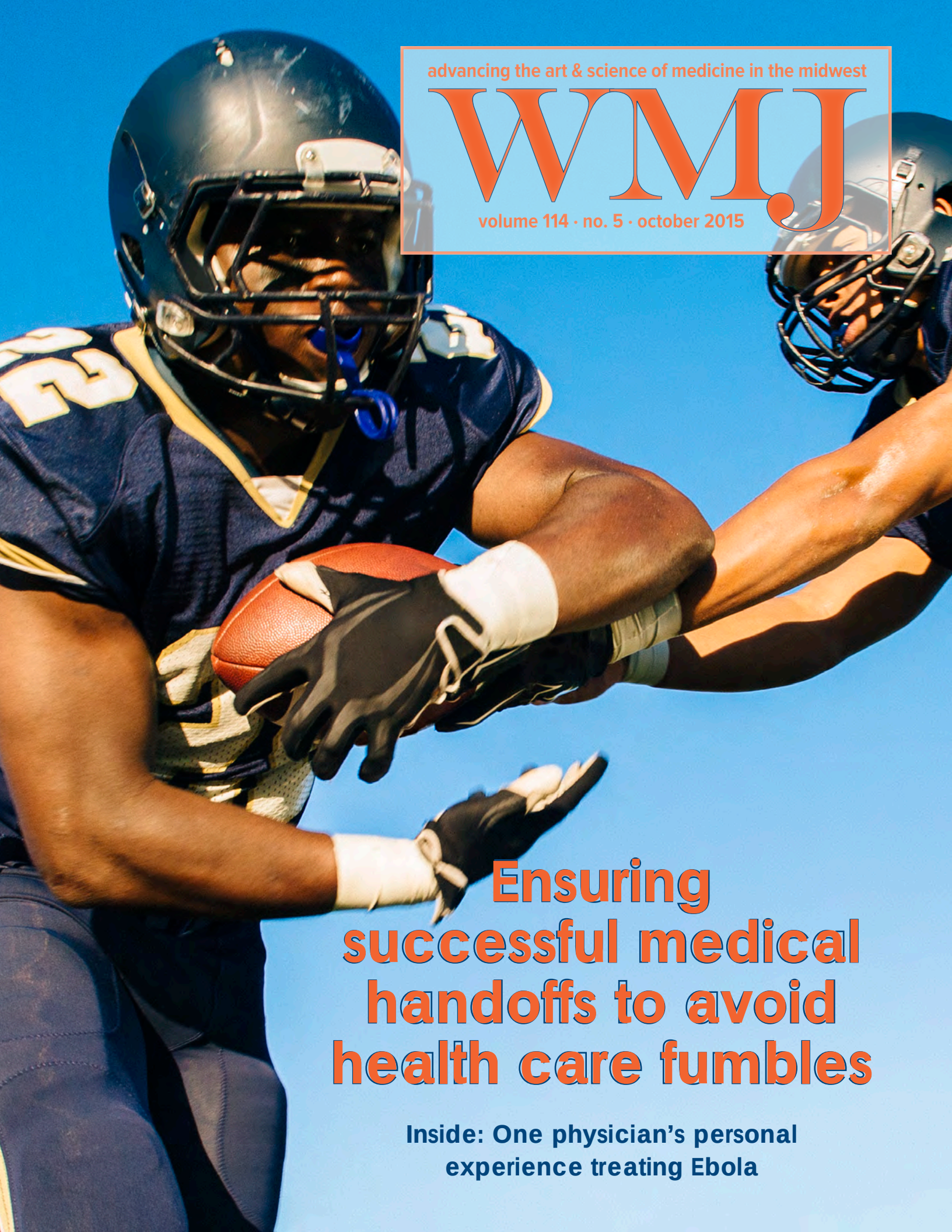




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WMIJ

volume 114 • no. 5 • october 2015

Ensuring successful medical handoffs to avoid health care fumbles

Inside: One physician's personal
experience treating Ebola



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COVER THEME

Ensuring successful medical handoffs to avoid health care fumbles

In football, miscommunication or misinformation can lead to a fumble on the field. In health care, the potential consequences of mismanaged handoffs are much more severe. A report in this issue of *WMJ* focuses on hospital discharges and the education needed to ensure safe handoffs occur.

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.

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Wisconsin Marches On

Amy Louise Hunter, MD, Bureau of Maternal and Child Health, State Board of Health Madison

Editor's note: The following article was originally published in WMJ, Volume 39, No. 11, p.944, November 1940

PROGRESS always brings a sense of satisfaction. Every doctor in Wisconsin can look with pride at the advances made in the last few years in the reduction of maternal and infant deaths within the state. Total annual maternal deaths dropped from 225 in 1932, to 153 in 1939. Total infant deaths were reduced from 2,670 to 2,172. These lower total deaths have occurred even though there has been an increase in births. Actually, our change in maternal death rate has been from 4.2 to 2.8 per 1,000 live births—a drop of 33 percent—while the infant death rate dropped from 50.0 to 40.1 or 20 percent for the state as a whole from 1932 to 1939.

Since many doctors have a very real interest in the problems of maternal and infant deaths, we are presenting for comparison the rates by counties for two three-year periods. It will be noted that the averages for individual counties are compared on the basis of three-year periods rather than on single years. This is done to eliminate the probable error involved when statistics of this type are based on too low figures. Even on this basis, a few of the counties in the state have less than 750 births in the three-year period, so that the statistics shown for Adams, Burnett, Florence, Green Lake, Iron, Marquette, Pepin, and Sawyer counties are somewhat less significant than those for counties with more births, since a single birth or death rate tends to increase the rates markedly. Check your county and see where it stands.

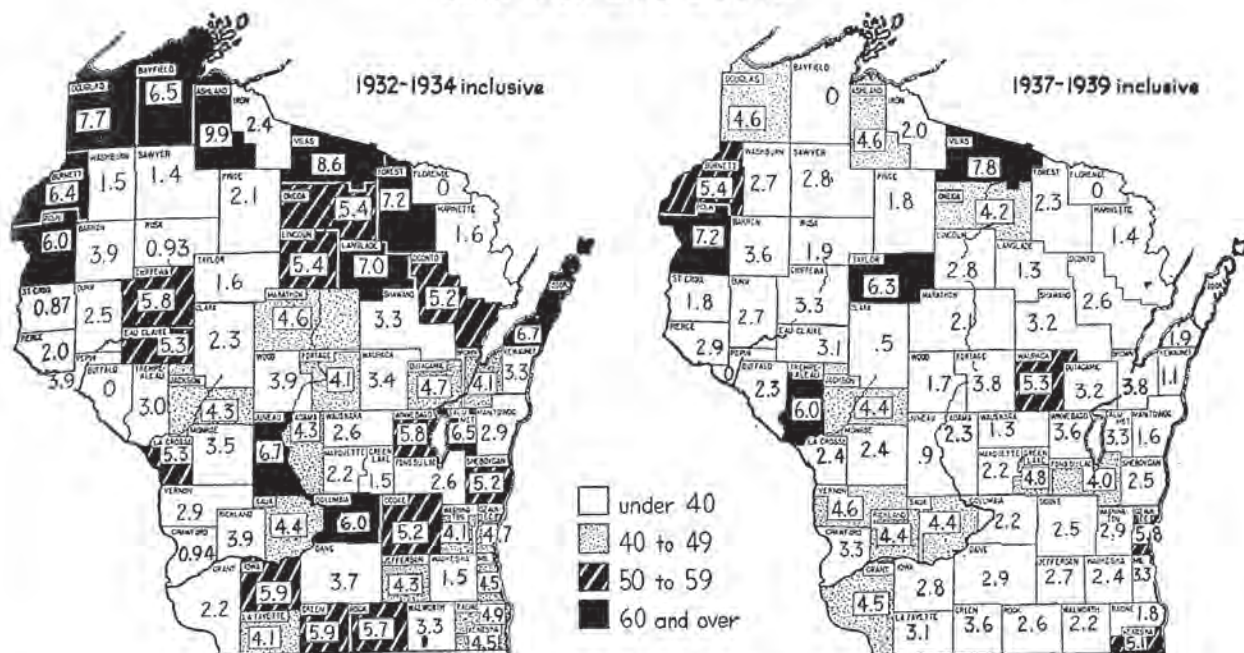
The program for further reducing maternal and infant deaths is that of every practicing physician. There is something that each can do whether or not he specializes in obstetrics or pediatrics. There is, for instance, the important need of re-educating the public to understand that pain relief is not quite as simple as certain articles which have appeared in recent years in the lay press would have us believe. Too often now individuals make their own decisions as to the type of treatment they should receive, basing it on popular magazine articles. We need to combat the release of misinformation which now appears. The physician should also do everything in his power to see that any hospital with which he is associated meets standards; that the nurses in the hospital have adequate supervision and that techniques are rigidly maintained. Nurses with upper respiratory infections should not be allowed to continue their duties. More careful and complete filling out of all birth and death certificates would aid in analyzing problems. Consideration at staff meetings of every maternal or infant

death occurring in the hospital would bring to light much information that might lead to further reduction of deaths. We need to know more about the increasing number of maternal deaths associated with embolism and with hemorrhage. Requirement of consultation prior to all operative procedures on obstetrical cases would merit consideration. Doctors can encourage routine supervision of the pregnant woman from the time of conception, and routine health supervision of the baby after birth, beginning with a detailed appraisal of the newborn. Parents need to be repeatedly encouraged to have preventive procedures carried out routinely in the doctor's office.

Local public health nurses can offer real assistance if prenatal cases are routinely referred to them. These nurses can be especially helpful to the physicians who are doing home deliveries by teaching preparation for such deliveries in advance, and in the postnatal demonstration of caring for the newborn baby. Careful nursing supervision is especially important for the premature baby, and the public health nurse can offer real assistance to the physician who delivers a premature baby in the home. Also, through the local nurse, an incubator for home use where necessary can usually be obtained. This care of premature babies is important for they still account for the largest number of infant deaths—36.6 percent of the 2,172 infant deaths occurring in Wisconsin in 1939. It is interesting to note that this is approximately 8 percent higher than the figure for the United States for 1938. Do we have a higher proportion of premature babies in Wisconsin? Can more of these babies be saved? We need the assistance of every physician in answering these questions.

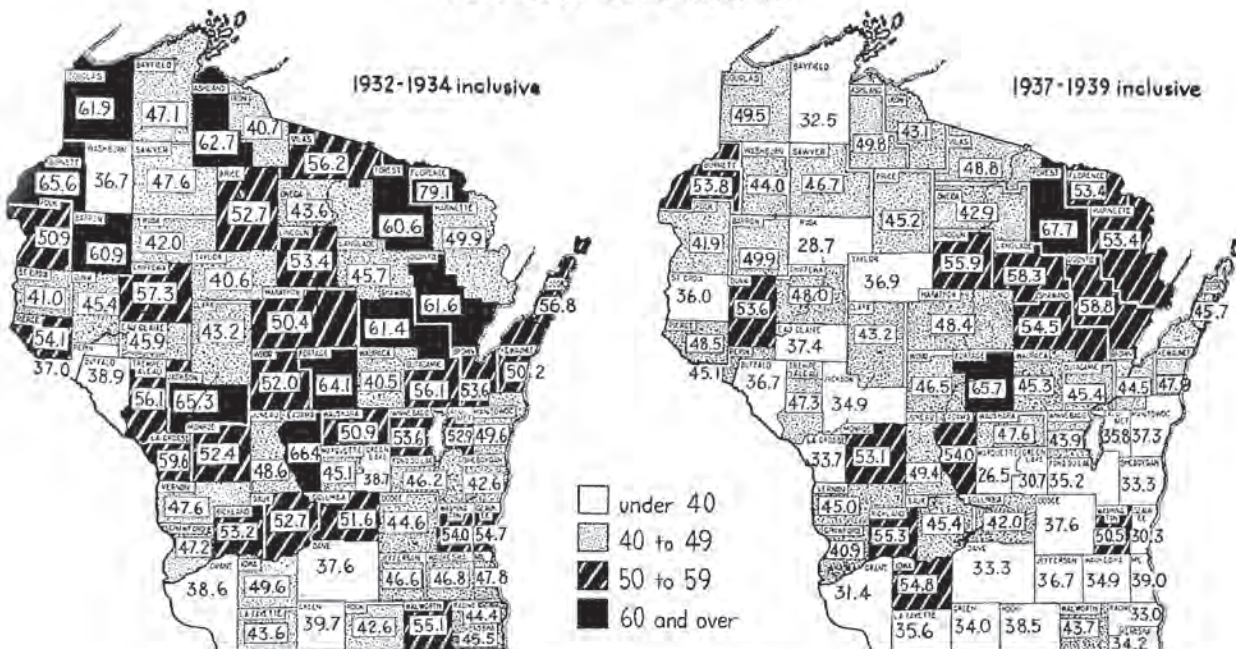
Wisconsin is fortunate in being spared some of the problems of other states. More than 99 percent of the deliveries are by physicians. Standards of living in Wisconsin are definitely above many states. We do not have racial problems. Sixty-three of the seventy-one counties have locally organized and directed health programs with local physicians participating in program planning. With the great corps of well trained physicians and the educational and institutional facilities available, Wisconsin should lead the nation in low infant and maternal deaths. Will you help to place Wisconsin in this position by the end of the next three-year period? The State Department of Health can aid every physician through analysis of data available, and through educational programs, but the real responsibility for life conservation rests largely in the hands of the practicing physician.

WISCONSIN MATERNAL MORTALITY RATES PER 1,000 LIVE BIRTHS



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WISCONSIN INFANT MORTALITY RATES PER 1,000 LIVE BIRTHS



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Responding to the 2014 West African Ebola Outbreak From Wisconsin

Vijay Aswani, MD, PhD

The 2014 West Africa Ebola epidemic was the largest in history. As of July 22, 2015, Wisconsin had monitored 170 travelers from countries in which Ebola was circulating. Of those, only 5 (including this author) were health care providers. The rest traveled for a variety of reasons—business, school, mission trips, as non-governmental organization (NGO) workers, and simply to visit family.¹ Coincidentally, all 5 of the health care providers from the state—1 physician, 1 physician assistant/midwife, and 3 nurses—served as short-term clinicians with Partners In Health in their Ebola response.²

A Personal Journey

When I first heard of the Ebola outbreak in West Africa, I began looking for ways to go. I felt that I could help care for patients and be of service. I was moved to go for several reasons: I grew up in West Africa—I was born in Nigeria and lived in Monrovia, Liberia until age 10—and I was appalled by the death and fear of Ebola, unexpectedly, even by people in health care. When a building is on fire, most people run out—but firefighters, trained and prepared, go in. I felt that as a physician, I should be going to rather than running away from a disease. By around October 2014, various professional

...

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Vijay Aswani, MD, PhD, dons Personal Protective Equipment (PPE)—except the boots—during World Health Organization (WHO) training in Freetown, Sierra Leone.

societies (American College of Physicians, American Academy of Pediatrics, United States Agency for International Development) had put up links on their websites where one could volunteer.³

Partners in Health (PIH) contacted me regarding an opportunity to work as a short-term clinician in Sierra Leone as part of their Ebola Outbreak Response. PIH paid its short-term clinicians a salary for the period we worked and the 3-week quarantine period that followed. They also provided traveler's insur-

ance and ensured a medical evacuation if we contracted Ebola or anything else for which better treatment could be provided in the United States.

One of the first questions everyone at work asked me when I announced my interest was, "What does your wife think?" My wife is an intelligent, informed woman with a strong sense of social justice. She had volunteered for a year in college to go to Croatia after the war and help relocate refugees. She was very supportive.

My employer was very empathetic and applauded my willingness to go to West Africa and help. However, since it involved a 9-week absence (6 weeks in country with 3 weeks of subsequent quarantine), it was difficult to work out leave for that long. My options were limited, and I resigned my position and hoped to be rehired upon return. (My employer offered me a rehire contract to sign before I left.) In order to have health insurance coverage for my family while I was off work in the States, I paid for COBRA.

After a week of training at PIH headquarters in Boston and a few days additional training by the World Health Organization (WHO) in Freetown, Sierra Leone, I worked for 2 weeks in an Ebola Community Care Center in the Kono district of Sierra Leone and then for the remaining time in an Ebola Treatment Center in Port Loko.

Working in an Ebola Treatment Unit (ETU) was not unlike working in a hospital here: we worked in round-the-clock 8-hour shifts, had sign-outs, and rounded on our patients



Above: The Community Care Center for holding Ebola patients in Kono, Sierra Leone.

Left: The Ebola Treatment Unit in Port Loko, Sierra Leone.

twice each shift. We started the shift with a report from the outgoing team on admissions, deaths, and current status of our patients. Patients were divided into a suspect ward (those with Ebola-like symptoms but not yet tested or whose test results were not back yet) and a confirmed ward (those whose reverse transcription polymerase chain reaction [RT-PCR] results confirmed Ebola virus disease [EVD]). The suspect ward was divided into “dry” and “wet” patients. Wet meant that the patients had vomiting, diarrhea, urine or stool incontinence, and/or bleeding. Before going into the high-risk zone (the areas where patients were), we prepared our medications, gathered supplies, and divvied up the tasks and patients.

The time we could spend in the high-risk zones was limited to anywhere from 45 to 90 minutes depending on the heat index that day. Working in full protective personal equipment (PPE) was exhausting and led to dehydration quite quickly, so vigorous hydration was necessary before and after working in the high-risk zone. Our work in the high-risk zone consisted of administering oral medications (antimalarials, antibiotics, analgesics, and antipyretics) and administering intravenous (IV) fluids (vigorous IV hydration is a main-

stay of EVD that produces shock). Assessing patients was made challenging by the fact that we could not use stethoscopes (since our ears were covered by PPE). Starting IVs also was challenging; finding veins in dehydrated African patients meant relying on feel rather than visual landmarks, and we were wearing 2 to 3 pairs of gloves, a facemask, and a face shield that often fogged up with sweat and humidity from our breath. In some cases, especially with children, we had to use intraosseous lines. Children were often scared and sought to be held, cuddled, and comforted, which was difficult in full PPE during rounds. One flailing child’s hand knocked my face mask off as I tried to hold him.

