advancing the art & science of medicine in the midwest

WMJ

volume 110 · no. 3 · june 2011

Building bridges: collaboration promotes healthy communities

12th Annual Midwest Coding & Practice Management Symposium

EDUCATION. NETWORKING. RESULTS.

The Total Package.

With relevant, timely topics presented by top-notch speakers, this information-packed learning opportunity is one you won't want to miss. Two pre-symposium sessions and 32 break-out sessions will keep you on the road to success.

Session topics

- **ICD-10**
- **Evaluation and management (E/M) coding**
- **Practice management**
- **Compliance and quality**
- **Specialty coding**
- **Billing/payers**

Learn more at
www.wisconsinmedicalsociety.org/education/2011_symposium.

September 18 – 20, 2011
Kalahari Resort and Convention Center, Wisconsin Dells

Wisconsin Medical Society
Your Doctor. Your Health.

MEDICAL OFFICES

HEALTHWORKS®

License. Patients. Records. Society.

It's what you need to do business.

Looking to keep your medical business in good health? Then make an appointment with Society® Insurance. From property/casualty to workers compensation, our HEALTHWORKS package offers unique and comprehensive coverage that can be customized to meet the needs of your healthcare facility. When it comes to medical business insurance you can feel good about, HEALTHWORKS from Society is just what the doctor ordered.

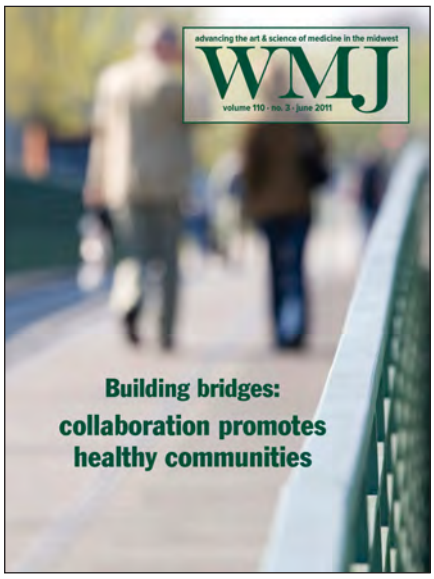
Society Insurance is endorsed by: Wisconsin Medical Society Insurance & Financial Services, Inc.

SOCIETY INSURANCE®
UNCOMMON INSURANCE®

150 Camelot Drive
P.O. Box 1029
Fond du Lac, WI 54936
888-5-SOCIETY
(888-576-2438)
societyinsurance.com

Volume 110, no. 3 • June 2011

WMJ



COVER THEME
building bridges: collaboration promotes healthy communities

Collaboration is a concept often touted, but not always achieved. This issue of *WMJ* contains papers that describe how clinical care, research, and community health can benefit from new directions that bring people together for organization or community interest—examples of ways successful collaboration can build bridges to healthier communities.

Cover design by Mary Kay Adams-Edgette.

The mission of *WMJ* is to provide a vehicle for professional communication and continuing education for Midwest physicians and other health professionals. *WMJ* is published by the Wisconsin Medical Society.

advancing the art & science of medicine in the midwest

The *WMJ* (ISSN 1098-1861) is published by the Wisconsin Medical Society and is devoted to the interests of the medical profession and health care in the Midwest. The managing editor is responsible for overseeing the production, business operation and contents of the *WMJ.* The editorial board, chaired by the medical editor, solicits and peer reviews all scientific articles; it does not screen public health, socioeconomic, or organizational articles. All articles published herein, including commentaries, letters to the editor and editorials represent the views of the authors, for which neither *WMJ* nor the Wisconsin Medical Society take responsibility, unless clearly stated. Advertising content is the responsibility advertiser and does not imply an endorsement or sponsorship by *WMJ* or the Wisconsin Medical Society and its affiliates unless specified. *WMJ* is indexed in Index Medicus, Hospital Literature Index, and Cambridge Scientific Abstracts.

Send manuscripts to *WMJ*, 330 E Lakeside St, Madison, WI 53715. Instructions to authors are available at www.wmjonline.org, call 866.442.3800, or e-mail wmj@wismed.org.

SUBSCRIPTION RATES
Members: included in membership dues. Non-members: $149. Current year single copies, $25 each. Previous years' single copies, when available, $12 each.

Periodical postage paid in Madison, Wis, and additional mailing offices.

Published every other month, beginning in February. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917. Authorized August 7, 1918.

Address all correspondence to *WMJ*, PO Box 1109, Madison, WI 53701. Street address: 330 E Lakeside St, Madison, WI 53715; e-mail: WMJ@wismed.org

POSTMASTER
Send address changes to: WMJ, PO Box 1109, Madison, WI 53701

ISSN 1098-1861
Established 1903

Recommendation for management of *I scapularis* bites draws mixed reactions

To the Editor:

I was disappointed with the review article "The Management of *Ixodes scapularis* Bites in the Upper Midwest" by Elizabeth Maloney, MD.[1] When controversy regarding a condition or treatment results in wide variation in diagnostic and therapeutic approaches, "guidelines" for diagnosis and treatment, developed and published by an authoritative body using the best science available, may be developed in an effort to limit variation and improve outcome. The Infectious Disease Society of America (IDSA) developed such guidelines, as the author correctly points out and effectively reviews and summarizes.

Amazingly, in spite of acknowledging that evidence supporting an "alternative recommendation" is limited, Dr Maloney proceeds to advocate such an alternative based on "deductive" reasoning. At the very least, I would expect some citation of evidence suggesting that the rate of identifiable disease associated with *I scapularis* bites is increased if not given prophylaxis. As limited as the research regarding tick-borne disease may be, and as limited as the IDSA Guidelines may be, I see no evidence offered by Dr Maloney suggesting the need or desirability of not following the IDSA guidelines.

Paul K. Wegehaupt, MD, FAAP
Ministry Medical Group, Rhinelander, Wis

Conflict of Interest Disclosure: The author completed and submitted the ICMJE Form for Disclosure of Potential Conflict of Interest; none was reported.

Reference

1. Maloney EL. The management of *Ixodes scapularis* bites in the upper Midwest. *WMJ.* 2011;110(2):78-81.

• • •

To the Editor:

Doctor Maloney's authoritative article regarding tick-borne diseases in the April issue of *WMJ*[1] is timely coming at the beginning of heightened tick activity in the spring. Located in the central bird migratory corridor, the Midwest is the site of diseases spread by ticks that travel with birds and find resident intermediate hosts. As Maloney points out, local education about tick-borne diseases is essential. Minimizing tick exposure is a primary preventive measure.

Lyme disease (LD) caused by the spirochete bacteria *Borrelia* is the most frequently encountered of these tick-borne disease. LD is easily diagnosed and effectively treated. A centrifugally expanding annular erythema migrans (EM) rash heralds the disease in 30% to 60% of infected people and should be immediately treated. If an individual is seronegative 6 weeks after tick exposure, LD is unlikely. The prophylactic single oral dose of doxycycline advocated by the IDSA guidelines to prevent LD from a tick bite[2] is dangerous and should be avoided. This recommendation was based on a flawed 2001 paper by the guideline chairman showing that a single dose blocked both seroconversion (87%) and EM. The single antibiotic dose blocked neither disease (flu-like symptoms) nor long-term signs of infection (<6 week follow-up made evaluation impossible).

The capacity of inadequate doses of antibiotics to block skin and antibody responses had been shown previously. In 1952, an inadequate dose of penicillin was shown to abrogate the skin manifestations of rabbit syphilis[3] without stopping infection, and inadequate doses of antibiotics have been shown to block seroconversion in man also without curing the infection.[4,5] More ominous, the guideline risks leaving treated people with persistent *Borrelia* infections for years and little anti-*Borrelia* antibodies to indicate the cause. Sixty percent to 80% of mice given the recommended oral regime at the time of infection developed persistent borreliosis.[6]

Physicians in the Midwest need to recognize tick-borne diseases and avoid treating tick bites prophylactically with the recommended single oral doxycycline regimen. Twenty days of daily doxycycline in patients older than 8 effectively treats several diseases spread by ticks.[2]

David J. Volkman, PhD, MD
Emeritus Professor of Medicine and Pediatrics
State University of New York, Stony Brook

Conflict of Interest Disclosure: The author completed and submitted the ICMJE Form for Disclosure of Potential Conflict of Interest; none was reported.

References

1. Maloney EL. The management of Ixodes scapularis bites in the upper Midwest. *WMJ.* 2011;110(2):78-81.

2. Wormser GP, Dattwyler RJ, Shapiro ED, et al. The clinical assessment, treatment, and prevention of Lyme disease, human Granulocytic anaplasmosis, and babesiosis: clinical practice guidelines by the Infectious Diseases Society of America. *Clin Infect Dis.* 2006;43(9):1089-1134.

3. Hollander DH, Turner TB, Nell EE. The effect of long continued subcurative doses of penicillin during the incubation period of experimental syphilis. *Bull Johns Hopkins Hosp.* 1952;90:105-20.

4. Dattwyler RJ, Volkman DJ, Luft BJ, Halperin JJ, Thomas J, Golightly MG. Seronegative late Lyme borreliosis: dissociation of Borrelia burgdorferi specific T and B lymphocyte responses following early antibiotic therapy. *N Engl J Med.* 1988;319:1441-1446.

5. Luft BJ, Dattwyler RJ, Johnson RC, et al. Azithromycin compared with amoxicillin in the treatment of erythema migrans: a double blind, randomized, controlled trial. *Ann Intern Med.* 1996;124:785-791.

6. Zeidner N, Massung R, Dolan M, et al. A sustained-release formulation of doxycycline hyclate (Atridox) prevents simultaneous infection of Anaplasma phagocytophilum and Borrelia burgdorferi transmitted by tick bite. *J Med Microbio.* 2008;57:463-468.

Dulera®
(mometasone furoate/
formoterol fumarate dihydrate)
Inhalation Aerosol

DULERA is indicated for the treatment of asthma in patients 12 years of age and older.

Offer a world with powerful efficacy

DULERA is NOT indicated for the relief of acute bronchospasm.

▶ Visit dulera.com

Selected Important Safety Information about DULERA

WARNING: ASTHMA-RELATED DEATH

Long-acting beta$_2$-adrenergic agonists (LABA), such as formoterol, one of the active ingredients in DULERA, increase the risk of asthma-related death. Data from a large placebo-controlled U.S. study that compared the safety of another LABA (salmeterol) or placebo added to usual asthma therapy showed an increase in asthma-related deaths in patients receiving salmeterol. This finding with salmeterol is considered a class effect of the LABA, including formoterol. Currently available data are inadequate to determine whether concurrent use of inhaled corticosteroids or other long-term asthma control drugs mitigates the increased risk of asthma-related death from LABA. Available data from controlled clinical trials suggest that LABA increase the risk of asthma-related hospitalization in pediatric and adolescent patients.

When treating patients with asthma, prescribe DULERA only for patients with asthma not adequately controlled on a long-term asthma control medication, such as an inhaled corticosteroid, or whose disease severity clearly warrants initiation of treatment with both an inhaled corticosteroid and LABA. Once asthma control is achieved and maintained, assess the patient at regular intervals and step down therapy (e.g., discontinue DULERA) if possible without loss of asthma control, and maintain the patient on a long-term asthma control medication, such as an inhaled corticosteroid. Do not use DULERA for patients whose asthma is adequately controlled on low or medium dose inhaled corticosteroids.

Please read Brief Summary of the Prescribing Information, including Boxed Warning about asthma-related death, on following pages.

DULERA is indicated for the treatment of asthma in patients 12 years of age and older.
DULERA is NOT indicated for the relief of acute bronchospasm.

Consider DULERA

IN A CLINICAL STUDY WITH DULERA 100 mcg/5 mcg*

- Patients experienced significant improvement in lung function (FEV_1 AUC [0-12 hr]) at Week 12 (co-primary endpoint) that was maintained through Week 26 (versus patients on mometasone furoate 100 mcg).[1]
- Significantly fewer patients experienced clinically judged deterioration in asthma or reductions in lung function† through Week 26 (versus patients on formoterol fumarate 5 mcg).[1]
- Patients experienced significant reduction versus patients on placebo in total SABA use and in proportion of nights with nocturnal awakenings.[1]
- Metered-dose inhaler comes in 2 dosage strengths with an integrated numeric dose counter.

Selected Important Safety Information about DULERA

- DULERA is contraindicated in the primary treatment of status asthmaticus or other acute episodes of asthma where intensive measures are required. DULERA is contraindicated in patients with known hypersensitivity to any of the ingredients in DULERA.
- DULERA is NOT a rescue medication and does NOT replace fast-acting inhalers to treat acute symptoms. Increasing use of inhaled, short-acting $beta_2$-agonists is a marker for deteriorating asthma. In this situation, the patient requires immediate re-evaluation with reassessment of the treatment regimen.
- Patients using DULERA should not use additional formoterol or other long-acting inhaled $beta_2$-agonists for any reason.
- Oropharyngeal candidiasis may occur. If candidiasis develops, it should be treated with appropriate antifungal therapy, but at times therapy with DULERA may need to be interrupted. Advise patients to rinse the mouth after inhalation.
- DULERA should be used with caution in patients with tuberculosis, fungal, bacterial, viral (including chickenpox or measles), or parasitic infections; or ocular herpes simplex infections because of the potential for worsening of these infections. A more serious or even fatal course of chickenpox or measles can occur in susceptible patients.
- Particular care is needed for patients who are transferred from systemically active corticosteroids to DULERA. Deaths due to adrenal insufficiency have occurred in asthmatic patients during and after transfer from systemic corticosteroids to less systemically available inhaled corticosteroids.
- Hypercorticism and adrenal suppression may occur with very high dosages of DULERA or at the regular dosage in susceptible individuals. Patients treated with DULERA should be observed carefully for any evidence of systemic corticosteroid effects. If such changes occur, discontinue DULERA slowly.
- Caution should be exercised when considering the coadministration of DULERA with long-term ketoconazole and other known strong CYP3A4 inhibitors, or in patients being treated with MAO inhibitors or tricyclic antidepressants.
- Discontinue DULERA and institute alternative therapy if paradoxical bronchospasm occurs.
- Excessive beta-adrenergic stimulation has been associated with central nervous system and cardiovascular effects. DULERA should be used with caution in patients with cardiovascular disorders, especially coronary insufficiency, cardiac arrhythmias, and hypertension.
- Decreases in bone mineral density (BMD) have been observed with long-term administration of products containing inhaled corticosteroids, including mometasone furoate, a component of DULERA.

Reference: 1. Nathan RA, Nolte H, Pearlman DS; for P04334 Study Investigators. Twenty-six-week efficacy and safety study of mometasone furoate/formoterol 200/10 µg combination treatment in patients with persistent asthma previously receiving medium-dose inhaled corticosteroids. *Allergy Asthma Proc.* 2010;31(4):269-279.

Please read Brief Summary of the Prescribing Information, including Boxed Warning about asthma-related death, on following pages.

*In a 26-week, placebo-controlled study of 781 patients 12 years of age and older comparing DULERA 100 mcg/5 mcg (n=191), mometasone furoate 100 mcg (n=192), formoterol fumarate 5 mcg (n=202), and placebo (n=196), each administered as 2 inhalations twice daily by metered-dose inhalation aerosols. All other maintenance therapies were discontinued. This study included a 2- to 3-week run-in period with mometasone furoate 100 mcg, 2 inhalations twice daily. Patients had persistent asthma that was not well controlled on a medium dose of ICS prior to randomization. All treatment groups were balanced with regard to baseline characteristics.[1]

The co-primary endpoints were FEV_1 AUC (0-12 hr) and clinically judged deterioration in asthma or reductions in lung function.[1]

†Deteriorations in asthma (any one of these asthma events)[1]:

- FEV_1 decrease of 20%
- PEF decrease of 30% on 2 or more consecutive days
- Emergency treatment, hospitalization, or treatment with systemic corticosteroids or other asthma medications not allowed per protocol

AUC=area under the curve; FEV_1=forced expiratory volume in 1 second; ICS=inhaled corticosteroid; PEF=peak expiratory flow; SABA=short-acting $beta_2$-adrenergic agonist.

Patients with major risk factors for decreased BMD should be monitored and treated with established standards of care.

- Inhaled corticosteroids, including DULERA, may cause a reduction in growth velocity when administered in pediatric patients.
- Glaucoma, increased intraocular pressure, and cataracts have been reported following the use of long-term inhaled corticosteroids, including mometasone furoate, a component of DULERA.
- DULERA, like other medications containing sympathomimetic amines, should be used with caution in patients with convulsive disorders or thyrotoxicosis; and in patients who are unusually responsive to sympathomimetic amines. Doses of the related $beta_2$-agonist albuterol, when administered intravenously, have been reported to aggravate preexisting diabetes mellitus and ketoacidosis.
- Be alert to hypokalemia and hyperglycemia as $beta_2$-agonist medications such as DULERA have the potential to produce adverse cardiovascular effects.
- The most common treatment-emergent adverse events reported in ≥3% of patients and more common than placebo included nasopharyngitis, sinusitis, and headache.
- Dysphonia was reported in a longer-term treatment trial at an incidence of 5% in patients receiving DULERA 100 mcg/5 mcg and 3.8% in patients receiving DULERA 200 mcg/5 mcg.

MERCK

Dulera®
(mometasone furoate/ formoterol fumarate dihydrate) Inhalation Aerosol

DULERA®

(mometasone furoate and formoterol fumarate dihydrate) Inhalation Aerosol

BRIEF SUMMARY (For full Prescribing Information, see package insert.)

WARNING: ASTHMA-RELATED DEATH

Long-acting beta$_2$-adrenergic agonists (LABA), such as formoterol, one of the active ingredients in DULERA, increase the risk of asthma-related death. Data from a large placebo-controlled U.S. study that compared the safety of another long-acting beta$_2$-adrenergic agonist (salmeterol) or placebo added to usual asthma therapy showed an increase in asthma-related deaths in patients receiving salmeterol. This finding with salmeterol is considered a class effect of the LABA, including formoterol. Currently available data are inadequate to determine whether concurrent use of inhaled corticosteroids or other long-term asthma control drugs mitigates the increased risk of asthma-related death from LABA. Available data from controlled clinical trials suggest that LABA increase the risk of asthma-related hospitalization in pediatric and adolescent patients. Therefore, when treating patients with asthma, DULERA should only be used for patients not adequately controlled on a long-term asthma control medication, such as an inhaled corticosteroid or whose disease severity clearly warrants initiation of treatment with both an inhaled corticosteroid and LABA. Once asthma control is achieved and maintained, assess the patient at regular intervals and step down therapy (e.g., discontinue DULERA) if possible without loss of asthma control, and maintain the patient on a long-term asthma control medication, such as an inhaled corticosteroid. Do not use DULERA for patients whose asthma is adequately controlled on low or medium dose inhaled corticosteroids. ***[See Warnings and Precautions (5.1)]***

1 INDICATIONS AND USAGE

1.1 Treatment of Asthma

DULERA is indicated for the treatment of asthma in patients 12 years of age and older.

Long-acting beta$_2$-adrenergic agonists, such as formoterol, one of the active ingredients in DULERA, increase the risk of asthma-related death. Available data from controlled clinical trials suggest that LABA increase the risk of asthma-related hospitalization in pediatric and adolescent patients *[see Warnings and Precautions (5.1)]*. Therefore, when treating patients with asthma, DULERA should only be used for patients not adequately controlled on a long-term asthma control medication, such as an inhaled corticosteroid or whose disease severity clearly warrants initiation of treatment with both an inhaled corticosteroid and LABA. Once asthma control is achieved and maintained, assess the patient at regular intervals and step down therapy (e.g., discontinue DULERA) if possible without loss of asthma control, and maintain the patient on a long-term asthma control medication, such as an inhaled corticosteroid. Do not use DULERA for patients whose asthma is adequately controlled on low or medium dose inhaled corticosteroids.

Important Limitation of Use

- DULERA is NOT indicated for the relief of acute bronchospasm.

4 CONTRAINDICATIONS

4.1 Status Asthmaticus

DULERA is contraindicated in the primary treatment of status asthmaticus or other acute episodes of asthma where intensive measures are required.

4.2 Hypersensitivity

DULERA is contraindicated in patients with known hypersensitivity to mometasone furoate, formoterol fumarate, or any of the ingredients in DULERA *[see Warnings and Precautions (5.10)]*.

5 WARNINGS AND PRECAUTIONS

5.1 Asthma-Related Death

Long-acting beta$_2$-adrenergic agonists, such as formoterol, one of the active ingredients in DULERA, increase the risk of asthma-related death. Currently available data are inadequate to determine whether concurrent use of inhaled corticosteroids or other long-term asthma control drugs mitigates the increased risk of asthma-related death from LABA. Available data from controlled clinical trials suggest that LABA increase the risk of asthma-related hospitalization in pediatric and adolescent patients. Therefore, when treating patients with asthma, physicians should only prescribe DULERA for patients with asthma not adequately controlled on a long-term asthma control medication, such as an inhaled corticosteroid or whose disease severity clearly warrants initiation of treatment with both an inhaled corticosteroid and LABA. Once asthma control is achieved and maintained, assess the patient at regular intervals and step down therapy (e.g., discontinue DULERA) if possible without loss of asthma control, and maintain the patient on a long-term asthma control medication, such as an inhaled corticosteroid. Do not use DULERA for patients whose asthma is adequately controlled on low or medium dose inhaled corticosteroids.

A 28-week, placebo-controlled US study comparing the safety of salmeterol with placebo, each added to usual asthma therapy, showed an increase in asthma-related deaths in patients receiving salmeterol (13/13,176 in patients treated with salmeterol vs. 3/13,179 in patients treated with placebo; RR 4.37, 95% CI 1.25, 15.34). This finding with salmeterol is considered a class effect of the LABAs, including formoterol, one of the active ingredients in DULERA. No study adequate to determine whether the rate of asthma-related death is increased with DULERA has been conducted.

Clinical studies with formoterol suggested a higher incidence of serious asthma exacerbations in patients who received formoterol fumarate than in those who received placebo. The sizes of these studies were not adequate to precisely quantify the differences in serious asthma exacerbation rates between treatment groups.

5.2 Deterioration of Disease and Acute Episodes

DULERA should not be initiated in patients during rapidly deteriorating or potentially life-threatening episodes of asthma. DULERA has not been studied in patients with acutely deteriorating asthma. The initiation of DULERA in this setting is not appropriate.

Increasing use of inhaled, short-acting beta$_2$-agonists is a marker of deteriorating asthma. In this situation, the patient requires immediate re-evaluation with reassessment of the treatment regimen, giving special consideration to the possible need for replacing the current strength of DULERA with a higher strength, adding additional inhaled corticosteroid, or initiating systemic corticosteroids. Patients should not use more than 2 inhalations twice daily (morning and evening) of DULERA.

DULERA is not indicated for the relief of acute symptoms, i.e., as rescue therapy for the treatment of acute episodes of bronchospasm. An inhaled, short-acting beta$_2$-agonist, not DULERA, should be used to relieve acute symptoms such as shortness of breath. When prescribing DULERA, the physician must also provide the patient with an inhaled, short-acting beta$_2$-agonist (e.g., albuterol) for treatment of acute symptoms, despite regular twice-daily (morning and evening) use of DULERA.

When beginning treatment with DULERA, patients who have been taking oral or inhaled, short-acting beta$_2$-agonists on a regular basis (e.g., 4 times a day) should be instructed to discontinue the regular use of these drugs.

5.3 Excessive Use of DULERA and Use with Other Long-Acting Beta$_2$-Agonists

As with other inhaled drugs containing beta$_2$-adrenergic agents, DULERA should not be used more often than recommended, at higher doses than recommended, or in conjunction with other medications containing long-acting beta$_2$-agonists, as an overdose may result. Clinically significant cardiovascular effects and fatalities have been reported in association with excessive use of inhaled sympathomimetic drugs. Patients using DULERA should not use an additional long-acting beta$_2$-agonist (e.g., salmeterol, formoterol fumarate, arformoterol tartrate) for any reason, including prevention of exercise-induced bronchospasm (EIB) or the treatment of asthma.

5.4 Local Effects

In clinical trials, the development of localized infections of the mouth and pharynx with *Candida albicans* have occurred in patients treated with DULERA. If oropharyngeal candidiasis develops, it should be treated with appropriate local or systemic (i.e., oral) antifungal therapy while remaining on treatment with DULERA therapy, but at times therapy with DULERA may need to be interrupted. Advise patients to rinse the mouth after inhalation of DULERA.

5.5 Immunosuppression

Persons who are using drugs that suppress the immune system are more susceptible to infections than healthy individuals.

Chickenpox and measles, for example, can have a more serious or even fatal course in susceptible children or adults using corticosteroids. In such children or adults who have not had these diseases or who are not properly immunized, particular care should be taken to avoid exposure. How the dose, route, and duration of corticosteroid administration affect the risk of developing a disseminated infection is not known. The contribution of the underlying disease and/or prior corticosteroid treatment to the risk is also not known. If exposed to chickenpox, prophylaxis with varicella zoster immune globulin (VZIG) or pooled intravenous immunoglobulin (IVIG) may be indicated. If exposed to measles, prophylaxis with pooled intramuscular immunoglobulin (IG) may be indicated. (See the respective package inserts for complete VZIG and IG prescribing information.) If chickenpox develops, treatment with antiviral agents may be considered.

DULERA should be used with caution, if at all, in patients with active or quiescent tuberculosis infection of the respiratory tract, untreated systemic fungal, bacterial, viral, or parasitic infections; or ocular herpes simplex.

5.6 Transferring Patients from Systemic Corticosteroid Therapy

Particular care is needed for patients who are transferred from systemically active corticosteroids to DULERA because deaths due to adrenal insufficiency have occurred in asthmatic patients during and after transfer from systemic corticosteroids to less systemically available inhaled corticosteroids. After withdrawal from systemic corticosteroids, a number of months are required for recovery of hypothalamic-pituitary-adrenal (HPA) function.

