Focusing on Physicians

A look at the impact of burnout in Wisconsin and initiatives to ensure access to physicians for rural patients

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COVER THEME
Focusing on Physicians: A look at the impact of burnout in Wisconsin and initiatives to ensure access to physicians for rural patients

In Wisconsin, 26% of the population lives in a rural area, yet only 10% of physicians practice in rural areas. In this issue of *WMJ,* 2 reports look at the problem of physician burnout, and 2 more describe innovative efforts to expand the physician workforce in rural Wisconsin to ensure patients will continue to have access to care.

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Helicopter Emergency Medical Services: The Financial Burden Patients Face

David M. Marshall, BS

While there has been research evaluating the effectiveness of helicopter emergency medical services (EMS) and conversation surrounding the overall safety of helicopter transport, the monetary affliction that patients face is also an important consideration.

Utility

In Wisconsin, where traumatic and unintentional injury as well as acute medical issues can occur great distances from the nearest medical facility, every second counts during transport. Rural homes are often difficult or impossible to access efficiently via ambulance, requiring the use of helicopters, and as of the 2010 census, about a third (29.9%) of Wisconsinites were living in rural areas.[1] In a recent study of rural transport, patients suffering traumatic injuries secondary to motor vehicle accidents had significantly improved outcomes with helicopter EMS as compared to ground transport.[2] However, recent studies have focused on mortality in other parts of the country, and we do not know much about HEMS effects on morbidity or the general effectiveness in Wisconsin.

Safety

Many industries in the United States are continuously looking to improve the safety of helicopter EMS, such as enhanced vehicle precautions, improved triage guidelines, and more. Decreasing the overall usage of helicopter EMS, while being careful not to negatively impact patient outcomes, intuitively can decrease the rate of adverse events. This was done in Maryland where modifications to the statewide EMS protocols successfully reduced the utilization of helicopters while improving patient outcomes.[3] Similar changes to reduce the number of unnecessary flights could be beneficial in Wisconsin.

Cost-Burden

In a recent consumer alert by the National Association of Insurance Commissioners, the average air ambulance trip was estimated between $12,000 and $25,000 per flight.[4] When performed in-network, these costs typically are added to the total hospital bill when the flight is deemed "medically necessary" by the insurance provider, meaning the most a patient will have to pay is their out-of-pocket maximum. However, what happens when air medical transport is performed out-of-network? Payment varies considerably based on health insurance coverage, and even with substantial private insurance, much of the bill may fall to the patient.

Many helicopter EMS programs in the United States band together to form membership programs, such as Life Flight, AirMedCare, and Air Methods. Members pay an annual fee (usually $60 to $100 per year) to cover themselves and their dependents. Those enrolling in the membership program must have some form of insurance to be eligible, but in the event that airlift is needed, a covered person is not responsible for any portion of the cost—the membership organization will pay anything not covered by the patient's insurance. Issues arise when a patient is airlifted by a helicopter service not participating in the membership program, leaving the flight uncovered. One way to alleviate this issue would be to create a state- or region-wide membership program. By collaborating across competing air ambulance services to facilitate cost-conscious emergency transport, out-of-pocket expenses for patients could be decreased substantially. Unfortunately, most of Wisconsin is not included in these membership programs, and a large barrier prevents this from happening. The Airline Deregulation Act (ADA), legislated in 1978, encourages competition in the airline industry by prohibiting states from regulating air carrier prices. This has contributed to the high costs associated with air medical transport; and a federal law that encourages competition and, in turn, profit seems unethical in this setting. The Isla Rose Life Flight Act, which was introduced in the Senate in 2017, attempts to override the ADA in the setting of air ambulance services. I believe this could be tremendously helpful in decreasing the costs associated with helicopter EMS.

By working together, we can create a more patient-friendly HEMS system in Wisconsin (Figure). When seconds matter in life-altering situations, cost determinants should not have to be a part of the equation.

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Figure. Helicopter Emergency Medical Services Bases in Wisconsin

Flight for Life (Waukesha-Medical College of Wisconsin and Fond du Lac), UW MedFlight (Madison and Mineral Point), Gundersen Air (La Crosse), ThedaStar (Neenah), Eagle III (Green Bay), Ascension Spirit (Stevens Point and Minocqua), Mayo One (Eau Claire), Aspirus MedEvac (Wausau), and LifeLink III (Marshfield and Rice Lake).

Physician's Passion Helps Improve the Lives of Victims of Sex Trafficking

Kay Simmons

Wisconsin physicians work to improve the health of their patients every day. At the same time, there are physicians whose efforts extend well beyond their day-to-day practice, making an even bigger impact on the lives of their patients, their communities, and the world.

Gloria Halverson, MD, is one of those physicians. She began her medical career by forging new paths for women and has continued to use her medical training to help poor and abused women find health and a better way of life. Doctor Halverson was honored as the Wisconsin Medical Society's 2018 Physician Citizen of the Year for her commitment to the medical profession and to helping victims of human trafficking both locally and internationally.

When she began medical school in 1969, women faced many barriers to becoming physicians. But with persistence, intellect, and the ability to question and take on the establishment, Dr Halverson not only became a physician leader but also made history as the first married woman admitted to Marquette Medical School and the first woman obstetrics/gynecology resident at the Medical College of Wisconsin.

After completing her medical degree in 1973 and her residency in obstetrics and gynecology in 1977, Dr Halverson continued to break ground by becoming the medical director of the Maternal Infant Care Project at the City of Milwaukee Health Department and served on the State of Wisconsin Maternal Mortality Committee for two decades.

And while she has held numerous leadership positions throughout her career, it was her work to help victims of sex trafficking that led to her recognition as Physician Citizen of the Year.

"There are myriad roles she has played as a physician and contributor to society, but in my opinion, the most important is her work to help victims of human trafficking and how she brought together resources, experience, medical care, technology, and her undeterred attention to these suffering, shackled poor," said Kesavan Kutty, MD, in his nomination.

In the early 1990s, Dr Halverson became involved in international relief work when she began working with the World Relief agency and with Global Health Outreach (GHO) and House of Hope in Nicaragua.

"My husband and I have always enjoyed doing global health work. I was a board member of the Christian Medical and Dental Association, and every few years they hold a meeting out of the country," she said. "I went to a meeting in Nicaragua and we stayed for a week to work at a rescue shelter called House of Hope and my heart was broken. I was so appalled and my eyes were opened to a world I'd never seen before. I didn't realize sex trafficking involved between 21 and 27 million people in the world, mostly women and children. It just changed the whole trajectory of my life. Before we left I knew I'd be back."

Since that first trip to Nicaragua, Dr Halverson has led 11 medical teams that have partnered with House of Hope, a vocational rehabilitation program for women and their children leaving the world of prostitution and human trafficking. The teams provide medications and medical services in pediatrics, gynecology, dentistry, physical therapy, ultrasound, laboratory, pharmacy, and ultrasound.

On her first visit to Nicaragua, Dr Halverson learned that cervical cancer is the leading

> "Physicians can help to turn the tide on trafficking, and the first step is to educate themselves, their hospitals, and staff."
>
> —*Gloria Halverson, MD*

cause of cancer and cancer deaths in that country, and it was significantly higher among this group because the women were not only forced into prostitution at a very young age but are forced to have as many as 30 to 40 sexual partners a day. What's more, since 90% of Nicaraguan women never have a pap smear, these women do not have access to early screening and treatment.

To combat this situation, Dr Halverson established a program to screen with one-hour turnaround pap smears, followed by screening abnormalities with colposcopy and treating precancerous lesions. To date, more than 1300 pap smears have been administered and countless lives have been saved.

Dr Halverson said women report back to other women in the brothels that they were treated with kindness and skill, which has led to women lining up at the bus pickup site in

Gloria Halverson, MD, of Milwaukee was honored with the Wisconsin Medical Society's 2018 Physician Citizen of the Year Award for her efforts to provide health care and education to women who are victims of sex trafficking, internationally and in the United States.

the early morning hours in hope of getting a ticket to see a doctor. When the health care teams visit, they also help draw women to House of Hope.

"We go into the brothels ourselves to invite them to clinic when we first arrive, and many come to learn of House of Hope programs for the first time. There are always women waiting to move into House of Hope after we leave," said Dr Halverson.

Through House of Hope, the women are taught they are of worth; they are given training in basic life skills such as getting along with others, parenting, and cooking nutritious food. They join a microenterprise program that gives them job skills and their children are sent to school—the first formal education in many of these families. Microgrants are available to start businesses. After completing the program, which can take three to five years, the women may graduate and are given a small house and supplies for the business they have chosen. Graduates now go to brothels throughout Nicaragua, and to Honduras, Bolivia and Guatemala, working with women there to let them know they don't have to continue living as they have, and that help is available.

For Dr Halverson and the other medical team members, the growth they see in these women each time they visit is great encouragement.

"Most remarkably, two daughters of graduates—who otherwise would have continued

a life in prostitution—are attending medical school, and the medical teams have been sponsoring one young woman," she said.

Encouraged by these results, and under the auspices of GHO, Dr Halverson also has started a cervical cancer screening program for prostitutes in Mumbai, India, and similar programs are scheduled to start in Guatemala and Honduras.

Her passion in this area has led her to serve on the international board of House of Hope and serve on the *Trafficking in Persons Commission* for the Christian Medical and Dental Association. She has been one of four authors of an online curriculum for physicians to learn how to identify and treat trafficked victims. She has also coauthored a chapter in a medical school textbook about human trafficking, and has lectured locally, nationally, and internationally to student and medical groups on this topic.

While Dr Halverson is passionate about helping women and children in other countries, she is quick to point out that human trafficking is just as much of a problem in the United States, and right here in Wisconsin, as it is overseas.

"There is just as much for physicians in Wisconsin to know about this issue. We tend to think about it as being 'over there,' but trafficking has been found in every single county in Wisconsin. I guarantee it is in your area if you are a physician practicing in Wisconsin," she said.

"Physicians can help to turn the tide on trafficking, and the first step is to educate themselves, their hospitals, and staff," she added. Numerous resources are available to physicians to help set up protocols and to better understand the warning signs and victims' needs. (See box for resources).

"It is imperative that physicians know the warning signs. We need to know what the women look like, what their histories are like, what their needs are when we do the physical exam, what the physical findings might be and, most importantly, after becoming aware you need to have a protocol in your system for assisting them because these women need so much. You need to assemble a team before they walk in the door because you may be their one chance for rescue," said Dr Halverson.

Rural Health in Wisconsin–Looking to the Future

Sarina Schrager, MD, MS, *WMJ* Associate Editor

Twenty percent of the US population lives in a rural area. In Wisconsin, this number is 26%. Yet only 10% of physicians (both nationally and in Wisconsin) practice in rural areas and the ratio of primary care providers (PCP) to population numbers is significantly higher in rural areas.[1] Significant health disparities exist between rural and urban populations. Rural populations have higher poverty rates, lower access to high speed internet, and more tobacco use in rural youth. Infant mortality rates are 25% higher in rural areas than in urban areas, likely due in part to lack of access to medical care.[2] More than half of motor vehicle crash fatalities happen on rural roads, resulting from a combination of delay in the arrival of emergency personnel, high speeds on roads, or decreased visibility.[3] In 2013, 66% of all traffic related fatalities in Wisconsin were in rural areas.[3] Rural youth are twice as likely to commit suicide.[2] Rural populations have high medical needs, and are at increasing risk of opioid use disorder, which is epidemic. However, the number of physicians practicing in rural areas is not adequate to meet the need.

The path forward requires increased graduate medical education (GME) initiatives to develop the physician workforce in rural Wisconsin. The paper by Bruksch-Meck, et al in this issue provides a summary of various strategies geared toward increasing rural physicians in Wisconsin.[4] Both Wisconsin medical schools, along with the Wisconsin legislature and the Wisconsin Rural Health Cooperative have promoted educational opportunities for medical students, residents, and fellows that encourage rural prac-

tice. The goal is to create 141 new GME positions statewide by 2020. One example of such a program is the Wisconsin Academy for Rural Medicine (WARM) program through the University of Wisconsin School of Medicine and Public Health. This program, started in 2007, develops rural physicians by exposing undergraduate medical students to rural areas. The WARM students do a majority of their clinical rotations at rural practices and hospitals. To date, 91% of WARM graduates practice in Wisconsin, 51% in rural areas.[5] A second example is the creation of 2 rural regional campuses by the Medical College of Wisconsin, in northeastern and central Wisconsin in 2015 and 2016 respectively.[4]

In northern Wisconsin, federally qualified health centers (FQHC) work to meet the needs of rural patients. FQHCs were created to provide primary care services in underserved rural and urban communities. Northlakes Community Health Center is an FQHC with 14 clinics in 12 communities in Northern Wisconsin. In a December 2018 conversation with Reba Rice, CEO of Northlakes, she commented that "a key component of FQHCs are that they are community based and are focused on the needs

of their particular community." By individualizing the approach to health care within a community, the FQHC can affect health outcomes unique to each individual area. Rice sees the opioid epidemic as one of the main health challenges for rural Wisconsin.

Northlakes employs 110 clincians and a dedicated recruiter who focuses on engaging providers who are "mission driven." Recruiting and retaining providers con-

> Rural populations have high medical needs, and are at increasing risk of opioid use disorder, which is epidemic. However, the number of physicians practicing in rural areas is not adequate to meet the need.

tinues to be a struggle for rural practices. A paper by Morken et al explores factors related to retention of family doctors in rural Wisconsin.[6] The authors surveyed graduates of the University of Wisconsin Department of Family Medicine and Community Health rural residency track in Baraboo, Wisconsin to determine why their graduates decide to practice in rural areas. This rural training track started in 1996. The authors found that the most important issues relate to needs of their significant others, availability of meaningful work, and involvement in the local community. Loan repayment was the least important reason to practice in a rural area.

Transportation barriers can affect access to health care in rural areas. In an "As I See It"

column, Marshall comments on the cost of helicopter emergency medical services.[7] These services are used mostly in rural areas and confer a high cost to the system, and sometimes to the patients. Improving access to helicopter emergency services may help decrease the mortality rates in rural communities after motor vehicle accidents. He suggests developing collaborative membership groups among different companies to defray the cost for patients.

This issue of *WMJ* details a number of innovative efforts to improve health care in Wisconsin's rural communities. Such efforts should go a long way in narrowing the health disparities between rural and urban Wisconsin residents. According to the Wisconsin Council on Medical Education and Workforce, 86% of physicians stay and practice in Wisconsin if they go to medical school and complete their residencies in the state.[1] So, the state focus on expanding training programs in rural communities may further the supply of physicians in our state.

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Physician Burnout in Wisconsin:
An Alarming Trend Affecting Physician Wellness

Anne Hauer, BA; H.J. Waukau, MPA; Peter Welch, MA

ABSTRACT

Wisconsin physicians are experiencing burnout at levels that surpass national benchmarks. The Wisconsin Medical Society (Society), in conjunction with the American Medical Association (AMA), conducted a survey of 1,165 Wisconsin physicians to assess burnout and its contributing factors. The results indicate that primary causes of physician burnout include utilization and interactions with electronic health records (EHR), lack of a supportive practice environment, the loss of autonomy, and poor work/life balance. Addressing physician burnout in Wisconsin calls for significant efforts by all relevant stakeholders, including insurers, government entities, health care systems and their executive leadership, and physicians themselves, and will require improving physician interactions with the EHR, increasing the physician role in administrative decision-making, and maintaining the focus of health care on the patient.

To lessen the impact of the key factors that lead to physician burnout, the Society plans to convene stakeholders to improve EHR functionality, develop and encourage physician leadership opportunities, create a Center for Physician Empowerment to unite stakeholders to lead systemic change through collective education and action, and pursue legislation to establish a Physician Health Program through the state government structure.

BACKGROUND

Physician burnout is a growing problem in the American health care system and is especially pronounced in Wisconsin. According to the Agency for Healthcare Research and Quality, burnout is defined as "a long-term stress reaction marked by emotional exhaustion, depersonalization, and a lack of sense of personal accomplishment."[1]

In 2009 and 2014, the Wisconsin Medical Society (Society) conducted surveys of physicians practicing in Wisconsin[2,3] that revealed some startling statistics regarding the state of medicine and practice in the state. In 2014, 39.17% (n = 398) of respondents reported that the time they spent in direct patient care over

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the previous year decreased, compared to 30.20% (n = 315) of respondents in 2009. The 2009 survey indicated that 33.68% of physicians were not satisfied with the amount of time they were spending on direct patient care versus administrative work. During the 5 years between the 2009 and 2014 survey, there was a 23.43% increase in the number of respondents who reported that their practice utilizes an electronic health record (EHR), and almost three quarters of respondents (70.81%) in the 2014 survey indicated that the EHR has negatively impacted their workload.

On a national level, approximately 1 physician per day commits suicide,[4] and suicide is the second leading cause of death among medical students.[5] In addition, by the year 2030 it has been predicted there will be a national shortage of 42,600 to 121,300 physicians.[6]

To assess current levels of burnout and determine ways to address the issue, in 2017 the Society commissioned a mini-Z survey (mini-Z) with the American Medical Association (AMA).[7] The results of that survey and the Society's strategies to improve physician satisfaction are included in this report and compared to the similar surveys completed in 2009 and 2014.

METHODS

In 2017, to establish a benchmark against the national comparison, the Society, in collaboration with the AMA, conducted the mini-Z survey on physician satisfaction and burnout. An email invitation was delivered to 13,150 member and non-member physicians practicing in Wisconsin whose email address is listed in the Society's database. The full mini-Z survey had a total of 48 questions, including open-ended questions to allow physicians to expand on their responses. Respondents participated online, and the survey was open from

November 20, 2017 to January 6, 2018. Five days before the survey opened, a message was sent to 56 health system leaders announcing the survey. In addition to the initial email to physicians inviting them to participate in the survey, 2 more reminder emails were sent during the open period.