Patients sometimes died between times when there was a caregiver in the high-risk zone, and we would have to remove the bodies from the wards. Others died while we were providing care. Making the most use of our limited time in PPE with the limited number of caregivers led to some difficult triage situations. We had a debriefing meeting once a week and spent our time away from the ETU either sleeping, getting some exercise, or trying to connect with family back home.

The experience was intense; there was a lot of death and some saves. On our last day, we

visited the Port Loko graveyard where most of the Ebola patients were buried. I was moved by the sight of the graves of children and young people there. To me there is no greater reason to invest in research on Ebola or to respond to the epidemic with all we can.

I came back to the United States in early March. After going through immigration at Newark,⁴ I was walked back to an office where representatives of the Centers for Disease Control and Prevention (CDC) and the US Public Health Service screened me for Ebola with a temperature check and a symptoms checklist. I was given an Ebola Care Kit, which included sheets to record my temperature and symptoms for the next 21 days, a prepaid cell-phone, and information on the monitoring program. I was monitored through the Marathon County Public Health Department, whose staff was polite, pleasant, and very respectful of my privacy. They thanked me for my service, and acquainted me with the details of the home quarantine and monitoring program. In the mornings, I connected with them via a secure iPad video application to take my temperature and show them the reading. In the evenings, I was contacted by phone and reported my temperature and any symptoms I did or did not have. I was asked to limit my movements



Graves in the Port Loko Ebola Graveyard.

and keep a roster of anyone who visited the home.

I returned to work as a physician on March 23, 2015, after being cleared by the public health department. I was grateful for the quarantine period in one sense: it gave me time to process some of what I had experienced. Patients and colleagues asked about my experience and I would find myself tearing up when talking about some of what I saw and lived through. I presented a grand rounds at my institution on May 29, 2015 to inform and educate while sharing my personal experience with Ebola.⁵ Response to my having worked with Ebola in West Africa was unanimously one of gratitude and some admiration.

I would encourage more health care providers to respond! Doing so will build expertise dealing with Ebola and other tropical diseases through the clinical exposure to cases in the course of the work, which will be useful when they return.

I had to resign my position to take on the work of being a short-term clinician, which involved some financial loss and upheaval in my job. I missed being away from my family for 6 weeks and then being in quarantine for 3 more weeks. However, I had the adventure of a lifetime and learned lessons in medicine, ethics, public health, and life that I do not think I could have learned elsewhere. I would certainly do it again.

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Avoiding Fumbles and Understanding Populations

John J. Frey III, MD, Medical Editor

It seems right to be talking about handoffs in the midst of football season. Anyone who has family who have encountered the health system in the past decade likely has a story of miscommunication, misinformation or simply poor care that is, at the least, aggravating and, in some cases, life threatening. The press also is full of stories of fumbles from badly managed medical handoffs.

In the simpler days of 30 years ago, the handoff consisted of a phone call to a specific doctor—who the referring physician generally knew well—asking either his or her opinion about management or referring the patient for a consultation. The referring doctor told the consultant the “story” and followed with a letter about the patient. In turn, the referring doctor often got a call back with the consultant’s opinion or ideas and a letter followed. Doctor to doctor, in person. The hospital was easier, since we cared for patients in the hospital and arranged the discharges ourselves. In recent years, many generalist groups created a weekly hospital rotation for their clinic, so they made the hand-off in person to partners. Hospitals, even for those who spent little time with inpatient care, were places that helped create social networks among clinicians. Breakfast in the doctor’s dining room of the city hospital where I worked was where the practicing doctors broke the new people in and where we listened to lots of cases being talked about. It was the best continuing medical education (CME) I ever had. Those informal social spaces have been replaced, for the most part, by functional 7 AM meetings about tasks and administrative chores. Personal connections are being lost.

In large health systems like those in Wisconsin, the simplicity of past handoffs has come unglued to the point where their number,

internally and externally, can be truly staggering. They involve primary care clinicians and their advanced practice clinicians; emergency department physicians; admitting hospitalists; consultants in the hospital—each with an opinion—and advanced practice clinicians, fellows

In this issue of *WMJ* the very important article by Carnahan and Fletcher² describes a high level of confidence of internal medicine house officers expressed in their discharge planning skills, while questions about specific skills challenge whether that confidence might

“House staff also identified communication with primary care providers, especially via discharge summaries, to be of great importance in the transition of care from hospital to home. Interestingly, many house staff did not believe that discharge summaries were usually available for primary care providers at the time of hospital follow-up.”

and residents in tow; discharge planners, and then, if things work well, back to the primary care clinician with an accurate summary of care and communication about plans and goals that have been worked out between the hospitals and the community-based generalists. We all know there are far too many opportunities to fumble things during a hospitalization, and reliance on the EHR to solve the problems is misinformed, at best. Technology is more about documentation than communication and the fragmenting of care continues unabated today. The next generation of physicians who come from a culture whose overall communication skills may be subverted by the ubiquitous cell phones they glance at continuously will have to work harder than we did without those distractions.¹

be misplaced. The house staffs admit to little formal education about handoffs during their training and rely on rounds and other informal methods to learn. One particularly chilling comment from the discussion is “house staff also identified communication with primary care providers, especially via discharge summaries, to be of great importance in the transition of care from hospital to home. Interestingly, many house staff did not believe that discharge summaries were usually available for primary care providers at the time of hospital follow-up.” The unexpressed question in this statement is whose responsibility is it to see that failure never happens? Seeing a “hospital follow-up” on one’s schedule for the day, with no idea what happened or what is expected during the visit is more the rule for my family medicine

colleagues than the exception. A phone call from the hospital consultant to a patient's primary physician saying "here is what went on, here is the plan for ongoing care, and here is what you could do to help" is essential to a completed handoff.

My favorite story about this scenario comes from my first job in Worcester, Massachusetts in the 1970s, when a senior resident in family medicine came to see me with an amazed look on her face, saying that the chair of pediatric surgery at the Mass General had just called her personally. He thanked her for her referral, reinforced that her diagnosis of a patent urachus was correct, reported that the patient's surgery went well as anticipated and that he wanted the resident to talk with the family at follow-up to reassure them about the child's future well-being and that a letter would follow. The call took less than 3 minutes and established a referral pattern from that resident for the rest of her clinical career. Some today might feel a text or e-mail might suffice, but I don't think so. Getting a thank you call from Hardy Hendren was still one of the most important events in my colleague's life 40 years later. Technology will never replace simple courtesy.

Communication

On the topic of communication, the article by Olejniczak and colleagues³ reinforces the challenges of communicating effectively with adolescents who need to have confidence and trust to talk about difficult things, like family and personal struggles. The authors describe a statewide program to improve clinicians' skills in talking with adolescents and to increase the comfort of adolescents in talking with clinicians. The program showed real progress in both groups and the involvement of teens as educators for clinicians was an added benefit for the program.

The Value of Looking at Populations

This issue also contains a number of articles on populations in the region and set the stage for how clinical systems might approach risk and prevention. Fortunately, maternal mortality is a rare event and the overall state rate remains substantially lower than national averages. But,

as Schellpfeffer and colleagues⁴ report, the disparity between African American mothers and all other races and ethnicities remains and, following on past studies, has not made progress. Their study reports data from the Wisconsin Maternal Mortality Review team, which goes into detail about reviewing circumstances and management of deaths. Morbidity review is the traditional way medicine tries to understand causes and avoid future tragedies. But the data also reveal the extent to which social determinants of health like education, family structure, and poverty add to risk. There are certainly clinical issues that should be attended to, but the majority of the factors lie outside the hospital and require community solutions of which health professionals should be a part.

What is particularly amazing in this issue is the "Looking Back" piece from Dr Amy Louise Hunter from the 1940 *Wisconsin Medical Journal*,⁵ which discusses the situation with maternal and infant mortality in the state. While reporting systems and definitions may differ from 1939 to now, the disparities at that time were more rural than urban and the correlations with poverty and lack of access to care resonate with the findings of Schellpfeffer et al 75 years later.

Peterson and colleagues⁶ report from the state cancer registry on the widely discussed phenomenon of increased incidence of malignant melanomas, with the good news that survival has increased in the state, which is in contrast to decreased survival nationally. This article would serve as an excellent discussion paper for physicians in training and students since it raises questions about targeting populations for prevention (mortality in men went up while women went down), or the value and methods of education about risk in targeted younger sun-exposed populations, or might enter the debate about whether the increase is due to an increased awareness, but may not affect patient outcomes.

Thao and colleagues⁷ chronicle the high prevalence of diabetes in the Hmong population in the state, which is even more dramatic since the Hmong came from a region in Asia with a low prevalence of diabetes. Their work also shows the unhelpfulness of EHRs in identi-

fying at-risk subpopulations, since Thao had to devise search strategies based on last names to identify Hmong patients in the clinical dataset. As the number of immigrants and refugees rises dramatically in the United States, lumping populations under very broad umbrellas such as Hispanic or Asian or African will not help identify at-risk groups and possibly be blurred by lumping rather than splitting. We can't do a good job with populations unless the available tools help us.

Finally, Gupta and colleagues⁸ report on a rare case of a twin molar/fetal pregnancy and how the use of early ultrasound aided the clinicians in the management of a difficult situation that enabled the family to be involved early enough to help them find options under trying and potentially dangerous circumstances.

This issue also includes the moving personal story by Vijay Aswani, MD, PhD,⁹ of his service to West Africa during the recent Ebola virus epidemic. Doctor Aswani's story is helpful for understanding how the desire to run toward the burning building, as he says it, has implications at home and for institutions that many of us may not consider when thinking about helping out in a crisis.

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Discharge Education for Residents: A Study of Trainee Preparedness for Hospital Discharge

Jennifer L. Carnahan, MD, MPH; Kathlyn E. Fletcher, MD, MA

ABSTRACT

Background: Safe hospital discharges have become a major focus in the national discussion on transitions of care and care coordination. Education on the hospital discharge process is evolving as the needs of trainees are better understood.

Purpose: This study is a cross-sectional survey of residents in a Midwestern residency program about their confidence in safely discharging patients from the hospital, including how they have or have not learned to do so.

Methods: An anonymous paper questionnaire was distributed to a convenience sample of interns and residents at a weekly meeting of the residency program.

Results: Most residents reported a general confidence in their abilities to safely discharge patients from the hospital; however, further probing revealed that their confidence breaks down when required to competently perform specific tasks of the discharge process such as activity restrictions or facilitation of home care. More than 50% of house staff surveyed responded that their education in many specific aspects of the discharge process are lacking.

Conclusion: Interdisciplinary care education, and the discharge summary in particular, warrant further scrutiny as a care transition tool and means of teaching safe hospital discharge to trainees. We present a questionnaire that may serve useful as an anonymous tool to gauge residents' educational needs.

INTRODUCTION

Discharge from the hospital is a precarious time for patients because of the potential for errors in their post-hospitalization care. By some estimates, 1 in 5 patients discharged from the hos-

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pital to home experiences at least 1 adverse event.¹ Some of the most common post-discharge adverse events that patients face include medication errors, recurrence of symptoms, and readmission to the hospital.²⁻⁴

Hospital readmission rates improved only slightly in 2012 with the advent of mandated readmission penalties.⁵ Given the high risk of adverse events at the time of hospital discharge, it is unsurprising that national 30-day readmission rates persistently hover around one-fifth of hospital discharges. Without systematic changes to discharge practices and transitional care training for young physicians, further improvements in readmission rates will be difficult to achieve. Attempts to reduce 30-day hospital readmissions are focused largely on increased post-hospitalization care coordination.⁶⁻⁹ Concurrently, there has been an increased interest in interdis-

disciplinary care.^{7,8,10,11} Transitions of care, teamwork, and interdisciplinary collaboration are areas of focus in the Accreditation Council for Graduate Medical Education's (ACGME) Next Accreditation System (NAS) and Clinical Learning Environment Review (CLER) and are fundamental to improving patient care quality and safety at academic medical centers. Efforts at teaching these skills are actively evolving, making it an opportune time to focus on improving education on hospital discharges.¹²⁻¹⁴

Most residency programs report little formal instruction in discharge planning.^{15,16} Where there is a need for a formal curriculum in discharge planning, much is left to the informal curriculum. This results in a patchwork education for residents that varies depending on the staff with whom they work, patient census, patient comorbidities, and established local practices regarding hospital discharge.¹⁶ During residency training there is ample opportunity to actively teach about the discharge process. At least one study found that implementing house staff education on

Figure 1. Sample Questions and Likert Scales

Please choose the best answer for each question

	Strongly Disagree	Disagree	Agree	Strongly Agree
I am confident in my discharge plan when discharging patients from the hospital.	1	2	3	4

Please rate how confident you feel in ordering or identifying the following at patient discharge...

	Not at all	A little	Moderately	Completely
Dietary Restrictions	1	2	3	4

For the full questionnaire please see Appendix online: https://www.wisconsinmedicalsociety.org/_WMS/publications/wmj/pdf/114/5/carnahan_114no5_appendix.pdf.

discharge summaries resulted in improved organization, readability, consistency, and inclusion of elements required by the Joint Commission on the Accreditation of Hospital Organizations (JCAHO).¹⁷

In the current study, we sought to: (1) assess residents' confidence in discharge planning, and (2) better understand the educational milieu within which residents learn about discharging patients from the hospital. Our objective was to lay the groundwork for future discharge planning education.

METHODS

We conducted an anonymous, cross-sectional survey of internal medicine house staff at a large Midwestern residency program. In this program, the house staff rotate at 3 different hospitals. Interns have approximately 7 inpatient ward rotations during the year. Second- and third-year residents have 5 to 6 inpatient ward rotations per year. We intentionally distributed the questionnaire in December so that all of the respondents would have had some experience discharging patients from the hospital when they completed the questionnaire. Institutional Review Board approval was obtained prior to distributing this questionnaire.

At the time of the study, there were 132 house staff in the program, 46 of whom were interns. All internal medicine house staff were eligible, including preliminary year interns.

A 37-question questionnaire was developed after an extensive literature search. The questions were derived from reports in the literature on key elements of a safe discharge, areas that may be lacking in discharge education, including education on documentation, and factors that contribute to adverse post-hospitalization

outcomes such as readmissions.^{2,4,8,14,18,19} We asked about respondent demographics, confidence in performing various aspects of discharge planning, general approach to discharge planning, and education received about discharge planning. The format was mixed with open-ended, yes/no, and multiple choice questions. Two sample questions with Likert scales are shown in Figure 1. The full questionnaire appears in the Appendix online https://www.wisconsinmedicalsociety.org/_WMS/publications/wmj/pdf/114/5/carnahan_114no5_appendix.pdf. A paper copy of the questionnaire was distributed at a regularly scheduled house staff meeting during a 10 to 15 minute time period allotted for its completion.

RESULTS

There was a 75% response rate (n=62) of the 82 house staff who attended the meet-

ing during which the questionnaire was distributed. There were 132 house staff in the program, thus 47% of total house staff completed the questionnaire. Women comprised 63% of respondents and 37% were men. Senior residents were 53% of respondents and 47% were interns. The mean age of respondents was 28.3 years old.

Most house staff (93.5%) agreed that they were moderately to completely confident in their discharge plan when discharging patients from the hospital, with 23% reporting being completely confident in their discharge plans. Three of the four house staff who admitted they were not confident in their discharge plan were interns.

When queried about specific aspects of the discharge process, the house staff responses indicated areas of greater and lesser confidence (Figure 2). House staff were most confident when ordering discharge medications, with 53% being completely confident; one-third of those were interns, which was just over one-third of the total intern respondents. Less than half of the total house staff (42%) were completely confident in educating their patients about danger signs that would necessitate a trip to an emergency department or readmission to the hospital. Roughly one-fourth of the intern respondents were completely confident in their ability to appropriately warn patients about danger signs. Only 40% of respondents were completely confident in ordering post-hospitalization dietary restrictions. Forty-five percent of residents were completely confident, while only 34% of interns were completely confident.

Close to 28% of interns were completely confident in ordering fluid restrictions and 40% of senior residents were completely con-

fidient in fluid restriction orders. Combining intern and resident responses results in approximately a third (34%) of the total cohort who were completely confident when ordering fluid restrictions. Internal medicine house staff were least confident in ordering activity restrictions at discharge (24% completely confident). A quarter of intern respondents and a quarter of resident respondents reported being completely confident in ordering discharge activities.

When asked about their experience with formal education in 9 key aspects of the discharge process, 63% of house staff reported no formal instruction in any of the 9 areas (Figure 3). Most respondents reported that the discharge plan was reviewed with them at least once during internship, with 98% reporting this occurring at least half of the time. Thirty-nine percent reported that a resident, fellow, or attending physician never reviewed a discharge summary with them during their intern year.

At the end of the questionnaire, house staff were asked to list any aspects of the discharge process for which they would like to have more education. More than 50% of respondents reported wanting more instruction on specific aspects of the discharge process: 16% requested more information on home health care options, 16% on activity restrictions, 10% on diet restrictions, and 6% on fluid restrictions. Of those who wanted more instruction, a little more than half were interns and comprised 56% of the total intern cohort of respondents. One respondent said in general regarding the discharge process, “I feel like it has been a lot of guess work that I have gotten a little better at with practice.”

When questioned on the means by which a primary care provider learns of a patient’s hospital course, 93% reported that they believed it was via the discharge summary. However, less than three-quarters of house staff (74%) believed that primary care providers have access to their patients’ discharge summaries prior to a post-hospitalization follow-up appointment. Four of the 62 respondents identified the patient as the primary care provider’s main source of information about their recent hospitalization. Free text responses revealed frustration regarding communicating with patients’ primary care providers and with arranging follow-up appointments for 6 of the 62 respondents.