Patients who have been previously maintained on 20 mg or more per day of prednisone (or its equivalent) may be most susceptible, particularly when their systemic corticosteroids have been almost completely withdrawn. During this period of HPA suppression, patients may exhibit signs and symptoms of adrenal insufficiency when exposed to trauma, surgery, or infection (particularly gastroenteritis) or other conditions associated with severe electrolyte loss. Although DULERA may improve control of asthma symptoms during these episodes, in

recommended doses it supplies less than normal physiological amounts of corticosteroid systemically and does NOT provide the mineralocorticoid activity necessary for coping with these emergencies.

During periods of stress or severe asthma attack, patients who have been withdrawn from systemic corticosteroids should be instructed to resume oral corticosteroids (in large doses) immediately and to contact their physicians for further instruction. These patients should also be instructed to carry a medical identification card indicating that they may need supplementary systemic corticosteroids during periods of stress or severe asthma attack.

Patients requiring systemic corticosteroids should be weaned slowly from systemic corticosteroid use after transferring to DULERA. Lung function (FEV_1 or PEF), beta-agonist use, and asthma symptoms should be carefully monitored during withdrawal of systemic corticosteroids. In addition to monitoring asthma signs and symptoms, patients should be observed for signs and symptoms of adrenal insufficiency such as fatigue, lassitude, weakness, nausea and vomiting, and hypotension.

Transfer of patients from systemic corticosteroid therapy to DULERA may unmask allergic conditions previously suppressed by the systemic corticosteroid therapy, e.g., rhinitis, conjunctivitis, eczema, arthritis, and eosinophilic conditions.

During withdrawal from oral corticosteroids, some patients may experience symptoms of systemically active corticosteroid withdrawal, e.g., joint and/or muscular pain, lassitude, and depression, despite maintenance or even improvement of respiratory function.

5.7 Hypercorticism and Adrenal Suppression

Mometasone furoate, a component of DULERA, will often help control asthma symptoms with less suppression of HPA function than therapeutically equivalent oral doses of prednisone. Since mometasone furoate is absorbed into the circulation and can be systemically active at higher doses, the beneficial effects of DULERA in minimizing HPA dysfunction may be expected only when recommended dosages are not exceeded and individual patients are titrated to the lowest effective dose.

Because of the possibility of systemic absorption of inhaled corticosteroids, patients treated with DULERA should be observed carefully for any evidence of systemic corticosteroid effects. Particular care should be taken in observing patients postoperatively or during periods of stress for evidence of inadequate adrenal response.

It is possible that systemic corticosteroid effects such as hypercorticism and adrenal suppression (including adrenal crisis) may appear in a small number of patients, particularly when mometasone furoate is administered at higher than recommended doses over prolonged periods of time. If such effects occur, the dosage of DULERA should be reduced slowly, consistent with accepted procedures for reducing systemic corticosteroids and for management of asthma symptoms.

5.8 Drug Interactions with Strong Cytochrome P450 3A4 Inhibitors

Caution should be exercised when considering the coadministration of DULERA with ketoconazole, and other known strong CYP3A4 inhibitors (e.g., ritonavir, atazanavir, clarithromycin, indinavir, itraconazole, nefazodone, nelfinavir, saquinavir, telithromycin) because adverse effects related to increased systemic exposure to mometasone furoate may occur *[see Drug Interactions (7.1) and Clinical Pharmacology (12.3)]*.

5.9 Paradoxical Bronchospasm and Upper Airway Symptoms

DULERA may produce inhalation induced bronchospasm with an immediate increase in wheezing after dosing that may be life-threatening. If inhalation induced bronchospasm occurs, it should be treated immediately with an inhaled, short-acting inhaled bronchodilator. DULERA should be discontinued immediately and alternative therapy instituted.

5.10 Immediate Hypersensitivity Reactions

Immediate hypersensitivity reactions may occur after administration of DULERA, as demonstrated by cases of urticaria, flushing, allergic dermatitis, and bronchospasm.

5.11 Cardiovascular and Central Nervous System Effects

Excessive beta-adrenergic stimulation has been associated with seizures, angina, hypertension or hypotension, tachycardia with rates up to 200 beats/min, arrhythmias, nervousness, headache, tremor, palpitation, nausea, dizziness, fatigue, malaise, and insomnia. Therefore, DULERA should be used with caution in patients with cardiovascular disorders, especially coronary insufficiency, cardiac arrhythmias, and hypertension.

Formoterol fumarate, a component of DULERA, can produce a clinically significant cardiovascular effect in some patients as measured by pulse rate, blood pressure, and/or symptoms. Although such effects are uncommon after administration of DULERA at recommended doses, if they occur, the drug may need to be discontinued. In addition, beta-agonists have been reported to produce ECG changes, such as flattening of the T wave, prolongation of the QTc interval, and ST segment depression. The clinical significance of these findings is unknown. Fatalities have been reported in association with excessive use of inhaled sympathomimetic drugs.

5.12 Reduction in Bone Mineral Density

Decreases in bone mineral density (BMD) have been observed with long-term administration of products containing inhaled corticosteroids, including mometasone furoate, one of the components of DULERA. The clinical significance of small changes in BMD with regard to long-term outcomes, such as fracture, is unknown. Patients with major risk factors for decreased bone mineral content, such as prolonged immobilization, family history of osteoporosis, or chronic use of drugs that can reduce bone mass (e.g., anticonvulsants and corticosteroids) should be monitored and treated with established standards of care.

In a 2-year double-blind study in 103 male and female asthma patients 18 to 50 years of age previously maintained on bronchodilator therapy (Baseline FEV_1 85%-88% predicted), treatment with mometasone furoate dry powder inhaler 200 mcg twice daily resulted in significant reductions in lumbar spine (LS) BMD at the end of the treatment period compared to placebo. The mean change from Baseline to Endpoint in the lumbar spine BMD was -0.015 (-1.43%) for the mometasone furoate group compared to 0.002 (0.25%) for the placebo group. In another 2-year double-blind study in 87 male and female asthma patients 18 to 50 years of age previously maintained on bronchodilator therapy (Baseline FEV_1 82%-83% predicted), treatment with mometasone furoate 400 mcg twice daily demonstrated no statistically significant changes in lumbar spine BMD at the end of the treatment period compared to placebo. The mean change from Baseline to Endpoint in the lumbar spine BMD was -0.018 (-1.57%) for the mometasone furoate group compared to -0.006 (-0.43%) for the placebo group.

5.13 Effect on Growth

Orally inhaled corticosteroids, including DULERA, may cause a reduction in growth velocity when administered to pediatric patients. Monitor the growth of pediatric patients receiving DULERA routinely (e.g., via stadiometry). To minimize the systemic effects of orally inhaled corticosteroids, including DULERA, titrate each patient's dose to the lowest dosage that effectively controls his/her symptoms *[see Use in Specific Populations (8.4)]*.

5.14 Glaucoma and Cataracts

Glaucoma, increased intraocular pressure, and cataracts have been reported following the use of long-term administration of inhaled corticosteroids, including mometasone furoate, a component of DULERA. Therefore, close monitoring is warranted in patients with a change in vision or with a history of increased intraocular pressure, glaucoma, and/or cataracts *[see Adverse Reactions (6)]*.

5.15 Coexisting Conditions

DULERA, like other medications containing sympathomimetic amines, should be used with caution in patients with convulsive disorders or thyrotoxicosis; and in patients who are unusually responsive to sympathomimetic amines. Doses of the related $beta_2$-agonist albuterol, when administered intravenously, have been reported to aggravate preexisting diabetes mellitus and ketoacidosis.

5.16 Hypokalemia and Hyperglycemia

$Beta_2$-agonist medications may produce significant hypokalemia in some patients, possibly through intracellular shunting, which has the potential to produce adverse cardiovascular effects. The decrease in serum potassium is usually transient, not requiring supplementation. Clinically significant changes in blood glucose and/or serum potassium were seen infrequently during clinical studies with DULERA at recommended doses.

6 ADVERSE REACTIONS

Long-acting $beta_2$-adrenergic agonists, such as formoterol, one of the active ingredients in DULERA, increase the risk of asthma-related death. Currently available data are inadequate to determine whether concurrent use of inhaled corticosteroids or other long-term asthma control drugs mitigates the increased risk of asthma-related death from LABA. Available data from controlled clinical trials suggest that LABA increase the risk of asthma-related hospitalization in pediatric and adolescent patients. Data from a large placebo-controlled US trial that compared the safety of another long-acting $beta_2$-adrenergic agonist (salmeterol) or placebo added to usual asthma therapy showed an increase in asthma-related deaths in patients receiving salmeterol *[see Warnings and Precautions (5.1)]*.

Systemic and local corticosteroid use may result in the following:

- *Candida albicans* infection *[see Warnings and Precautions (5.4)]*
- Immunosuppression *[see Warnings and Precautions (5.5)]*
- Hypercorticism and adrenal suppression *[see Warnings and Precautions (5.7)]*
- Growth effects in pediatrics *[see Warnings and Precautions (5.13)]*
- Glaucoma and cataracts *[see Warnings and Precautions (5.14)]*

Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in practice.

6.1 Clinical Trials Experience

The safety data described below is based on 3 clinical trials which randomized 1913 patients 12 years of age and older with asthma, including 679 patients exposed to DULERA for 12 to 26 weeks and 271 patients exposed for 1 year. DULERA was studied in two placebo- and active-controlled trials (n=781 and n=728, respectively) and in a long term 52-week safety trial (n=404). In the 12 to 26-week clinical trials, the population was 12 to 84 years of age, 41% male and 59% female; 73% Caucasians, 27% non-Caucasians. Patients received two inhalations twice daily of DULERA (100 mcg/5 mcg or 200 mcg/5 mcg), mometasone furoate MDI (100 mcg or 200 mcg), formoterol MDI (5 mcg) or placebo. In the long term 52-week active-comparator safety trial, the population was 12 years to 75 years of age with asthma, 37% male and 63% female, 47% Caucasians, 53% non-Caucasians and received two inhalations twice daily of DULERA 100 mcg/5 mcg or 200 mcg/5 mcg, or an active comparator.

The incidence of treatment emergent adverse reactions associated with DULERA in Table 2 below is based upon pooled data from 2 clinical trials 12 to 26-week in duration in patients 12 years and older treated with two inhalations twice daily of DULERA (100 mcg/5 mcg or 200 mcg/5 mcg), mometasone furoate MDI (100 mcg or 200 mcg), formoterol MDI (5mcg) or placebo.

Table 2: Treatment-emergent adverse reactions in DULERA groups occurring at an incidence of ≥3% and more commonly than placebo

Adverse Reactions	DULERA*		Mometasone Furoate*		Formoterol*	Placebo*
	100 mcg/ 5 mcg n=424 n (%)	200 mcg/ 5 mcg n=255 n (%)	100 mcg n=192 n (%)	200 mcg n=240 n (%)	5 mcg n=202 n (%)	n=196 n (%)
Nasopharyngitis	20 (4.7)	12 (4.7)	15 (7.8)	13 (5.4)	13 (6.4)	7 (3.6)
Sinusitis	14 (3.3)	5 (2.0)	6 (3.1)	4 (1.7)	7 (3.5)	2 (1.0)
Headache	19 (4.5)	5 (2.0)	10 (5.2)	8 (3.3)	6 (3.0)	7 (3.6)
Average Duration of Exposure (days)	116	81	165	79	131	138

*All treatments were administered as two inhalations twice daily.

Oral candidiasis has been reported in clinical trials at an incidence of 0.7% in patients using DULERA 100 mcg/5 mcg, 0.8 % in patients using DULERA 200 mcg/5 mcg and 0.5 % in the placebo group.

Long Term Clinical Trial Experience

In a long term safety trial in patients 12 years and older treated for 52 weeks with DULERA 100 mcg/5 mcg (n=141), DULERA 200 mcg/5 mcg (n=130) or an active comparator (n=133), safety outcomes in general were similar to those observed in the shorter 12 to 26 week controlled trials. No asthma-related deaths were observed. Dysphonia was observed at a higher frequency in the longer term treatment trial at a reported incidence of 7/141 (5%) patients receiving DULERA 100 mcg/5 mcg and 5/130 (3.8%) patients receiving DULERA 200 mcg/5 mcg. No clinically significant changes in blood chemistry, hematology, or ECG were observed.

7 DRUG INTERACTIONS

In clinical trials, concurrent administration of DULERA and other drugs, such as short-acting beta$_2$-agonist and intranasal corticosteroids have not resulted in an increased frequency of adverse drug reactions. No formal drug interaction studies have been performed with DULERA. The drug interactions of the combination are expected to reflect those of the individual components.

7.1 Inhibitors of Cytochrome P450 3A4

The main route of metabolism of corticosteroids, including mometasone furoate, a component of DULERA, is via cytochrome P450 (CYP) isoenzyme 3A4 (CYP3A4). After oral administration of ketoconazole, a strong inhibitor of CYP3A4, the mean plasma concentration of orally inhaled mometasone furoate increased. Concomitant administration of CYP3A4 inhibitors may inhibit the metabolism of, and increase the systemic exposure to, mometasone furoate. Caution should be exercised when considering the coadministration of DULERA with long-term ketoconazole and other known strong CYP3A4 inhibitors (e.g., ritonavir, atazanavir, clarithromycin, indinavir, itraconazole, nefazodone, nelfinavir, saquinavir, telithromycin) *[see Warnings and Precautions (5.8) and Clinical Pharmacology (12.3)]*.

7.2 Adrenergic agents

If additional adrenergic drugs are to be administered by any route, they should be used with caution because the pharmacologically predictable sympathetic effects of formoterol, a component of DULERA, may be potentiated.

7.3 Xanthine derivatives

Concomitant treatment with xanthine derivatives may potentiate any hypokalemic effect of formoterol, a component of DULERA.

7.4 Diuretics

Concomitant treatment with diuretics may potentiate the possible hypokalemic effect of adrenergic agonists. The ECG changes and/or hypokalemia that may result from the administration of non-potassium sparing diuretics (such as loop or thiazide diuretics) can be acutely worsened by beta-agonists, especially when the recommended dose of the beta-agonist is exceeded. Although the clinical significance of these effects is not known, caution is advised in the coadministration of DULERA with non-potassium sparing diuretics.

7.5 Monoamine oxidase inhibitors, tricyclic antidepressants, and drugs known to prolong the QTc interval

DULERA should be administered with caution to patients being treated with monoamine oxidase inhibitors, tricyclic antidepressants, or drugs known to prolong the QTc interval or within 2 weeks of discontinuation of such agents, because the action of formoterol, a component of DULERA, on the cardiovascular system may be potentiated by these agents. Drugs that are known to prolong the QTc interval have an increased risk of ventricular arrhythmias.

7.6 Beta-adrenergic receptor antagonists

Beta-adrenergic receptor antagonists (beta-blockers) and formoterol may inhibit the effect of each other when administered concurrently. Beta-blockers not only block the therapeutic effects of beta$_2$-agonists, such as formoterol, a component of DULERA, but may produce severe bronchospasm in patients with asthma. Therefore, patients with asthma should not normally be treated with beta-blockers. However, under certain circumstances, e.g., as prophylaxis after myocardial infarction, there may be no acceptable alternatives to the use of beta-blockers in patients with asthma. In this setting, cardioselective beta-blockers could be considered, although they should be administered with caution.

8 USE IN SPECIFIC POPULATIONS

8.1 Pregnancy

DULERA: Teratogenic Effects: Pregnancy Category C

There are no adequate and well-controlled studies of DULERA, mometasone furoate only or formoterol fumarate only in pregnant women. Animal reproduction studies of mometasone furoate and formoterol in mice, rats, and/or rabbits revealed evidence of teratogenicity as well as other developmental toxic effects. Because animal reproduction studies are not always predictive of human response, DULERA should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

Mometasone Furoate: Teratogenic Effects

When administered to pregnant mice, rats, and rabbits, mometasone furoate increased fetal malformations and decreased fetal growth (measured by lower fetal weights and/or delayed ossification). Dystocia and related complications were also observed when mometasone furoate was administered to rats late in gestation. However, experience with oral corticosteroids suggests that rodents are more prone to teratogenic effects from corticosteroid exposure than humans.

In a mouse reproduction study, subcutaneous mometasone furoate produced cleft palate at approximately one-third of the maximum recommended daily human dose (MRHD) on a mcg/m^2 basis and decreased fetal survival at approximately 1 time the MRHD. No toxicity was observed at approximately one-tenth of the MRHD on a mcg/m^2 basis.

In a rat reproduction study, mometasone furoate produced umbilical hernia at topical dermal doses approximately 6 times the MRHD on a mcg/m^2 basis and delays in ossification at approximately 3 times the MRHD on a mcg/m^2 basis.

In another study, rats received subcutaneous doses of mometasone furoate throughout pregnancy or late in gestation. Treated animals had prolonged and difficult labor, fewer live births, lower birth weight, and reduced early pup survival at a dose that was approximately 8 times the MRHD on an area under the curve (AUC) basis. Similar effects were not observed at approximately 4 times MRHD on an AUC basis.

In rabbits, mometasone furoate caused multiple malformations (e.g., flexed front paws, gallbladder agenesis, umbilical hernia, hydrocephaly) at topical dermal doses approximately 3 times the MRHD on a mcg/m^2 basis. In an oral study, mometasone furoate increased resorptions and caused cleft palate and/or head malformations (hydrocephaly and domed head) at a dose less than the MRHD based on AUC. At a dose approximately 2 times the MRHD based on AUC, most litters were aborted or resorbed *[see Nonclinical Toxicology (13.2)]*.

Nonteratogenic Effects:

Hypoadrenalism may occur in infants born to women receiving corticosteroids during pregnancy. Infants born to mothers taking substantial corticosteroid doses during pregnancy should be monitored for signs of hypoadrenalism.

Formoterol Fumarate: Teratogenic Effects

Formoterol fumarate administered throughout organogenesis did not cause malformations in rats or rabbits following oral administration. When given to rats throughout organogenesis, oral doses of approximately 80 times the MRHD on a mcg/m^2 basis and above delayed ossification of the fetus, and doses of approximately 2,400 times the MRHD on a mcg/m^2 basis and above decreased fetal weight. Formoterol fumarate has been shown to cause stillbirth and neonatal mortality at oral doses of approximately 2,400 times the MRHD on a mcg/m^2 basis and above in rats receiving the drug during the late stage of pregnancy. These effects, however, were not produced at a dose of approximately 80 times the MRHD on a mcg/m^2 basis.

In another testing laboratory, formoterol was shown to be teratogenic in rats and rabbits. Umbilical hernia, a malformation, was observed in rat fetuses at oral doses approximately 1,200 times and greater than the MRHD on a mcg/m^2 basis. Brachygnathia, a skeletal malformation, was observed in rat fetuses at an oral dose approximately 6,100 times the MRHD on a mcg/m^2 basis. In another study in rats, no teratogenic effects were seen at inhalation doses up to approximately 500 times the MRHD on a mcg/m^2 basis. Subcapsular cysts on the liver were observed in rabbit fetuses at an oral dose approximately 49,000 times the MRHD on a mcg/m^2 basis. No teratogenic effects were observed at oral doses up to approximately 3,000 times the MRHD on a mcg/m^2 basis *[see Nonclinical Toxicology (13.2)]*.

8.2 Labor and Delivery

There are no adequate and well-controlled human studies that have studied the effects of DULERA during labor and delivery.

Because beta-agonists may potentially interfere with uterine contractility, DULERA should be used during labor only if the potential benefit justifies the potential risk *[see Nonclinical Toxicology (13.2)]*.

8.3 Nursing Mothers

DULERA: It is not known whether DULERA is excreted in human milk. Because many drugs are excreted in human milk, caution should be exercised when DULERA is administered to a nursing woman.

Since there are no data from well-controlled human studies on the use of DULERA on nursing mothers, based on data for the individual components, a decision should be made whether to discontinue nursing or to discontinue DULERA, taking into account the importance of DULERA to the mother.

Mometasone Furoate: It is not known if mometasone furoate is excreted in human milk. However, other corticosteroids are excreted in human milk.

Formoterol Fumarate: In reproductive studies in rats, formoterol was excreted in the milk. It is not known whether formoterol is excreted in human milk.

8.4 Pediatric Use

The safety and effectiveness of DULERA have been established in patients 12 years of age and older in 3 clinical trials up to 52 weeks in duration. In the 3 clinical trials, 101 patients 12 to 17 years of age were treated with DULERA. Patients in this age-group demonstrated efficacy results similar to those observed in patients 18 years of age and older. There were no obvious differences in the type or frequency of adverse drug reactions reported in this age group compared to patients 18 years of age and older. Similar efficacy and safety results were

observed in an additional 22 patients 12 to 17 years of age who were treated with DULERA in another clinical trial. The safety and efficacy of DULERA have not been established in children less than 12 years of age.

Controlled clinical studies have shown that inhaled corticosteroids may cause a reduction in growth velocity in pediatric patients. In these studies, the mean reduction in growth velocity was approximately 1 cm per year (range 0.3 to 1.8 per year) and appears to depend upon dose and duration of exposure. This effect was observed in the absence of laboratory evidence of hypothalamic-pituitary-adrenal (HPA) axis suppression, suggesting that growth velocity is a more sensitive indicator of systemic corticosteroid exposure in pediatric patients than some commonly used tests of HPA axis function. The long-term effects of this reduction in growth velocity associated with orally inhaled corticosteroids, including the impact on final adult height, are unknown. The potential for "catch up" growth following discontinuation of treatment with orally inhaled corticosteroids has not been adequately studied.

The growth of children and adolescents receiving orally inhaled corticosteroids, including DULERA, should be monitored routinely (e.g., via stadiometry). If a child or adolescent on any corticosteroid appears to have growth suppression, the possibility that he/she is particularly sensitive to this effect should be considered. The potential growth effects of prolonged treatment should be weighed against clinical benefits obtained and the risks associated with alternative therapies. To minimize the systemic effects of orally inhaled corticosteroids, including DULERA, each patient should be titrated to his/her lowest effective dose *[see Dosage and Administration (2.2)]*.

8.5 Geriatric Use

A total of 77 patients 65 years of age and older (of which 11 were 75 years and older) have been treated with DULERA in 3 clinical trials up to 52 weeks in duration. Similar efficacy and safety results were observed in an additional 28 patients 65 years of age and older who were treated with DULERA in another clinical trial. No overall differences in safety or effectiveness were observed between these patients and younger patients, but greater sensitivity of some older individuals cannot be ruled out. As with other products containing $beta_2$-agonists, special caution should be observed when using DULERA in geriatric patients who have concomitant cardiovascular disease that could be adversely affected by $beta_2$-agonists. Based on available data for DULERA or its active components, no adjustment of dosage of DULERA in geriatric patients is warranted.

8.6 Hepatic Impairment

Concentrations of mometasone furoate appear to increase with severity of hepatic impairment *[see Clinical Pharmacology (12.3)]*.

10 OVERDOSAGE

10.1 Signs and Symptoms

DULERA: DULERA contains both mometasone furoate and formoterol fumarate; therefore, the risks associated with overdosage for the individual components described below apply to DULERA.

Mometasone Furoate: Chronic overdosage may result in signs/symptoms of hypercorticism *[see Warnings and Precautions (5.7)]*. Single oral doses up to 8000 mcg of mometasone furoate have been studied on human volunteers with no adverse reactions reported.

Formoterol Fumarate: The expected signs and symptoms with overdosage of formoterol are those of excessive beta-adrenergic stimulation and/or occurrence or exaggeration of any of the following signs and symptoms: angina, hypertension or hypotension, tachycardia, with rates up to 200 beats/min., arrhythmias, nervousness, headache, tremor, seizures, muscle cramps, dry mouth, palpitation, nausea, dizziness, fatigue, malaise, hypokalemia, hyperglycemia, and insomnia. Metabolic acidosis may also occur. Cardiac arrest and even death may be associated with an overdose of formoterol.

The minimum acute lethal inhalation dose of formoterol fumarate in rats is 156 mg/kg (approximately 63,000 times the MRHD on a mcg/m^2 basis). The median lethal oral doses in Chinese hamsters, rats, and mice provide even higher multiples of the MRHD.

10.2 Treatment

DULERA: Treatment of overdosage consists of discontinuation of DULERA together with institution of appropriate symptomatic and/or supportive therapy. The judicious use of a cardioselective beta-receptor blocker may be considered, bearing in mind that such medication can produce bronchospasm. There is insufficient evidence to determine if dialysis is beneficial for overdosage of DULERA. Cardiac monitoring is recommended in cases of overdosage.

Manufactured by 3M Health Care Ltd.,
Loughborough, United Kingdom.
Manufactured for Schering Corporation, a subsidiary of
MERCK & CO., INC.
Whitehouse Station, NJ 08889 USA.

6/10 32704107T-JBS

Prolonged Cessation of Respiration—Recovery—Case Report

S.M. Morwitz S B, MD, Interne (sic) in the Milwaukee County Hospital

Complete cessation of natural respiration for 1 hour and 20 minutes with recovery is of very infrequent occurrence…

CASE

G.S., Hospital No. 9794, a white male, aged 45, laborer, an Armenian, was admitted to the Milwaukee County Hospital July 3, 1911, complaining of pain in the stomach and over the lower dorsal spines, vomiting and obstinate constipation. On entrance he appeared considerably emaciated and very weak, requiring support while walking a few rods from the ambulance to the wards. His pulse was 88, regular, of small volume, temperature 98.6 F°, respirations 20. The following history was obtained through an interpreter: The patient's family and personal history are uneventful. Present complaint: this began 6 months ago with pain the epigastrium and left hypochondrium and later in the back over the 7th to 10th dorsal vertebrae. This pain is of a gnawing character and is most pronounced 1 or 2 hours after eating. The taking of food or of soda relieves the pain. He has had persistent vomiting since the onset of trouble. The vomiting occurs a few hours after his meals, usually after dinner and supper. The vomitus was never bloody or fecal in character. His bowels are obstinately constipated. Cathartics have no effect while enemas expel a few small, thin stools. Urination is not frequent or painful. He has lost a good deal in weight but does not know the amount; also he has become very weak and unable to move about. He has no headache, cough, or sweats.

