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Focusing on education leads to improved care for patients with low vision

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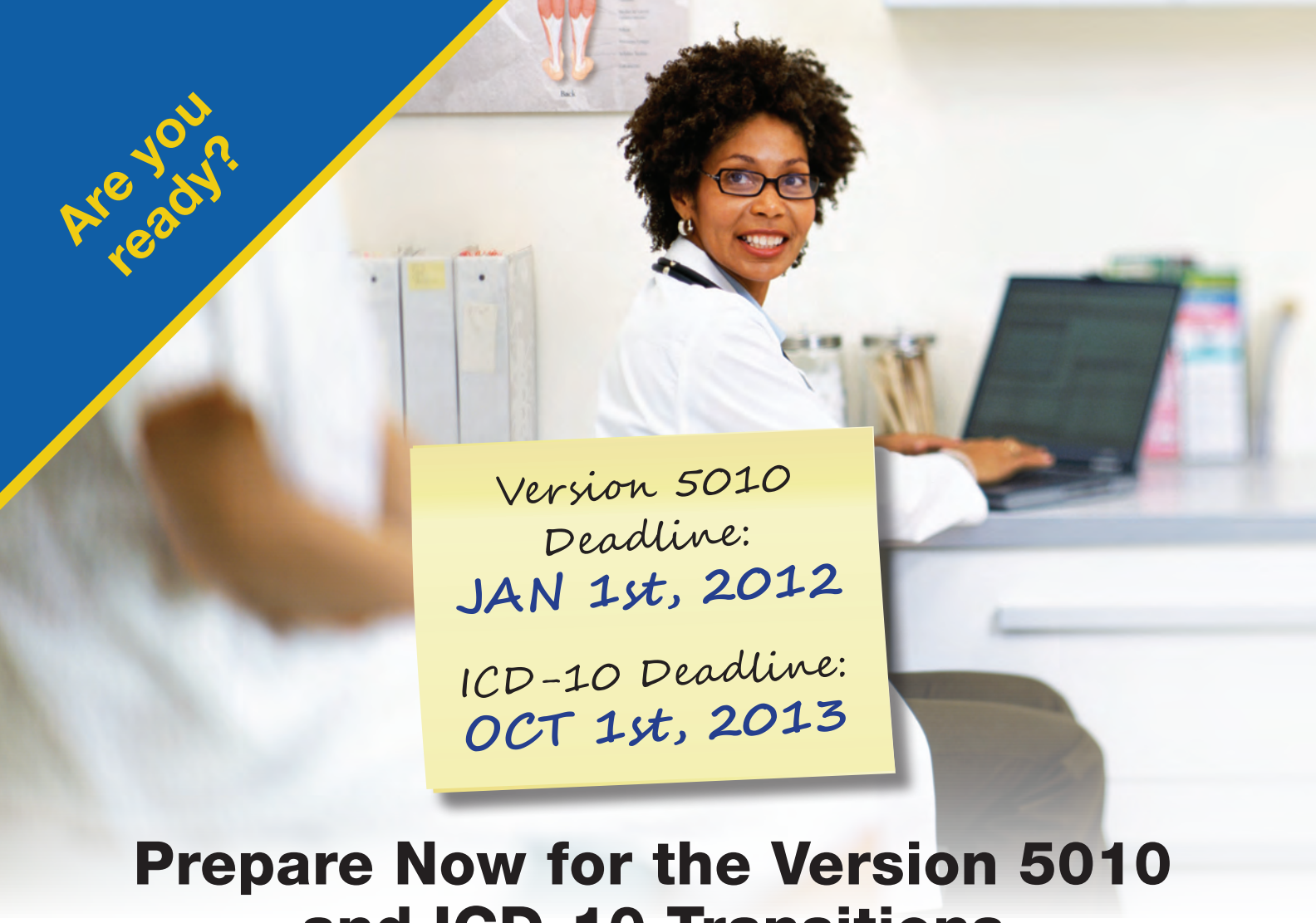

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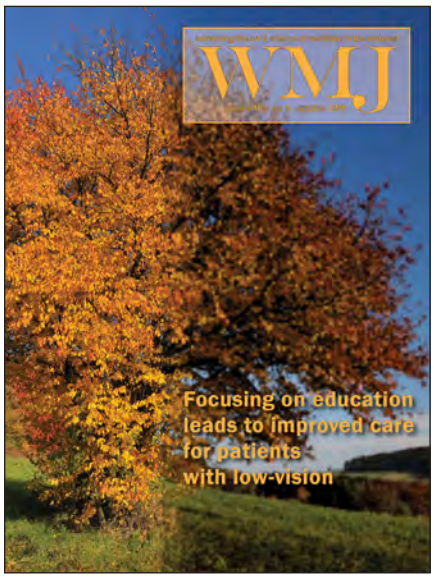

COVER THEME
Focusing on education leads to improved care for patients with low-vision

As our population ages, health care professionals are likely to see more patients with low vision. Educating health care staff about the needs of these patients can lead to a more satisfying experience for patients and staff, and may also lead to fewer adverse outcomes—as illustrated in one of the articles in this issue of *WMJ*, which focuses on preventing miscommunication and injury.

Cover design by Mary Kay Adams-Edgette.