Figure 2. House Staff Confidence in Specific Aspects of Discharge Planning

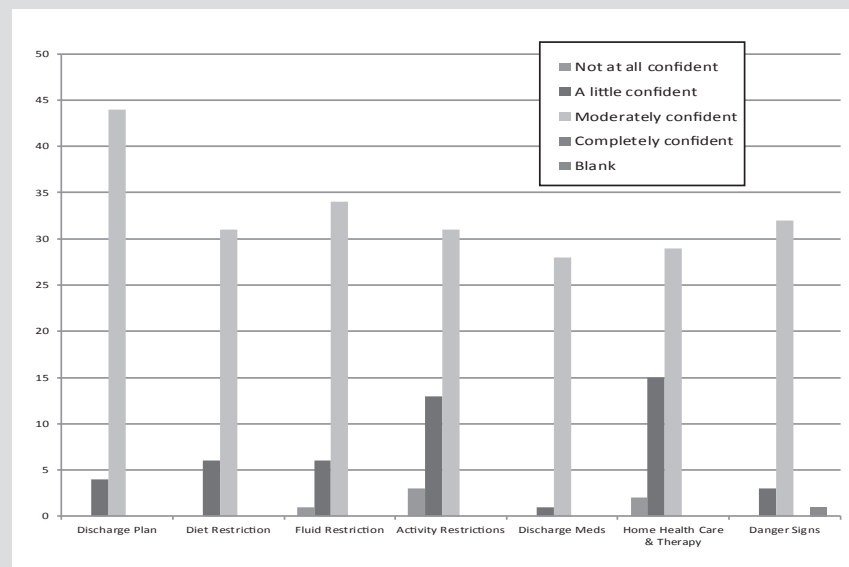
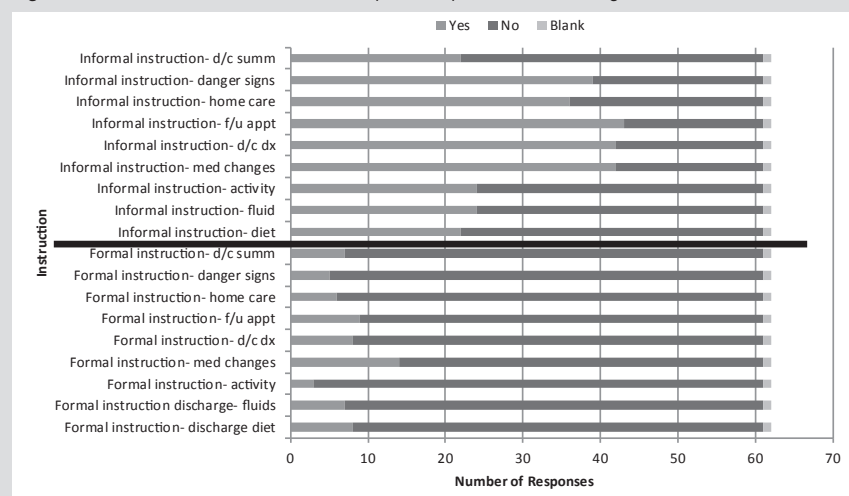


Figure 3. Formal and Informal Instruction in Specific Aspects of the Discharge Process



DISCUSSION

Overall, internal medicine house staff reported high levels of confidence in the discharge plans for their inpatients. However, when queried on more specific aspects of discharge planning, they revealed variable levels of confidence. Their greatest level of confidence in a specific aspect of the discharge process was in regard to ordering discharge medications, yet health services researchers have found evidence of inadequate discharge medication reconciliation in numerous studies.^{2,20,21} While the house staff confidence may indicate that the message about the need for improved medication reconciliation has infiltrated residency training, it also may reveal false confidence on the part of the trainees. Certainly one area for future investigation is physician

confidence in discharge medication reconciliation and how that relates to medication errors.

Respondents also reported that the informal education that they do receive is inconsistent and nonstandardized, which indicates a need for more formal instruction on executing safe hospital discharge. This need has been identified as a gap elsewhere in medical education literature, however, there are few resources available for instructing house staff in effective hospital discharge.²²

House staff also identified communication with primary care providers, especially via discharge summaries, to be of great importance in the transition of care from hospital to home. Interestingly, many house staff did not believe that discharge summaries were usually available for primary care providers at the time of hospital follow-up. This disconnect may be an important barrier to making sustained changes in the quality of the discharge summary. Prior work suggests that improved instruction on discharge summaries is one of the key ways that house staff can learn to foster an appreciation for their role in the larger medical care system.¹⁷ Our data suggests that the respondents not only perceive a lack of formal training from supervising physicians on how to write discharge summaries, but they also may not believe that the discharge summaries are useful at the point of care. They view discharge summaries as a potential vehicle for providing minimal information to primary care providers, but not as essential for post-hospital care. Both the lack of discharge summary authorship training and utility of the discharge summary should be addressed by education designed to improve discharge quality.

Trainees want to have a better understanding of patients' home environment needs and challenges. Home health and activity restrictions at discharge were the two areas residents identified in an open-ended question on aspects of the discharge process for which they desired more education. Knowledge of how to designate appropriate post-hospital health restrictions can be gained by more strategic involvement of the interdisciplinary team such as dietitians and physical therapists. These disciplines may contribute directly to house staff education through case conferences. As part of our residency program's efforts to comply with NAS and CLER mandates, we have increased interdisciplinary team member participation in existing educational forums such as the noon report. The focus of these educational sessions is often on hospital discharge practices by disciplines, including physical and occupational therapy, nutrition, and social work. Residents' discharge care plans benefit from what they learn during these sessions on how to assess patients' abilities to manage at home.

This study has limitations. One is that it represents a single residency training program. Another limitation is that the questionnaires relied on self-report, which may have contributed to house staff under- or overestimating their ability to safely discharge hospitalized patients. Furthermore, house staff earlier in

their training may not yet have received some of the program's education on discharge practices. In all of the specific aspects of the discharge process except for activity restrictions, interns were consistently less confident about their abilities than residents. Interns' responses to the questionnaire may reflect their medical school education more than their residency training. To mitigate this potential effect, we did administer the questionnaire approximately half-way through the academic year. This timing still may have been too early in the academic year and proximate to medical school to reflect the effects of residency training. A benefit of this study is that it directly queries house staff about their perceived educational needs rather than conjecturing what their needs are or continuing to relegate these issues to the hidden curriculum.

CONCLUSION

This study is positioned within the current state of the literature on what is known about hospital discharge. Our study is unique in that it uses both qualitative and quantitative data to describe the perspectives of physicians in training and provides their anonymous concerns about these practices. Interns are less confident than residents, but ultimately, both types of trainees described gaps in their education on safe discharges. To truly change the way we practice medicine and ensure safer patient discharges from the hospital, we need to train future physicians better in these skills.

Internal medicine residency programs should enhance their curricula with more thoughtful and explicit instruction on safe patient care transitions, especially with regard to the hospital discharge process. This represents an excellent opportunity to highlight the importance and contribution of the interdisciplinary team to ensure safe patient care. Additionally, increased education on patients' social and functional context outside of the hospital, and how that affects their health will improve residents' patient discharge outcomes. For programs that are contemplating the implementation of care transitions education, our questionnaire could be used as a needs assessment and monitoring tool for this component of the curriculum.

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The Prevalence of Type 2 Diabetes Mellitus in a Wisconsin Hmong Patient Population

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ABSTRACT

Purpose: Wisconsin's largest Asian population, the Hmong, may be at high risk for type 2 diabetes. However, there are few population-based studies investigating the prevalence of diabetes in this population. This study compared the prevalence of diabetes between Hmong and non-Hispanic white patients of the University of Wisconsin departments of family medicine, pediatrics, and internal medicine clinics.

Methods: The study utilized data from the University of Wisconsin Electronic Health Record Public Health Information Exchange (UW eHealth – PHINEX). The proportion of Hmong patients diagnosed with diabetes was compared with the prevalence of diabetes in non-Hispanic white patients. Multivariate logistic regression was used to control for the differences in age, sex, body mass index (BMI), and health insurance between the two populations.

Results: The total prevalence of diabetes in the Hmong patient population was 11.3% compared to 6.0% in the non-Hispanic white patient population ($P < 0.001$). The prevalence of diabetes in Hmong adult patients was 19.1% compared to 7.8% in white adult patients ($P < 0.001$). Compared with non-Hispanic whites, the odds ratio (95% CI) for diabetes, adjusted for age, sex, BMI, and insurance was 3.3 (2.6–4.1) for Hmong patients.

Conclusion: Despite being one of Wisconsin's newest immigrant populations, who came from an area of the world with low rates of diabetes, the adjusted relative odds of diabetes in this clinic sample of Hmong patients is 3.3 times higher than its non-Hispanic white counterpart. The results support previous findings of significantly increased diabetes risk in the Hmong of Wisconsin.

INTRODUCTION

The Hmong people are one of the most recent immigrant groups to arrive in Wisconsin. More than half of the population was born outside the United States in countries such as Laos, Thailand, and Vietnam. The majority of the Hmong entered the

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United States in the 1980s and 1990s after the Vietnam War.¹ During this conflict, the Hmong supported US military operations in Laos. After the takeover of Laos by communist factions, hundreds of thousands of Hmong fled the country seeking safe haven in Thailand.² From Thailand, the Hmong resettled in the countries such as the United States, France, and Australia.²

According to the University of Wisconsin Extension Applied Population Laboratory report on the Hmong people of Wisconsin, the Wisconsin Hmong population numbered 33,791 in 2000. The 2010 US Census noted a population of 49,240 Hmong in Wisconsin, a change of 46% growth in 10 years.³ Hmong people make up 0.63% of Wisconsin's total population and the majority (32.9%) of the Asian population in Wisconsin.¹ Wisconsin has the third largest Hmong population in the United States after California and Minnesota. The counties with the most Hmong residents include Milwaukee

County with 23.3% of the population, and Marathon County with 13.2% of the population. Other counties with significant Hmong populations include Brown, Sheboygan, Outagamie, La Crosse, and Dane.¹

Chronic diseases such as diabetes, cardiovascular disease, and hypertension are unfamiliar to many Hmong Americans.⁴ These diseases have been reported at very low prevalence in southeast Asia during the 1980s and 1990s when many Hmong left these countries for the United States.⁵ During the 1990s, national health data from countries such as Thailand and Vietnam report the prevalence of diabetes to be between 1.4% and 3.7%.⁵

Early evidence for the growing risk for diabetes in the Wisconsin Hmong population was discovered by Her and Mundt in 2005.⁶ The pilot study surveyed a cross-section convenience sample of 144 Hmong community members in 2 Wisconsin

communities. The study measured casual capillary whole blood glucose values and utilized the American Diabetes Association (ADA) definition of a value over 140mg/dL to identify participants at risk for diabetes. Although the study did not obtain the diagnosed prevalence of diabetes, it did reveal 47% of Hmong women and 32% of Hmong men tested had random whole blood glucose values above 140 mg/dL.⁶ In addition to this high rate of a diabetes risk found in Wisconsin Hmong communities, other researchers have estimated the prevalence of diabetes in Hmong communities in other areas of the Midwest to be as high as 16%.^{7,8} Another study investigating national 2001 Behavioral Risk Factor Surveillance System data noted the prevalence of diabetes in Asians (not specific to the Hmong population) was 60% higher than non-Hispanic whites.⁹ Data from the National Health Interview Survey (1997-2008) found Asian Americans to be at significantly higher risk for diabetes compared to whites.¹⁰

Although Her and Mundt revealed a high risk of diabetes in the Hmong population, currently there is no large population-based study describing the prevalence of diabetes in the Hmong population. The purpose of this study was to use a patient electronic medical record (EMR) database to describe and compare the prevalence of type 2 diabetes mellitus between Hmong and non-Hispanic white patients.

METHODS

Setting

This study utilized data from the University of Wisconsin (UW) Public Health Information Exchange (PHINEX) database. PHINEX includes electronic health record data from patients accessing UW Health primary care from 2007 through 2012 and the program has been previously described in detail elsewhere.^{11,12} The objective of the PHINEX project is to link EMRs with population databases to facilitate multidimensional investigations of population health. This study and the larger UW PHINEX database project is approved by the University of Wisconsin-Madison School of Medicine and Public Health Institutional Review Board Research Protocol M2009-1273, Family Medicine/Public Health Data Exchange.

Study Population

The extracted data contain detailed health and demographic information on 504,799 unique ambulatory care patients who visited the UW clinics, spread throughout Wisconsin, for the years 2007-2012. The dataset captured over 16 million encounters. To protect patient confidentiality, any potentially identifying information such as name, date of birth, social security number, and address were removed from the extracted dataset. The patient EMR numbers were replaced with randomly generated accession numbers. The link between the random accession number and the medical record number for each patient was masked before the data was provided to the research team.

For the purposes of this study, it was necessary to classify records by race and ethnicity. The EpicCare EMR (Epic Systems Inc, Verona, Wisconsin) contains discrete data input fields indicating a patient's race and ethnicity. Possible race inputs include American Indian or Alaskan Native, Asian, Black or African American, Native Hawaiian or other Pacific Islander, White, Patient refuses to answer, or Unknown. Possible ethnicity inputs include Hispanic, non-Hispanic, Patient refuses to answer, or Unknown. All patient records indicating non-Hispanic white were stratified into the control subject population. In comparing the Hmong patient data to a standard population, the research team utilized the non-Hispanic white population in Wisconsin as a control population. Exclusion of other minority groups from the control group facilitates the future ability to cross compare the prevalence of the Hmong to other minority groups, as well as to compare those groups to the control population. All records with non-Hispanic Asian designations were selected for further identification of Hmong patients. Hmong patients were identified when they self-reported Hmong language in the language field. Because the Hmong language is unique to the Hmong population, it was assumed that those individuals self-reporting primary use of the Hmong language were in fact Hmong. The language field is used primarily by clinics to identify patients requiring interpretive services. Since it is known that a large portion of the Hmong population requires language interpretation, this selection method was used to define a subset population of Hmong patients. Of the 504,799 total patients, 412,908 (81.80%) were identified as non-Hispanic whites and 964 (0.19%) as Hmong.

Variables

Patient race and ethnicity were coded as either non-Hispanic white or Hmong. Body mass index (BMI) (kg/m²) was calculated from the earliest weight and height measurements recorded in the patient's record. Individual records were then classified into the following BMI categories: Normal Weight (BMI < 25), Overweight (BMI 25-30), Obese (BMI > 30) or BMI Missing. Additionally, standard methods of categorization were used to classify children under the age of 18 into BMI categories.¹³ Patient age and sex were recorded for each patient record. Health insurance was encoded as Commercial, Medicare, Medicaid, Workers Compensation or No Insurance.

Diabetes diagnosis for each patient record was made by utilizing the International Classification of Disease, 9th Revision (ICD-9) diagnosis codes, laboratory values, and identification of antidiabetic medication prescription. ICD-9 250.x0 and 250.x2 codes, where x can be variable, identify a diagnosis of type 2 diabetes mellitus. Within the EMR there are 2 unique fields for diagnosis input. For each clinical encounter an ICD-9 diagnosis is entered in the encounter diagnosis field. This field is used to identify the diagnosis(es) of each patient visit and also is used for billing. The problem list field is another location where clinicians

Table 1. Characteristics of Hmong and Non-Hispanic White Subject Populations

Characteristic	Hmong	Non-Hispanic White	P-value
Number (Percent of Total)	964 (0.19%)	412,908 (81.80%)	
Average Age Years	31.0 ± 0.77	37.8 ± 0.04	<0.001
Age Range in Years (Percentage of Total)			
0-17	392 (40.7%)	96,912 (23.47%)	<0.001
18-54	368 (38.2%)	206,514 (50.0%)	<0.001
55-64	115 (11.9%)	54,495 (13.2%)	0.23
65+	89 (9.2%)	54,987 (13.3%)	<0.001
Total	964	41,2908	
Sex % male	43.4%	47.1%	0.022
Mean BMI (kg/m²)	24.1 ± 0.48	26.4 ± 0.03	<0.001
BMI Category (Percent of Total)			
Normal weight	282 (29.3%)	135,201 (32.7%)	0.025
Overweight	202 (21.0%)	91,914 (22.3%)	0.333
Obese	152 (15.8%)	94,696 (22.9%)	<0.001
BMI missing	328 (34.0%)	91,097 (22.1%)	<0.001
Health Insurance (Percent of Total)			
Commercial/Workers Comp/No insurance	286 (29.7%)	327,453 (79.3)	<0.001
Medicaid	589 (61.1%)	27,802 (6.7%)	<0.001
Medicare	89 (9.2%)	57,653 (14.0%)	<0.001

Abbreviation: BMI, body mass index

can enter an ICD-9 diagnosis code. This field is used by clinicians to maintain active problems for each patient. In addition to the encounter and problem list diagnostic codes, standard laboratory values also were used to identify patients with diabetes according to the American Diabetes Association definition of type 2 diabetes. The lab values that support the diagnosis of diabetes include a fasting glucose value > 126 mg/dL, a 2-hour Glucose Tolerance Test value > 200 mg/dL, a random glucose value greater > 200 mg/dL, or a hemoglobin A1c > 6.5%. Finally, the medication list of each patient was reviewed for prescriptions for antidiabetic medications. Metformin was excluded from the antidiabetic medication class, since it can be used for other conditions such as polycystic ovary syndrome.

Individual patient records were labeled with a diagnosis of type 2 diabetes if both the encounter and problem list diagnoses were consistent for the diagnosis. In addition, if a diagnosis for type 2 diabetes was only found in either the encounter diagnosis or the problem list diagnosis, then the record was labeled with diabetes only after a laboratory value or medication list also supported a type 2 diabetes diagnosis. In circumstances of inconsistencies between type 1 and type 2 diabetes within 1 individual record, a review of the most recent diagnosis was made to determine the most consistent diabetes type diagnosis.

Statistical Analysis

The statistical analysis of data was performed with SAS software, version 9.3 (SAS Institute Inc, Cary, North Carolina). Individual variables were compared between the Hmong subject population and the non-Hispanic white population with the appropriate sta-

tistical test (*t* test or χ^2 test) and *P*-values were reported. Multiple step logistic regression was used to calculate odds ratios for type 2 diabetes, adjusting for age, sex, BMI, and health insurance. Due to a high number of missing BMI values, 2 logistic regression models were developed. Model 1 is adjusted for age, sex, and insurance. Model 2 is adjusted for age, sex, insurance, and BMI.

RESULTS

A total of 964 Hmong patient and 412,908 non-Hispanic white patient records were analyzed in the study. The general patient population characteristics of the Hmong and non-Hispanic white population are shown in Table 1. The Hmong patients were younger than white patients ($P < 0.001$) with a large proportion of individuals in the 0-17 age group.

In a portion of patient records from both

Hmong and white populations, there was insufficient height and weight data to calculate a BMI. BMI was missing in 34.0% of the Hmong population and 22.1% of the white population. The mean recorded BMI of Hmong records was significantly lower than the mean BMI of white patients ($P < 0.001$). The majority of the Hmong patients had Medicaid for insurance (61.1%) compared to only 6.7% of white patients.