EXAMINATION

Outside of the marked degree of emaciation the head, neck, and thorax were negative. The abdomen was retracted, the belly wall devoid of fat, and the liver dullness normal. The lower border of the stomach extended 4 fingers below the umbilicus upon inflation with air. No definite tumor mass was palpable at the pylorus nor in any other part of the abdomen except a probable enlargement … of the belly wall by light tapping with the tips of the fingers peristaltic waves travelling from left to right were elicited. There were no hernia at the inguinal rings; and the inguinal glands were palpable. The genitals and extremities were negative.

Gastric contents: A stomach tube was easily passed into the stomach and 1200 cc of a brownish yellow material of a strong garlicky odor was removed. Analysis of the contents showed free HC l.12%, total acidity 23, blood negative with guaiac and benzidene tests. The next day the stomach tube was again introduced and about 1 litre of a similar smelling material obtained.

Although no tumor mass was palpable, it was evident that the dilatation of the stomach and the retention of food was due to a stricture of the pylorus. The patient was then transferred to the surgical wards for a gastrjejunostomy. Before being taken to the operating room, he was given subcutaneously strychnine sulphate gr. 1/30, and morphine gr. ¼ and atropine sulphate gr. 1/150.

OPERATION

Dr Tisdale, surgeon; ether anesthesia employed. A median line incision from the ensiform process to the umbilicus was made. The stomach was exposed and the pylorus was found to be contracted to the size of a lead pencil. No tumor mass was palpable. A probable gland enlargement was palpable behind the peritoneum. The first part of the jejunum was pushed through a vessel-free area in the mesocolon and brought in apposition with the posterior aspect of the stomach. Clamps were applied, and the first line of sutures begun when the patient's respiration

• • •

Editor's Note: This article was first published in *WMJ* Volume 10, October 1911.

ceased. The facial and radial pulse became barely palpable. The administration of ether was stopped and a subcutaneous injection of strychnine sulphate gr. 1/30 immediately given. After a few futile attempts to promote respiration by intermittent firm pressure against the ribs, the exposed organs were replaced into the abdomen and the wound well protected with sterile towels. The head of the patient was lowered over the end of the talbe, the tongue drawn forwards, the fauces cleared, and artificial respiration begun. Sylvester's method was employed. The arms were grasped at the wrists and drawn upwards above the patient's head so as to expand the chest through the action of the pectoralis major muscles. This position was maintained a couple of seconds and then the arms were lowered to the side and pressed firmly against the ribs to produce a forcible expiratory act. The arms were then again elevated and the same cycle repeated and kept up at about 15 times per minute, the normal rate of respiration. Thus, for 1 hour and 20 minutes artificial respiration was continued until the first signs of natural respirations were noted. In the interim, 3 doses of strychnine gr. 1/30 and lastly atropine suphate gr. 1/100 were injected subcutaneously, intervals of about 20 minutes lapsing between the injections. During the period of respiratory failure, the patient did not even make a gasp while the heart sounds remained fairly regular, of medium volume, and about normal in rate, the strychnine no doubt influencing the heart center. As the patient as was in a very precarious condition it was not deemed advisable to continue the operation, so the abdominal incision was closed with a few interrupted silkworm sutures.

The patient was quickly returned to his bed and the treatment for surgical shock instituted. The respirations continued slow and irregular. During the next 12 hours, they registered between 7 and 12 per minute. The next day they varied from 12 to 16 per minute and were still somewhat irregular. Heart stimulants were given every 3 hours. The patient was now put on nutrient enemas. After 1 week, he was in a sufficiently good condition to warrant the completion of the operation, for it was essential to do a gastrojejunostomy and thus give the patient a better opportunity to recover.

Operation concluded: As the patient was not a very good surgical risk, no general anesthetic was used. A subcutaneous injection of morphine suphate gr. ¼ and atropine gr. 1/100 was given prior to the operation. The wound was reopened and an anastomosis between the stomach and jejunum made. In attempting to sew up the peritoneum the patient experienced so much pain, although gr. 1/8 and gr ¼ doses or morphine had been added, that the abdominal incision was merely closed with interrupted silkworm sutures notwithstanding the possibility of subsequent ventral hernia.

The respirations once more became exceedingly slow and for the next few hours averaged about 6 per minute. However, they gradually increased so that by the next day there were normal in rate and character. The patient now began to improve rapidly. His appetite became voracious and he continually requested more to eat although he was getting more food than the average healthy patient in the ward receives. His weight increased 18 lbs during the first month after the operation.

The only sequela resulting from prolonged artificial respiration was a partial paralysis of the left deltoid muscle causing partial limitation of motion at the left shoulder joint. It is surprising that only a paralysis of such small extent followed. At the time of writing, 2 months after the operation the patients is in very good condition. He walks about and does light work in the ward. His weight is 139 lbs, a gain of 27 lbs since his admission to the hospital. His temperature, pulse, and respirations are normal, red blood cells 5,6000,000 per c.cm., white blood cells 7,600, hemoglobin 82, and his blood pressure is 128m.m. Hg. His appetite is still voracious and his bowels act daily; he occasionally has recourse to cathartics. He has recovered the use of the deltoid muscle which had remained paralyzed for 6 weeks. A well formed scar marks the line of incision in the abdomen.

SUMMARY

This case illustrates a few very interesting points. In the first place, to the writer's knowledge it is the first case of its kind recorded. Again, it upholds Dr. J. F. Mitchell's contention (*JAMA*, Aug 26, 1911) that there is a distinct contrast in the sensibility of the parietal and visceral peritoneum, a subject first worked out and published by Lennander. The parietal peritoneum is intensely sensitive to pain while the visceral peritoneum and the abdominal organs are not sensitive to pain. It was noted in the case report that during the manipulations within the abdomen the patient remained perfectly quiet. However, when an attempt was made to sew up the parietal peritoneum, the patient experienced such intense pain although 2 more doses of morphine were given, that the abdominal incision was simply closed with a few interrupted silkworm sutures. Finally, this case teaches that hope for recovery should never be given up as long as the heart beats; and that one should not b e guided by any specified time allotted in such cases by some surgeons.

SOME KIDS ARE GROUNDED WHEN THEY'RE CAUGHT WITH A DRINK.

OTHERS ARE OFFERED ANOTHER.

Underage teens are finding it easier and easier to obtain alcohol— the number one drug of choice for American youth.

What's worse, they're getting it more often from adults, including their own parents, than from strangers. In an American Medical Association (AMA) survey, one in three teens responded that it is easy to obtain alcohol from their own consenting parents.

Some parents believe that underage drinking is a rite of passage. But fatal injuries, car accidents, sexual assaults and contracting sexual diseases are not rites of passage- they are life-altering events. And alcohol causes what may be irreversible damage to a young person's brain, which develops into their 20s.

Wisconsin **Medical** Society

Your Doctor. Your Health.

The challenges and opportunities of working together

John J. Frey, III, MD, Medical Editor

This issue of *WMJ* contains a number of papers that describe how clinical care, research, and community health might benefit from new directions that bring people together for organizational or community interest. Collaboration is a concept more often touted than actually demonstrated. Terms such as mine shafts, silos, or tradition are used to justify what keeps real collaboration from happening.

Communities, even those with a long history of activism, often struggle with getting groups that may have a lot to learn from each other to actually sit down and plan projects of mutual benefit. Health is a community function as much as a medical one. The article by Ahmed and colleagues[1] describes the end result of a large number of rural initiatives. The most important measure of a community health improvement project is its sustainability, and longer-term evaluation of this large project is required to see what the long-term effects will be. But one immediate effect was getting two medical schools to put funds and faculty time into the effort, funded by the Blue Cross/Blue Shield of Wisconsin endowment located at the medical schools. This could have been akin to the Packers and the Vikings sharing coaching staffs, but in this case it worked.

The article by Serrano and Monden[2] describes how the integration of behavioral health professionals into primary care practice affects patient care and physician comfort with the burden of mental health issues. They show important effects on the process of care that include improving quality and decreasing costs for patients with depression. Primary care and mental health clinicians have been locked into traditions that separate them from each other. The physical integration Serrano and Monden describe helps clinicians from both disciplines operationalize the biopsychosocial model described over 40 years ago.[3] Their work is a great step forward.

Yale and his colleagues describe an approach begun at the Marshfield Clinic to use the talent and energy of emeritus faculty members as clinical-researchers.[4] The authors did an extensive study of emeritus roles in academic institutions and developed a plan that would meet the needs of senior faculty members who wanted to continue in a different role that would benefit their home institution. This model could be adapted by many academic health centers nationally to avoid losing talented people. It offers a career transition that many of us would welcome.

Austin and Wolfe[5] explore the effectiveness of a program designed to encourage patients with diabetes to get required lab tests. Written reminders with an offer of a small financial incentive were sent to a group of patients who had been out of compliance on at least 1 test for a year or more. Those who received the missing test were given a gift card worth $6 at a local gas station.

Communities, even those with a long history of activism, often struggle with getting groups that may have a lot to learn from each other to actually sit down and plan projects of mutual benefit. Health is a community function as much as a medical one.

Two case reports in this issue highlight unusual presentations of unusual tumors (Amin and Kong)[6] and an unusual allergy (Gimenez and Zacharisen).[7] The latter shows that flavoring food has its risks for children. Many of us are grateful to have avoided becoming allergic to spices as a child; otherwise we would be condemned to a lifelong diet of cheese curds.

Finally, in this issue we take a look back—100 years—at a case report first published in *WMJ* in 1911. It's an interesting and nostalgic glimpse at the history of medicine as well as *WMJ,* and an excellent reminder of how far we've come. Look for this to become a regular *WMJ* feature.

• • •

(Editor disclaimer: I practice in a family medicine clinic affliated with Access Community Health Center, which is the location of the study by Serrano and Monden, and, despite my mother's insistence that anything other than salt and pepper were unnecessary on food, I have a recurring bias toward New Mexico green chile to make it through Midwestern winters.)

continued on page 150

The Effect of Behavioral Health Consultation on the Care of Depression by Primary Care Clinicians

Neftali Serrano, PsyD; Kimberley Monden, PhD

ABSTRACT

Purpose: The aim of this study is to assess the impact of an integrated care model, called the Behavioral Health Consultation model, in the delivery of care for depression in an urban Federally Qualified Health Center, and to gauge the receptiveness of primary care clinicians to increasing their responsibility for the mental health care of their patients.

Methods: We reviewed electronic medical records to measure referral rates to mental health specialty care, patient engagement in care, management of psychotropic medications, and initiation of antidepressant medication, comparing data from the year prior to program implementation to that from the third year post-implementation. Clinician attitudes were assessed using an online anonymous questionnaire.

Results: Statistically significant findings included post-implementation increases in the use of standardized measures of depression, documentation of behavioral goals and patient visits to the primary care clinician (increased engagement), decreases in initiation rates of antidepressant medications, and decreases in referrals to mental health specialty care. No significant difference was found in rates of dosage changes or change to new medications among patients who were already on psychiatric medications. Clinicians reported near universal acceptance of the behavioral health consultation program and willingness to increase their role in managing patient mental health issues.

Conclusions: This study demonstrates that a behavioral health consultation program in an urban community health center can improve adherence to evidence-based indicators in the care of depression, making it possible to manage the majority of patients presenting with depression in the primary care setting.

INTRODUCTION

In many communities, the primary care setting is where mental health disorders are detected and managed.[1] This is the result of a combination of factors, including poor access to mental health specialists, poor referral completion rates to specialty mental health, and patient preference in maintaining care with their primary care clinic (eg, reduced stigma, convenience).

According to unpublished data provided by United Way of Dane County (Wisconsin), the county bears a significant burden of mental illness, with 105,000 adults and 16,000 children suffering from behavioral health problems, leading to more than $200 million in annual treatment costs. Due to the aforementioned barriers to specialty mental health care, efforts have been made to integrate behavioral health services into the primary care setting. Primary care behavioral health models are an attractive solution in that they address the access-to-care problem while also reducing the strain on already overburdened specialty mental health services.

A review of the literature on integrated care (ie, delivery of mental health care integrated into the primary care setting) reveals a growing sentiment that traditional care for depression (ie, referral to specialty mental health care) is no longer acceptable. In the current treatment model, less than one-third of all patients with mental health conditions ever meet with a psychologist or mental health professional.[2] In addition, primary care medical professionals currently prescribe 60% to 70% of the psychotropic medications prescribed in the United States.[3-5] A growing body of data suggests that patients who receive integrated care report improved mental health outcomes, including more anxiety- and depression-free days, increased remission rates, improved quality of life, and decreased functional impact of symptoms, compared to patients receiving routine primary care interventions.[5-9] In addition, integrated care models have been shown to produce better patient engagement and similar clinical outcomes than traditional models of mental health care.[7]

However, there are limited studies that specifically address the impact of integrated care on referral rates to specialty care, explicit management strategies for psychotropic medications, and how the behavioral health consultation model affects these

• • •

Author Affiliation: Access Community Health Centers, Madison, Wis.

Corresponding Author: Neftali Serrano, PsyD, Access Community Health Centers, 2202 S Park St, Madison, WI 53713; phone 608.556.1027; e-mail neftali.serrano@uwmf.wisc.edu.

Table 1. Summary Statistics of Variables Studied Pre- and Post-Behavioral Health Consultation

	2005		2009	
Variables	**Number**	**Percentage**	**Number**	**Percentage**
Symptomatic	264	93.62	268	95.04
Initiated selective serotonin reuptake inhibitor (SSRI)	136	48.23	115	40.78[a]
Adjusted dosage	79	28.01	77	27.30
Changed medication	53	18.79	57	20.21
Documentation of behavioral goal	15	5.32	223	79.08
Documentation of a standard measure	7	2.48	118	41.84
Referred out	136	48.23	25	8.86
Other diagnosis	50	17.73	88	31.21
Alcohol and Other Drug Abuse (AODA)	67	23.76	64	22.70
Involved BHC	N/A	227	80.5	

[a] Of patients not already on an antidepressant medication, there was a statistically significant drop in initiation of SSRI.

Table 2. Population Sample Characteristics

	2005		2009	
Descriptors	**Number**	**Percentage**	**Number**	**Percentage**
Gender	190 females	67.38	189 females	67.02
Already on selective serotonin reuptake inhibitor (SSRI)	106	37.59	115	40.78
Already have specialty mental health	41	14.54	33	11.70
More than 1 mental health diagnosis	50	17.73	88	31.21
Substance abuse diagnosis	67	23.76	64	22.70
Involved Behavioral Health Consultant	N/A	N/A	227	80.5

	2005			2009		
	Mean	**Std dev**	**Median (Min, Max)**	**Mean**	**Std dev**	**Median (Min, Max)**
Age	39.7	13.3	39 (11, 72)	41.0	13.0	41 (15, 86)

Abbreviation: Std dev = standard deviation.

factors.[10] The purpose of this study is to investigate the impact of a specific primary care behavioral health model, called the behavioral health consultation model, in the delivery of integrated care for depression in an urban Federally Qualified Health Center in Madison, Wis, which began its program in 2006. This study compares the care of depression, using evidence-based indicators, prior to the initiation of the behavioral health consultation program to the care provided after more than 3 years of program development (2009).

METHODS

The study was conducted using a review of electronic medical records comparing the year 2005 and the year between July 1, 2008 and July 1, 2009, corresponding to 1 year prior to initiation of the integrated behavioral health program and 3 years post-implementation. The behavioral health consultation model is a model in which the behavioral health specialist acts as an immediate support to the primary care clinician providing expertise to the clinician and same-day intervention to the patient, often in the same exam room.[3] One of the principal components of the behavioral health consultation model is that the primary care clinician (PCC) retains full responsibility for patient care. In addition, as a population-based model of care, the behavioral health consultant (BHC) seeks to maximize impact by seeing a greater number of patients, scheduled and unscheduled, in 15- to 30-minute primary care style visits. The BHC also acts as an intermediary between the primary care clinician and the consulting psychiatrist who provides 1-time psychiatric evaluations to selected patients and verbal and/or written feedback based on chart reviews or conversations with the BHCs or primary care clinicians. At the time of the study, Access Community Health Centers (ACHCs) had 3 staff BHCs (2.5 full-time equivalent [FTE] psychologists) and a .2 FTE consulting psychiatrist supporting the work of about 11 FTE primary care clinicians; the clinic patient population was approximately 10,000 patients.

Using the electronic health record (Epic Systems Corp, Verona, Wisconsin), a list of all adult patients who had been assigned a diagnosis of depression during any of those years was produced. For 2005, all 282 patients with a diagnosis of depression were included in the study. For 2008 to 2009, 282 patients were selected randomly from 617 patients with a diagnosis of depression in order to provide roughly equal comparison groups. No other efforts were made to match the patient samples on any additional variables. Patients with dual psychiatric diagnoses, eg, depression and bipolar disorder, were not excluded. Variables assessed are included in Table 1.

In this study, psychotropic medications were defined as all medications used for the purposes of treating depression, including antidepressant medications and medications in other classes with antidepressant effects, such as some mood stabilizers and antipsychotic medications. Symptomatic patients were defined as patients who had active symptoms of depression during the time periods specified (compared to patients with an existing diagnosis of depression but no symptoms).

Because the comparison samples were not completely inde-

pendent (16 symptomatic patients overlapped both samples) additional analyses were made to confirm the findings of the complete sample. When these patients were excluded from the analyses, the assumptions of the chi-square test were met, and the results remained qualitatively the same. In addition, the distribution of total visits was skewed, so this number was log-transformed before analysis with the student *t*-test or with analysis of variance. After transformation, the assumptions underlying these analyses were reasonably met (groups with equal variances and normal distribution). Also, 7 patients (6 in 2005, 1 in 2009) had 0 PCC visits and 0 BHC visits. These patients were excluded from the analysis. The standard deviation is not indicated because it is not representative of the spread of these skewed distributions. The Wilcoxon rank sum test and the Kruskal-Wallis test, which are nonparametric tests, yielded identical conclusions when applied to the analysis of visit-frequency data.

Clinician perspectives and attitudes toward treating mental illness were collected using an anonymous electronic survey developed by the authors and distributed by e-mail in September 2009. Fourteen clinicians responded (3 pediatricians, 2 nurse practitioners, 1 internal medicine clinician, 5 family medicine clinicians, and 3 midwives.) This sample constituted more than half of the clinicians working at ACHC at the time. Upon a request for review, it was determined by clinic leadership that the study did not require a Human Subjects Protocol Review because it was part of an internal standard quality improvement activity and because of the nature of the data collection.

RESULTS

Each group consisted of 282 patients with very little overlap (19 patients were sampled in both years). The 2 groups were similar at baseline (see Table 2) across a variety of characteristics. For the purposes of comparison, symptomatic patients were used in the analysis.

Rate of Documentation of Behavioral Goals and Use of Standard Measures

The rate of documentation of a behavioral goal increased significantly in 2009 (82.5%) compared to 2005 (5.7%) as did the rate of documentation of the use of a standard measure of depression: 41.8% vs 2.7%, respectively.

Type and Rate of Medication Adjustments

The proportion of patients who had a change of medication or adjusted dosage (or both) was not statistically different between 2005 and 2009 (N = 532, $\chi^2 = 0.10$, df = 1, $P = 0.75$). However, the 2009 symptomatic patients were somewhat less likely to initiate psychotropic medication (42.9% vs 51.1%), a marginally statistically significant difference. In addition, the 2009 symptomatic patients were less likely to have 1 or more changes to their medication regimen: 61.2% of symptomatic patients initiated psychotropic medication, had a change of medication or had a dosage adjustment, vs 71.6% in 2005. This difference is moderately significant statistically.

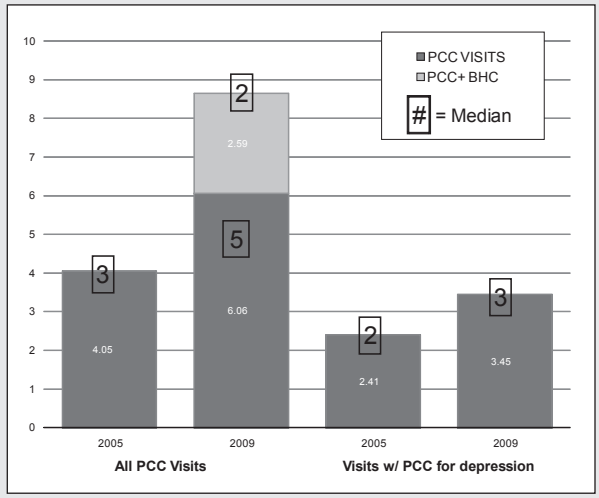


Figure 1. Impact of behavioral health consultation program on visit frequency. Abbreviations: PCC = primary care clinician; BHC = behavioral health consultant.

Symptomatic patients not already on psychotropic medication also were isolated for analysis. These patients were less likely to have 1 or more changes overall in psychotropic medication in 2009 compared to 2005 (61.1% = 99 out of 162 vs 82.3% = 135 out of 164) and were less likely to initiate psychotropic medication in 2009 than in 2005 (98/162 = 60.5% versus 135/164 = 82.3%). Both of these differences were strongly significant.

In contrast, symptomatic patients already on psychotropic medication were slightly more likely to experience 1 or more changes in 2009 compared to 2005 (61.3% vs 54%), but this difference was not statistically significant. Symptomatic patients already on psychotropic medication also were more likely to initiate psychotropic medication in 2009 (16%) compared to 2005 (0%), and this difference was strongly statistically significant.

Rate of Specialty Mental Health Referrals

Patients were far less likely to be referred out in 2009 than in 2005 (8.9% vs 48.2%), and this difference was significant (Table 1).

Impact of BHC Involvement on the Number of Visits for Depression and for Overall Visits to the PCC

In 2009, BHC involvement was associated with a 34% increase in the total number of Primary care visits. This increase was moderately significant statistically ($t = 2.34$, df = 265, $P = 0.020$).

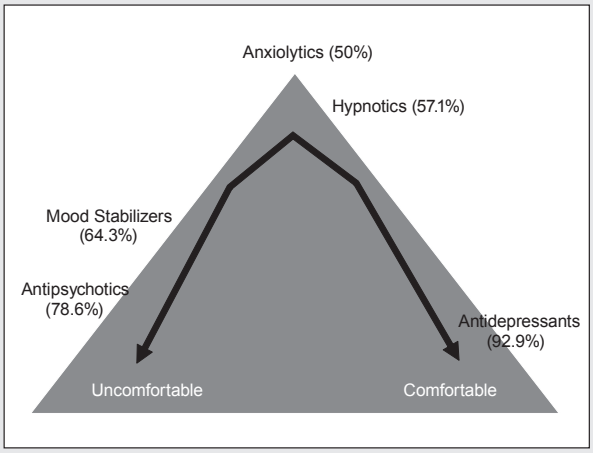


Figure 2. Comfort level with prescribing psychotropics, n=14

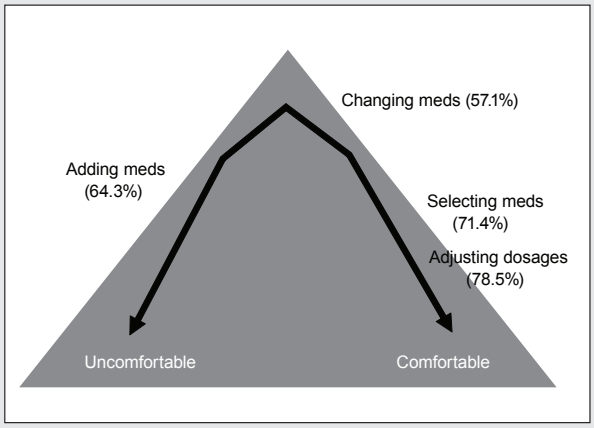


Figure 3. Comfort level with managing psychotropics, n=14.

BHC involvement was associated with a 109% increase of total number of combined PCC/BHC visits in 2009, which was strongly statistically significant (t=6.35, df= 265, P<0.00001). The number of PCC visits and the combined number of PCC and BHC visits showed a 117% and a 147% increase in 2009 when BHC was involved, compared to the total number of PCC visits in 2005. These differences were significant in both cases (Figure 1).

Primary Care Clinician Attitudes Toward Treating Mental Illness

Of respondents to the questionnaire, 92.9% agreed or strongly agreed that prescribing psychotropic medications was rightfully in their scope of practice. However, 61.6% noted that they treat mostly out of a sense of need (eg, lack of other resources such as specialty mental health). Clinicians noted a relative comfort with prescribing antidepressant medications (92.9% comfortable or very comfortable) but lesser comfort with other psychotropic classes (Figure 2). Clinicians also noted relative comfort selecting medications and adjusting dosages (71.4% and 78.5%, respectively) but less comfort with changing and adding medications (Figure 3). Diagnostically, clinicians indicated greater comfort working with depression, anxiety, and substance abuse (collectively 69.2% somewhat or much more comfortable) and lesser comfort with bipolar, personality disorders, and severe and persistent mental illness (collectively 71.4% uncomfortable or very uncomfortable). Clinicians credited the behavioral health consultation (BHC) program most highly (average rating of 9 on a scale of 1 to 10) among choices for sources of impact improving their comfort level with treating mental disorders with professional experience (8.54), with mentorship from colleagues (8.23) close behind. When asked to compare their comfort with prescribing psychotropics at present to 5 years before, most clinicians indicated greater comfort at present (53.8% somewhat more comfortable, 15.4% much more comfortable, 15.4% just as uncomfortable, 7.7% much more uncomfortable, 7.7% somewhat more uncomfortable). All respondents rated the BHC program as important (15.4%) or very important (84.6%) to their practice. Clinicians rated the psychiatric consultation (8.17 on a scale of 1 = low to 10 = high) and BHC components (9.46) of the program as having high importance to their practice.

DISCUSSION

The results of this study demonstrate that key indicators of evidence-based depression care improved post-implementation of the behavioral health consultation program. In addition, it revealed positive clinician attitudes toward taking on responsibility of caring for mental health issues in their patients.

