved. Mutations in the genes coding for either H or N proteins can alter their antigenic character. Slight to significant changes occur in surface antigens of influenza A viruses over time making antibodies formed during past infection or prior immunization for a given H or N antigen less effective. As a consequence, antigenic drift reduces previously acquired immunity, thus necessitating annual vaccination to adequately protect against circulating influenza viruses.

Antigenic Shift

Antigenic shift occurs with reassortment of 2 or more influenza A genomes within a host cell that is simultaneously infected.[3] This shift can produce novel combinations of H and N, along with genetic material that can confer significant virulence and pathogenicity. A significant antigenic shift is accompanied by very low rates of naturally occurring immunity and sets the stage for pandemic spread of influenza.

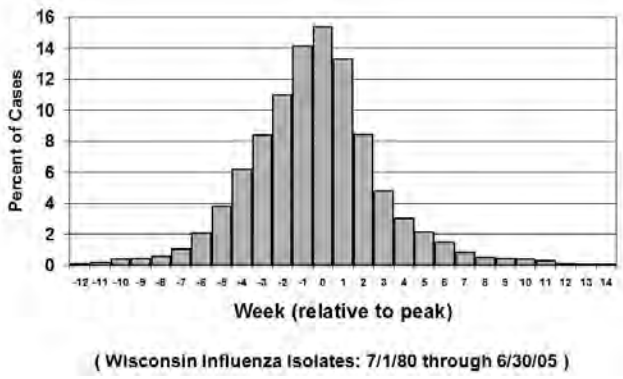

Figure 1. The shape of a typical influenza epidemic curve based on the 25-year average of influenza A in Wisconsin.

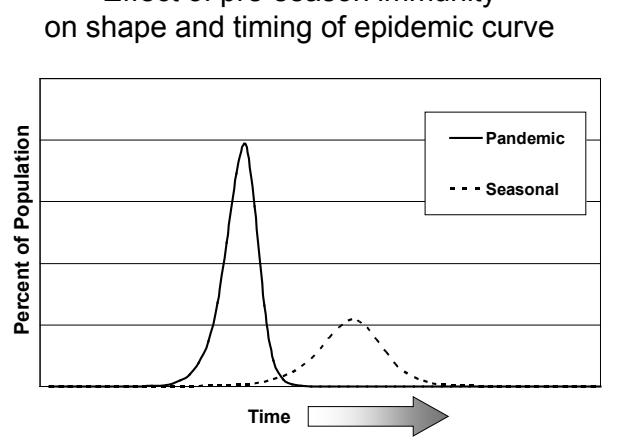

Figure 2. The theoretical effect of altering population immunity on the shape of the epidemic curve in the subsequent influenza season. (Unpublished model based on Wisconsin influenza A data.)

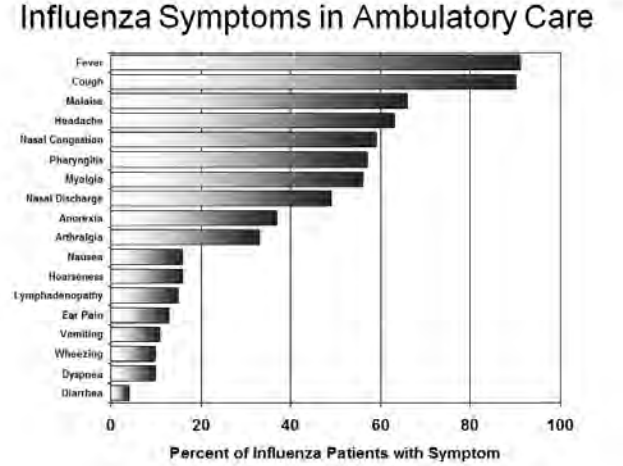

Figure 3. Symptoms associated with influenza A and B infections within primary care populations. (Unpublished data from the Wisconsin State Laboratory of Hygiene.)

Antigenic Gift

Influenza viruses have reservoirs within a wide variety of other mammalian and avian hosts, including domesticated animals such as swine and poultry. On occasion, influenza will jump species and produce significant human infection such as the smoldering avian influenza A(H5N1) zoonoses occurring in southeast Asia.[5]

Transmission Characteristics

Like most respiratory viruses, influenza is spread from person to person through respiratory droplets.[3,6] An individual with influenza can shed virus from 1 day before to 5-6 days after symptom onset. Peak shedding occurs with the peak of symptoms during day 2 or 3 of clinical illness.[7] Prolonged shedding, however, can occur in patients hospitalized with severe disease.[8]

Seasonality and Timing

Influenza is a highly seasonal virus with most transmission limited to late fall and winter across temperate latitudes.[3,6] Cool, dry air facilitates transmission in laboratory studies.[9] This results in peak influenza activity in late January and early February in the United States.[10] On average, initial cases are detected 12 weeks prior to the peak and continue for 14 weeks following the peak. An estimated 86% of cases occur during a 9-week period within a given locality (Figure 1). High levels of surveillance, however, such as during the 2009 pandemic of influenza A (H1N1), can detect low levels of community transmission of non-pandemic influenza viruses even during summer months.[11]

Pandemics of Influenza

Antigenic shifts or "gifts" (zoonoses) can result in the introduction of novel antigenic combinations for which there is no pre-existing immunity (Figure 2). Widespread and explosive outbreaks can occur at unexpected times of the year, circling the globe in a matter of weeks.[12,13]

CLINICAL CONSEQUENCES OF INFLUENZA

Pathogenesis

After an incubation period averaging 1.4 days (range: 1-3 days),[14] desquamation of infected respiratory mucosa and ciliated cells initiates early local symptoms. Interluekin-6 and interferon-α levels peak at 2 days correlating with mucus production, temperature, and symptom scores.[15] This release of inflammatory cytokines results in the sudden onset of the pronounced malaise and fever characteristic of influenza infection.

Symptoms

Influenza-like illness (ILI) is defined as fever accompanied by a cough and/or sore throat.[10] Influenza

symptoms are well defined and include fever, cough, malaise, headache, nasal congestion, sore throat, and myalgia (Figure 3).[3,6,16] The positive predictive value of various clinical signs and symptoms generally support the use of fever with cough as an indicator of influenza illness when circulation has been confirmed in the community.[17,18]

Consequences

Most individuals have mild to moderate symptoms and either continue with their daily activities or return to these after a short absence. Nevertheless, uncomplicated influenza infection can be associated with prolonged peripheral airway dysfunction and hyper-reactivity lasting up to 7 weeks.[19] Emerging from numerous mild to moderate cases in the community are the estimated 226,000 annual influenza-related hospitalizations and 36,000 annual deaths.[10] While attack rates are highest for older children, adolescents, and young adults, hospitalization and case fatality rates are highest for infants, young children, and older adults.[10] The annual medical and indirect costs have been estimated at $10.4 billion and $76.7 billion, respectively.[20]

PREVENTION OF INFLUENZA

Prevention is the key in managing influenza. Prevention can generally be accomplished in 3 ways: avoidance, vaccination, and chemoprophylaxis.

Avoidance

Avoiding exposure to respiratory droplets prevents infection (Box 1). Because influenza can survive on dry inanimate surfaces for 1-2 days,[21] hand washing and the use of facemasks limit nosocomial spread by physicians and other health care workers (HCW) who often continue to work when infected with influenza.[22] HCWs with influenza symptoms, however, should simply refrain from working since they interact with individuals at high risk for influenza complication. A recent randomized, controlled study detected no differences in the protection offered by simple surgical masks and N-95 respirators in hospital settings.[23] Either soap and water or alcohol-based sanitizers are effective; antibacterial soaps are no more effective than standard products.[24]

Immunization

Vaccines are developed annually in anticipation of the 3 strains of influenza [A(H1), A(H3) and B] that will most likely be in circulation during the coming influenza season.[10] In addition, monovalent vaccines may be produced in response to pandemic threats such

Box 1. Tips for Avoiding Influenza

- Stay at least 3-6 feet away from sick people, farther if possible.
- Avoid touching your eyes, nose, or mouth, especially without washing your hands first.
- Stay away from crowded or confined spaces such as malls, subways, airplanes, or buses during influenza peaks.
- Avoid sharing food, drinking glasses, towels, or other personal care items with others.
- In the doctor's office, keep your distance from other patients who may be ill.
- Use a facemask to reduce contact with respiratory droplets.
- Use a facemask to reduce spreading influenza if you are ill.
- Use a humidifier to increase humidity as influenza virus thrives in dry air.

Additional Tips for Heath Care Workers

- Wash hands frequently.
- Get vaccinated as early as possible each year.
- Stay home if you have an influenza-like illness.

Box 2. Advisory Committee on Immunization Practices (ACIP) recommends annual influenza vaccination for the following individuals using an appropriate vaccine[10]

- Adults who want to reduce their risk of becoming ill with influenza or transmitting influenza to others
- All children 6 months to 18 years of age
- All adults ≥50 years of age
- Children and adolescents 6 months to 18 years of age receiving long-term aspirin therapy who might therefore be at risk for Reyes syndrome after influenza infection
- Women who will be pregnant during the influenza season
- Children, adolescents, and adults with chronic pulmonary (including asthma), cardiovascular (except hypertension), renal, hepatic, hematologic, or metabolic disorders (including diabetes mellitus)
- Children, adolescents, and adults who are immunosuppressed, including those receiving immunosuppressive drugs and those with HIV infection
- Children, adolescents, and adults with any condition that can compromise respiratory function or handling of respiratory secretions or increase the risk for aspiration (eg, cognitive dysfunction, spinal cord injuries, seizure disorders, other neuromuscular disorders)
- Children, adolescents, or adults who are residents of nursing homes and other chronic-care facilities
- Health care workers
- Household contacts and caregivers of children <5 years of age (especially contacts of children <6 months of age)
- Household contacts and caregivers of adults ≥50 years of age
- Household contacts and caregivers of individuals with medical conditions that put them at high risk for severe influenza complications

as for influenza A (H5N1) and influenza A (H1N1). Vaccination is now universally recommended by the Advisory Committee on Immunization Practices[25] and is especially important people at high risk for severe illness, hospitalization, or death from influenza, as well as their contacts and health professionals who can transmit illness to others (Box 2). Children aged 6 months to 8 years should receive 2 doses of vaccine, separated by 4 weeks, if they have not been vaccinated previously at any time or if, during the preceding year, they received a first and only influenza vaccine dose.

Influenza vaccination prevents death, hospitalizations, and physician visits in high-risk patients.[26] It is effective in elderly populations when the vaccine is well matched to the circulating influenza strains.[27] Vaccine reduces influenza-like illness, pneumonia, hospital admission, and influenza or pneumonia-related deaths in nursing home patients, and reduces the risk of hospitalization for influenza or pneumonia and risk of death among community-dwelling elderly persons. Vaccinating physicians and staff who provide care to elderly patients in nursing homes may also reduce nursing home resident mortality from pneumonia and all cause death.[28] Vaccine induced immunity persists in elderly, supporting early vaccination timing.[29]

In healthy adults, influenza vaccine reduces influenza and reduces work absence.[30] Vaccination of pregnant women decreases respiratory illness in the mother and reduces influenza in infants during the first 6 months of life.[31] Influenza vaccination of children in daycare or school may reduce morbidity in children and household contacts.[32,33] Live attenuated influenza vaccine appears to be more effective than the trivalent inactivated vaccine in preventing influenza in children.[34,35]

Chemoprophylaxis

Chemoprophylaxis is an option for patients who have either not been vaccinated or have had exposure to influenza in the 2 weeks following vaccination. Prophylaxis should be continued for at least 10 to 14 days following exposure in home settings and at least 1 week past the end of an institutional outbreak.[36]

The adamantine antivirals (amantadine and rimantadine) are active against influenza A; however, the Centers for Disease Control and Prevention (CDC) has advised not using adamantanes due to widespread resistance in A(H3) viruses.[37] Adverse effects with adamantanes include insomnia, light-headedness, nervousness, difficulty concentrating, delirium, hallucinations, and seizures, but are less common with rimantadine.

The neuraminidase inhibitors (oseltamivir and zanamivir) are generally effective against influenza A and B and may be more effective than the adamantanes in preventing influenza, but resistance patterns need to be kept in mind.[38] Adverse effects of oseltamivir include nausea, vomiting, and headache, while zanamivir is associated with nausea, vomiting, diarrhea, headache, respiratory tract irritation, and infection. Oseltamivir is FDA approved for children ≥1 year; reports of an association with adverse behavioral complications in children[39] have not confirmed in large cohort studies.[40,41] In the 2008-2009 season, high resistance to oseltamivir in seasonal A(H1) viruses emerged.[42] Zanamavir is FDA approved for children at least 5 years of age but is not recommended for patients with underlying airway disease. Oseltamivir, rimantadine, and amantadine doses must be adjusted for renal function.

CLINICAL MANAGEMENT OF INFLUENZA

Successful management of patients presenting with ILI depends on the clinician's situational awareness, diagnostic approach, advice for supportive measures, and judicious use of antiviral medications.

Awareness

Perhaps the greatest impediment to the appropriate management of influenza is the failure to recognize this common pathogen as a primary cause of fever and cough. This is evidenced by the 86-fold range in state-by-state estimates of H1N1 incidence during 2009.[43] The key is awareness of community patterns of disease. Excellent surveillance information is available from the CDC (FluView: www.cdc.gov/flu/weekly), many state and local public health departments, and novel tools such as Google FluTrends (www.google.org/flutrends).

Diagnosis

Diagnosis can be made on clinical grounds or through laboratory testing. Fever with cough in adults and children—when influenza is circulating in the community—is highly suggestive of influenza infection with a positive predictive value of 80%.[17,18,44] Laboratory approaches include rapid antigen tests for influenza (RATi), direct fluorescent antibody testing (DFA), polymerase chain reaction (PCR), and culture. Of these, only RATi are applicable to the time constraints of ambulatory care. In a recent comparative study, 6 commercially available RATi had sensitivities of 67% to 71% for influenza A and 30% for influenza B.[45] Specificities were uniformly high. Sensitivity, however, declines substantially with declining levels of virus in the respiratory mucosa[46] indicating the importance of timing specimen collection relative to the course of illness.

Table 1. Antiviral Dosing for Prophylaxis and Treatment of Influenza

Antiviral Agent		Age Group (years) 1-6	7-9	10-12	13-64	65 and Older
Zanamivir[a]	Treatment, influenza A and B	N/A[b]	10 mg (2 inhalations) twice daily	10 mg (2 inhalations) twice daily	10 mg (2 inhalations) twice daily	10 mg (2 inhalations) twice daily
	Chemoprophylaxis, influenza A and B	**Ages 1-4** N/A	**Ages 5-9** 10 mg (2 inhalations) once daily	10 mg (2 inhalations) once daily	10 mg (2 inhalations) once daily	10 mg (2 inhalations) once daily
Oseltamivir	Treatment[b], influenza A and B	Dose varies by child's weight[c]	Dose varies by child's weight[c]	Dose varies by child's weight[c]	75 mg twice daily	75 mg twice daily
	Chemoprophylaxis, influenza A and B	Dose varies by child's weight[d]	Dose varies by child's weight[d]	Dose varies by child's weight[d]	75 mg/day	75 mg/day
Amantadine[e]	Treatment, influenza A	5 mg/kg body weight/day up to 150 mg in 2 divided doses[f]	5 mg/kg body weight/day up to 150 mg in 2 divided doses[f]	100 mg twice daily[g]	100 mg twice daily	≤100 mg/day
	Prophylaxis, influenza A	5 mg/kg body weight/day up to 150 mg in 2 divided doses[f]	5 mg/kg body weight/day up to 150 mg in 2 divided doses[f]	100 mg twice daily[g]	100 mg twice daily[c]	≤100 mg/day
Rimantadine[h]	Treatment,[i] influenza A	N/A[j]	N/A	N/A	100 mg twice daily[g,k]	100 mg/day
	Prophylaxis, influenza A	5 mg/kg body body weight/day up to 150 mg in 2 divided doses[f]	5 mg/kg body body weight/day up to 150 mg in 2 divided doses[f]	100 mg twice daily[g]	100 mg twice daily[c]	100 mg/day[l]
Duration of Treatment		Recommended duration for antiviral treatment is 5 days.				
Duration of Chemoprophylaxis		Recommended duration is 5-7 days after the last known exposure. For control of outbreaks in long-term care facilities and hospitals, CDC recommends antiviral chemoprophylaxis for a minimum of 2 weeks and up to 1 week after the last known case was identified.				