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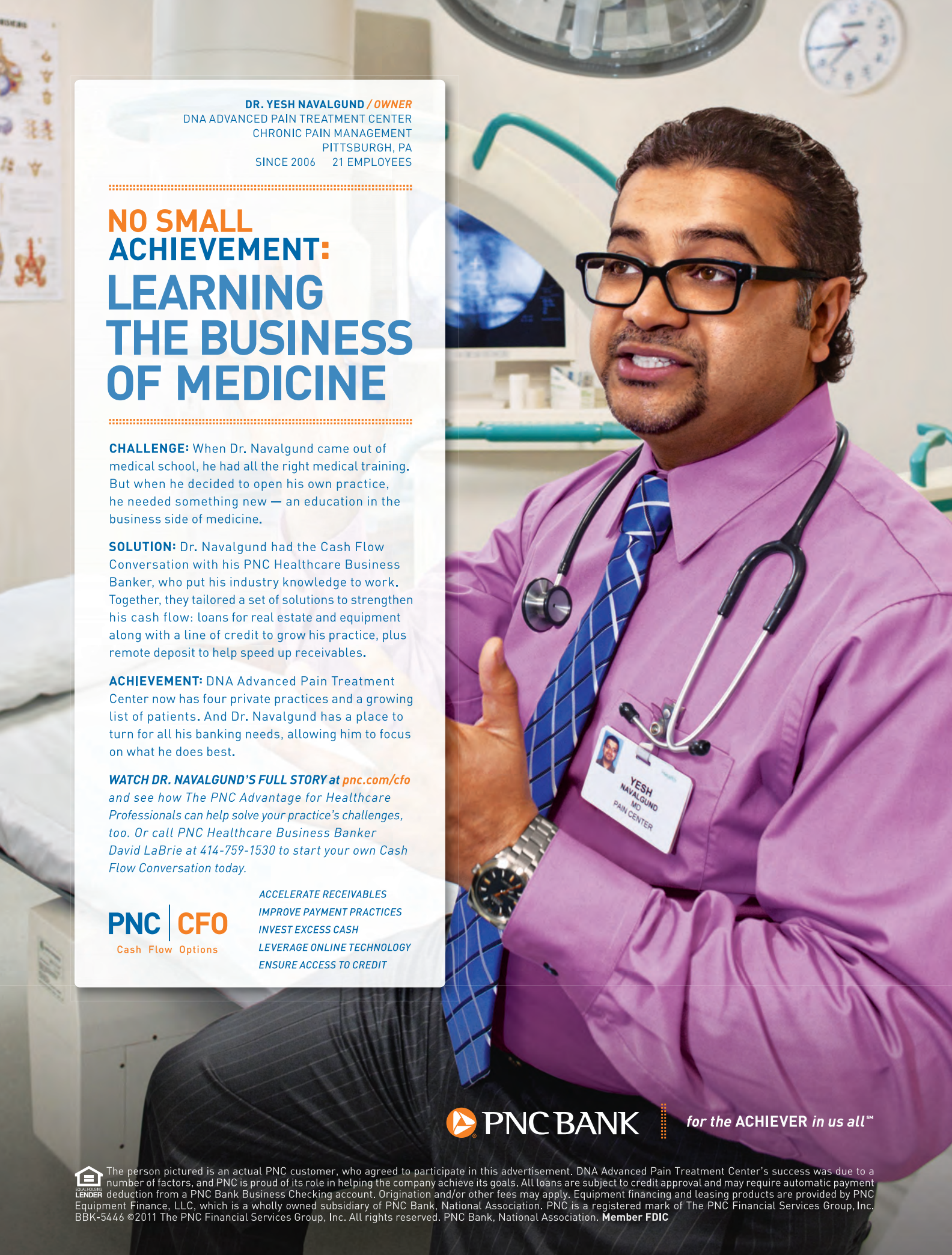

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Editorial Comment: Undesirable Publicity

A.W. Myers, MD, *WMJ* Editor; J.P. McMahon, MD, *WMJ* Managing Editor

Editor's note: The following is excerpted from *WMJ*, Volume 9, April 1911, pp. 727-728.

The two clippings which are printed below are from a local newspaper in one of the smaller cities of the State and have been forwarded to the editor with a request for an opinion as to whether it is ethical to have items of this character printed in a town where there are several physicians.

"* * * * last Sunday accidentally cut his left wrist badly with a knife while busy building a new boat. The ulnar artery was severed and the blood spurted from the gash. Dr * * * responded promptly to a call for medical assistance and managed to stop the flow of blood. One of the tendons was also cut and may cripple the little finger of the hand."

The 1-year-old daughter of Mr and Mrs * * * * underwent an operation last Thursday, Dr * * * removing an abscess from the child's neck. The little patient is now doing well."

In the opinion of the writer, the publication of items of this sort is undesirable and improper. While it is probable that the items quoted were published without the knowledge of the physician whose name is mentioned the continued appearance of bits of news of this character would give rise to a suspicion that the man in question had not used the energetic measure to prevent this occurrence which the situation demanded. A physician may plead that he cannot help it when items are printed giving his name in connection with medical or surgical details, but so far as our observation goes, a firm but courteous request to the editor to have his name omitted from news items of this character will relieve him in the future of the unpleasant criticism by his colleagues which is almost sure to be occasioned by this kind of newspaper publicity.

One would not feel that the physician who permitted his name to appear frequently in print in connection with items of this class had committed an unpardonable sin against medical ethics, but if it is not a sin, it is at least a weakness to allow his name to be used in this way. He is "practicing the small vices" of medical ethics, and there is no surer way of stirring up unpleasant feelings among his colleagues.

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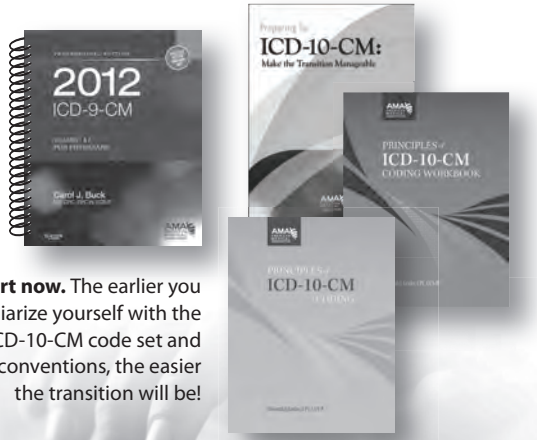

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Prevention of Miscommunication and Injury

John J. Frey, III, MD, Medical Editor

Intraprofessional communication—how doctors talk with each other about mutual patients—is perhaps the most poorly taught component of current medical practice. When I was starting practice, doctors gathered in the hospital for meals and conversations and "cafeteria consults," which were important to the culture of developing mutual respect in a given medical community. As a new doctor in town in 1973, I learned the culture and values of that community from senior doctors over pancakes and coffee, not through online courses.

In the present disconnected world of medical practice, electronic messaging is substituted for face-to-face communication over breakfast. We are too busy having "meetings" to actually talk with each other. Today most hospitalists and primary care doctors wouldn't even recognize one another, even though they share patients and are in the same "group." Neighborliness is as important in medicine as it is in the community but is not taught or structured in the efficient world of modern medicine. Lack of good communication between primary care doctors and consultants also has the greatest potential for tragedy and poor outcomes. Substituting an electronic bulletin board or e-mail does not replace personal, contextual, unhurried collaboration about patients.

The article by Farrell and colleagues[1] might help to change that dynamic in one important area. They discuss a newborn screening team that acts on positive results by engaging the primary care provider to counsel that provider on how to convey positive screening information to parents. The best people to convey worrisome information in a clear and understanding way to parents should be the doctors they know best and trust. But primary care doctors often can benefit from education, not only to the facts but to the language that would best convey those facts to parents. Having a coach and collaborator as part of a team overseeing the statewide newborn screening process, which—with new genetic markers—will only get more complicated, should make all primary care providers for children feel better. The solution to some of the concerns raised in this article may come with the next generations of doctors who learn, early in their careers, to work together.

Substituting an electronic bulletin board or e-mail does not replace personal, contextual, unhurried collaboration about patients.

When my male patients ask me what they should do different as they get older, I have always advised them to stay off ladders and roofs unless doing so is part of their job. In that regard, the very complete course in injury prevention outlined by Webb and colleagues[2] offers an experiential and evidence-based approach to educating medical students about what can be done to both decrease injury and to manage it once it happens. The course nicely demonstrates that advice and counsel for patients is important, but that advocacy for policies that would avoid injury is also the responsibility of physicians. There are many examples of such work in this state ranging from decreased temperatures in hot water heaters to avoid burns in children to seat belt and safe food laws. While the course may be logistically challenging, an abbreviated version might be an appropriate continuing education module for each of the health systems in the state. The problem is that in our offices we only see examples of accidents and injuries after they happen rather than those we prevented by counseling and policy.