Stratified Diabetes Prevalence Comparisons

The stratified diabetes type 2 crude prevalence comparisons between the Hmong patient population and the white population are shown in Table 2. The overall prevalence of diabetes in the total Hmong population is 11.3%, which is significantly higher than the overall prevalence of 5.97% in the white population ($P < 0.001$). The adult Hmong population prevalence for diabetes was 2.54 times higher at 19.1% compared to 7.78% in the adult non-Hispanic white population ($P < 0.001$). Hmong individuals within all adult age groups had significantly higher rates of type 2 diabetes than white patients. Significant differences in prevalence of type 2 diabetes between Hmong and white patients, stratified by the BMI category, also were noted by the analysis. Type 2 diabetes was diagnosed in 7.45% of normal weight Hmong compared to only 1.38% of normal weight whites ($P < 0.001$) and 19.3% of overweight Hmong compared to 5.24% of overweight whites ($P < 0.001$). There was a non-significant difference in prevalence of diabetes in obese Hmong and white patients. In medical insurance stratification, Hmong patients with Medicaid had significantly higher rates of type 2 diabetes compared to whites with Medicaid ($P < 0.001$).

Table 2. Crude Diabetes Prevalence of Hmong vs Non-Hispanic White Population by Age, BMI Category and Health Insurance

	Hmong		Non-Hispanic White		Odds Ratio (OR)	OR CI	χ^2 P-value
	Number With Diabetes	Diabetes Prevalence	Number With Diabetes	Diabetes Prevalence			
Total Study Population	109	11.3%	24,646	5.97%	2.01	1.64-2.45	< 0.001
Adults (age >18)	109	19.1%	24,585	7.78%	2.79	2.26-3.44	< 0.001
Sex							
Female	79	14.5%	11,653	5.33%	3.01	2.37-3.83	< 0.001
Male	30	7.16%	12,993	6.69%	1.07	0.74-1.56	0.703
Age Range							
0-17	0	0.0%	61	0.06%	—	—	—
18-54	40	10.9%	8108	3.93%	2.98	2.15-4.15	< 0.001
55-64	42	36.5%	7421	13.6%	3.65	2.50-5.34	< 0.001
65+	27	30.3%	9056	16.5%	2.21	1.40-3.47	< 0.001
BMI Category							
Normal weight	21	7.45%	1867	1.38%	5.75	3.68-8.98	< .001
Overweight	39	19.3%	4813	5.24%	4.33	3.05-6.15	< .001
Obese	28	18.4%	15,168	16.2%	1.18	0.79-1.78	0.420
Health Insurance Type							
Commercial/ Workers Comp/No insurance	23	8.04%	13,372	4.08%	2.05	1.34-3.15	< 0.001
Medicaid	56	9.51%	1217	4.38%	2.30	1.73-3.04	< 0.001
Medicare	30	33.7%	10,057	17.4%	2.41	1.55-3.74	< 0.001

Abbreviation: BMI, body mass index

Adjusted Odds of Diabetes Relative to Non-Hispanic Whites

The results of the multivariate logistic regression analysis are shown in Table 3. Two multivariate logistic regression models were used to adjust for differences between the 2 populations. Model 1 adjusts for age, sex, and insurance and shows the odds of diabetes in the Hmong population compared to the non-Hispanic white population to be 2.3 ($P < 0.001$). After the results were adjusted for age, sex, insurance, and BMI, the odds of diabetes increased to 3.3 ($P < 0.001$).

DISCUSSION

The results of this clinic-based population study support previous findings that Hmong Americans are at significantly increased risk for developing diabetes.^{6,7,14} The risk for diabetes is more than 3-fold higher for a Hmong patient when adjusted for age, sex, BMI, and insurance. The data also indicate the prevalence of diabetes stratified across age group, BMI category, and insurance type is significantly higher in the Hmong population than the non-Hispanic white population. Diabetes is being diagnosed at higher proportions in younger, thinner Hmong patients compared to their white counterparts. The prevalence of type 2 diabetes of Hmong adults in this study at 19.1% supports previous estimates of diabetes prevalence of 16%.^{7,8} These data also support previous studies that have shown increased risk for Asians compared to their white counterparts.⁹

Although the study was not designed to determine why Hmong Americans are at increased risk for diabetes, there are sev-

Table 3. Odds Ratios of Type 2 Diabetes by Race and Ethnicity

	Non-Hispanic White OR	Hmong OR (95% CI)	Wald χ^2 P-value
Model 1	1.0	2.3 (1.9-2.9)	<0.001
Model 2	1.0	3.3 (2.6-4.1)	<0.001

Abbreviation: OR, odds ratio for diabetes (95% CI).

Model 1 is adjusted for age, sex, and insurance.

Model 2 is adjusted for age, sex, insurance, and body mass index.

eral plausible explanations for this increase in diabetes risk. One possible explanation relates to the changes in environment that greatly affect populations migrating from developing countries to affluent countries.¹⁵ This transition has occurred for the Hmong people who moved from Laos to the refugee camps of Thailand to the United States. In focus group studies, the Hmong have attributed change in environment, leading to factors such as lack of physical activity and poor diet to the development of diabetes.⁴ Study participants noted few instances of diabetes in Laos, where the agrarian Hmong practiced labor intensive agriculture.⁴

The clinical implications of this research can be applied directly to patient care. This study supports previous recommendations that health care professionals should be aware of the increased risk for diabetes in the Hmong population.^{6,7,14} Physicians should consider screening for glucose intolerance in the Hmong patient population starting at younger ages and lower BMI.¹⁴

The research findings also suggest future directions for research.

The next step of research should be to obtain a large representative sample of the Wisconsin Hmong population to evaluate the disparity of diabetes prevalence between the general Hmong and non-Hispanic white populations. Further research also should be conducted to explore the relationship of environmental change, genetics, and historical influences on the development of diabetes in the Hmong population.

This research study capitalized on the wealth of data generated by the merging of EMRs from a large health care organization and public health databases. The PHINEX database has allowed researchers to investigate not only the overall health of hundreds of thousands of Wisconsinites, but it also has allowed this research team to specifically identify a minority group to obtain information previously inaccessible. Utilizing the unique race and ethnicity fields will make it possible for other researchers to study specific underrepresented minority groups and compare different health parameters between these groups. The layering of public health data such as socioeconomic, geographic, and educational variables to the health-specific data allows more insight into the interactions between the specific determinants of health and health outcomes.

Study Limitations

This clinic-based population study has several limitations. The major limitation of this study is the potential for selection bias of the study population. The health information in this study was from ambulatory care patient electronic health records of the UW Health primary care patients. Although the total sample size was very large (504,799 unique records), the sample was a non-random sample of Wisconsin residents, living primarily in south central Wisconsin. Furthermore, the population characteristics and health information from patients of the ambulatory care system might be different from the general Wisconsin population. However, previous studies^{11,12} using the PHINEX database found overall that studied health outcomes and demographic characteristics were remarkably similar to Wisconsin's as a whole. Indeed, in this study the crude diabetes prevalence estimate for non-Hispanic white adults (7.8%) was very similar to the comparable Behavioral Risk Factor Surveillance System (BRFSS) state-wide estimate for non-Hispanic white adults in 2012 (7.4%).¹⁶ However, the generalizability of findings still may be of concern if there are meaningful differences between those who seek care and those who do not seek it. This concern may be mitigated by evidence that the majority of Americans are indeed utilizing ambulatory care services. National and state public health surveys have assessed health care utilization of the general population in the United States and in Wisconsin. The 2009 Behavioral Risk Factor Surveillance System reported 80.8% of Americans had primary care providers and 81.65% of Americans were seen for a routine health check up in the last 2 years.¹⁷ The results from The Wisconsin Family Health Survey, 2001-2005, indicate

92% of surveyed Wisconsinites reported having a place of routine health care.¹⁸ Furthermore, 87% of Wisconsin's Asian population surveyed indicated having a place of routine health care.¹⁸ The PHINEX database contains information about UW ambulatory patients that does not include data from other health care systems. Although UW clinics do extend throughout the state, the majority of the database records come from individuals residing in the southern and eastern parts of the state. Differences in UW Health data compared to other system data may have affected identification of diabetes rates among the Hmong and white populations.

Another study limitation is the selection bias when obtaining Hmong patient data. The research team confirmed with clinic registration staff that the language field was used to facilitate interpretive services. It is unknown at the current time how many Hmong patients did not list Hmong in the language field. Hmong ethnicity was not an option for input into the EpicCare EMR. Although the study was able to specifically identify a large number of Hmong patient records, the study likely under-sampled younger, more English-proficient Hmong patients not utilizing interpreter services. The research team did at one point contemplate using Hmong surnames to identify more Hmong patients; however, due to a lack of a validated Hmong surname list as well as the de-identification process, this technique ultimately was abandoned.

A third limitation to the study was the issue of missing data for BMI calculation. Because this dataset was not generated solely for research purposes, it was expected that there would be missing values in certain areas of the medical record. Significant portions of both the non-Hispanic white population and the Hmong population had missing height and/or weight measurements. Records with missing BMI data were not excluded from the general analysis because other valuable information could be obtained from the record. Furthermore, the records missing BMI also were included in the multivariate logistic regression model under the category missing BMI, in addition to BMI categories described above. This step was done to ensure the inclusion of all records in models 1 and 2.

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Incidence, Survival, and Mortality of Malignant Cutaneous Melanoma in Wisconsin, 1995-2011

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ABSTRACT

Objective: To assess trends in malignant melanoma incidence, survival, and mortality in Wisconsin.

Methods: Incidence data for Wisconsin were obtained from the Wisconsin Cancer Reporting System Bureau of Health Information using Wisconsin Interactive Statistics on Health, while incidence data for the United States were obtained from the Surveillance, Epidemiology, and End Results system (SEER). The mortality to incidence ratio $[1 - (\text{mortality/incidence})]$ was used as a proxy to estimate relative 5-year survival in Wisconsin, while observed 5-year survival rates for the United States were obtained from SEER. Mortality data for both Wisconsin and the United States were extracted using the Centers for Disease Control and Prevention Wide-ranging Online Data for Epidemiologic Research.

Results: During the past decade, malignant melanoma incidence rates increased 57% in Wisconsin (from 12.1 to 19.0 cases per 100,000) versus a 33% increase (from 20.9 to 27.7 cases per 100,000) in the United States during the same time period. The greatest Wisconsin increase in incidence was among women ages 45-64 years and among men ages 65 years and older. Overall relative percent difference in 5-year survival in Wisconsin rose 10% (from 77% to 85%) and was unchanged (82%) for the United States. Wisconsin overall mortality rates were unchanged at 2.8 deaths per 100,000, compared to a 10% increase in the United States (from 3.1 to 3.4 deaths per 100,000). Wisconsin mortality rates improved for women ages 45-64 and for men ages 25-44.

Conclusion: Despite improvements in malignant melanoma survival rates, increases in incidence represent a major public health challenge for physicians and policymakers.

INTRODUCTION

According to the Centers for Disease Control and Prevention (CDC), skin cancer is the most common form of cancer in the United States.¹ Malignant melanoma is the least common but deadliest of the 3 most common skin cancers and is associated

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with exposure to ultraviolet light² (UV) and genetic factors that control characteristics such as lighter skin color, many large nevi, blue eye color, and red or blonde hair color.³ Alarming, despite decreased incidence rates of most other types of cancer, melanoma incidence and mortality rates have increased rapidly in recent decades.⁴

In a previous analysis of melanoma trends in Wisconsin for the period 1979-1997, incidence rates rose 25% among men and 11% among women, while rates for the United States rose 61% and 43%, respectively.⁵ Though Wisconsin seemingly has fared better than the United States in relation to incidence and incidence trends, this advantage did not hold up for mortality rates. In the same time period, Wisconsin mortality rates rose 26% among men and 17% among women, while US rates remained relatively stable among women and rose 10% among men.⁵ Such trends are of great concern to Wisconsin, and highlight why continued monitoring of melanoma incidence, survival, and mortality is essential.

The purpose of this study is to extend previous comparisons of Wisconsin and the United States to include more recent data. Unlike earlier studies, this analysis also assessed 5-year survival trends. Incidence, survival, and mortality are interrelated, yet distinct population-based indicators of cancer burden and analysis of all 3 measures is necessary to fully interpret progress in cancer control. Considering that melanoma is an increasingly common disease with known risk factors, it is important to carefully monitor trends to identify opportunities for prevention, early detection, and treatment.

METHODS

Malignant melanoma incidence data for Wisconsin were obtained from the Wisconsin Cancer Reporting System Bureau of Health

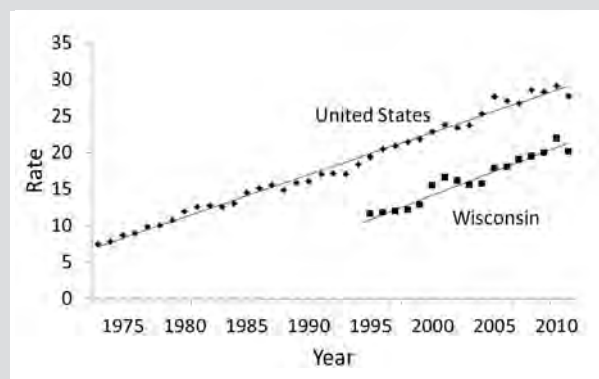
Information using the Wisconsin Interactive Statistics on Health (WISH) online database (<http://www.dhs.wisconsin.gov/wish/cancer/>) for the period 1995-2011. Because of varied reporting methods and incomplete data collection from nonhospital sources prior to 1995, incidence data before 1995 are not included in the analysis. Incidence data for the US population for the period 1973-2011 were extracted from the Surveillance, Epidemiology, and End Results (SEER) system using SEER*Stat 8.1.5 (National Cancer Institute, Bethesda, Maryland). SEER routinely collects patient statistics from 12 cancer registries, including Oakland and San Francisco, San Jose, and Los Angeles, California; Seattle, Washington; Detroit, Michigan; Atlanta, Georgia; rural Georgia; Connecticut; Iowa; New Mexico; Utah; and Hawaii. These data are considered representative of the entire United States.

Due to limited availability of cancer-specific survival data in Wisconsin, we used the melanoma mortality to incidence ratio [$1 - (\text{mortality/incidence})$] to approximate survival. The ratio is defined as the number of deaths from a specific disease within a specified time period to the number of new cases of the same disease during the same time period. This method produces comparable estimates of 5-year relative survival for most tumor sites.⁶ For the United States, 5-year survival data were obtained from SEER. The site was coded as “melanoma of the skin” (ICD-O-3/WHO 2008). We included only malignant cases of known age that were actively followed in the research database. Death certificate only and autopsy only cases, as well as cases alive with no survival time, were excluded from the analysis.

Malignant melanoma mortality data for both Wisconsin and the United States for the period 1968-2010 were collected from the National Center for Health Statistics using CDC Wide-ranging Online Data for Epidemiologic Research (WONDER). Neoplasm cases coded as “malignant melanoma of skin” (172) and “malignant melanoma of skin” (C43) were included, based on the *International Statistical Classification of Disease*, 8th, 9th, and 10th Revisions (ICD-8, ICD-9, ICD-10, respectively). Non-cutaneous melanoma and melanomas in genital regions are coded separately and thus were not included in this study. In order to examine long-term trends, we used all available data from the earliest time period to the most recently available for each measure of cancer burden.

Incidence, survival, and mortality rates were stratified by age and gender to compare trends over time and identify subgroups at greatest risk. To provide more stable rate estimates and trends, data were compiled for two 5-year time periods (1995-1999 and 2005-2009). The same 5-year time periods were chosen to permit comparison of all 3 metrics in the last decade. The percent change in the rates from 1995-1999 to 2005-2009 was calculated for each age group to compare age-specific trends in malignant melanoma between women and men in the past decade. When comparing rates, standard errors ($SE = \text{rate}/\text{square root of num-}$

Figure 1. Malignant Melanoma Incidence, Wisconsin and the United States, 1973-2011



Rates are per 100,000 and age-adjusted to the 2000 US population.

ber of deaths) and 95% confidence intervals were calculated. All incidence and mortality rates were age-adjusted to the 2000 US standard population using 19 age groups (<1, 1-4, 5-9, 10-14, 15-19, ... ≥85 years). This study was restricted to non-Hispanic whites because they comprise over 90% of all patient cases in the United States.⁷

RESULTS

Incidence

In Wisconsin, overall incidence rates linearly increased 6.3 cases per 100,000 every 10 years ($R^2=0.94$), reaching 20.2 cases per 100,000 in 2011. For the United States, incidence rates increased 5.7 cases per 100,000 every 10 years ($R^2=0.99$), reaching 27.8 cases per 100,000 in 2011 (Figure 1). Despite greater increases in incidence, Wisconsin's total incidence remains 27% below the US average.

Wisconsin and United States malignant melanoma incidence rates, stratified by age and gender, are presented in Table 1. In Wisconsin, incidence rates for all ages increased 57% from 1995-1999 to 2005-2009 (from 12.1 to 19.0 cases per 100,000), with greater increases for people over 65 years of age. For women of all ages, incidence rates increased 65% (from 10.1 to 16.7 cases per 100,000) versus a 49% increase for men (from 15.0 to 22.4 cases per 100,000). Women age 45-64 experienced the highest percent change of 72% (from 15.1 to 26.0 cases per 100,000). In the United States, overall incidence rates increased 33% (from 20.9 to 27.7 cases per 100,000). Incidence rates rose 31% for women over 65 years of age, compared to a 35% increase for men. Although incidence data for Wisconsin are unavailable prior to 1995, the trends in incidence rates among men and women in Wisconsin are similar to those observed in the United States (Figure 2).