(http://www.cdc.gov/flu/professionals/antivirals/dosagetable.htm)

[a] Zanamivir is administered through oral inhalation by using a plastic device included in the medication package. Patients will benefit from instruction and demonstration of the correct use of the device. Zanamivir is not recommended for those persons with underlying airway disease.

[b] A reduction in the dose of oseltamivir is recommended for persons with creatinine clearance less than 30 mL/min.

[c] The treatment dosing recommendation for children who weigh <15 kg is 30 mg twice a day. For children who weigh >15 kg and up to 23 kg, the dose is 45 mg twice a day. For children who weigh >23 kg and up to 40 kg, the dose is 60 mg twice a day. For children who weigh >40 kg, the dose is 75 mg twice a day.

[d] The chemoprophylaxis dosing recommendation for children who weigh <15 kg is 30 mg once a day. For who weigh >15 kg and up to 23 kg, the dose is 45 mg once a day. For children who weigh >23 kg and up to 40 kg, the dose is 60 mg once a day. For children who weigh >40 kg, the dose is 75 mg once a day.

[e] The drug package insert should be consulted for dosage recommendations for administering amantadine to persons with creatinine clearance ≤50 mL/ min/1.73m^2.

[f] 55 mg/kg body weight of amantadine or rimantadine syrup = 1 tsp/22 lbs.

[g] Children aged 10 years and older who weigh <40 kg should be administered amantadine or rimantadine at a dosage of 5 mg/kg body weight/day.

[h] A reduction in dosage to 100 mg/day of rimantadine is recommended for persons who have severe hepatic dysfunction or those with creatinine clearance <10 mL/min. Other persons with less severe hepatic or renal dysfunction taking 100 mg/day of rimantadine should be observed closely, and the dosage should be reduced or the drug discontinued, if necessary.

[i] Only approved by Food and Drug Administration (FDA) for treatment among adults.

[j] Not applicable.

[k] Rimantadine is approved by the FDA for treatment among adults. However, certain specialists in the management of influenza consider rimantadine appropriate for treatment among children. Studies evaluating the efficacy of amantadine and rimantadine in children are limited, but they indicate that treatment with either drug diminishes the severity of influenza A infection when administered within 48 hours of illness onset.

[l] Older nursing-home residents should be administered only 100 mg/day of rimantadine. A reduction in dosage to 100 mg/day should be considered for all persons aged 65 years and older, if they experience possible side effects when taking 200 mg/day.

Table 2. Key Recommendations for the Clinician

Recommendation	SORT[a]	References
Immunization is highly effective in preventing influenza	A	26,27,30,31,34
Chemoprophylaxis with antiviral medications can prevent influenza	A	38
Influenza can be diagnosed based on symptoms of fever and cough when influenza is present in the community	B	17,18,44
Antiviral medications are effective in reducing the symptoms and illness duration of influenza	A	38,48,51,52,53
Antiviral medications are limited by timing of initiation	B	54
Antiviral medications are limited by resistance	C	37,42
Public health surveillance can assist in diagnosis and rational choice of antiviral	C	17,18,44,55

[a]Strength of Recommendation Taxonomy: A – Recommendation based on consistent and good-quality patient-oriented evidence; B – Recommendation based on inconsistent or limited-quality patient-oriented evidence; C – Recommendation based on consensus, usual practice, disease-oriented evidence, case series for studies of treatment or screening, and/or opinion.

Box 3. Case Presentation

In mid-March 2008, a 64-year-old man with a history of mild asthma presented to the emergency department (ED) of a hospital with complaints of progressive dyspnea and fever. He started feeling ill 24 hours ago after returning home from a cruise in Florida. In the ED, he was noted to have a temperature of 102.2ºF. He was slightly tachycardic with a pulse rate of 104. Oxygen saturation on room air was 86%, rising to 96% with 2 liters/minute of oxygen per nasal cannula. A chest X-ray showed questionable hazy infiltrates. He was provided intravenous fluid and started on piperacillin/tazobactam by the ED physician for a presumptive pneumonia.

The admitting family physician noted the abrupt onset of symptoms, the lack of definite consolidation on the chest X-ray (CXR), and the presence of an influenza-like illness during a period of circulation of multiple strains of influenza. A nasopharyngeal swab was obtained for influenza testing. Due to knowledge of circulating strains and antiviral resistance patterns, the family physician empirically started the patient on oseltamivir and amantadine.

By the following morning, the patient felt significantly improved. He no longer required oxygen. A direct fluorescent antibody test was positive for influenza A, and he was discharged to home that morning with a continuation of oseltamivir and amantadine for a total of 5 days.

Supportive Measures

Most authorities recommend rest, fluids, and antipyretics as supportive measures for influenza. Antipyretics can reduce fever and myalgia and make the patient feel subjectively better. A systematic review indicated benefit from acetaminophen and ibuprofen in the management of acute sore throat.[47] Aspirin products should be avoided, especially in children, due to the risk of Reyes syndrome.

Antiviral Medications

Influenza antivirals can be effective in treating influenza infection, but their effectiveness is highly time dependent and complicated by the emergence of resistant strains. Moreover, their use should be based on the potential benefits from treatment. In large meta-analyses, these medications reduce the length of influenza illness, on average, by approximately 1 day.[48-53] For benefit, they have to be started within 36 to 48 hours of illness onset. Early initiation of therapy is associated with profound reductions in illness and return to full function.[54] Initiation of therapy prior to a clinical visit—in selected patients—may provide 1 avenue for early intervention.[55] There is emerging evidence that even antivirals started late in the course of hospitalized patient can reduce morbidity and mortality.[56]

The specific antivirals are discussed in the section on chemoprophylaxis; dosing is provided in Table 1. The adamantane antivirals are ineffective against influenza B viruses. Resistance to this antiviral class in influenza A(H3) viruses extended to 100% by 2009.[37] Accordingly, adamantanes should be used only for seasonal A(H1) viruses. Widespread resistance to oseltamivir by seasonal influenza A(H1) viruses was also noted in 2009.[42] Only zanamivir is effective against all strains of influenza, but is not recommended for children >7 years and in patients with respiratory problems such as asthma and chronic obstructive pulmonary disease (COPD).

The conundrum for the clinician, therefore, is choosing the correct antiviral therapy with insufficient information; there is no point-of-care test that will identify subtypes or resistance patterns. Consequently, empiric therapy must be based on up-to-date surveillance and a willingness to consider combination therapy (See Table 2).[57] An example of a case of influenza presenting to the emergency department is available in Box 3.

PUBLIC HEALTH SURVEILLANCE OF INFLUENZA EPIDEMIOLOGY

There is a long history of partnerships between primary care clinicians, local and state public health departments, public health laboratories, and the CDC Influenza Branch, resulting in a highly functional, accurate, and timely monitoring of influenza. The US Outpatient Influenza-like Illness Surveillance Network (ILINet) started in 1974 as a cooperative agreement between the CDC and the Ambulatory Sentinel Physician Network. Over the years, this program has grown to be an essential component of influenza surveillance in the United States.[58] When combined with virological surveillance, the ultimate product is highly accurate monitoring of influenza prevalence, strain assessment, and resistance patterns. Surveillance information available at www.cdc.gov/flu/weekly can assist the primary care clinician in making rational treatment decisions regarding patients presenting with fever and cough during the influenza season. Clinicians should also stay in close contact with their local and state health departments during the influenza season for a more detailed, local picture of influenza trends and recommendations.

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WISCONSIN MEDICAL JOURNAL

Epidemiologic and Clinical Features Among Patients Hospitalized in Wisconsin with 2009 H1N1 Influenza A Virus Infections, April to August 2009

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ABSTRACT

Background: During April 15 through July 23, 2009, Wisconsin reported the most confirmed and probable cases of 2009 influenza A (H1N1) virus (2009 H1N1) infection in the United States. Preliminary reports suggest that 2009 H1N1 infection disproportionately affected minority populations.

Methods: Prospective surveillance among all acute care hospitals in Wisconsin to detect patients hospitalized at least 24 hours with confirmed 2009 H1N1 infection during April 23 through August 15, 2009.

Results: During the study interval, 252 patients were hospitalized and 11 (4%) died. Statewide hospitalization rates by age, sex, and race/ethnicity categories were highest among patients aged <1 year (21.6/100,000), females (4.9/100,000), and African Americans (36.3/100,000). The median age was 28 years: Hispanics (median age=16 years) and African Americans (24 years) were younger than non-Hispanic whites (37 years) and Asians (38 years). African Americans were more likely to have a hematologic condition and be morbidly obese (BMI ≥40 kg/m^2), and less likely to be admitted to an intensive care unit compared to other race/ethnicity groups (P<0.05). Hispanics and non-Hispanic whites were more likely to have cancer, be non-morbidly obese (BMI 30–39.9 kg/m^2 or BMI percentile ≥95%), and be hospitalized for >5 days compared to African Americans and Asians (P<0.05). There were no significant racial/ethnic differences in time from illness onset to admission or receipt of antiviral therapy, need for mechanical ventilation, acute respiratory distress syndrome, or death.

Conclusions: The first wave of the 2009 H1N1 pandemic in Wisconsin disproportionately affected hospitalized patients who were African Americans, Asians, and Hispanics compared to non-Hispanic whites. Preventive measures focused on these populations may reduce morbidity associated with 2009 H1N1 infection.

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INTRODUCTION

During April 15 through July 23, 2009, an estimated 1.8 million to 5.7 million cases of 2009 influenza A (H1N1) virus (2009 H1N1) infection and 9000-21,000 related hospitalizations occurred in the United States.[1] During this same time period, there were 6222 confirmed and probable cases of 2009 H1N1 infection reported among Wisconsin residents, more than in any other state.[2] Collaboration between the Wisconsin State Laboratory of Hygiene (WSLH), City of Milwaukee Public Health Laboratory (CMPHL), Midwest Respiratory Virus Program Laboratory (MRVPL), and Marshfield Laboratories facilitated confirmatory testing of over 15,000 suspected case specimens during April 15 through July 23 (R.T. Heffernan, unpublished data, March 2010).

Because of the emergence of the novel 2009 H1N1 virus, the Wisconsin Division of Public Health (WDPH) greatly expanded its existing influenza surveillance program. This included a heightened surveillance for cases of 2009 H1N1 infection among hospitalized patients. The ability to accommodate the increased demand for testing, in combination with enhanced surveillance for hospitalized cases, resulted in a high degree of ascertainment of severe cases of 2009 H1N1 infection in Wisconsin.

This report summarizes the epidemiologic and

clinical features among all patients hospitalized at least 24 hours with confirmed 2009 H1N1 infection in Wisconsin during April 23 through August 15, 2009.

METHODS

Study Design

Prospective surveillance was conducted at all acute care hospitals in Wisconsin to detect patients hospitalized with confirmed 2009 H1N1 infection. Because novel influenza virus infections are reportable in Wisconsin, all hospitals, healthcare providers, and laboratories were required to report confirmed and probable cases of 2009 H1N1 infection to the WDPH. To maximize ascertainment of all hospitalized cases of 2009 H1N1 infection, WDPH staff were in weekly contact with local health departments and infection preventionists (IP) at Wisconsin acute care hospitals.

All cases included in the hospitalized cohort occurred in patients who were hospitalized for at least 24 hours and had 2009 H1N1 infection confirmed using a real-time reverse-transcriptase polymerase chain reaction (RT-PCR) assay. These assays were conducted at 1 of 4 laboratories in Wisconsin that were certified by the Centers for Disease Control and Prevention (CDC) to conduct confirmatory testing. The MRVPL developed and validated primers for detection of 2009 H1N1 infection,[3,4] and the other certified laboratories used primers provided by the CDC.

Patient medical records were reviewed and abstracted by an IP or 1 of 2 investigators (JKD, ST) initially using a 16-page case report form developed by CDC staff.[5] Later, an abridged version of the form developed by WDPH staff was used. Both forms included data on age, sex, race (eg, white, black, Asian, etc) and ethnicity (Hispanic or non-Hispanic), residential ZIP code, clinical signs and symptoms at presentation, underlying medical conditions, radiographic findings, treatment course, and dates of hospitalization, discharge, onset of symptoms, and initiation of antiviral therapy. This surveillance study was approved by the WDPH as a public health response to a novel influenza virus investigation and did not require approval by an institutional review board.

Data Analysis

Data analysis was conducted using SAS version 9.1. Incidence rates were calculated for Wisconsin residents using 2008 population estimates from the United States Census Bureau. Ninety-five percent confidence intervals for rate ratios were calculated using Poisson regression. For time calculations, the date of illness onset or date of hospital admission was considered to be day 0. The body mass index (BMI) was calculated for all non-pregnant patients aged at least 2 years for whom height and weight were available. Obesity is defined as a BMI ≥30 kg/m^2 among patients aged at least 18 years, or a BMI percentile ≥95% among patients aged 2 through 17 years. Obesity was further classified as non-morbid (BMI 30–39.9 kg/m^2 among patients aged at least 18 years, or obesity in patients aged 2 through 17 years) or morbid obesity (BMI ≥40 kg/m^2 among patients aged at least 18 years).

Differences in proportions were evaluated using either a Fisher's exact test or Pearson's chi-square test. A Student's t-test was used to compare differences in continuous variables. Analyses of trend were conducted using a Cochran-Mantel-Haenszel test. All reported *P*-values are 2-sided and were not adjusted for multiple testing.

RESULTS

Hospitalization Rates

During April 23 through August 15, 2009, 252 patients were hospitalized at least 24 hours with confirmed 2009 H1N1 infection in Wisconsin; 98% of these cases occurred among Wisconsin residents. Among age, sex, and race/ethnicity categories, statewide rates of hospitalization resulting from confirmed 2009 H1N1 infection were greatest among infants aged <1 year, females, and African Americans (Table 1). The median age among all patients in this cohort was 28 years (range=11 days - 85 years).

One hundred sixty-three (66%) patients with 2009 H1N1 infection were residents of the city of Milwaukee, where hospitalization rates were 17-fold greater overall and 5- to 8-fold greater among certain race/ethnicity groups compared to all other Wisconsin residents (Table 1). Among Wisconsin residents living within or outside the city of Milwaukee, hospitalization rates were several-fold greater among African Americans, Asians, and Hispanics compared to non-Hispanic whites.

Epidemiologic and Clinical Characteristics

Among the 252 hospitalized patients, 56% were female, 76% were aged <50 years, 48% were African American, 80% had a fever, 71% had a cough on admission, and 50% presented to a hospital within 48 hours after illness onset (Table 2). Patients aged <18 years were more likely than patients aged 18 to 49 and ≥50 years to be male (56%, 37%, 34%; P=0.01), have a fever (91%, 73%, 73%; P=0.004), or have vomiting or diarrhea (46%, 27%, 17%; P<0.001) at presentation, and were less likely to have nausea at presentation (1%, 13%, 11%; P=0.01).

Seventy-four percent of patients had at least 1 medical condition that was a risk factor for seasonal influenza, most commonly asthma (32%), diabetes (17%),

Table 1. Rates of Hospitalization Resulting from 2009 H1N1 Infection by Age, Sex, and Race/Ethnicity, Wisconsin and City of Milwaukee, April 23 - August 15, 2009

Category	Number (%)[a]	Rate[b]	Rate Ratio (95% CI)[c]
Wisconsin	**(N = 246)**	**4.4**	
Age			
<1 year	16 (7)	21.6	—
1-9 years	48 (20)	7.5	—
10-17 years	28 (11)	4.7	—
18-49 years	97 (39)	3.9	—
50-59 years	39 (16)	4.9	—
≥60 years	18 (7)	1.7	—
Sex			
Females	140 (57)	4.9	1.00
Males	106 (43)	3.8	0.77 (0.60-0.99)
Race/ethnicity[d]			
White, non-Hispanic	68 (28)	1.4	1.00
Black, non-Hispanic	120 (49)	36.3	25.56 (18.98-34.42)
Hispanic	39 (16)	13.6	9.60 (6.48-14.24)
Asian	19 (8)	16.8	11.85 (7.13-19.70)
City of Milwaukee	**(n = 163)**	**27.9**	
Race/ethnicity[d]			
White, non-Hispanic	14 (9)	6.0	1.00
Black, non-Hispanic	109 (67)	49.5	8.19 (4.70-14.29)
Hispanic	31 (19)	33.7	5.57 (2.96-10.47)
Asian	9 (6)	50.8	8.42 (3.64-19.45)
Wisconsin, excluding city of Milwaukee	**(n = 83)**	**1.6**	
Race/ethnicity[d]			
White, non-Hispanic	54 (65)	1.2	1.00
Black, non-Hispanic	11 (13)	10.0	8.42 (4.40-16.09)
Hispanic	8 (10)	4.1	3.48 (1.66-7.32)
Asian	10 (12)	10.5	8.86 (4.51-17.40)

[a] Number of patients hospitalized for ≥24 hours with confirmed 2009 H1N1 infection. Total patient counts only include patients who were Wisconsin residents. Excluded were 6 non-Wisconsin residents who were hospitalized in Wisconsin hospitals.
[b] Rate per 100,000 population of hospitalization resulting from 2009 H1N1 infection.
[c] 95% Confidence Interval (CI) calculated using Poisson regression.
[d] No additional racial/ethnicities were reported among hospitalized patients during the study period.

or a chronic lung disorder (12%) (Table 2). Patients aged <18 years were more likely than patients aged 18 to 49 and ≥50 years to have no medical conditions that are risk factors for seasonal influenza (39%, 21%, 14%; $P<0.001$). Patients aged ≥50 years were more likely than patients aged <18 and 18-49 years to have a cardiac condition (3%, 7%, 25%; $P<0.001$) or diabetes (2%, 19%, 37%; $P<0.001$).