The Health Innovation article by Khan and Simon[3] on a vision-friendly hospital follows the same principle—education of health care staff about the needs of low vision patients will not only create a more satisfying experience for patients and the staff but may decrease adverse outcomes, like falls. Our aging population will include

more patients with low vision so hospitals had best prepare in the most proactive way possible.

In their review of clinician adherence to appropriate Lyme disease screening guidelines for children, Al-Sharif and Hall[4] demonstrate the value of mining data in electronic health records (EHR). Since the disease is so prevalent in rural Wisconsin and the national guidelines are part of the Marshfield Clinic's EHR, one would expect closer adherence; but the study results continue to point out the difficulties inherent in moving agreed-upon guidelines into practice, even with the new tools available to us.

Aryal and Pathak[5] describe a case report where the unexpected, once again, is found to complicate the ordinary. We continue to advocate for looking for horses when hoof beats are heard, but occasionally zebras do appear.

Finally, we look back at the *WMJ* from 100 years ago to see how "advertising" oneself was discouraged and deemed unethical by organized medicine. Times have changed – doctors advertise on TV, billboards, buses and YouTube. It leads one to wonder if patients are asking each other "what brand is your doctor?"

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Improving Communication between Doctors and Parents after Newborn Screening

Michael H. Farrell, MD; Stephanie A. Christopher, MA; Audrey Tluczek, PhD, RN; Karen Kennedy-Parker, MT(ASCP); Alison La Pean, MS, CGC; Kerry Eskra, BBA; Jenelle Collins, BSN, RN; Gary Hoffman, MS; Julie Panepinto, MD; Philip M. Farrell, MD, PhD

ABSTRACT

Background: Newborn screening (NBS) enables early treatment, and some consider it a natural vehicle for genetic screening. Bioethicists argue for caution since families of infants with carrier status can develop psychosocial complications. This paper describes the methods and feasibility of Wisconsin's statewide project for quality improvement of communication and psychosocial outcomes after NBS.

Methods: When NBS identifies carrier status for cystic fibrosis or sickle cell, we contact primary care providers (PCPs), answer questions, and invite them to rehearse informing the parents. Three months later, we telephone the parents, assess knowledge and psychosocial outcomes, provide counseling, and assist with self-referral to further resources. Afterward, evaluation surveys are provided to the parents, to be returned anonymously.

Results: Birthing facilities provided accurate PCP names for 73% of 817 infants meeting inclusion criteria; we identified PCPs for 21% more. We reached 47.3% of PCPs in time to invite a rehearsal; 60% of these accepted. We successfully called 50.2% of eligible parents; 61% recalled a PCP explanation, and 48.5% evaluated the explanation favorably. Evaluations by parents with limited health literacy were less favorable.

Conclusion: It is feasible to follow parents for psychosocial outcomes after NBS. Preliminary data about communication is mixed, but further data will describe psychosocial outcomes and investigate outcomes' associations with communication.

INTRODUCTION

This paper describes the methods, feasibility, and early experience of a statewide, multifaceted quality improvement project designed to assess and improve the quality of provider-parent communication after newborn screening (NBS) identifies heterozygous ("carrier") status for cystic fibrosis (CF) or sickle cell hemoglobinopathy (SCH).

NBS is a population-scale public health program in which newborn infants' blood specimens are applied to a special filter paper, dried, and tested at a centralized laboratory for a panel of genetic and metabolic diseases.[1] CF and SCH are included on NBS panels because the diseases' risk of death and disability can be reduced if the disease is identified before becoming symptomatic.[2-4]

CF is a metabolic disease in which abnormal secretions lead to lung disease, nutritional problems, and dangerous losses of salt in sweat.[2] SCH is a blood disorder in which a hemoglobin mutation (S) is associated with painful crises, life-threatening infections, and vasculopathy, leading to problems like stroke.[3]

Both CF and SCH are autosomal recessive conditions, and carrier infants are identified in far greater numbers than infants with the actual diseases. Infants with carrier status for CF and SCH do not develop the actual disease, but their children may develop the disease if the other parent is also a carrier. Unfortunately, many families of carrier infants develop psychosocial complications after NBS, ranging from clinical levels of parental anxiety and depression to impaired parent-child bonding and the vulnerable child syndrome.[5-10] NBS programs have developed materials for education and support of families, but first conversations can be critical, and the quality of primary care providers' (PCPs) communication about NBS has been criticized by parents and NBS officials.[11,12] Psychosocial problems after carrier identification are cited by bioethicists and others as grounds for delaying or discontinuing some NBS activities.[7-9,13,14] To ensure the continuation of successful NBS programs and reduce harm from psychosocial complications, we developed the Wisconsin

• • •

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Project on Improvement of Communication Process and Outcomes after Newborn Screening (the Project). We adapted our methods from quality improvement techniques used for medical record review, simplified telephone follow-up, and patient tracking, so that the Project would be affordable and sustainable after research funding ended and replicable by other NBS programs without major budget increases. Eventually, it is hoped that these types of methods may be useful for other genetic conditions, as well as for false-positive results of metabolic screening tests.

The purpose of this paper is to describe the initial workings of the Project, ranging from feasibility of identifying NBS results and PCPs, to preliminary findings from evaluation surveys.

METHODS

At its core, the Project is designed to be a quality improvement effort by the NBS program of the Wisconsin State Laboratory of Hygiene and the Department of Health Services, with the Medical College of Wisconsin as a contracted agent. Methods and materials are approved by Institutional Review Boards at the Medical College of Wisconsin and University of Wisconsin–Madison.

Setting

When NBS identifies either CF or SCH, the NBS laboratory communicates by telephone with the infant's PCP and subspecialists to facilitate identification, treatment, and follow-up. The NBS laboratory obtains PCP contact information from the birthing facility's specimen collection card. Anecdotal experience shows that the clinician listed on the NBS card occasionally is incorrect, and the baby's full name may not be listed (eg, "Baby Boy Smith"). When the clinician's name is not the PCP, the listed clinician often is expected to forward the results to the actual PCP or to take temporary responsibility for the infant. When the baby's full name is incorrect, the clinician or the NBS laboratory must backtrack to the birthing facility to connect the result with the correct infant and PCP.

Usual practice is somewhat different when NBS identifies heterozygous carrier status for CF and SCH, which occurs in far greater numbers than results indicating true CF or SCH. SCH carrier results (defined by the presence of fetal, adult, and sickle hemoglobin, or "FAS") are mailed to the PCP because these results are not medically urgent. Note that NBS also identifies carriers for other hemoglobinopathies (eg, Hemoglobin C, D, and E), but the Project is limited to hemoglobin S to focus its analyses on the most common condition.