RESULTS

A total of 1,165 physicians anonymously responded to the 10 core questions for a response rate of 8.86%. (Questions can be found at https://www.wisconsinmedicalsociety.org/_WMS/publications/wmj/pdf/117/5/Appendix-Hauer.pdf). This is a statistically significant rate for a 95% confidence interval with a 3% error rate.[8,9] The 2017 response rate is .93% lower than in 2014 (n = 1,016), and 1.51% lower than in 2009 (n = 1,044). Table 1 demonstrates that survey respondents are an accurate representation of physicians actively practicing in Wisconsin. Out of the 1,094 responses to the question regarding sex, 34.4% selected female (n = 376), 62.6% selected male (n = 685), and the remaining 3% chose not to answer (n = 33). This response is comparable to 2014 results, where 33% of respondents identified themselves as female and 67% as male. As Table 2 illustrates, the survey is also representative of the physician distribution by specialty in Wisconsin. The data in this report are compared against the 2014 study, Factors Affecting Physician Satisfaction and Wisconsin Medical Society Strategies to Drive Change[2] and the 2009 Society survey regarding physician satisfaction and burnout in the state of Wisconsin.[3]

In 2014, 17.8% of the survey respondents reported no symptoms of burnout, and 46.9% reported experiencing moderate to severe symptoms of burnout. The 2017 survey results showed a 4.8% decrease in physicians reporting no burnout symptoms, bringing the total to 13%. This coincides with a 4.8% increase in physicians experiencing symptoms of burnout since 2014. The results also indicate that 53.5% of physicians in Wisconsin have at least 1 symptom of burnout and over one-third are dissatisfied with their profession—both of which are part of an increasing trend and exceed national averages (Figure 1).[10]

Table 1. Comparison of Age and Sex Characteristics Between Survey Respondents and Practicing Physicians

2018 Wisconsin Physician Demographics			2017 Survey Demographics		
Age Range	**N**	**N÷13,700**	**Age Range**	**N**	**N÷1,094**
18-30	147	1.1%	18-30	9	0.8%
31-40	3,116	22.7%	31-40	182	16.6%
41-50	3,729	27.2%	41-50	273	25.0%
51-64	5,248	38.3%	51-64	474	43.3%
65+	1,429	10.4%	65+	129	11.8%
Unknown	31	0.2%	Unknown	27	2.5%
Total	13,700		Total	1,094	
Sex	**N**	**N÷13700**	**Sex**	**N**	**N÷1094**
Female	4,805	35.1%	Female	376	34.4%
Male	8,893	64.9%	Male	685	62.6%
Unknown	2	0.0%	Prefer not to answer	33	3.0%
Total	13,700		Total	1,094	

Table 2. Physician Specialty Distribution

2018 Wisconsin Physician Demographics			2017 Survey Demographics	
Specialty	**N**	**N÷13,700**	**N**	**N÷1,017**
Allergy and Immunology	73	0.5%	8	0.8%
Anesthesiology	823	6.0%	48	4.7%
Cardiac/Thoracic Surgery	67	0.5%	3	0.3%
Cardiovascular Diseases	393	2.9%	20	2.0%
Dermatology	199	1.5%	13	1.3%
Emergency Medicine	758	5.5%	94	9.2%
Family Medicine	2,485	18.1%	214	21.0%
Gastroenterology	186	1.4%	9	0.9%
General Practice	343	2.5%	15	1.5%
Internal Medicine	1,726	12.6%	107	10.5%
Neurological Surgery	95	0.7%	3	0.3%
Neurology	307	2.2%	17	1.7%
Obstetrics/Gynecology	584	4.3%	38	3.7%
Oncology	217	1.6%	14	1.4%
Ophthalmology	305	2.2%	19	1.9%
Orthopedic Surgery	454	3.3%	41	4.0%
Other non-surgery related specialty	686	5.0%	62	6.1%
Otolaryngology	164	1.2%	9	0.9%
Pathology	275	2.0%	14	1.4%
Pediatrics	1,170	8.5%	90	8.8%
Physical Medicine and Rehabilitation	195	1.4%	10	1.0%
Plastic Surgery	75	0.5%	6	0.6%
Psychiatry	643	4.7%	56	5.5%
Pulmonary Disease	118	0.9%	14	1.4%
Radiation Oncology	87	0.6%	5	0.5%
Radiology	613	4.5%	27	2.7%
Rheumatology	57	0.4%	9	0.9%
Surgery	567	4.1%	46	4.5%
Vascular Surgery	35	0.3%	6	0.6%
Total	13,700		1,017	

In the 2017 survey, Wisconsin primary care physicians (PCP) report the highest rates of burnout when compared to surgeons and other nonsurgical specialties. According to the 2018 Wisconsin Council on Medical Education and Workforce report, "40% of currently working PCPs are projected to retire by 2035."[11] Further, based on the 2017 results, 47.1% or 6,194 Wisconsin physicians are considering reducing hours or retiring early in the next 5 years

Figure 1. Benchmark Comparisons

2017 WISCONSIN PRACTICING PHYSICIANS

| 46.5% | 53.5% |

NATIONAL BENCHMARK*

| 71% | 29% |

■ No Burnout Reported
■ Burnout Reported

* Taken from the AMA PowerPoint *Physician Burnout Survey*
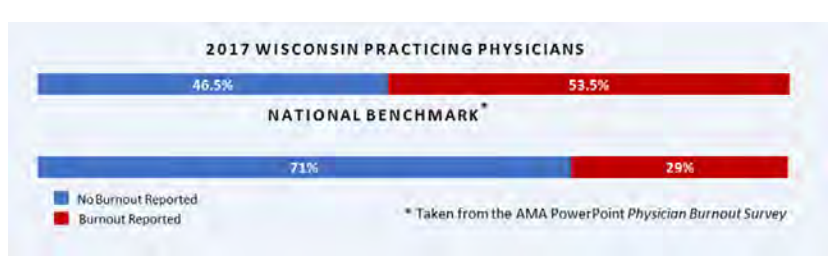
Figure 2. Physicians Retiring Early/Reducing Hours

Physicians Planning to Reduce Hours or Retire

—●— Yes —●— No —●— Uncertain
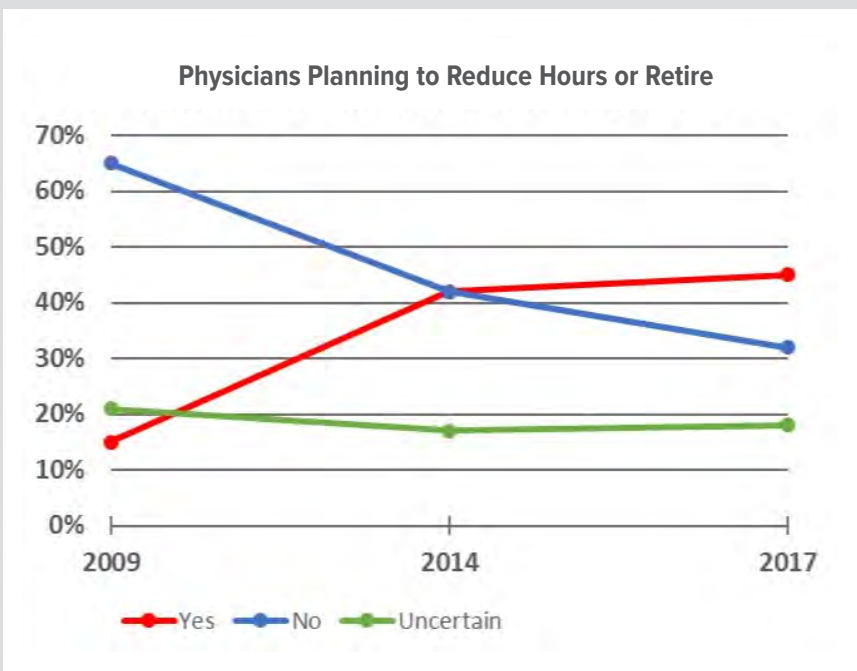
(Figure 2); over a quarter (30.4%) of physicians in the 2017 survey indicated they would not recommend their career (Figure 3). When considered alongside Wisconsin's aging population, it is perhaps not surprising that the state is projected to experience a shortage of 745 FTE primary care physicians.[11]

Physician burnout in Wisconsin can be traced to 3 categories as measured by the mini-Z survey: (1) clinical leader alignment, (2) EHR/documentation time, and (3) workload control. As related to these categories, physician interaction and dissatisfaction in their work environment are causing physicians to reevaluate their future in medicine. Nearly one-half (47.1%) of physicians are planning on retiring or decreasing their clinical hours in the next 5 years, which is an increase of 5.6% from the 2014 survey. Further, 47% (n = 519) of physicians indicated that their retirement plans have changed due to the health care environment, a 7.7% increase from 2014. With projected increases in physician shortages, health care systems and administrators must look at how are they addressing burnout to ameliorate future shortages.[6]

A developing trend among physicians is the increasing number of women physicians, specifically in family practice.[11] In 2017, the number of female medical students outnumbered males.[12] In Wisconsin, women will constitute a growing portion of family practice physicians by 2035,[11] however, the 2017 survey illustrated women have a higher reported burnout rate compared to men. In Wisconsin, over half of the sample populations for both women (57%) and men (52%) are starting to exhibit symptoms of burnout or are completely burned out. Both sexes have experienced a decrease in physician satisfaction since the 2014 study. In the 3 years since the last survey, satisfaction among women physicians has decreased 11.3% and dissatisfaction has increased 12.1%.

Causes of Frustration/Burnout

In previous surveys, the EHR was reported to be a top stressor and concern for physicians. Sixty-five percent of clinicians in the 2017 survey agreed or strongly agreed that the use of an EHR adds frustration to their day. As Figure 4 illustrates, the number of hours physicians spend working on the EHR outside their workday directly correlates with their level of frustration with the EHR. Forty-two percent of physicians who spend zero to 2 hours working at home on the EHR report being frustrated with the EHR, which is almost half the frustration level reported by physicians who spend 8 or more hours on the EHR outside of work. Of the 202 physicians who said they spend more than 8 hours working on the EHR at home, 85.1% (n = 172) reported frustration with the EHR. Since 2014, there has been a decrease in the number of physicians spending time at home in all the categories except in the 4- to 6-hour and > 8 hours ranges, which increased by 0.9 % and 5.7 %, respectively. Across all age groups, nearly two-thirds (64.2%) of physicians agree or strongly agree that the EHR adds frustration to their day.

Along with the EHR and time spent on documentation, increasing insurance and government regulation was the third most-mentioned stressor. One respondent in the 2017 survey said, "Too many outside forces are driving the practice of medicine. There is way too much bureaucracy diverting us away from caring for our patients…" while another expressed frustration with insurance companies, citing "…increasing doctor workloads" and nothing that the EHR "is not really of increased value over the paper chart except to insurance companies who

will cut reimbursement if all the specific points THEY want are missing…"

As smaller practices consolidate with larger health systems, physicians are losing some of their autonomy. The 2017 survey showed that 16.4% of respondents own all or part of their practice, a drop from the 2009 survey, in which nearly a quarter (24.9 %) of respondents were full or part owners of their practice. Physicians who once were sole or shared decision-makers in their clinical work are now being told how to manage their practice, which adds to stress and, in turn, increases burnout.

DISCUSSION
Electronic Health Records

Multiple studies have highlighted the issue of EHRs and how they contribute to burnout. Physicians are spending nearly half their time—49.2%—utilizing the EHR and performing clerical duties.[13] While frustration with the EHR is a symptom of physician burnout, its design and implementation are the ultimate contributor. In fact, in 2018, The Harris Poll on behalf of Stanford Medicine surveyed 521 PCPs regarding their EHR use and 44% of respondents viewed the function of the EHR as health storage rather than a health tool.[14]

These findings seem to be supported by Downing, et al.[15] Since enactment of the Health Information Technology for Economic and Clinical Health (HITECH) Act in 2009, physicians' notes have doubled in length, resulting in EHR notes that are 4 times longer in the United States compared to other countries.[15] The clerical requirements placed on physicians by the EHR require extensive time outside of normal working hours.[16] For every hour that physicians spend with patients, it takes 2 hours to complete notes in the EHR.[13] Physicians also report spending an additional 1 to 2 hours outside their work day on EHR and other administrative tasks.[13] While the EHR may provide flexibility for the physician to work wherever they choose, it has allowed health system leadership to increase the amount of work physicians must complete without giving consideration for increased workloads.[17]

It has been reported that the use of scribes or other forms of assistance for documentation has increased the face-to-face time a physician can spend with a patient from 23.1% to 43.9%.[13] Yet this practice is more common among some specialties. In a study of 4 specialties—cardiology, orthopedics, internal medicine, and family medicine—documentation support was available more to cardiologists and orthopedists.[13]

Burnout Among Women

The Wisconsin Council on Medical Education and Workforce reported that 60% of family medicine physicians in Wisconsin under the age of 34 are women.[11] The 2018 Medscape National Report on Physician burnout found that 48% of female physicians are burned out, compared to 38% of males.[18] Research has shown

Figure 3. Percent of Physicians Who Would Recommend Their Career

Figure 4. Physician Frustrations With Electronic Health Record (EHR)
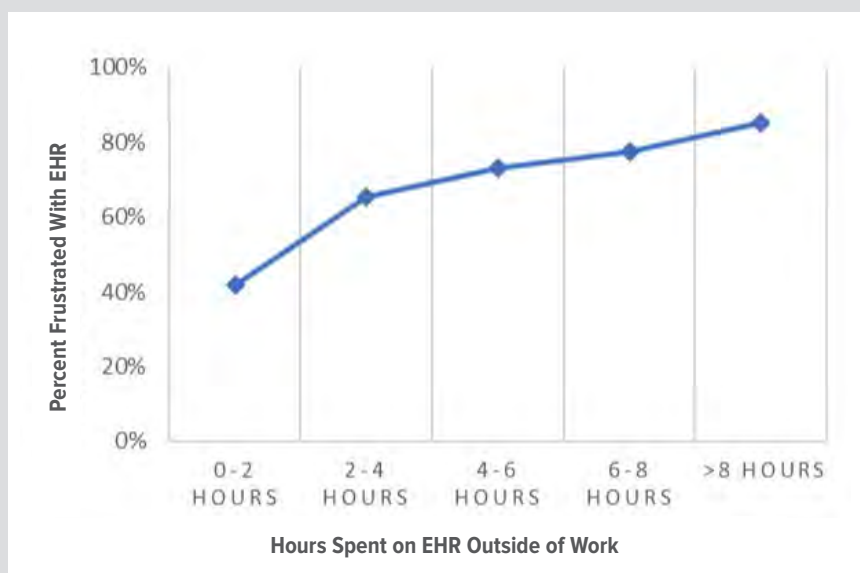
that female physicians spend more time communicating with patients than their male counterparts.[19] However, that extra time adds up, and longer hours for female physicians increase the chances of burnout by 12% to 15%.[20] Based on the 2017 results, female physicians in Wisconsin are experiencing the pressure of increasing work hours as well, and 39.1% are considering retiring or reducing clinical hours within the next 5 years, a 4.3% increase from 2014.

This trend is echoed nationally. As women physicians have children, they are reducing their availability by 10.9 hours a week and rethinking their career choice.[21,22] One study found that only 28.9% of women have maternity leave included in their contract, and consequences for taking leave for a pregnancy include making up missed shifts, losing productivity bonuses, and owing money to the practice.[22] Within developed nations, the United States remains the only country that does not legally require paid maternity leave, and the majority of physician mothers who take maternity leave lose more than $10,000 during their leave.[22] As more millennial generation women become physicians and mothers, changes will need to occur to create better work-life balance in order to encourage and keep women working in medicine.[23]

Lack of a Supportive Practice Environment

As mentioned previously, the number of physicians who reported owning their own practice has decreased from 24.8% in 2009 to 16.4% in 2017. Independent physicians have been shown to have lower burnout rates because they have more control over their work, leading to a higher sense of autonomy.[24,25] Ariely and Lanier wrote that the current medical climate is the direct opposite of autonomy because, "The current procedures in medical reimbursement policies and technological advances are constantly moving physicians in the direction of less time spent with each patient and greater floods of information to manage or master."[26]

Nearly half of the 2017 mini-Z respondents (49.9%) work with 1 to 24 physicians in a given practice, while the remaining 50.1% work in practices with 25 to >500 physicians. In fact, the largest percentage (19.6%) of physicians in Wisconsin work in practices with more than 500 physician full-time equivalents.

Physicians expressed frustration that employers do not value their voice as a health care leader, and most physicians believe they do not have influence in the health care system.[27] One of the 2017 survey respondents wrote, "I don't feel that my input is valued to the degree that it should be and most of the time I feel like a consultant to the team rather than a team leader." Another respondent expressed concern that the "goal of (an) institution is money rather than patient care." Many physicians commented that providing high-quality care and caring for patients are their top priorities, not profits. As previous research has found, when physicians and hospital administrators have conflicting viewpoints regarding the health care environment, care of the patient could be negatively affected.[28]

Government and Insurance Regulations

Physicians feel they have lost control of the practice of medicine and are increasingly burdened by the changing government and insurance regulations.[29] As the Merit-based Incentive Payment System (MIPS) is implemented, it will add more documentation requirements, which may increase administrative work for physicians.[15] While the EHR promotes the collection of data, hospital systems are encouraging the creation of new data to be measured to have a financial edge.[15] Along with collecting an increasing amount of data, physicians also are having to justify their treatment to insurance companies for payment. In 2017, the AMA released a physician survey regarding prior authorizations and the impact it has on the patient. Sixty-four percent of physicians reported that a decision from the insurance company took at least 1 business day, with 30 of physicians having to wait at least 3 business days.[30] The delay in prior authorizations can not only lead the patient to decide to forgo the treatment, but it has been found to create on average an additional 14.6 hours of administrative work for physicians and staff.[30]

Limitations

It should be noted that the 2017 study differs from the 2014 and 2009 studies. Because the mini-Z survey was used in 2017, the questions are not worded identically to the 2014 and 2009 surveys, nor were they developed and conducted by the same entities. In addition, the studies were not longitudinal, and it is not known if the 2014 and 2009 respondents participated in the 2017 survey. Although all surveys were a representative sample of physicians actively practicing in Wisconsin, they do not include physicians who have left medicine due to burnout. Future studies should include this population.

SOCIETY STRATEGIES AND RECOMMENDATIONS

Physician burnout is the result of the action and inaction of multiple health care stakeholders, including health care insurers, EHR/technology vendors, policymakers, hospital systems and physicians themselves. Informed by the findings of this survey and current research and literature, the Society will work to address this issue with the following strategies: (1) improve the functionality of the EHR, (2) enhance physician leadership and involvement in decision-making, (3) create a Center for Physician Empowerment, and (4) collaborate with state policymakers to create a Physician Health Program.

The EHR

Physicians completing the survey identified the EHR as the largest contributor to burnout. At the same time, the EHR has become integral to modern health care. The Society suggests that examining *how* the EHR is utilized in physician practices and understanding the reasons behind physicians' frustration is necessary to address this issue. It is important that physicians be engaged in discussions before, during, and after EHR implementation. Instead of telling

them how EHR integration will happen, administrators should offer the opportunity for input from all health care employees potentially affected by the EHR. It is also important that EHR vendors including Epic, Cerner, and others recognize the impact EHRs have had on physician well-being and that they commit to identifying and addressing the causes of this dissatisfaction.

Further, instead of approaching the EHR and computer as a barrier to patient care, physicians and administrators should consider how they can be used to engage patients in their health.[31] Examples include placing the computer in the exam room so that it faces the patient and allows the physician to make direct eye contact[32] and exploring different models of care to increase the face-to-face time physicians have with their patients. The Ambulatory Process Excellence model (APEX) designed by the University of Colorado is an example that increases the ratio of medical assistant to clinicians at 2.5:1.[17] With this model, medical assistants gather patient information before the physician enters the exam room, then remain in the exam room to document the physician visit. In the first 6 months after implementation, burnout rates decreased from 53% to 13%.[17] The use of administrative support allows the physician to provide more direct patient care and removes some of the administrative burden, which potentially could decrease burnout.[13,33]

The Society aims to convene vendors, physicians, administrators, and other stakeholders to work collaboratively and explore solutions like these and others that will mitigate the negative impact of EHRs on physician burnout.