BMI was calculated for 199 (84%) of 237 patients who were at least 2 years old and not pregnant. Non-obesity, non-morbid obesity, and morbid obesity were detected in 112 (56%) of 199 patients, 57 (29%) of 199 patients, and 30 (22%) of 136 patients, respectively (Table 2). Forty-three (75%) non-morbidly obese and 25 (86%) morbidly obese patients had at least 1 medical condition that was a risk factor for seasonal influenza. Patients aged <18 years were less likely to be non-morbidly obese compared to patients aged 18-49 and ≥50 years (22%, 32%, 31%; $P<0.001$), and females were more likely to be morbidly obese than males (28%, 13%; $P=0.03$). Thirty-nine percent of patients received the 2008-2009 seasonal influenza vaccine, and females were more likely to receive the vaccine than males (45%, 32%; $P=0.04$).

Racial/ethnic differences in epidemiologic and clinical characteristics among individuals hospitalized with 2009 H1N1 infection are presented in Table 2. Hispanics (median age=16 years) and African Americans

Table 2. Epidemiologic and Clinical Characteristics by Race/Ethnicity Among Patients Hospitalized with Confirmed 2009 H1N1 Infection in Wisconsin, April 23 - August 15, 2009

Characteristics	All Patients (N = 252)	White, non-Hispanic (n = 72)	Black, non-Hispanic (n = 121)	Hispanic (n = 40)	Asian (n = 19)	*P*-value[a]
Female, No. (%)	142 (56)	44 (61)	69 (57)	22 (55)	7 (37)	0.30
Age, median (range), years	27.5 (<1-85)	37.0 (<1-85)	23.5 (<1-72)	16.0 (<1-60)	38.0 (<1-79)	<0.001
Signs/presenting symptoms, No. (%)						
Fever (Temp ≥100.4°F)	201 (80)	64 (89)	88 (73)	33 (83)	16 (84)	0.05
Cough	178 (71)	59 (82)	73 (60)	29 (73)	17 (89)	0.003
Shortness of breath	137 (54)	42 (58)	52 (43)	12 (30)	9 (47)	0.03
Vomiting or diarrhea	77 (31)	18 (25)	31 (26)	21 (53)	7 (37)	0.008
Time from illness onset to admission, No. (%)[b,c]						
< 48 hours	121/244 (50)	30/67 (45)	66/120 (55)	15/38 (39)	10 (53)	
48-96 hours	52/244 (21)	15/67 (22)	27/120 (23)	8/38 (21)	2 (11)	0.33
> 96 hours	71/244 (29)	22/67 (33)	27/120 (23)	15/38 (39)	7 (37)	
Medical history, No. (%)[b]						
Asthma	81 (32)	20 (28)	45 (37)	14 (35)	2 (11)	0.10
Chronic lung disorders[d]	29 (12)	13 (18)	8 (7)	4 (10)	4 (21)	0.05
Diabetes[e]	43 (17)	13 (18)	15 (12)	11 (28)	4 (21)	0.16
Cancer[f]	17 (7)	9 (13)	4 (3)	4 (10)	0 (0)	0.04
Hematologic[g]	17 (7)	1 (1)	14 (12)	1 (3)	1 (5)	0.03
Pregnancy[h]	15/54 (26)	3/14 (21)	9/31 (29)	2/7 (29)	1/2 (50)	0.85
Obesity[i]						
Non-obese	112/199 (56)	33/60 (55)	48/91 (53)	20/33 (61)	11/15 (73)	
Non-morbid obesity	57/199 (29)	21/60 (35)	21/91 (23)	11/33 (33)	4/15 (27)	0.04
Morbid obesity	30/136 (22)	6/43 (14)	22/64 (34)	2/18 (11)	0/11 (0)	
No underlying conditions[j]	66 (26)	23 (32)	24 (20)	11 (28)	7 (37)	0.18
Influenza vaccination, seasonal[k]	93/237 (39)	27/63 (43)	38/118 (32)	21/38 (55)	7/18 (39)	0.08

[a] Fisher's exact test was used to determine significance when a cell value was <5, Student's t-test was used to compare continuous variables, and Pearson's chi-square test was used for all other comparisons.

[b] Includes cases with known information only.

[c] Time from illness onset to admission was calculated using the difference between date of admission and date of illness onset, with date of onset as day 0. The calculated difference was an integer value for days and was converted into hours.

[d] Chronic lung disorders include chronic obstructive pulmonary disease (14 patients), obstructive sleep apnea (8), congenital lung defects (7), in-dwelling tracheostomy (6), pulmonary hypertension (3), and cystic fibrosis (1).

[e] Diabetes includes diabetes mellitus types 1 (12%) and 2 (88%).

[f] Cancer types included acute lymphoblastic leukemia (3 patients), glioblastoma (1), multiple myeloma (3), myelodysplastic syndrome (1), myelocytic leukemia (1), renal (1), breast (2), hepatocellular (1), prostate (1), bladder (1), and unknown (3).

[g] Hematologic conditions included sickle cell (14 patients), Osler-Weber-Rendu syndrome (1), and aplastic anemia (1).

[h] Pregnant case denominators include all females of childbearing age (15 – 44 years) from the hospitalized populations.

[i] Obesity, non-morbid obesity, and morbid obesity were determined using body-mass index (BMI) in adults ≥18 years or BMI percentile in children 2 to 17 years old. Non-morbid obesity is defined as a BMI of 30-39.9 kg/m^2 in adults ≥18 years or a BMI percentile of 95-100 in children 2 to 17 years old. Morbid obesity was defined as a BMI ≥40 kg/m^2 in adults only (≥18 years). Denominators exclude pregnant women, patients <2 years for obesity and patients <18 years for morbid obesity.

[j] Having no conditions considered risk factors for seasonal influenza infection, including pregnancy and excluding obesity.

[k] Influenza vaccination refers to seasonal vaccination for the 2008-2009 season. These data were derived from hospital records and data from the Wisconsin Immunization Registry; data unknown for 15 patients.

(24 years) were younger than non-Hispanic whites (37 years) and Asians (38 years). African Americans were less likely to have a fever and cough at presentation compared to other race/ethnicity groups, and African Americans and non-Hispanic whites were less likely to have vomiting or diarrhea compared to Hispanics and Asians. Non-Hispanic whites were more likely to have shortness of breath at presentation, while Hispanics were less likely, compared to African Americans and Asians. African Americans were more likely to have a hematologic condition and be morbidly obese compared to other race/ethnicity groups. African Americans and Hispanics

Table 3. Diagnostic, Treatment, and Hospital Course Related Features by Race/Ethnicity Among Patients Hospitalized with Confirmed 2009 H1N1 Infection in Wisconsin, April 23 to August 15, 2009

Features	All Patients (N = 252)	White, non-Hispanic (n = 72)	Black, non-Hispanic (n = 121)	Hispanic (n = 40)	Asian (n = 19)	*P*-value[a]
Diagnostics, No. (%)[a]						
Positive bacterial cultures[b]	19/241 (8)	7/67 (11)	7/117 (6)	5/39 (13)	0/18 (0)	0.26
Abnormal radiographic imaging[c]	123/229 (54)	42/69 (61)	44/105 (42)	26/37 (70)	11/18 (61)	0.008
Treatment, No. (%)[a]						
Antivirals[d]	215/250 (86)	58/70 (83)	109 (90)	35 (88)	13 (68)	0.07
Antibiotics[e]	204/249 (82)	61/71 (86)	89/119 (75)	37 (93)	17 (89)	0.04
Illness onset to antiviral medication[f]	**(n = 214)**	**(n = 58)**	**(n = 109)**	**(n = 34)**	**(n = 13)**	
<48 hrs	82 (38)	22 (38)	43 (39)	10 (29)	7 (54)	
48-96 hrs	45 (21)	7 (12)	30 (28)	7 (21)	1 (8)	0.10
>96 hrs	87 (41)	29 (50)	36 (33)	17 (50)	5 (38)	
Admission to antiviral ≤ 24 hrs[g]	164 (77)	39 (67)	88 (81)	25 (74)	12 (92)	0.12
Illness severity, No. (%)	**(n = 252)**	**(n = 72)**	**(n = 121)**	**(n = 40)**	**(n = 19)**	
Admission to intensive care unit	59 (23)	23 (32)	19 (16)	11 (28)	6 (32)	0.05
Death	11 (4)	4 (6)	4 (3)	2 (5)	1 (5)	0.89
Length of stay, No. (%)[a,h]	**(n = 247)**	**(n = 70)**	**(n = 120)**	**(n = 38)**	**(n = 19)**	
0-2 days	98 (40)	23 (33)	52 (43)	11 (29)	12 (63)	
3-5 days	85 (34)	21 (30)	45 (38)	14 (37)	5 (26)	0.03
≥6 days	64 (26)	26 (37)	23 (19)	13 (34)	2 (11)	

[a] Fisher's exact test was used to determine significance when a cell value was <5, Student's t-test was used to compare continuous variables, and Pearson chi-square test was used for all other comparisons.

[b] Pathogenic bacteria were isolated from cultures of urine (7 patients), sputum (5), throat (2), tracheal aspirate (2), stool (3), and blood (2).

[c] Radiologist's report includes at least 1 of 3 findings: opacities or infiltrates (78%), consolidation (21%), or pleural effusion (15%), detected by chest X-ray or chest CT. Among the 96 patients with opacities or infiltrates, 70% had bilateral opacities or infiltrates.

[d] The influenza antiviral medications prescribed were oseltamivir only (98%), zanamivir only (1%), or both (1%).

[e] The antibiotic medications prescribed were azithromycin (44%), ceftriaxone (37%), fluoroquinolone (36%), vancomycin (17%), or an anti-pseudomonal beta-lactam or cephalosporin (16%). Among these 204 patients, 74% received 2 or more antibiotics.

[f] Time from illness onset to admission was calculated using the difference between date of admission and date of illness onset, with date of onset as day 0. The calculated difference was an integer value for days and was converted into hours.

[g] Time from hospitalization to receipt of antiviral medication was calculated by finding the difference between the date of antiviral treatment initiation and the date of hospital admission. The calculated difference was an integer value for days and was then converted into hours.

[h] Length of stay was calculated using the difference between dates of hospital discharge and hospital admission.

were less likely to have a chronic lung disorder compared to Asians and non-Hispanic whites. Hispanics and non-Hispanic whites were more likely to have cancer and be non-morbidly obese compared to African Americans and Asians. There were no significant racial/ethnic differences in time from illness onset to hospital admission.

Hospital Course

Among patients who had diagnostic testing or received either antiviral therapy or antibiotics during their hospital course, 8% had positive bacterial cultures, 54% had radiographic findings suggestive of pneumonia, 86% received an influenza antiviral medication, and 81% received an antibiotic (Table 3). Patients aged ≥50 years were more likely than patients aged <18 and 18-49 years to have positive bacterial cultures (3%, 10%, 19%, *P*=0.02). Most patients received antiviral therapy within 72 hours from illness onset (52%) and within 24 hours after hospitalization (77%).

Fifty-nine (23%) patients were admitted to an intensive care unit (ICU) and 11 (4%) died (Table 3). Of the 59 patients admitted to an ICU, 34 (58%) required mechanical ventilation, and 29 (49%) had a clinical diagnosis of acute respiratory distress syndrome (ARDS). The median length of stay was 3 days (range=1-51 days). Patients aged ≥50 years were more likely than patients aged <18 and 18-49 years to have a length of stay of at least 6 days (24%,

Table 4. Illness Severity and Hospital Length of Stay by Time from Illness Onset and Hospitalization to Receipt of Antiviral Medication Among Patients Hospitalized with Confirmed 2009 H1N1 Infection in Wisconsin, April 23 - August 15, 2009

	Time from Illness Onset to Receipt of Antiviral				Time from Hospitalization to Receipt of Antiviral		
	<48 hour	48-96 hour	>96 hour	*P*-value[a]	≤24 hr	>24 hr	*P*-value[b]
Illness severity, No. (%)	**(n=82)**	**(n=45)**	**(n=87)**		**(n= 64)**	**(n=50)**	
Admission to intensive care unit	15 (18)	10 (22)	28 (32)	0.04	30 (18)	23 (46)	<0.001
ARDS[c]	10 (12)	3 (7)	19 (22)	0.10	21 (11)	11 (22)	0.11
Mechanical ventilation[d]	6 (7)	4 (9)	24 (28)	<0.001	14 (9)	20 (40)	<0.001
Death	1 (1)	1 (2)	7 (8)	0.04	5 (3)	4 (8)	0.13
Length of stay, No. (%)[e]	**(n =82)**	**(n =42)**	**(n =85)**		**(n =160)**	**(n =49)**	
0-2 days	43 (52)	14 (33)	18 (21)		69 (43)	5 (10)	
3-5 days	26 (31)	19 (45)	28 (33)	<0.001	60 (38)	14 (29)	<0.001
≥6 days	13 (16)	9 (21)	39 (46)		31 (19)	30 (61)	

a Cochran-Mantel-Haenszel test was used to assess for a trend.
b Fisher's exact test was used to detect differences in proportions.
c Acute respiratory distress syndrome.
d Invasive mechanical ventilation. Excludes non-invasive forms of mechanical ventilation (ie continuous positive airway pressure therapy [CPAP], BiPAP).
e Length of stay was calculated using the difference between dates of hospital discharge and hospital admission.

19%, 41%; *P*=0.02).

Among non-obese, non-morbidly obese, and morbidly obese patients, there were no statistically significant differences in the proportion of patients who were admitted to an ICU (26%, 29%, 21%, *P*=0.73), required mechanical ventilation (14%, 14%, 24%, *P*=0.37), or were hospitalized for at least 6 days (27%, 33%, 28%, *P*=0.80).

Racial/ethnic differences related to the hospital course are presented in Table 3. African Americans were less likely to have abnormal radiographic imaging, received an antibiotic, and been admitted to an ICU compared to other race/ethnicity groups. Hispanics and non-Hispanic whites were more likely be hospitalized for at least 6 days compared to African Americans and Asians. There were no significant racial/ethnic differences in time from illness onset or admission to receipt of antiviral therapy, need for mechanical ventilation, acute respiratory distress syndrome (ARDS) occurrence, or mortality.

Time to Receipt of Antiviral Medication

Increasing time from illness onset to receipt of antiviral therapy was significantly associated with increasing proportions of patients requiring ICU admission, mechanical ventilation, and longer lengths of stay, and with increasing mortality (Table 4). Receipt of antiviral therapy within 48 hours of onset provided the most benefit.

Similarly, patients who received an antiviral medication within 24 hours of hospitalization were significantly less likely to be admitted to an ICU, need mechanical ventilation, and be hospitalized for >2 days compared to patients who received an antiviral medication >24 hours after hospitalization (Table 4).