CF carrier status in NBS is defined by a blood spot showing an elevated immunoreactive trypsinogen and a single CF-associated mutation, followed by a normal sweat chloride test. The most common CF-associated mutation is ΔF508 but there are many others.[2] The sweat test is done because up to 2% to 5% of infants with a single mutation have an unmeasured second mutation that results in actual CF.[2] It has been recommended to have the sweat test before 8 weeks of age to have the benefit of early identification,[4] so the NBS laboratory faxes results to PCPs and tracks whether sweat tests have been done. The Project uses the term "likely CF carrier" for infants who had an elevated immunoreactive trypsinogen and a single CF-associated mutation, but who have not yet had a sweat chloride test.

Project Design

The Project expands the standard NBS methods for telephone follow-up to serve the typical number of about 900 infants born each year in Wisconsin with SCH carrier status or likely CF carrier status (Figure 1). An initial telephone call is conducted with the infant's PCP immediately after the abnormal NBS result is found. A second call is conducted with the infant's parents when the infant is between 3 and 5 months old, allowing sufficient time for infants to have at least 1 well-child visit during which the NBS result could be discussed. Scripts for telephone calls are similar to those that might be used for purely clinical follow-up, but have some additional research questions embedded in them. After telephone calls to the PCP and parent, an anonymous evaluation survey is distributed. The survey's questions are described in the Results section.

Participants

The main participants in the Project are the infants' parents, although data also are collected about the infants and their PCPs.

To reduce confounding effects of other factors that might cause potential anxiety or correlate with other psychosocial issues, we exclude infants when the NBS report (1) lists more than 1 abnormality, (2) states that the gestational age was <35 weeks, or (3) states that the calendar age at the time of specimen collection was >180 days of age. We also exclude infants if we discover the infant required either (1) >5 days in a neonatal intensive care unit, (2) hospitalization after discharge from the nursery, or (3) evaluation for some other medical abnormality. During the PCP call, we ask the PCP to identify parents who do not speak English and other contraindications to contacting the family by asking, "Can you think of any reason why it would not be appropriate to contact this family later this year?"

Prior to the parent call, a second exclusion criterion is implemented when we use NBS laboratory tracking data to exclude parents of infants who had non-normal sweat test

results (ie, results indicating the presence of CF).

Parents are offered a $20 gift certificate to more than 200 local or Internet merchants as a gratuity for their participation.

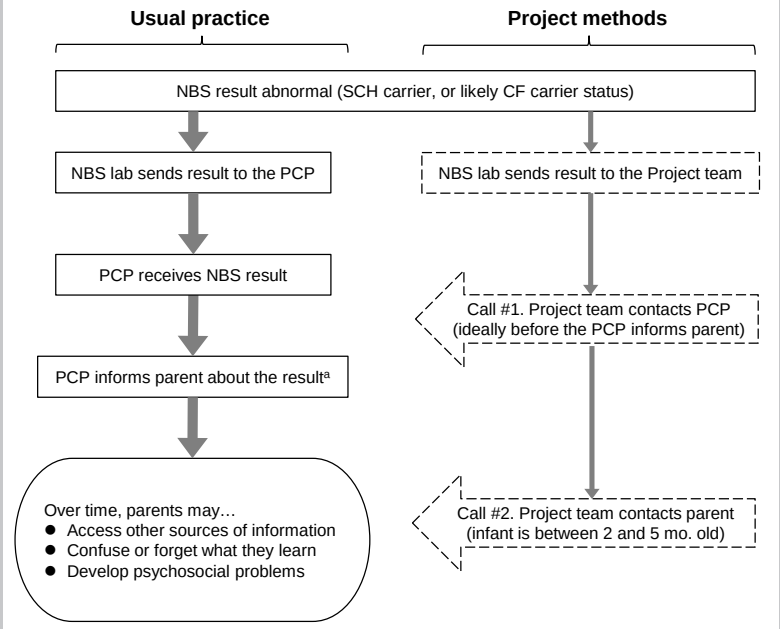

Figure 1. Usual practice (left) and Project methods (right) after newborn screening identifies carrier status for sickle cell hemoglobinopathy or likely carrier status for cystic fibrosis.

Abbreviations = NBS, newborn screening; SCH, sickle cell hemoglobinopathy; CF, cystic fibrosis; PCP, the infant's primary care provider.

[a]Not shown: for infants with the likely CF carrier result, the PCP orders a sweat chloride test to verify that CF is not present.

Procedures

Protocol for locating PCPs. The Project's first goal is to ensure that the NBS laboratory report has reached the provider who has actual primary care responsibility for the infant. We begin by sending an introductory fax and a copy of the NBS result to the clinician listed by the birthing facility, using information from a directory maintained by the NBS laboratory. A Project caller then telephones the clinician's office and asks if the clinician is the infant's PCP. If the clinician does not know the infant or denies a PCP relationship, the Project caller attempts to find the PCP by asking the clinician for advice, and then by contacting the birthing facility or its medical record department. If these methods are not successful in finding the PCP, in a few days the Project team contacts the listed clinician again to see if the infant's parents have made an appointment. IRB stipulations disallow the Project team from contacting families directly.

When the Project caller reaches the PCP, he or she asks if the PCP has questions about the NBS result or its implications, and describes the Project goals and the parent call. If time allows, the Project caller invites the PCP to rehearse how he or she will inform the infant's parent(s) about the result. Project callers exercise judgment in deferring the rehearsal invitation if the PCP is hurried due to being contacted between patients. When the PCP does agree to rehearse, that portion of the call is audiotaped, transcribed, and de-identified for future analysis.

Protocol for locating parents. If neither the NBS laboratory report nor the PCP identify a reason for exclusion, the parents are mailed an initial contact letter when the infant is about 3 months old. The letter purposely does not mention the infant's NBS result, in order to avoid confusion or distress for parents who have not heard their child's results or may not fully understand the implications of the results. Also included is a "decline of contact" card to give the parents an opportunity to decline participation without becoming fully informed about the Project.

Approximately 10 days after the initial contact letter is mailed, a Project caller telephones the parents. Parents are asked if they recall the letter and if they are willing to complete the call. They are given the opportunity to discontinue the phone call if it is an inconvenient time or if they simply are not interested. The Project caller follows a carefully designed script that weaves together components of informed consent, discussion about the screening result, open-ended survey questions, and fixed answer questions from established scales to assess psychosocial outcomes such as parental anxiety and perceptions of the child's health.[15-18]

Project callers have a clinical background, so they have the expertise to perceive emotional distress or confusion over the phone. If serious distress or confusion becomes evident, the Project caller has the option of bypassing the research questions, transitioning to a purely clinical intervention. Regardless of whether a parent completes the entire call, the conversation ends with a debriefing effort to ensure there is no lingering confusion, and to provide assistance with self-referral to additional resources.

Analysis

Both the PCP and parent calls are audio-recorded, transcribed, de-identified, and abstracted for quantitative data. Descriptive data, including the majority of data for this paper, are stored in a Microsoft Access database (Redmond, Washington) and analyzed using JMP software (SAS Institute, Cary, North Carolina). A separate series of papers will report analysis of psychosocial data from the parent calls and communication data from the PCP calls following our communication quality indicator approach. The communication quality indicators follow our previously published techniques for jargon usage,[19,20] assessments of understanding,[21] organizing behaviors,[22] communication about potential emotions,[23] and inclusion of key content messages.[24,25]

RESULTS

During the Project's first 14 months, the Project team received 929 NBS results from the NBS laboratory; 709 showed SCH carrier status and 220 showed likely CF carrier status. In 141 of the 220 likely CF carrier results, the ΔF508 mutation was seen (64.1%), while the other 79 infants had 1 of 18 other mutations from the 23 included on Wisconsin's screening panel. Gender was evenly distributed (49.1% male).