Physician Leadership and Autonomy

Administration and physicians have different roles within health organizations, however, open communication can provide an opportunity for collaboration between the two and aid in ensuring that the patient is the top priority.[28] For example, Advocate Health Care, headquartered in Illinois, recognized the need for physician feedback and formed a steering committee to facilitate communication between physicians and management.[34] The committee expressed concerns regarding the lack of physicians' leadership skills, which led to the creation of an 18-month long mentorship program that identifies and pairs potential physician leaders within the organization and allows a space for collaboration and learning that encourages physicians to develop their leadership skills. The program had such a high success rate there are plans to expand it.[34]

Medical schools also are recognizing the need to develop physician leadership skills and some are offering Master of Business Administration programs in conjunction with the medical degree.[28,35] However, even though it has been found that physician-led hospitals receive higher quality and cancer care scores, it is not essential that health care organizations be led exclusively by physicians.[35] Rather, there needs to be open communication between clinical and nonclinical executives, as

well as a working environment that encourages all physicians to provide feedback.[35,36]

To facilitate physician leadership, the Society plans to develop physician leadership and mentorship programs and will continue to build on the success of its annual CMO Leadership Summit, which brings together chief medical officers and other physician leaders from health care organizations throughout the state to collaborate and share expertise. The Society also will continue to engage physicians and health care systems in its "Leading Healthy Work Systems" curriculum, a program that employs a systems approach to better understand how changes in one part of the system ripple across the rest, affecting the mental and physical health of physicians and patients alike.

Physician Wellness Action Center

As mentioned earlier, physician burnout cannot be directed at one specific group, but multiple health care stakeholders, including insurers, EHR/technology vendors, policymakers, hospital systems, and physicians themselves. In 2019, the Society will create a Center for Physician Empowerment with a mission "to lead the battle against burnout by motivating and empowering all stakeholders to take action." The Center will cultivate discussion and encourage collaboration across all levels of the health care landscape. Stakeholders will engage in collective education and action to implement organization change to lessen the impact of the key factors that lead to clinician burnout. Through participation in events, programming, pilot projects, and a digital community, they will have access to collaborative opportunities and best practices in addressing this critical issue.

Physician Health Program

Physician health programs are designed to be a resource for physicians suffering from mental or physical difficulties that threaten their ability to provide a minimal standard of care and thus threatening patient and physician safety. Programs nationwide have an admirable record of successfully helping physicians with mental and physical challenges, thus enhancing the quality and effectiveness of medical care for patients. As we pursue work environment changes to help prevent physician burnout, it is also important to help physicians whose burnout may have manifested to the point where physician health program services are critical.

Currently, Wisconsin is one of only a few states without a dedicated physician health program. The Society's program was ended in 2007 due to legal concerns and difficulties coordinating funding for the program, which was open to both member and nonmember physicians. To ensure a robust program independent of any employer pressures, the Society is pursuing legislation during the 2019-2020 legislative biennium that will create a physician health program within the state government structure that can help physicians obtain needed treatment.

CONCLUSION

The AMA Code of Medical Ethics states, "physicians' primary ethical obligation is to promote the well-being of individual patients."[37] Addressing the causes of burnout will allow physicians to focus on their patients and making complex medical decisions. Through a coordinated, collaborative effort among all stakeholders, we can decrease physician burnout, strengthen our health system, and improve patients care.

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Graduate Medical Education Initiatives to Develop the Physician Workforce in Rural Wisconsin

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ABSTRACT

The physician shortage is an increasing concern across the nation. Wisconsin is seeing this shortage grow even more prominently in rural counties. In order to prepare a sufficient rural physician workforce, several state-funded programs are collaborating to monitor the number of rural graduate medical education (GME) opportunities available, assess the number of rural physicians needed to meaningfully reduce the shortage, and promote effective development and expansion of new and existing opportunities. From 2010 to 2017, there has been substantial growth in rural-focused undergraduate, graduate, and continuing medical education opportunities; by 2020, there will be 141 new rural GME positions through creating new and expanding existing residency and fellowship programs. Once residents and fellows graduate from their respective programs, it will be possible to measure to what degree rural program expansion may impact the number of physicians who choose to stay and practice in rural Wisconsin communities. The program initiatives in this report have demonstrated success in increasing residency and fellowship training opportunities with early outcomes indicating this strategy is effective in the recruitment and retention of physicians in rural Wisconsin.

INTRODUCTION

The shortage of rural physicians continues to increase across the nation,[1] and reports of rural hospital closures continue to rise.[2] Physician shortages and hospital closures are 2 leading factors that contribute to the limited access to health care services that patients experience in rural communities.[3] Travel burden commonly experienced in rural areas has been associated with lower health care utilization,[4] which may lead to an earlier onset of illness or disease and influence more aggressive treatment options when illness or disease is present.[5] Aggressive treatments put patients at a higher risk of infections and mortality and also contribute to higher preventable costs in health care expenditures.[6] This cycle demonstrates how the shortage of physicians impacts growing health risks observed in rural communities.

According to County Health Rankings & Roadmaps, 12 of the 17 unhealthiest counties (71%) in Wisconsin are both rural and in the northern region of the state. Top US performers have a ratio of 1 primary care provider (PCP) for every 1,030 people, whereas one third of Wisconsin counties have only 1 PCP for a population of 2,000 or more. The majority of these counties (71%) are rural, with the lowest ratio of PCP to population being 1:20,150.[7] An adequate supply of physicians is critical to improving access and reducing travel burden to health care services for patients living in rural areas.[8]

To address the rural physician shortage, the Wisconsin Council on Medical Education and Workforce (WCMEW), medical schools, and a number of graduate medical education (GME) programs have developed and expanded rural medical training programs. With both of Wisconsin's medical schools increasing their number of graduates and rural training opportunities, it is essential that residency programs also expand rural training options across the state to most effectively retain the graduates and relieve the misdistribution of physicians.[9] Prior reports identify that 86% of residents from Wisconsin who attend both an in-state medical school and in-state residency program also will go on to practice medicine in the state.[10]

This review will outline the collaboration among Wisconsin's state-funded GME initiatives to strategically address the number, size, and location of residency programs to resolve the physician shortage and improve health outcomes in rural communities throughout the state.

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Through this discussion, we will highlight the state's accomplishments related to increasing the supply of the rural physician workforce.

BACKGROUND

In a 2004 physician workforce report, the Wisconsin Hospital Association and Wisconsin Medical Society outlined a plan to forecast future demand for physicians and identify strategies to meet the need. To improve physician recruitment and retention, the group recommended increasing the number of students in medical school and recruiting students who are likely to practice in underserved parts of the state. One of the action steps to achieve this goal involved creating a school-within-a-school with a programmatic focus on underserved areas.[11] Studies have shown that medical schools that select students of rural origins are more likely to have graduates who go on to practice in rural areas.[12] It also has been shown that medical students with exposure to clinical rotations in rural communities are more likely to practice medicine in rural communities, especially if they continue their residency education at a rural medical center.[13]

Medical School Expansion

To address the front-end of the physician workforce development continuum, the University of Wisconsin School of Medicine and Public Health (UWSMPH) and Medical College of Wisconsin (MCW) created new educational programs to graduate an increased number of medical students each year. Focused on rural physician workforce needs, the UWSMPH Wisconsin Academy for Rural Medicine (WARM) program in Madison and 2 new MCW campuses in northeastern (Green Bay) and central (Wausau) Wisconsin select students who demonstrate rural origin and interest and provide medical training and curriculum that prepares students for rural practice. WARM, which began in 2007, matriculates 26 students each year to participate in a rural core curriculum along with rural clinical experiences at regional sites. MCW's Northeastern and Central campuses, which began in 2015 and 2016 respectively, matriculate 25 students each year.

Graduates from the WARM program who have completed their residency training are meeting the program goals with 89% practicing in the state. Of these physicians, 51% practice in rural areas and 35% have returned to their hometown to practice.[14] The first class of students at MCW campuses will start their residency as early as 2018 and enter practice as early as 2021.

Rural GME Programs

As discussed in the physician workforce report by the WCMEW, expanding the capacity of both in-state medical schools and residency programs can lead to a greater supply of in-state physicians.[10] Rural training track residency programs historically have found the majority (76%) of graduates enter rural practice;[15] however, in 2010, Wisconsin had only 1 remaining family medicine rural training track and limited opportunities for other rural-intensive residency training opportunities. Rural communities have a significant need for more primary care physicians, including family medicine, as well as general surgeons and psychiatrists.[16] While family medicine physicians historically have provided the majority of maternity care in rural areas, there has been a steady decline in access to hospital-based obstetrical services in these areas.[17] This creates an additional gap in obstetrical care in rural communities.

Goals

In the physician workforce report *100 New Physicians a Year: a Wisconsin Imperative*, the Wisconsin Hospital Association reiterated its recommendation to increase the number of medical school graduates (preferably by establishing new community-based campuses of our existing medical schools), and also proposed to increase the number of available GME positions, and address anticipated changes in care delivery by ensuring the educational and clinical infrastructures are in place.[18]

The Wisconsin Hospital Association projected a deficit of over 2,000 physicians by 2030, and additionally recommended an increase in the amount of state funding for GME and monitoring of GME program development to ensure sufficient opportunities to place Wisconsin's medical school graduates in in-state residency programs.[18]

OUTCOMES OF GME INITIATIVES
State Funding for Rural GME

In response to the WCMEW's recommendations, as well as efforts and advocacy among the Wisconsin Hospital Association, Wisconsin Medical Society, specialty organizations, and the Rural Wisconsin Health Cooperative (RWHC), the state legislature and governor established the Wisconsin Rural Physician Residency Assistance Program (Residency Assistance Program) in 2010 with funding to help develop the infrastructure, network, and processes to design and implement new rural GME programs. In 2013, an additional $2.5 million in the state's biennial budget was provided for the Department of Health Services GME Initiative ("DHS Initiative") to target expansion of existing GME programs and further develop new programs. Each year, the Residency Assistance Program and DHS Initiative collectively distribute $3.25 million in state-funded grants to assist rural hospitals and educational institutions in increasing rural GME programs, tracks, and rotations throughout the state. In 2017, ongoing legislative advocacy and demonstrated success resulted in funding increases for both the Residency Assistance Program and DHS Initiative.

Support Services for New Development

A key finding from early outreach activities was that interested hospitals and institutions commonly need additional support to manage accreditation requirements in order to develop new rural programs. Rather than providing grants to hire new staff at each site, the Residency Assistance Program and RWHC responded to the collective need through forming and funding a new entity named

the Wisconsin Collaborative for Rural GME (Collaborative). The Collaborative was created to address similar administrative needs that exist across the state, which includes providing accreditation assistance and consulting services at no cost to hospitals and educational institutions that are developing new rural GME programs. Their functions expanded to include hosting statewide meetings to serve a broader range of rural GME stakeholders, providing training opportunities for faculty and administrators, and offering a centralized online directory and interactive state map that displays new and existing rural GME programs.

Rural GME Grant Activities

The Residency Assistance Program and Collaborative strategically provide information and outreach for rural hospitals that are potential sites for developing GME. Through these activities, the programs observed that strong support from both administration and physicians is necessary to achieve successful GME infrastructure development. Once hospitals and institutions identify committed faculty and staff, they are encouraged to schedule an initial site assessment with the Collaborative and apply for a grant to further assess the feasibility of developing a sustainable new GME program or rotation.

As of 2017, 14 new program grants awarded by the Residency Assistance Program and/or DHS Initiative have helped to establish 31 new first-year positions for residents and fellows in rural GME programs. These numbers result from 2 new family medicine rural training track residency programs and new rural tracks in or alongside urban family medicine, general surgery, psychiatry, and obstetrics and gynecology residency programs. Figure 1 demonstrates the growth in rural residency capacity for these specialties since 2010. In 2020, there will be a total of 208 residents and fellows in rural programs, compared to a total of 67 residents and fellows in rural programs in 2010. These 141 new positions in rural programs will translate to annually graduating 72 physicians, compared to the 19 rural GME program graduates in 2010 (see Table 1).

As shown in Table 2, funding from the Residency Assistance Program and DHS Initiative will have supported 183 (88%) of the 208 total GME positions in Wisconsin's rural programs in 2020. State assistance will contribute to training 88 of the 90 residents in rural family medicine, all 32 residents in rural psychiatry, 8 of the 23 residents in rural general surgery, all 4 residents in rural obstetrics and gynecology, 45 of the 53 residents in other rural primary care specialties like internal medicine and pediatrics, and all 6 of the rural fellowship positions. Figure 2 shows the number of open positions for medical school graduates to enter rural residency programs each year. These programs are considered a high priority for rural health care needs and designed to provide residents with significant clinical experiences in delivering health care specifically for Wisconsin's rural populations.

Table 1. Summary of Positions in Wisconsin Graduate Medical Education Programs With Rural Emphasis

Residency Program	2010 R1	2010 Total	2013 R1	2013 Total	2017 R1	2017 Total	2020 R1	2020 Total
Family Medicine	5	14	4	14	22	41	35	90
Psychiatry	0	0	0	0	8	11	8	32
General Surgery	2	15	3	15	5	19	5	23
Obstetrics/Gynecology	0	0	0	0	1	1	1	4
Other Primary Care	12	38	16	48	17	53	17	53
Total	19	67	23	77	53	125	66	202
Fellowships	0	0	0	0	2	2	6	6
Grand Total	19	67	23	77	55	128	72	208

Abbreviation: R1, first-year resident.

Table 2. Number of Rural Graduate Medical Education Positions That Received State Funding, 2020

Program	2020 Positions With Funding	Total Positions
Family Medicine	88	90
Psychiatry	32	32
General Surgery	8	23
Obstetrics/Gynecology	4	4
Other Primary Care	45	53
Total	177	202
Fellowships	6	6
Total	183	208

GME distribution

In addition to increasing the number of resident physicians, there is an emphasis on the distribution of graduating resident physicians. Based on the implications that adequate rural training increases the likelihood of physicians to practice in rural communities,[13,15] and physicians tend to enter practice in areas near the site of their residency training,[19] there have been intentional efforts to develop training opportunities in areas of Wisconsin with the greatest shortages. The growing awareness of the health disparities in northern Wisconsin put a special focus on expanding GME in this region. Targeted statewide forums have resulted in the early formation of 2 new family medicine residency programs that primarily serve the Northwest region, and there is strong interest in creating a GME consortium that will specifically sponsor GME expansion across the northern part of the state.

DISCUSSION
Successes
The WCMEW recommendations supported the creation of the UWSMPH WARM program and 2 new MCW regional medical school campuses, funding for the Residency Assistance Program and DHS Initiative, and assistance to develop rural GME programs distributed throughout rural and underserved regions. Rural physician workforce stakeholders continue to expand

Rural Residency Program Capacity

*Other Primary Care (PC) includes internal medicine, pediatrics and med-peds.

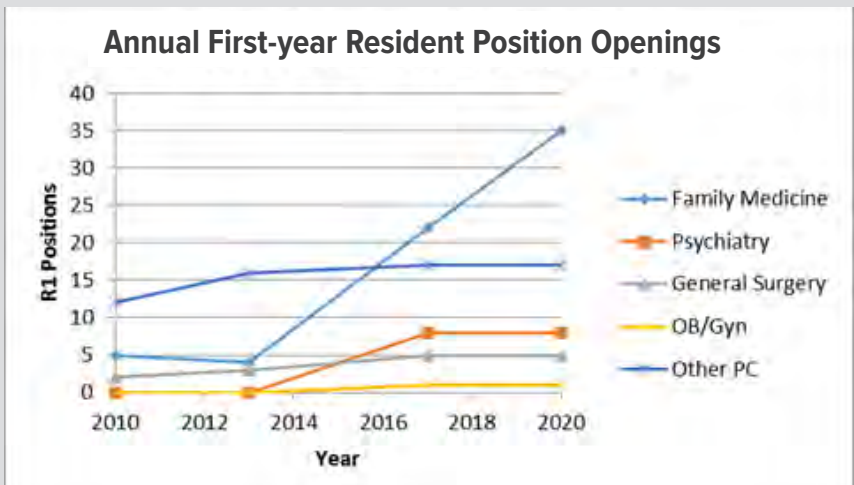**Annual First-year Resident Position Openings**
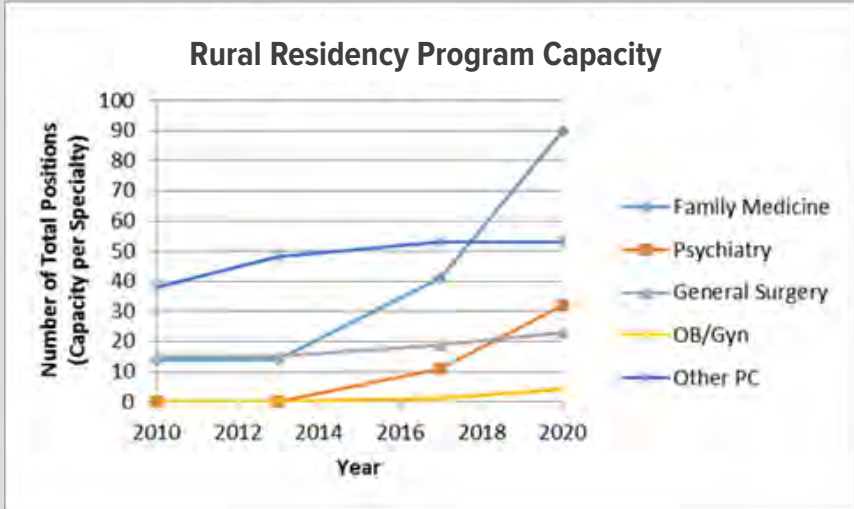
*Other Primary Care (PC) includes internal medicine, pediatrics and med-peds.
Abbreviation: R1, first-year resident.

al identified 4 conceptual models used in recruitment and retention: affinity, indenture, economic, and practice characteristics.[21] In Wisconsin, the medical school initiatives and GME initiatives incorporate aspects of the affinity model through the selection process of students and residents and in the educational experiences in rural settings. The state Loan Forgiveness Program, administered through the Wisconsin Office of Rural Health, is an example of the indenture model where payments for service in underserved rural regions will reimburse education loans. This indenture model can complement the affinity model. In Georgia, the state is increasing the number of medical students being trained to address the rural physician shortages, and developing residency programs in areas of physician shortages to address physician maldistribution. The expansion of available medical school positions in the state combined with state funding to start new GME programs are similar to the Wisconsin initiatives reported here.[9]

With the development of new residency programs, there is the opportunity to enhance rural recruitment and retention through the "practice characteristics model," in which many of the initiatives target primary care. After the passage of the Affordable Care Act of 2010, the Agency for Healthcare Research and Quality created a national Primary Care Extension Program (Extension Program)

statewide GME grant programs, improve health professional education infrastructure, and implement strategies that are likely to influence physician recruitment and retention.

Statewide collaboration has influenced the development of a number of GME opportunities in rural settings. Based on the evidence pertaining to rural training track outcomes and in-state physician recruitment, this development is expected to result in a significant increase in the number of physicians practicing in rural Wisconsin.[20] There has been growth in rural opportunities along the continuum of educational opportunities, ranging from rotations in smaller rural communities where the infrastructure would not support a full residency, to increasing the size of GME programs with a rural emphasis, to creating new GME programs in a rural setting.

Wisconsin is among other states that have prioritized GME expansion to address the rural physician shortage. Crandall et

to deploy local community-based extension agents and "assist primary care providers to implement a patient-centered medical home to improve the accessibility, quality, and efficiency of primary care services." New Mexico and Colorado have combined funding from governmental and private sources, foundations, and state agencies to implement this Extension Program model to successfully improve quality of care while reducing utilization.[22] These changes can make rural practice more attractive and further aid recruitment and retention.