DISCUSSION

This cohort is inclusive of all patients hospitalized for at least 24 hours with 2009 H1N1 infection in Wisconsin during April 23 through August 15, 2009. This interval constituted the first wave of the 2009 H1N1 pandemic in Wisconsin, which was centered in the city of Milwaukee and led to disproportionately higher hospitalization rates among African Americans, Asians, and Hispanics compared to non-Hispanic whites. Despite finding differences in epidemiologic and clinical characteristics between racial/ethnic groups who were hospitalized with 2009 H1N1 infection, we found no racial/ethnic differences in illness severity or outcomes.

The lack of association between race/ethnicity and illness severity or outcomes among hospitalized patients with 2009 H1N1 infection is unexpected. Initial studies of critically ill patients in Canada[6] and surveillance reports from Canada, Australia, New Zealand, and the United States[7-9] noted that racial/ethnic minority populations with 2009 H1N1 infection had high rates of hospitalization, critical illness, and death. The causal mechanisms explaining these findings are unclear, but 1 possible explanation is the higher prevalence of underlying medical conditions that are risk factors for seasonal influenza among racial/ethnic minority populations.[6-9] In our study, we found that African Americans were more likely to have hematologic conditions, Hispanics and non-Hispanic whites were more likely to have cancer, Asians and non-Hispanic whites were more likely to have a chronic lung disorder, and Asians were less likely to have 1 or more underlying conditions that are risk factors for sea-

sonal influenza compared to other racial/ethnic groups. Since relatively few patients had a hematologic condition, cancer, or a chronic lung condition, it is unlikely that the increased proportion of any of these medical conditions among any of the racial/ethnic groups accounts for the racial/ethnic differences in hospitalization rates of 2009 H1N1 infection in our study.

Other possible reasons for the racial/ethnic differences in rates of hospitalization for 2009 H1N1 infection in our study include delayed access to care, household size and socioeconomic status, and age of household members. Although our study did not include information on the insurance status of patients or the number of outpatient or urgent care visits prior to hospitalization, we did not find any racial/ethnic differences in time from illness onset to admission or receipt of antiviral therapy, and time from hospitalization to receipt of antiviral therapy. Previously reported studies of hospitalized patients with 2009 H1N1 infection have noted receipt of antiviral therapy within 48 hours of illness onset was associated with increased survival and fewer ICU admissions.[10,11] The absence of racial/ethnic differences in the proportion of hospitalized patients who received antiviral therapy within 48 hours of illness onset and within 24 hours of admission may, in part, explain the lack of association between race/ethnicity and illness severity or outcomes in our study.

Data regarding household size, socioeconomic status, and age of household members were not obtained in this study, and the influence these factors had in contributing to racial/ethnic differences in hospitalization rates of 2009 H1N1 infection could not be evaluated. Further studies examining the influence household factors have on the association between race/ethnicity and 2009 H1N1 infection are warranted. Although the reasons for racial/ethnic disparities among patients hospitalized with 2009 H1N1 infection have not been elucidated, strategies to reduce morbidity and mortality related to future waves of 2009 H1N1 infection among vulnerable populations are needed.[12]

Because racial/ethnic disparities in receipt of seasonal influenza vaccine[13] can lead to disproportionate mortality,[14] assuring equal access to influenza vaccines may reduce racial/ethnic disparities in morbidity and mortality caused by 2009 H1N1 infection. When the supply of the 2009 H1N1 influenza vaccine was sufficient, the CDC recommended that providers offer the vaccine to all patients in an attempt to reduce the complications associated with the 2009 H1N1 infection.[15] To achieve these goals, providers and health departments will need to assure that influenza vaccination campaigns sufficiently focus on racial/ethnic groups that have been disproportionately impacted by 2009 H1N1 infection.

Our study contributes to current literature regarding the clinical characteristics of 2009 H1N1 infection among hospitalized patients. The demographic features of our population confirm the downward shift in age among hospitalized patients with 2009 H1N1 infection compared to those typically hospitalized with seasonal influenza. The median age among our hospitalized population (28 years) was similar to those in previous studies among persons hospitalized with 2009 H1N1 infection,[10,11] but lower than that for seasonal influenza.[16] The lower median ages among Hispanics and African Americans compared to those among non-Hispanic whites and Asians in our study may contribute to the increased hospitalization rates among Hispanics and African Americans but not Asians. Similar to findings in California[11] and Chicago,[17] we noted hospitalization rates were higher among children aged <1 year compared to patients aged ≥60 years. The decreased hospitalization rate among patients aged ≥60 years may be related, in part, to the presence of cross-reactive antibodies to 2009 H1N1 from a previous influenza virus infection or vaccination.[18]

The most prevalent risk factor for 2009 H1N1 infection in our study was asthma; 32% of all hospitalized patients in this cohort had a history of asthma. The estimated prevalence of asthma in Wisconsin is 9.3%, but among females and African Americans in Wisconsin, and among residents of Milwaukee County, it is 13% to 15%.[19] These demographic features were prevalent among this hospitalized cohort and may partially account for the increased prevalence of asthma noted in our study. However, because we did not obtain data regarding asthma severity and current use of corticosteroids, we could not determine whether these factors also contributed to the increased prevalence of asthma among patients in our study.

The prevalence of obesity (44%) and morbid obesity (22%) among patients in our study was notably higher than the estimated prevalence of obesity (26.2%, 95% CI 24.6-27.8%) in 2007 among Wisconsin adults aged ≥20 years,[20] and morbid obesity (2%) in 2001 among Wisconsin adults aged ≥18 years.[21] Although there were racial/ethnic differences among patients who were obese or morbidly obese, we did not find that obesity or morbid obesity was independently associated with measures of illness severity or outcomes. Other studies among hospitalized patients with 2009 H1N1 infection have also demonstrated a high prevalence of obesity and morbid obesity.[6, 10,11] Nonetheless, there has been a lack

of data linking obesity as an independent risk factor to 2009 H1N1 infection or to increased complications associated with infection. Further studies investigating the association between obesity and 2009 H1N1 infection among hospitalized patients are needed.

Our study has several limitations. We did not obtain data regarding household size and socioeconomic status, and could not determine the influence these factors had in contributing to racial/ethnic differences in hospitalization rates of 2009 H1N1 infection. Also, because we examined only confirmed cases of 2009 H1N1 infection, we were unable to calculate the specificity or positive and negative predictive values of the reverse transcription-polymerase chain reaction assay among hospitalized patients. Additionally, our group of patients may not be representative of all hospitalized patients who were tested for 2009 H1N1 infection.

CONCLUSION

In summary, the first wave of the 2009 H1N1 pandemic in Wisconsin was centered in the city of Milwaukee and disproportionately affected African Americans, Asians, and Hispanics. Preventive measures that include focused educational campaigns to assure high rates of influenza vaccination among all racial/ethnic groups should help minimize the morbidity and mortality associated with future waves of 2009 H1N1 and other influenza virus infections.

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Influenza-related Viral Myocarditis

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ABSTRACT

Seasonal influenza outbreak is responsible for significant morbidity and mortality around the world. The disease can be severe, leading to rapid worsening of breathing and culminating in death. The pulmonary manifestations are prominent and may mask the involvement of other organs, such as the heart. This paper will discuss the incidence, clinical manifestations, and management of viral myocarditis in a modest attempt to heighten awareness of acute viral myocarditis for early recognition and prompt management during seasonal episodes of influenza infection.

INTRODUCTION

Influenza spreads throughout the world in seasonal epidemics. It may result in approximately 200,000 to 500,000 deaths per year, a number that is occasionally higher during pandemics.

Influenza viral infections usually present as fever, chills, cough, fatigue, arthralgia, and other constitutional symptoms. Despite the frequent genetic variations that occur with the influenza A virus, the array of symptoms and complications appear to be similar and depend, to some degree, on the virulence of the virus and the immune status of the infected host. Details of the clinical presentation can be found online at the Centers for Disease Control and Prevention (cdc.gov and flu.gov).

Because of the variability and evolution of symptoms, one of the often-overlooked manifestations of viral infections, including influenza A, is acute myocarditis. This review will focus on the incidence, pathophysiology, clinical manifestations, and management of viral myocarditis.

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INCIDENCE

In addition to the occasional epidemic of influenza A, there have been 3 major pandemics in the past century. The Spanish flu in 1918, caused by the H1N1 strain, appears to have been the most devastating, affecting about one-third of the world population and resulting in 50 million deaths. It affected mostly young healthy individuals. The Asian flu in 1957 was caused by the H2N2 strain, and the Hong Kong flu in 1968 was caused by the H3N3 strain. The recent swine flu pandemic was caused by the H1N1 strain. While similar to the 1918 pandemic, it had less impact, since it appears that the strain was genetically different and less virulent.[1] The current vaccination and other preventive measures, as well as treatment, are equally different and designed to mitigate the complications of the infection. Needless to say, the world is now very different from the post-World War I era, and most countries are at high alert to combat this pandemic. The media and the widespread dissemination of information on the Internet enhances awareness of the disease, limits its spread, and hopefully has a positive impact on its morbidity and mortality.

In severe cases of infection, clinicians pay utmost attention to the pulmonary symptoms that ensue, yet the infection may affect other organs such as the heart, causing acute myocarditis. Cases of acute myocarditis may result in shortness of breath, left ventricular dysfunction, and even death.

During the Sheffield, England influenza epidemic from 1972 to 1973, the cases of 50 consecutive patients who were initially diagnosed as mild cases and were treated on an outpatient basis were followed. Transient electrocardiogram (ECG) changes were seen in 18 patients, and long-lasting changes were seen in 5 patients. The ECG changes were non-specific:

S-T abnormality, nodal rhythm, atrial fibrillation, and atrio-ventricular dissociation.[2] Four of the patients died, and autopsy revealed abnormal myocardium with changes ranging from inflammatory cellular infiltration to interstitial edema and petechial hemorrhages.

During the influenza epidemic in 1978 in Finland, 104 consecutive military recruits who presented with sudden respiratory illness were prospectively studied. Forty-one patients tested positive for influenza A. Six patients had, in addition to electrocardiographic abnormalities, regional wall motion abnormalities on 2-D echocardiography. The chance of coronary artery disease in young military recruits should be very low, and it is highly probable that these regional wall motion abnormalities represent cases of acute myocarditis, with an incidence close to 15%.[3] Other publications have also reported acute myocarditis during viral illness.[4]

In a landmark study conducted during the Asian influenza pandemic of 1957, 33 cases of sudden or unexpected death occurred in the United States in the Cleveland, Ohio area.[5] All cases underwent autopsy. These were non-selected cases and were mostly young patients, with the majority being under the age of 40. Definite acute myocarditis was found in one-third of the cases as documented by classic cellular infiltration and myocyte necrosis. A striking finding was that, in most cases, cardiac involvement was not suspected prior to death.

The most recent pandemic of the H1N1 influenza A virus was also associated with myocarditis, occasionally presenting as acute fulminant myocarditis. Bratincsák et al,[6] in a retrospective review of children admitted with H1N1 to a children's hospital for a single month in the fall of 2009, reported that 4 out of 80 patients were found to have acute myocarditis based on T1 release or abnormal echocardiogram. This testing was performed only for those patients in whom acute myocarditis was suspected. It is possible that the true incidence of myocarditis was higher.

Thus, while most patients' cardiac symptoms are likely due to coronary artery disease or hypertensive heart disease, during influenza epidemics the clinician should be suspicious of the possibility of myocarditis.

PATHOPHYSIOLOGY OF MYOCARDITIS

In at least 10% of patients with viral infection, the virus may replicate in the heart. It results in focal infiltration of inflammatory cells, usually mononuclear cells, accompanied by interstitial edema and cardiac necrosis. The inflammation may also occur concomitantly in the pericardium, hence the term perimyocarditis.[7] The pathophysiology of acute carditis does not appear to be different in those cases that occur during pandemics compared to those cases occurring interpandemically; the severity is dependent on the virulence of the organism.[8]

During the epidemic of 1918, Locke et al[9] performed autopsies on 126 fatal cases of influenza. In the majority of cases, the heart was affected. Frequently, both the left and right sides of the heart were dilated. Microscopic examination revealed loss of cardiac striations; the nuclei of the cardiac muscle cells were pale, swollen, or fragmented; and the interstitium was filled with hemorrhage, edema, and cellular infiltration. The pericardium frequently showed inflammatory changes, and, rarely, the endocardium revealed subendocardial petechial hemorrhages.[5]

CLINICAL MANIFESTATION

Each year, 3 million to 5 million patients suffer from seasonal influenza, with an annual mortality rate of 300,000.[10] During influenza pandemics, morbidity and mortality are expected to increase, and since pulmonary involvement is more universal and frequently severe, it may conceal the diagnosis of viral myocarditis. A heightened awareness of cardiac involvement is essential in a disease that affects at least 10% of the infected population.

The onset of acute carditis starts on day 4 to 7 of the onset of viral symptoms.[11] Patients may have worsening shortness of breath or recurrence after initial improvement. Patients may present with other cardiac symptoms such as chest pain or palpitations. On examination, patients may have sinus tachycardia out of proportion to the degree of fever, signs of cardiomegaly, and, when significant, left ventricular dysfunction and signs of congestive heart failure are evident.[12]

In a patient with suspected acute carditis, a 12-lead ECG should be acquired. Changes such as sinus tachycardia, atrial or ventricular arrhythmias, conduction abnormalities, and non-specific S and T wave abnormality raise the degree of suspicion and prompt the need for further diagnostic testing.[13] Morimoto et al[14] were able to show that patients with significant conduction abnormality demonstrated myocardial interstitial edema using myocardial biopsies. Lewes et al,[15] in 1974, suggested that patients with significant myalgias are more likely to develop acute myocarditis during a viral illness and may develop significant electrocardiographic abnormalities.

Echocardiography is the mainstay in making the diagnosis of acute myocarditis. It may show diffuse

left ventricular dysfunction, but occasionally it demonstrates regional wall motion abnormalities. These areas of regional wall motion abnormalities are usually involved with the mononuclear inflammatory cells and interstitial fibrosis.[16] When cardiac necrosis ensues, cardiac biomarkers may be detected in the blood, particularly troponin.[17] Serum interleukin-10 is elevated in patients with severe acute myocarditis and may predict the need for mechanical cardiopulmonary support.[18] Acute and convalescent viral titers may aid in the diagnosis.

While the majority of cases of viral myocarditis are of mild to moderate severity, some cases may be fatal,[19,20] particularly during epidemics.[21] Lee et al[22] showed that prolongation of the QRS complex and depressed left ventricular function on admission were predictive signs of fulminant myocarditis and were associated with increased mortality.

Acute myocarditis may have unusual presentations, such as acute myocardial infarction and can also precipitate acute myocardial infarction in patients with known coronary artery disease.[23, 24] This is due to inflammation of epicardial coronaries or microvascular inflammation.

MANAGEMENT

The majority of cases of acute myocarditis may be mild and result in spontaneous improvement, but some cases may be fatal. Many cases not recognized during the acute episode may develop into dilated cardiomyopathy later and may require cardiac transplantation.[25] Therefore, recognition and early treatment are of paramount importance, particularly during influenza pandemics.

In addition to bed rest and the standard management of patients with congestive heart failure, special attention needs to be focused on the use of angiotensin converting enzyme inhibitors (ACEI) in myocarditis.[26] There is a paucity of controlled studies using ACEI in human myocarditis. With the incidence of the disease being low during non-epidemic times, often mild or moderate in severity, and occasionally missed clinically, conducting human controlled studies to test the efficacy of various medications in human myocarditis is a challenge. It has been shown, however, that the disease process in a murine model of coxsackievirus myocarditis closely parallels that of human myocarditis.[27]

With the ACEI captopril's role in the treatment of left ventricular dysfunction and congestive heart failure well-established in humans, we sought to test its effect in the treatment of experimental murine myocarditis. Ninety 3-week-old cesarean-derived mice (Charles

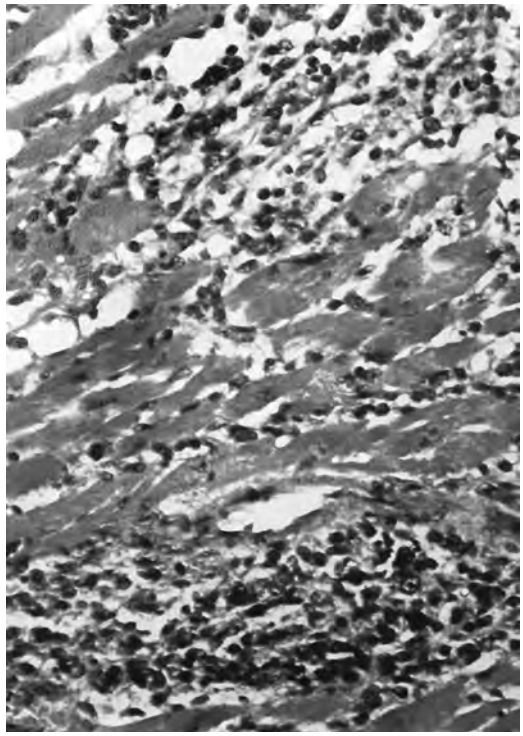

Figure 1A. Microphotograph of animal heart infected with coxsackievirus B3, showing extensive inflammation and necrosis.