Information included on the NBS laboratory report, gestation age and the presence of multiple conditions, was sufficient to exclude 112 infants (12.1%) without the need for a PCP call. The remaining 817 infants who constitute the main sample for this analysis were submitted by 70 different birthing facilities and 4 home births. The median number of results listed for a facility was 36 (SD 26.1). The facilities listed a total of 414 clinicians for their infants. The highest number of infants logged for a single PCP was 13.

Information about PCPs

Accuracy of PCP listing provided by the birthing facility. For 58.8% of infants, the birthing facility listed the accurate PCP, and the NBS laboratory had accurate contact information (Figure 2). For 14.2% of infants, the birthing facility had listed a clinical partner of the correct PCP, so the NBS laboratory's contact information was accurate even if the responsible PCP had not been listed. For the other 27% of infants, the information provided by the birthing facility was not sufficient for the NBS result to automatically reach the PCP. For 20.9% of the 817 infants, we found the PCP by following the protocol described in the Methods section. For 7.3% of the 817 infants, the birthing facility had provided the correct PCPs name, but the PCP had changed locations recently enough that the NBS report was faxed or mailed to an old address. PCPs of infants with likely CF carrier results were more likely to have moved than PCPs of infants with SCH carrier status (χ^2, $P=0.03$). We were unable to identify a PCP for 50 infants with SCH carrier reports (6.1% of 817). In summary, using our contact procedures, we were able to identify PCPs for 767 infants, or 93.9% of the 817 infants without exclusion criteria.

PCPs' description of results communication. Of the 767 infants for whom we identified and reached a PCP during the Project's first 14 months, in 41 cases (5.4%) the PCP reported that he or she had not received the NBS result fax. For the other 672 infants, 130 PCPs reported already informing the parent in person (19.4%), 134 had already told the parent via telephone or planned to do so that day (19.9%), 377 planned to tell the parent at the next scheduled appointment (56.1%), 3 planned to send a letter or an e-mail to the parent(s), and 16 PCPs had not decided how to inform the parent. Only 3 PCPs planned to schedule a special appointment to discuss the NBS result.

PCPs were more likely to wait until the next appointment if the infant had an SCH carrier result than a likely CF carrier result (73% vs 43%, χ^2, $P<0.001$).

When we asked PCPs if they had questions about the NBS result or its implications, PCPs for 33 infants (4.9% of the 672) asked for an explanation. PCPs were more likely to request an explanation about likely CF carrier results than SCH carrier results (13.3% vs 3.0%, χ^2, $P<0.001$).

Many PCPs were willing to rehearse telling the infant's parent(s). Of the 414 individual PCPs identified, we invited rehearsals from 196 PCPs (47.3%) who had not yet informed the parent(s). Of these, 118 agreed to rehearse (60.2%). Another 42 PCPs (21.4%) indicated willingness to rehearse for another infant but deferred rehearsal for the current infant because of time limitations. There were no significant differences by PCP gender or clinical specialty with regard to availability for invitation or agreement to rehearse.

The PCPs who rehearsed supplied some demographic information. The average number of years since graduation from training was 16.7 (SD 10.4 years), with a maximum of 44 years. The average number of months since the PCP last discussed genetic carrier status with a patient was 12.8 (SD 24.7 months).

Project Acceptability by PCPs. By the end of the 14-month period analyzed for this paper, we received 79 anonymous evaluations from PCPs who rehearsed with us. We asked, "Was the information you obtained during the telephone call useful?" and gave them 3 options: "very useful" (27/79 respondents), "somewhat useful" (44/79 respondents), and "not at all useful" (8/74 respondents). We asked: "Was the amount of time spent on the interview appropriate?" and gave them 3 options: "just right" (71/79 respondents), "too long," (6/79 respondents), and "too short," (0/79 respondents). Two left the response choices blank. As shown in Table 1, slightly

more than half of the PCPs reported that being notified about the NBS result or having the opportunity to rehearse had influenced their interaction with parents.

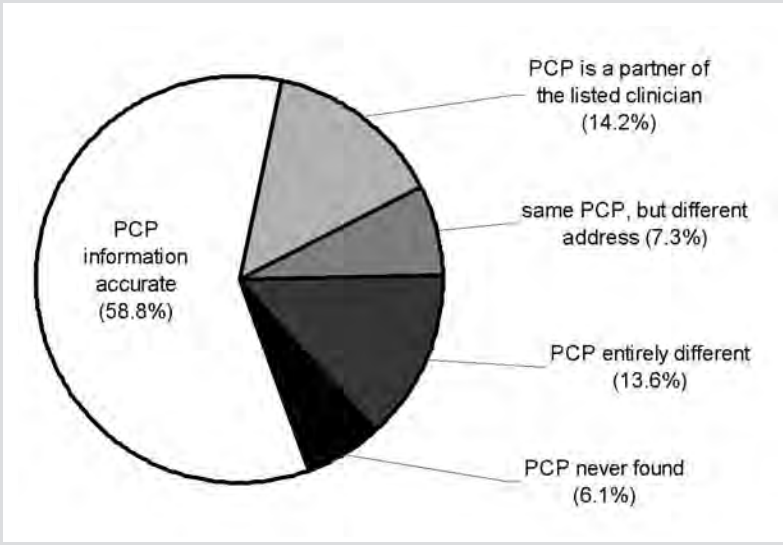

Figure 2. Accuracy of PCP information provided by the birthing facility for SCH (sickle cell hemoglobinopathy) and CF (cystic fibrosis) carrier infants

Parent Information

Of the 767 infants for whom we identified and reached a PCP, we were told of contraindications to us contacting the parents for a follow-up call in 54 cases (7%), including 29 infants whose families did not speak English. Seventeen were excluded due to non-normal sweat test before the parent call.

The outcomes of our attempts to reach the remaining 696 infants with SCH carrier results and likely CF carrier results are listed in Table 2. Overall, we were able to complete a call for 297 parents, or 50.4% of eligible parents. The infants' average age at the time of the call was 107.5 days old.

Most of the called parents were mothers, but 8 fathers (2.7%) were called. The average age of parents called was 26.7 years (SD 6.6). The youngest person we called was a 14-year-old mother; the oldest was a 46-year-old mother. We asked most parents their ethnic background in an open-ended question; 54% reported African American, 37% Caucasian, 4% Latino, and 5% reported a combination, such as African American and Latino.

Results of the 3-item health literacy screener identified 25 parents with the potential for a significant limitation in health literacy (9%). Another 83 parents (29.9%) answered the screening questions with intermediate-range answers consistent with occasional health literacy problems.