Impact on Patient Care

Research has demonstrated that factors such as systematic implementation of screening and tracking tools and adherence to related medication and visit strategy algorithms produce better results than usual care.[11] In this study, there was a marked increase in the use of standardized instruments for tracking and screening purposes, a marked increase in the documentation of behavioral goals, and an indication of improved patient engagement, namely more visits with both the primary care clinician and behavioral health consultant in general and specifically for depression care. However, there was not strong evidence of an impact on the management of medication overall, with a few important exceptions. There was not a significant difference in the management of medications (initiation rates, change or addition of medication, dosage adjustments) among symptomatic patients between the 2005 and 2009 sam-

ples. This appears to run contrary to the goal of the program, which should facilitate more efficient and likely more frequent medication management resulting in more changes (assuming clinicians were not adequately following guidelines in 2005). Nonetheless, an unexpected finding may shed light on 1 possible explanation for this result. In the overall sample comparison, there was a trend toward decreased initiation of psychotropic medications and decreased rate of medication changes in general. Furthermore, in the subset of patients not already on psychotropic medications there was a statistically significant drop in initiation rates (less in 2009 than 2005). What this may indicate, contrary to the author's hypothesis that more patients would be medicated due to higher identification rates, is that the behavioral health consultation program brought an emphasis on behavioral management and/or that patients, once given the opportunity to choose between medication management and behavioral management, began to choose the latter more often. Another factor that may explain decreased changes in medication is increased clinician education regarding adequate trials, as opposed to patient-driven decisions to switch medications after insufficient trials. However, additional data and more detailed investigation into clinician practice habits are necessary in order to substantiate this interpretation and to determine true adherence to evidence-based guidelines.

Systemic Impact of the BHC Program

One of the most striking findings of the study was the impact of the behavioral health consultation model on referral rates to specialty mental health. This study demonstrated that the clinic could and did retain the majority of patients needing mental health care (only 8% referred out) despite a complex population (31% other diagnosis in addition to depression,23% substance abuse).

In addition to retaining patients, the behavioral health consultation program assisted in engaging patients more effectively. While this is a significant clinical finding, it can be interpreted to mean higher costs for payers in a fee-for-service environment. It could be argued, however, that compared to specialty mental health, the increase in visits from a median of 3 in 2005 to a combined median of 7 behavioral health/primary care clinician visits in 2009 are mild to moderate at best. There also are possible cost-effectiveness and cost-offset arguments that could be made; for example, increased patient engagement can have a halo effect on his/her entire health care outcomes, thus potentially minimizing long-term costs such as hospitalizations, emergency department use, and cost of inefficient care. These hypotheses require testing and validation. It may be that payers wishing to adopt this model in their systems would decide to re-evaluate the way that a health care home is reimbursed.

Primary Care Clinician Willingness to be Mental Health Clinicians

One of the most important components in any health care redesign toward integrated care is the willingness of primary care clinicians to reshape their practices. This study demonstrated what also has been shown by other studies:[12] that primary care clinicians are generally up to the task, but with the right kind of support. Results from the present study appear to replicate findings from previous research on the integration of behavioral health services with primary care, showing positive clinician perceptions of and satisfaction with integrated care programs.[12]

In the case of this study, when provided with behavioral health consultants at their immediate disposal and a psychiatric consultation system facilitated by the behavioral health consultants, clinicians felt they could take on the management of their patients' mental health concerns. They also felt their skills were enhanced and their practices were improved in substantial ways. On the clinician survey, clinicians made comments about what their practice would look like without behavioral health integration, such as:

- "It would be horrible—back to the dark days of trying to muddle through and figure out what to do with these situations. The behavioral health consultation program is one of the best things about Access Community Health Center and about practicing at Access Community Health Center."
- "I might do the same things, but with a much lower comfort level. I couldn't do the same behavioral interventions that the patients get now."
- "Patients would suffer from lack of timely treatment (both counseling and possibly medication)."
- "Patients would get less attention to their mental health due to time constraints."

LIMITATIONS

While this study replicates findings in other larger studies and adds important nuances of its own to the literature, there are some important limitations to the data and its interpretation. Chief among them is the single-site, single-program nature of the study and the retrospective nature of the clinician survey data. In addition, the data measures indicators of improved patient care, but no direct outcomes were presented in the study to ascertain the exact clinical outcomes. It also is important to contextualize the data. For example, the 8% referral rate demonstrated here may vary based on patient population and/or community. In the case of this community health center, access to specialty mental health was found to be poor in its county, thus necessitating retention of even some of the most severe psychiatric patients, (as per clinician reports). That did not, however, stop them from trying to refer in 2005. Other

communities with better access to care might find different referral patterns, or, in the case of the visit data, different visit patterns. Therefore, clinic and community factors should be taken into account when seeking to generalize these results. Finally, it is important to note that mood disorders are not the sole focus of behavioral health consultation and, as such, studies that focus on a single diagnosis miss the breadth of the more expansive mission of behavioral health consultation programs, which include supporting primary care clinicians in providing behavioral health care (eg, chronic disease management, medication adherence, etc).

CONCLUSION

This study demonstrates that a behavioral health consultation program in an urban community health center significantly and positively impacts the care of depression and makes it possible to manage the majority of patients presenting with these issues in the primary care setting. From a policy standpoint, this is a significant conclusion to draw, because it opens the possibility of redesigning the health care system to better support the work of primary care clinicians in the care of depression. Specifically, integrated care programs can increase access for patients, increase patient engagement, and improve quality indicators. They also are highly acceptable to patients and clinicians in the primary care environment. Future research will be needed to determine whether the behavioral health consultant model is similarly effective with other psychiatric and behavioral health conditions, the economic impact of such programs, and the key ingredients of the model for successful outcomes. Primary care is emerging as an important point of service for mental health in the American health care system. Therefore, it would seem to be the case that the question is not whether such support should be provided, but exactly what components of what programs will achieve the best and most cost-efficient patient care.

Funding/Support: None declared.

Financial Disclosures: The authors completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Dr Serrano reported serving as a paid consultant for primarycareshrink.com and Farleigh Dickinson University.

REFERENCES

1. Regier DA, Narrow WE, Rae DS, et al. The de facto US mental and addictive disorders service system: epidemiologic catchment area prospective 1-year prevalence rates of disorders and services. *Arch Gen Psychiat.* 1993;50:85-94.

2. Miranda J, Hohnmann AA, Attikisso CA. *Epidemiology of Mental Health Disorders in Primary Care.* San Francisco, CA: Jossey-Bass; 1994.

3. Robinson PJ, Reiter JT. *Behavioral Consultation and Primary Care: A Guide to Integrating Services.* New York, NY: Springer; 2007.

4. Gunn WB, Blount A. Primary care mental health: a new frontier for psychology. *J Clin Psychol.* 200;65:235-252.

5. Katon WJ, Roy-Byrne P, Russo J, Cowley D. Cost-effectiveness and cost offset of a collaborative care intervention for primary care patients with panic disorder. *Arch Gen Psychiat.* 2002;59:1098-1104.

6. Simon GE, Katon WJ, VonKorff M, et al. Cost-effectiveness of a collaborative care program for primary care patients with persistent depression. *Am J Psychiat.* 2001;158:1638–1644.

7. Gallo JJ, Zubritsky C, Maxwell J, et al. Primary care clinicians evaluate integrated and referral models of behavioral health care for older adults: results from a multisite effectiveness trial (PRISM-E). *Ann Fam Med.* 2004;2:305-309.

8. Bartels SJ, Coakley EH, Zubritsk C, et al. Improving access to geriatric mental health services: a randomized trial comparing treatment engagement with integrated versus enhanced referral care for depression, anxiety, and at-risk alcohol use. *Am J Psychiat.* 2004;161:1455-1462.

9. Unutzer J, Katon W, Callahan CM, et al. Collaborative care management of later life depression in the primary care setting: a randomized controlled trial. *JAMA.* 2002;22:2836-2845.

10. Bryan CJ, Morrow C, Appolonio KK. Impact of behavioral health consultant interventions on patient symptoms and functioning in an integrated family medicine clinic. *J Clin Psychol.* 2009;65:281-293.

11. Craven MA, Bland R. Better practices in collaborative mental health care: an analysis of the evidence base. *Can J Psychiat.* 2006;51(6 Suppl 1):7S-72S.

12. Levine S, Unutzer J, Yip JY, et al. Clinicians' satisfaction with a collaborative disease management program for late-life depression in primary care. *Gen Hosp Psychiat.* 2005;27:383-391.

Strong Rural Communities Initiative (SRCI) Program: Challenges in Promoting Healthier Lifestyles

Syed M. Ahmed, MD, MPH, DrPH, FAAFP; Tim Size, BSE, MBA; Byron Crouse, MD, FAAFP; Leslie Patterson, MS; Eric Gass, PhD; Sarita L. Karon, PhD; Liz Lund, BS; Connie Abert, MS; Amy Wergin, RN, BSN; Karen Hegranes, RN, MSN, PHN; Linda Bishop, MA; Sue Duffy, RN, BSN; Kevin Jacobson

ABSTRACT

Background: The Strong Rural Communities Initiative (SRCI) was created to address the health needs of rural Wisconsin communities through a multifaceted partnership that included the Medical College of Wisconsin (MCW), University of Wisconsin School of Medicine and Public Health (UWSMPH), the Rural Health Development Council (RHDC), and hospitals, public health departments, and businesses in 6 rural communities in Wisconsin. The SRCI provided a broad framework of leadership to assist each of the 6 rural communities in developing and implementing new, collaborative interventions that addressed the specific health needs of the community.

Methods: Separate assessments were conducted for the communities that partnered with each respective medical school and focused on the processes of community collaboration and partnership function. Assessment approaches included formative and outcome evaluation.

Results: Each community independently reported positive outcomes associated with the partnership process and various aspects of community collaboration, including the successes and health impacts of the workplace wellness programs implemented. Assessment data also revealed challenges related to conducting effective community-academic partnerships.

Conclusions: The SRCI was established to execute statewide programs in rural communities with the goal to improve the health of people living in those communities. We have gained applicable knowledge regarding the types of challenges that exist in establishing a rural-based community research network between academic partners and community leaders.

• • •

Author Affiliations: Medical College of Wisconsin, Milwaukee, Wis (Ahmed, Patterson); Wisconsin Rural Health Cooperative, Sauk City, Wis (Size); University of Wisconsin School of Medicine and Public Health, Madison, Wis (Crouse); Milwaukee Health Department, Milwaukee, Wis (Gass); Center for Health Systems Research and Analysis, Madison, Wis (Karon); Black River Memorial Hospital, Black River Falls, Wis (Lund); UW-Extension, Waupaca, Wis (Abert); Manitowoc County Health Department, Manitowoc, Wis (Wergin); Langlade County Health Department, Antigo, Wis (Hegranes); Sauk Prairie Memorial Hospital, Prairie du Sac, Wis (Bishop); Hayward Area Memorial Hopspital, Hayward, Wis (Duffy); Wisconsin Office of Rural Health, Madison, Wis (Jacobson).

Corresponding Author: Syed M. Ahmed, MD, MPH, DrPH, FAAFP, Professor of Family and Community Medicine, Medical College of Wisconsin, Plank Road Clinic, 1155 N Mayfair Rd, Wauwatosa WI, 53226; phone 414.456.8291; e-mail sahmed@mcw.edu.

BACKGROUND

The Strong Rural Communities Initiative (SRCI) was established in 2004 to improve health for rural Wisconsin communities and to significantly accelerate the establishment of collaborations to champion disease prevention. The SRCI evolved from collaborative visions of 3 major organizations in Wisconsin: the Rural Health Development Council (RHDC), the Medical College of Wisconsin (MCW), and the University of Wisconsin School of Medicine and Public Health (UWSMPH). Discussion among these 3 initial partners resulted in the conception of collaborative preventive health ventures, implemented through worksites, as a way to improve the health of community members and to reduce health care costs of businesses, thereby encouraging businesses to expand, remain in, or relocate to rural communities and thus improve their economic health. This model was consistent with the recommendation of the Institute of Medicine report *Quality through Collaboration: The Future of Rural Health Care,* which suggested that rural communities must reorient their strategies from a "patient- and provider-centric approach to one that also addresses the problems and needs of rural communities and populations."[1] The SRCI model also addressed concerns about urban-rural disparities in health outcomes as reported in *Wisconsin County Health Rankings 2004* and *Healthiest Wisconsin 2010: A Partnership Plan to Improve the Health of the Public* and was consistent with RHDC's emphasis on the link between rural health and community and economic development.[2,3]

Figure 1. Map of community and academic partners in Wisconsin.
Abbreviations: MCW = Medical College of Wisconsin; UWSMPH = University of Wisconsin Madison School of Medicine and Public Health; RHDC = Rural Health Development Council.

RHDC and SRCI Program Descriptions

The RHDC brought together 2 academic partners, UWSMPH and MCW, to discuss a process that would provide funding for rural communities to initiate programs geared toward improved health outcomes. Blue Cross/Blue Shield of Wisconsin endowments were a particular funding source located at each of the state's 2 medical schools. Funds were allocated through the Healthier Wisconsin Partnership Program (HWPP) at MCW and the Wisconsin Partnership Fund for a Healthy Future (WPF) at UWSMPH.[4,5] In late 2004, the RHDC formed a work group, comprised of RHDC volunteer members as well as other stakeholders in the statewide rural health community, to develop a proposal for the RHDC to submit to each of the medical school's funding sources.

The RHDC issued a statewide call for local community projects in 2005. The request for proposals stated "[t]he goal of the initiative is for rural communities to improve their health indicators and health status through the development of ongoing, local interventions by coalitions that include: (1) the local hospital and representatives of the medical community, (2) the county health department, and (3) representatives of other non-health-related local businesses." The RHDC work group selected 6 communities from the 22 proposals received. Based on past working relationships and geography, it was decided that the UWSMPH would serve as the academic partner to local community projects in Jackson, Sauk, and Sawyer counties, and MCW would operate as the academic partner for Langlade, Manitowoc, and Waupaca counties. Figure 1 displays the geographical location of all partners.

In the spring of 2006, a 3-year implementation grant from HWPP was awarded to support the programs at the MCW sites. The Wisconsin Office of Rural Health (WORH) contributed funding through its Rural Hospital Flexibility Grant funds to support the programs at the UWSMPH sites for the first year, and WPF funding was awarded for the final 2 years.

Representatives of each of the 6 communities, 2 academic institutions, and the Rural Health Development Council (RHDC) created the SRCI Advisory Committee. Figure 2 illustrates the partnership framework for the SRCI Advisory Committee. Its function was to manage and direct the vision of the SRCI. The committee met bimonthly to share work in progress and provide strategic support and resources to each of the members.

Community Partners

The 6 rural community partners were given flexibility to develop and implement programs that would be of greatest benefit to their community. Table 1 provides an overview of all community programs.

METHODS

Program Assessment

The SRCI assessment focused on the process of collaboration and the perceptions of partnership functions from the perspective of participants in the collaborations. The SRCI assessment did not evaluate the impact on individual health outcomes. Some community programs did track outcomes of those participating in their interventions, but these were not standardized across all sites and therefore not evaluated by the SRCI. We deferred instead to the large body of literature documenting the known benefits of the types of health and lifestyle changes promoted by the SRCI partnerships.[6-9] We also did not seek to address any impact of the SRCI programs on health experiences and related health insurance costs for the participating worksites. Those impacts take time to be observed and should be measured in the future.[10]

In keeping with the SRCI structure, separate assessments were conducted for the communities that partnered with the UWSMPH and those that partnered with the MCW. Assessment approaches were developed by the academic partners in conjunction with their respective community partners. Differences in timing of the 2 groups of projects meant that the UWSMPH

assessment was designed and conducted earlier than the MCW evaluation. This provided MCW with the opportunity to build on the UWSMPH approach and to modify that approach to reflect the needs of its community partners.

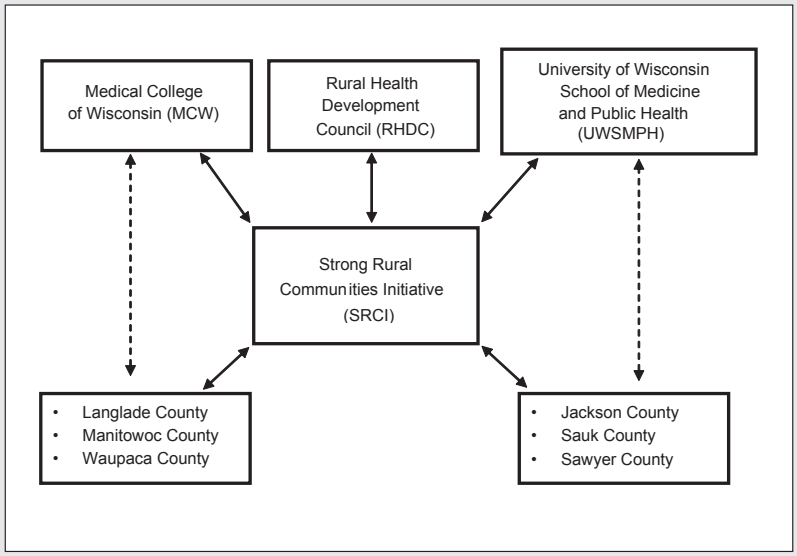


Figure 2. The Strong Rural Communities Initiative partnership framework.

UW School of Medicine and Public Health

The assessment approach was developed as a collaborative effort of the UWSMPH, its evaluator, the Center for Health Systems Research and Analysis (CHSRA), and the 3 counties represented by UWSMPH. A formative evaluation addressed the processes, challenges, and successes experienced in developing the collaborative approach. The formative assessment was conducted using in-depth interviews with key informants in each community. Questions addressed understanding of the structure and design of the SRCI program, ways that organizations benefited from participation in the program, benefits of the program to the community, challenges encountered, and lessons learned. A total of 11 interviews were conducted. We gained additional information from participant observation at coalition meetings, including routine meetings of the SRCI Advisory Committee, meetings of individual community collaboratives, and a meeting of leaders of the 3 communities' collaborative where they shared successes, struggles, and strategies.

An outcomes evaluation was designed to reflect the collaborative nature of the project. We designed a tool that included measures that addressed impact on each of the partnering organizations—hospitals, public health departments, businesses, and the broader community—as well as the collaborative as a whole. These outcome measures were developed initially through a meeting of the 3 communities, in which appreciative inquiry was used to identify common outcomes of interest and to highlight the unique perspectives of the different partner organizations.[11] Additional outcomes were identified through literature review, and an outcome measurement tool was developed. A final set of 83 outcome measures, each rated for importance and for achievement, was adopted based on community partners' review of the draft tool. The outcomes tool was designed to highlight differences in perspective of the various community partners—hospitals, departments of public health, worksites, and the general public.

Data for the outcome measures was collected by a written survey in which individuals rated (a) the importance of each outcome measure to the community's health improvement program, and (b) how well the community's program succeeded in achieving each outcome. Written surveys were mailed to key informants, using criteria provided by the evaluator. A total of 43 surveys were distributed; 29 surveys were returned. This study was reviewed and approved by the UWSMPH Institutional Review Board (IRB).

Medical College of Wisconsin

This assessment, done by MCW's Center for Healthy Communities (CHC) and the 3 counties represented by MCW, focused on various aspects of collaboration and particularly on the congruence between *importance* and a*chievement* of the outcomes of collaboration. By drawing from these comparisons, we could identify areas of success (achievement levels ≥ importance) and areas in need of improvement (achievement levels < the level of importance).

The MCW faculty began with the outcome tool developed by CHSRA and modified it to reflect the nature of its partnerships with the 3 rural counties and allow for specific statistical analyses but did not change the nature or content of the survey questions.

Forty-five surveys were sent to the rural community partners in August 2007 with the instruction that stakeholders and participants involved in local SRCI health coalitions complete the survey. The stakeholders included managers from businesses implementing an SRCI-supported worksite wellness program, hospital executives, public health workers, and other members of the health coalition leadership. Twenty-eight completed surveys were returned to the MCW for analysis.

Data were analyzed using the nonparametric Wilcoxon

Table 1. Summary of the Community Programs

Community Partner	Population of County	Number of Organizations/ Hospitals Represented	Number of Participating Businesses	Number of Programs	Program Focus
Langlade County	20,165	18	8	3	Development of worksite wellness committees, smoke-free policies implemented at workplaces, improved Health Risk Assessment (HRA) scores, weight loss challenges
Waupaca County	54,157	1	28	3	Development of worksite wellness committees, walking programs, exercise classes, healthier vending machine choices, "lunch and learn" sessions
Manitowoc County	80,641	4	18	18	Development of worksite wellness committees, improved HRA scores, smoking cessation programs, weight management programs, development of community walking trail
Jackson County	19,500	12	7	7	Development of worksite wellness committees, healthier vending machine choices,"lunch and learn" sessions, team challenges, improved health assessments, weight loss, and promote preventive care
Sauk County	55,225	8	3	13	Improved HRA scores, exercise classes/fitness memberships, nutrition counseling and classes
Sawyer County	17,117	3	6	2	Increased activity levels, increased weight loss, smoke-free policies implemented at worksites

Signed Ranks test.[12] For analytical purposes and based on results of early analyses, responses of 5 or 4 on the 5-point Likert scale were combined into 1 response category. We performed 3 separate comparisons: Achievement < Importance, Achievement > Importance, and Achievement = Importance, to identify areas of success and those in need of improvement. This study was reviewed and approved by the MCW IRB.

RESULTS

UW School of Medicine and Public Health

Each of the 3 communities based its program on an existing program of the hospital. The specific design of each program was driven in part by the contractual requirement that the program include a collaborative effort of hospitals, public health departments, and local businesses. Within these constraints, there was variation in the breadth of community representation. They also varied in the length of the health education programs offered (6 weeks to unlimited), the program location (worksite or hospital), methods of motivating individuals (competitions, incentives, group support, and accountability), and program content (information and exercise in varying combinations). Without exception, informants agreed that a combination of education and activity worked best.

Qualitative information from the interviews and participant observation revealed several common challenges. Development and implementation of the SRCI programs were more costly than anticipated. The biggest challenge was having adequate staff time to manage the project. Costs related to incentives for individual participation and repeated health risk assessments (HRAs) also were greater than expected.

Leadership was key, both for the collaborative efforts and at each worksite. Buy-in and commitment from others also was essential. Turnover in key collaborative members resulted in program discontinuities and disrupted trust relationships that had been developed over time.

Scheduling was another common challenge. In most cases, program activities took place at the worksite, usually during work hours. This presented practical challenges related to the need for participants to complete routine work activities, conflicts with other work demands, and the need for coworkers to cover for participants while they were engaged in the program.

Various approaches were used to encourage individuals to participate and remain motivated. Rewards and competitions were used to encourage participants to set and strive for personal goals. One community agreed with the importance of motivation, but expressed belief that motivation comes from within and not by external reward.

Trust was an important theme, both among members of the working collaborations and between trainers and program participants. Trust was a particular issue when trying to engage members of local minority (Native American and Hispanic) communities. This was achieved most readily when there were established personal relationships to build on and was disrupted when individuals left the community.

Collaborative members reported improved communication among the participating organizations. The effect on the business climate in the communities was unclear. Several of the participating worksites (schools, police department, county government) would be unlikely to leave the community in any case. Some of the effects that would attract businesses

Table 2. Importance and Achievement of Select Measures: University of Wisconsin School of Medicine and Public Health Partners

Leadership, Vision and Direction		
	Importance	**Achievement**
Leadership includes high–level, visible leaders	4.36 (4.18 – 4.71)	4.59 (4.45 – 4.71)
Leadership is open to perspectives, viewpoints, and suggestions of all participants	4.83 (4.73 – 5.00)	4.54 (4.36 – 4.70)
Partners agree on the goals of the collaborative	4.66 (4.57 – 4.73)	4.37 (4.33 – 4.43)
The collaborative has identified ways to measure progress	4.59[a] (4.36 – 4.86)	4.00 (4.00 – 4.00)
Hospital leaders are committed to the SRCI program	4.89 (4.82 – 5.00)	4.72 (4.63 – 5.00)
Public health leaders are committed to the SRCI program	4.88[b] (4.70 – 5.00)	4.28[c] (3.89 – 5.00)
Leaders of participating businesses are committed to the SRCI program	4.72 (4.73 – 4.86)	4.08[b] (3.33 – 4.33)
Resources		
	Importance	**Achievement**
The collaborative has adequate resources to achieve its goals	4.66 (4.64 – 4.71)	4.11[a] (3.80 – 4.45)
The collaborative has the resources to continue when the grant funding ends	4.68 (4.50 – 4.86)	3.13 (3.00 – 3.25)
The collaborative has an effective strategy for generating resources needed to be self–supporting	4.73 (4.56 – 4.86)	3.29 (3.00 – 3.44)
Trust and Collaboration		
	Importance	**Achievement**
There is a high level of trust among partners	4.72 (4.71 – 4.73)	4.39 (4.14 – 4.55)
There is clear and open communication among partners	4.79 (4.77 – 4.82)	4.46[a] (4.30 – 4.86)
Membership reflects the diversity of the community's population and organization	4.59 (4.45 – 4.73)	4.04 (3.70 – 4.29)
New members are actively recruited	4.04 (3.71 – 4.20)	3.64 (3.38 – 3.90)
There is a process for integrating new members into the group	4.22 (4.14 – 4.27)	3.81 (3.75 – 3.82)
Partners are committed to making the collaborative an on–going effort	4.69 (4.64 – 4.86)	3.88 (3.67 – 4.00)
Results		
	Importance	**Achievement**
The targeted issues improve as direct result of the collaborative	4.79[a] (4.64 – 5.00)	4.37[b] (4.13 – 4.83)
Partners feel pride in what the collaborative is achieving	4.75 (4.60 – 4.86)	4.41[c] (3.89 – 4.71)
The collaborative is accomplishing more than the partners could accomplish individually	4.82 (4.73 – 4.90)	4.60[b] (4.00 – 4.90)
Other businesses/worksites have asked to join the collaborative	4.60 (4.44 – 4.78)	3.86[a] (3.44 – 4.43)
The community is more attractive to businesses as a result of the collaborative	4.04 (3.67 – 4.50)	3.83 (3.25 – 4.50)
The SRCI program improves the health of participants	4.83 (4.73 – 5.00)	4.33[c] (4.11 – 4.86)
Employees at participating businesses are participating in the SRCI program	4.64 (4.55 – 4.80)	3.88[a] (3.43 – 4.17)

Note: The range shows the minimum and maximum average values found among the 3 communities. Significant differences between communities were tested using F tests. Because of the small sample sizes, we highlight differences significant at $P<.20$ or less.