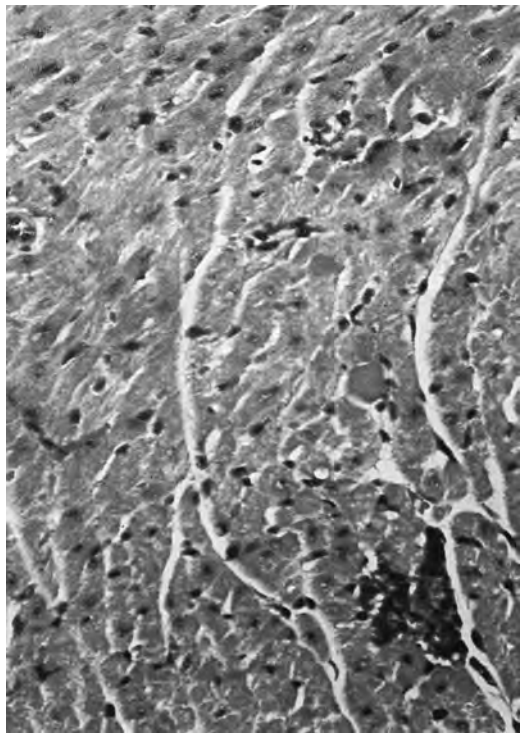

Figure 1B. Captopril treated animal. Low power magnification, hematoxylin, and eosin. (Courtesy of *Circulation.* Rezkalla et al., *Circulation.* 1990;81(3):1039-1046.)

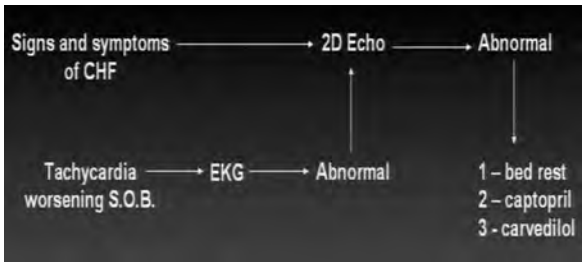

Figure 2. Diagram for diagnosis and treatment of acute viral myocarditis.

River Laboratory, Wilmington, Massachusetts) were infected with coxsackievirus B3 and divided into 2 groups. The first group of mice was started on treatment on day 1 of the infection, while a second group started treatment on day 10 of the experimental infection. In each group, treatment was then randomized to captopril at a dose of 0.05 mg/g administered intraperitoneally twice daily or normal saline. The group given captopril had less cardiac mass and less evidence of congestive heart failure as measured by liver to body weight ratio. These effects were expected in the face of the known effects of captopril. The surprising finding was the significant reduction in inflammation, cardiac necrosis, and dystrophic calcification in the group treated with captopril starting on day 1 of the infection (Figure 1A and 1B). We hypothesized that perhaps, besides the ACEI properties, the oxygen radical scavenging properties of captopril may be responsible for such a dramatic benefit.[28] Enalapril was not effective in treating the infected group, while captopril was, and resulted in improved survival.[29]

The effect of beta blockers on acute myocarditis has been somewhat controversial. While metoprolol was not found to be favorable during acute myocarditis,[30] carvedilol was clearly beneficial.[31] In the experimental model of coxsackievirus-induced murine myocarditis, carvedilol treatment resulted in decreased expression of the proinflammatory cytokines as well as matrix metalloproteinases. This resulted in improved left ventricular function in treated animals. There is no role or benefit for corticosteroid therapy in acute viral myocarditis. Their use in animal model studies has resulted in increased mortality.[32,33] Their use in human studies has been disappointing, and currently there is no clear role for their use, particularly during the acute phase.[34] The role of antiviral therapy is even less clear, suggesting a need for controlled randomized trials.[35] A simple diagram to help clinicians manage cases of acute myocarditis is depicted in Figure 2.

CONCLUSION

During any influenza outbreak, a significant number of patients may be infected and suffer the consequences of this widespread disease. The spectrum of illness associated with influenza infection is broad, ranging from several days of headache, fever, and generalized malaise to secondary pulmonary infections that may be life threatening. And it may include acute carditis, whose early signs and symptoms may be subtle and are frequently overlooked. Acute myocarditis has been directly attributed to the influenza infection and has contributed to the fatalities associated with the infection. Thus, it is imperative that early recognition and prompt therapeutic intervention with effective agents (ie, captopril or carvedilol) be instituted to achieve a favorable outcome and avoid the long-term complications that have been associated with the infection.

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The Usefulness of Health Care Databases in Wisconsin for Identifying Hmong Patients with Cancer

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ABSTRACT

Objectives: The Wisconsin Cancer Reporting System (WCRS) collects data on cancer diagnoses in the state of Wisconsin. California and Minnesota cancer registries have reported that Hmong have higher rates of certain cancers than the general population. WCRS collaborated with the Wisconsin Comprehensive Cancer Control Program (WCCCP) and Wisconsin United Coalition of Mutual Assistance Associations (WUCMAA) to investigate the reporting of cancer cases in the Hmong population by medical facilities.

Methods: WCRS, WCCCP, and WUCMAA conducted a mail survey of facilities in 12 Wisconsin counties where Hmong populations reside.

Results: The survey found that <30% of facilities collected Hmong as a demographic category or identified cancer patients as Hmong; most facilities reported Hmong patients only as Asian. A training webcast was developed for facilities to reinforce WCRS reporting requirements and to elucidate the Hmong culture. A pamphlet for Hmong patients was developed to explain the importance of self identification for more racially representative cancer data in Wisconsin.

INTRODUCTION

Wisconsin is home to the third largest Hmong population in the United States, following California and Minnesota. The Hmong population in Wisconsin increased by 106% between 1990 and 2000, to a total of 33,791. Hmong comprise approximately 38% of the Asian population and are the largest Asian group in Wisconsin.[1] The 2000 US Census data show that 34.8% of Hmong report being linguistically isolated compared to 4.1% of the general population, and 38% of Hmong live below the poverty level compared to 12% of the US population.[2] Over two-thirds of the Hmong population in Wisconsin are under 24 years of age, and 57.1% are under 18 years of age.[3] The South East Asian Hmong traditionally were an agrarian people in isolated villages with no formal education, and resettlement in the United States presented many challenges for them.[4]

The studies of cancer incidence in the Hmong population in California revealed elevated age-adjusted incidence rates for hepatic, gastric, cervical, and nasopharyngeal cancers, as well as leukemia and non-Hodgkin's lymphoma.[5,6] California and Minnesota studies also showed that Hmong experienced a later stage and higher grade of disease at diagnosis compared to the rest of the population.[6,7] Other racial disparities in larger Wisconsin populations have been documented,[8,9] but accurate data are necessary to meet the health needs of the Hmong community and to support current cancer prevention and control initiatives.

The Wisconsin Cancer Reporting System (WCRS) is the population-based state cancer registry in the Division of Public Health that collects data on all newly diagnosed cancer cases for Wisconsin residents. Newly diagnosed cancer cases are reported to WCRS by Wisconsin hospitals, clinics and physician offices, cooperating out-of-state cancer registries, and selected Minnesota hospitals. Funded by the Centers for Disease Control and Prevention (CDC), WCRS has participated in the National Program of Cancer Registries since 1994. WCRS is required to collect from facilities and report to CDC detailed race categories including Hmong and other Asian groups. WCRS collaborated with the Wisconsin Comprehensive Cancer Control Program (WCCCP)[10] and the Wisconsin United Coalition of Mutual Assistance Associations

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(WUCMAA) to improve surveillance of cancer in the Hmong population.

Table 1 shows the race categories and codes required by WCRS and most state cancer registries in the National Program of Cancer Registries since 1995. It then compares them to the minimum Office of Management and Budget (OMB) categories, still collected by many health care facilities. WCRS reports cancer cases among Wisconsin residents to CDC and other federal agencies for virtually all major national publications.[11,12] The collaborative survey asked the following questions: Where are Wisconsin's Hmong receiving cancer care, what services are provided, and what are the processes for collecting data on ethnicity and race and, in particular, Hmong patients with cancer?

METHODS

The 3 statewide organizations combined resources to approach a long-standing scarcity of cancer data for the Hmong population. WUCMAA provided cultural- and community-based knowledge of Hmong health care practices. WCCCP offered a network to make appropriate contacts for partnerships and additional staff as needed to conduct the survey. WCRS designed the survey, developed the data collection instruments, and created training and educational resources, many of which were promoted directly to facilities. The design phase identified medical facilities that provide cancer diagnoses and/or treatment to Hmong patients for the sample selection and drafted questions regarding health services to Hmong, quantification of cancer incidence, and facility reporting practices. The implementation phase consisted of conducting the survey of the medical facilities indentified in the sample, and follow-up techniques to obtain maximum response rate. Data consisting of small numbers were compiled in descriptive statistics of frequencies and cross tabulations.

The survey sample was developed to reach facilities (hospitals, clinics, and physician offices) serving Hmong patients newly diagnosed or treated for cancer. According to the 2000 Census, roughly 94% of Hmong in Wisconsin could be found in 12 Wisconsin counties.[1] To capture all facilities, WCRS asked WUCMAA to compile a list of facilities from the 14 regional office rosters where Hmong receive health care within those 12 counties (Milwaukee, Marathon, Brown, Sheboygan, Outagamie, La Crosse, Dane, Winnebago, Eau Claire, Manitowoc, Portage, and Wood). Seventy-five facilities were identified as having any potential for past or current experience with Hmong cancer patients.

The survey questionnaire included a screening question to eliminate those facilities that did not diagnose or treat cancer patients. The questionnaire was designed to collect information in several integrated areas: special services for Hmong patients; cancer screening, diagnostic, or treatment services provided; cancer case referral patterns for Hmong patients; practices for the reporting of race and ethnicity to the state; current staff resources; and training needs to improve reporting of detailed race categories.

A survey was mailed to 75 medical facilities in the 12 Wisconsin counties. The cover letters, self administered questionnaires, and postage-paid return envelopes were mailed to facility administrators. The cover letters assured facilities of confidentiality and offered training resources based on results of the survey. Two survey follow-ups to non-respondents were conducted. One month after the first mailing, a second reminder cover letter, replacement questionnaire and postage-paid return envelope were mailed. Approximately 6 weeks after the initial mailing, a third and final telephone follow-up was conducted.

For the purpose of this analysis, data were calculated in frequencies and cross-tabulations to provide descriptive statistics. The relatively small number of facilities serving Hmong patients and scarcity of Hmong cancer cases did not support higher-level analytical techniques.

Table 1. Wisconsin Cancer Reporting System Required Race Codes

01	White	21	Chamorran
02	African American	22	Guamanian, NOS
03	American Indian, Aleutian, Alaskan Native or Eskimo (includes all indigenous populations of the Western hemisphere)	25	Polynesian, NOS
		26	Tahitian
		27	Samoan
		28	Tongan
		30	Melanesian, NOS
04	Chinese	31	Fiji Islander
05	Japanese	32	New Guinean
06	Filipino	88	No further race documented
07	Hawaiian		
08	Korean	96	Other Asian, including Asian, NOS and Oriental, NOS
09	Asian Indian, Pakistani		
10	Vietnamese		
11	Laotian		
12	**Hmong**	97	Pacific Islander, NOS
13	Kampuchean	98	Other
14	Thai	99	Unknown

Minimum Office of Management and Budget Race Categories

White
African American
American Indian/Alaska Native
Asian
Native Hawaiian or Other Pacific Islander
Unavailable

NOS = not otherwise specified

For purposes of improvements in cancer surveillance, the collaborators were most interested in the extent of reporting compliance, the distribution of Hmong patients throughout the state, and the special services available.

RESULTS

The final response rate of 72% (54 facilities), higher than average for mail surveys,[13] was largely attributable to the follow-up measures and to primary contact with facility administrators. Sixty-six percent (36) of responding facilities reported diagnosing or treating cancer patients. In response to the question, "Has your facility ever provided health care services to Hmong patients?", 86% (31) of those cancer facilities reported serving Hmong patients in general.

Facility Services for Hmong Patients

Those 31 facilities with Hmong patients were asked about special services. The largest proportion of facilities, 87%, reported providing Hmong language interpreters, followed by 61% that reported case management services. Fifty-eight percent reported providing culturally sensitive medical information to Hmong patients, and 54% reported providing general educational information about cancer. Just over half reported providing transportation services.

Cancer Data Collection for Race and Ethnicity

The majority of facilities (27) reported collecting race and ethnicity cancer data. However, of those collecting race/ethnicity data, only 7 facilities collected Hmong as a distinct category. Most facilities reported Hmong patients with cancer to WCRS only as Asian, not otherwise specified.

Method of Collecting Race Classifications

The 27 facilities reporting race and ethnicity data were asked how they collect this information from patients. Sixty-three percent of facilities reported that admission staff asked patients; 12% reported that patients completed a form (wrote race or checked box); 5% reported admission staff completed the information based on observation; and almost 20% did not answer or reported that it varied by circumstance.

DISCUSSION

The major strengths of the survey were the broad collaborative sponsorship, including WUCMAA, and a commitment to provide resources to address facility needs. Also, the relatively high response rate provided an adequate number of facilities serving Hmong patients to help understand prevalent data collection practices. The primary limitation of the survey, due to the lack of standardized collection of race data, was that it may have resulted in undercounting the number of Hmong patients. However, due to the unique needs of many older generation Hmong, the majority of facilities provide special services and therefore have general knowledge of Hmong patient admissions and treatments. Therefore, we are confident that this investigation captured the majority of targeted cancer care facilities.

One major finding of our survey of Wisconsin cancer care facilities was that although the majority of facilities reported minimum OMB race categories to WCRS, the detailed categories (such as Hmong) required by WCRS were not even collected at most facilities. There was also a general lack of standardized practices and procedures for collecting data on race and ethnicity. To address the problems identified in the survey, collaborators responded with 3 products: (1) thank you letters were mailed to responding facility administrators with an announcement of a training webcast. (2) Training webcast was broadcast to help facilities understand Hmong culture and special needs of Hmong patients, and to emphasize the requirement of reporting Hmong cases to the state cancer registry. The webcast recommended the *Health Research and Educational Trust Disparities Toolkit for Collecting Race, Ethnicity and Primary Language Information from Patients* as a comprehensive resource.[14] The webcast expressed the rationale for detailed data collection standards to address racial disparities. Webcast speakers included a Hmong health educator, a Hmong physician, and a Certified Tumor Registrar. (3) In partnership with the WUCMAA, a bilingual pamphlet was developed for Hmong patients to explain the importance of self-identification and the need for accurate data to better serve Hmong patients. The pamphlet is available at: https://dhs.wisconsin.gov/wcrs/pubs.htm. *(Accessed Aug 3, 2010.)*

Although we investigated race/ethnicity data collection from the context of cancer registry requirements, the lack of standardization has implications for other national data programs. Like Wisconsin, most states have growing diversity in their populations, although the difficulties in race/ethnicity data collection persist. There is no current uniform national policy for collecting these data at health care facilities. Some of the largest medical surveys collect only the OMB minimum 5 categories. The National Hospital Discharge Survey, the National Ambulatory Medical Care Survey, and the National Health and Nutrition Examination

Survey collect the minimum OMB categories.[15] Our results of an underreporting of race and the variability in data collection practices are similar to those found in a California survey and the National Hospital Discharge Survey.[16-18] Previous studies have reported deficiencies in Medicare data to measure racial and ethnic disparities in health care.[19]

To help address the current lack of national uniformity, there is growing support for national standardization of detailed data collection, as emphasized in the recent report from the Institute of Medicine *Race, Ethnicity, and Language Data: Standardization for Health Care Quality Improvement*, available at the American Hospital Association's Web site (http://www.ahanews.com). This report recommends the collection of fine-grained categories, beyond the 5 minimum OMB categories. The report also states that opportunities should be afforded for individuals who want to self-identify their race and ethnicity, that locally relevant categories of detailed race and ethnicity should be chosen, and that these new standards should be used by federally funded health care programs and in electronic health record systems. The Health Research and Educational Trust also recommends that, when possible, organizations should collect detailed data on race and ethnicity.[14]

Although national organizations may strongly recommend more detailed race and ethnicity data, and CDC requires the detailed data from all state registries in the National Program of Cancer Registries, many states—including Wisconsin—have neither statutory enforcement nor penalties for noncompliance. Also, evidence indicates current misclassification is in the direction of misclassifying minority non-white races as white. To help standardize national cancer incidence data, CDC now requires at least 3 remedial data revisions for state cancer registries to help address widespread underreporting and misclassification of race and ethnicity: Hispanic algorithm, Asian algorithm, and the linkage of registry cases to Indian Health Service enrollment records.[20-22] Adding to the challenge of accurate measurement, the 2000 and 2010 US Census forms did not provide the Hmong category, but rather "Other Asian" with an option of writing in one's race.[23,24] There is reason to believe that Wisconsin Hmong were undercounted in the 2000 Census,[2] and there is no definitive count of the Hmong population.