Survival

For Wisconsin, overall survival from 1995-1999 to 2005-2009 increased 10% (from 77% to 85%). Though men and women

Table 1. Trends in Malignant Melanoma Incidence, Survival, and Mortality, by Age and Gender, Wisconsin and the United States

	Age	1995-1999	2005-2009	Percent Change ^a		Age	1995-1999	2005-2009	Percent Change ^a
Incidence Rates: Wisconsin					Incidence Rates: United States				
Women	25-44	11.9	18.9	59%	Women	25-44	18.7	22.9	22%
	45-64	15.1	26.0	72%		45-64	29.1	38.0	31%
	65+	21.5	35.5	65%		65+	38.8	54.9	41%
	All ages	10.1	16.7	65%		All ages	17.6	23.1	31%
Men	25-44	8.8	11.0	25%	Men	25-44	13.7	14.8	8%
	45-64	23.1	33.4	45%		45-64	42.8	50.6	18%
	65+	55.1	89.7	63%		65+	91.5	144.7	58%
	All ages	15.0	22.4	49%		All ages	25.5	34.4	35%
Overall		12.1	19.0	57%	Overall		20.9	27.7	33%
Survival^b Rates: Wisconsin					Survival Rates: United States				
Women	25-44	92%	95%	3%	Women	25-44	96%	96%	0%
	45-64	83%	90%	8%		45-64	91%	92%	1%
	65+	65%	79%	22%		65+	68%	70%	3%
	All ages	81%	89%	10%		All ages	86%	87%	1%
Men	25-44	82%	87%	6%	Men	25-44	89%	90%	1%
	45-64	78%	84%	8%		45-64	84%	85%	1%
	65+	67%	79%	18%		65+	64%	66%	3%
	All ages	74%	82%	11%		All ages	78%	78%	0%
Overall		77%	85%	10%	Overall		82%	82%	0%
Mortality Rates: Wisconsin					Mortality Rates: United States				
Women	25-44	1.0	1.0	0%	Women	25-44	1.1	1.0	-9%
	45-64	2.6	2.5	-4%		45-64	3.1	3.1	0%
	65+	7.5	7.6	1%		65+	8.2	9.0	10%
	All ages	1.9	1.8	-5%		All ages	2.1	2.1	0%
Men	25-44	1.6	1.4	-13%	Men	25-44	1.6	1.5	-6%
	45-64	5.1	5.3	4%		45-64	6.5	6.3	-3%
	65+	18.2	19.0	4%		65+	19.9	24.5	23%
	All ages	3.9	4.0	3%		All ages	4.4	5.0	14%
Overall		2.8	2.8	0%	Overall		3.1	3.4	10%

^aPercent Change = [(2005-2009) - (1995-1999)] / (1995-1999)^bEstimated 5-year survival based on [1 - (mortality/incidence)]⁶

All incidence and mortality rates are per 100,000 population and all-ages rates are age-adjusted to the 2000 US population.

experienced similar increases in survival rates, survival was considerably lower among men (82%) than women (89%). In the United States, overall survival rates remained fairly constant in the past decade. Similar to Wisconsin, survival rates are lower among men (78%) than women (87%) (Table 1). Notably, we found that observed US survival data from SEER closely matched estimated survival for the United States using the [1 - (mortality/incidence)] approximation. This supports the reliability of estimated survival in Wisconsin.

Mortality

Total malignant melanoma mortality data for Wisconsin and the United States from 1968 to 2010 are presented in Figure 3. During this time period, Wisconsin total malignant melanoma death rates rose 94% from 1.6 to 3.1 deaths per 100,000, while US death rates rose 70% from 2.0 to 3.4 deaths per 100,000. Mortality rates for both Wisconsin and the United States show some evidence of leveling off in recent years.

Overall mortality rates in Wisconsin stabilized at 2.8 deaths per 100,000 in the past decade. Death rates decreased by 5% from 1.9 to 1.8 deaths per 100,000 for women of all ages and increased 3% from 3.9 to 4.0 for men of all ages. In contrast, overall mortality in the United States increased 10% in the past decade. Death rates remained constant for women of all ages (2.1 deaths per 100,000) compared to a 14% increase in men. Men over 65 years of age had the sharpest increase in mortality over this period of 23% (from 4.4 to 5.0 deaths per 100,000). Age-stratified mortality trends for the United States are presented in Figure 4.

DISCUSSION

Our analysis of malignant melanoma data in Wisconsin and the United States suggests continued rises in incidence for all age groups, corresponding increases in 5-year survival rates, and improved mortality rates overall. However, the trends in mortality vary by age—with rates increasing progressively for men over

65 years of age, but leveling off or even decreasing for younger adults. These findings are consistent with previous reports of similar trends worldwide.⁸⁻¹⁰

While overall incidence and mortality trends in Wisconsin seem to parallel the United States from 1968 to 2011, several noticeable distinctions have emerged in the past decade. First, overall incidence rates have increased more rapidly in Wisconsin than the United States, especially for younger adults. Second, incidence rates have risen most sharply for women age 45-64, compared to greater increases for men 65+ in the United States. This represents a recent shift in Wisconsin incidence trends. Third, despite less favorable incidence trends in Wisconsin, survival and mortality trends appear to be somewhat more favorable in Wisconsin.

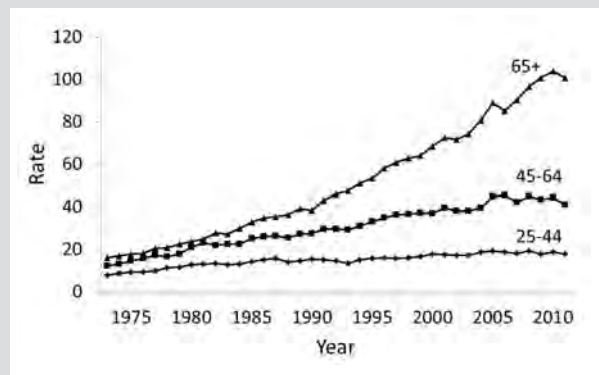
The underlying etiology of melanoma trends is widely debated. Some postulate that continued increases in melanoma incidence rates may be due to increases in natural and artificial ultraviolet radiation exposure.^{11,12} In a 2011 study, more than one-third of American adults reported being sunburned in the previous year, with the highest rates among non-Hispanic men.¹³ There is also evidence that indoor tanning is increasing among US adults, most of whom are women.¹⁴ According to the 2010 National Health Interview Survey, 32% of women age 18-21, 30% of women age 22-25, 22% of women age 26-29, and 17% of women age 30-34 admitted to using a tanning bed.¹⁵

Consistent with prior reports,^{4,16} malignant melanoma risk was most prominent for individuals over age 65, particularly men. Age is one of the strongest risk factors for all cancers, likely due to accumulating DNA damage over time.⁷ It also has been suggested that melanoma in the elderly may result from different mechanisms causing altered immune response, which could explain increased incidence.¹⁷ Furthermore, higher incidence rates in men may reflect differences in sun exposure, sun protection, and early detection practices. In fact, several studies have found that men are more likely than women to experience sunburn,¹⁴ while they are less likely to practice sun protection¹⁴ and utilize melanoma screening programs.^{18,19}

Mortality trends were not uniform across age groups, with continued increases for individuals over 65 and leveling off or even decreasing among younger adults. Increased mortality in the elderly may reflect poor access to medical care and late stage at diagnosis. Explanations for higher mortality among elderly males may be similar to those described earlier for incidence. In contrast, favorable mortality trends for younger adults may reflect improvements in early detection and suggest outcomes related to better treatments. This raises the question whether early detection and education efforts have effectively reached some groups but not others.

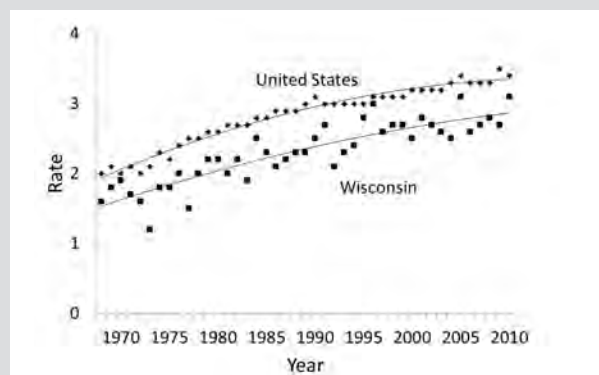
Because malignant melanoma incidence rates have substantially outpaced mortality rates, there has been some debate over

Figure 2. Malignant Melanoma Incidence, United States, 1973-2011



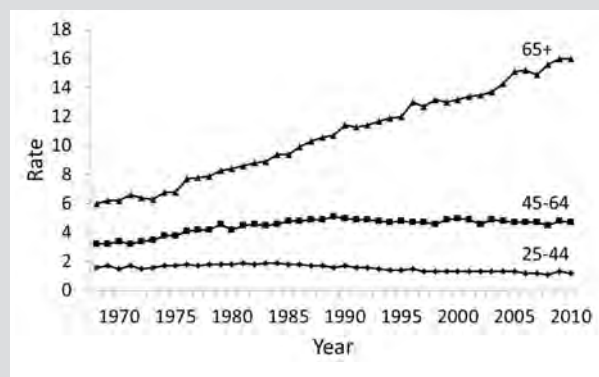
Rates are per 100,000 and age-adjusted to the 2000 US population.

Figure 3. Malignant Melanoma Mortality, Wisconsin and the United States, 1968-2010



Rates are per 100,000 and age-adjusted to the 2000 US population.

Figure 4. Malignant Melanoma Mortality, United States, 1968-2010



Rates are per 100,000 and age-adjusted to the 2000 US population.

whether increased incidence could be an artifact of improved surveillance,²⁰ regular screening,²¹ or better detection of thinner tumors.²¹ Recent evidence, however, suggests that the increase is in fact real.^{4,7,16} Differences in diagnostic methods have not changed over time in ways that would be predicted if improved surveillance and increased screening were solely responsible

for higher melanoma rates. Additionally, there is evidence that thicker melanomas, which are less susceptible to misclassification, also are increasing in incidence.^{4,7}

Several limitations in the data may affect the interpretation of our findings. First, malignant melanoma data collection procedures have changed significantly over time; thus, observed trends may reflect differences in the thoroughness of case reporting. Traditionally, malignant melanoma cases were reported almost entirely by hospitals. In the past several decades, however, melanoma has been increasingly diagnosed and treated in nonhospital settings. This poses challenges for cancer registries that may not have the resources to collect data from nonhospital sources such as outpatient surgery centers, pathology facilities, and physician offices. Second, comparisons between Wisconsin and US incidence rates may be influenced by variations in the completeness of case reporting between WISH and SEER. Indeed, underreporting^{19,22} and delayed reporting²³ of melanoma to cancer registries has been documented and suggests that even the best records of melanoma incidence likely underestimate true incidence. Third, melanoma counts reported by WISH and SEER are based on the number of melanomas in the population, not the number of people with melanoma. Because some people have multiple melanomas, particularly elderly patients, melanoma risks reported here should be interpreted with caution.

Another possible limitation is that changes in disease classifications over time potentially could affect our results. Disease classifications were based on ICD-8, ICD-9, and ICD-10 codes for the time periods 1968-1978, 1979-1998, and 1999-2010, respectively. According to a study by Anderson et al,²⁴ an estimated 3% fewer deaths were classified to melanoma as the underlying cause of death using the revised ICD-10 rules compared to ICD-9. It is possible that this change could have caused an apparent increase in mortality rates for individuals over 65 years of age. These issues highlight the dependence of melanoma surveillance on complete and accurate reporting to cancer registries.

The findings and associated limitations of this analysis raise appropriate public health concerns regarding screening and prevention efforts. Notably, incidence and mortality rates and trends for men over 65 years of age warrant special attention. Rapid increases in the percentage of the population over 65 years of age may significantly change melanoma burden in the coming years. Therefore, surveillance and future cancer objectives must consider the significant effects of the aging population. Furthermore, recent incidence trends for women in Wisconsin should be of great concern. Because exposure to UV light may be linked to increasing incidence trends, especially among women, primary prevention efforts should emphasize the dangers of indoor tanning.

In order to reduce the burden from malignant melanoma, a comprehensive approach is needed to improve cancer preven-

tion, early detection, and treatment. Unfortunately, the current evidence reviewed by the US Preventive Services Task Force is that there is insufficient data to assess the balance of benefits and harms of using a whole-body skin examination by a primary care clinician or patient skin self-examination for the early detection of cutaneous melanoma in the adult general population.²⁵ Therefore, it is especially important to promote evidence-based prevention programs, including the use of sunscreen or sun protective clothing, educational interventions in primary and middle schools to increase sun-protective behaviors, and implementation of sun protection policies to increase protection from UV exposure. In addition, multicomponent community-wide interventions should be promoted that include individually oriented strategies, mass media campaigns, and environmental and policy changes across multiple sites.²⁶

In summary, our study suggests that treatment outcomes for patients with melanoma are improving, as evidenced by improving survival rates. This could represent improvements in treatment and/or results of treating patients at an earlier stage of disease. Furthermore, while Wisconsin has a lower overall burden compared to the United States, rates appear to be rising more rapidly. Unfortunately, the significant increase in melanoma incidence in all age groups, as well as the continued increase in melanoma mortality rates in some age groups, is a major concern. These findings are a call for more effective prevention efforts and represent a major public health challenge for physicians and policymakers alike.

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A Review of Pregnancy-Related Maternal Mortality in Wisconsin, 2006-2010

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ABSTRACT

Introduction: Maternal mortality is a key indicator of maternal health and the general state of health care. This report summarizes maternal deaths in Wisconsin from January 2006 through December 2010.

Methods: Maternal deaths were identified using death certificates and supporting links with infant birth and fetal death certificates. Suspected pregnancy-related maternal deaths were abstracted by a Wisconsin Maternal Mortality Review Team nurse abstractor. The entire team reviewed and analyzed these cases. If the death was deemed pregnancy related, a cause of death was determined, potential factors of avoidability were assessed, and recommendations for possible quality improvement were made.

Results: Fifty cases were reviewed and 21 cases were determined to be pregnancy related. The Wisconsin pregnancy-related maternal mortality ratio was 5.9 deaths per 100,000 live births (3.9-9.0, 95% CI), with markedly higher rates for non-Hispanic black women. The most common cause of death was cardiovascular related, with 5 of the 7 deaths being ascribed to peripartum cardiomyopathy. Chronic medical problems were associated with 55% of pregnancy-related maternal deaths excluding obesity. Nineteen percent of the pregnancy-related deaths reviewed were considered to be avoidable, and almost half (48%) had substantive recommendations made to improve maternal health.

Conclusion: Even though the Wisconsin pregnancy-related maternal mortality ratio is well below the national average, there remain stark racial disparities in maternal deaths and a number of avoidable pregnancy-related deaths that should be targeted for prevention.

INTRODUCTION

Maternal mortality is an indicator of the state of maternal health, and the general state of health care in every country where it is studied.¹ Every maternal death represents not just the loss of a woman's life, but the impact of that loss on her family and com-

munity. Although there have been dramatic improvements in maternal mortality over the past century, the most current statistics reported by the Centers for Disease Control and Prevention (CDC) highlight a recent increase in the pregnancy-related maternal mortality ratio to 16.0 deaths per 100,000 live births for 2006-2010.² This remains well above the Healthy People 2020 target of 11.4 maternal deaths per 100,000 live births.³

In Wisconsin, maternal mortality ratios historically have been well below the national average, and the number of maternal deaths remains relatively small.^{4,5} This does not diminish the impact that these deaths have on the affected families and communities in Wisconsin, and each event should be examined to identify opportunities to prevent future maternal deaths. The Wisconsin Maternal Mortality Review Team (MMRT) reviews detailed information of deaths occurring in Wisconsin

women while pregnant or within 1 year of pregnancy. The purpose of these reviews is to determine avoidability and make recommendations for changes in health care systems and practices aimed at the prevention of future maternal deaths. This paper reports on maternal deaths occurring from January 2006 through December 2010 and the MMRT findings for these cases.

METHODS

Pregnancy-associated deaths are deaths occurring to women who were pregnant at the time of death or within 1 year of pregnancy, irrespective of cause.⁶ These deaths are identified by the pregnancy checkbox on the death certificate. The checkbox identifies whether the decedent was pregnant at the time of death, within 42 days of death, within 43 days to 1 year of death, or not pregnant in the year before death. Linkage analyses also are performed between deaths to women of child-bearing age and

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infant birth and fetal death certificates. This is done to assist in complete case ascertainment and to identify additional pregnancy-associated deaths where the pregnancy checkbox may not have been marked appropriately. All medical records pertinent to the maternal death (eg, hospital, prenatal, specialist) and any autopsy reports are requested and reviewed by a nurse abstractor to verify the need for a formal review by the MMRT. Mental health records generally are not available for review in Wisconsin. This is due to difficulty identifying the mental health provider in other available medical records and to the protected status of these records under Wisconsin law. All data collection is done by the Wisconsin Department of Health Services as public health investigation activities allowed for under Wisconsin state statute to determine potential causes of morbidity and mortality. As this effort was undertaken as part of standard public health practice, Institutional Review Board approval was not required.

Only suspected pregnancy-related deaths are reviewed by the MMRT. Pregnancy-related deaths are defined by the CDC and the American Congress of Obstetricians and Gynecologists (ACOG) as “the death of a woman while pregnant or within one year of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by her pregnancy or its management, but not from accidental or incidental causes.”⁶ Deaths that are not suspected to be pregnancy related include homicides, cancer deaths, automobile crashes, and other unintentional deaths as well as those deaths in which a recent pregnancy could not be corroborated. A comprehensive chart abstraction is performed on all suspected pregnancy-related deaths by the nurse abstractor, and summaries are prepared for formal review by the MMRT. Strict confidentiality is maintained throughout the process, and all information related to each case is deidentified prior to team review.

The MMRT includes a multidisciplinary group of physicians, allied health care professionals, and public health specialists, all with expertise in maternal and child health. The team meets to conduct the reviews at least yearly depending on the number of cases requiring review. Due to the length of time required to identify cases and request, obtain, and abstract large volumes of medical records, the MMRT frequently reviews cases approximately 1 to 2 years after the event. Each member of the MMRT receives deidentified case summaries approximately 1 week before each scheduled meeting. At the meeting the chair provides a brief overview of each case, followed by a group discussion to summarize risk factors, examine findings from the medical records and autopsy, and assess group agreement with the cause of death as noted on the death certificate. The team then determines (1) whether each case was pregnancy related (direct obstetric or indirect obstetric), possibly pregnancy related, or not pregnancy related; and (2) if pregnancy related, whether the death could have been avoided. Decisions are made by simple majority vote

if consensus cannot be reached. Cases may be tabled until the next meeting if the team requests that additional information be gathered. Finally, the team identifies possible opportunities and strategies for preventing similar deaths in the future.