Primary care physicians account for 37% of the total physician shortage across the United States and general surgeons are the next highest in demand, comprising 33% of the shortage.[23] The inadequate supply of general surgeons is especially threatening in rural areas, because of the critical role that general surgeons play in the health care workforce. If general surgeons retire or leave small hospitals and are not replaced, small hospitals are more likely to

close.[24] Hospital closures especially impact access to emergency care, and elderly and low-income individuals are more likely to be affected by challenges and thus delay needed care.[25] Both of Wisconsin's medical schools are addressing this issue by starting new rural tracks within their general surgery residency programs. With support from the Residency Assistance Program and DHS Initiative, the UW General Surgery Residency successfully matched its first rural resident in 2015. MCW General Surgery Residency also received funding from the DHS Initiative and successfully matched its first rural resident in 2017. Wisconsin is 1 of 9 states to offer a rural track for general surgeons.[26]

Rural psychiatry has turned into a widespread focus as the mental health needs of our nation have become increasingly evident in recent years. Not only have youth suicide rates been found to be disproportionately high in rural areas, nearly doubling those in urban areas,[27] but the opioid epidemic has also become the number 1 cause of accidental deaths in Americans, with the largest increases in opioid mortality and injury being reported in heavily rural states like Kentucky, West Virginia, Alaska, and Oklahoma.[28] The Wisconsin Office of Rural Health compiled data from the Health Resources and Services Administration and identified that the vast majority of the state is experiencing population-based mental health professional shortage areas.[29] Ng, Camacho, and Dimsdale found that "challenges particular to rural psychiatry include patient confidentiality and therapeutic boundary issues, overlapping relationships, cultural and ethical demands, lack of subspecialty support, professional isolation, absence of academic collaboration, and difficulties in recruiting psychiatrists."[30]

Through funding from the DHS Initiative and Rural Assistance Program, the UW Psychiatry Residency developed a public health track designed to provide 1 resident per year with a stronger knowledge base of the diverse mental health needs across the state. The program has found an unprecedented level of interest in rural mental health care among its residents and aims to better prepare these residents through offering clinical experiences and educational opportunities, including community-based treatment programs, telemedicine technology, and rural rotations that will address the unique issues facing individuals with mental illness in rural areas. In addition, and again with joint funding, MCW developed 2 new rural residency programs alongside the regional medical campuses in central and northeastern Wisconsin to recruit graduates of the MCW Central and Northeastern Wisconsin medical school programs. Both programs are community-based with required rotations occurring in a number of rural hospitals and other rural facilities. The MCW Central and Northeastern Wisconsin Psychiatry Residency programs recruited their first classes in July 2017; Central with 3 residents and Northeastern with 4 residents per year. The 4-year residencies will graduate their first class of residents, specifically trained to provide treatment in rural communities, in 2021 and together advance 7 new board-eligible psychiatrists each year.

While family physicians continue to be trained in maternity care, the proportion of family physicians providing maternity care has been declining for more than a decade.[31] Obstetrician-gynecologists provide advanced obstetrical care and treat severe complications that might be referred out by family physicians but are less likely to be located in rural areas.[32] Across the United States, the decreasing hospital-based obstetric services in rural counties and longer travel distances for patients are resulting in significant increases in out-of-hospital births and births in hospitals without obstetric services.[33] In response to these issues, the UW Obstetrics and Gynecology (Ob-Gyn) Residency received support from the Residency Assistance Program and started the nation's first rural track for Ob-Gyn residents. The new program's aim is to maintain the infrastructure and workforce for obstetric services and improve access to safe maternity care in Wisconsin's rural communities.

Challenges

The opportunity to develop GME rotations in a rural setting was met with a great deal of enthusiasm, but not every site was successful in implementing the rotations. Active participation and support by both the administration and practicing physicians was critical in order to be successful. Early observations showed that when only 1 segment was engaged, the efforts languished and inevitably failed. Now a suggested prerequisite to rotation development is to identify a site's leaders and supporters.

Key Learnings

Early on, strategies to attract interest in GME from hospitals and clinics were deployed addressing challenges noted by others in expanding GME.[9] In 1 community where there had been a long-standing engagement in medical student education, there was concern about participating in GME where the residents would need to assume an active role in patient management. The decision was made to start a fellowship in hospitalist medicine and emergency medicine. Embarking on GME programming with board-certified learners resulted in less resistance among administrators and physicians to participate in the continuing education of these more advanced learners. In this case, a successful fellowship curriculum along with faculty experience facilitated more organizational participation in educational efforts and soon garnered enough interest and commitment among physicians to develop a traditional rural family medicine residency training track. As organizational leaders saw resident retention in regions where they trained and learned of improved physician retention because of the presence of a residency program, other organizations became more active in residency rotations and GME participation.

The achievements in Wisconsin result from a range of efforts, including gubernatorial support; legislative advocacy; community, faculty, and administrative development; and funding support for feasibility exploration and program implementation. The stakeholders outlined in this review evolved in a cooperative environment and have matured with

the understanding that success is a function of effective collaboration.

Intentional collaborative effort is a key factor in dealing with the legislative variations involving the Residency Assistance Program and DHS Initiative, where there are slight differences in funding support eligibility. For example, funding eligibility for either program can differ based on the definition of rural, in terms of where the training sites are located, as well as the type of GME specialty under which the resident is training. Organizations interested in implementing new GME activities benefit from statewide program collaboration, as they receive efficient guidance to appropriate funding sources and outreach support that best fits their planned activities. In a number of situations, communication and collaboration between the Residency Assistance Program and DHS Initiative have facilitated effective sequential funding from both programs, leading to successful development and implementation of new rural GME opportunities.

When new rural GME programs, tracks, and rotations were fully implemented, some organizations experienced concerns around long-term sustainability due to funding availability. In most cases, health systems prioritize GME in their long-term strategy to address workforce shortages and include the financial investment in their core recruitment and retention expenses. However, as the funding of health care faces potential challenges, systems may find it more challenging to continue support for all operations. This is bringing more attention to statewide and national discussions surrounding nationwide GME reform.

In this report, there are limitations in assessing the outcomes. With many different communities, health systems, GME programs, hospitals, and clinics involved, the collection of data is more complicated than initially anticipated. Historically, many programs and GME sites were not expected to collect or retain data in a retrievable format to allow for historical comparisons. GME is a complicated process and the differing definitions of rural programs, tracks, and rotations can hinder meaningful comparisons across time and geography.

CONCLUSION

Ensuring an adequate rural physician workforce has been a challenge for decades and continues today. Initiatives providing educational opportunities in rural settings during medical school and residency are among the strategies to address these shortages. The initiatives reported here demonstrate success in increasing the opportunities for GME in rural Wisconsin with early outcomes indicating this strategy is effective in the recruitment and retention of physicians in rural hospitals and clinics. This success is the result of the efforts of many partners across a continuum, including advocacy and development of community, faculty, and administration support to actual support and implementation of GME activities. Collaborative partners working toward a common goal are paramount in overcoming obstacles to increase the number of practicing physicians in rural communities.

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Factors Influencing Rural Physician Retention Following Completion of a Rural Training Track Family Medicine Residency Program

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ABSTRACT

Introduction: Rural training track residency programs were created to aid in addressing the shortage of rural physicians. While these programs have been shown to increase rural recruitment and retention, the reasons for improved retention are unclear.

Methods: We analyzed survey results of 16 graduates of the UW-Baraboo Rural Training Track Family Medicine Residency Program on which factors influenced rural retention.

Results: Participants cited the wishes of significant others, meaningful work, and integration into the local community as the most important factors in rural retention. Loan repayment and teaching opportunities were least important.

Discussion: The factors identified in this study as important to rural retention were supported by previous literature and have remained consistent over time for rural physicians, including rural training track graduates.

Conclusion: Rural Training Track alumni physicians in our study found similar factors important to rural retention when compared to other rural physicians in the United States reported in the literature, regardless of residency background. These factors continue to be important to shape retention strategies employed by rural health care systems; future studies should evaluate rural retention strategies that utilize these factors.

INTRODUCTION

The maldistribution of physicians to rural areas continues to pose issues around hospital staffing and health care access across the Unites States, and many institutions are responding with various recruitment and retention strategies to create and sus-

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tain a sufficient rural health physician workforce.[1,2] While recruitment is critical to place physicians in rural areas, some researchers have argued that there needs to be more focus on factors that impact retention.[3] Since the 1990s, more studies have focused on retention as a way to bolster the rural workforce and have identified factors important to rural retention.[4]

Family medicine residency programs have been used to maintain and increase the number of practicing rural physicians because family physicians provide the highest proportion of care in rural areas.[1,2] One example is the 1-2 Rural Training Track Family Medicine Residency Program, where the first year of residency is completed in an urban setting and the following 2 years are completed at a rural site.[5] The primary goal of this model is to prepare more physicians who want to practice in rural areas for the personal and professional demands of rural practice.[5] These programs have placed over 70% of graduates in rural areas, and studies have shown that residency programs that prepare physicians to live in rural areas improve retention outcomes.[5,6]

While Rural Training Track (RTT) outcomes have been shown to improve rural physician recruitment and retention, little research has been done on what factors resulted in increased retention rates among graduates of these programs.[7] Additionally with changes in health care delivery and the structure of health care systems, we questioned if factors influencing rural retention have changed from previous generations. We hypothesized that the level of importance of various retention factors for RTT graduates would differ from previous generations of rural physicians because their training better prepared them for rural life and practice.

METHODS

We conducted a case study of graduates of the University of Wisconsin-Baraboo Rural Training Track Family Medicine Residency Program (UW-Baraboo RTT) because this group demonstrates high recruitment rates to rural areas, but less is known about their retention. We created a cross-sectional survey to determine what these physicians found important to rural retention. Of the original 40 questions, the 16 that evaluated physicians' views on retention factors and demographic information were included in this analysis. Surveyed retention factors were based on previous literature, and the survey was reviewed by experts in the field but not validated.

Of the 29 graduates since the program's inception in 1996, three were excluded because they had not yet begun practicing independently at the time the survey was sent. The remaining 26 physicians were sent an invitation letter and a link to the survey on the Qualtrics platform via email in June 2017. Written consent was obtained at the beginning of each survey. Three email reminders were sent before the survey closed in July 2017. Those who had not responded by the end of June were mailed a paper copy of the survey, along with an introductory letter, a letter signed by the current program director encouraging participation in the study, and a prepaid return envelope. Current practices were defined as rural using Rural-Urban Commuting Area codes of 4 or higher. Rurality was also defined as communities with urban centers of fewer than 20,000 residents. Through cross-referencing our survey data with data collected by UW-Baraboo RTT, we determined which physicians had moved locations 1 or more times throughout their careers. This study was deemed exempt from formal review by the UW-Madison Health Sciences Institutional Review Board.

RESULTS

Of the 26 physicians invited to participate in our survey, we received responses from 19 (73.1%). Nearly three quarters (73.7%) of respondents were practicing in rural areas. Due to the small size of our study population and our focus on rural retention, the 3 respondents who had only practiced in urban areas were not included in analysis. Respondent characteristics are listed in Table 1. We also identified the mobility patterns of survey respondents (Table 2). Of the physicians who had ever practiced in rural areas, 87.5% were still practicing in rural areas. Half of the respondents were employed at their original practice sites. None of the physicians started practicing in an urban area and moved to a rural area. Most physician mobility occurred between rural practices, and the 4 respondents who planned on leaving their current practice in the next 3 years intended to continue practicing in rural areas.

Table 3 summarizes the importance of various factors in determining retention according to study participants. All queried factors except teaching and loan repayment opportunities were at least somewhat important in respondent's retention. The most important factors were significant other's wishes, meaningful work, and the local com-

Table 1. Respondent Characteristics

	N = 16 (%)
Currently practicing in a rural area	14 (87.5%)
Practicing in Wisconsin	10 (62.5%)
Practicing in a health professional shortage area	10 (62.5%)
Involved in teaching medical students or residents	14 (87.5%)
Completed a loan repayment program	2 (12.5%)
Practicing obstetrics	13 (81.3%)
Prenatal care only	1 (6.3%)
Prenatal care and delivery	6 (37.5%)
Prenatal care, delivery, and c section	6 (37.5%)
Grew up in a rural community (urban center < 20,000)	9 (56.3%)
Had at least 8 weeks of rural experience in medical school	8 (50.0%)
Probably or definitely wanted to become a rural physician prior to residency	12 (75.0%)
Female	9 (56.3%)
Married or has a partner	16 (100%)
Have children or plan to have children	14 (87.5%)

Table 2. Physician Retention and Mobility

	N = 16 (%)	Average # of Years	Range
Number of years in practice	--	8.3	1-18
Number of years at current practice	--	6	1-16
Practicing at original rural practice	8 (50%)	6.1	1-16
Moved between rural practices	4 (25%)	--	--
Moved from rural to urban practice	2 (12.5%)	--	--
Moved from rural to urban and back to rural practice	2 (12.5%)	--	--
Planning to leave current practice within 3 years	4 (25%)	--	--

Reasons for Leaving:
- Practice is considering a hospitalist model; we are also in dire need of another partner.
- Completing my MBA in Healthcare Management. I was offered a job in rural Wisconsin that includes leadership opportunities.
- Moving to Iowa.
- Transitioning from family medicine to mostly public health. I am our local health officer and only work 1-2 days per week in clinic.

munity. In addition to loan repayment and teaching opportunities, professional development opportunities also ranked least important.

DISCUSSION

Our results aligned with many previously reported outcomes and also provided some unexpected results. Respondents had remained in their current practices for an average of 6 years, nearly 1.5 years longer than reported in previous studies.[8] The proportion of physicians in our study who have continued practicing in rural areas is consistent with what has been found for other rural training track graduates (87.5% and 84.3%, respectively).[7] In general, a higher proportion of mobile primary care physicians move from rural to urban areas versus within rural areas; however, all mobile physicians in this study reported they were moving within rural areas, as well as the majority of physicians who previously had moved practices.[9]

Many of our retention results were consistent with those found

Table 3. Importance of Various Factors in Rural Retention

Rank	Factor	Mean (sd)
1	Significant other's wishes	4.50 (0.52)
2	Meaningful work	4.38 (0.81)
3	Local community	4.25 (0.58)
4	Medical community/work environment	4.20 (0.94)
5	Work/life balance	4.06 (0.85)
6	Broad scope of practice	4.06 (1.12)
7	Job security	3.81 (0.91)
8	Need for health care in the community	3.73 (0.80)
9	Proximity to family and friends	3.63 (1.09)
10	Income/benefits	3.50 (1.03)
11	Local school system	3.50 (1.15)
12	Professional development	3.38 (1.15)
13	Teaching opportunities	2.88 (1.09)
14	Loan repayment opportunities	2.00 (1.41)

Scale: Not at all important (1), A little important (2), Somewhat important (3), Very important (4), Extremely important (5).
Abbreviation: sd, standard deviation.

by Cutchin et al in 1994. Their study highlighted the importance of availability of relief coverage, compatibility with the medical community, acceptance in the local community, spouse's happiness, and access to family.[4] While similar factors observed in our study did not fall in the same order of importance, many of the same themes emerged in the importance of spousal support, local community factors, medical community support, and work-life balance. This study also supported our finding that professional development opportunities and opportunities to teach medical students or residents are less important factors for rural retention.[4]

While the Cutchin et al study supported many of our findings, it also produced results that varied from ours. Their study identified local public schools as one of the most important factors in rural retention, whereas our study found local schools to be only somewhat important.[4] Two of our respondents (12.5%) did not have children and if their responses are removed from the analysis, local school systems become the 7th most important retention factor. While this does not completely explain the variation, it is worth noting that local school systems may not be as important for rural retention to those who do not have school-aged children. They also found loan repayment assistance to be very important for rural retention; however, our results do not concur.[4] While this may have been true at the time their survey was conducted, other studies have shown that loan repayment may have an impact on recruitment but is not an important factor in rural retention.[2]

Other more recent studies also supported many of our results. The wishes of significant others has been found to be a main factor in rural retention, signifying the importance of spousal satisfaction and employability in the community.[10] Findings additionally conclude that physicians need to find their work meaningful and fulfilling in order to stay.[3,10] Many studies acknowledge the importance of the local community. Not only do communities need amenities that meet physicians' needs and wants, but community integration has been reported as a key factor in rural retention.[2,3,10] Finally, the physician needs to feel supported by the medical community and be able to achieve an acceptable work-life balance in order to stay at a practice.[3,10]

This study was limited by the small sample size of UW-Baraboo RTT graduates, therefore there were large standard deviations for some items. The variability in responses also is consistent with the belief that rural retention is a complex and individual concept with no universally accepted retention strategies.[3,4,10] Our study only focused on 1 RTT program, therefore results cannot be generalized to other rural residency programs. Additionally, the survey was not validated, preventing removal of weak survey questions that could have led to ambiguous outcomes.

CONCLUSION

UW-Baraboo RTT alumni physicians and other rural physicians in the United States found similar factors important to rural retention, regardless of residency background. These factors have remained consistent over time, indicating that the UW-Baraboo RTT training did not impact factors associated with retention, and these factors have remained consistent over time. However, these factors continue to be important to shape retention strategies employed by rural health care systems. Future work should evaluate rural retention strategies that utilize these factors, especially those that aim to foster spousal satisfaction, meaningful work, and integration into the local community.

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Medical Student Wellness in Wisconsin: Current Trends and Future Directions

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ABSTRACT

Introduction: The goal of this study is to describe the state of mental health of Wisconsin medical students.

Methods: Online wellness surveys were distributed to students at the University of Wisconsin School of Medicine and Public Health (UWSMPH) and Medical College of Wisconsin (MCW) during the 2016-2017 school year.

Results: Of UWSMPH respondents, 40.0% and 12.5% reported experiencing depression/other mood changes and suicidal ideation during medical school, respectively. Twelve percent of MCW respondents screened positive for depression using the Patient Health Questionnaire-2, and 7.8% reported experiencing suicidal ideation in the last 2 weeks.

Discussion: Similar to results shown worldwide, Wisconsin medical students experience diminished mental health relative to nonmedical peers. Changes in medical education are needed to improve student mental well-being.

BACKGROUND

Medical students experience lower mental quality of life,[1] and higher rates of depression[1,2] and suicidal ideation[2] relative to similarly aged nonmedical peers. Nationally, the 12-month prevalence of a major depressive episode and serious suicidal ideation reported in 2016 were 10.9% and 8.8% for 18 to 25 year olds and 7.4% and 4.2% for 26 to 49 year olds, respectively.[3] A recent meta-analysis reported a depression rate of 27.2% and an alarming 11.1% prevalence of suicidal ideation among medical students.[2] Burnout rates are also significantly higher among medical students than the general population, and studies suggest that this may be the origin of future physician burnout.[1] High rates of depression, suicide, and burnout also have been reported among residents and physicians.[1,4]

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In addition to adverse effects on academic performance,[5] the consequences of poor mental health and burnout among medical students may extend into patient care. Medical student psychologic distress has been associated with unprofessional behaviors and decreased empathy.[5] These changes may have long-term effects as students continue in training. Decreased empathy and burnout among residents and physicians have been correlated with increased rates of medical errors and lower quality care.[6,7]

Although there is growing literature on medical student wellness at the national and international levels,[1,2,5] data at the state level is lacking. The purpose of this research is to assess medical student mental health and wellness at Wisconsin's 2 medical schools, the University of Wisconsin School of Medicine and Public Health (UWSMPH) and the Medical College of Wisconsin (MCW). This study serves as a collaborative effort to educate Wisconsin's medical community on the well-being of its medical students.