[a] $P<.20$

[b] $P<.10$

[c] $P<.05$

(eg, reduced health care costs) will take time to be observed. Nonetheless, surveys completed by members of businesses/worksites reported very positive results, including increased productivity.

The survey data supported these findings and identified other issues. Given the number of outcomes measured, we show data only on select measures. (Complete data are available from the Dr Karon, the UWSMPH evaluator, upon request). The mean values of outcomes, rated both for importance and achievement, are shown in Table 2, with significant differences by community noted. Nearly all measures were rated with high levels of importance by individuals in all communities. Differences by communities were found in the importance of having ways to measure progress and the ability to identify improvements as a direct result of the collaborative.

Measures of achievement generally were not rated as highly, although most of them also had mean values of 4.00 (on a 5-point scale) or greater. Significant differences among the communities were reported with regard to the commitment of public health and business leaders. The adequacy of resources to achieve goals and continue after grant funding generally had low rates of achievement. There were significant differences among communities in the ability to achieve their goals with current funding. All 3 of the communities reported similarly low rates of achievement related to future funding.

Measures of trust and collaboration found relatively high

rates of achievement of trust among existing partners, but low rates of achievement related to the recruitment and integration of new members into the collaborative.

Rates of achievement of several measures of results were generally high, with lower rates of achievement found in results related to participating businesses than in those related to the collaborative as a whole. Significant differences by community were found in the achievement of many of these measures of results.

Medical College of Wisconsin

In all cases where statistically significant differences were found, participants rated the importance of a specific partnership characteristic higher than their current partnership's level of achievement of that characteristic. Table 3 shows which areas of the local collaboration were in need of improved functioning (high importance, low achievement). Those areas of collaboration that needed improvement included clear, honest, and open communication; timeliness of task completion; inclusion of high-level, visible leaders; accumulation of adequate resources; measurement and achievement of long-term goals; shared decision-making; active recruitment of new, diverse members; increase policy change efforts; increase pride, awareness, and publicity of SRCI programs; increase attractiveness of community through health programs; and inclusion of participants' families in health programs.

Table 4 shows collaborative outcomes that participants felt were both important and achieved by their local partnership. These areas of strength included trust among partners; active participation among partners and acceptance of other's perspectives; clear mission and goals for the partnership; established roles for each partner; achievement of short-term goals; using outcomes to develop future efforts; sense of collaborative accomplishment; creation of new relationships; and feeling that worksite wellness programs improve health.

DISCUSSION

This is an innovative program bringing together 2 of the largest academic institutions in Wisconsin. The design of our program identified barriers to implementation of the program.

Statewide Obstacles to Implementation

The logistics of coordinating efforts between the RHDC, MCW, UWSMPH, and 6 rural communities posed several challenges to the partnership. Considering the large geographical distance between partners, simply getting meetings arranged proved to be challenging. This obstacle was resolved by a collective commitment to attend bimonthly conference calls and a yearly face-to-face meeting. Additionally, differences in the research timetable of the 2 academic institutions (and therefore the community partners) created a discrepancy in analyzing and evaluating complementary phases of the project. Yet, despite differences in programmatic deadlines, the RHDC was able to serve as an intermediary between academic partners and community partners through the sharing, reporting, and dissemination of program information and results.

Another challenge was evident in the understanding and navigation of the IRB. There were systematic differences in IRB procedure between MCW and UWSMPH. Also, considering the relative novelty of community-based programs at each institution, initially there was an inherent lack of understanding on how to review community-based research. This project was the first IRB experience for many of the local community partners, and many of them encountered barriers in understanding IRB protocols. To combat this, academic partners met with IRB personnel on several occasions and resolved many issues. The community partners also were required to complete the IRB's Collaborative Institutional Training Initiative course, a web-based course for conducting human subject research, and expressed mixed feelings about the need for this process. Over time, the IRB process has become more responsive to community-based participatory research (CBPR) proposals.

Local Obstacles to Implementation

Several common challenges emerged among the 6 community partners. The rural sites varied in their histories of collaboration among the local partners, approaches to implementing the programs at the business sites, and resources available.

One overarching challenge exhibited by all 6 local community partners was overcoming scheduling conflicts. The wellness committees at sites experienced difficulties with establishing regular meeting attendance guidelines for committee members. On a smaller scale, it was also difficult to work around the various schedules of the participants. Many participants did not want to attend program-related sessions that were offered during off-work hours. Many of SRCI's community partners were able to overcome this barrier by offering wellness sessions during the workday.

Another local-level challenge centered on a lack of readiness to make healthy lifestyle behavior changes. Particularly, Jackson County and Sauk County noted that a major challenge with the project's objective to improve health status was the lack of control over an individual's lifestyle habits. Encouragement to make improvements to current lifestyle habits can be difficult to influence depending on the participant's current level of motivation to change behaviors. A select few participants reverted to habits (ie, started smoking or ignored moderation over the holidays) or were not willing to be "present" or follow the program, which affected their own results and potentially skewed the overall results.

Staff turnover within the project team and within partici-

Table 3. Importance to Partnership > Current Achievement of Partnership: Medical College of Wisconsin Partners

	Importance > Achievement
Members feel comfortable being open and honest	*P*<.05
Tasks are completed on schedule	*P*<.05
Leadership includes high-level, visible leaders	*P*<.05
Your local partnership has adequate resources (people, funds, other resources) to achieve its goals	*P*<.01
Your local partnership has identified ways to measure progress	*P*<.05
Your local partnership is achieving its long-term goals	*P*<.05
There is clear and open communication among partners	*P*<.05
Partners share decision-making responsibility	*P*<.05
Membership in your local partnership reflects the diversity of the community's population and organizations	*P*<.01
New members are actively recruited	*P*<.05
Your local partnership has a way to measure progress in achieving its desired outcomes	*P*<.05
Your local partnership has the resources necessary to continue when the current grant funding ends	*P*<.001
Your local partnership has an effective strategy for generating the resources needed to be self-supporting	*P*<.001
Partners are committed to making your local partnership an ongoing effort	*P*<.05
Outcomes of the project are being measured	*P*<.05
The targeted issues improve as a direct result of the your local partnership	*P*<.05
Other issues improve indirectly as a result of your local partnership	*P*<.05
Your local partnership has evidence of affecting public policy	*P*<.05
Outcomes of the project demonstrate the value of continuing your local partnership	*P*<.05
Partners feel pride in what your local partnership is accomplishing	*P*<.05
The public is aware of your local partnership	*P*<.05
Other businesses or worksites have asked to join the your local partnership	*P*<.05
Your local partnership is involved in promotional activities	*P*<.05
The community is more attractive to businesses as a result of your local partnership	*P*<.01
There is an increased awareness of fitness, nutrition, and other healthy lifestyle issues in the community	*P*<.05
There are new community programs focused on healthy lifestyle choices	*P*<.05
There is a sense of community pride in the Strong Rural Community Initiative program	*P*<.01
The community promotes itself as being a healthy place to live	*P*<.01
There are local policy changes to support healthy lifestyles	*P*<.01
The program improves the health of participants' families	*P*<.05

Table 4. Importance to Partnership = Current Achievement of Partnership: Medical College of Wisconsin Partners

	Importance = Achievement
The partners all have something to gain from a successful collaboration	NS
There is a high level of trust among partners	NS
Partners actively participate in meetings and provide input during discussions	NS
Leadership is open to perspectives, viewpoints, and suggestions of all participants	NS
Your local partnership has a clear mission statement	NS
Partners agree on the goals of your local partnership	NS
Your local partnership has clear goals, plans, and measures of success that provide a sense of accomplishment among partners	NS
Your local partnership is achieving its short-term goals	NS
Your local partnership includes representatives from local health care organizations, businesses, government, and residents	NS
There is a process for integrating new members into the group, giving them information about how your partnership functions and its history, and actively involving them	NS
Roles and responsibilities among partner organizations and individuals are clearly defined	NS
Your local partnership has an effective governance structure	NS
Learning generated from projects and processes can be used to enhance future efforts	NS
Partnering organizations change the way they operate as a result of this collaborative	NS
Your local partnership is accomplishing more than the partners could accomplish individually	NS
New relationships have been created among the partners	NS
Businesses involved in the your local partnership remain in the community	NS
The program improves the health of participants	NS

(NS = not statistically significant)

pating businesses also was a barrier to success for several community partners (Manitowoc County, Jackson County, Sawyer County). Turnover within participating businesses often led to decision changes regarding participation in projects, where under previous management the business had been enthusiastic about participating in SRCI-initiated programs.

Other common challenges at a local level manifested with differences in components and completion rates of HRAs, overall promotion of the project, and recognizing the "full cost" and time commitment of implementing their programs, which presented unanticipated financial restrictions.

CONCLUSION

Despite the above-mentioned challenges, the SRCI was able to bring together 2 medical schools in Wisconsin and 6 communities with 43 businesses and health partners to address health at the workplace. The collaboration created an environment of possibilities that previously did not exist, since each of the 2 medical schools did not have any significant prior history of forming this type of partnership.

The key elements of this successful collaboration included outstanding leadership, group enthusiasm and involvement; shared goals and objectives; and continuous bidirectional dialogue among community and academic partners. The SRCI agenda will be carried forward in the ongoing work of the RHDC, the WORH, and the Rural Wisconsin Health Cooperative. Participating communities also will maintain a link in the SRCI's progress. It is our hope that the SRCI can serve as a framework for executing statewide community-academic programs that partner with the business sector.

Acknowledgments: We express our appreciation for the help of our community partners; without their assistance, this project could not have been completed.

Funding/Support: We would like to gratefully acknowledge MCW's Healthier Wisconsin Partnership Program, UWSMPH's Wisconsin Partnership Fund for a Healthy Future, and the Wisconsin Office of Rural Health for their generous funding to the SRCI.

Financial Disclosures: None declared.

REFERENCES

1. Institute of Medicine. *Quality through Collaboration: The Future of Rural Health Care.* Washington, DC: The National Academies; 2005.

2. Peppard PE, Kempf A, Dranger E, Kindig D, Remington PL. *Wisconsin County Health Rankings: 2004.* Madison, WI: Wisconsin Public Health and Health Policy Institute. http://pophealth.wisc.edu/uwphi/pha/wchr/2004/rankings.pdf. Accessed April 27, 2011.

3. Wisconsin Department of Health Services. *Healthiest Wisconsin 2010: A Partnership Plan to Improve the Health of the Public.* Madison, Wis. http://dhs.wisconsin.gov/statehealthplan/hw2010/index.htm. Accessed April 27, 2011.

4. Medical College of Wisconsin. *Healthier WI Partnership Program.* Milwaukee, Wis. http://www.mcw.edu/healthierwipartnerships.htm. Accessed April 27, 2011.

5. University of Wisconsin School of Medicine and Public Health. *Wisconsin Partnership Fund for a Healthy Future.* Madison, Wis. http://www.med.wisc.edu/partnership/main/499. Accessed April 27, 2011.

6. Carnethon M, Whitsel LP, Franklin BA, et al. Worksite wellness programs for cardiovascular disease prevention: a policy statement from the American Heart Association. *Circulation.* 2009;120:1725-1741.

7. Kilpatrick S. Multi-level rural community engagement in health. *Aust J Rural Health.* 2009;17:39-44.

8. Robroek S, Van Lenthe, F, Van Empelen P, Burdorf A. Determinants of participation in worksite health promotion programs: a systematic review. *Int J Behav Nutr Phys Activity.* 2009;6(26):1-12.

9. Terry PE, Fowles JB, Harvey L. Employee engagement factors that affect enrollment compared with retention in two coaching programs—the ACTIVATE Study. *Population Health Management.* 2010;13(3):115-122.

10. Champion VL, Skinner CS. The health belief model. In Glanz K, Rimer BK, Viswanath K, eds. *Health Behavior and Health Education: Theory, Research, and Practice.* San Francisco, CA: Jossey-Bass; 2008:45-65.

11. Markova D, Holland B. Appreciative inquiry. *School Administrator.* 2005;62(2):30-35.

12. Argyrous G. *Statistics for Social and Health Research.* Thousand Oaks, CA: Sage; 2000.

The Emeritus Clinical-Researcher Program

Steven Yale, MD; Michael Jones, JD; Stephen D. Wesbrook, PhD; Stephen Talsness, BA; Joseph J. Mazza, MD

ABSTRACT

Background: For some physicians, retirement means leaving their practice and severing ties with their institution, while others may wish to maintain a more active role within their institution. Many institutions have designed programs that enable these individuals to maintain an academic relationship and provide services to their institution.

Objectives: This manuscript provides a brief experience of the Marshfield Clinic (MC) and Marshfield Clinic Research Foundation (MCRF) recent development of an emeritus program for research and education.

Results: The program is designed to provide opportunities for physicians, clinical PhDs, dentists, and other clinicians with terminal degrees and the necessary qualifications as researchers, to continue to contribute to the MC/MCRF research mission after retirement from clinical practice. Assignment to various aspects of the program is determined by the individual's expertise, experience and institutional needs. Expectations and performance of each individual is evaluated. The infrastructure of the program was assembled by reviewing institutes that have had an emeritus program in operation and integrating the unique aspect of MC/MCRF resources.

Conclusion: Alignment of the unique skills, expertise, knowledge, and wealth of experience of emeritus faculty along institutional needs has provided added value to the institution without major financial investment.

INTRODUCTION

For some physicians, retirement means leaving practice and severing ties with their institution. However, others may have interest in maintaining a more active role within their institution by continuing to contribute intellectually. As a result, many institutions have recognized the expertise and talents of those nearing retirement and have designed programs that enable these individuals to maintain an academic relationship and provide beneficial services to their institution (eg, research, education, manuscript writing and editing, and mentoring).

We present herein the structure and design of our Emeritus Clinical-Researcher (ECR) Program at Marshfield Clinic Research Foundation (MCRF). The Marshfield Clinic (MC) health care system consists of over 750 physicians in 42 regional centers throughout Wisconsin, nearly 400 of whom are located at the main campus in Marshfield. MCRF is a division of MC and consists of over 200 senior, associate, and assistant scientists involved in various aspects of research. The concept of the ECR Program was 1 of 10 initiatives conceived during MC's mission review. The review was intended to assess the state of clinician-led research and make recommendations to MC leadership on how to accomplish the goals and initiatives articulated in the MC/MCRF strategic plan. The ECR initiative was established to use the talents of distinguished physicians, PhDs, dentists, and other professionals with terminal degrees and the necessary research qualifications to continue to contribute to MC/MCRF's research mission after retirement from clinical practice.

The term "emeritus" is used to recognize retired physicians or scientists for their academic or scientific excellence and past contributions, or as an academic staff appointment title bestowed by the individual's department. Rather than sever ties with the institution, leaving the retiree "legally and academically dead,"[1] an alternate vision elucidated over 20 years ago has emerged, establishing the emeritus status as a distinguished active professional within the institution.[2] Currently, it is com-

• • •

Author Affiliations: Clinical Research Center, Marshfield Clinic Research Foundation, Marshfield, Wis (Yale, Talsness, Mazza); Licensed to practice law in Wisconsin, Washington DC, and before the United States Patent and Trademark Office (Jones); Research Administration, Marshfield Clinic Research Foundation, Marshfield, Wis (Wesbrook); Department of Internal Medicine, Marshfield Clinic, Marshfield, Wis (Yale).

Corresponding Author: Steven H. Yale, MD, Clinical Research Center, Marshfield Clinic Research Foundation, 1000 N Oak Ave, Marshfield, WI 54449; fax 715.387.9110; e-mail yale.steven@marshfieldclinic.org.

mon for retiring faculty to seek emeritus status through their department to continue teaching and/or facilitate continuation of their research.

A number of universities provide support for individuals who are interested in continuing research and educational endeavors after retirement. The nature of support for emeritus faculty varies among institutions, but there are common elements. Generally, the needs of full-time faculty are favored over emeritus faculty (ie, full-time faculty are given preference in the selection of office and laboratory space and in the distribution of internal funding).[3] Moreover, emeritus faculty are encouraged to seek external sources of funding for their research, and those who continue to bring in grants are treated more favorably than those who do not.[4,5] In a deviation from this trend, the University of Southern California has established an Emeriti Research Grant program that includes an option for additional funding for undergraduate research assistants.[6]

Benefits and compensation for emeritus faculty vary across institutions. Approximately 20% of doctoral institutions provide stipends to cover travel expenses for professional activities.[5] Appointment to emeritus status at some institutions includes provision of financial and other support to promote meaningful contributions to their respective disciplines. At Texas Tech University,[7] emeritus faculty generally are not compensated, and the title is considered honorary. However, there are policies that allow retired faculty to receive a salary for part-time teaching.[8] In this case, compensation is limited to between a third and a half of their most recent salary while working no more than half of full-time faculty. Many institutions also provide continuation of health benefits through their emeritus programs. Yet, while 80% of institutions in the United States allow emeritus faculty to remain eligible for health insurance through the group plans, only 58% cover the cost of the premium.[5]

Institutions manage emeritus faculty and ensure efficient resource utilization by 2 methods. The first is to make appointments for a limited period that can be renewed only at the discretion of the institution.[4,5] In this model, the appointment to professor emeritus is for life, although use of university resources and space is delimited (eg, 3 to 5 years). Renewal is rare (approximately 7%) and is contingent on sustainment of external support by the emeritus faculty member. These programs are viewed by institutions as affiliation agreements whereby the emeritus faculty member can continue to conduct his/her research in the name of the institution but must bring in external funding to support the research. A second method is to have an indefinite appointment, subject to regular institutional review. At the University of Missouri,[9,10] these reviews occur on an annual basis and involve submitting a summary of activities in the areas of teaching, clinical practice, education, and research. This summary addresses only activities since the appointment or the last review, and a committee of peers evaluates these activities and provides recommendations to their respective dean and committee. The dean and review committee then determine whether the candidate's performance has been satisfactory. If performance has been unsatisfactory, a plan for improvement is implemented. If the plan fails, the appointment can then be terminated.

SELECTION OF RESEARCHER EMERITUS

Most institutions allow retiring faculty to seek emeritus status through their respective department to continue their academic and research activities. The process for obtaining an emeritus title generally involves a recommendation from the department chair and the department executive committee. At some institutions, the chancellor reviews and makes a recommendation to the board of regents,[7] while at others the chancellor can directly confer the title.[11]

At Oregon State University,[12] the process of clinical faculty promotion involves an examination of the candidate's performance in 4 areas. The candidate must demonstrate distinction in the areas of teaching, clinical practice, and research, as well as have a demonstrated history of service to the institution, the public, and the profession. A committee from the candidate's department prepares an evaluation of the candidate's activities. Recommendations from the candidate's peers outside the university also are solicited from those suggested by the candidate. Others are solicited by a committee of peers in the department. Based on the internal and external recommendations, the Promotion Committee and dean of the college finalize their recommendation. The provost and executive vice president then make the final decision.

The tenure selection process at Duke University Medical School[13] involves a set of minimum criteria that must be met to qualify for a promotion, such as teaching activities and invitations to speak at national meetings, seminars, and workshops. There also is an expectation of leadership in department-level programs, as well as participation in medical student, house staff, and/or graduate student curricula. The candidate is expected to have a strong reputation regionally and/or nationally for his/her accomplishments. Participation on national boards or inclusion on national panels provides evidence of the candidate's reputation for excellence. The candidate is generally expected to have established a record of sustained funding through peer-reviewed grants and participation in clinical trials as the team leader. Bench researchers are expected to have established a national reputation through

participation in National Institutes of Health study sections or offices in professional societies. The candidate also is expected to have a minimum number of peer-reviewed publications, varying between 25 and 50 publications, with the expectation of being first or senior author on at least 40%.

MCRF'S EMERITUS CLINICAL RESEARCHER PROGRAM DESCRIPTION

The ECR Program described herein was conceptualized with aspects that add value to institutional needs. The organizing principle for the ECR Program is that it fills a purposeful need within MC/MCRF. The program should be viewed primarily as an opportunity for service—to give something back to the institution. In developing this program, we incorporated principles used at other institutions as well as in our current policies. Our system was created with requirements for contributions relative to clinical care, research, and education.

Selection

Potential candidates are selected based on a detailed description of their prior educational and research activities in each of the 4 areas listed under qualifications, their curriculum vitae, and current and pending funding support. Minimal qualifications in 1 area may be waived if the candidate is considered exceptional in other areas, especially where there is a recognized institutional need.

Qualifications

The following list of qualifications was drafted based on requirements used by institutions that have established a similar emeritus program.[9,10,12,13]

Education. Teaching activities for an ECR might include invited lectures at national meetings, seminars, and workshops. Evidence of leadership in departmental programs and participation in medical student, house staff, and/or graduate student curricula planning and presentation are required.

Clinical Practice. ECRs are expected to be recognized regionally and/or nationally for their expertise. Participation on national board examinations or involvement in designing practice guidelines provides additional evidence of clinical excellence. Inclusion on national or international committees and membership on editorial boards of medical publications along with other markers of clinical excellence are expected.

Research. A research track record for the ECRs is essential because sustaining research is a specific goal of this program. Participation in educational programs and national or international recognition as a researcher are deemed desirable qualities. The candidate is expected to have an established record of consistent receipt of extramural funding and involvement in clinical research over his/her career and must have served as team leader on 30% of trials. The candidate also must have demonstrated experience in designing trials and data analysis. Individuals are expected to review manuscripts and grant applications, research foci and priorities, and mentor young investigators in research and educational initiatives. Additionally, the ECRs will provide expertise in evaluation of key policy issues and administrative decisions.

Service. Demonstration of professional service may be at the local, regional, or national level, or within the community at large. Service also may occur within a clinical department or at a regional center.

Application and Selection Process

A candidate for this program submits a letter to the center director to whom the emeritus research candidate reports, outlining his/her desire for continued service in research and education, the proposed areas of continued research, and any specific responsibilities that he/she desires to undertake during an initial term. The candidate also should submit a curriculum vitae and other documents that show achievement in research, education, clinical practice, and service to MC/MCRF and the general public. The center director reviews and makes recommendations to the directors of medical research and education, who make the final decision regarding the candidate's appointment.

Responsibilities

The specific duties of an individual in this program, as well as measurable objectives for the period of appointment, are documented in a memorandum of understanding. This document is signed by the ECR, the Director of Medical Research, and the director of the center to which he/she is assigned. The range of responsibilities for this position is broad and may include the following:

- Conduct medical research as a principal investigator or co-investigator.
- Provide advice and consultation in his/her area of expertise to active research teams.
- Complete analysis of results from projects not finished before leaving clinical practice.
- Assist MC/MCRF scientists and clinicians in protocol development, review of grant proposals, publications, and other forms of scientific writing.
- Participate on the editorial board or serve as a reviewer for nationally and internationally indexed journals published at Marshfield Clinic: *Clinical Medicine and Research* and *Journal of Agromedicin*e.
- In concurrence with the Director of Clinical Research, mentor new investigators in clinical research.
- Serve on standing or special institutional committees.

Term of Appointment

Appointment is for 12 months and may be renewed. A written performance evaluation is reviewed at the end of each term by the center director and by the Director of Medical Research, who is the appointing authority and makes a decision on the appointment in consultation with other members of MCRF's senior staff.

Employment Status

An ECR is a part-time Marshfield Clinic employee. The terms of employment are specified in a contract of employment that is signed by the ECR and the Director of Medical Research. Typically the amount of time and effort is limited to 0.5 full-time equivalent (FTE) or less. However, the specific level of support depends on the expertise of the individual and the program needs. The Memorandum of Understanding is an essential precursor to completion of the Contract of Employment.

Direct and Indirect Compensation

The financial compensation in this program is in keeping with the overall principle of service in filling a purposeful need. However, the ECR does receive substantial direct and indirect support including office space (may be shared) and laboratory space (as available); computer and other technology support; administrative support from the center to which he/she is assigned; and access to MCRF research administration and support offices, such as the Core Research Laboratory and Office of Research Integrity and Protections. ECRs may apply for internal research awards, are eligible to receive published research awards, and maintain an investigator research account.

PROGRAM ASSESSMENT

The emeritus program has been piloted for 3 years with 3 physician emeriti. One of these physicians is currently in his third-year term, 1 in his second-year, and 1 completed a 1-year term. Expectations for each of these positions were based on specific needs and circumstances of the MCRF, education programs, and the expertise of the individual.

Specific contributions made include mentorship in grant development to associate scientists and physician investigators, peer review and editing of grants and manuscripts, and collaboration with principal investigators on active studies. The ECRs also provided advice on research priorities, provided critical analysis of key policies, and assisted the center directors in decision-making processes and development of new research initiatives and educational programs. Other duties performed included meeting with senior personnel at pharmaceutical and biotechnology firms to evaluate research proposals and assisting with subject accrual into clinical trials.

Expanded duties included fostering skills needed to enhance the research career of young investigators by providing orientation and consultation to young investigators, residents, and students in research methodology and design of clinical trials, as well as teaching and participating in journal clubs, seminars, and educational programs. During the past 3 years, participants also have been involved in the following activities:

- Reviewing and editing manuscripts.
- Writing manuscripts that involve education and research.
- Participating in industry-sponsored clinical trials.
- Mentoring graduate students and house staff.
- Attending and presenting continuing medical education conferences.

SUMMARY

A structured ECR program at our institution (created with guidelines regarding candidate selection, requirements, expectations, and performance evaluation) is currently offered to physicians and scientists who wish to continue an affiliation and provide desired services to the institution based on expertise and experience. The program represents a compilation of information and guidelines from other institutions that have demonstrated successful programs. It is tailored to reflect the major assets and priorities of our institution and provide opportunities to qualified physicians with aspirations to continue or pursue educational and biomedical research upon retirement. Alignment of the unique skills, expertise, knowledge, and wealth of experience of the emeritus faculty along institutional needs has provided added value to the institution without major financial investment.

Acknowledgments: The authors wish to thank the Marshfield Clinic Research Foundation's Office of Scientific Writing and Publication for assistance in the preparation and submission of this manuscript.

Funding/Support: None declared.

Financial Disclosures: None declared.