Parents' description of communication with the PCPs. The parents of 38.5% of the SCH carrier infants did not recall an explanation from the PCP. All of the parents of likely CF carrier infants recalled an explanation except for one, despite that infant having gone through the sweat testing process, which includes meeting with a genetic counselor, prior to our phone call.

When asked how well the PCP had explained the result, 48.5% of parents responded "well" or "very well." Responses were similar to a question about general satisfaction with the NBS experience. Parents were more likely to be satisfied if they remembered an explanation or if they evaluated the PCP's explanation favorably (χ^2, $P < 0.01$). There was no apparent difference in satisfaction of parents of likely CF carrier infants versus SCH carrier infants, but parents were more likely to evaluate PCP explanations unfavorably if their health literacy was marginal or inadequate (χ^2, $P = 0.04$).

Acceptability of the Project for the parents. By the end of the 14-month period, we received 70 anonymous parent evaluations. When asked: "Was the information you obtained during the telephone call useful?", 50 replied "very useful" (71.4%) and 17 replied "somewhat useful" (24.3%). Three respondents said the information was "not at all useful" (4.3%). When asked: "Was the amount of time spent on the interview appropriate?", 63 said that the time was "just right" (90%), and 7 said it was "too long" (10%). No one responded that the call was "too short."

Time and Labor Involved

One of our main research questions at this point was the amount of time and labor needed to do follow-up on communication processes and psychosocial outcomes in a typical sample of nearly 900 families per year.

To facilitate planning for similar programs in the future, we tracked time and expenses for clinical and research aspects of the Project. Not counting IRB-required activities necessary for research, we estimate that telephone calls to PCPs and related administrative needs occupied half of each weekday for 1 staff person, or about 20 hours per week. Parent calls take longer, requiring almost 40 hours per week of staff time for calls and documentation. Because of the research and IRB needs for the Project, the call workload was spread out over several members of our lab's team, including a genetic counselor, 3 nurses, a coordinator, and the project director (a pediatrician).

Table 1. PCPs' Opinions about the Influence of Being Called by the Project Team

Opinion	"Yes" n (%)	"Somewhat" n (%)	"No" n (%)
"Being notified about the result influenced my interaction with…			
… this parent."	14 (17.9)	29 (37.2)	35 (44.9)
… all parents."	12 (15.6)	30 (39)	35 (45.5)
"The rehearsal session influenced my interaction with…			
… this parent."	13 (17.6)	23 (31.1)	38 (51.4)
… all parents."	11 (15.1)	27 (37)	35 (47.9)

Table 2. Recruiting Experience with Parents

	Parents of infants with NBS results showing…	
	SCH carrier status	Likely CF carrier status
Outcome of parent recruiting effort	n (% for result)	n (% for result)
Unable to find reliable contact information	102 (19.0%)	5 (3.1%)
No response to voicemails	183 (34.1%)	46 (28.8%)
Parent reached by telephone but declined	45 (8.4%)	18 (11.3%)
Parent called	206 (37.4%)	91 (56.9%)
Total number of eligible infants	536	160

Limitations

The Project methods are elaborate in order to integrate into usual-practice NBS, but some limitations are inevitable. Some selection bias may be present despite our response rate and status as a quality improvement project. Due to IRB restrictions and NBS legislative rules about contacting parents directly, we have little or no reliable data about many of the parents who were not reachable via the 2 protocols described earlier. In addition, the use of survey methods may be associated with the social desirability and Hawthorne effects, a change in participant behavior due to a sense of observation. Further study may be needed to know whether it is reasonable to generalize our findings about infants with carrier status for CF and SCH to other types of carrier states and to false positive NBS results.

DISCUSSION

Decades of experience have shown that NBS effectively can identify diseases before they become symptomatic, but also that NBS can be followed by serious psychosocial complications.[5-10] These complications and other communication problems are found across entire states, so we have developed a population-scale, quality improvement approach to addressing them.

We were pleased at the generally favorable reactions to our calls by PCPs and parents. Some of the busiest PCPs were annoyed to be telephoned directly, but our evaluation data and PCP calls indicated that most PCPs either were grateful or neutral. To improve acceptability for PCPs with large numbers of infants, we developed a protocol for relaying communications through office staff or fax machines. We were impressed by the number of PCPs who were willing to rehearse with us. We hope eventually expand to our service to parents who require English-language translation.

Our most troubling experience has been difficulty locating physicians willing to assume clinical responsibility for some carrier infants. This difficulty stands in sharp contrast to the urgency with which subspecialists and PCPs take action when presented with NBS reports for a life-threatening illness. For NBS to result in more good than harm, some of that urgency needs to be extended to parents of carrier infants. A casual attitude to carrier results may be partially to blame for the psychosocial complications seen in many previous studies.

CONCLUSION

To ensure that NBS and associated interventions consistently lead to more good than harm, clinicians need to assume responsibility and provide high-quality care for carrier and disease-affected infants. Future reports will comment on the psychosocial data we have gathered which indicates that parents do experience real psychosocial effects of poor communication about NBS results. The role of communication quality assurance and centralized follow-up will be to support PCPs and parents as they deal with positive and false-alarm NBS results. We further hope that the Project and forthcoming papers will serve as models for other population-scale efforts to improve the quality of communication in many other areas of health care.

Acknowledgment: The authors dedicate this paper in memory of our colleague Ronald H. Laessig, PhD, a fierce advocate of newborn screening, laboratory quality improvement, and families everywhere.

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Lyme Disease Testing in Children in an Endemic Area

Bashar Al-Sharif, MD; Matthew C. Hall, MD

ABSTRACT

Purpose: The purpose of this study was to determine clinician adherence to recommendations regarding diagnostic testing for Lyme disease (LD). The specific aims were to determine the rate of inappropriate test ordering for a diagnosis of erythema migrans and lack of confirmatory test ordering for positive LD screening tests.

Methods: Using the data warehouse of Marshfield Clinic Research Foundation's Bioinformatics Research Center, cases were identified from 2002 through 2007. A retrospective chart abstraction was performed using Marshfield Clinic's electronic medical record. The study involved children (<19 years old).

Results: In 57% of cases, LD testing occurred after a clinical diagnosis of erythema migrans was made. Patients with any symptom in addition to erythema migrans were more likely to have testing (odds ratio (OR) = 3.52, 1.75 - 7.08). A positive LD screening test was not confirmed 24% of the time. Lack of ordering confirmatory testing was not associated with any clinical factors or site of the evaluation.

Conclusion: This study found that some clinicians in an LD-endemic area do not follow guidelines for diagnosing children suspected to have Lyme disease.

INTRODUCTION

Just over 3 decades ago, Lyme disease (LD) was first recognized as a multi-system illness with an infectious etiology.[1] It is now the most commonly reported tick-borne infection in both North America and Europe.[2] During that time period, a practice guideline from the Infectious Disease Society of America (IDSA) was developed,[3] initially published in 2000, and then updated in 2006. LD practice management outlined in the *Red Book* is congruent with the IDSA practice guideline.[4] Though there remains much to be learned about LD, and some areas of management are not well established (eg, presentation with fever but without rash), most care for patients suspected of having LD is standardized.