METHODS
Overall Design
This study is a retrospective review of a subset of deidentified data previously collected from the 2016-2017 UWSMPH and MCW wellness surveys. The surveys were one-time, voluntary questionnaires designed to assess current medical student wellness and determine specific areas for improvement. At both institutions, medical students were sent emails via the school's electronic mailing list inviting them to complete a web-based survey. All responses were confidential and anonymous. No incentives were offered for participation, and there was no follow-up contact made with nonparticipants. For study data analysis, frequency and relative frequency distributions were calculated for multiple choice questions, and thematic analysis was performed on free text responses.

	Respondents, n (%)	
	UWSMPH (n=255)	MCW (n=405)
Year in medical school		
1st	97 (38.0%)	143 (35.3%)
2nd	94 (36.9%)	109 (26.9%)
3rd	33 (12.9%)	75 (18.5%)
4th	27 (10.6%)	64 (15.8%)
Other[a]	4 (1.6%)	0
Missing	0	14 (3.5%)
Gender identity		
Male	99 (38.8%)	187 (46.2%)
Female	155 (60.8%)	203 (50.1%)
Other[b]/missing	1 (0.4%)	15 (3.7%)
Residency status		Not Assessed
In-state (Wisconsin resident)	193 (75.7%)	
Out-of-state (not Wisconsin resident)	62 (24.3%)	
Campus location	Not Assessed	
Milwaukee campus		346 (85.4%)
Regional campus[c]		46 (11.4%)
Missing		13 (3.2%)

[a] Students who took a leave of absence from medical school to pursue research projects, graduate studies, etc.
[b] Students who are gender non-conforming.
[c] Includes MCW-Green Bay and MCW-Central Wisconsin.

UWSMPH

After review by the UW-Madison Institutional Review Board (IRB), this study was deemed minimal risk and qualified for exemption from further IRB oversight. UWSMPH survey questions were written by the medical student wellness committee and school administration. Seven hundred medical students were invited to complete the survey, including those at statewide clinical sites and those pursuing additional degrees or research. Students accessed the survey through an anonymous link, and responses were collected between December 2016 and January 2017. Data was stored in a password-protected online database.

Eight questions from the survey were reviewed for this study. They included standard multiple choice, Likert-type scale multiple choice, 1 "check all that apply," and 1 free response. Students were screened for depressive symptoms and anxiety attributable to medical school as well as suicidal ideation during medical school via self-report. Students were asked to choose their greatest stressors in medical school from a list of possible answers, and also about their utilization of wellness resources, including mental health services.

MCW

This study was approved by the MCW IRB as a Registration Project for nonfederally funded and non-FDA regulated research whose activities fall into the minimal risk category. Over nine hundred medical students across MCW's 3 campuses were invited to participate in the wellness survey. Responses were collected throughout February 2017 using the SPSS Data Collection Interviewer and immediately deidentified by MCW's Office of Measurement and Evaluation.

Ten questions from the survey were analyzed for this study, and their format included multiple choice on a Likert-type scale, "check all that apply," and 1 free response. Depression and suicidal ideation screening were performed using the well-validated Patient Health Questionnaire-2 (PHQ-2) and item 9 from the PHQ-9, respectively.[10] Data from the questions using the PHQ-2 were added together, using a cut-off point of 3 to indicate a positive screen for depression.[10] Finally, participants were asked about their utilization of mental health services.

RESULTS

UWSMPH

The Table shows demographic characteristics of survey respondents at both schools. The UWSMPH survey response rate was 36.4% (255/700). Fifty-six percent (144/255) of respondents indicated that medical school has had a negative impact on their mental health. Specifically, 65.1% (166/255) and 40.0% (102/255) reported experiencing anxiety and depression/other mood changes attributable to medical school, respectively. Among respondents, 12.5% (32/255) endorsed experiencing suicidal ideation during medical school. The 3 most commonly chosen responses for the greatest stressors in medical school were "general lack of time" (78.8%, 201/255), "volume of academic material" (69.4%, 177/255), and "lack of time for self-care" (66.7%, 170/255). Fifty-eight percent (147/255) of respondents reported very rarely or never using available wellness resources, including mental health services. In free text responses, survey participants described lack of time and limited access as reasons for not using such resources.

MCW

The MCW survey response rate was 44.3% (405/915). Each question was optional and respondents were able to choose not to answer questions. Twenty-nine percent (112/381) of respondents reported experiencing a mental health condition while in medical school. Among the individuals who completed the survey, 12.0% (46/384) screened positive for depression in the last 2 weeks using the PHQ-2. Prevalence of suicidal ideation in the last 2 weeks was 7.8% (30/384). The rate of reported utilization of mental health services among respondents was 28.6% (110/384). Forty-three percent (164/382) felt the need to utilize mental health services but did not pursue them. The most prevalent reasons given for not pursuing mental health services were limited free time from school (87.8%, 144/164), fear of stigma (34.1%, 56/164), perceived difficulty accessing services (31.7%, 52/164), and fear of counseling records appearing on the academic record (31.1%, 51/164).

DISCUSSION

This is the first report to describe the mental well-being of medical students in Wisconsin. Our research utilizing wellness surveys at UWSMPH and MCW demonstrates that Wisconsin medical students experience depression and suicidal ideation at rates greater than those reported in the general population but similar to rates found among medical students more broadly.[2,3] Wisconsin medical students reported an overall negative effect of medical school on their mental health, which aligns with results from previous studies.[1,2,5] Additionally, our survey data reveals that many students do not utilize available mental health services due to lack of time, limited access, and concerns over confidentiality and stigma. This is consistent with other studies that have reported low rates of mental health service utilization by depressed medical students.[9]

This study has several limitations. First, direct comparison of the data from UWSMPH and MCW is limited due to the use of different survey tools at each institution, specifically the methods used for depression and suicidal ideation screening. Interpretation of UWSMPH data is further restricted due to the use of an internally developed survey rather than validated metrics. The answer choice "depression or other mood changes" used for self-reported depression screening at UWSMPH likely led to overestimation of depressive symptoms. In addition, although similar to other medical student survey studies,[1] our survey response rates were fairly low. Voluntary participation may have resulted in selection bias, as distressed medical students may have been more likely to complete the survey. Given that our results were collected during the winter months, seasonal changes in mood may have resulted in increased reporting of depressive symptoms. Finally, respondents at both schools were more likely to be in their pre-clinical years, indicating that results may not adequately represent the mental health of third- and fourth-year students.

This study serves as a foundation for future research on Wisconsin medical student wellness. Efforts are underway to improve the wellness surveys at both institutions and make the results more directly comparable through increased use of validated metrics. Future surveys will include the well-studied PHQ-2, Generalized Anxiety Disorder scale (GAD-2), and questions from the PHQ-9.[8,10] Questions to screen for burnout will be added as an additional marker of medical student wellness. Additionally, we are working to increase survey response rates, particularly among third- and fourth-year students and at regional campuses/clinical sites. Sub-analysis of the survey data by year in medical school, race/ethnicity, and campus site should be studied in order to assess the association between specific variables and differences in medical student well-being. Finally, evaluation of the impact of wellness programming implemented at both schools is another important area for future research.

Our state-level data add to the growing literature[1,2,5] indicating that medical students experience diminished mental health compared to age-matched, nonmedical peers. UWSMPH and MCW, along with many other medical schools around the country, are making significant changes in order to create an environment that fosters student well-being and resiliency in addition to learning. The culture of medicine needs to shift and embrace the humanity of its trainees, viewing education about self-care as essential to optimal patient care. This shift will enhance not only the medical education experience, but also foster successful transitions to residency and clinical practice, with patients being the ultimate beneficiaries.

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Pardon the Interruption(s)—Enabling a Safer Emergency Department Sign Out

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ABSTRACT

Introduction: Patient "handoffs" or "sign outs" in medicine are widely recognized as highly vulnerable times for medical errors to occur. The Emergency Department (ED) has been identified as an environment where these transitions of care at shift changes are particularly high-risk due to a variety of factors, including frequent interruptions, which can further lead to errors in transfer of information. Our primary objective was to evaluate whether simple interventions could minimize interruptions during the sign out period in an attempt to improve patient safety.

Methods: Multiple low-cost interventions were implemented, including an overhead chime, clerical staff diversion of phone calls and electrocardiograms, and prominent positioning of a movable pedestal sign. Utilizing a before-and-after study design, we directly observed team sign outs at various shift changes throughout the day over 2-month periods before and after implementation. Our primary outcome measure was the number of interruptions that occurred during designated sign out times. We also assessed total time spent in sign out, and a survey was sent to clinicians to assess their perception of sign out safety.

Results: Total sign out interruptions were significantly decreased as a result of the above-noted interventions (average 6.1 vs 1.1; $P < 0.01$). Total time spent during sign out was reduced (14.1 vs 11.4 minutes; $P < 0.04$), and clinicians' perception of safety improved significantly, with Likert scores of 4 or 5 on a 5 point scale increasing from 47.4% before to 91.7% after implementation.

Conclusion: Patient sign out at shift change is a vulnerable time for patient safety and transition of care with interruptions further compromising the safe transfer of information. Simple interventions significantly decreased interruptions and were associated with shorter sign out periods and improved provider perception of sign out safety.

INTRODUCTION

The Joint Commission recognizes that failure to communicate patient information accurately between health care providers is a major source of medical errors.[1] The Emergency Department (ED) may be particularly vulnerable to errors in communi-

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cation due to the high patient volume, high acuity, and fast pace. Information decay during patient handoffs is a well-described phenomenon; at-risk information includes vital signs,[2] patient history,[3] and medication administration history.[4] Provider-to-provider communication at shift change is an especially vulnerable time for interruptions to compromise patient care safety. The transfer of care occurring from a team with more familiarity with the patient to one who may feel less ownership of the patient's care could lead to information decay.

Unfortunately, shift sign out is also susceptible to frequent interruptions,[4,5] which increase the risk of error[6] and occur frequently in the ED. Prior studies show 5 to 6 interruptions per hour,[7-9] which may lead to an even greater degree of information loss than would have otherwise occurred.

Over the last 5 years, the importance of patient handoffs has received increasing recognition.[10] Improvement in data transfer from provider to provider has been achieved through the use of standardized checklists.[11,12] The Emergency Medicine Patient Safety Foundation's *SAFER Sign Out* guideline provide a standardized process of handing off information with the goal of reducing patient errors.[13] However, there has been little research done to evaluate the setting of shift sign out.

We hypothesized that simple interventions could significantly reduce the number of interruptions that occur during shift sign out and improve provider perception of sign out efficiency and safety.

METHODS

This study was conducted at an academic, tertiary care ED with approximately 60,000 patient visits per year. Institutional Review Board exemption was sought and granted.

The ED utilizes 2 separate care teams with staggered shifts that are responsible only for adult patients. We piloted a 3-pronged simultaneous intervention: (1) an overhead chime audible through the ED signaling the start of shift sign out, (2) diversion of phone calls by clerical staff to the second care team (the team not actively signing out), and (3) a lightweight, easily movable pedestal sign with the message "Sign out Rounds in Progress, Please Minimize Interruptions" placed outside the physician work area to signify shift sign out occurring. These interventions were chosen to provide an audible cue to all staff that sign out was beginning and a visible reminder that sign out was in process and interruptions should be minimized. The diversion of phone calls (specifically calls about patients being transferred from outside facilities) provided an operational workflow change for the department clerk. All 3 interventions were initiated simultaneously in September 2013 and remain in place. Prior to implementation, an email was sent out introducing the changes to all ED staff, with messaging reinforcing the idea that sign out is a high-risk time during which interruptions should be minimized as critical patient information is being communicated. The ED does not utilize any formalized structure for sign out content; it typically is resident-to-resident with attending supervision.

Utilizing a before and after study design, a research assistant observed team sign outs at various shift changes throughout the day before the interventions (July 2013 - August 2013), and again after a 4-month washout period (January 2014 – March 2014). All sign outs observed occurred either during the 3 pm or 5 pm sign outs, which were chosen because these hours are when the department has the highest volume and the highest number of patients are likely to be signed out. Other sign outs, which occur at 7 am and 11 pm, were not observed, although the interventions were still utilized during these times. Using the data-collection form (Figure 1), the research assistant observed shift sign out and recorded each instance and type of interruption (eg, nursing interactions, electrocardiogram (ECG) deliveries, consultants, phone calls, and arrival of critically ill and/or trauma patients). Interruptions were defined as anyone outside of members of either the oncoming or offgoing team speaking to a member of either team, any member of either team being handed an ECG for interpretation, any member of either team answering a phone call during the sign out period, or the arrival or identification of a critically ill and/or trauma patient that required immediate attention.

Also recorded were the start and end times of shift sign out, number of patients signed out, total number of patients in the ED,

Figure 1. Direct Observation Template Form

Sign out Project Data Sheet
Date _____

Shift change   7a   3p   5p   11p
(circle)

Time sign out begins _____

Time sign out ends _____   Total time (min) _____

Number of team members on offgoing team _____
(Residents and attendings)

Number of team members on oncoming team _____

Total patients in department _____

Total patients being signed out _____

<u>Interruptions/Delays</u>

(Circle)
Attending late/missing   Resident late/missing

(Tally)
Phone calls _____   Nursing _____

Consultants/other providers _____   ECGs _____

Critically ill patients/traumas _____

Total interruptions _____

Figure 2. Pre- and Postintervention Survey Instrument

In the past week, how often has a sign out/patient handoff been interrupted by nursing or other ED staff?

1	2	3	4	5
Never	Rarely	Sometimes	Frequently	Very Frequently

In the past week, how often has sign out/patient handoff been interrupted by phone calls or consultants?

1	2	3	4	5
Never	Rarely	Sometimes	Frequently	Very Frequently

In the past week, how often have you needed to repeat or restart a patient handoff due to interruptions?

1	2	3	4	5
Never	Rarely	Sometimes	Frequently	Very Frequently

How efficient do you think sign outs have been in the past week?

1	2	3	4	5
Very Inefficient	Somewhat Inefficient	Neutral	Somewhat Efficient	Very Efficient

In the past week, how often did you feel that interruptions during sign out/patient handoffs has compromised patient safety?

1	2	3	4	5
Never	Rarely	Sometimes	Frequently	Very Frequently

Overall, how safe do you feel sign out has been over the past week?

1	2	3	4	5
Not at all	Somewhat Unsafe	Neutral	Fairly Safe	Very Safe

Table. Pre- and Postintervention Likert Scale Responses by Providers

		Very Frequently	Frequently	Sometimes	Rarely	Never	P-value for Chi-square Test
		1	2	3	4	5	
In the past week, how often has a sign out been interrupted by nursing or other ED staff?	Pre	34.21%	28.95%	28.95%	7.89%	0.00%	<0.001
	Post	2.70%	13.51%	27.03%	54.05%	2.70%	
In the past week, how often has sign out been interrupted by phone calls or consultants?	Pre	31.58%	23.68%	36.84%	5.26%	2.63%	0.002
	Post	0.00%	22.22%	50.00%	22.22%	5.56%	
In the past week, how often have you needed to repeat or restart a patient sign out due to interruptions?	Pre	23.68%	26.32%	31.58%	13.16%	5.26%	0.002
	Post	0.00%	10.81%	43.24%	40.54%	5.41%	
In the past week, how often did you feel that interruptions during sign out/patient handoffs have compromised patient safety?	Pre	0.00%	10.53%	42.11%	34.21%	13.16%	0.026
	Post	0.00%	0.00%	21.62%	59.46%	18.92%	
		Very Inefficient	Somewhat Inefficient	Neutral	Somewhat Efficient	Very Efficient	
How effecient do you think sign out has been in the past week?	Pre	13.16%	21.05%	34.21%	31.58%	0.00%	0.002
	Post	2.70%	8.11%	13.51%	62.16%	13.51%	
		Not at all Safe	Somewhat Unsafe	Neutral	Fairly Safe	Very Safe	
		1	2	3	4	5	
Overall, how safe do you feel sign out has been over the past week?	Pre	0.00%	23.68%	28.95%	34.21%	13.16%	0.001
	Post	0.00%	2.78%	5.56%	72.22%	19.44%	

There were 38 respondents in the pre group and 37 in the post group. Chi-square test was used to calculate P-values.

Figure 3. Pre- and Postintervention Average Frequency of Interruptions by Type
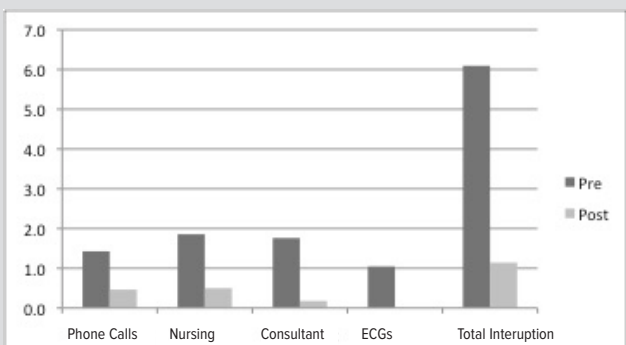
Reduction in all categories of interruption were statistically significant. Abbreviation: ECG, electrocardiogram.

number of team members on both the oncoming and offgoing teams, and whether faculty or residents were late to sign out.

A survey (Figure 2) was emailed to 24 faculty and 18 residents working in the ED during implementation to assess their perceptions of the frequency of interruptions during sign out and their overall perception of the efficiency and safety of sign out in the past week on a 1-5 Likert scale. The survey was sent to this group of providers both prior to the initial data collection period and again after the postintervention observation period.

Outcomes measured by direct observation and survey results were compared statistically utilizing 2-sample *t*-tests, 2-sample proportion tests, and chi-square tests as appropriate. STATA version 13 (StataCorp, College Station, Texas) was utilized for all statistical analyses.

RESULTS

Twenty-one sessions of shift sign out were directly observed prior to the intervention. Twenty-eight sessions were observed after intervention. The preintervention survey was completed by 38 of 42 providers (90.5% response rate), and the postintervention survey was completed by 37 of 42 providers (88.1% response rate).

The average frequency of preintervention interruptions was 1 occurring every 2.38 minutes. Postintervention interruptions occurred at a rate of 1 every 10.36 minutes. The average number of interruptions per shift sign out were significantly decreased by the interventions (6.1 vs 1.1 total interruptions; $P < 0.001$). The frequency of all measured categories of observed interruptions were reduced during the sign out process, including nursing interactions ($P = 0.01$), consultant interactions ($P = 0.02$), ECG delivery ($P = 0.001$), and phone calls ($P < 0.01$) (Figure 3). There were no interruptions either preintervention or postintervention from the arrival of critically ill patients or trauma patients.

There was a higher mean number of patients handed off preintervention (12.9 vs 9.6 patients; $P < 0.01$), but the total number of patients in the ED at the time of sign out was higher in the postintervention period (33.6 vs 38.6; $P = 0.03$). Shift sign out occurred a mean of 6.1 minutes late pre-intervention, and 3.9 minutes late postintervention ($P = 0.03$). Additionally, the total time spent during shift sign out was reduced (14.1 vs 11.4 minutes; $P = 0.04$).

The survey results (Table) showed statistically significant improvements in clinician perception of interruption frequency as well as perception of overall sign out safety. "Top Two Box" Likert scores of 4 or

5 increased from 47.4% before implementation to 91.7% after implementation for provider perception of sign out safety.