REFERENCES

1. Mosher HP. On being a professor emeritus. 1944. *Ann Otol Rhinol Laryngol.* 1994;103:919-928.

2. Mauch JE, Birch JW, Matthews J. Institutional planning for emeritus faculty. 1990. http://eric.ed.gov/PDFS/ED382135.pdf. Accessed May 18, 2011.

3. University of Oregon Policy Library. Retired Faculty: Rights, privileges and perquisites. Policy Number 02.01.10. Last Updated 02/06/1991. http://policies.uoregon.edu/policy/by/1/03000-human-resources/retired-faculty-rights-privileges-and-perquisites. Accessed April 30, 2011.

4. Beckman M. The not-so-retired scientist. *Chronicle Higher Education.* 2003. http://chronicle.com/article/The-Not-So-Retired-Scientist/45130/. Accessed April 30, 2011.

5. Ehrenburg RG. Career's end: a survey of faculty retirement policies. *Academe Online.* 2001. http://www.aaup.org/AAUP/pubsres/academe/2001/JA/Feat/ehre.htm. Accessed April 30, 2011.

6. Glazer SD, Redmon EL, Robinson KL. Continuing the connection: emeriti/retiree centers on campus. *Educational Gerontol.* 2005;31:363-383.

7. Texas Tech University Health Sciences Center. Operating Policy and Procedure HSC OP 10.12: Emeritus Appointments. 2009. http://www.ttuhsc.edu/hsc/op/op10/op1012.pdf. Accessed April 30, 2011.

8. Texas Tech University. Operating Policy and Procedure OP 32.30: Voluntary Retirement of Faculty Members with Option for Part-time Teaching. 2007. http://www.depts.ttu.edu/opmanual/OP32.30.pdf. Accessed April 30, 2011.

9. University of Missouri System. Collected Rules and Regulations: Faculty Bylaws and Tenure Regulations. Chapter 310: Academic Tenure Regulations. 310.015-Procedures for Review of Faculty Performance. 2007. http://www.umsystem.edu/ums/departments/gc/rules/bylaws/310/015.shtml. Accessed April 30, 2011.

10. University of Missouri System. Collected Rules and Regulations: Personnel. Chapter 320: Employment and Termination. 320.090-Emeritus Designation. 2007. http://www.umsystem.edu/ums/departments/gc/rules/personnel/320/090.shtml. Accessed April 30, 2011.

11. University of Wisconsin-Madison. Secretary of the Faculty. Faculty Policies and Procedures Chapter 7.31- Emeritus/Emerita Faculty. 2009. http://www.secfac.wisc.edu/governance/FPP/Chapter_7.htm#731. Accessed April 30, 2011.

12. Oregon State University. Faculty Handbook. Guidelines for Clinical Faculty Appointments and Promotion. http://oregonstate.edu/facultystaff/handbook/promoguide.html. Accessed April 30, 2011.

13. Duke University Medical School. Proposed Changes in Promotion and Tenure Policies for Clinical Departments. 2004. Appendix II-Proposed Revised Tracks I-V. Track II: Researcher/Clinician-Practitioner. pp. 8-14. http://medschool.duke.edu/wysiwyg/downloads/FacultyHiringandPromotionPractice12-02-2004.pdf. Accessed April 30, 2011.

The Effect of Patient Reminders and Gas Station Gift Cards on Patient Adherence to Testing Guidelines for Diabetes

Sam Austin, MA; Barbara L. Wolfe, PhD

ABSTRACT

Objective: Analysis of the effectiveness of a small financial incentive and a written reminder to encourage test taking among persons with diabetes who have missed glycosylated hemoglobin (HbA1c) and low-density lipoprotein cholesterol (LDL-C) screenings.

Research Design and Methods: The analysis uses data from the University of Wisconsin Medical Foundation medical records of persons diagnosed with diabetes who had not received an HbA_{1c} screening or had not received an LDL-C screening over the previous year (prior to October 2005). This study uses a quasi-experimental design comparing 464 diabetic patients (cases) who received a letter reminder of screening and financial incentive for undergoing screening, and 693 controls who did not receive a letter or financial incentive. The treated patients (464) all were seen in 1 of 4 clinics while those not treated used different clinics within the same system of care. Propensity scores served as the matching procedure using the following covariates: age, gender, ethnicity, marital status, number of HbA_{1c} tests and number of LDL-C tests in the year prior to pilot program, mean HbA_{1c} levels in the year prior to the pilot program (when available), census income data, and a comorbidity measure.

Results: During the 2 years following the pilot program, on average the target or "treated" population received significantly more screenings—3.34—compared to 2.69 screenings for the matched comparison group, and a far smaller proportion of the target population had no screening at all.

Conclusions: The results provide evidence that a small financial incentive coupled with a written reminder work to increase test taking (especially the HbA_{1c} screening) and suggest greater control of HbA_{1c} levels among persons who had previously missed screenings.

INTRODUCTION

Effectively controlling diabetes requires a combination of lifestyle changes and regular clinical visits and laboratory tests. Changes in lifestyle include dietary adjustment, exercise, weight loss, and adherence to medical regimens. Two important laboratory tests for diabetes control are glycosylated hemoglobin (HbA_{1c}), which measures blood glucose control over time, and low-density lipoprotein cholesterol (LDL-C), an indicator of cardiovascular health. The American Diabetes Association (ADA) recommends a minimum of 2 annual HbA_{1c} tests, with a reading of 7% generally considered "controlled" for persons with diabetes.[1] LDL-C tests are recommended to be conducted at least once a year, with a target of below 100 mg/dl.[2] When patients regularly receive these tests, health care professionals can more easily assess the severity of a person's diabetes and can adjust care accordingly. Adherence to appointments and medication has been shown to improve HbA_{1c} levels.[3] In fact, immediately providing the results of these tests at the clinic visit by performing point-of-care testing also may improve glycemic control.[4]

This paper analyzes the effect of a program designed to encourage HbA_{1c} and LDL-C test taking among persons with diabetes who had been out of compliance on at least 1 of these tests for a year or more. It is an example of a quality improvement program termed "Patient Reminders" according to the taxonomy defined by the US Agency for Healthcare Research and Quality,[5] but implicitly it also had a goal of organizational change should the intervention be successful in improving test taking among diabetics. The program, implemented in 2005 as a quality improvement measure by UW Health in Madison, Wisconsin, provided a written reminder to the test-takers who were out of compliance, with an offer of a small financial incentive after they received the missing test. This study uses a quasi-experimental approach, by matching a comparison group of patients whose

• • •

Authors' Affiliations: La Follette School of Public Affairs, University of Wisconsin-Madison.

Corresponding Author: Barbara L. Wolfe, PhD, Professor, Departments of Economics, Population Health Sciences and the La Follette School of Public Affairs, University of Wisconsin-Madison, Madison, WI 53706; phone 608.263.2029; fax 608.265.3233; e-mail bwolfe@wisc.edu.

clinics were not targeted in the initiative to the group who received the reminder letter and the incentive offer.

METHOD

In the fall of 2005, UW Health implemented a pilot program to improve rates of receiving HbA_{1c} and LDL-C tests by providing screening reminder letters and offering a small financial incentive.[6] At the time, 32% of the more than 7000 persons diagnosed with diabetes in the UW Health system had received < 2 annual HbA_{1c} tests; nearly 25% had not received an annual LDL-C screening.[7]

The pilot program focused on 4 clinics in the UW Health system, targeting patients who had not received an HbA_{1c} screening from October 2004 to October 2005, or had not received an LDL-C screening during that same period. A Diabetes Improvement Team reviewed patient records to assess if individual patients were diabetics and if so, their test-taking history. The list of those to receive a reminder then was reviewed and corrected by clinic staff. UW Health sent each of these patients a letter, signed by their physician, informing them of the missing tests, and offering each patient a gift card worth $6 at a local gas station (a "gas card") if they received the tests. During the 3-month pilot program period (October to December 2005), gasoline sold for between $2.15 and $2.90 a gallon.[8]

Box 1. A sample letter

Dear _____:

To help improve your health, UW Health and the American Diabetes Association recommend that you have specific laboratory tests performed at regular intervals. These lab tests help us decide what steps to take to help lower your risks of developing problems that can be caused by diabetes.

Our records indicate that you are due for:

☑ A1C. This blood test tells us your level of glucose (blood sugar) control in the past 3 months

☑ Lipid Panel (LDL). This blood test tells us your good and bad cholesterol levels. You should have this test done yearly.
(This test requires a 12 hour fast--drink water only. You can take your pills/medications.)

Please bring this letter that serves as your lab request to the …UW Health Lab for the identified test(s). The preferred days to obtain your lab tests are Tuesdays through Fridays. We will contact you with the results either by phone or letter approximately 2 weeks after you have had your test(s).

If you feel you have received this letter in error or if our records are incorrect in any way, please contact the UW Health medical management department at … to make the needed corrections.

To thank you for making diabetic care a priority in your health care needs, enclosed is a coupon to receive a complimentary Kwik Trip gas/gift card. Please present this card and letter to the lab staff.

Sincerely,
Dr……

The letter (Box 1) reminded the recipient of the tests he or she had missed and directed the recipient to bring the letter to the UW Health Lab. The recipient then could talk with the lab staff and redeem a coupon included with the letter. The recipient was not required to see his or her primary care provider to receive the gas card. Upon receiving the tests, patients also received an educational packet outlining the importance of the HbA_{1c} and LDL-C tests.

Participants

Only patients who had not received an HbA_{1c} or LDL-C screening were eligible for inclusion in this study. Pilot program participants ("treated group members") were identified in 2 ways: using UW Health's definition of current diabetes management, which uses Wisconsin Collaborative for Healthcare Quality (WCHQ) standards,[9] or identification by the individual's primary care provider. The WCHQ definition includes all patients who had 2 diabetes-coded ambulatory care encounters during a 24-month period. At least 1 of the encounters must have been with a primary care physician (the second encounter could have been with either primary care or endocrinology), and at least 1 encounter had to have occurred in the most recent 12 months. Of this population, only those persons with diabetes who had not received an HbA_{1c} or LDL-C screening during the previous 12 months received a reminder letter.

The pilot program targeted 464 persons with diabetes who fit the WCHQ criteria. This population included 230 female and 234 male participants, with a mean age of 63.7 years. The top panel of Table 1 shows the frequency of HbA_{1c} and LDL-C tests received by the treatment group in the 12 months prior to the pilot program.

Research Design

As the original pilot program conducted by UW Health did not include a randomly assigned control group, the research design of this study mimicked the randomization process. First, the research team constructed a population of persons whose primary care physician was a UW Health provider. The providers for this patient group were not located at 1 of the 4 targeted clinics, and therefore did not participate in the pilot program. This potential comparison group population was drawn from

Table 1. Descriptives for the Pilot and Control Populations

	Percentage of Pilot Program Population (n=464)	Percentage of Potential Comparison Group Population (n=2101)
Number of HbA_{1c} Screenings (in year previous to pilot program)		
0	20.69	33.32
1	34.70	30.41
2	25.65	17.18
3	12.07	9.80
4	4.31	5.00
5	2.16	2.19
6	0.22	0.86
7	0.22	0.81
8	0	0.29
9	0	0.10
10	0	0.05
Number of LDL-C Screenings (in year previous to pilot program)		
0	89.22	83.91
1	9.7	12.71
2	0.65	2.57
3	0.43	0.57
4	0	0.19
5	0	0.05
Marital Status		
Divorced	7.54	9.28
Married	48.71	48.31
Separated	1.08	0.57
Single	23.49	27.61
Unknown	0.65	1.48
Widowed	18.53	12.76
Ethnicity		
Hispanic/Latino	2.59	4.81
Not Hispanic/Latino	89.01	79.30
Unknown	8.41	15.90
Gender		
Male	50.43	46.83
Female	49.57	53.17
Known Deceased, as of Dec 31, 2007	10.13	8.04
Known Alive, as of Dec 31, 2007	89.87	91.81
Unknown Status	0.00	0.14
Mean Age (in years)	63.7	58.6
Imputed Annual Income	$48,576.51	$49,220.95

Abbreviations: LDL-C = low-density lipoprotein cholesterol; HbA_{1c} = glycosylated hemoglobin.

the UW Health patient database; all patients were defined as persons with diabetes by WCHQ standards and met the same HbA_{1c} and LDL-C truancy requirements as the pilot program population. This population totaled 2101 persons with diabetes who met these criteria; 984 patients were male, 1117 were female, and the mean age was 58.6 years. Table 1 shows the frequency of HbA_{1c} and LDL-C tests received by the potential comparison group in the 12 months prior to the pilot program and shows a comparison of the characteristics of the pilot and potential comparison populations.

Using this potential comparison population, matched comparison groups were constructed to determine program effects, using propensity scores as the matching procedure. The propensity score method determines a conditional probability of having received the treatment (in this case, of having received the reminder letter and offer of a gas card), given a set of covariates.[10] Each patient in the pilot program population received a propensity score, as did each patient in the potential comparison population. A comparison group was then matched to the treatment group by nearest neighbor matching—that is, each pilot program patient was assigned at least 1 comparison patient that was his/her closest match in probability of having been targeted by the pilot program. This propensity score procedure was conducted using the statistical analysis software Stata 10, using the protocol developed by Becker and Ichino.[11]

Covariates Used for Propensity Score Matching

The set of covariates was obtained from University of Wisconsin Medical Foundation (UWMF) and UW Health Clinics (UWHC) administrative and clerical data. It was provided to the researchers in a limited dataset format and covered the period from January 1, 2005 to December 31, 2007. To construct the propensity scores, the following covariates were used: age, gender, ethnicity, marital status, number of HbA_{1c} tests in the year prior to the pilot program, number of LDL-C tests in the year prior to the pilot program, and mean HbA_{1c} levels in the year prior to the pilot program (when available). Because many patients had not received an HbA_{1c} test over the 12 months prior to the pilot program, many had no recorded mean HbA_{1c} level. Due to this limitation, 2 versions of matching procedure were conducted: a version that only included patients who had a recorded mean HbA_{1c} measure and a version that included all pilot program patients, but excluded mean HbA_{1c} level.

In addition to these covariates taken directly from UWMF and UWHC records, 2 additional measures were derived using the data. First, a proxy measure for patient income was constructed by matching patient ZIP code to the US Census Bureau data for income. This measure gives the median income for every ZIP code block, providing an approximation of patient income.

Finally, a comorbidity variable was included in the propensity score specification, using the procedure developed by Elixhauser et al.[12] This "Elixhauser Method" defines a set of 30 comorbidity measures created from diagnosis codes included in patient data. The 30 comorbidity groups are available from the authors.

Primary Outcome Variables

Two main outcome variables are specified to determine the effects of the gas card pilot program: frequency of HbA_{1c} screenings and frequency of LDL-C screenings after the program. We also wished to learn if additional testing led to improved control. Too few patients received an LDL-C screening in the pre-pilot period to allow analysis of the effect of the pilot program on LDL-C levels. We test for HbA_{1c} levels after the program as a third outcome, however, the fact that many patients do not have a prior measure limits the usefulness of this outcome.

The first measure took patient data on number of HbA_{1c} screenings from October 1, 2005 to December 31, 2007, and divided it into 5 time periods (see Table 2). Breaking each year into 2 measurement periods attempts to analyze the success of the program in encouraging patients to receive the recommended biannual HbA_{1c} screening. In addition, the total number of HbA_{1c} screenings from January 1, 2006 to December 31, 2007 was analyzed. As noted above, 2 rounds of matching were conducted: 1 with the mean HbA_{1c} measure included as a covariate and 1 without that measure.

The LDL-C screening frequency outcome measure was broken down into 3 time periods (see Table 2). Because each patient with diabetes is recommended to receive 1 annual LDL-C screening, the outcome variable is broken down into 1-year periods. Two rounds of matching were conducted: 1 with the mean HbA_{1c} measure as a covariate and 1 without that measure.

Finally, the mean HbA_{1c} level measure analysis was broken down into the same time periods as the HbA_{1c} screening frequency analysis. As mentioned above, mean HbA_{1c} level was not available for all patients. For this analysis, only those patients who had a mean HbA_{1c} measure in the pre-pilot period *and* in the outcome period of interest were used in the propensity score matching procedure.

Table 2. Screening Frequency Results

Number of HbA_{1c} Tests (With and Without HbA_{1c} Level Covariate)

Sample with HbA_{1c} Levels Included in Matching[a]

	ATT	Standard Error	t-statistic
Time Period			
Oct 2005–Dec 2005	0.047	0.049	0.963
Jan 2006–June 2006	0.116[d]	0.065	1.790
Jul 2006–Dec 2006	0.217[c]	0.151	1.437
Jan 2007–June 2007	0.178[e]	0.072	2.457
July 2007–Dec 2007	-0.067	0.062	-1.077

Sample without HbA_{1c} Levels Included in Matching[b]

	ATT	Standard Error	t-statistic
Time Period			
Oct 2005–Dec 2005	0.082[d]	0.043	1.925
Jan 2006–June 2006	0.225[e]	0.055	4.109
Jul 2006–Dec 2006	0.434[e]	0.122	3.554
Jan 2007–June 2007	0.171[e]	0.059	2.893
July 2007–Dec 2007	0.082[c]	0.05	1.631

Number of LDL-C Tests (With and Without HbA1c Level Covariate)[†]

	ATT	Standard Error	t-statistic
Time Period			
1 Oct 2005–31 Dec 2005	0.208[e]	0.035	5.888
1 Jan 2006–31 Dec 2006	-0.101	0.064	-1.593
1 Jan 2007–31 Dec 2007	-0.156[d]	0.068	-2.297

Sample without Hb_{A1c} Levels Included in Matching[b]

	ATT	Standard Error	t-statistic
Time Period			
1 Oct 2005–31 Dec 2005	0.234[e]	0.031	7.614
1 Jan 2006–31 Dec 2006	-0.02	0.047	-0.422
1 Jan 2007–31 Dec 2007	-0.041	0.054	-0.757

Abbreviation: ATT = Average effect of treatment on the treated
[a]with Hb_{A1c} as covariate, treated patients (n=364), matched comparison patients (n=300)
[b]without Hb_{A1c} as covariate, treated patients (n=464, matched comparison patients (437)
[c]Significant at 10% level
[d]significant at 5% level
[e] significant at 1% level

RESULTS

Number of HbA_{1c} Tests

The propensity score matching procedure calculated the average effect of treatment on the treated (ATT) for each outcome variable. As the top 2 panels of Table 2 show, the pilot program patients show statistically significant increases in Hb_{A1c} test-taking frequency over most of the time periods following the program's conclusion. The 2 different matching specifications show different results during the pilot program itself, with no significant difference when including HbA_{1c} levels in the matching procedure, and a small but significant increase when excluding HbA_{1c} levels from the matching procedure. In general, patients in the pilot program received more HbA_{1c} screenings after the pilot program than the matched comparison group received.

There is a suggestion of an immediate short-term response

Table 3: Distribution of Receipt of Test for Pilot Group and Potential Controls

	Pilot Group N = 464	Potential Comparison Group N = 2101
Average Number of Hb_{A1c} Tests, October 2005-December 2007	3.34	2.69
Average Number of LDL-C Tests, October 2005-December 2007	1.29	1.26
	% of Group Receiving Specified Number of Tests	
Number of Hb_{A1c} Tests, October 2005-December 2007		
0	14.87	23.51
1	11.85	13.52
2	11.85	16.14
3	15.09	12.90
4	14.87	11.85
5	12.07	8.14
6	9.05	6.47
7	4.96	4.05
8	4.09	1.90
9	0.86	1.05
10	0.43	0.33
11	0.00	0.10
12	0.00	0.00
13	0.00	0.00
14	0.00	0.05
	% of Group Receiving Specified Number of Tests	
Number of LDL-C Tests, October 2005-December 2007		
0	34.05	41.08
1	28.45	24.51
2	20.04	16.28
3	11.85	9.14
4	3.66	5.19
5	1.51	2.43
6	0.00	0.86
7	0.43	0.33
8	0.00	0.14
9	0.00	0.00
10	0.00	0.05

and then a gradual return to earlier patterns of test taking. This is not unexpected, because the patients received only a small, 1-time financial incentive. Nevertheless, there is clearly a significant increase in the frequency of screening for the first 2 years following the reminder and the incentive offer. Over the entire period, those in the pilot sample had 3.34 screenings on average, compared to 2.69 for the comparison group, an increase of roughly two-thirds (.65) of a visit on average. And as shown in Table 3, a smaller proportion of the group that was offered a gas card had 0 tests over the period of analysis (14.9% of the target group vs 23.5% of the comparison group).

Number of LDL-C Tests

For the number of LDL-C tests, there is a significant increase in the number of LDL-C screenings received during the pilot program period for the targeted group, as seen in the bottom 2 panels of Table 2. On average, each patient received 0.21 more tests during that period. However, this positive effect on the pilot program patients disappeared following the program; in fact, the pilot program patients may have received *fewer* LDL-C screenings than the comparison group in both 2006 and 2007. The evidence is mixed, but suggests no overall increase in these screenings. Over the entire period, the number of visits is nearly identical between the 2 groups: (1.29 for the target group vs 1.26 for the comparison group). However, as highlighted in Table 3, there is evidence that a small financial incentive reduced the numbers of patients who received 0 tests over the analysis period. For the LDL-C test, the proportions receiving no tests over the entire period are 34% for the target group vs 42% for the comparison group.

HbA_{1c} Levels

We report results separately for those who had an HbA_{1c} test in the pre-pilot period and those who did not (Table 2). In both cases, we report simple numbers of those patients with HbA_{1c} levels determined to be "in control" and those patients with HbA_{1c} levels determined to be "not in control." Although glycemic control can be defined at different levels, this study defines "in control" as having an HbA_{1c} level at or below 7%. Interestingly, the largest difference in percentage of patients with HbA_{1c} in control is among those who did not have a pre-pilot HbA_{1c} test. Among this group, nearly half (49%) of those who received a gas card had HbA_{1c} levels under control while 36% of the comparison groups have HbA_{1c} levels under control. However, the pattern among those with a prior test is puzzling. Among both groups, a smaller proportion had HbA_{1c} levels under control after the treatment than the proportions under control prior to treatment. However, the decrease in proportion under control is greater for the comparison group than for those who received a reminder letter and a gas card (8.7% increase among controls compared to 2.7% increase among the treated). Thus, both comparisons are suggestive of a positive influence of the gas card program in terms of an increase of diabetes patients with HbA_{1c} levels that are under control.

DISCUSSION AND CONCLUSIONS

From this quasi-experimental analysis, we see that the UW Health Gas Card Pilot Program had generally positive effects on the HbA_{1c} test-taking behavior of the targeted patients. During the 2 years following the pilot program, on average the target patient population received about two-thirds more screenings than the matched comparison group, and a smaller proportion

had no screening at all during the period. The improvement appears to persist for a relatively long time period, given the nature of the initiative.

The results of the LDL-C test-taking behavior analysis are harder to interpret. The pilot program had a limited effect during the pilot period itself, with each targeted patient receiving 0.21 more LDL-C screenings on average during those 3 months. However, during the following 2 years, the targeted patients were less likely than the comparison patients to receive an LDL-C screening. The reasons for this are unclear, although the requirements of the LDL-C test itself (involving a 12-hour fast prior to the test) and the low recommended frequency may influence the long-term impact of the pilot program on this screening. More encouraging is the finding that a considerably lower proportion of the population offered this financial incentive had no LDL-C screening over the period compared to the controls.

The evaluation also suggested that the pilot program had some success in increasing the proportion of participants with levels of HbA_{1c} levels that are "under control." However, the lack of recorded HbA_{1c} levels for many patients limits the analysis of this outcome.

This evaluation suggests that the UW Health Pilot Program was relatively successful in its stated goals of improving test-taking behavior among persons with diabetes. The program was more effective during the pilot period for LDL-C screening, but more effective over the subsequent years for HbA_{1c} screenings. For both screenings, the gas card program clearly reduced the number of patients who received no tests for diabetes during the 2 years following the program. Overall, this evaluation suggests that a relatively inexpensive financial incentive coupled with a reminder can increase compliance with test taking among diabetics and may well pass a cost-benefit test.

One important limitation facing this analysis is the bundled nature of the UW Health intervention. Given that this research was conducted on a program that provided a reminder letter *and* a financial incentive to patients, it is impossible to determine which component is responsible for the program effects. A program that provided a reminder letter and financial incentive to 1 group of patients and a reminder letter without a financial incentive to another group of patients would allow for a more complete analysis. However, because this study analyzed a pilot program that had already been designed and conducted, this analysis was not possible.

Finally, it is important to consider the potential perverse effects of regularly providing financial incentives for basic medical procedures. If patients come to expect a gas card for every procedure that they receive, from routine blood screening to routine appointments, will this reduce compliance? As UW Health and other health care professionals continue to innovate and move forward with similar initiatives, these issues should be considered in subsequent evaluations that more fully address the broader issues of incentives and compliance.

Acknowledgments: We would like to thank in particular Sally Kraft, MD, MPH, Maureen Smith, MD, MPH, PhD, Grace Flood, MD, staff at UW Health, and the Referees of this journal.

Funding Support: Mr Austin's work on this project was supported in part by the UW Institute for Clinical and Translational Research. Dr Wolfe's work is supported by Robert Wood Johnson Foundation Health Policy Scholars and the William T. Grant and Russell Sage Foundations.

REFERENCES

1. American Diabetes Association. American Diabetes Association's New Clinical Practice Recommendations Promote A1C as Diagnostic Test for Diabetes. http://www.diabetes.org/for-media/2009/cpr-2010-a1c-diagnostic-tool.html. Accessed April 30, 2011.

2. American Diabetes Association. Treating High Cholesterol in People with Diabetes—All About Diabetes. http://www.diabetes.org/type-1-diabetes/well-being/treating-cholesterol.jsp. Accessed April 30, 2011.

3. Rhee MK, Slocum W, Ziemer DC, et al. Patient adherence improves glycemic control. *Diabetes Educator.* 2005;31:240-250.

4. Cagliero E, Levina EV, Nathan DM. Immediate feedback of HbA1c levels improves glycemic control in type 1 and insulin-treated type 2 diabetic patients. *Diabetes Care.* 1999;22:1785-789.