The facility survey, resultant training webcast, and educational patient pamphlet were provided to address the systemic difficulties: lack of national or state regulations for race and ethnicity data collection, nonstandardized facility collection of detailed race data, and reluctance of minority populations to self-identify. To bring measurable progress to troubling disparities in cancer detection and treatment, continuing promotion, education, and monitoring are necessary. Although hospitals, clinics, health centers, physician practices, health plans, and local, state, and federal agencies all can play key roles by incorporating race and ethnicity data into existing data collection practices, each faces opportunities and challenges in attempting to achieve this objective. The survey helped us to better understand these opportunities and challenges in the context of current facility practices. In the future, more detailed and systematic collection of race and ethnicity data across all facilities in Wisconsin should greatly benefit mandates for eliminating health disparities in public health programs.

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WISCONSIN MEDICAL JOURNAL

Cardiac Computed Tomography and Quadricuspid Aortic Valve: A Case Report

Carrie B. Chapman, MD; Takushi Kohmoto, MD; Annie F. Kelly, MD; Frank Thornton, MD; Jon G. Keevil, MD

ABSTRACT

A quadricuspid aortic valve is rare and often incidentally found by echocardiography, surgically, or on post mortem examination. Aortic regurgitation is common and if severe enough can lead to symptoms of dyspnea. We report a case of a quadricuspid aortic valve, which was found by cardiac multidetector computed tomography during a pre-operative assessment for severe aortic regurgitation.

CASE DESCRIPTION

A 35-year-old previously healthy woman was sent for echocardiography after her allergist auscultated a murmur during an evaluation for persistent cough. Her history was significant for allergies, controlled hypertension, mild glucose intolerance, and occasional tobacco use. She had no family history of coronary artery disease (CAD), sudden death, or known valvular abnormalities. Symptomatically, the patient reported worsening shortness of breath over the previous several months associated with exertional chest heaviness.

A transthoracic echocardiogram (TTE) demonstrated severe aortic regurgitation by color Doppler. The short axis view, however, was inadequate to evaluate the numbers of aortic valve cusps, likely due to the patient's body mass index of 38. The left ventricle was found to be severely enlarged, with an end-diastolic dimension of 79 mm and end-systolic dimension of 56 mm, and the ejection fraction was mildly reduced to 50%. Additionally, the ascending aorta was noted to be mildly enlarged at 40 mm.

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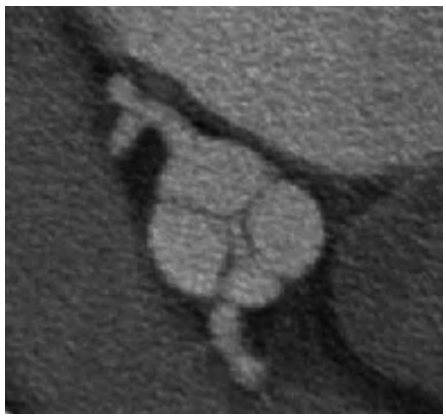
Given this information, it was decided to pursue cardiac computed tomography (CT) both to define the size of the patient's aorta and to rule out coronary atherosclerosis. Coronary CT angiography (CTA) is known to be highly accurate compared to conventional coronary angiography and has been validated in the preoperative setting for chronic aortic regurgitation.[1] Thus, invasive cardiac catheterization, which was previously uniformly done prior to aortic valve surgery, could be avoided.

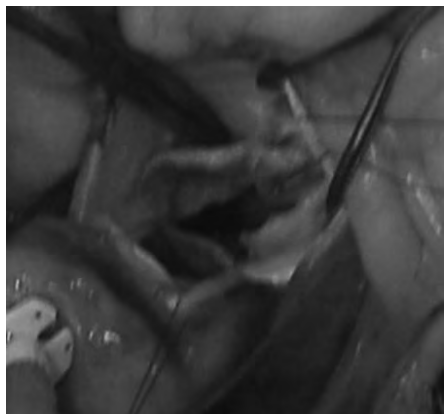
The cardiac CT was performed on a 64-slice GE VCT scanner (General Electric, Waukesha, Wisconsin). The patient underwent standard protocol with beta blockade and nitroglycerin sublingually prior to scanning. The images were obtained by retrospective gating and reconstructed using a dedicated Advantage workstation. The patient was administered 21.9 mSv of radiation and 87 ml of contrast. Overall, the quality of the CT images was good.

Figure 1A shows the aortic valve in diastole with both the right and left coronary arteries at their insertion points. The valve can be described as a Type B variant with 3 equal cusps and 1 smaller accessory cusp,[2] now felt to be the second most common described in the literature.[3] Type A variant is more common and has 4 equal cusps; however, Type B is more likely to lead to aortic regurgitation. The 3 larger cusps include a left coronary cusp, right coronary cusp, and non-coronary cusp. The CT image demonstrates the lack of coaptation of the valve leaflets with a regurgitation orifice that measured 20 mm^2. The remainder of the CTA demonstrated large coronary arteries free from calcium or plaque. The ascending aortic root was only mildly enlarged at 43 mm. The left ventricular ejection fraction was calculated to be 55%, and the end-systolic volume was 145 ml.

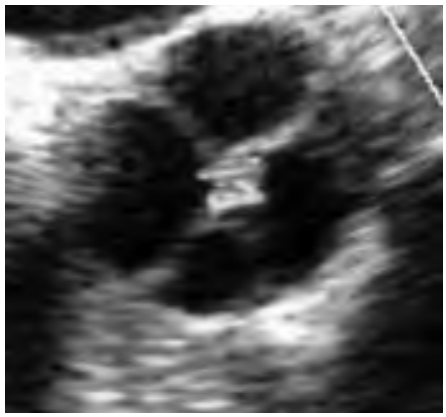
The patient subsequently underwent surgical replacement of her severely insufficient aortic valve. Intraoperative pictures by a transesophageal echocardiogram (TEE) and photography confirmed the diag-



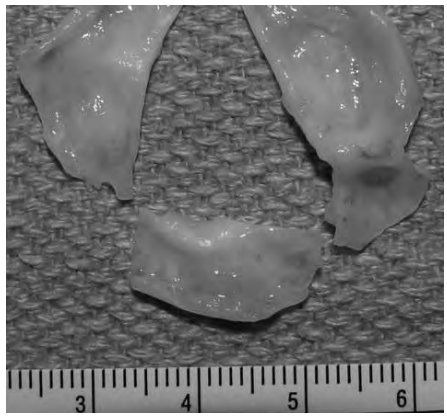
A. Cardiac CT of aortic valve and coronary arteries.



C. Intraoperative view of aortic valve with coronary arteries identified by forceps.



B. TEE short axis of aortic valve with aortic insufficiency.



D. Post-operative gross specimen of aortic valve.

Figure 1. Quadricuspid Aortic Valve.

nosis obtained by cardiac CT (Figures 1B, 1C, 1D). The cusps are labeled to coincide with the CT image.

DISCUSSION

A quadricuspid aortic valve remains a rare finding. In 2004, Tutarel performed an in-depth literature review and identified 186 cases published.[3] Aortic regurgitation was found in approximately 75% of the cases, with 9% having both aortic stenosis and regurgitation, and 16% having a normal functioning aortic valve. Symptoms and progressive valvular dysfunction were significant enough to require surgery for 45.2% of the subjects in this series. Several associated cardiac abnormalities were also identified, including hypertrophic cardiomyopathy, atrial septal defects, patent ductus arteriosus, and, most commonly, anomalous coronary arteries.[3,4]

The estimated incidence of quadricuspid aortic valve has varied from 0.008% by autopsy to 0.043% by TTE, both of which likely underestimate the true incidence.[4,5] The first reported case was in 1862, described at autopsy by Balington.[6] In 1969, a quadricuspid aortic valve was imaged by aortography and described by Peretz.[7] Transthoracic 2-dimensional echocardiography became available in the 1970s with several cases of quadricuspid aortic valves being described in 1984.[8,9] Today, TEE is considered the superior imaging test for a clear anatomical image of a quadricuspid aortic valve. It is particularly useful in defining abnormally placed coronary ostia, which can affect valve replacement surgery.[10,11] Three-dimensional TTE has been used but currently produces images inferior to TEE.[12] Recent reports of cardiac magnetic resonance imaging to diagnose a quadricuspid aortic valve have also been published with good image quality[13,14] and case reports using multidetector CT imaging are now being published, also with excellent images.[14,15]

In our patient, cardiac CT provided clear simultaneous images of a quadricuspid aortic valve, mild aortic root dilation, location of coronary ostia, and absence of coronary atherosclerotic disease. Pathologic specimens verified the quadricuspid valve that was identified. In this case, the transthoracic echocardiographic images were inadequate to completely define our patient's anatomy. Cardiac CT allowed for a non-invasive modality to obtain this information and also allowed for improved pre-surgical planning by our cardiothoracic surgeons.

There are currently multiple appropriate uses of cardiac CT that have been established by the American College of Cardiology. Several examples include coronary evaluation in patients with intermediate risk of CAD presenting with acute chest pain who have both negative enzymes and ECG, patients with an uninterpretable stress test, and patients with suspected coronary anomalies, congenital heart disease, or valvular abnormalities.[16] The negative predictive value of CTA has been reported near or at 100%. A lesion of >50% or more by CTA would, however, subsequently need to be evaluated by catheterization. In 1 study of subjects needing aortic valve surgery for aortic regurgitation, catheterization could have been avoided in 70% of patients.[1]

Cardiac CT could conceivably replace both TEE and cardiac catheterization preoperatively for aortic valve surgery, which would reduce the number of diagnostic studies performed and patient risk. Radiation and contrast exposure with cardiac catheterization is similar compared to CTA; however, several risks associated with the invasive nature of catheterization—including stroke, myocardial infarction, and bleeding—are not a factor. In conclusion, for the appropriate patient, cardiac CT is a reasonable modality for the preoperative evaluation of aortic valve insufficiency and can detect a previously undiagnosed quadricuspid aortic valve.

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'SWINEUPDATE': Using EMR charting tools as a clinical decision support tool during the H1N1 outbreak

Alexander Young, MD

BACKGROUND

The emergence of the novel influenza H1N1 virus resulted in a multitude of e-mail updates for providers in our health care system. The e-mails came from different providers and health care organizations and correspondingly contained different types of information. Because of H1N1's novelty, this information changed on a near-daily basis. One day an e-mail may have specified both nasopharyngeal and oropharyngeal swabs were needed for collection, but the next day a new e-mail specified only a nasopharyngeal swab was needed. These kinds of e-mails, which had specific information that is useful for clinical care, were buried amongst other H1N1-related e-mails from the public health department, a local infectious disease expert, the medical director, etc. Also, even though these e-mails contained information useful at the point of care, e-mail was not easily accessible in patient rooms. Therefore, during a situation of rapidly changing clinical protocols, e-mail can be a poor informational technology tool. The report below describes how a simple EHR charting tool was rapidly adapted into an effective clinical decision support tool.

METHOD

At our local organization, a more efficient approach of dispersing clinical protocols was tried in conjunction with the ongoing e-mails described above. The approach depended on 3 elements: (1) an electronic health record (EHR) available in each patient's room (our clinics use Epic; Epic Systems Corporation, Verona, Wisconsin), (2) an EHR charting tool that is "shareable," and (3) individuals who can abstract information from the daily H1N1 e-mails. Within our available EHR is a charting tool (SmartPhrase) that allows providers to create their own shorthand of commonly used phrases, eg typing ".bv" generates the text "bacterial vaginosis" in the patient's chart. Furthermore, this shorthand (".bv") can be accessed and used by any other provider, an important feature for the application we are describing here.

Within the first week of the H1N1 outbreak, we generated a new SmartPhrase ".SWINEUPDATE". Rather than a short phrase, typing ".SWINEUPDATE" would generate the entire H1N1 protocol (who to test, how to test, indications for treatment, etc) within the patient's EHR chart. (See Figure 1.) Once referred to, the SmartPhrase material could be deleted in its entirety from the patient's chart, and the provider could continue with the visit. ".SWINEUPDATE" was kept current by our medical director, who abstracted relevant information from daily e-mails and meetings. As a result, approximately 70 urgent care providers had access to the latest H1N1 protocols within their patient rooms by simply typing ".SWINEUPDATE".

The following are benefits of using a shareable charting tool as a clinical informational tool:

- Point of care. Clinical information is now available in the patient's room where e-mail is not.
- Consistent location of information. Providers do not have to spend time finding and comparing e-mails and/or paper handouts.
- Speed of development. The charting tool can be created in a few minutes, disseminated to multiple providers, and updated multiple times a day by virtually anyone. No work order requests need to be sent to the IT department.
- Customization of the EHR. Whereas most EHR settings must be standardized across the entire institution, this charting tool can be customized and shared among a couple of providers, among a clinic setting, or a whole department.

POST-IMPLEMENTATION SURVEY RESULTS

About 3 months after ".SWINEUPDATE" was implemented, an informal survey was distributed by e-mail. (See Figures 2-5). There was a general positive response from those providers who accessed the charting tool

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Last updated 5/11 at 12:22PM by tyska.

Influenza Testing: Order "**RMISC**", where it says "what test would you like performed" put in "**influenza PCR**". In the comments section, list patient's symptoms so that lab can complete the state lab form. Use a **nasopharyngeal swab only. Blue top** medium is preferred, OK to use red top if no blue tops available. Testing will now be done at the state lab.

For high risk outpatients (for example, patients with underlying medical complications, transplant or immunocompromised patients), **DFA testing** should be performed. This can be done on the same swab. Simply add the request, "please perform DFA test" in the comments section of the PCR order.

Sometime in the next 48 hours, we should be notified about the process of accessing the state's supply of antiviral medication.

Figure 1. Portion of the ".SWINEUPDATE" SmartPhrase

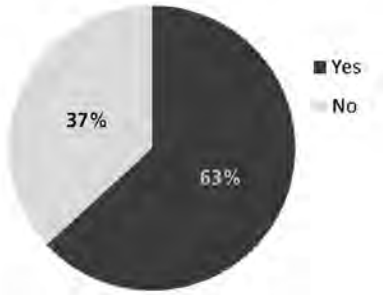

Figure 2. Are you aware of the existence of the EPIC SmartPhrase ".SWINEUPDATE"? *(Total of 36 respondents)*

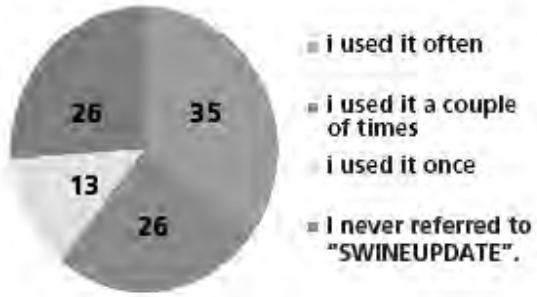

Figure 3. Within the past 3 months, approximately how many times have you referred to ".SWINEUPDATE"? (*n=23, excludes respondents who were not aware of existence of "SWINEUPDATE", n=23*)

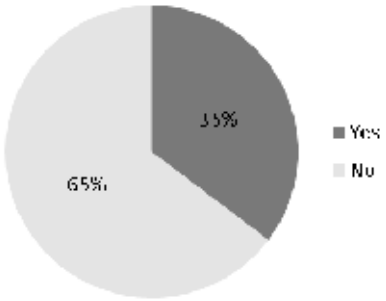

Figure 4. Did you refer to ".SWINEUPDATE" while in the exam room with a patient? (n=17, excludes respondents who never referred to ".SWINEUPDATE)

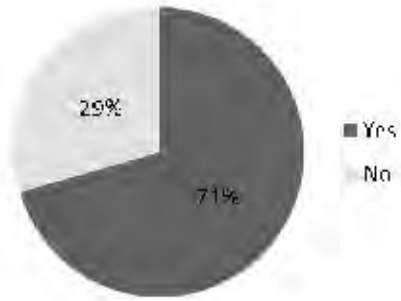

Figure 5. Did ".SWINEUPDATE" save you any time? (*n=17, excludes respondents who never referred to ".SWINEUPDATE*)

with approximately 70% answering "yes" to the question "Did '.SWINEUPDATE' save you any time?". Surprisingly, many providers were not even aware of the charting tool adaptation, with 30% answering "No" to "Are you aware of the existence of the EPIC SmartPhrase '.SWINEUPDATE'?" This lack of awareness likely reflects the fact that providers were primarily notified of the charting tool adaptation by e-mail and no formal demonstration was provided. Presumably usage and satisfaction would increase with formal explanation of the rationale and a demonstration of the charting tool adaptation.