DISCUSSION

Interruptions during shift sign out may be an underreported phenomenon. Our study found 1 interruption per 2.38 minutes during sign out (during the preintervention phase), which is higher than previously reported rates of interruption.[4] The simple interventions through which we were able to reduce interruptions are only a few of the many possible ways to move toward this goal. We demonstrated that very low cost and easily implemented interventions can reduce the rate of interruptions by over 80%.

The increased awareness that shift sign out was occurring provided by the overhead chime and visible signage seemed to lead to greater hesitation to interrupt the shift sign out process. This also seemed to lead to a change in the culture of sign out, evidenced by the increased provider perception of the safety of sign out as well as secondary metrics, including the duration and start time of sign out.

With so much recent attention on the safety risks associated with patient handoffs in medicine, it is not surprising to see a resultant surge in research focused on improving this process. This includes the Emergency Medicine Patient Safety Foundation's ED-specific *SAFER Sign Out* guideline, in addition to other patient sign out guidelines.[11,12] While these handoff "checklists" focus on improving the content of sign out, to maximize the effect of these tools, the context of the sign out also is important and must occur in an environment optimized for the communication of patient data.

Although some interruptions could be perceived as necessary to delivering safe and efficient ED care (ie, for critical patients), any benefit must be weighed with the risk during the already high-risk sign out period.[14-16] It is unclear that minimizing interruptions has any positive effect on patient outcomes, although our clinicians did perceive that overall safety of sign out had improved due to the intervention (Table).

The physician station in the ED could be compared to the cockpit of an aircraft. The aviation industry is viewed as the gold standard in the utilization of similar safety checklists. In addition to the content of the safety checklists, there is emphasis on the idea of implementing a "sterile cockpit" during recognized high-risk times such as takeoff and landing,[17] with interruptions limited only to critical information. The fast pace, unpredictable nature, and frequent interruptions make the ED a similarly high-risk environment less than ideal for effective transfer of information.

Health care systems should consider working toward the idea of a "sterile cockpit" in the ED during our most vulnerable times—patient handoffs. Only those interruptions that are truly critical should occur during these times.

Limitations

This study was conducted as a before-and-after study design and was not randomized. We selected observation times on similar days of the week and times of the day to avoid potential confounding, but there could be other variables not controlled for that influenced the results. One of these variables—discussed in the results section—was that the volume of patients in the department signed out at shift change was higher during the postintervention period. However, this would be expected to negatively impact the results.

In this study, the data recorder was present during sign out. Although the clinicians signing out were not aware of the specific variables being collected, they were aware that they were being observed, which could have influenced their behavior.

Due to the rotation schedule of resident physicians, there also were slightly different providers working in the ED during the pre- and postintervention periods. The 24 faculty stayed consistent, but there was turnover in 10 of the 18 residents due to off-service rotations, meaning that there could have been a potential difference of up to 26% in the providers responding from the presurvey to the postsurvey.

As with any change in a complex system, it is also difficult to assess inevitable unintended or downstream consequences.[18] It is possible that these interventions, while reducing interruptions during sign out, led to interruptions in nurses' workflow or the omission of communication of patient data between nursing or consultants and the ED care team.

While we used a decrease in interruptions and provider perception of safety to demonstrate potential safety improvements, we did not investigate the effects of our interventions on actual patient outcomes or adverse events. Further study would be warranted in these areas. Patient perception of sign out safety and communication of information between physician teams also would be an interesting topic of investigation.

CONCLUSION

This study demonstrates that following implementation of very simple interventions, there was a significant reduction in the frequency of interruptions occurring during ED shift sign out as well as increased provider perception of sign out safety. Optimizing the ED environment for shift sign out could allow for more successful communication of critical patient information and ultimately could lead to improved patient safety.

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Cultural and Social Challenges of Diabetes Self-Management Education Through Physicians' Voices

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ABSTRACT

Objective: The aim of this study is to understand how the physician-patient relationship is related to referral practices for diabetes self-management education and physicians' perceptions of culturally competent health care delivery at a large health system affiliated with an academic medical center in a Midwestern city.

Methods: Sixteen physicians (6 family medicine, 6 internal medicine, 4 endocrinology) participated in semistructured interviews. Interviews were audio-recorded, transcribed, and coded. Data were thematically analyzed using MAXQDA software.

Results: All physicians considered diabetes self-management education a very important part of diabetes treatment, but physician referral patterns to diabetes education varied. Study findings indicated that both high and low referring physicians reported providing care that was responsive to personalized patient needs, including cultural beliefs, attitudes, and behaviors that affect health/health care. Building relationships and rapport with patients led to discussions of understanding barriers to diabetes management.

Conclusion: This study highlights physicians' perceptions of and concerns about referrals to diabetes self-management education and the treatment of type 2 diabetes. Physicians understood the personal, environmental, and health care factors that limit the number of racial/ethnic minorities from participating.

Practice Implications: In addition to diabetes education, physicians suggested that additional resources or programs will help them address socioeconomic factors beyond their control and to understand cultural preferences.

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INTRODUCTION

Diabetes health disparities by race, ethnicity, and socioeconomic status continue to be a major public health concern.[1] Racial and ethnic minorities have a higher risk of diabetes complications that may result in blindness, renal disease, heart disease, stroke, and lower extremity amputation than non-Hispanic whites.[2] Tight diabetes control (maintaining hemoglobin A1c levels at or less than 7%, ideally) can prevent or delay complications of the disease. Achieving the best possible glucose control requires an individualized approach including culturally competent health care tailored to ethnic, racial, religious, geographic, or social group needs.[1,3]

In much of the current research describing cultural competence, the focus is narrowly construed to include race and ethnicity only, while the role and definition of "culture" is much more complex. Definitions of cultural competence may differ and overlap with other concepts, such as cultural competence and patient-centered care.[4] Therefore, it is important to distinguish that this study used the Consumer Assessment of Healthcare Providers and Systems Cultural Competence (CAHPS CC) Item Set developed by Dr Robert Weech-Maldonado and collaborators to assess cultural competency. Based on their work, culturally competent care is defined as care that respects diversity in the patient population and cultural factors that can affect health and health care, such as language, communication styles, beliefs, attitudes, and behaviors.[5]

Given that racial and ethnic minorities have higher rates of diabetes and are more likely to develop diabetic complications, interven-

ing earlier and aggressively in the disease process is beneficial. Formal diabetes self-management education is recommended to enhance diabetes self-care knowledge, provide skill training, understand how to overcome identified barriers, and create self-efficacy.[1,3] Despite the solid evidence that diabetes self-management education can improve clinical outcomes and health status, less than half of people with diabetes receive formal diabetes education.[6] In studies on attendance at diabetes self-management education, the most important factor predicting patient participation was the physician's influence.[7] A review of the literature did not reveal any studies evaluating the perceptions of culturally competent health care in high and low referring physicians to diabetes self-management education.[8-12]

A previous quantitative study by our research team found that less than 7% of 9,992 patients with type 2 diabetes received a diabetes self-management education referral within the health system.[13] These findings underscored the need to understand the reasons behind low referral rates. Recognizing that there may be many reasons for underuse of diabetes self-management education, the research question is whether high referring physicians may be practicing health care differently from low referring physicians. To address this question, we conducted in-depth interviews with high and low referring physicians to evaluate their perceptions of self-management education and the integration of cultural competence in their practice areas. A better understanding of how cultural competence is incorporated into the treatment of type 2 diabetes and how the physician-patient relationship influences access to diabetes education might support efforts to decrease the cost of complications and increase quality, especially patient-centered, effective, and equitable services in the health care system.

METHODS

Study Design

This is an exploratory study using in-depth interviews with physicians from family medicine, internal medicine, and endocrinology practices who treat patients with type 2 diabetes. In-depth interviewing is a method of qualitative research in which the researcher explores extensively the participants' perspectives, typically with a small number of individuals.[14] Qualitative methods can provide important insights about social beliefs and behavioral and cultural considerations to improve diabetes management.[15] The study was approved by the institutional review board at the Medical College of Wisconsin prior to any study activities. Informed consent was obtained from each participant, and a lunch incentive of $15 was provided.

Recruitment—Criterion sampling, a type of purposeful sampling, was employed to recruit physicians by selecting participants who met specific criteria ensuring data quality and achieving data saturation.[16] The selection of ordering physicians to determine referral rates was based on the formal referral process to the 2 Diabetes and Health Education Centers, within 1 health system (Diabetes Education Accreditation Programs). This was the best approach to assess access to diabetes education in the health system.

A physician's referral rate to diabetes self-management education was derived from the referrals placed in the electronic health record. Eligibility criteria for the study included the following: (1) endocrinologist, family practice clinician, or general internist; and (2) a clinical practice that includes patients with type 2 diabetes served at a specific, single health care system. A list of eligible physicians was generated from the electronic medical records system from the period 2006-2015 to designate physicians as high referrers versus low referrers. The referral numbers were attributed solely to the ordering physician.

Practice referrals were calculated using the number of referrals placed to self-management education (CPT code G0108) by the ordering physician as a numerator and the number of patients with type 2 diabetes in their patient panel as a denominator (referral range: 2-267, patient panel size range: 42-1,156). The literature does not provide average national or local referral rates to diabetes education. Main information about referrals came from the American Diabetes Association Standards of Medical Care guidelines, which recommend referrals at 4 key points: a diagnosis of diabetes, on an annual basis, when new complicating factors (diabetes-related or other) influence self-management, and at the time of transitions in care.[1] Therefore, this study calculated meaningful referral rates for physicians by dividing the total number of referrals by the total list size (patient panel).[17] Seventy-nine physicians were designated as high referrers (rates above the median > 0.16; eg, 28 referrals/169 patients with type 2 diabetes = 0.17) and 81 physicians were designated as low referrers (rates below or including the median < = 0.16). Using the complete list, physicians were contacted via email by their respective clinic medical directors to announce the study and encourage participation. Physicians who wished to participate voluntarily contacted the research coordinator for an interview appointment.

Data Collection—Interviews were conducted between March and July 2016. Physicians were recruited from a health system that includes an academic medical center-based practice and community-based practice, with both having primary and specialty care practices located in and around a mid-sized Midwestern city. Interviews took place at the physician's clinical office space.

Individual interviews were conducted using a semistructured guide based on specific study objectives, with content following the CAHPS CC Item Set (the cultural competence index is available as Appendix A at https://www.wisconsinmedicalsociety.org/_WMS/publications/wmj/pdf/117/5/Appendix%20A_Azam.pdf).[4] The research team designed the interview guide and ensured the flow and clarity of the questions. The guide included questions regarding physicians, practice patterns, perceptions of diabetes self-management education, how they identified social and cultural needs, and how they aligned the treatment of diabe¬tes and culture (physician interview questions are listed in Appendix B, found at https://www.wisconsinmedicalsociety.org/_WMS/publications/wmj/pdf/117/5/Appendix%20B-Phys%20Int%20Questions.pdf).

Data Analysis—Interviews averaged 30 minutes. Interviews were audiotaped and transcribed verbatim for analysis. MAXQDA version 11 (VERBI GmbH, Germany) was used to facilitate coding and analyses.[17] Interviews were analyzed using the framework method[18] combined with thematic analysis.[14] The framework approach focuses on using structured topic guides to elicit and manage qualitative data. Specifically, the codebook started with some a priori codes developed from the most relevant literature and expanded during analysis using the thematic analysis approach.

Analysis occurred in 2 stages, corresponding with the inductive approaches of open coding and axial coding.[14] For the open coding, 2 coders (LA and SY) separately conducted line-by-line coding of a sample of transcripts to create codebooks. The codebooks were then refined into a master codebook through comparison and categorization, with discrepancies resolved through discussion on the interpretation of the codes and their properties and dimensions. Axial coding followed the open coding, wherein transcripts were reviewed and references to each of the elements identified in the codebook were highlighted. The analysis of key words, phrases, and texts allowed the coders to take the next step of extracting and identifying themes. Datasets were categorized into high and low referral groups looking for similarities and differences within the data. The themes identified in each group had a high degree of overlap. Therefore, the low group data set and high group data set were combined into one file.

To support credibility/validity and dependability/reliability of the data, the coders triangulated data sources and methods.

RESULTS

Sixteen physicians participated in this study: 6 from family medicine (4 low and 2 high referrers), 6 from internal medicine (4 low and 2 high referrers), and 4 from endocrinology (1 low and 3 high referrers). Eight of the physicians self-identified their race as white, 2 as African-American, and 4 as other. Half of the physicians were male. Seven participants reported having received cultural competence training within the last 5 years and 6 participants reported having received patient-centered care training. Additionally, participants had an average of 30% racial and ethnic minorities in their practice and estimated referring to diabetes education an average 10% of the time regardless of whether categorized as high or low referrers. Other characteristics are summarized in the Table.

Interview Findings

Three themes emerged that overlapped across the high and low referring physicians: (1) diabetes self-management education referral patterns; (2) understanding patient culture and preferences; and (3) shared physician and patient decision-making. Results are presented in the order of their frequency within the raw data of the interviews.

Diabetes Self-Management Education Referral Patterns

Three different types of physician practices were identified for

Table. Demographic Characteristics of Physicians (n = 16)

Specialty	n (%)
Endocrinology	4 (25.0)
Family Medicine	6 (37.5)
Internal Medicine	6 (37.5)
Sex	
Female	8 (50.0)
Race	
White	8 (50.0)
African American	2 (12.5)
Other	6 (37.5)
Cultural competency training	7 (43.8)
Patient-centered care training	6 (37.5)
Aware of diabetes self-management education	15 (93.8)
Recognized by the National Committee for Quality Assurance for Excellence in Diabetes Care	
Yes	8 (50.0)
No	7 (44.0)
Don't know	1 (6.3)
Median years (and range) in practice	15 years (5-34 years)
Median years (and range) in current role	8 years (2-24 years)
Median patient care time spent in clinic	80.0%
Median distribution of racial and ethnic minority patients	30.0%
Median percent of referrals	10.0%

referring to diabetes self-management education: (1) refer to the off-site diabetes education center (2 formal diabetes education health centers using CPT Code G0108); (2) on-site, clinic-based education and refer to the off-site diabetes education center; and (3) on-site education only. Significant variation existed in how diabetes education took place within a single health system based on perceptions and use of available resources.

Patients were referred to a diabetes nurse educator, pharmacist, or nutritionist. Referrals were tracked only if they were ordered in the electronic health record system via the CPT code G0108. When patients attended the diabetes education session, the referring physician received a note from the diabetes educator. In general, physicians did not track if a referral was verbally offered and declined.

Referrals to the Off-site Diabetes Education Center—Nine physicians [3 high and 6 low referrers] reported sending patients to the diabetes education center. Physicians provided basic diabetes education; patients with difficult-to-control diabetes received repeated referrals to reinforce nutrition and other aspects of diabetes management. If patients had been diagnosed years ago, participants reported that they still refer to diabetes education to keep patients up-to-date with new information:

> "So I usually send my patient the first time I meet the patient, the patient has uncontrolled diabetes, A1c is high, so I tell the patient that they really need to go and see the diabetes educator. And many of them will tell me, but I already saw the educator when I was diagnosed with diabetes ten years ago, 20 years ago. I say, yes, but there's new information that

you need to learn, like what is your A1c, what are the newest goals, new medications." *(Female Endocrinologist 101)*

On-site Education and Referral to the Off-site Diabetes Education Center—Five physicians [3 high and 2 low referrers] conducted most diabetes education on-site with the physician or another provider, such as a nurse or pharmacist. This group focused on educating patients themselves and referred out to the diabetes education center only when it was difficult to control their patient's HbA1c level. Participants discussed the barriers to attending off-site diabetes education for patients, including the need to schedule a different appointment, lack of coordinated care, or costs for an additional visit:

> "So when I first started a couple years ago doing all this for diabetes I trained my nurse. She went and talked to a diabetes educator and she got on board. However, those visits are free and there's no reimbursement and that takes about an hour or so of my nurse's time. So just as activity got busy it was not that sustainable, but I try to send them if they are not well controlled or if they're maybe diagnosed to one of the larger centers." *(Female Internal Medicine Physician 102)*

On-site Education Only—Two endocrinologists [1 high and 1 low referrer] did not refer to an external diabetes education program because they have on-site nurses and dieticians integrated into their practice model. Education is mainly incorporated into the clinic visit and, therefore, is not billed separately. A possible exception would be if a patient needed to return for specific education such as how to take insulin. In this case, a nurse would teach the patient how to do it and the education would be a billable service.

> "But we've had the luxury of being able to use, for the most part, one-on-one diabetes education for our patients, whether it be learning to take insulin, learning, you know, [sic] and a dietitian who's here and referred to and she can instruct them in dietary changes. So we've had that luxury." *(Male Endocrinologist 103)*

Understanding Patient Culture and Preferences

Physicians in this study considered the alignment of patient culture as challenging to the treatment of type 2 diabetes. They noted how diet is a fundamental part of diabetes care, and described culture as playing a role in beliefs about diet, exercise, and medications. They further described how complex culture can be to understand present dietary choices, lifetime dietary history, and patterns of exercise within their families and communities.

Some physicians described patient culture as being difficult to decipher, because culture is ingrained into individuals. One physician stated:

> "I think trying to explore who they are and what their background is important, but once you've identified some of those things, I don't know how you overcome that cul-

ture because that culture is so deeply embedded, and then so much of how they manage their diabetes is beyond my control." *(Male Internal Medicine Physician 104)*

Participants spoke more about individualizing the treatment of diabetes instead of focusing on the patient's background as noted in this quote: "I try to align the treatment of diabetes with every specific patient, and I don't know that I've had to make too many adjustments based on specific cultural preferences or issues." *(Female Internal Medicine 105)*

Finally, most physicians reported regularly encountering patients' socioeconomic needs instead of cultural needs. They expressed concerns about the difficulties of directing patients to community resources due to a lack of time and knowledge. Most physicians described directing patients to food pantries, prescription assistance programs, or getting in contact with a social worker.

Shared Physician and Patient Decision-Making

Most physicians relied on patients to describe what is important to them or any existing barriers to self-care they might have. While participants described building relationships and listening to their patients to understand their values and backgrounds, as important, most physicians did not find a need to inquire further unless their diabetes, weight, or blood pressure were out of control. One physician stated, "Why are we not able to exercise regularly, why are you not able to change your diet, why are you not able to take your medication every day?" *(Female Family Medicine 106)* Some physicians found strategies with patients with uncontrolled diabetes and acknowledged the need for understanding and collaboration to manage diabetes.

DISCUSSION

The aim of this study is to understand how the physician-patient relationship is related to referral practices for diabetes self-management education and physicians' perceptions of culturally competent health care delivery. In general, physicians strongly support and value formal and informal diabetes education. In this study, formal diabetes education was only 1 type of diabetes education, and the strength of this study is that additional types of education emerged, such as on-site diabetes education by physician, pharmacist, nurse, or other health care providers. As a result, some of the low referring physicians did not refer to the diabetes education health centers because they had a diabetes educator on-site. Therefore, more research is needed to determine the best strategies for incorporating unstructured and flexible approaches to self-management education.