5. Shojania K, McDonald K, Owens D. Evidence-based review methodology for the closing the quality gap series. In: Closing the Quality Gap: A Critical Analysis of Quality Improvement Strategies Volume 1—Series Overview and Methodology. Technical Review 9. Rockville, MD: Agency for Healthcare Research and Quality. August 2004 . Publication No. 04-0051-1. Contract No. 290-02-0017 to the Stanford University–UCSF Evidence-Based Practices Center.

6. Wisconsin Collaborative for Healthcare Quality. Diabetes: LDL cholesterol testing. http://www.wchq.org/reporting/results.php?category_id=0&topic_id=27&providerType=0&region=0&measure_id=75&sequence_id=2. Accessed April 30, 2011.

7. Wisconsin Collaborative for Healthcare Quality. Diabetes: blood sugar (A1c) testing. http://www.wchq.org/reporting/results.php?category_id=0&topic_id=27&providerType=0&region=0&measure_id=72&sequence_id=2. Accessed April 30, 2011.

8. Energy Information Administration. Midwest all grades all formulations retail gasoline prices (cents per gallon). http://www.eia.doe.gov/oog/ftparea/wogirs/xls/pswrgvwall.xls. Accessed April 30, 2011.

9. Hatahet MA, Bowhan J, Clough EA. Wisconsin Collaborative for Healthcare Quality (WCHQ): lessons learned. *WMJ.* 2004;103:45-48.

10. Rosenbaum P, Rubin D. The central role of the propensity score in observational studies for causal effects. *Biometrika.* 1983;70:41-55.

11. Becker S, Ichino A. Estimation of average treatment effects based on propensity scores. *Stata J.* 2002;2:358-377.

12. Elixhauser A, Steiner C, Harris DR, Coffey RM. Comorbidity measures for use with administrative data. *Medical Care.* 1998;36:8-27.

Severe Pepper Allergy in a Young Child

Leslie Gimenez, MD; Michael Zacharisen, MD

ABSTRACT

Introduction: Spices are ingredients to confer improved taste to foods. As they are derived from plants, they have the potential for inducing allergic reactions. There is a lack of studies to accurately determine the rate of pepper allergy in children. Allergic reactions to pepper in children are rare. This case illustrates such a reaction.

Methods: Patient is a 17-month-old boy with mild eczema who developed urticaria, conjunctivitis, facial swelling, and severe cough immediately after ingesting venison prepared in a Southwest/mesquite marinade containing a variety of spices including black and cayenne pepper. His food was not routinely peppered. A similar but less severe reaction with facial urticaria and conjunctivitis occurred after eating roast beef in the same marinade while reintroduction of venison without marinade did not result in recurrence of symptoms.

Results: Skin tests to cayenne and black pepper extracts were positive. Skin testing to crude extracts of the food marinades was negative as well as commercial extracts of onion, garlic, paprika, thyme, and tomato. IgE radioallergosorbent results showed undetectable levels to black pepper, chili pepper, lemon, tomato, garlic, onion, green pepper, and white pepper. Specific IgE to cayenne pepper was detected at 0.11 kU/L.

Conclusions: Pepper allergy is an unusual but potentially severe food allergy in children.

INTRODUCTION

Case Report

A 17-month-old white boy had severe urticaria, conjunctivitis, facial swelling, and severe cough within minutes of eating venison prepared with a spicy Southwest/mesquite marinade. He did not have vomiting, diarrhea, shortness of breath, or wheezing. He was treated with intramuscular epinephrine and oral diphenhydramine in the emergency department and improved. The parents were concerned that he had venison allergy and thus avoided venison. Two months later, he developed facial urticaria and conjunctivitis after eating roast beef also prepared with the Southwest/mesquite marinade. This marinade contained a variety of spices including black and cayenne pepper. Since this episode, he has eaten venison meat without marinade without symptoms. His food is typically not peppered.

• • •

Author Affiliation: Department of Pediatrics, Medical College of Wisconsin.

Corresponding Author: Leslie Gimenez, MD, 9000 W. Wisconsin Ave. Suite 411, Milwaukee, WI 53226; phone 414.266.6840; fax 414.266.6437; e-mail lgimenez@mcw.edu.

His past medical history is significant for mild eczema not requiring topical steroids and egg allergy that caused hives. He has recurrent otitis media. He has no known drug allergies and takes diphenhydramine as needed. He does not have chronic rhinitis or asthma. He has urticaria with dog contact. Family history is remarkable for his 4-year-old brother with asthma and gastroesophageal reflux. On physical examination at baseline, conjunctivae were noninjected. Nasal mucosa was pink without turbinate edema. He had mucoid nasal discharge. Oropharynx was clear without postnasal drainage or exudate. Lungs were clear to auscultation. His skin revealed no rash. The rest of his physical examination was normal.

METHODS

Percutaneous skin tests were performed with the Quintip device (Hollister-Stier Laboratories; Spokane, Washington) using commercial allergenic extracts of onion, garlic, paprika, thyme, black pepper, cayenne pepper, tomato, and crude extracts of mesquite, Southwest, Montreal and chipotle marinades. In the presence of a negative saline control, a wheal and erythema similar to the histamine control was considered positive. IgE Radioallergosorbent (RAST) tests were performed by Quest Diagnostics Incorporated (Wood Dale, Illinois) for black pepper, chili pepper, lemon, tomato, garlic, onion, green pepper, white pepper, cayenne pepper, paprika, thyme, and tomato. Allergy testing for inhalant allergens was not performed.

RESULTS

Percutaneous allergy skin tests to cayenne and black pepper extracts (1:20 W/V Greer; Lenoir, North Carolina) were positive, (2 mm wheal × 9mm flare and 3 mm wheal × 14 mm flare respectively) compared to histamine (5 mm wheal × 25 mm flare) and saline controls. Skin testing to crude extracts of the food marinades was negative as was testing of commercial extracts of onion, garlic, paprika, thyme, and tomato. IgE RAST results showed undetectable levels to black pepper, chili

pepper, lemon, tomato, garlic, onion, green pepper, and white pepper. Specific IgE to cayenne pepper was 0.11 kU/L.

DISCUSSION

This report illustrates a case of severe pepper allergy presenting in early childhood.

Spice is often used to describe a variety of flavoring agents derived from a dried seed, fruit, root, bark, or vegetable. Spice allergy is rare, ranging from 2% to 6.4% of all food allergies and usually has its onset in adulthood, affecting primarily women.[1] Most spice allergies are related to the family Apiaceae (celery, fennel, caraway, coriander, chervil, dill), followed closely by Liliaceae (garlic, onion, chive) with a low incidence of sensitization to nutmeg, pepper, and ginger.[2] In a study evaluating 22 patients with pepper and paprika allergy, the mean age was 37 years old, and the youngest patient was 15 years old.[3] Sensitization occurs in the occupational setting such as butchers, bakers, and spice factory workers where there is frequent and prolonged spice exposure.

Spice allergy is believed to be a secondary effect after primary sensitization with inhalant allergens. Because spices are derived from plants, they harbor allergenic potency and can induce mild local to severe systemic reactions.[1] Profilin and Bet v 1 homologues found in different plants are cross reactive between inhalant allergens and spices. The mugwort-birch-celery-spice syndrome illustrates a classic example where mugwort and birch pollen allergy are frequently associated with IgE-mediated hypersensitivity to celery and spices in the Apiaceae family as well as paprika, pepper, garlic, leek, and onion.[3] Therefore, patients at risk for a spice allergy are those sensitized to mugwort and birch. Reported symptoms through inhalation exposure include asthma and rhinitis.[4] Sensitization to spices may occur through skin contact.[1] One case describes a butcher who developed contact dermatitis from a spice mix used to marinate meat.[5] He also was skin-test positive to mugwort. Because our patient did not exhibit seasonal or perennial rhinitis, testing for such aeroallergens was deferred.

Our case describes a very young child allergic to black pepper and cayenne pepper. Black pepper, *Piper nigrum*, is a flowering vine in the family Piperaceae. The fruit is known as a peppercorn when dried. Peppercorns are ground to a powdered form and described as black, white, or green pepper, or just pepper. Reported allergic symptoms include asthma, shortness of breath, rhinitis, and contact dermatitis.[1,3] Cayenne pepper, *Capiscum annuum*, is from the fruit red hot chili pepper. It is a pungent fruit grown for condiments, spices, ornamentals, and pharmaceutical preparations.[6] Chili pepper also is ground to make paprika. Reported allergic symptoms have been reported only for adults and include respiratory symptoms including asthma, generalized eczema, and urticaria.[1,7,8]

Although spice allergy is believed to be a secondary effect after primary sensitization with inhalant allergens, it is unclear how pepper allergy developed in our patient. A hypothesis for our patient could include being (1) a "susceptible host" having eczema and other food allergy (egg); (2) an immature gastrointestinal tract with absorption and transport of an "immunologically intact" pepper allergen crossing a multi-layered barrier; (3) a failure to develop oral tolerance or a breakdown in tolerance to a specific or intact pepper antigen; and/or (4) a specific biological action of a pepper component on the intestinal epithelial cells and immune cells affecting absorption and sensitization. Specifically, when cayenne pepper, which contains capsaicin, is directly placed on intact intestinal epithelial mucosa, there is a significant but transient decrease in transepithelial electrical resistance and increased permeability for 10-, 20-, and 40-kDa dextrans but not for 70-kDa dextrans. This observation might be of pathophysiological importance with respect to food allergy and intolerance;[9] the hotter the spices, the more likely they could act as adjuvants for sensitization by promoting transport of molecules below a molecular mass of 70-kDa.[1] To date, there is insufficient research studying the mechanism of spice allergy in young children.

CONCLUSION

Pepper allergy is an unusual but potentially severe food allergy in childhood.

Funding/Support: None declared.

Financial Disclosures: None declared.

REFERENCES

1. Scholl I, Jensen-Jarolim E. Allergenic potency of spices: hot, medium hot, or very hot. *Int Arch Allergy Immunol.* 2004;135:247-261.

2. Moneret-Vauntrin DA, Morisset M, Lemerdy P, Croizier A, Kanny G. Food allergy and Ige sensitization caused by spices: CICBAA data (based on 589 cases of food allergy). *Allergie et Immunologie.* 2002;34(4):135-140.

3. Leitner A, Jensen-Jarolim E, Grimm R, et al. Allergens in pepper and paprika. immunologic investigation of celery-birch-mugwort-spice syndrome. *Allergy.* 1998;53:36-41.

4. Van der Walt A, Lopata AL, Nieuwenhuizen NE, Jeebhay MF. Work-related allergy and asthma in spice mill workers – the impact of processing dried spices on IgE reactivity patterns. *Int Arch Allergy Immunol.* 2010;152:271-278.

5. Anliker MD, Borelli S, Wuthrich B. Occupational protein contact dermatitis from spices in a butcher: a new presentation of the mugwort-spice syndrome. *Contact Dermatitis.* 2002;46:72-74.

6. Barceloux D. Pepper and capsaicin (capsicum and piper species). In *Medical Toxicology of Natural Substances: Foods, Fungi, Medicinal Herbs, Toxic Plants, and Venomous Animals.* Wiley; 2009:380-390.

7. Feldman H, Levy P. Hot pepper-induced urticaria while repairing a digital laceration. *Am J Emerg Med.* 2003;21(2).

8. Dikensoy O, Bayram NG, Filiz A. Severe asthma attack in a patient with premenstrual asthma: hot pepper is the possible trigger. *Respiration.* 2001;68:227.

9. Jensen-Jarolim E, Gajdzik L, Haberl I, Kraft D, Scheiner O, Graf J. Hot spices influence permeability of human intestinal epithelial monolayers. *J Nutr.* 1998;128:577-581.

Metastatic Neuroendocrine Tumor Found on Screening Mammogram

Amanda L. Amin, MD; Amanda L. Kong, MD, MS

ABSTRACT

Background: Tumor metastatic to the breast is uncommon, and a neuroendocrine tumor metastatic to the breast is even more unusual. The breast lesion can be the first manifestation of a nonmammary malignancy.

Methods: Metastatic neuroendocrine tumors to the breast have been described in the literature in case reports or very small case series. Because of the small number, current treatment recommendations are not well defined. We present a case report of a metastatic neuroendocrine tumor that first presented as a breast lesion on screening mammography.

Conclusion: Accurate diagnosis is important for appropriate management, as the treatment for a breast primary neuroendocrine tumor is different than a neuroendocrine tumor metastatic to the breast.

INTRODUCTION

Neuroendocrine tumors comprise a diverse group of neoplasms including carcinoid tumors, islet cell tumors, neuroblastomas, and small-cell carcinoma of the lung. They vary widely in clinical characteristics, but the presence of neurosecretory granules, detected with immunochemical staining, is diagnostic. Primary neuroendocrine tumors in the breast are rare, first described by Cubilla and Woodruff in 1977, and account for <0.1% of all breast cancers and <1% of all neuroendocrine tumors.[1] Metastatic tumors to the breast also are uncommon and represent approximately 1% to 2% of all breast tumors.[1] Melanoma is the most common malignancy to metastasize to the breast in adults, followed by lung, stomach, ovary, kidney, and lymphoma. In children, rhabdomyosarcoma is the most common primary tumor to metastasize to the breast.[2]

CASE REPORT

A 69-year-old asymptomatic woman presented to the Clinical Cancer Center at the Medical College of Wisconsin in May 2010 with a screening mammogram that demonstrated a new 6-mm round nodular density in the left breast. She had undergone yearly screening mammograms prior to this finding, which all were unremarkable. This density was further imaged with diagnostic mammogram (Figure 1); ultrasound, which demonstrated a 4-mm hyperechoic oval mass with a smooth margin; and, because of suspicion of malignancy, ultrasound-guided biopsy. The pathology of the lesion was neuroendocrine carcinoma, large-cell type, grade II, triple negative for (Estrogen receptor) ER, (progesterone Receptor) PR, and HER2/*neu*. It stained positive for chromogranin and synaptophysin on immunohistochemistry. Because primary breast neuroendocrine tumors are exceedingly rare, a metastatic workup was performed. A routine screening colonoscopy performed prior to mammography demonstrated several tubular adenomas in the cecum, but no evidence of a primary neuroendocrine tumor.

On the computed tomography scan of the abdomen and pelvis, the patient had extensive hepatic metastases (Figure 2) as well as masses in the head and proximal body of the pancreas and a soft-tissue mass in the root of the mesentery near the duodenum and adjacent to the ascending colon (Figure 3). Octreotide scan demonstrated increased activity in the liver consistent with metastatic neuroendocrine lesions, but no increased activity in the pancreas. Ultrasound-guided biopsy of 1 of the liver lesions also was positive for metastatic neuroendocrine tumor. Her serum chromogranin A level was significantly elevated at

• • •

Author Affiliation: Department of Surgery, Medical College of Wisconsin, Milwaukee, Wis.

Corresponding Author: Amanda L. Kong, MD, Department of Surgery, 9200 W Wisconsin Ave, Milwaukee, WI 53226; phone 414.805.5815; fax 414.805.5771; e-mail akong@mcw.edu.

CME available. See page 145 for more information.

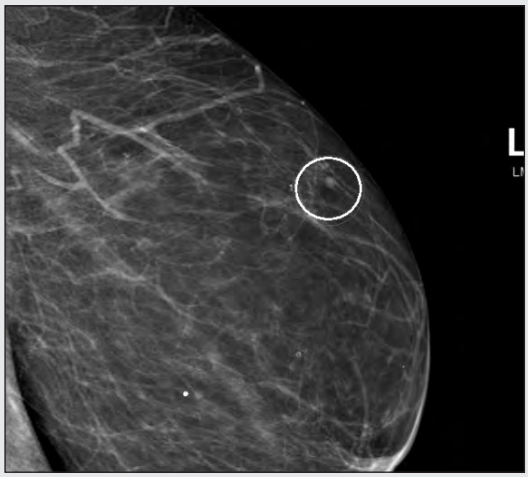


Figure 1. Diagnostic mammogram of the left breast. New 6-mm lesion at 12 o'clock within the circle.

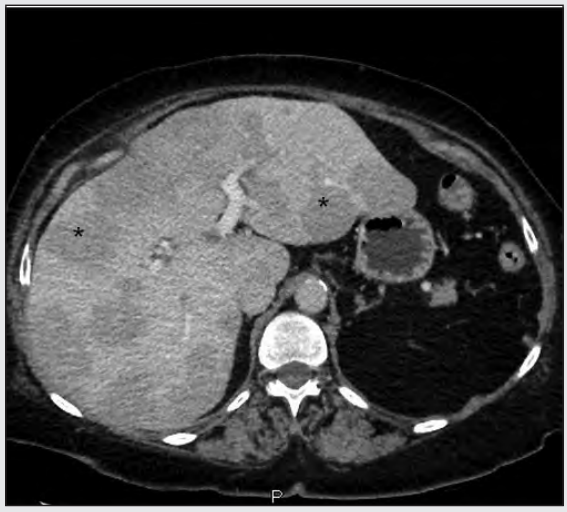


Figure 2. Cross-sectional images from abdominal CT scan demonstrating extensive hepatic metastases. Asterisks annotate 2 of the larger lesions.

878.4 ng/mL (reference: <36.4 ng/mL) with a normal neuron specific enolase (NSE) level of 6.2 ug/L (reference: 3.7-8.9 ug/L). She was deemed a nonoperative candidate because of her extensive liver tumor burden as well as involvement of her right and middle hepatic veins. She was referred to interventional radiology, where the patient was started on a clinical trial to receive selective internal radiation therapy (SIRT) with the goal of debulking her tumor for palliation. She also was referred to medical oncology to discuss systemic chemotherapy options. Upon further questioning, the patient admitted to intermittent flushing and several loose stools per day. She was started on systemic octreotide to address these symptoms and improve her progression-free survival based on the PROMID study.[3]

DISCUSSION

Neuroendocrine tumors are uncommon, slow-growing tumors originating from neoplastic transformation of enterochromaffin or Kulchitsky cells. They arise most commonly in the gastrointestinal tract and bronchopulmonary system, with an overall prevalence of 1 to 2 cases per 100,000 people. Carcinoid syndrome, including flushing, diarrhea and bronchospasm, occurs in about 5% to 10% of patients with neuroendocrine tumors. In 2003, the World Health Organization (WHO) classified primary neuroendocrine tumors of the breast into solid neuroendocrine carcinoma, small-cell/oat-cell carcinoma, and large cell neuroendocrine carcinoma.[4] The diagnosis of a primary neuroendocrine tumor of the breast may be made if nonmammary sites are confidently excluded or if there is the presence of a ductal carcinoma in situ component within the specimen. Neuroendocrine tumors also can metastasize to the breast. It is important to differentiate between a primary breast neuroendocrine tumor and metastatic disease to the breast because

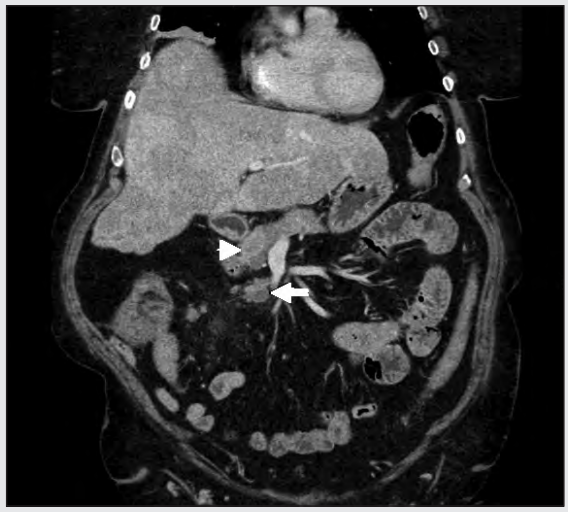


Figure 3. Coronal images from abdominal CT scan. The white arrow head points to a 2.2-cm mass in the head of the pancreas. The white arrow points to a soft-tissue mass in the mesentery adjacent to the superior mesenteric vein.

of the differences in treatment.[5] A clinical history of a prior neuroendocrine tumor elsewhere in the body may be helpful in making this diagnosis.

Histologically, neuroendocrine tumors typically form nests or sheets consisting of a uniform population of cells with abundant eosinophilic cytoplasm and round nuclei. More than 50% of the cell population must be immunoreactive for at least 1 neuroendocrine marker, including chromogranin, synaptophysin, and neuron-specific enolase.[1] A neuroendocrine tumor will typically be negative for cytokeratin 7, whereas true breast carcinomas will strongly express cytokeratin 7.[6] Staining for estrogen and progesterone hormone receptors may not

be helpful in differentiating between a breast carcinoma and a primary neuroendocrine tumor of the breast, because the receptor status may be positive in both cases.[7] Metastatic neuroendocrine tumors to the breast typically have negative hormone receptors.[2]

The mammographic appearance of a neuroendocrine tumor of the breast is that of a round, sharply circumscribed mass. This is in contrast to a breast carcinoma, which usually has more ill-defined or spiculated edges. Microcalcifications, which often are present in a breast carcinoma, usually are absent with a neuroendocrine tumor of the breast. On breast MRI, a neuroendocrine tumor of the breast shows early enhancement, similar to a breast carcinoma. On ultrasound, the tumor may appear as a hypoechoic solid mass with increased vascularity,[8] which also may be seen with primary breast cancer. However, these imaging characteristics are not sufficient for a diagnosis, and fine-needle aspiration or core-needle biopsy examination is necessary for definitive diagnosis. Caution must be taken when biopsying a lesion in patients with a hormonally active tumor because there have been case reports of biopsy precipitating a carcinoid crisis.[6]

The data have been conflicting about the prognosis of primary neuroendocrine tumors of the breast. Some studies have suggested that patients have a better prognosis with a primary neuroendocrine tumor of the breast compared to patients with invasive ductal carcinomas. However, the reason for this finding may be that previous studies had a selection bias, with a large proportion of patients with solid papillary and/or mucinous types of neuroendocrine tumors of the breast, which tend to be well differentiated and are associated with a better prognosis.[7,9] However, there are other variants of neuroendocrine tumors of the breast, including small cell and large cell that are poorly differentiated and tend to carry a worse prognosis. Higher nuclear grade also is associated inversely with disease-free and overall survival.[7] Therefore, when considering all variants of primary neuroendocrine tumors of the breast, this disease has a higher tendency for local and distant relapse and poorer overall survival when compared to primary breast carcinoma.[7] The median survival for a patient with metastatic primary neuroendocrine tumor of the breast is 14 months.[10]

Neuroendocrine tumors found in the breast also may be metastatic from another primary source. There is a tendency for these tumors to have late metastases, which may be focal or widespread and diffuse, as in our patient. The ileum is the most common primary site for metastatic breast carcinoids tumor, followed by the appendix, duodenum, pancreas, lung, and ovary.[11] The first case of a carcinoid tumor metastatic to the breast was found on autopsy and was reported in the literature in 1957.[11] In a review of the literature, Upalakalin found that 59 cases of carcinoid tumors in the breast had been reported, 9 of which were metastatic lesions with an occult primary carcinoid tumor.[5] The mean age of presentation was 56.[5] Patients with metastatic neuroendocrine tumors to the breast appear to present on average 10 years younger than patients with primary neuroendocrine tumors of the breast, which typically occur in patients in their 6th and 7th decade of life.[9]

There is a lack of clear recommendations regarding the surgical management of these uncommon tumors. It appears that primary breast neuroendocrine tumors should be treated in a similar manner to invasive ductal carcinoma appropriate for the size and stage of the lesion, including mastectomy or breast-conserving therapy with lumpectomy and negative margins, as well as axillary staging with sentinel lymph node biopsy.[5] The use of adjuvant treatment with endocrine and radiation therapy has shown a trend in survival benefit, as reported in a case-controlled study by Wei et al, though none of these reached significance because of a lack of statistical power.[7] However, they found that standard chemotherapy was associated with a poorer outcome.

Historically, patients with breast metastases from neuroendocrine tumors of another source were subjected to mastectomy because the lesion was often erroneously diagnosed as a primary carcinoma, and the diagnosis was made only after reviewing the histology of the mastectomy specimen. If patients with metastatic neuroendocrine tumors to the breast are surgical candidates, meaning they may have only a few isolated metastases that are amenable to resection, they should undergo lumpectomy alone. Mastectomy would be indicated only if there were numerous or very large metastatic neuroendocrine tumors to the breast. Multiple resections may be performed if more than 1 lesion is present and breast-conserving surgery is desired, as this aids in local control.[5,12] Axillary node dissection is not necessary in the case of metastatic disease, but may be considered if palpable adenopathy is present.[5] Complete surgical resection of both the primary tumor and metastasis is curative, but resection of metastatic disease alone may offer survival advantage over no resection.[13] Liver metastases that are too bulky for resection can be managed with arterial-based liver-directed therapies such as transarterial embolization (TAE), transarterial chemoembolization (TACE), and SIRT. These methods have been shown to reduce hormone levels, palliate symptoms, and reduce tumor burden.[14]

Systemic therapy is still the cornerstone for metastatic malignancies. However, existing options remain suboptimal for metastatic neuroendocrine tumors, and it remains to be determined what the most appropriate systemic regimen should be. Somatostatin analogs can control symptoms and stabilize certain slow-growing tumors, but they rarely result in tumor

regression.[3,15] Metastatic neuroendocrine tumors have been responsive to platinum-based combination regimens, but systemic chemotherapy overall is minimally effective.[15] A multimodality approach is typically the most appropriate method of treatment for a patient with unresectable disease.

CONCLUSION

In summary, we present a patient with a breast lesion found on screening mammography that was the first detected site of a metastatic neuroendocrine tumor. It is important to determine whether the neuroendocrine lesion of the breast is a primary tumor or a metastatic tumor when biopsy confirms this diagnosis. Finally, it is important to search for the primary tumor when it is determined that the tumor is metastatic.

Funding/Support: None declared.

Financial Disclosures: None declared.

Planners/Reviewers: The planners and reviewers for this journal CME activity have no relevant financial relationships to disclose.

REFERENCES

1. Ogawa H, Nishio A, Satake H, et al. Neuroendocrine tumor in the breast. *Radiat Med.* 2008;26(1):28-32.

2. Kanthan R, Negreiros F, Kanthan SC. Colonic carcinoid metastatic to the breast. *Arch Pathol Lab Med.* 2003;127(10):1373-1375.