Data from the chart abstraction and the review team summary sheets is aggregated and analyzed using SAS 9.2 software (SAS Institute, Cary, North Carolina). Confidence intervals and modified Wald test *P*-values are calculated using the OpenEpi web-based calculator (www.openepi.com). Pregnancy-related mortality ratios are calculated using the number of maternal deaths in a given category as obtained from the maternal mortality database, divided by the number of live births in the same category as provided by the Wisconsin Interactive Statistics on Health (WISH) system. Support for the abstraction and data analysis is provided by the Health Resources and Services Administration (HRSA) Title V Maternal and Child Health Services block grant.

RESULTS

A total of 126 maternal deaths occurring to Wisconsin residents from January 2006 through December 2010 were identified. Fifty of these deaths were abstracted and reviewed as possible pregnancy-related deaths. Of the 50 deaths reviewed, 21 (42%) were determined to be pregnancy related, 4 (8%) to be possibly pregnancy related, and 25 (50%) to not be pregnancy related. The pregnancy-related maternal mortality ratio (PRMR) for 2006–2010 was 5.9 deaths/100,000 live births (3.9–9.0, 95% CI). The PRMR was broken down by demographic groups as noted on the death certificate (Table 1). The statistically significant differences illustrated in Table 1 were the non-Hispanic white/non-Hispanic black racial disparity (4.5 vs 22.5 deaths/100,000 live births), the differences between married and unmarried women (2.2 vs 12.4 deaths/100,000 live births), and the higher ratio of maternal death in women who smoke (17.7 vs 3.9 deaths/100,000 live births). Age was another possible indicator of the risk of maternal mortality, with the youngest (<20) and oldest (35+) mothers exhibiting a higher PRMR than women 20 to 34; however, these differences were not statistically significant. The majority of pregnancy-related maternal deaths occurred in the postpartum period (71.4%) with 57.1% of these deaths being in the first 42 days (Table 2).

Pre-pregnancy chronic medical conditions—such as hypertension, diabetes, or depression—were documented in 55% of pregnancy-related deaths. When obesity was included as a chronic medical condition, the percentage increased to 80% of all pregnancy-related maternal deaths examined. Among all pregnancy-related maternal deaths, 12% were overweight and 65% were obese (total 76.5%) as defined by standard body mass index (BMI) measures (Table 3).

The most common cause of pregnancy-related death was cardiovascular disease, specifically cardiomyopathy, followed

Table 1. Pregnancy-Related Mortality Ratios (PRMR) by Selected Demographic Characteristics, Wisconsin, 2006-2010

	Number of Deaths	Number of Live Births	PRMR	
			PRMR	95% CI
Age				
15-19	4	29,518	13.6	3.9-36.2
20-24	4	81,870	4.9	1.4-13.1
25-29	4	111,108	3.6	1.0-9.6
30-34	3	87,087	3.4	0.7-10.6
35-39	5	38,359	13.0	4.6-31.5
40+	1	8,217	12.2	0.0-76.3
Education				
<12 years	5	51,706	9.7	3.4-23.4
12 years	10	99,116	10.1	5.2-18.9
>12 years	6	203,141	3.0	1.2-6.6
Marital Status				
Married	5	226,889	2.2	0.8-5.3
Unmarried ^a	16	129,217	12.4	7.4-20.3
Race/Ethnicity				
White non-Hispanic	12	265,955	4.5	2.5-8.0
Black non-Hispanic ^a	8	35,612	22.5	10.5-45.2
Hispanic	1	34,283	2.9	0.5-16.5
American Indian	0	5,749	0.0	0.0-66.8
Hmong	0	6,531	0.0	0.0-70.9
Other	0	7,907	0.0	0.0-58.6
Smoking status				
Smoker ^a	9	50,725	17.7	8.8-34.3
Nonsmoker	12	304,181	3.9	2.2-7.0
Total ^b	21	356,252	5.9	3.9-9.0

^aDemographic characteristics associated with a higher PRMR ($P < 0.05$).^bTotals for demographic characteristics may not add up to total live births because of missing values for certain characteristics.**Table 2.** Timing of Death Among Pregnancy-Related Death, Wisconsin, 2006-2010

Timing of death	Frequency	Percent
Antepartum	5	23.8
1st trimester	2	9.5
2nd trimester	0	0.0
3rd trimester	3	14.3
Labor and delivery	1	4.8
Postpartum	15	71.4
<42 days	12	57.1
≥42 days	3	14.3
Total	21	100

by sepsis, thromboembolic disease, and hemorrhage (Table 4). The most common causes of death for the pregnancy-associated maternal deaths (cases not brought to the committee for review or not deemed by the committee as pregnancy related) were motor vehicle crashes, cancer, and homicide.

Nineteen percent of the pregnancy-related deaths were judged to be avoidable. Substantive recommendations were made in almost half (48%) of the pregnancy-related deaths regarding pos-

Table 3. Body Mass Index in Pregnancy-Related Deaths, Wisconsin, 2006-2010

Body Mass Index	Frequency	Percent
Underweight (<18.5)	0	0.0
Normal (18.5-24.9)	4	23.5
Overweight (25.0-29.9)	2	11.8
Obese (30.0-39.9)	11	64.7
Total	17	100
Missing	4	-

Table 4. Causes of Death Among Pregnancy-Related Deaths, Wisconsin, 2006-2010

Cause of Death	Frequency
Cardiac	7
Cardiomyopathy	5
Other cardiac	2
Sepsis	4
Thromboembolic disease	4
Amniotic fluid embolism	1
Other thromboembolic	3
Hemorrhage	3
Abnormal placentation	2
Ectopic pregnancy	1
Anesthesia	1
Hypertension/Preeclampsia/Eclampsia	1
Suicide (postpartum depression)	1
Total	21

sible opportunities for quality improvement. These recommendations varied from specific items about a particular case to more general recommendations about improvement in the quality of obstetric care in Wisconsin. Most often recommendations were made for educational efforts in a specific area of obstetric care, but more global recommendations were made regarding management of chronic medical conditions before, during, and after pregnancy. Also, recommendations were made to address promoting research in the area of peripartum cardiomyopathy, as well as continued efforts in the area of patient safety.

DISCUSSION

As shown in Table 1, the pregnancy-related mortality ratio for 2006-2010 is 5.9 per 100,000 live births. This is a slight decrease, though not statistically significant, from the combined statistics in the last report from 1998-2005 of 9.4 deaths/100,000 live births (7.1-12.3, 95% CI).⁵ This is substantially lower than the reported United States rate for the same time period.² It is unclear whether this difference indicates that the actual number of pregnancy-related mortality is lower in Wisconsin. The difference might instead be an artifact due to differences in case ascertainment, methods for identification of cases for review, or the distribution of demographic characteristics and risk factors in the population. However, the group-specific pregnancy-related mortality ratios appear to be lower in Wisconsin across all demo-

graphic groups. Confidence intervals do overlap due to the small number of events over the time period of review.

Several demographic disparities associated with pregnancy-related deaths are again noted in this report as they were in the 2 previous reports, most notably a greater than 4-fold difference in the PRMR between non-Hispanic black and non-Hispanic white mothers. This association is likely complex and related to a number of other social, economic, and medical factors. One key concept focused on addressing these disparities is the “life-course” perspective introduced in 2002.⁷ This approach suggests that health outcomes across the life span are influenced by a complex interplay of biological, behavioral, psychological, and social protective factors as well as risk factors.^{8,9} Many state and local public health initiatives in Wisconsin and throughout the country now include this concept in all of their programming efforts and aim to understand and address the many risk and protective factors that play a role in outcomes even before a woman becomes pregnant.¹⁰

Chronic medical conditions appear to play an important part in a number of maternal deaths. A significantly higher proportion of the pregnancy-related deaths reported in Wisconsin occurred in obese women (65%) compared to all births in Wisconsin (28%; 2011-2013).¹¹ Recent data published by the California Maternal Mortality Review Team found that this association remained only for certain causes of death.¹² In Wisconsin, in many cases, chart reviews fail to provide enough details about the course of the medical condition to allow for a complete understanding of the role that chronic conditions may have played in contributing to the death. The MMRT discussion frequently includes concern that many of the women who died as a result of being pregnant enter pregnancy with medical conditions not optimally treated, end pregnancy without coordinated and consistent postpartum care for these conditions, or are inadequately counseled regarding the risks of becoming pregnant with a serious medical condition. Nationally, the current (2006) unintended pregnancy rate in the United States is 49%.¹³ The Wisconsin Pregnancy Risk Assessment Monitoring System (PRAMS) shows that mothers who gave birth in 2009-2011 who did not intend pregnancy, as opposed to mothers who intended pregnancy, were more likely to suffer from chronic medical conditions, as well as engage in behaviors and life experiences that increase risk for poor infant and maternal outcomes.¹⁴ A maternal comorbidity index was recently developed as a tool to better assess pregnancy risk based upon chronic medical conditions, but it has not yet been tested prospectively.¹⁵

The observation that the most common causes of pregnancy-related deaths in Wisconsin are cardiac in nature is a change from the 1998-2005 data in which the most common cause of death was thromboembolic disease, with a substantial number of those deaths caused by amniotic fluid embolism (AFE).

The most recent US statistics also reflect this change, with a steady increase in cardiomyopathy deaths.² There appears to be a decline in the incidence of thromboembolic disease and AFE as a cause of maternal mortality since the last report, and there has been a concerted national effort in the United States to prevent postsurgical thromboembolic disease.¹⁶ There also is evidence that the mortality rate from AFE is declining due to more rapid and effective diagnosis and management.^{17,18} The Wisconsin data may be a reflection of these efforts.

Hemorrhage continues to be a leading cause of obstetric morbidity and mortality, however, none of the hemorrhage deaths from the current study were due to the most common cause of maternal hemorrhage, uterine atony. Two deaths were due to abnormal placentation. Nationally, increasing Cesarean section rates are thought to be directly related to this infrequent but significant iatrogenic problem causing obstetrical hemorrhage.¹⁹ Unfortunately, effective treatment of abnormal placentation, in many cases, is highly problematic. It requires early and accurate diagnosis and appropriate planning for delivery in a facility with proper equipment, personnel, and experience to deal with the problems associated with this condition. Even in the most optimum circumstances, these women still can experience severe morbidities and mortality.

Two other pregnancy-related deaths illustrate points worth emphasizing in this report. The first is an overdose of local anesthesia with a labor epidural. Immediate public attention surrounding this case prior to the MMRT review resulted in major changes in hospital pharmacy policies, as well as labor and delivery nurse staffing throughout the United States.²⁰ The second case involves an infection with *Clostridium sordellii* after a medical termination of pregnancy. This type of infection is rare but almost uniformly lethal. Cases of this sort are still reportable. To date, only 1 case of survival with this specific type of infection has been reported in the literature.²¹ Although cases of *C sordellii* do occur with normal vaginal deliveries and with spontaneous pregnancy losses, this infection seems to be associated more frequently with intravaginal prostaglandin use and its possible immune-suppressive effects.^{22,23}

In the past, recommendations and action plans resulting from MMRT review have been carried forward through an invaluable partnership with the Wisconsin Association for Perinatal Care (WAPC) and the Wisconsin Section of the ACOG. Together they have translated MMRT findings into prevention projects and initiatives concerning maternal hemorrhage, maternal depression screening, maternal obesity, and maternal substance abuse. In addition, groups including the Wisconsin Chapter of the Association of Women's Health, Obstetric, and Neonatal Nurses (AWHONN) and the Wisconsin Chapter of the American Academy of Family Physicians (AAFP) have used this information as a springboard for their educational efforts. However, the

processes and partnerships necessary to fully realize the potential of maternal mortality reviews to inform public health systems, health care delivery systems, and state and local government agencies have not yet been fully realized. The Wisconsin Perinatal Quality Collaborative was formed recently and will implement quality improvement strategies to reduce maternal deaths and morbidities, as has been done successfully in California and other states. The MMRT is committed to collaborating with this group to more efficiently translate team findings and recommendations to quality improvement action for prevention of maternal deaths.

Looking to the future, maternal mortalities are but the tip of the iceberg in terms of adverse outcomes. Severe maternal morbidities or so-called “near misses” make up a much larger portion of adverse maternal outcomes; however, the study of these morbidities has been limited. Until recently, most hospitals had no mandates to do such reviews, compared to many states that require maternal mortality reviews. However, the Joint Commission for Hospital Accreditation recently mandated a review of all maternal intensive care unit (ICU) admissions and transfusions over 4 units.²⁴ Interest is also increasing among ACOG and the Society for Maternal Fetal Medicine (SMFM) with initiatives to investigate and analyze these events on a nationwide basis.^{25,26} Efforts are underway to create standardized means of performing these investigations at a local level with the aim of more rapidly and efficiently addressing quality-of-care issues.²⁷ Review of these larger numbers of severe maternal morbidities could complement maternal mortality reviews and allow more evidence-based recommendations to be made. Finally, the MMRT hopes to build relationships with other state mortality review and reporting systems to obtain more complete records concerning homicide, cancer, and motor vehicle deaths to incorporate these cases into its formal maternal mortality review process.

The maternal mortality review process and the resulting data are not without limitations. Identification and proper review of maternal mortalities is highly dependent on complete case ascertainment, the availability of high-quality source data, and the composition and perspectives of the review team. Specific to pregnancy-related mortalities, Wisconsin’s ratio may well be artificially low due to possible underreporting of maternal deaths related to nonobstetric causes using the pregnancy checkbox, by the exclusion of certain causes and manners of death from review, by lack of availability of records, or by insufficient documentation on available records. In addition, the determination of avoidability can be subjective and may be influenced by the composition of the team and the perspectives and personalities of its members. As a consequence, it also may be difficult to make direct comparisons between states or across time within an individual state. Lastly, it may be difficult to identify statistically significant differences or trends when the number of events is relatively small.

CONCLUSION

Maternal mortality reviews continue to be a vital and necessary means of assessing maternal health and health care. In Wisconsin, there is a lower than average pregnancy-related maternal mortality ratio, but this is not a reason for complacency. There continue to be many challenges in women’s health that are illustrated in sharp relief by maternal death reviews. It is imperative that the next steps forward by the MMRT should include initiation of reviews of severe maternal morbidities, closer scrutiny of chronic medical conditions causing maternal morbidities and mortalities, and re-examination of pregnancy-associated deaths.

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Early Detection by Ultrasound of Partial Hydatidiform Mole With a Coexistent Live Fetus

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ABSTRACT

Introduction: Twin pregnancy with hydatidiform mole and coexistent live fetus is a rare condition with severe maternal and fetal complications such as preeclampsia, vaginal bleeding, persistent gestational trophoblastic tumor, and fetal death.

Case Presentation: We report a case of a twin pregnancy with histopathologically proven hydatidiform mole and a coexistent live fetus in a 30-year-old Indian woman diagnosed by first trimester ultrasound.

Discussion: Our case emphasizes the role of ultrasound in diagnosing this condition in early pregnancy. A succinct overview of etiological mechanisms, possible complications, and clinical management is provided.

Conclusion: Ultrasound is an effective diagnostic tool to diagnose hydatidiform mole with coexistent live fetus. Early diagnosis of this condition is important for risk stratification and facilitates an informed decision by the patient whether to terminate the pregnancy or to continue until full term with close monitoring after delivery.

INTRODUCTION

Twin pregnancy with hydatidiform mole and a coexistent live fetus is a rare occurrence, with a prevalence of 1 in 20,000 to 100,000 pregnancies.^{1,2} A molar pregnancy can be either complete or partial. The majority are a complete hydatidiform mole coexisting

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with a normal fetus and placenta. Twin pregnancies with partial hydatidiform mole coexisting with a live fetus are rarely reported, since fetuses identified with partial mole are generally triploid and tend to die in the first trimester.^{1,3,4} Hydatidiform mole with live fetus is associated with the risk of many maternal and fetal complications such as vaginal bleeding, preeclampsia, thromboembolic disease, hyperemesis, hyperthyroidism, fetal intrauterine demise, and a potentially lethal risk of gestational trophoblastic neoplasia.^{5,6} Management of such cases presents a dilemma to both the clinician as well as the patient. The possible risks that may ensue upon continuation of pregnancy must be weighed against the chances of fetal survival so as to facilitate

a well-informed decision by the patient to opt between continuation and termination of pregnancy. An early diagnosis of this condition by high resolution ultrasound is important for clinical management and helps the patient in making a decision whether to terminate pregnancy or continue with close fetomaternal monitoring. We report a histopathologically confirmed case of partial hydatidiform mole with coexistent live fetus, diagnosed on a routine first trimester ultrasound.

CASE PRESENTATION

A 30-year-old woman (gravida 2, para 1) of Indian origin with a nonconsanguineous conception came for a routine first trimester ultrasound examination at a gestation age of 13 weeks 3 days by last menstrual period. The first child was a healthy 5-year-old girl from an uneventful, normal full-term gestation. The present conception resulted from ovulation induction with a 5-day course of clomiphene citrate. The patient reported 2 episodes of vaginal bleeding and 1 episode of passing white, ball-like structures in the present pregnancy.

Transvaginal ultrasound scanning (Philips HD7; 4-8MHz) revealed a dichorionic diamniotic twin pregnancy. One sac con-



CME available. See page 212 for more information.

tained sonographically normal live fetus matching the gestational age with unremarkable placenta. The placenta attached to the fetus was examined carefully and found to be normal. Amniotic fluid volume was appropriate. The other sac had an abnormally thickened placenta showing multifocal cystic spaces with no identifiable fetus or umbilical cord (Figures 1 and 2). Doppler evaluation of cystic spaces in the abnormal placenta revealed no significant vascularity. The maternal ovaries were normal. Clinical correlation with serum β -human chorionic gonadotropin (β -hCG) revealed an alarmingly elevated level of 180,000 mIU/ml. A tentative diagnosis of twin gestation with complete molar pregnancy and coexistent fetus was made based on sonographic findings, raised β -hCG level, and clinical history. A fetus in partial mole tends to die early in pregnancy.^{3,4} An option of amniocentesis was offered to the patient to confirm the diploid status of the fetus, but the patient refused. The couple was counseled about the possible maternal and fetal risks of this condition, including a potential risk for onset of malignant change termed persistent gestational trophoblastic disease. The patient opted for termination of the pregnancy rather than expectant management. A stillborn male fetus of 90mm length and placenta appropriate for gestation age were delivered upon medical termination of the pregnancy. These were grossly and histopathologically normal. Another placenta with grey-white soft tissue fragments was delivered. On histopathological examination, it demonstrated dilated villi with edema and focal scalloping. The villi were lined by attenuated trophoblasts. These features were compatible with a diagnosis of partial hydatidiform mole (Figure 3). No fetal parts, however, were found along with partial hydatidiform molar placenta. Following termination, close β -hCG surveillance of the mother was done daily, which revealed rapid regression to 7,700 mIU/ml on the third postpartum day. Weekly serum β -hCG surveillance was continued thereafter, which showed decreasing levels with insignificant value (0.87mIU/ml) reached in 8 weeks.