Additionally, the term *culture* varied depending on the physician's perspective. The researcher did not ask physicians directly to define culture, but made inferences based on responses about how they align culture with the treatment of diabetes. The interviewer did not define culture for the physicians to decrease social desirability bias in their responses.[6] High referring and low referring physicians reported providing care that was responsive to

personalized needs, including beliefs, attitudes, and behaviors that affect health and health care. Findings highlight that most physicians did not report cultural or religious ideas conflicting with how they educate or communicate with their patients. Physicians thought that only foreign-born or limited English proficient patients may have explicit needs based on cultural beliefs and values. Thus, interventions need to recognize the differences between and within group variation.[4]

Physicians believed the strongest factors for patient diabetes outcomes were socioeconomic rather than cultural. In line with previous research, some physicians were still able to reveal barriers that patients were facing by having strong physician-patient relationships built on time, effective communication, trust, and commitment.[19,20,21] While no differences were found with respect to communication patterns, this study is still clinically relevant as both low and high referring physicians were equally attuned to the social and economic needs of their patients. Physicians suggested additional resources or programs (eg, social workers) would help them address socioeconomic factors beyond their control. This study indicates that a physician's cultural competency does not influence access to diabetes self-management education. High referring physicians understood the patient's perspective and gained insight into their personal world views; however, that did not always lead to positive clinical outcomes.

Limitations

This study has some limitations. One is that the findings are specific to physicians within a single health system and thus may not be generalizable. Another potential limitation is that the 16 physicians who volunteered to be in the study may have been different than those who declined or did not respond. Additionally, there was a striking difference in referral patterns and patient panel size for each of the 16 physicians—some with very low volumes and some with very high volumes (referral range: 2-267; patient panel size range: 42-1,156). This explains why the median value of 0.16 was relatively low.

CONCLUSION

Cultural competence is an important factor in diabetes care delivery. Broadly, this study shows that physicians perceive that they provide care that is responsive to personalized needs, including cultural beliefs, attitudes, and behaviors that affect health and health care. Although no differences were found between high and low referring physicians to diabetes self-management education, the key lies in building trust and relationships to consider opportunities for redesign. Innovative approaches may be found and implemented in redesigning formal structured diabetes self-management education programs that may improve referral rates, attendance, self-management, and well-being.

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Promoting Antimicrobial Stewardship by Incorporating it in Undergraduate Medical Education Curricula

Aaron P. Beck; Kelsey Baubie, MPH, MS; Mary Jo Knobloch, PhD, MPH; Nasia Safdar, MD, PhD

ABSTRACT

Background: Education related to antimicrobial stewardship–the judicious use of antimicrobials– is essential to stem the rising tide of resistance.

Methods: Using a scoping review method that includes a consultation component, we explored the extent to which antimicrobial stewardship is incorporated in undergraduate medical education.

Results: We found 4 studies evaluating stewardship content in undergraduate medical school curricula along with 2 studies assessing the effectiveness of specific stewardship training programs in medical education.

Discussion: We highlight three recommendations: (1) if applicable, identify an institutional "champion" and incorporate antibiotic stewardship-related content into medical school curriculum; (2) evaluate the status and effectiveness of antibiotic stewardship curricular components in medical education; (3) conduct research evaluating the long-term outcomes of antibiotic stewardship training in medical education.

BACKGROUND

Antimicrobial resistance in bacteria causing infections is a public health crisis that requires urgent action.[1] Antibiotic overuse and misuse drives antimicrobial resistance, thus antibiotic stewardship (AS) programs, including training in judicious use of antibiotics, are crucial to stem the rising tide of resistance.

Guidelines from national societies such as the Infectious Disease Society of America, the Society of Healthcare Epidemiology of America and the Pediatric Infectious Disease Society recommend that AS education include learners such as fellows, postgraduate residents, and medical students.[2-5] To date, most stewardship education programs have targeted health care professionals at the postgraduate level.[6-10] However, the literature points out that the undergraduate medical education setting, when prescribing behavior is being developed, is an important time to engage in AS learning activities.[9,11]

Research shows that medical students often feel inadequately prepared to judiciously prescribe antibiotics, have an insufficient comprehension of AS principles, and prefer additional education on AS-related content and prescribing of antibiotics.[12,13] Yet the extent to which AS features in education in medical student curricula is unclear. This review identifies gaps and summarizes findings related to AS education in medical school.

METHODS

We used a scoping review method to summarize this topic. The purpose of a scoping review is to examine the extent, range, and nature of research on a topic; identify research gaps; provide a descriptive overview; and quickly determine the potential of undertaking a full systematic review.[14,15] This type of review is useful when the topic has not yet been extensively reviewed or studies are heterogeneous in nature.[14] We reviewed published literature using PubMed and Scopus databases through August 2017. These search engines were used over others (eg, MedEd Portal) as they provided a more comprehensive list of records. MeSH terms pertaining to "antibiotic stewardship" and "medical school curriculum" were combined with a Boolean "AND" without search limitations. We excluded non-English and duplicate articles before reviewing the Title and Abstract of the remaining records, excluding articles that failed to include keywords or pertained to broad AS platforms or clinic-/hospital-related

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AS programs. In an effort to identify any missed articles in our literature search, we reviewed reference lists of the publications included in full-text review. Studies were excluded if content was limited to education of physicians, residents, or nonphysician clinicians and/or nonmedical, public health training. We also excluded studies that evaluated medical students' knowledge, perception, and/or attitudes of AS without significant investigation of curricula. After applying exclusion criteria, we included 6 articles that examined AS in medical school curricula (Figure).

We also conducted interviews with 2 institutional leaders overseeing medical school curriculum development and administration, which augmented our findings by providing a more indepth examination of factors relevant to integrating AS principles in medical education. These experts were chosen for their experience in medical school curriculum development and recent involvement in a medical school curriculum transformation. Furthermore, each expert actively teaches and pursues research in medical education.

RESULTS

We found 6 articles that investigated AS programs in medical school curricula. Four were cross-sectional national surveys investigating AS-related curricular components, such as prevalence of AS teaching

Figure. Article Selection Flow Chart

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Articles identified (121)
        │
        │──────────────► Duplicates removed (2)
        │                Non-English removed (1)
        ▼
Titles and abstracts
reviewed (118)
        │
        │──────────────► Articles removed (101)
        │                • Title did not include key words
        │                • Focused on broad AS platforms and/or
        ▼                  clinic- or hospital-based AS programs

Full text articles retrieved (9)      Articles included from reference list review (19)
        │                                       │
        └───────────────┬───────────────────────┘
                        ▼
        Articles included in full text review (28)
                        │
                        │──────────────► Articles removed (22)
                        │                • Limited to physician, resident or non-
                        │                  physician clinician education or non-
                        │                  medical and public health training
                        │                • Only assessed knowledge, percep-
                        ▼                  tions and/or attitudes towards AS
                                           without investigating curriculum

        Articles included in literature review (6)
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Abbreviation: AS, antibiotic stewardship.

and content, delivery, and evaluation of material. These studies show frequent, yet disparate AS content offered through undergraduate medical curricula.[10,16-18] Each cross-sectional study is summarized in Table 1, with specifics on curricula content, delivery, and evaluation detailed in Table 2.

We also found 2 studies that evaluated the impact of AS programs through a quasi-experimental design (Table 3). They found medical students' knowledge and attitudes of AS and interprofessional collaboration were significantly increased after completing the AS-specific curriculum. Both studies also emphasized the importance of long-term outcomes research to better understand the impact of AS training in medical school on physicians' prescribing behaviors.[19,20] In addition, the University of California San Francisco research group provided free access to their curriculum, which can be found online at http://tiny.ucsf.edu/stewardship.[19]
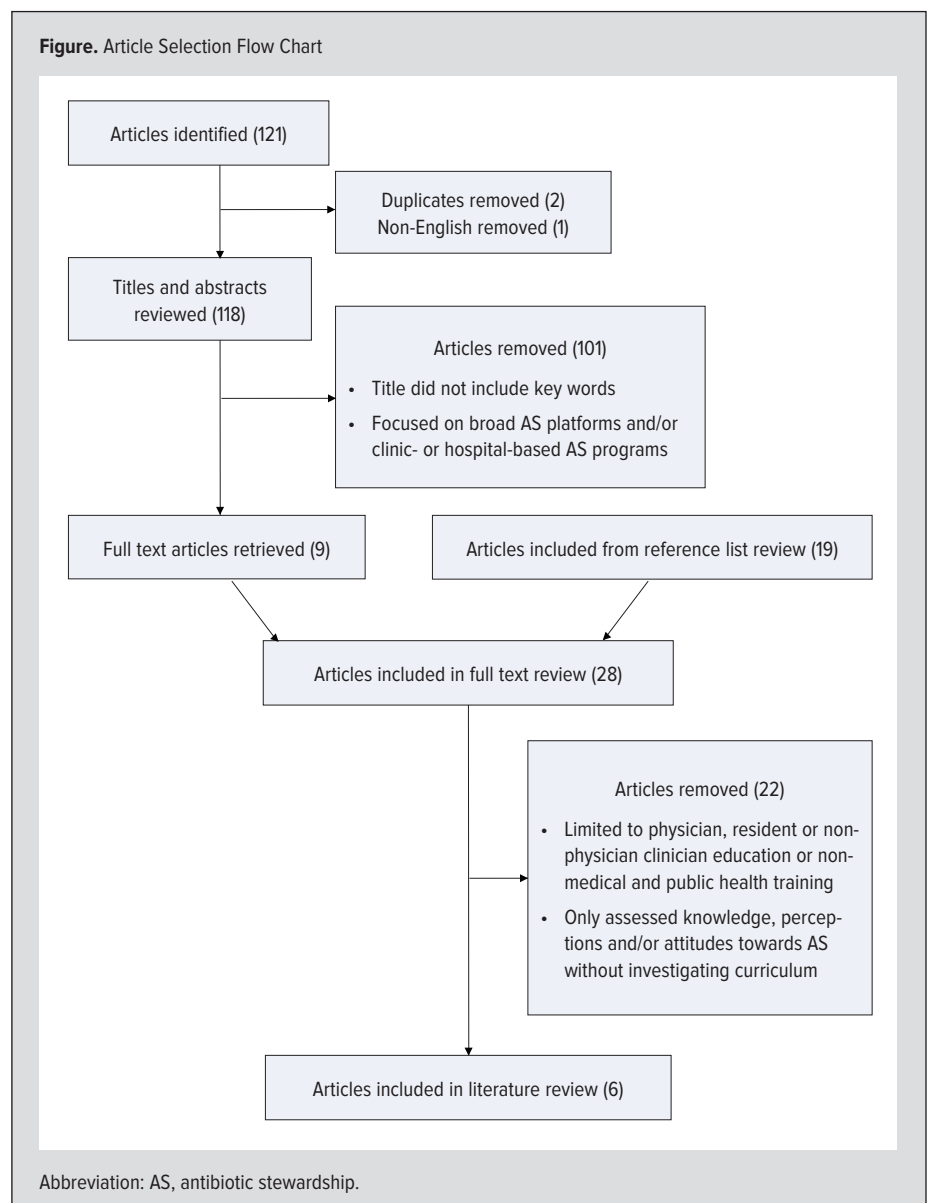
Our interviews with institutional experts yielded insights into incorporating AS in medical education. The observed heterogeneity of AS teaching in medical school curricula is likely linked to institutional flexibility when developing a curriculum, and meeting national accreditation standards largely depends on the institution's curriculum development strategy and mission-sensitive content prioritization. Furthermore, medical training occurs in a fast-paced content-dense setting, and the integration of additional content such as AS may be at the expense of another topic. Both experts stressed that a "champion" is necessary to spark and sustain a medical school's interest and ability to teach AS as a key curriculum component.

DISCUSSION

We found 4 studies on AS in medical school curriculum and 2 studies evaluating the effectiveness of a specific AS program. It is evident disparate learning environments and training approaches exist in medi-

Table 1. Summary of Research Investigating Medical School Curricula Related to Antimicrobial Stewardship

Article	Topic	Outcome Measures	Country	Method	Participants	Response Rate	Recommendations
Castro-Sanchez et al, 2016[16]	Teaching of AS principles	Prevalence of AS teaching, stewardship principles taught, time allotted to content, content delivery and teaching strategies, evaluation methodologies, multi disciplinary learning	United Kingdom	Cross-sectional survey	Medical, Dental, Nursing, Pharmacy and Veterinary Medicine Schools	70.5% [a]	Educators must adopt a comprehensive approach using standardized content relating antimicrobial stewardship; increased standardization of AS-related content
Melber et al, 2016[17]	Microbiology and Infectious Disease (MID)	Prevalence of MID topics, course leadership, curricular structure, course content, educator perceptions about microbiology education locally and nationally	United States	38 questions cross-sectional survey, interviews	LCME accredited US Medical Schools	73%	Multi disciplinary local and national collaboration; changing curriculum structure and content; identify best practices and support research
O'Shaughnessy et al, 2010[18]	Clinical pharmacology and therapeutics	Prevalence of CPT teaching, course structure, course leadership, content delivery and teaching strategies, assessment measures, interdisciplinary education, medical student transition, follow-up prescribing performance	United Kingdom	10 questions web-based cross-sectional survey	UK medical schools	94%	Increased collaboration between foundation schools, medical schools, pharmacists, and clinicians to ensure GMC's emphasis on CPT is met
Pulcini et al, 2015[10]	Teaching of prudent antibiotic prescribing behavior	Prevalence of prudent antibiotic use principles, content delivery and teaching strategies, qualitative background on the topic, associations between curriculum, antibiotic use and/or rates of bacterial resistance	13 European Countries[b]	57-point cross-sectional survey, interviews	Proportional sampling of 13 European countries' medical schools	94.6%	Improvement in the teaching of prudent antibiotic prescribing principles through national and European programs that establish specific learning outcomes and competencies

[a] Response rate refers to medical schools only.
[b] Countries include Belgium, Croatia, Denmark, France, Germany, Italy, Netherlands, Norway, Serbia, Slovenia, Spain, Switzerland, and United Kingdom.
Abbreviations: AS, antibiotic stewardship; CPT, clinical pharmacology and therapeutics; MID, microbiology and infectious disease; LCME, liaison committee on Medical Education; GMC, General Medical Council; US, United States; UK, United Kingdom.

Table 2. Summary of Medical Schools' Curricula Content, Delivery and Evaluation Related to Antimicrobial Stewardship

Article	Content	Delivery			Evaluation
	AS Principles	Lecturers	Course Structure	Timing [b]	Methodologies
Castro-Sanchez et al, 2016[16]	95.8%	Academian (82.6%)	Integrated (54.2%)	N/A	Essays + OSCEs + other (33.3%)
Melber et al, 2016[17]	66%	Microbiologist (48%) Microbioligist + Clinician (23%) Clinician (20%)	Integrated (45%)	First year (32%) Second year (53%) First + second year (12%)	Multiple-choice exams (98%) Small group and team-based learning
O'Shaughnessy et al, 2010[18]	60% [a]	Pharmacologist (70%)	Vertical integration (72%) Horizontal integration (17%)	Third year [c]	Written exams (90%) OSCEs (73%)
Pulcini et al, 2015[10]	97.1%	AS involvement (77%)	Integrated (68%)	Prior to clinical training (71%)	N/A

Percentages refer to the proportion of schools.
[a] Percentage of schools teaching CPT, AS principles may be underlying theme.
[b] Years denote when the majority of content was delivered.
[c] No exact proportion provided.
Abbreviations: AS, antibiotic stewardship; OSCE, objective structured clinical examination; CPT, clinical pharmacology and therapeutics.

Table 3. Summary of Research Evaluating the Effectiveness of Newly Developed Antibiotic Stewardship Curricula

Article	Location and Sample	Curriculum	Design	Assessment	Results	Recommendations
McDougall et al, 2017[19]	UCSF 425 2nd year medical students, 320 3rd year pharmacy students	Online case vignette Online learning module 3Two-hour group workshop (Open source curriculum)	Quasi-experimental	Knowledge and attitudes, efficacy of interprofessional collaboration; attitudes towards interprofessional collaboration	48% more students were able to describe role in appropriate antibiotic use; 19% more students were able to communicate in an interprofessional team; 43% more students were able to describe collaborative approaches to antimicrobial use	More robust analyses of effectiveness of AS curricula needed; desire for their open sourced curriculum to serve as exemplar for AS-related medical education; long-term impact evaluation is needed
Nori et al, 2017[20]	AECM 183 medical students pers year from 2014-2016; residents, ID fellows, and attending physicians also surveyed	Two 2-hour seminars on AS and IPC Integrated case-based modules, ARS, group learning, smartphone applications	Quasi-experimental	General antibiotic use, principles of microbiology and testing, prescribing using local antibiogram, understanding of IPC and HAI	Improved prescriber confidence; Improved understanding of transmission-based precautions	Smartphone technology is a convenient and effective platform for enforcing AS-related topics; long-term impact evaluation is needed

Abbreviations: USCF, University of California San Francisco; AS, antibiotic stewardship; AECM, Albert Einstein College of Medicine; ID, infectious disease; IPC, infection prevention and control; HAI, hospital acquired infection.

cal schools incorporating AS modules, but these studies also feature the potential benefits of AS-specific curricula on medical student's knowledge and attitudes of AS, prescribing behaviors, and infection prevention and control. In addition, our interviews with institutional experts elucidate several key aspects to curriculum design and modification related to AS, including time and content constraints and the importance of an AS "champion." Our limited findings stress the need to augment current evaluations of AS training in medical education to determine evidence-based teaching approaches to AS and to understand the long-term outcomes of AS training.[19,20] These steps are essential to better understand how AS-related curricular components in medical education impact physician prescribing behavior.

This paper has implications for medical schools seeking how to best incorporate AS-related content into undergraduate medical curricula, as recommended by national societies.[2,3,7] One option may be to incorporate existing open source curricula, such as the University of California San Francisco's, (http://tiny.ucsf.edu/stewardship) as a framework.[19] Institutional leaders also should evaluate current medical school curricula to assess the status and effectiveness of AS-related topics. This evaluation will identify institutional gaps in AS content and supplement the limited body of literature in this field. Research to examine novel approaches to AS training in medical education, (eg, smartphone technology) is needed.[20]

Limitations

The goal of this scoping review was to take a broad look at the extent to which medical students are being exposed to AS education. A limitation is that we excluded non-English articles. We also acknowledge this scoping review is meant to serve as a precursor to systematic review, and one such systematic review of this topic has been published.[21] This paper found that while medical schools are implementing AS training, thorough evaluation of the curricula's effectiveness has not been completed.

Publication bias may be another limitation of this paper; it is possible not all AS education and training activities are reported in peer reviewed journals. In addition, our qualitative data may not represent that of other medical school administrators and curriculum developers. These limitations notwithstanding, the inclusion of a key step of consultation—our interviews with topic experts from our institution—is a strength of our scoping review.[14]

CONCLUSIONS

We highlight 3 recommendations: (1) if applicable, identify an institutional "champion" and incorporate AS-related content into medical school curriculum; (2) evaluate the status and effectiveness of AS curricular components in medical education; (3) conduct research evaluating the long-term outcomes of AS training in medical education.

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Learning From Leaders of Academic Medicine

Joseph E. Kerschner, MD

Joseph E. Kerschner, MD

Academic medical centers (AMC)—medical centers and affiliated hospitals and clinics that provide care for the majority of complex medical conditions and have a medical school as a central component of their missions—are at the crux of changes in the US health system. Concurrently, they allocate resources and support for important biomedical research and train the physician workforce. AMCs face increasing complexity and expense in conducting biomedical research and providing excellent medical education, as well as challenges from many directions for reimbursement of clinical services. There are no simple solutions to these headwinds; however, the ability to continue to create new knowledge to improve health and provide an outstanding medical education system depend on the development of novel ideas for these anchor institutions/organizations to thrive.