Although an LD practice guideline has been available for a number of years, there has been an ongoing concern in the literature about LD management, especially related to diagnostic laboratory testing.[5-11] In a survey of New Hampshire clinicians, it was found that physicians seemed to rely on testing in situations in which it was unnecessary, including erythema migrans.[7] A survey of Wisconsin providers conducted by Ramsey et al,[6] assessing inappropriate testing with LD serologic tests, found that 27% of tests were inappropriately ordered, with a quarter of these for patients with erythema migrans. Qureshi et al,[8] in a prospective case series of children seen in a pediatric infectious disease clinic, noted a tendency for referring practitioners to treat based on a borderline LD screening test (LDST). This published literature is consistent with our clinical experience related to patient referrals.

This study was conducted in a health system that has an intranet guideline site for LD management that emphasizes the best-supported recommendations, with web links to primary source information. Two important recommendations are (1) that early LD manifested as erythema migrans is a clinical diagnosis for which serology testing is not recommended, and (2) when serologic testing is performed for evaluation of disseminated LD, a 2-tier process should be followed, with a confirmation of a positive LDST with a Western Blot LD confirmatory test (LDCT). In LD-endemic areas, patients presenting with erythema migrans-type rash have a relatively high likelihood of having LD. Seroconversion with a detectable antibody level is delayed, such that in most presentations laboratory testing

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CME available. See page 247 for more information.

will not assist in the diagnostic process, and the diagnosis is purely clinical. As for laboratory testing in disseminated LD in which a detectable antibody level is present, the simple enzyme immunoassay is used to initially screen patients due to the high sensitivity yet low cost of the test. LD enzyme immunoassay (EIA) tests have been limited by specificity so that confirmation with the more specific immunoblot technology is required.

We sought to determine how well clinicians within our health care system were following LD testing recommendations. We hypothesized that both inappropriate laboratory testing for erythema migrans was common, and that LD confirmatory testing for positive LD screening assays was not being performed consistently. Our specific aims were to determine how often clinicians inappropriately ordered LD testing after a diagnosis of erythema migrans was made clinically and how often clinicians failed to confirm a positive LDST with a LDCT. In contrast to previously published studies, we focused on the pediatric population and performed direct medical record abstraction rather than surveying clinicians.

METHODS

This study consisted of a retrospective chart review involving pediatric patients seen within the Marshfield Clinic System, (Marshfield, Wisconsin) from 2002 through 2007. Patients included in the study were children < 19 years old. This study was approved by the Marshfield Clinic Research Foundation's Institutional Review Board.

Using Marshfield Clinic's electronic medical record and data warehouse, potential cases were identified by appropriate International Classification of Diseases 9th Edition (ICD-9) codes (088.81 for Lyme disease and 795.79 for LDST) from 2002 through 2007.

Sample 1 included those patients diagnosed with LD, as there is no ICD-9 code specific to erythema migrans. Chart abstraction identified those patients who met the study case definition of a pediatric patient with erythema migrans (age < 19 years; clinician stated diagnosis of either erythema migrans, rash, or LD; or skin lesion described as being red or pink, at least 4 cm in size, and expanding with time). Patients who did not meet this definition were excluded. Patients with a rash not typical of erythema migrans were not included in the study. Chart abstraction was performed on the medical record of the cases that met these criteria. Data abstracted included clinician specialty, setting of the visit, subject date of birth and gender, history of specific tick bite or tick exposure, associated illness symptoms, and treatment.

Sample 2 included those patients who were found to have had a positive LDST. Chart abstraction was performed to confirm these were pediatric patients who met the case definition of having positive LDST for the first time (age < 19 years, a positive EIA or enzyme-linked immunosorbent assay [ELISA] serology test for *Borrelia burgdorferi* with no prior positive EIA, or ELISA serology test for *Borrelia burgdorferi*). Those who were diagnosed with erythema migrans were excluded (LDST should not have been ordered). Complete chart abstraction of the medical record for patients meeting the case definition was then performed. Data abstracted included clinician specialty, setting of the visit, subject date of birth and gender, history of specific tick bite or tick exposure, associated illness symp-

Table 1. Frequency Distribution of Clinical Characteristics for LDST

Clinical characteristic	No. of subjects	(%)
Rash of erythema migrans		
Yes	171	(100)
LDST ordered		
Yes	98	(57)
Type of location		
Emergency department	8	(5)
Urgent care	45	(26)
Primary care	85	(50)
Other	33	(19)
Duration of rash (days)		
<7	119	(70)
7-14	19	(11)
>14	10	(6)
Unknown	23	(13)
Exposure to tick(s)		
Yes	65	(38)
Tick bite		
Yes	32	(12)
Clinical symptoms/signs		
Yes	123	(72)
Fever		
Yes	74	(43)
Headache		
Yes	46	(27)
Weakness		
Yes	0	(0)
Fatigue		
Yes	41	(24)
Myalgia		
Yes	35	(20)
Chills		
Yes	7	(4)
Cranial nerve palsy		
Yes	3	(2)
Arthralgia/Arthritis		
Yes	33	(19)
Syncope		
Yes	0	(0)
Vomiting		
Yes	10	(6)
Gender		
Male	107	(63)
Female	64	(37)
Antibiotic		
Yes	171	(100)

Abbreviations = LDST, Lyme disease screening test.

Table 2. Odds Ratios (OR) and 95% Confidence Intervals (CI) for the status of Lyme Disease Screening Test (LDST) by Clinical Characteristics

	LDST				
Clinical characteristics	**Yes**	**No**	**OR**	**CI**	***P*-value[b]**
Type of location					
Emergency department/Urgent care[a]	30	23	1.00		
Primary care	46	39	0.90	0.45-1.80	0.77
Other	22	11	1.53	0.62-3.79	0.35
Duration of rash (days)					
<7[a]	78	64	1.00		
7-14	13	6	1.78	0.64-4.94	0.27
>14	7	3	1.91	0.48-7.70	0.36
Exposure to tick(s)					
Yes	37	28	0.98	0.53-1.84	1.00
No[a]	60	46	1.00		
Tick bite					
Yes	16	16	0.51	0.23-1.11	0.09
No[a]	92	47	1.00		
Clinical symptoms/signs					
Yes	81	42	3.52	1.75-7.08	<0.05
No[a]	17	31	1.00		
Fever					
Yes	48	26	0.91	0.48-1.70	0.76
No[a]	65	32	1.00		
Headache					
Yes	34	12	1.83	0.86-3.87	0.11
No[a]	76	49	1.00		
Fatigue					
Yes	28	13	1.18	0.56-2.50	0.66
No[a]	84	46	1.00		
Myalgia					
Yes	26	9	1.73	0.75-3.99	0.19
No[a]	85	51	1.00		
Arthralgia/Arthritis					
Yes	23	10	1.27	0.58-2.88	0.57
No[a]	89	49	1.00		
Male					
Yes	58	49	0.71	0.38-1.34	0.29
No[a]	40	24	1.00		
Age at diagnosis (years)			1.05	0.98-1.12	0.18
No. of subjects	98	73			
Mean	8.9	7.9			
Standard deviation	4.5	4.7			
Median	8.2	7.0			
Range	1.0-18.8	0.6-18.0			

[a] Referent group.