3. Rinke A, Muller HH, Schade-Brittinger C, et al. Placebo-controlled, double-blind, prospective, randomized study on the effect of octreotide LAR in the control of tumor growth in patients with metastatic neuroendocrine midgut tumors: a report from the PROMID Study Group. *J Clin Oncol.* 2009;27(28):4656-4663.

4. Righi L, Sapino A, Marchio C, Papotti M, Bussolati G. Neuroendocrine differentiation in breast cancer: established facts and unresolved problems. *Semin Diagn Pathol.* 2010;27(1):69-76.

5. Upalakalin JN, Collins LC, Tawa N, Parangi S. Carcinoid tumors in the breast. *Am J Surg.* 2006;191(6):799-805.

6. Adams RF, Parulekar V, Hughes C, Kadour MJ, Talbot D. Radiologic characteristics and management of screen-detected metastatic carcinoid tumor of the breast: a case report. *Clin Breast Cancer.* 2009;9(3):189-192.

7. Wei B, Ding T, Xing Y, et al. Invasive neuroendocrine carcinoma of the breast: a distinctive subtype of aggressive mammary carcinoma. *Cancer.* 2010;116(19):4463-4473.

8. Kopans DB. Histologic, pathologic and imaging correlation—metastatic lesions to the breast. In: *Breast Imaging.* 3rd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2007:783.

9. Stita W, Trabelsi A, Gharbi O, Mokni M, Korbi S. Primary solid neuroendocrine carcinoma of the breast. *Can J Surg.* 2009;52(6):E289-E290.

10. Greco FA, Hainsworth JD. Cancer of unknown primary site. In: DeVita VT, Lawrence TS, Rosenberg SA, eds. *Devita, Hellman & Rosenberg's Cancer: Principles & Practice of Oncology.* Vol 2. Part 3. 8th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2008.

11. Gupta C, Malani AK, Rangineni S. Breast metastasis of ilial carcinoid tumor: case report and literature review. *World J Surg Oncol.* 2006;4:15.

12. Berruti A, Saini A, Leonardo E, Cappia S, Borasio P, Dogliotti L. Management of neuroendocrine differentiated breast carcinoma. *Breast.* 2004;13(6):527-529.

13. Abood GJ, Go A, Malhotra D, Shoup M. The surgical and systemic management of neuroendocrine tumors of the pancreas. *Surg Clin North Am.* 2009;89(1):249-66.

14. Nazario J, Gupta S. Transarterial liver-directed therapies of neuroendocrine hepatic metastases. *Semin Oncol.* 2010;37(2):118-126.

15. Reidy DL, Tang LH, Saltz LB. Treatment of advanced disease in patients with well-differentiated neuroendocrine tumors. *Nat Clin Pract Oncol.* 2009;6(3):143-152.

advancing the art & science of medicine in the midwest

WMJ

Call for Papers Special Issue

The *WMJ* will publish a themed issue in April 2012 focusing on the use of clinical information systems as a method of integrating clinical medicine and public health. The United States is rapidly moving to use large public health data sets, electronic health records (EHRs), and Geographic Information Systems for surveillance of health problems such as influenza, chronic illness management, asthma and diabetes. At-risk populations in clinical care systems are among the areas addressed.

The journal encourages investigators who are using clinical information to potentially improve clinical care and stimulate innovative methods for approaching health problems to submit their work for consideration in this special issue. We are interested in method pieces that describe the use of clinical health systems for clinical care and research, and in completed work that has used clinical information systems to identify and manage problems or has addressed the challenges and opportunities in developing clinical data systems.

During the past five years, *WMJ* has published a great deal of information about health disparities, infectious disease, and access to care that has drawn on large public health data sets and contributions from clinical informatics and other sources.

With rapidly evolving tools such as clinical registries, whole-population EHRs, and health mapping becoming more prevalent, we would like to showcase how public health and clinical systems are using these tools to improve health.

If you have questions or would like more information, e-mail wmj@wismed.org.

Timeline:
Manuscript Deadline: December 16, 2011
Editorial Deadline: February 20, 2012
Publication: April 2012

Instructions for authors are available at www.wmjonline.org.

Visit www.wmjonline.org to learn more.

CME

To receive CME credit, complete this quiz and return it to the address listed below. See CME-designated article on pages 140-143.

Quiz: Metastatic Neuroendocrine Tumor Found on Screening Mammogram

EDUCATIONAL OBJECTIVES

1. To understand the diagnostic approach to the patient found to have a neuroendocrine tumor of the breast and the importance of differentiating whether it is a primary or metastatic tumor.
2. To understand some of the specific characteristics of neuroendocrine tumors, particularly as they present as breast masses.
3. To understand some of the treatment options available for patients with neuroendocrine tumors of the breast.

PUBLICATION DATE: June 7, 2011

EXPIRATION DATE: June 7, 2012

QUESTIONS

1. Neuroendocrine tumors include all except:
   A. Carcinoid tumors
   B. Islet cell tumors
   C. Neuroblastomas
   D. Ductal cell breast carcinoma
   E. Small cell carcinoma of the lung

Answer:

- ❑ A
- ❑ B
- ❑ C
- ❑ D
- ❑ E
- ❑ A and C
- ❑ B and D

2. Which of the following markers is not typically seen in neuroendocrine tumors:
   A. Chromogranin
   B. Cytokeratin 7
   C. Synaptophysin
   D. Neuron-specific enolase

Answer:

- ❑ A
- ❑ B
- ❑ C
- ❑ D
- ❑ All of the above
- ❑ None of the above

3. Which of the following statements is/are incorrect:
   A. Neuroendocrine tumors originate from neoplastic transformation of enterochromaffin or Kulchitsky cells.
   B. Primary neuroendocrine tumors of the breast may express estrogen (ER) and progesterone (PR) receptors while metastatic neuroendocrine tumors are generally negative for ER and PR.
   C. In general, primary neuroendocrine tumors of the breast have less tendency for local and distant relapse with a better overall survival when compared to primary breast cancer.
   D. The mean age of presentation of patients with metastatic neuroendocrine tumors to the breast is 10 years younger than patients with primary neuroendocrine tumors of the breast.

Answer:

- ❑ A
- ❑ B
- ❑ C
- ❑ D
- ❑ A and C
- ❑ B and D
- ❑ All of the Above

4. Carcinoid syndrome, which may include flushing, diarrhea, and bronchospasm, occurs in a majority of patients with neuroendocrine tumors.

Answer:

- ❑ True
- ❑ False

• • •

You may earn CME credit by reading the designated article in this issue and successfully completing the quiz (75% correct). Return completed quiz to WMJ CME, 330 E Lakeside St, Madison, WI 53715 or fax to 608.442.3802. You must include your name, address, telephone number, and e-mail address.

The Wisconsin Medical Society (Society) is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians. The Wisconsin Medical Society designates this educational activity for a maximum of 1.0 *AMA PRA Category 1 Credit™*. Physicians should only claim credit commensurate with the extent of their participation in the activity.

Lessen Risk, Avoid Billing Delays by Working with Postal Service

Faith N. Mondry, JD

The March 9, 1929 cover of *The Saturday Evening Post* featured Norman Rockwell's "Doctor and the Doll," a painting that depicts a kindly physician spending a moment listening to the heart of a doll held up by a little girl. While the care and concern physicians have for their patients that Rockwell illustrated has not changed over time, how they manage the administrative details of their practices today is quite different from the simplicity of that scene. Today technology and automation have changed how medicine is practiced. Unlike the early 20th century doctor working from a roll-top desk in his home office, many physicians today exist in a world of high-tech equipment, paperless medical records, and electronic transmission of insurance and patient billing information.

Likewise, things have changed a great deal for the US Postal Service (USPS) since Rockwell's "Sorting the Mail" graced the cover of the *Post* in 1922. Gone are the days when mail was sorted manually by workers in local post offices that were business and social hubs in the communities they served. Physicians might think of the USPS in terms of the friendly mail carrier, those blue street-side mail boxes, or the stamps they buy for their holiday cards. What they typically don't think about are compliance or risk management, or the fact that one day their clinic's business may become the USPS's business.

• • •

Faith Mondry is a US Postal Inspector in Milwaukee, Wis.

The USPS is a business that charges for its products and services. The US Postal Inspection Service (USPIS) is a federal law enforcement agency charged with maintaining the integrity of the US mail. Both of these organizations recently have stepped up education and outreach efforts with the health care community, as well as with the legal community and other businesses, in hopes of increasing awareness and protecting the nation's mail system and the people who use it.

As part of those efforts, the following are a few practical tips that will help ensure that your facility and staff are in compliance with current postal rates and regulations.

Postage Due is a USPS Don't

A review conducted in the Milwaukee, Wisconsin, area last year by the USPIS showed a large amount of underpaid postage was applied to outgoing mail by businesses using postage meters. A surprising quantity of the underpaid mail originated from medical facilities and health care and insurance businesses. While some of the meter holders were using old postage rates to send out their mail, others were simply miscalculating rates. While underpaid mail may not seem like a significant concern, it can affect a medical facility's business practices by creating unnecessary delays in getting the facility's mail to the intended recipient, as well as deteriorating the facility's customer service.

A targeted effort has been made by both the USPS and the USPIS to educate customers about the importance of paying the right amount of postage for each mail piece. The USPS has the ability to deliver mail "postage due," meaning that if underpaid pieces are detected, payment can be requested from the recipient for the balance due. Pursuant to the *Domestic Mail Manual,* larger quantities of mail pieces determined to be underpaid may be returned to the sender to collect proper postage prior to being sent on.

For medical facilities, insurance companies, even medical practices that send monthly statements to their patients, the return of this mail could be disruptive financially and administratively. Staff will need to spend time reprocessing the mail, and the extra time may result in a slowing of payments by patients. Additionally, medical facilities often mail records or other documents to their patients that contain sensitive or confidential patient information (eg, copies of medical records, summaries of care, paperwork for disability or workers' compensation claims). Ensuring such information is mailed in a manner that protects patient confidentiality is paramount. When postage is underpaid, manual processing is necessary to collect payment. You can provide the best protection of your patients' privacy by adhering proper postage to your mail, which will prevent the mail from being manually processed, returned, or held for proper postage. Adhering proper postage also will ensure the correspondence is delivered in a timely manner, facilitating continuity of care and efficient business operations for the medical facility.

USPS implemented a rate change in April 2011, and it is important to make sure your facility is paying current rates. Assistance is available to postal customers to ensure they are aware of current postage rates and that their equipment and software are up to date. A periodic postage compliance check of your practice or facility helps ensure the most efficient, timely, and secure communication via US mail. Contact your postage meter vendor to be sure you have the current software installed. Physicians or administrators can visit www.usps.com to obtain information about current postal rates and services. Using a postage rate calculator, such as USPS's Postage Price Calculator, can also assist with compliance.

Safeguarding Against Identity Theft

Identity theft, another investigative arena for the USPIS, has become an area that should concern health care professionals. Last year, more than 9.9 million Americans were victims of identity theft.[1] One might think of identify theft primarily in terms of credit card and Internet fraud, but recently patient information was stolen from a large regional medical center's files by a custodian who cleaned the medical offices after hours. Because this type of information can be used for criminal activity through the US mail, the USPIS was the lead investigative agency in this case. Many identity theft and credit card frauds involve criminal misuse of the mail, and the USPIS often is called upon to investigate on behalf of victims or institutions suffering losses from these types of crimes.

Paper and digital files alike should be safeguarded. Tools such as locks, encryption, and password protection for files should be used to maximize the preservation of patient confidentiality. A common-sense approach and a periodic review of office practices can help develop policies, no matter the size of the medical office or facility, to deter identity thieves from preying on sensitive patient information and to prevent breaches from occurring.

The Postal Inspection Service website, https://postalinspectors.uspis.gov, has specific information about fraud prevention and how to protect personal identifying information in your organization.

Working Together to Increase Compliance and Safety

The USPS makes every effort to assure the efficiency and security of the mail service. However, medical practices also have an important part to play in safeguarding patient communications and records. While there is no way for medical practices to completely eliminate risk to their practices and patients, there are many ways to mitigate such risks. The USPS and USPIS encourage physicians and their staff to use the resources available to assist them in protecting their practices and their patients. For issues affecting patient privacy and the preservation of sensitive information—whether paper or digital—an ounce of prevention is likely worth more than a pound of cure.

Reference

1. US Postal Inspection Service. Identity theft is America's fastest growing crime. https://postalinspectors.uspis.gov/investigations/MailFraud/fraudschemes/mailtheft/IdentityTheft.aspx. Accessed May 10, 2011.

advancing the art & science of medicine in the midwest

WMJ

CALL FOR PAPERS & REVIEWERS

WMJ is a peer-reviewed, indexed scientific journal published six times a year by the Wisconsin Medical Society (Society). *WMJ's* mission is to provide a forum for professional communication and continuing education for its readers—thousands of practicing physicians and other health professionals from around the country and even the world. *WMJ* is available via subscription and electronically—in full text online at www.wmjonline.org and in PubMed through the National Library of Medicine.

WMJ invites original research, case reports, review articles and essays about medical issues relevant to its readers. This includes submissions to the new "Health Innovations" section, which features short reports showcasing results of initiatives being tested in clinics and communities throughout the region by health care professionals striving to improve quality, patient safety and satisfaction, cost efficiency and more.

WMJ also seeks health care professionals to add to our list of highly qualified reviewers who can be objective, insightful and respond in a timely manner. Reviewers receive manuscripts electronically and are asked to complete their review within 4 weeks. Interested physicians should e-mail their name, contact information including preferred e-mail address, specialty including at least 3 areas of expertise or interest, and the frequency they are willing to serve as reviewers to wmj@wismed.org.

Visit www.wmjonline.org or e-mail wmj@wismed.org for manuscript submission guidelines and tips for authors and reviewers, or to access *WMJ* online.

Need for translational neuroscience investigation gives rise to multidisciplinary research center

Joseph E. Kerschner, MD
Interim Dean and Executive Vice President, Medical College of Wisconsin

The many disorders we classify as neurological have diverse etiologies, consequences, and age of onset. They affect great numbers of Wisconsin residents and cut across all demographics.

Neurodegenerative diseases like Parkinson's and Alzheimer's take a tremendous societal toll, while multiple sclerosis affects residents of the northern United States with greater frequency than other regions of the US. Spinal cord and traumatic brain injuries are rare but often impact people in the prime of life. Seizure disorders and migraines typically are diagnosed in childhood or adolescence but tend to be life-long with few therapeutic options.

Psychiatric disorders also involve neuropathology. Drug and alcohol abuse alter brain function. Schizophrenia has a strong genetic component and appears midlife. More commonly, an estimated 10% to 20% percent of women (twice as high as the incidence in men) experience a debilitating episode of depression during their lives.

Resultant from this broad range of clinical pathologies, neuroscience research is proportionately diverse. This might be best demonstrated by the existence of 4 different National Institutes of Health institutes focused primarily on neuroscience research, while others have strong neuroscience components.

Despite the characteristics that distinguish them, all neurological disorders are marked by changes in the functioning of the brain or other nervous tissues. In response, The Medical College of Wisconsin created the Neuroscience Research Center (Center), bringing investigators in these fields together not just in the spirit of collaboration, but in the activity of translational research. The Center will foster, facilitate and grow multidisciplinary neuroscience research under the leadership of founding director Cecilia J. Hillard, PhD, Professor of Pharmacology and Toxicology. The Medical College also has invested in a new leader in the Department of Neurosurgery by promoting Dennis Maiman, MD, PhD, and is actively recruiting a new department chair in Neurology. Each of these additions is linked to increased emphasis in treating and researching neurologic disorders at the Medical College.

Research emphasis in the Center will be placed on (1) mechanisms of neurodegeneration and regeneration, (2) the impact of chronic pain on brain function, and (3) the role of stress and stress resilience on psychiatric and behavioral disorders – areas where the burden for patients is profound and the need for increased knowledge is apparent. To do so, we will leverage areas of expertise at the Medical College, including imaging, proteomics, genomics, engineering, neurosurgery, cellular and molecular neuroscience, and cognition.

> The more we learn about the brain, the more we understand that the processes at the beginning of life and those at the end of life are very similar.

The Center complements and interacts with the Medical College's Center for Imaging Research, capitalizing on our pioneering development of functional MRI, which remains an institutional strength. The Neuroscience Research Center engages faculty across more than 13 departments, so research encompasses myriad themes, including vision, hearing, neurotrauma, rehabilitation from injury and disease, memory, movement, sleep, addiction, and neuroprotection.

Using fundamental mechanisms as the entry point relevant to virtually any brain or nervous system disorder, the Center will enable cross pollination to engender new ideas and expedite the translation of discoveries to clinical applications that help patients in and beyond Wisconsin.

The overarching theme linking researchers in the Center is increased understanding of synapses and mechanisms involved in synaptic plasticity, the processes that increase or decrease the strength of synaptic communication between neurons in the nervous system. These processes underlie learning and memory, and are disrupted by neurodegeneration, chronic stress, chronic pain, and substance abuse.

We need an enhanced understanding of neurons to unlock information about diseases and how to mitigate their destructive effects on health. Disorders of aging and those of neurodegeneration all are cases of neurons dying. The trigger that induces them to die may be different, as are the parts of the brain affected, but the process is the same throughout the brain. Neuroscience Research Center activities will be aimed at learning how neurons die; finding a way to prevent that cellular death could have implications for many diseases.

The more we learn about the brain, the more we understand that the processes at the beginning of life and those at the end of life are very similar. Regenerating a neuron lost in a spinal cord injury or the excision of a brain tumor, for example, may be accomplished by turning on the genes that were active when those neurons were first formed in utero. Harnessing the processes in neurodevelopment may allow us to initiate the regeneration of nervous tissue to repair injury or reverse disease progression.

The Neuroscience Research Center will be a catalyst for advancing these research concepts and many others. Collaboration is essential because neurologic diseases are so complex—isolated efforts are not conducive to progress. An inclusive approach that attracts engaged neuroscience researchers will increase the Medical College's investigative output so resulting therapies can be achieved faster. With scores of people affected by neurological and psychiatric disorders, there is no time to lose.

In This Issue

continued from page 111

REFERENCES

1. Ahmed SM, Size T, Crouse B, et al. Strong rural communities initiative (SRCI) program: Challenges in promoting healthier lifestyles. *WMJ.* 2011;110(3):118-126.

2. Serrano N, Monden K. The effect of behavioral health consultation on the care of depression by primary care clinicians. *WMJ.* 2011;110(3):113-117.

3. Engel GL. The biopsychosocial model and the education of health professionals. *Ann N Y Acad Sci.* 1978;310:169-187.

4. Yale S, Jones M, Wesbrook SD, Talsness S, Mazza JJ. The emeritus clinical-researcher program. *WMJ.* 2011;110(3):127-131.

5. Austin S, Wolfe BL. The effect of patient reminders and gas station gift cards on patient adherence to testing guidelines for diabetes. *WMJ.* 2011;110(3):132-137.

6. Amin AL, Kong AL. Metastatic neuroendocrine tumor found on screening mammogram. *WMJ.* 2011;110(3):140-143.

7. Gimenez L, Zacharisen M. Severe pepper allergy in a young child. *WMJ.* 2011;110(3):138-1390.

WISCONSIN VEIN CENTER—a division of Premier Surgical of WI, SC **Seeking General/Vascular Surgeon/Phlebologist.** Total office-based care. Wide regional coverage. Prefer Duplex Ultrasound, Endovascular experience. Will train. **Tired of hospital rounds, night calls? Join us!** Terry Gueldner, MD, FACS, RPhS, Member: ACP, AVF, Vein Affiliates. 940 Maritime Dr, **Manitowoc**, WI 54220, 920.686.7900

PROFESSIONAL OFFICE SPACE TO LEASE—up to 6000 sq. ft., lower level, near Watertown Hospital, 920.285.1189

PHYSICIAN NEEDED

Family Physician and a Physician assistant with interest in Pediatrics to join a group practice in Milwaukee, Wisconsin. Competitive salary and benefits. Send CV to: Shafimd1@yahoo.com

Advertise in *WMJ*— Call Heidi Koch, Slack Attack Communications, 5113 Monona Dr, PO Box 6096, Madison, WI 53716; phone 608.222.7630; fax 608.222.0262; e-mail heidi@slackattack.com.

Index to Advertisers

John Hancock Life Insurance Company (U.S.A.)
(John Hancock)

A proactive step to help secure your future

Now is the time to apply for long-term care (LTC) insurance from John Hancock at a 5% discount

You are never too young to start planning for the future, because the need for long-term care services can happen at any time due to an accident or illness. You want to be sure that if the need ever arises, you have a plan in place that can help protect your assets, allow you to remain independent, and enable you to get the care you need, in the setting you desire.

Apply today and receive:

- A 5% discount on an LTC insurance policy for you and your eligible family members
- An important benefit that offers comprehensive coverage in various settings
- LTC insurance backed by the financial strength of John Hancock, a leader in LTC insurance

To learn more about how to obtain this LTC insurance benefit, please contact: Wisconsin Medical Society Insurance Services at 1-866-442-3810

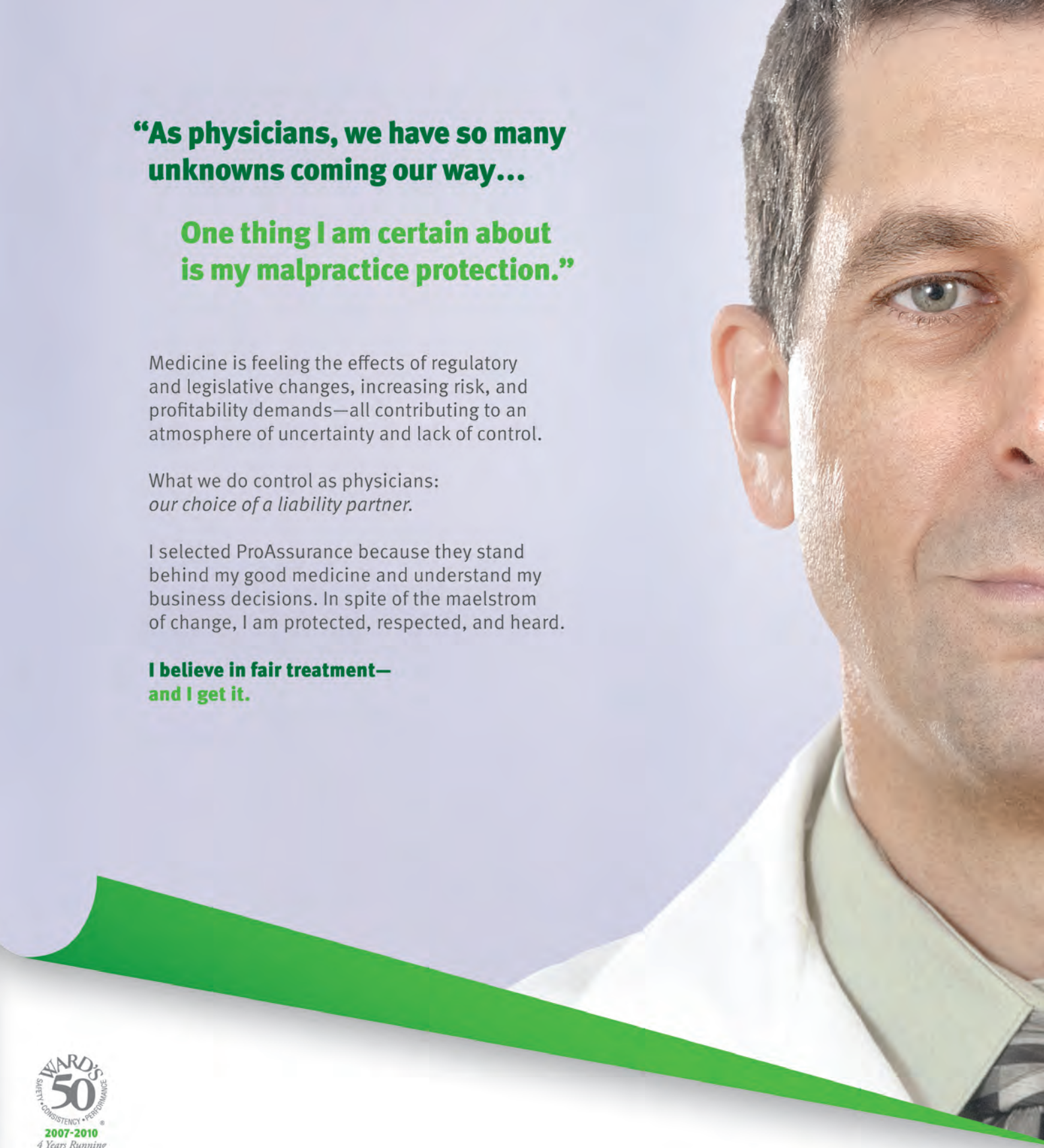
Wisconsin Medical Society
Insurance & Financial Services, Inc.

John Hancock

This is an insurance solicitation. An insurance agent may contact you.
Long-term care insurance is underwritten by John Hancock Life Insurance Company (U.S.A.), Boston, MA 02117.
LTC-6365WI 1/10

Policy Form: LTC-03 WI, LTC-06 WI

Long-Term Care Insurance



"As physicians, we have so many unknowns coming our way...

One thing I am certain about is my malpractice protection."

Medicine is feeling the effects of regulatory and legislative changes, increasing risk, and profitability demands—all contributing to an atmosphere of uncertainty and lack of control.

What we do control as physicians:
our choice of a liability partner.

I selected ProAssurance because they stand behind my good medicine and understand my business decisions. In spite of the maelstrom of change, I am protected, respected, and heard.

I believe in fair treatment—
and I get it.

WARD'S 50 SAFETY • CONSISTENCY • PERFORMANCE
2007-2010
4 Years Running

PROASSURANCE®
Treated Fairly

Professional Liability Insurance & Risk Management Services

ProAssurance Wisconsin is rated **A- (Excellent)** by A.M. Best.
For individual company ratings, visit **www.ProAssurance.com** • 800.279.8331

Proudly Endorsed by

Wisconsin Medical Society
Insurance & Financial Services, Inc.