CONCLUSION

We describe a workaround method to provide clinical recommendations within a health care system where no formal EHR clinical decision support tools are available. Overall the feedback has been positive within our clinical setting. While our clinical setting uses the EPIC EHR, likely there are similar charting tools in other EHRs and that can make this process reproducible. This is 1 more tool to help decrease clinical protocol confusion during the next influenza outbreak.

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2. Avoid the use of medical jargon. Words or phrases that are particular to conversations among medical personnel are inappropriate in scientific writing. (Examples: For "presented with" use "had;" for "experienced a weight loss" use "lost weight.")
3. Supply the full and correct names of drugs. Use generic names of drugs, unless the specific trade name of a drug is directly relevant to the discussion. Brand names may be inserted in parentheses.
4. Units of measure are to be provided in metric, followed by International System units (SI) in parentheses.
5. Provide each author's full name and highest academic degree in the byline.
6. Figure legends must be typed double spaced on pages separate from the text and figure. Abbreviations used in the figure must be listed in the legend and all symbols must be explained. All lettering and symbols must be of a readable size–12 pt is recommended.
7. Tables should be self-explanatory and should not duplicate the text or figures. Please place tables at the end of the document, with each on a separate page.

REVIEW PROCESS

1. Original research, review articles and case reports undergo a peer review process, with members of the editorial board and others with expertise on the subject serving as reviewers. The medical editor has the final decision as to whether these types of papers will be published.
2. Editorials, letters, and commentary are reviewed by the medical editor, Society staff, and legal counsel. Editorials and letters are signed by the authors, are the authors' opinions, and do not necessarily reflect the policies of the Society. Letters are limited to 500 words and subject to editing for length, clarity, and style.

REVISIONS

It is rare that a paper is accepted without revision. Authors should submit their revised version by sending a hard copy of the manuscript with an electronic version on a PC-compatible disk or e-mailing the file to wmj@wismed.org.

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The author will be asked to review a galley proof prior to publication to verify statements of fact. Galley proofs are for correcting minor and typographical errors only. Revisions in the paper are not possible at this stage and should have been made prior to final acceptance of the paper. Authors are responsible for all statements made in their work, including any changes made by the editors and authorized by the corresponding author.

QUESTIONS

If you have questions, contact the *Wisconsin Medical Journal* at 866.442.3800 or 608.442.3800, or e-mail wmj@wismed.org.

A Summer in Research on Newborn Screening

Abigail M. Bales, BS

I have always considered preventing future health problems and targeting the root of illness to be an important part of any physician's practice, but I did not really understand the term "public health" until my first year of medical school. Once I became aware of public health as a field, I immediately started to think about public health opportunities for the summer between my first and second years of medical school.

Through contacts in Madison, I learned of a summer genetics internship at the Marshfield Clinic, where I could work on a project related to the Wisconsin newborn screening program. Although I was somewhat hesitant to venture up to the Marshfield Clinic for the summer because it was out of my Madison comfort zone, I was intrigued by the promise of an interesting project at a renowned medical center. In the end, this internship was a great lesson in the realities of public health and medicine.

My main task for the summer was to research 22q11 deletion syndrome (22q11DS), otherwise known as DiGeorge or Velocardiofacial syndrome, in order to determine its suitability for addition to Wisconsin's newborn screening panel. At first glance, it seemed like a perfect candidate for newborn screening. The syndrome affects at least 1 in 5000 babies born, which is comparable to other diseases on the newborn screening panel. It is also associated with severe medical problems, such as cardiac defects, immune deficiency, and hypocalcemic seizures. Identifying newborns who have 22q11DS could allow for earlier treatment to improve outcomes. It might also relieve some of the stress of a "diagnostic odyssey" that families of affected children sometimes experience due to uncertain diagnosis. An inexpensive, accurate PCR (polymerase chain reaction) test was expected to be available soon in order to identify newborns with the gene deletion.

However, as I reviewed the literature and talked with state experts in the fields of newborn screening, genetics, public health, ethics, cardiology, and immunology, it became clear that the situation was much more complex. The syndrome varies widely between individuals; hypocalcemia and immunodeficiency requiring urgent care are seen in a minority of cases. Cardiac defects do occur in about three-quarters of the cases, but there is again quite a variety of manifestations, from ventricular septal defects to interrupted aortic arch. Some of these could be indentified on physical exam due to murmurs or cyanosis, so it is not clear that newborn screening would be of significant benefit in all cases. The situation is further complicated by factors including potential negative effects on parent-child bonding, the ethics of newborn screening for a condition including adulthood-presenting features such as mental illness, setting precedent for other newborn screening tests, and lack of proven benefits of early diagnosis. There is also risk for potential incidental findings of unclear significance, such as 22q11 duplication syndrome, a recently recognized microduplication syndrome whose features are not well defined beyond some cases of mental retardation, learning disability, growth retardation, and other problems. It has also been seen in individuals with no identifiable effects, so early diagnosis would likely offer little medical benefit.

Of course, weighing these risks and benefits depends on personal judgments, which vary between individuals. For example, in interviewing patients with 22q11DS and their families over the summer, I found that a majority felt the benefits of screening outweighed the risks, and many professionals I spoke to appeared to feel the same way. However, others, myself

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included, are a bit more hesitant and remain unconvinced that newborn screening will provide clear benefit. Medical technologies are advancing in a way that makes it likely we will soon have technologies to allow early diagnosis of a plethora of genetic diseases. In some cases, these early diagnoses may lead to dramatic benefit, as with diseases like phenylketonuria. However, I now realize that even if screening tests are available, they are not always appropriate, especially when management would not be dramatically altered. The mandated nature of newborn screening prevents families and individuals from making decisions consistent with their personal beliefs. It remains to be seen what decisions will be made at the state level regarding screening for 22q11DS, but in the course of my research it became clear that, as simple as the term "newborn screening" sounds to the general public, it is much more complex and deserves greater consideration than it is usually given.

Even though wrestling with this complex problem was rewarding on its own, leading to two manuscripts, one published in Genetics in Medicine and one under review by the Journal of Genetic Counseling, this research describes only a portion of my summer experience. While working in the Marshfield Clinic's Medical Genetics department, I had the chance to observe numerous patient appointments, covering genetic issues across the entire life span. I saw how genetics plays a role before birth, in instances of preconception advising and abnormal prenatal screening results. I saw the role of genetics consultations in childhood, including sweat tests for positive cystic fibrosis newborn screens, assessment of children with multiple congenital anomalies, and investigation for a genetic cause of a patient's autism. I saw, too, how genetics can be important in adulthood, providing guidance and treatment for diseases like Huntington's disease, hearing loss, and Marfan syndrome. These clinical experiences helped me to understand the role of genetics in primary care medicine in ways that my genetics course did not.

In addition to this clinical knowledge, I also learned important genetics skills that will help me treat patients in my future practice. A pedigree is an important tool for documenting a patient's detailed family history in a precise, yet expedient manner. After seeing the important information that can be drawn from an accurate pedigree, I'll never forget to inquire about all the appropriate details, such as half-siblings, Ashkenazi Jewish background, or age of onset of cancer. I am embarrassed to think of the many incomplete family histories I obtained from standardized patients last year, but after this experience, I won't make that mistake again.

I also acquired a taste of the specialized physical exam skills geneticists use. I never knew that measuring the distance between the eyes, the length of the fingers, or the flexibility of joints could be useful in diagnosis. Perhaps someday I will even be able to identify a genetic syndrome based on "facies" alone, like some clinicians can. If not, I now have a better idea of the diagnostic tests that can help with genetic diagnosis, including microarray, FISH (fluorescence in situ hybridization), and DNA sequencing. Even ultrasound can give valuable information for a prenatal genetic diagnosis.

Overall, this seemingly simple project (the suitability of 22q11 deletion syndrome for newborn screening) blossomed into an unforgettable experience in public health and its intersection with medicine. I'm sure I will carry the lessons of this summer far into my future medical practice.

Acknowledgments: I'd like to thank Christina Zaleski, MS, Elizabeth McPherson, MD, and Murray Katcher, MD, PhD, for their guidance on this project. I also thank the many experts who shared their insights over the summer. I gratefully acknowledge the Marshfield Clinic Research Foundation Internship Program, the Wisconsin Maternal and Child Health Block Grant, and UW-Madison's Shapiro Research program for funding contributions.

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1. Bales AM, Zaleski CA, McPherson EW. Newborn screening programs: should 22q11 deletion syndrome be added? *Genet Med. 2010;* 12(3): 135-144.

Barriers to Research in Rural Wisconsin

Alisha Fahley, University of Wisconsin School of Medicine and Public Health

With a Wisconsin Medical Society Foundation Fellowship during the summer of 2009, I had the opportunity to work with Janette F. Strasburger, MD, in Neenah to examine issues surrounding medical research in rural Wisconsin. As a member of the Wisconsin Academy for Rural Medicine, this project allowed me to do research on a topic that deeply interests me and also had the potential to help rural communities throughout Wisconsin.

The original goal of the project was to evaluate the current state of medical research in rural areas, specifically Northeast Wisconsin. Through this, we hoped to identify ways to improve and expand research being conducted in the area. Before such an expansion, current barriers to research must be identified and then addressed. This project therefore aimed to identify those barriers that prevent rural researchers from performing research projects that would ultimately benefit patients within those communities. Given that there are also barriers to disseminating and publishing results from rural research projects, this project sought to highlight some of the research currently being performed in rural communities in Northeast Wisconsin.

To identify barriers to medical research in rural communities, I spent the first half of my fellowship developing a survey about medical research for distribution to rural health care professionals in Northeast Wisconsin. The survey covered a variety of topics related to medical research, including perceptions of medical research as a whole, perceptions of publishing research results, and what place medical research currently holds, or should hold, within rural Wisconsin.

As part of the background work necessary to develop the survey, I spent time speaking with various health care professionals throughout Wisconsin. From these discussions, access to medical literature emerged as a significant barrier to both performing research and publishing the results, especially among those not affiliated with a university or hospital system. As such, the second part of my fellowship looked at issues surrounding access to medical literature for unaffiliated rural researchers in comparison to affiliated, university-based researchers. I compared the availability of article references in the first 3 months of the *Wisconsin Medical Journal* from 2009 for the 2 types of researchers above. Resources available at the 2 medical schools within Wisconsin served as the basis for affiliated researcher availability. For the unaffiliated researcher, PubMed and Google Scholar, as well as the state-sponsored resource Badger Link were used. Once I obtained the relative availabilities, I also calculated the average cost per article to obtain full text references. Specific findings from this assessment have been submitted for publication.

During the course of my project, it became clear that the improvement and expansion of medical research in rural communities will only be possible through the combined efforts and cooperation of the rural research teams, tertiary medical centers, the government, and the community. It is, therefore, our hope to use the results of our project to identify ways in which various groups can work together to improve medical research in rural Wisconsin.

This fellowship experience provided me with an excellent opportunity to grow both personally and professionally. I was able to learn a great deal about the research process including the development, execution, and analysis of a project. I experienced the many obstacles that may occur during the course of a research project and learned how best to work through them to complete the project. I also learned about the importance of collaboration with a wide variety of individuals and organizations. These are skills I will take with me as I continue in my medical career.

The goal of the Wisconsin Medical Society Foundation's Summer Fellowship in Government and Community Service Program is to provide medical students a public health research opportunity within a Wisconsin community. The experience exists to educate students about ways in which the medical profession can work to improve health through connections to both community organizations and government. Each student receives a $3500 stipend. The fellowships require the support of donors to make the experience possible and physician mentors who help guide and foster students' projects.

In 2009, the Foundation provided 6 fellowships, which will be highlighted in the *Wisconsin Medical Journal* throughout the year. For more program information and sponsorship opportunities, please contact Foundation Executive Director, Rebecca Thompson, CPA, at rebecca.thompson@wismed.org.

WHITEC: The Wisconsin Health Information Technology Center

Jay A. Gold, MD, JD, MPH; Ashley Green

Meaningful Use. EHRs. Incentives. Prominent catchwords in the current national discussion on health care reform. Each presents challenging implications in its own right, but taken together they signify a veritable flood of government policies, technological practices, and financial promises that can seem overwhelming to even the most savvy medical practices trying to navigate the brave new world of health information technology (HIT).

A provision of the American Recovery and Reinvestment Act of 2009, the HITECH (Health Information Technology for Economic and Clinical Health) Act set as its goal the transformation of the quality, efficiency, and safety of American health care through the "meaningful use" of electronic health records (EHRs). Of course, physicians must play a central role in attaining such a goal. Many physicians, however, find themselves struggling to implement new HIT—such as EHRs—on their own and have few resources and little time to spare. Such lack of experience and capital, coupled with the threat of future Medicare penalties for not demonstrating meaningful use, seems poised, as it were, to sweep some smaller practices out to sea.

Enter WHITEC, the Wisconsin Health Information Technology Extension Center, 1 of 60 HIT Regional Extension Centers (RECs) funded through cooperative agreement with the Office of the National Coordinator for Health Information Technology (ONC). WHITEC is operated as a division of MetaStar, and is a joint venture of MetaStar, the Wisconsin Medical Society, the Rural Wisconsin Health Cooperative, the Wisconsin Hospital Association, and the Wisconsin Primary Health Care Association. In addition, the Wisconsin Department of Health Services is represented on WHITEC's steering committee.

WHITEC's goal is to facilitate Wisconsin's effort to promote the widespread meaningful use of EHRs. The purpose of such HIT Regional Extension Centers is to provide education, outreach, and technical assistance to certain primary care providers in their region to assist them in selecting, successfully implementing and achieving meaningful use of certified EHR products. WHITEC sees itself on the side of the physician, providing assistance to the practice that is "shoulder to shoulder and elbow to elbow," according to David Blumenthal, MD, the current National Coordinator for HIT.

Although WHITEC serves all Wisconsin health care professionals across the continuum of care, right now there are financial subsidies for priority primary care providers, who comprise WHITEC's first mandate. Priority primary care providers include individual and small group practices, as well as certain public and critical access hospitals, federally qualified health centers, community health centers, certified rural health clinics, and generally those practices serving uninsured, underinsured, and medically underserved populations.

The technical assistance WHITEC provides to physician practices falls under 4 broad categories: planning, vendor selection, implementation, and meaningful use. Once a practice signs an agreement with the center, WHITEC conducts a readiness assessment to help determine a customized "road map" of assistance for that practice.

For practices without an EHR, the vendor selection services offered by the center may be reason enough to sign an agreement. With the hundreds of EHRs available on the market today, a practice can become easily mired in the process of finding a certified vendor that offers the functionality that meets the practice's individual

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goals while still having the capabilities to achieve the meaningful use standard. WHITEC is firmly vendor-neutral and is thus in a position to offer unbiased advice to physicians regarding selection of the EHR that best fits the unique needs of their practice. EHR vendors that agree to certain criteria established by WHITEC can join WHITEC's preferred vendor list—and this tool can greatly streamline the selection, contracting, and installation stages of the implementation phase of assistance. With expertise in a number of preferred vendors, WHITEC serves as a liaison between the practice and the vendor during the implementation phase, saving a great deal of time and effort for the practice. If a practice has a pre-established vendor relationship, WHITEC will also collaborate closely with the practice to maximize results, an approach that reflects WHITEC's commitment to practice partnership and open collaboration.