DISCUSSION

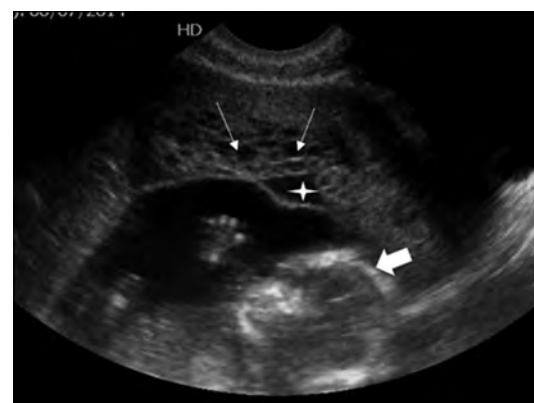
Coexistence of molar pregnancy with a twin live fetus is a rare, complex clinical condition. Complete molar pregnancies show complete lack of fetal parts, while partial molar pregnancies show fetus or indication of previous fetal existence. The majority of them are complete hydatidiform mole coexisting with a normal fetus and placenta, with nearly 200 cases documented in literature to 2007.^{1,6} Twin pregnancies with partial hydatidiform mole coexisting with a live fetus are rarely reported, since fetuses identified with partial mole are generally triploid and tend to die in the first trimester.^{1,3} The possible scenarios of a molar pregnancy coexisting with a fetus in a twin gestation are (1) complete molar gestation with a coexistent normal diploid fetus in a dizygotic twin pregnancy, (2) partial hydatidiform mole with a coexistent normal diploid fetus in a dizygotic twin pregnancy, and (3) par-

Figure 1. Ultrasound Scan of Dichorionic Twin Pregnancy



Transvaginal ultrasound (Philips HD7; 4-8MHz) shows abnormal placenta in 1 sac (thin arrow, left) and twin sac with a live fetus and normal placenta (bold arrows, right) posterior to it.

Figure 2. Ultrasound Scan, Enlarged View

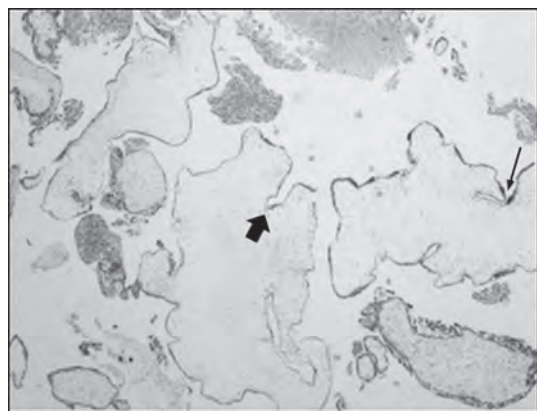


Transvaginal ultrasound scan (Philips HD7; 4-8MHz) with enlarged view of one sac showing abnormal placenta with multifocal sonolucencies (thin arrows) and amniotic fluid (marked by 4-point star). Twin sac revealed a live fetus (bold arrow).

tial hydatidiform mole and a coexistent abnormal triploid fetus in a monozygotic twin pregnancy.

In this case, ultrasound demonstrated a normal fetus in one sac and an abnormal, thickened, multicystic placenta without any fetus in the twin sac. Histopathological examination after termination of pregnancy demonstrated a partial molar placenta with no evidence of a fetus or fetal parts noted in the twin sac containing the abnormal placenta. Lack of fetal parts in our case was an interesting finding since a fetus or fetal parts are usually, though not always, present in cases of partial mole.⁷ In cases of complete mole, the abnormal placenta has a characteristic “snow-storm” appearance showing multiple sonolucencies sized 1 mm to 30 mm with a normal coexistent twin fetus.^{4,8} Detectability of partial mole by ultrasound is only 30%, since partial mole lacks

Figure 3. Molar Placenta Tissue



Microphotograph showing dilated villi lined by attenuated trophoblastic cells. The villi have scalloped borders (bold arrow, left) and stromal inclusions (thin arrow, right). H&E stain, x40 magnification.

the typical “snowstorm” appearance. Partial mole shows heterogeneous placenta with multicystic spaces and interspersed solid areas. Color Doppler may show the presence of high-velocity, low impedance flow in the multicystic placental mass.^{4,9} The differential diagnoses of such a sonographic appearance are placental mesenchymal dysplasia, choriocarcinoma, and placental hematoma. Placental mesenchymal dysplasia is a recently recognized, rare placental vascular anomaly characterized by placentomegaly and grape-like vesicles appearing as hypoechoic areas on sonography.⁹ Confirmation of diagnosis is based on histopathological examination. Choriocarcinoma is differentiated on sonography with increased vascularity or a large feeding vessel inside the tumor.⁹ Placenta hematoma may sometimes resemble partial mole with its partially solid, partially cystic sonographic appearance. Because of their similar sonographic appearances, the differentiation between these diagnoses may be difficult to make antenatally and often can be made successfully only in the postpartum/termination period, as was in our case. Confirmation of partial molar placenta is done histopathologically depicting organization of villous tissue with hyperplastic surface trophoblasts and irregular outline of villi leading to stromal inclusions.⁵ A prior molar pregnancy increases the risk of recurrence up to 2%.¹⁰

Other etiological risk factors for partial mole are repeated past abortions, irregular cycles, and maternal age of more than 40 years.^{5,11} Incidence of partial mole is higher in Asia than North America and Europe, being highest in India.^{5,10,11} Common clinical presentations of molar pregnancies are vaginal bleeding in the first or second trimester, unusually elevated serum β -hCG levels, and early development of preeclampsia.⁴ There is a suggestion in recent literature of increased incidence of twin pregnancies with mole and coexistent fetus in patients using drugs for ovulation induction for fertility, as in our case. However, ovulation induc-

tion drugs are yet to be established as a potential risk factor due to a limited number of reports available up to date.¹² In view of associated high complications, molar pregnancy with live fetus has complex clinical considerations in a strongly desired pregnancy. Termination of pregnancy is generally recommended in a severely malformed fetus.^{5,8} In sonographically normal fetuses, the prenatal diagnosis of fetal karyotype can be attempted by chorionic villus sampling, amniocentesis, or fetal cord blood sampling.¹ Women should be counseled about the risk of both the maternal complications, including preeclampsia, thromboembolic disease, hyperemesis, and hyperthyroidism and fetal complications including spontaneous miscarriage, intrauterine death, and preterm labor.^{5,6,8} A potentially fatal complication of molar pregnancies is the risk of persistent gestational trophoblastic disease (pGTD).^{2,6,10} The incidence of pGTD after surgical evacuation in complete hydatidiform mole with fetus is considerably higher as compared to partial hydatidiform mole with fetus (10-28% vs 3-5%).¹³ The risk of pGTD remains unchanged whether the patient opts for early termination of pregnancy or chooses to continue the pregnancy. Thus, expectant management may be permitted in cases of a complete molar pregnancy with coexisting fetus, which has up to a 40% chance of a viable live birth.^{2,6,8} If the fetus is euploid and sonographically normal and the mother is clinically well, the pregnancy can be continued under careful perinatal monitoring.

Expectant mothers with a twin and partial mole are difficult to counsel due to the paucity of available literature. In our case, the patient did not consent to prenatal karyotyping and chose to terminate the pregnancy, in view of the risk of severe maternal and fetal complications. In cases where continuation of pregnancy is desired, guidelines for patient management should include serial serum β -hCG levels and a chest x-ray to screen for metastases for gestational trophoblastic neoplasia.¹⁴ Post evacuation, intense maternal follow-up is required by (1) β -hCG assays to confirm its return to baseline values (<5 mIU/mL), and (2) sonographic evaluation and measurement of endometrial thickness.^{10,13-15} Serial quantitative serum β -hCG assay is recommended within 48 hours of evacuation, every 1 to 2 weeks while elevated, and monthly for 6 months after the β -hCG levels return to normal.^{14,15} Treatment for pGTD with chemotherapy is indicated in cases of persistently raised β -hCG at 6 months after evacuation or with histopathological diagnosis of choriocarcinoma.¹⁰

CONCLUSION

It is clinically challenging to diagnose a molar placenta in an ongoing pregnancy. Early diagnosis depends on a combination of detecting an unusually high level of β -hCG and abnormalities detected on ultrasound examination. This case emphasizes the importance of ultrasound as a good diagnostic tool in cases of twin pregnancy with a molar and a coexistent live fetus. Ultrasound

alone is insufficient for diagnosing such cases but serves to raise the possibility of this condition. Partial molar pregnancies generally present in the second trimester and manifest with complications such as vaginal bleeding or spontaneous abortion. In our case, however, the patient was relatively asymptomatic at presentation and the condition was diagnosed much earlier on a routine first trimester ultrasound scan. The radiologist should be aware of the sonographic manifestations and differential diagnosis of this condition to ensure appropriate management. Careful monitoring of these patients in the postpartum period and close monitoring of subsequent pregnancies to rule out the recurrence of gestational trophoblastic disease is of utmost importance.

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Quiz: Early Detection By Ultrasound of Partial Hydatidiform Mole With a Coexistent Live Fetus

EDUCATIONAL OBJECTIVES

Upon completion of this activity, participants will be able to:

1. Recognize the differences in pathogenesis and presentation in a complete or partial molar pregnancy with a coexistent fetus.
2. Identify the maternal and fetal complications of a molar pregnancy with a coexisting fetus.
3. Describe the role of sonography in the management of patients with a molar pregnancy.

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QUESTIONS

1. The possible scenarios of a molar pregnancy coexisting with a fetus in a twin gestation are:
 - ☐ A. Hydatidiform mole with a coexistent normal diploid fetus in a dizygotic twin pregnancy.

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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. You will receive an e-mail from wmj@wismed.org with instructions to complete an online evaluation. Your certificate will be delivered electronically.

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- ☐ B. Partial hydatidiform mole with a coexistent normal diploid fetus in a dizygotic twin pregnancy.
 - ☐ C. Complete hydatidiform mole and a coexistent abnormal triploid fetus in a monozygotic twin pregnancy.
 - ☐ D. A and B only
 - ☐ E. A, B, and C
2. In cases of a complete mole, the abnormal placenta has a characteristic “snowstorm appearance” showing multiple sonolucencies, whereas the detectability of a partial mole by ultrasound is only 30% since partial mole lacks the typical “snowstorm appearance.”
 - ☐ True
 - ☐ False
 3. Which of the following factors increases the risk for a molar pregnancy?
 - ☐ A. A prior molar pregnancy.
 - ☐ B. Repeated past abortions.
 - ☐ C. Maternal age more than 40 years.
 - ☐ D. A and B
 - ☐ E. A, B, and C
 4. A potentially fatal complication of molar pregnancies is the risk of persistent gestational trophoblastic disease. This complication is far more common in partial molar pregnancies.
 - ☐ True
 - ☐ False
 5. For patients who choose to continue the pregnancy, the chances of a viable live birth in complete hydatidiform mole with a coexistent live fetus approaches 40%.
 - ☐ True
 - ☐ False

Evaluation of a Curriculum to Improve Clinician Communication With Adolescents

Amy Olejniczak, MS, MPH; Hannah Otalora-Fadner, BA; Christina Hanna, MPH; Emma Hudson, MPA, MPH; Joanna Tess, MPH; Heather Royer, PhD, RN

ABSTRACT

Introduction: While guidelines for health care clinicians working with adolescent patients encourage open communication and confidential visits, current practices often fall short and many adolescents do not receive confidential care or adequate communication about sexually transmitted infections, reproductive health, and other sensitive health topics.

Methods: The Providers and Teens Communicating for Health (PATCH) program in Wisconsin aims to bridge communication gaps between adolescents and health care clinicians. Teen educators are hired and trained to lead 2 types of workshops—one targeting peers and one targeting clinicians.

Results: Pre- and post-intervention evaluations show improvements in clinician and teen knowledge, intentions to seek and provide quality care, and reported change in care delivery.

Conclusion: The PATCH program curriculum shows promise for improving the care of young people throughout Wisconsin.

INTRODUCTION

In the United States, around 20 million new sexually transmitted infections (STIs) occur each year, with roughly half occurring in individuals aged 15 to 24 years.¹ In Wisconsin, while nearly half of high school students are currently sexually active, only 61% report using condoms during their last sexual encounter.² Approximately 6000 Wisconsin teens become pregnant each year.^{2,3}

While adolescents demonstrate a need for access to sexual health services, nearly half report never having discussed their sexual health history with a clinician, and less than one-third report ever having discussed birth control, STI testing, proper condom

use, or counseling about sexual abuse.⁴ Health care clinicians are a reliable source of knowledge, and adolescents not receiving the information they need points to a critical gap in communication.^{4,5} Moreover, 48% of young people aged 13 to 24 report wanting more sexual health information from doctors than they currently are receiving.⁶

The Guide to Adolescent Preventive Services (GAPS) recommends that clinicians regularly communicate office confidentiality policies and communicate with patients in a nonjudgmental manner. This is particularly important as many adolescent patients report feeling uncomfortable

discussing health topics with clinicians if privacy and confidentiality have not been assured and if they feel as if the clinician is judgmental or condescending.⁷ Awareness of these concerns could help clinicians better communicate and ultimately improve the overall health of adolescent patients.

METHODS

Providers and Teens Communicating for Health (PATCH), formally the Wisconsin Adolescent Health Care Communication Program, is a program run by the Wisconsin Alliance for Women's Health with the goal of bridging gaps in communication between adolescents and clinicians. Recognizing that teens are best equipped to offer clinicians authentic insight into teen experiences and concerns, the program curriculum includes evidence-based content and delivery format and enables clinicians to learn directly from teen educators. The program also employs peer education to empower Wisconsin teens to seek quality sexual health care.⁸

The program curriculum includes facilitation of 2 workshops based on program structure developed by the National Institute for Reproductive Health: (1) PATCH for Providers—an interactive workshop in which teen educators present to health care clinicians using skits, small group discussions, worksheets, and

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Table 1. Demographic Characteristics of Teen Workshop Participants (n=371)

Demographic Characteristic	n	%
Age		
12	4	1
13	4	1
14	12	3
15	57	15
16	101	27
17	97	26
18	58	16
19	9	2
20 or older	13	3
Unknown/No response	16	4
Gender		
Male	189	51
Female	161	43
Other	2	0.5
Race		
White	281	75
Black/African-American	31	8
American Indian/Alaska Native	5	1
Asian	5	1
Native Hawaiian/Pacific Islander	3	0.8
Multiracial	30	8
Other	6	2
No response	11	3
Ethnicity		
Not Hispanic/Latino	250	67
Hispanic/Latino	32	9
No response	89	24
Sexuality		
Heterosexual	315	84
Homosexual	5	1
Bisexual	9	2
Asexual	5	1
Questioning	7	2
Other	12	3
No Response	18	5
Primary Guardian Education		
Less than high school	46	12
High school/General educational development	109	29
Some college	51	14
2-year degree	46	12
4-year degree	44	12
Master's degree	37	10
Doctoral degree	11	3
Professional degree (MD/JD)	8	2
Unknown/No response	17	5
Secondary Guardian Education		
Less than high school	39	11
High school/General educational development	125	34
Some college	48	13
2-year degree	42	11
4-year degree	53	14
Master's degree	23	6
Doctoral degree	7	2
Professional degree (MD/JD)	5	1
Unknown/No response	29	8

Table 2. Demographic Characteristics of Provider Workshop Participants (n=177)

Demographic Characteristic	n	%
Gender		
Male	32	18
Female	132	75
Other	2	1
No response	11	6
Years in the Field		
<5 years	91	51
5-10 years	51	10
11-20 years	28	16
>20 years	35	20
No response	6	3
County		
Dane	35	20
Milwaukee	20	11
Wood	14	8
Marathon	16	9
Clark	12	7
Rock	14	8
Taylor	7	4
Unknown	59	33
Provider Type		
Practicing clinician	48	27
Resident	44	25
Student	22	12
Other	57	32
No response	6	3

activities to help clinicians develop communication strategies; and (2) PATCH for Teens—a complimentary workshop where teen educators educate peers about health care rights and confidentiality laws in Wisconsin, and encourage them to seek positive health care experiences.

The PATCH for Teens workshop introduces teens to the confidentiality of certain sexual health services, equips students to think critically about the stigma that surrounds sexual health in our society, and empowers students to seek the health knowledge and services that clinicians offer. A skit at the end uses student volunteers to illustrate the importance of practicing open communication with one's clinician and provides tips and tools for doing so.