The Medical College of Wisconsin (MCW) and its predecessor institutions have been committed to creating new knowledge

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through biomedical research, training the physician workforce, and improving the health of Wisconsin patients and communities since 1893. As part of our 125th anniversary celebration, MCW convened a group of US medical school deans to discuss these important issues in a panel format entitled *Leaders of Academic Medicine: Challenges and Solutions.*

The panel included Peter Buckley, MD, Virginia Commonwealth University School of Medicine; E. Albert Reece, MD, PhD, MBA, University of Maryland School of Medicine; Paul Rothman, MD, Johns Hopkins School of Medicine; Robert Simari, MD, University of Kansas School of Medicine; and Selwyn Vickers, MD, University of Alabama School of Medicine, with me serving as moderator. These outstanding leaders discussed a number of themes that are summarized below.

Medical Education

The discussion of medical education focused on the subthemes of student debt, graduate medical education, and the place of basic science in the medical school curriculum. The question of increasing medical student debt burden prompted a conversation about the primary concern of debt affecting students'

> The ability to continue to create new knowledge to improve health and provide an outstanding medical education system depend on the development of novel ideas for these anchor institutions/organizations to thrive.

choices of specialties—exacerbating shortages and maldistribution in areas such as primary care and psychiatry. The panelists suggested potential solutions to reduce student debt burdens to a reasonable level (which would not influence career decisions), including an accelerated curriculum, philanthropic and state government support, and helping students take advantage of existing loan forgiveness programs.

In discussing the effects of increased medical student enrollment on difficulties for medical students in matching into residency programs, it was noted that increasing the student base was a national strategy for addressing the projected physician shortage. Graduate medical education positions, however, have not kept pace because most of them are funded through the Medicare budget, and there has not been a substantive increase in funding for positions since 1997. Solutions were noted in the support of the Veterans Administration for increased residency program growth, as well as state support–such as in Wisconsin where the legislature has provided support to MCW to develop primary care and mental health residencies.

Responding to the question around the importance of research exposure in the medical student curriculum, it was expressed that it is critical to blend science and clinical curricula while balancing essential skills with the availability of vast amounts of information that students and physicians can access on demand via technology. Further, it was noted that the science of medicine is critical to the profession's future in the emerging age of artificial intelligence, precision medicine, and bioinformatics, and that an emphasis on scientific knowledge and discovery would ensure that physicians being trained today would have the tools to synthesize the discoveries of tomorrow and remain clinically at the forefront of medical care for many decades.

Balance of Research and Clinical Missions

The central question on this topic was how to properly invest in the mission of discovery while concurrently balancing the other missions from the resources provided by clinical revenues. Several respondents discussed the need to continue expanding clinical operations and to create new efficiencies to safeguard the academic missions. Others discussed the need to better tell the story of discovery and how this research is a major source of progress to reduce the long-term costs of clinical care. The examples illustrat-

ing this idea were called "definitive technologies"–and included treatments such as immunizations, antibiotics, and anesthetics that dramatically reduce disease burdens, improve health outcomes, and lower the cost of treating certain conditions. Innovations are particularly needed in common, costly, and/or chronic conditions to reduce health care spending.

Community Engagement

The importance of medical schools and academic health systems as "anchor institutions" for communities was addressed, with an emphasis on how these institutions view the important mission of community engagement. Several respondents mentioned that their institutions historically had been good about telling people what is beneficial for their health, whereas now these institutions are focusing more on listening to better understand and engage in communities' priorities. The importance of the economic advancement of communities and the emphasis on health disparities also were discussed. Panelists shared various programs and strategies, including commitments to train and hire local residents from distressed areas while also spending more money to buy goods and services from local vendors to boost employment and its associated health benefits. Respondents felt it was important that academic medical centers contribute their strengths as economic engines and through their scientific expertise, without confusing missions and taking on roles best filled by social service agencies and other partners.

Workforce Equity

In discussing needed solutions to gender inequities in academic medicine, the panelists noted success in the earliest career phases–as women are now admitted as medical students in equal numbers to men. Many institutions also have equity at the assistant professor level, although it declines as faculty progress to associate and full professor. The respondents agreed upon the importance of intentional leadership at the highest levels, systemically review-

ing and ensuring equity in pay, and in supporting institutional programs that advance women's leadership as a local supplement to nationally focused programs.

Wellness

The panelists shared that addressing wellness, reducing burnout, and resiliency are major initiatives in their respective institutions as well as across US medical schools–for faculty, students, and staff alike. In some cases, these efforts are spearheaded by a Chief Wellness Officer. All agreed that more needs to be done to reduce stress, especially on health care providers.

The above is a sample of the invigorating discussion that occurred on topics critical for medicine throughout Wisconsin and beyond. I welcome readers to view the entire panel conversation at https://bit.ly/2CV6cFt.

Amy J.H. Kind, MD, PhD   Robert N. Golden, MD

Social Determinants of Health: Fundamental Drivers of Health Inequity

Amy J.H. Kind, MD, PhD; Robert N. Golden, MD

Health inequity is one of the most profound problems facing our generation and our state. The opportunity to live a long and health-filled life is not equally available for all within Wisconsin. Many health conditions, including Alzheimer's disease, cancer, and diabetes, disproportionately impact racial and ethnic minorities and individuals who are socioeconomically disadvantaged. These populations are more likely to experience poorer health, in part due to the social determinants of health—conditions related to the environments in which people are born, live, work, play, worship, and age that impact a wide array of health, functional abilities, quality-of-life outcomes and risks.[1] Examples of such factors include housing quality, employment status, income, and education.

Well-accepted, mechanistic theories supported by decades of rigorous research confirm that social determinants of health are among the fundamental drivers of health inequity.[2,3] As such, these factors have become the focus of a large number of state, federal, and foundation

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initiatives aimed at improving health inequities and the health of the public as a whole. The National Institutes of Health (NIH), the Centers for Disease Control and Prevention, the World Health Organization, and many other organizations support initiatives to address social determinants of health. The director of the NIH, Francis Collins, MD, PhD, writes, "…successfully improving public health and reducing health disparities depends on a wide range of complicated and often subtle factors [the social determinants of health]. Putting them in perspective, and implementing carefully designed research that will provide rigorous evidence about causes and possible interventions will require many creative minds, including those who focus their attention well beyond what happens in the medical exam room."[4]

No longer should we hold the antiquated view that "health care" is separate from "social care." When viewed through the social determinants of health lens, it becomes clear that health care and social care are fundamentally intertwined and largely interdependent in their impact on population health. There are many examples of this interdependence. For instance, living in substandard housing without consistent electricity makes it nearly impossible to properly refrigerate insulin to treat diabetes. Unemployment and resultant poverty may limit opportunities to purchase nutritional food, thus worsening cardiovascular risk factors like hypercholesterolemia, hypertension, and obesity. Residing in neighborhoods plagued by

safety concerns may make it more difficult to exercise or to access pharmacies and clinics for needed medications or care, respectively. Each of us in clinical practice encounters myriad examples of social factors that directly and significantly impact the health of our patients.

Multipronged Efforts to Catalyze Change

The University of Wisconsin School of Medicine and Public Health (SMPH) embraces our responsibility to address health inequities and catalyze sustainable change. We have launched, in partnership with other organizations, multipronged initiatives to address social determinants that span the full tripartite mission of education, research, and practice. Our strategy harnesses a mechanistic, theory-concordant approach and focuses on stakeholder partnerships that bridge multidisciplinary clinical, social, and community spheres. Many of our programs are supported by the SMPH's Wisconsin Partnership Program (WPP), which allocates peer-reviewed grants to research, education, and community partnerships designed to improve the health of Wisconsin. We offer a brief sampling of SMPH initiatives, including many that have received support from the WPP, below.

Education—Medical student education at the SMPH increasingly focuses on health equity and the social determinants of health. Our new transformation of medical education—the ForWard Curriculum—highlights the intersection of the health system and community throughout the students' educational journey,

Figure. Neighborhood Disadvantage Within Wisconsin

Decile 1 (Least Disadvantaged)
Decile 2
Decile 3
Decile 4
Decile 5
Decile 6
Decile 7
Decile 8
Decile 9
Decile 10 (Most Disadvantaged)
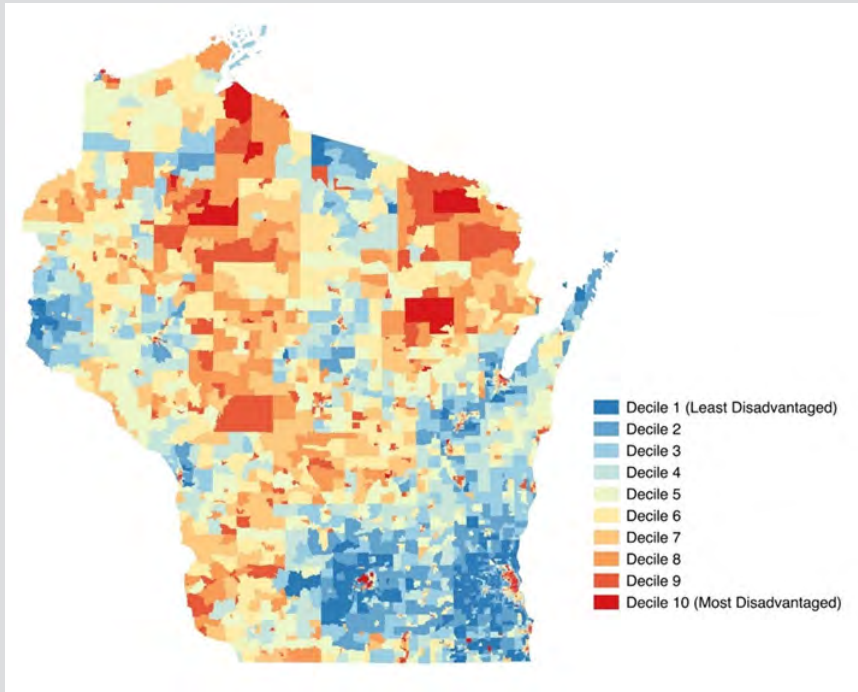
*Source: Neighborhood Atlas. 2018; University of Wisconsin Department of Medicine, https://www.neighborhoodatlas.medicine.wisc.edu/.

emphasizing longitudinal public health, system-based practice, and the application of knowledge and best practices in community settings. The Wisconsin Academy for Rural Medicine (WARM) and the Training in Urban Medicine and Public Health (TRIUMPH) programs focus on increasing the number of physicians who will practice in rural and urban Wisconsin settings, respectively—a critical contribution to improving the health of our state. The Wisconsin Population Health Service Fellowship Program, which is funded by the WPP, trains new public health leaders, with a goal of addressing the social-health system interface by deploying early-career professionals to community-based organizations throughout the state. These programs and many others guarantee that SMPH graduates will be ready to advance health in a holistic manner with a scope of knowledge ranging from the organization of cells to the organization of communities.

Research—Research that propels innovation at the basic science, clinical science, translational science, and public health levels provides another cornerstone for building a healthier state. To make meaningful gains in health equity,

continued research into the factors that drive, modify, and ameliorate social determinants' impact on health outcomes is imperative. One of the newest innovations in this area is the NIH-funded Neighborhood Atlas project.[5,6] The atlas is a first-of-its-kind, free, customizable, online mapping and data tool that allows anyone to visualize locations of neighborhood disadvantage across the entire United States, including Puerto Rico. The atlas is utilized by thousands within governmental, nonprofit, academic, community, and industry groups (Figure).[5,6] Research partnerships with Native American, African American, and other racial and ethnic minority populations have been a proud tradition at the SMPH. These initiatives, which reach all corners of Wisconsin, have led to critical advances across a large breadth of conditions, including asthma, Alzheimer's disease, and cancer.

Practice and Community—Translation of educational initiatives and research discoveries toward "real-world" change requires a sharp and deliberate focus on the third arm of our mission—clinical practice and community engagement. WPP-funded innovations involving multidisciplinary stakeholders leverage authentic

community partnerships, targeting the social determinants of health while establishing the necessary groundwork for future independence and sustainability. For example, the WPP-funded Black Men's Wellness Sustainable Initiative is applying innovative approaches to addressing and improving the health of African American men in Dane County. We recognize that sustainable change will not be possible without an SMPH student, faculty, staff, and leadership population that fully mirrors the breadth of diversity within Wisconsin. Expanded programs for enhancing diversity in all areas of our school will remain a focus in the coming years.

Future Vision—We are on the cusp of a revolution in the field of health equity, and the SMPH is committed to help lead the way through innovations in education, research, and practice. As the challenges of the social determinants of health evolve, so must we. Continued investments through the WPP grant programs are key to ensuring lasting progress in this area. We recognize that we are one of many key players in this field, and even the wonderful resources that are available through the WPP do not compare to the funds that are allocated to public health in most state and national budgets. We hope to continue to catalyze the elimination of health inequities in Wisconsin and, in doing so, serve as a model for the nation.

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Access to Palliative Care in Rural Wisconsin

DeAnn Richards, RN, BSN, CIC

Environmental Scan Shows Current Capacity

Palliative care is supportive medical care—at any age, diagnosis, or stage of illness—focusing on providing patients with relief from the symptoms, pain, and stress of a serious illness to improve quality of life.[1] America's Care of Serious Illness 2015 State-By-State Report Card on Access to Palliative Care in Our Nation's Hospitals demonstrated the importance of palliative care. This report highlighted the need for each state to "create a multidisciplinary advisory board and/or task force to conduct a landscape analysis of available palliative care services to determine state capacity and develop appropriate recommendations for improving access to quality palliative care."[2] Recent Wisconsin Senate and Assembly bills[3,4] failed to pass pursuant to Senate Joint Resolution 1 in March 2018. As a result, an environmental scan was the best option to fulfill the desired state from the report, which indicated "conducting a needs assessment and gap analysis is the foundation for strengthening access to palliative care at the state level."[2] MetaStar, under contract with the Wisconsin Office of Rural Health, conducted the environmental scan by looking at the population and the providers of this service.

One of the most significant findings of the environmental scan focused on rural counties. The 2017 Rural Wisconsin Health Report identified 46 of 72 counties (65%) as rural. Northern Region

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counties have the highest percentage of rural counties (93%) while Southeastern Region the lowest (25%). However, only 26% of the Wisconsin population resides within a rural county. In addition to potential geographic spread issues, certain conditions were more prevalent in rural counties. Coronary heart disease hospitalizations were reported as 3.5 per 1,000 people in a rural setting, which was higher than urban (2.6) and the state as a whole.[5] Ten percent of rural adult residents were reported diabetic, which was higher than urban and state (9%). Preventable hospital stays were 47 per 1,000 Medicare enrollees in the rural setting compared to urban (44) and state (45). Other aspects of rural health were consistent with urban and state, including the percent of rural adult residents reporting frequent physical or mental distress (10%), the percent who didn't receive needed health care (2%), and the percent living below the Federal Poverty Line (12%).[6]

When considering providers for care in rural areas, it was noted that 21 acute care hospitals[6] are located in rural counties. Also, 43 critical access hospitals[7] are in rural counties. Eighty-one hospice organizations are in the state.[8] Surveyed hospitals and members of the Palliative Care Network of Wisconsin indicated the presence of 33 palliative care organizations in Wisconsin. The only county without a known palliative care organization is Pepin, which lies in the Western region along the border with Minnesota.

As MetaStar continues to work with the Wisconsin Office of Rural Health, next steps will include determining the challenges of providing palliative care in a rural setting and address-

ing needs through collaborative efforts with providers and stakeholders. Interdisciplinary palliative care services are a cornerstone for addressing the needs of patients with serious illness and high health care costs as well as providing the highest quality of life for them and their families.[9]

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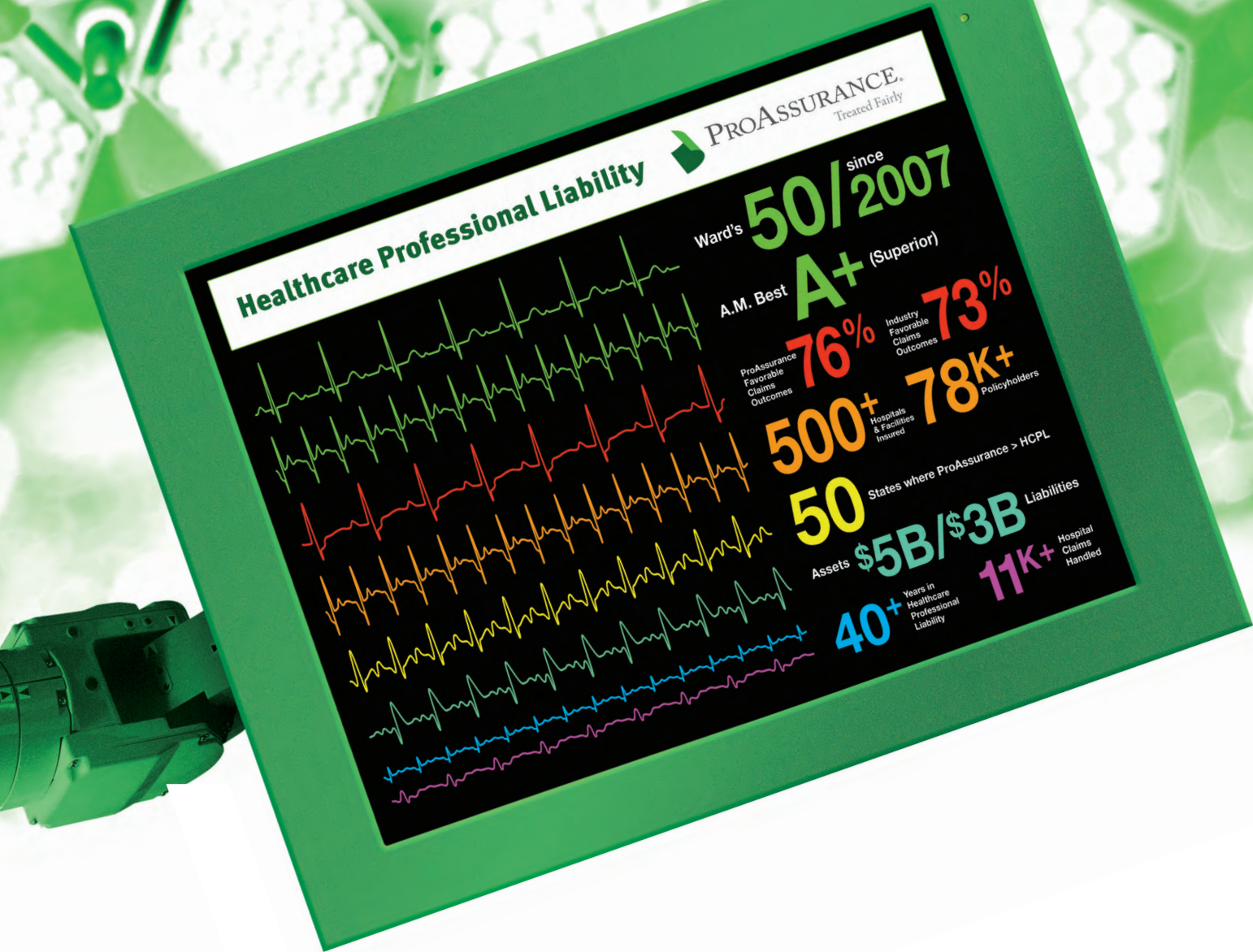
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