What chiefly differentiates the services and mission of WHITEC from the vendors or consulting firms in the private marketplace is WHITEC's focus on achieving and sustaining meaningful use. There is an important point for physicians to keep in mind with regard to the available Medicare or Medicaid incentives: although incentive payments, practically speaking, will be used by physicians to offset their investments in an EHR, the payments are not regarded by CMS as direct reimbursement for that investment. Rather, the incentive payments are viewed as a reward for demonstrating the meaningful use of EHR technology in their practice of medicine. WHITEC's focus on meaningful use ensures that the practice will comply with the meaningful use standard as defined by CMS so that they can receive the incentive payments.

WHITEC's services do not end with the successful implementation of a new EHR. Rather, WHITEC continues to work with the practices until they achieve meaningful use and can sustain it in the long run. Not only does WHITEC partner with those practices implementing an EHR for the first time, it also works with practices that already have an EHR but who are having trouble optimizing it to achieve meaningful use. As a non-profit organization that takes its commitment to improve the quality of health care seriously, WHITEC is mission-driven rather than profit-driven. Thanks to the subsidies it receives from the government, its fees are minimal compared to those charged by the typical consulting firm. WHITEC's own milestones are also completely aligned with those of the practices they serve: WHITEC receives its subsidies as practices successfully go live with a certified EHR and when the practices achieve meaningful use benchmarks.

Given the relatively short timeline for implementing EHRs in order to receive incentive payments, it behooves those practices that are considering adoption of an EHR or optimization of their existing EHR to register with WHITEC as soon as possible. Incentive payments begin in May 2011, so practices will need to begin their EHR implementations as soon as possible in order to maximize the amount of incentives they receive ($44,000 per eligible provider under the Medicare program, $63,750 under Medicaid). With the recent release of the final rule (Stage 1) for meaningful use—essentially, a list of 25 criteria and related measures—by CMS on July 13, 2010, the way has been cleared for those physicians and hospitals that have been hesitant up to this point to move forward with the process.

To learn more about meaningful use, EHRs, and incentive payments—and how WHITEC can help your practice—please visit WHITEC's website at www.whitec.org. A regularly scheduled webinar with question and answer sessions afterward is available if you would like more information.

Valerie J. Gilchrist, MD

Robert N. Golden, MD

Dean's Corner

Birthday Reflections for Family Medicine at the University of Wisconsin

Valerie J. Gilchrist, MD; Robert N. Golden, MD

Family Medicine at the University of Wisconsin celebrates its 40th birthday this year. It is remarkable how the seed planted in 1970 as one of the first 15 family practice residencies in the United States—which subsequently has been nourished by support from the State of Wisconsin—has flourished. The UW Department of Family Medicine is consistently ranked among the top 5 in our nation, based on its outstanding achievements in the interwoven missions of patient care, education, and research. Our faculty and staff provide care in 26 statewide clinics, with nearly a half million patient visits each year. We have grown to include more than 200 faculty members, another 225 statewide volunteer faculty, and nearly 800 employees in the department. Over two-thirds of the family physicians in Wisconsin have connections to the department. Many are graduates of the School of Medicine and Public Health and/or the department's residency programs; others are volunteer faculty members or collaborators in our community practice-based research network, Wisconsin Research and Evaluation Network (WREN). Wisconsin's strength in family medicine is especially timely considering the unmet and growing needs for primary care physicians throughout the state.

The University of Wisconsin Family Practice Residency was created in Madison in 1970 as 1 of the original 15 programs in the United States. The visionary leadership of John Renner, MD, called for a department that reflected the Wisconsin Idea that "the boundaries of the campus are the boundaries of the state." Thus, the Department of Family Medicine soon established residency and teaching programs at Milwaukee (1974), Eau Claire (1975), Wausau (1978), and in the Fox Valley (1980). All residency sites are MD and DO dual accredited. Each year, 30 to 35 new family physicians graduate from our programs. The department also supports 5 fellowships in academic medicine, integrative medicine, primary care research, sports medicine, and faculty development.

The Department of Family Medicine has long recognized the vital interplay between research and both patient care and training. Its outstanding research programs provide remarkable benefits to patients, who have access to state-of-the-art, cutting-edge, evidence-based practice, and to trainees who train for the future. Our faculty and staff have gained national stature in research in several vital areas, including alcohol addiction, native community health, and childhood obesity and nutrition. The department houses one of the country's leading programs in integrative medicine. Faculty serve in very prominent national leadership roles, including membership in the Institute of Medicine and the National Library of Medicine and as president of the World Organization of Colleges and Assemblies, and vice president at the AMA. Within the UW School of Medicine and Public Health, family medicine faculty serve in many top leadership positions, including associate dean for Rural and Community Health, director of the Wisconsin Academy for Rural Medicine program (WARM), associate dean for students, associate dean for Medical Education of the Milwaukee Academic Campus, and director of the Training in Urban Medicine and Public Health (TRIUMPH) program.

While we are proud of the outstanding achievements of the past 4 decades, we are now focused on the future challenges confronting the department, and indeed the nation. There is a growing shortage of family physicians, and their geographic distribution is not aligned well with the needs of Wisconsin. We especially need more primary care physicians in rural and underserved areas of the state, yet fewer medical school graduates are entering family medicine and primary care

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fields, and only a fraction of them develop practices in rural settings. There are substantial and daunting factors that must be addressed, including relatively low compensation and growing administrative requirements. A recent study shows that primary care physicians have average lifetime earnings that are $2.7 million less than those of other medical specialties. The vital functions of coordinating care and communicating with patients and their families are not compensated by most health care finance systems. Family physicians take care of people, not just diagnoses. Yet most current payment systems are based on pay for diagnoses or procedures rather than health promotion, disease prevention, and care for the person. Primary care physicians get paid more for removing a mole, for example, than trying to get hypertensive patients to take their medications. The vital but uncompensated work of communicating, reviewing reports and coordinating care for patients not in the office takes 20% to 25% of the average work day. These important functions are key elements of any efficient and effective health care system, and are extremely important in the lives of our patients and their families. Health care funding must be redesigned to support these cost-effective functions.

"Life begins at 40," and we are just beginning to recognize how much lies before us, including many unanswered questions about the practice of family medicine. Most published research focuses on the treatment of a single disease in specialized settings—what can work under controlled conditions—rather than what will work in the real world with real patients. Patients rarely walk into the office with just hypertension, but rather present with hypertension, obesity, diabetes, depression, hyperlipidemia, and osteoarthritis. What are the best treatments for these patients, especially when their families have limited incomes?

As we pursue our mission—"Improving the health of the people of Wisconsin and the nation through leadership in patient care, education and research"—in our 5th decade, we embrace the challenge of leading through innovation. We will integrate the insights afforded by research and education in our care for patients. We feel very fortunate that our department and its programs are extremely well positioned to serve the people of Wisconsin, and by extension, serve as an example for the rest of the nation, as we demonstrate the powerful impact of academic family medicine on the health of our communities.

Five Things Every Physician Needs to Know About Freebies and Discounts

Alyce C. Katayama, JD; Lisa A. Lyons, JD

It's still true—Mom was right: there is no such thing as a free lunch. Below are 5 things every physician needs to know about freebies and discounts.

1. Do not Offer Routine Waivers of Co-Pays and Deductibles

Physicians should not routinely reduce or waive co-payments and deductibles for insured patients, including Medicare and Medicaid patients. Routinely waiving co-pays and deductibles is considered a fraudulent misrepresentation of physician charges against payors, as well as an improper inducement of patients to use the provider. Such waivers are prohibited by Wis. Stat. §146.905(2)[1] and by the federal Anti-Kickback Statute (AKS)[2] and Civil Monetary Penalty Law.[3] Furthermore, most insurance contracts require providers to bill and collect all copayments and deductibles, and to waive is therefore a breach of contract.

Waivers and other discounts are allowed on a case-by-case basis for a patient's financial hardship.[4] The following rules should be followed for hardship waivers/discounts:

- Have a written policy defining "hardship" (e.g. meeting federal poverty levels, eligible for Medicaid, etc.) and apply the policy uniformly.
- Waive the co-pay and/or deductible only after determining in good faith that the individual is in financial need or after making reasonable (but failed) collection efforts.
- Do not advertise the waiver program or solicit patients for the program.
- Do not make waivers routinely.

The foregoing laws apply only to insured patients (commercial and governmental); waivers may be offered to self-pay patients.

2. Offer Patient Discounts Only to Self-Pay Patients

Discounts, such as prompt-pay and cash-up-front discounts, should not be given to insured patients in Wisconsin. Interestingly, the federal AKS allows legitimate discounts reflecting actual savings to the provider.[5] However, such discounts would be considered a reduction or elimination of cost-sharing amounts, which are prohibited by Wis. Stat. §146.905 except in cases of financial hardship. The discounts could also violate Wisconsin's insurance fraud law, Wis. Stat. §943.395, which could be avoided if the insurer was notified of the discount. However, nothing in Wis. Stat. §146.905 indicates that notice of the discount to the insurer will cure a violation, and that is why such discounts are not allowed in Wisconsin.

Be wary of an unpublished 2004 Wisconsin Attorney General Opinion stating that prompt pay discounts are allowed under §§943.395 and 146.905, so long as the insurer is fully informed of the discount and the discount is offered without discrimination. The opinion rests on public policy and cannot be harmonized easily with the actual language in Wis. Stat. §146.905 and should not be relied on.

So, the only patients who can be offered these types of discounts in Wisconsin are self-pay patients.[6] However, even with self-pay patients, physicians must be careful of offering discounts so often or so large that they affect the physician's "usual and customary" charge. This could lead to liability under the Wisconsin insurance fraud law[7] as well as federal law, which allows OIG to exclude providers from Medicare or Medicaid if they submit bills for amounts that are "substantially in excess" of the their "usual charge."[8]

Follow these rules for a compliant discount plan:

- The discount must bear a reasonable relationship to the amount saved by the practice.
- Offer the discount only to self-pay patients.
- Do not advertise the discount.

3. Give Only Very Small Gifts to Patients

As a general rule, physicians should avoid giving gifts to patients. Three important laws prohibit gifts from physicians to patients: the federal

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anti-inducement provisions of HIPAA,[9] the AKS, and Wis. Stat. §49.49 (Medical Assistance anti-kickback statute), all of which prohibit remuneration that is likely to or intended to influence the patient's choice of provider.

It is permissible to give inexpensive non-cash gifts,[10] but consider these rules:

- Keep the gift nominal (no more than $10 per gift/$50 annually, per patient).
- Track the gifts by patient and amount.
- Do not advertise the giveaways.
- Do not give cash or cash equivalents.

It is also allowable to offer preventive care if it is (1) covered by Medicare or Medicaid and (2) either prenatal or postnatal well-baby care or services described in the *Guide to Clinical Preventative Services.*[10]

The above laws apply only to government-pay patients. While there are no laws that specifically prohibit gifts to commercially insured or self-pay patients, we recommend that all patients be treated equally, which means using the same limited gift policy for all patients.

4. Avoid Gifts to and from Referral Sources

Physicians should ignore the old saying "it is better to give than to receive" and refrain from gifting to or from referral sources and business partners.

Gifts between physicians and referral sources or business partners may implicate the federal AKS. A gift can violate the AKS even if only 1 of its purposes is to induce referrals or business payable by a federal health program. There is no AKS "safe harbor" that covers the giving or receiving of gifts. Therefore, physicians should graciously say "no" to the cruise vacation offered by the drug rep, and send a nice card to the neighboring physician in lieu of an expensive gift certificate.

Further, if the gift-giver provides any "designated health services" (eg radiology, physical therapy, lab, etc), the gift will be considered "compensation" under the federal Stark self-referral law and regulations,[11] thereby prohibiting Medicare referrals from the recipient to the gift-giver unless a Stark exception is met. While there is a Stark exception that covers nonmonetary compensation under $300 per year per physician recipient, the compensation must not be:

- Related to the physician's referrals or business to the giver
- Solicited by the physician
- Violative of the AKS

Most gifts between physicians and referral sources would not meet these requirements (particularly the no-AKS violation requirement), and therefore would be prohibited.

5. Proceed with Caution on Professional Courtesy

Professional courtesy is a time-honored tradition of providing medical care to physician colleagues or their families free of charge or at a reduced rate. However, the skeptic might see it as an inducement to the recipient to refer patients to the provider, in violation of the AKS and also the Stark law (if the physician offering the courtesy is a provider of designated health services). There is no AKS safe harbor for professional courtesy, and the applicable Stark exception covers only courtesy plans offered by entities with "formal medical staffs." Therefore, physicians take some risk when offering professional courtesy. Best practice would be as follows:

- Offer professional courtesy on a non-discriminatory basis, meaning not just to those professionals who send business or patients to you.
- Require that the courtesy be reciprocal, so that it can be shown that the giver is receiving something of equal value in return.

References

1. Wis. Stat. §146.905 provides, "(1) A health care provider…that provides a service or product to an individual with coverage under a disability insurance policy… may not reduce or eliminate or offer to reduce or eliminate coinsurance or a deductible required under the terms of the disability insurance policy. (2) Subsection (1) does not apply if payment of the total fee would impose an undue financial hardship on the individual receiving the service or product."
2. 42 USC §1320a-7b(b).
3. 42 USC §1320a-7a(i)(6)(A) (expanded the definition of "remuneration" to include routine waivers of coinsurance and deductibles, for purposes of imposing civil monetary penalties).
4. Section 1128A(a)(5) (exception to definition of "remuneration" for non-routine waivers for financial hardship).
5. See OIG Advisory Opinion 08-03 favorably addressing a prompt-pay discount to Medicare and other insured patients.
6. Discounts could also be offered to patients who are insured, but the physician practice does not have a contract with the insurer, and the insurance company remits payment directly to the patient.
7. Wis. Stat. §943.395.
8. 42 USC §1320a-7(b)(6)(A) (note that regulations clarifying "usual charge" were proposed in 2003 but later withdrawn).
9. Section 1128A(a)(5) of the Social Security Act; 42 CFR 1003.101.
10. 42 CFR §1003.102(b)(13) (anti-inducement regulations).
11. Section 1877 of the Social Security Act; 42 CFR §411.351 et seq.

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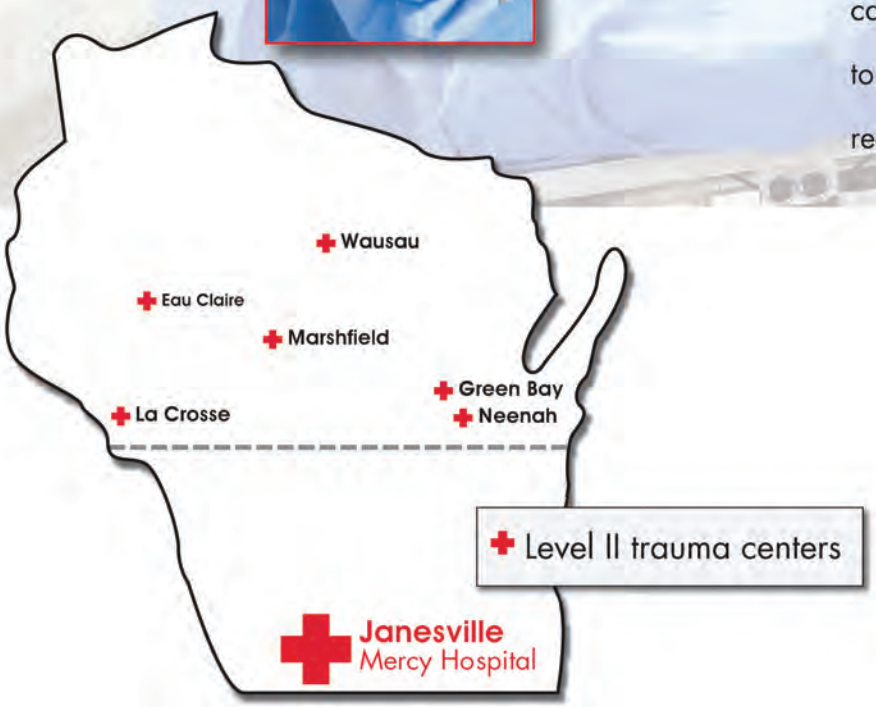

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