In the PATCH for Providers workshop, teen educators lead clinicians through a series of interactive activities in which clinicians are asked to respond and suggest ways in which communication with teens could be improved. For example, the workshop begins with a "Myth or Fact" exercise in which clinicians are shown statements about teen concerns or preferences and must determine the validity of that statement. Clinicians also are given the opportunity to volunteer in a skit that mimics an office visit in which they are asked to respond to a teen patient using strategies and methods taught throughout the workshop. As a group, the teen educators and clinicians watch a series of short standardized patient interactions and discuss what went well and

Table 3. Outcome Measures Descriptions and Percent Correct for Pretest and Posttest

Outcome Measure Title	Measure Description	Teens (N = 398)			Providers (N = 180)			
		Pretest	Posttest	Change	Pretest	Posttest	Follow-up	Change
Knowledge	Assesses understanding of youth-clinician sexual health communication, appropriateness of parent involvement in teen clinic visits, and knowledge about confidential health care services in Wisconsin. (% Correct)	58.61%	79.34%	Gain: +50.1% ^a	73.64%	80.30% (n = 146)	80.95% (n = 44)	Gain: +27.7% ^b
Internal Stigma (Clinicians)	Measures perceptions of teen sexual activity and teen communication skills. (4 = High Stigma; 1 = Low Stigma)				2.09	2.04 (n = 155)	1.92 (n = 52)	$P = 0.000^a$ $P = 0.731^b$
Anticipated and Internalized Stigma (Teens)	Assesses perceptions of teen sexual activity and the need for sexual health services. (4 = High Stigma; 1 = Low Stigma)	2.52	2.35	$P = 0.024^a$				
Self-Efficacy	Assesses clinicians' and teens' confidence in talking with each other about sexual health, confidentiality, and other sensitive health topics. (4 = High Self-Efficacy; 1 = Low Self-Efficacy)	2.97	3.10	$P = 0.002^a$	2.97	3.24 (n = 152)	3.40 (n = 47)	$P = 0.000^a$ $P = 0.002^b$
Current and Intended Behavior: (Teens)	Measures percentage of teens that have brought up sexual health and confidentiality with a clinician and percent of teens that intend to during future visits. (% Teens)	15.2%	44.7%	Gain: +34.8% ^a				
Current and Intended Behavior (Clinicians)	Measures self-reported current and intended behaviors for defining sex for teen patients. (1 = At every appointment; 4 = Never)				1.88	1.31 (n = 120)	1.72 (n = 44)	$P = 0.010^a$ $P = 0.670^b$
	Measures self-reported current and intended behaviors or discussing confidentiality with teen patients. (1 = At every appointment; 4 = Never)				1.39	1.10 (n = 122)	1.42 (n = 44)	$P = 0.021^a$ $P = 0.443^b$
	Measures self-reported current and intended behaviors for asking parents to leave the room during teen visits. (1 = At every appointment; 4 = Never)				1.70	1.13 (n = 120)	1.48 (n = 44)	$P = 0.061^a$ $P = 0.289^b$

^aChange from pretest to posttest^bChange from pretest to follow-up test

what areas need improvement. Teen educators also are trained as standardized patients and allow for practice interviews when appropriate.

Data was collected from 398 teens (Table 1) and 180 clinicians (Table 2) who participated in 28 1- to 2-hour workshops (10 for clinicians and 18 for teens) between September 2012 and May 2013. (Note that data was not available for all participants.) Participants were recruited through community connections and outreach, as well as an online workshop request form. Attendees were given pre- and posttests to assess outcome measures related to sexual health communication (Table 3). Providers completed a 3-month follow-up to assess medium-term impacts and an additional self-reported behavioral change measure. Gain scores were calculated to determine cumulative knowledge increases from pre- and posttests which, in this context, can be understood as the percentage of workshop attendees who answered the questions incorrectly on pretest, who then answered correctly on posttest. Gain scores demonstrate the program's impact on those who did not have the knowledge prior to the workshop. To analyze data, 2-tailed *t* tests were conducted with an alpha of 0.05. Paired analysis was used for clinicians but was not possible with the teen data (see Limitations).

RESULTS

Teens (N = 398) demonstrated the greatest increase in knowledge related to patient/clinician responsibilities when bringing up sensitive health conversations during a visit (gain = 32%, $P = 0.001$), and confidentiality policies around sexual and general health services (gain = 50%, $P = 0.001$). Teens also demonstrated significant improvements in self-efficacy. They reported greater confidence in talking to clinicians about sensitive health topics ($P = 0.08$) and from the pretest to the posttest, nearly twice as many teens intended to bring up sexual health and confidentiality with their clinician.

With an overall knowledge gain of 27.7% from pretest to follow-up, clinicians (N = 180) demonstrated the greatest gains in knowledge of adolescent concerns and preferences (gain = 71%, $P = 0.001$) and in an understanding of the role that confidentiality plays in adolescent health (gain = 70%, $P = 0.001$). Providers also reported increases in their confidence in talking to youth about sexual health (from 2.97 in pretest to 3.40 in follow-up with $P = 0.002$). Providers similarly showed a significant increase in intended behavior and a slight increase in self-reported actual behavior change—meaning they reported discussing confidential-

ity, definitions of sex terms, and asking parents to leave the room for a period during visits with youth in the follow-up test.

DISCUSSION

There was significant improvement in the areas of knowledge, self-efficacy, and reported behavioral intentions to seek and provide quality sexual health care for teens and clinicians. For clinicians, there was evidence of self-reported behavioral changes at the 3-month follow-up. Teens exhibited the greatest growth in learning confidentiality policies and the importance of patient/clinician communication.

Workshops were well-received with 93% of clinicians and 74% of teens rating the experience as very good or excellent. Additionally, 100% of teen educators who implemented workshops over the course of a year found the experience to be valuable and reported increases in knowledge and self-efficacy related to sexual health.

Limitations

Although this program evaluation shows evidence of a promising program, several limitations should be noted. First, occasional variations in workshop length and content occurred due to attendee scheduling constraints and natural variation between teen educators. Second, we experienced challenges when matching teen pre- and posttests, as well as tracking teens and clinicians for our 3-month follow-up (33% response rate).

CONCLUSION

The PATCH program demonstrated evidence of early efficacy, feasibility, and statewide demand. Projected goals for workshop delivery were exceeded by nearly 3 times. Providers and teens experienced significant improvements in knowledge, self-efficacy, and behavioral intentions to seek and provide quality sexual health care. PATCH hopes to continue its program expansion

in Wisconsin in order to be more accessible to teens and clinicians throughout the state. Clinicians can visit www.wipatch.org to learn more or to schedule a workshop.

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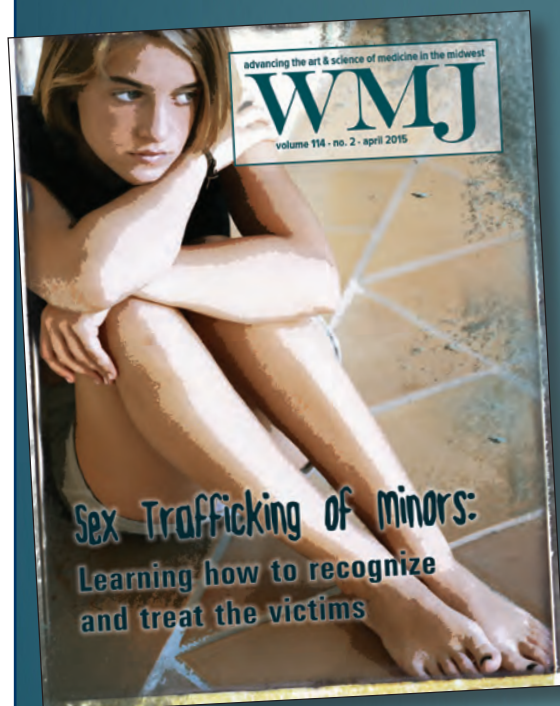
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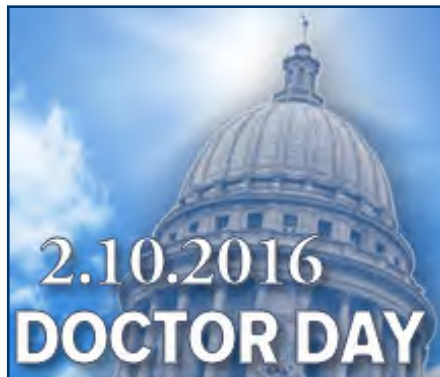
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Improving Identification of Depression and Alcohol Use Disorder in Primary Care and Care Transitions for Behavioral Health Conditions

Jay A. Gold, MD, JD, MPH; Christopher Becker, CPHIMS, CPHIT, PAHM, CHTS-IM

The Centers for Medicare and Medicaid Services (CMS) has identified alcohol use disorders and depression as significant causes of hospital readmissions. Major depressive disorder affects 6% to 9% of those over 55.¹ In the Medicare population, the prevalence of depression has been estimated to be 11%. It has a higher inpatient readmission rate than all other conditions except heart failure.²

Furthermore, alcohol use disorder is the most prevalent type of addictive disorder in those age 65 and over, exceeding prescription drug abuse.³ About 6% percent of the elderly are considered heavy users of alcohol.⁴

To help address these important issues, CMS has awarded the Lake Superior Quality Innovation Network (LSQIN), represented by MetaStar in Wisconsin, a new 4-year project. MetaStar and its counterparts in Minnesota and Michigan will work with primary care providers to increase the identification of Medicare beneficiaries with depression or alcohol use disorder in primary care settings, with a goal of reducing 30-day readmission rates and increasing outpatient follow-up for psychiatric discharges.

It is commonly accepted that screening rates for depression and alcohol use disorders in primary care settings are extremely low due to

apprehension about physicians' ability to effectively to screen for and to initiate treatment for behavioral health conditions because of:

- A lack of familiarity with mental health, substance use disorders (SUD), and alcohol use disorders (AUD).
- A knowledge gap related to evidence-based practices that would allow for office-based treatment of mild-to-moderate behavioral health conditions.
- A lack of understanding of community-based specialty mental health and SUD providers and how to develop relationships with them.

At present, physicians as a whole screen fewer than half of their patients for alcohol use disorders, and existing depression is identified in fewer than half of primary care patients. Approximately two-thirds of those with a behavioral health disorder do not receive behavioral health treatment.

This CMS funding offers LSQIN the opportunity to work with 600 provider practices across the 3-state region (200 practices in each state). In addition, in Wisconsin, a total of 5 inpatient psychiatric facilities (IPFs) (15 total across all 3 states) will have the opportunity to participate and receive support for improving readmission rates for psychiatric discharges. Practice recruitment will end on December 31, 2015.

The intended outcomes for the initiative are as follows:

- Increase the identification of people with depression or alcohol use disorder in primary care settings.
- Reduce 30-day readmission rate and increase outpatient follow-up for psychiatric discharges, along with increasing specialty care follow-up for discharges.
- Improve coordination/transitions of care

among care providers for Medicare beneficiaries with mental health disorders.

- Nationally, for practices recruited into this initiative, by 2019 it is expected that 10,000 primary practices will screen a majority of their Medicare caseload for depression and alcohol abuse with a validated screening instrument, with a total of 1.5 million beneficiaries screened by 2019.
- For inpatient settings recruited into the initiative—compared to baseline—the psychiatric readmission rate will be reduced, and the follow-up rate for behavioral health practitioners following discharge will increase.

LSQIN's behavioral health initiative is intended to support physicians in utilizing evidence-based alcohol and depression screening tools and interventions, initiating pharmacological treatment, and referral to treatment providers in the community.

Participants will develop mutually beneficial partnerships with community behavioral health providers, take advantage of reimbursements, and be prepared for future initiatives by all payers.

If you are interested in exploring participation in this project, please e-mail Chris Becker at cbecker@metastar.com.

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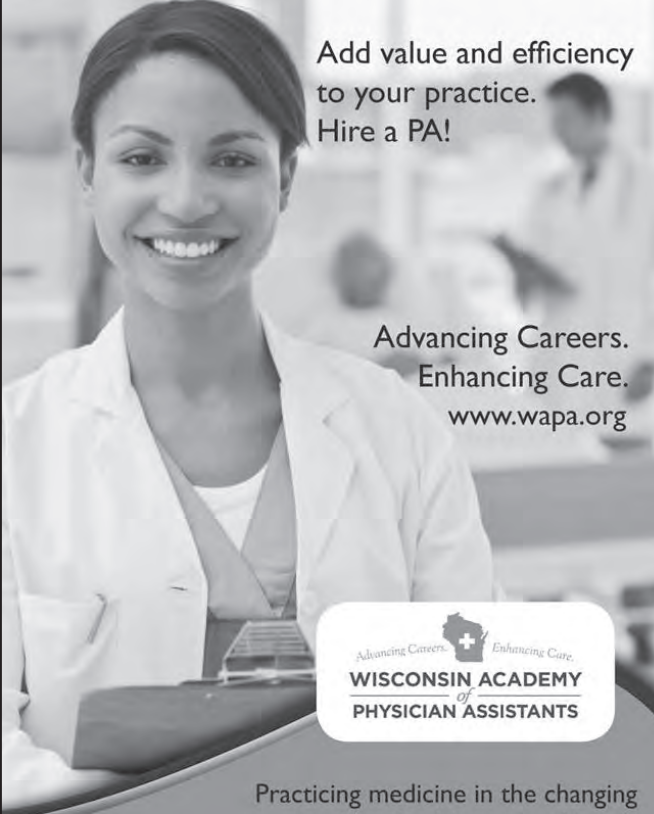
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Editor's note: The Wisconsin Medical Society helped form PIC Wisconsin in 1985 to ensure the availability of medical professional liability insurance for Wisconsin physicians. Today the Society continues to endorse ProAssurance (formerly PIC WISCONSIN) to provide professional liability insurance coverage for physicians.

Think for a minute about the true meaning of the word “partner.” The word implies a joint commitment to sharing risks and achieving mutual benefits. In my mind, that perfectly describes the ongoing collaboration between Wisconsin physicians, ProAssurance, and the Wisconsin Medical Society (Society).

Our partnership with organized medicine in Wisconsin marked its 30th anniversary this year, dating back to the 1985 founding of Physicians Insurance Company of Wisconsin (PIC Wisconsin). At the time, medical professional liability insurance was almost unobtainable in the state, and physicians turned to each other to ensure the viability of their honored profession. The shared peril gave birth to a lasting partnership.

Though much has changed in the intervening decades, the sense of shared risk and

mutual benefit endures. That partnership has only deepened since PIC Wisconsin became part of ProAssurance as a way of bringing a more profound commitment to Wisconsin physicians.

Together ProAssurance, with its focus on the guiding principal of Treated Fairly, and the Society have fought alongside physicians and their colleagues to ensure fair treatment in Wisconsin's courts; we also have created new insurance mechanisms to address the emerging medical/legal risks that are unique to Wisconsin.

Vendors vs Partners

Competing medical liability carriers have sought to capitalize on the joint success we've achieved, but are they real partners offering real-world solutions and real financial security—or are they simply vendors? You be the judge while considering the real benefits won through our partnership with you and the Society.

WMS Holdings Risk Purchasing Group, LLC (WMSH RPG) is the latest example of our ability to tailor a product to meet Wisconsin's unique practice environment. Wisconsin has been a longtime leader in the consolidation of medicine and delivery of high quality health care through large multispecialty groups. Its

health care system required an equally unique approach for larger risks.

Shared Goals

Along with providing customized underwriting and advantageous group-specific pricing, the WMSH RPG is committed to the Society's goal of enhancing patient safety and improving the quality of health care. The Risk Purchasing Group requires member groups to commit to integrated clinical risk management strategies developed in Wisconsin by leading medical/legal and patient safety experts.

Member groups also benefit by required participation in performance improvement continuing medical education (PI-CME), a process by which evidence-based measures are coupled with quality improvement strategies to enhance patient and clinical outcomes.

ProAssurance supports physicians' ongoing professional development to evaluate their practices, acquire new skills, and adapt to changing patient needs. In 2015, ProAssurance partnered with the Society to implement a PI activity for increasing patient satisfaction. Patients benefit from a physician's focus on better communication built on listening and sharing, coordinated care through interprofessional teams, and clinical documentation for effective integrated care delivery. Participating physicians further benefit by being able to earn continuing medical education credits for licensure and by fulfilling Maintenance of Certification Part 4 requirements for their designated specialty board.

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Stan Starnes is chairman and chief executive officer of ProAssurance Corporation, the parent company of ProAssurance Casualty Company (formerly PIC Wisconsin), the endorsed medical professional liability carrier of the Wisconsin Medical Society.

Our continued focus on enhancing patient safety and thus reducing medical malpractice lawsuits is demonstrated in our new risk assessment and practice consultation for hospital-based physicians. This no-additional cost program provides ProAssurance-insured physicians with a Risk Resource advisor's tailored recommendations for you and your practice after you complete a specialty-specific self-assessment survey. Using a pioneering approach, the program's design helps ensure that the risk management needs of individual physicians are not ignored when they migrate into a hospital setting.

Unparalleled Support

With malpractice lawsuits remaining a constant, ProAssurance has introduced a peer-to-peer counseling program, Physicians in Collaboration-Wisconsin. This program pairs physicians facing a malpractice lawsuit for the first time with colleagues who have experienced this trauma. Our experience shows that having a colleague with whom a defendant physician can maintain a confidential, professional dialogue dramatically lessens the strain of a lawsuit.

This service works hand-in-hand with our proven commitment to the superior defense of nonmeritorious lawsuits, providing our insureds with unparalleled peace-of-mind. After all, our partnership is about working together with our insureds, always being conscious of the importance of their professional reputation. Our tradition of excellence and advocacy continues; during 2014, ProAssurance successfully defended over 86% of lawsuits tried against ProAssurance insureds.

Enhanced Coverage

As further evidence of our true, long-term commitment to provide you and your colleagues with state-of-the-art liability protection, we are reworking our cyber liability coverage for 2016.* This will improve the industry-leading protections already included as part of the Society's Member Benefit Program policy.

Our CyberAssurance® coverage assists you in reacting quickly should you be hit with any of these increasingly common perils:

- Virus attacks
- Patient identity theft
- Online and offline data breaches

No matter how it occurs, a breach—through office computers, personal laptops, tablets, smartphones, or paper documents—demands an immediate, professional response. CyberAssurance provides Member Benefit Program insureds with access to highly qualified specialists who will help manage your response every step of the way. Up to specified limits, the current CyberAssurance plan:

- Pays regulatory fines and penalties and cover defense costs for governmental investigations (including HIPAA).
- Covers the cost of notifying patients and providing appropriate credit monitoring.
- Pays the cost of recovering or replacing data that is lost, erased, stolen, or corrupted.

Importantly, this CyberAssurance benefit applies to any professionals or entity named in your policy, including employees, officers, directors, and partners acting within the scope of their employment. Higher limits and additional protection are also available. Wisconsin Insurance & Financial Services, Inc. agents can provide all the details, including the 2016 Member Benefit Program cyber liability additions, when available.

Committed to Serving You

The examples I've provided are but a few of the ways in which we continually seek to enhance the partnership we have developed with Wisconsin physicians. Be assured, we are not resting on our laurels. We will maintain our commitment to be your valued partner, every step of the way.

**Subject to filing and Wisconsin Office of the Commissioner of Insurance approval.*



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☐ Has Changed During Preceding 12 Months (Publisher must submit explanation of change with this statement)

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