[b] *P*-value was derived from the unconditional logistic regression modeling.

toms—including the duration of illness—and clinical indication for ordering the LDST.

One author (BA) abstracted data from the medical record of the identified cases using specifically developed data abstraction forms. In situations where the data was equivocal, BA conferred with MH to reach consensus. Quality assurance was performed by trained abstractors from the Marshfield Epidemiology Research Center on 10% of the abstractions.

Statistical Analyses

The percent of inappropriate testing for LD and clinical characteristics of study patients are described and reported in the following Results section and tables. The association between each of the variables of interest (eg, gender, age, etc) and inappropriate testing for LD was assessed using unconditional logistic regression analysis with calculation of odds ratios (OR), 95% confidence intervals (CI), and *P*-values. A *P*-value of <.05 was used to claim that there exists a statistically significant association. All the data analyses were performed using SAS version 9.1 (SAS Institute, Cary, North Carolina).

RESULTS

Inappropriate Test Ordering for Erythema Migrans

The electronic data warehouse search identified 266 potential cases for the study period of 2002 through 2007 with 24 miscoded cases and 71 that did not have documentation of a rash consistent with erythema migrans. The remaining 171 erythema migrans cases underwent chart abstraction. The mean age of patients was 8.5 years, 63% were male. Of the 171 cases, 98 (57%) had LDST ordered, whereas 73 patients (43%) were managed without testing (Table 1). Half of the patients were seen in the primary care setting, and 30% were seen in an urgent care or emergency department setting. Most patients had the duration of the rash documented; 70% had the rash <7 days. Known tick exposure was documented in 49% of cases, with only 19% (32/171) having a known specific tick bite. Most of the patients had symptoms in addition to erythema migrans (72%), with fever (60%) being the most frequently reported. Treatment was started on all 171 cases; 2 had treatment delayed while awaiting serology. These 2 ultimately had negative serology.

Location of the clinical encounter, patient age or gender, duration of rash, tick exposure, and specific individual symptoms and signs were not associated with whether or not inappropriate LD testing was performed for erythema migrans.

However, patients with any additional clinical symptoms or signs, not just erythema migrans, were more likely to have testing (Table 2, OR=3.52 ordering LDST with the presence of symptoms/signs).

Failure to Confirm a Positive LDST with LDCT

The electronic data search for patients with a positive LDST identified 296 potential cases for the study period of 2002 through 2007. There were 109 cases excluded—98 due the presence of erythema migrans, 10 due a previous positive LDST (prior to the study period), and 1 in which there was no information in the reviewed record indicating that LDST was ordered. This left 187 patients for chart abstraction who had been evaluated for LD and had a positive LDST.

The mean age of patients was 10.3 years, 51% were male (Table 3). The majority of patients were seen in the primary care setting (62%). Duration of symptoms was 7 days or longer for half of the patients. The most common clinical reason for ordering testing was joint-related complaints. About a third of cases were patients being evaluated for fever with or without additional symptoms. There were only a few cases of classic disseminated LD such as cranial nerve palsy (4 patients).

Of the 187 patients with positive LDST, 45 (24%) did not have LDCT performed; 30 (67%) of these were treated. None of the clinical presenting factors or location of the evaluation were associated with appropriate confirmation of a positive LDST (Table 4).

Table 3. Lyme Disease – Frequency Distribution of Clinical Characteristics for Lyme Disease Screening Test (LDST)

Clinical Characteristic	No. of Subjects	(%)
Type of location		
Emergency department	13	(7)
Urgent care	22	(12)
Primary care	115	(62)
Other	37	(20)
Duration of symptoms (days)		
<7	85	(45)
7-14	24	(13)
>14	69	(37)
Unknown	9	(5)
Reason for ordering LDST: Suspected Lyme disease involving		
Skin	1	(1)
Joints	77	(41)
Nervous system	8	(4)
Skin/Joints	1	(1)
Joints/Other	3	(2)
Other	96	(52)
Clinical symptoms/signs		
Yes	176	(95)
Fever		
Yes	60	(32)
Headache		
Yes	54	(29)
Weakness		
Yes	3	(2)
Fatigue		
Yes	43	(23)
Myalgia		
Yes	41	(22)
Chills		
Yes	8	(4)
Cranial Nerve Palsy		
Yes	4	(2)
Arthralgia/Arthritis		
Yes	98	(52)
Syncope		
Yes	2	(1)
Vomiting		
Yes	18	(10)
Gender		
Male	96	(51)
Female	91	(49)
LDCT ordered		
Yes	142	(76)
No	45	(24)
Of the 45 LDCT not ordered—treated		
Yes	30	(67)
No	15	(33)

Abbreviations = LDCT, Lyme disease confirmatory test.

DISCUSSION

Our study findings are consistent with previous reports of a lack of clinician adherence with practice guidelines for LD management. Over half the patients presenting with erythema migrans had serology testing performed, even though there is no utility for serology in the evaluation of erythema migrans. The tendency to order serology to assist in the diagnosis of erythema migrans has been noted previously in surveys of providers.[7,9] Essentially one-fourth of the positive LDST did not have a confirmatory Western Blot performed as recommended by IDSA guidelines. Managing patients without performing LDCT has not been documented in the published literature.

For erythema migrans, part of the issue is likely the difficulty in making the clinical diagnosis.[5,12] No single clinical factor can be used to substantiate the diagnosis, and the skin lesion is not sufficiently characteristic as to be diagnostic. However, patients living in an endemic area who have a history of tick bite, systemic systems, and a rash suggestive of erythema migrans have a likelihood of LD that is clearly sufficient to justify treatment. For clinical presentations that are not as clear cut, other options exist, including observation for 24 to 36 hours to document an expanding skin lesion or referral to a dermatologist or infectious disease specialist with experience in LD evaluation. The important factor is that serologic testing (LDST) does not provide any clinical utility since most patients with erythema migrans have not developed a measurable immune response (seroconverted). The unneeded laboratory test adds to the health care cost.

Table 4. Odds Ratios (OR) and 95% Confidence Intervals (CI) for the status of Lyme Disease Screening Test (LDCT) by Clinical Variables

	LDCT				
Clinical Characteristics	**Yes**	**No**	**OR**	**CI**	***P*-Value[b]**
Type of Location					
Emergency department/Urgent care[a]	27	8	1.00		
Primary care	89	26	1.01	0.41-2.50	1.00
Other	26	11	0.70	0.24-2.02	0.51
Duration of rash (days)					
<7a	67	27	1.00		
7-14	17	7	0.98	0.37-2.63	0.97
>14	58	11	2.13	0.97-4.66	0.06
Suspected Lyme disease involving					
Skin/joint/nervous system	67	24	0.78	0.40-1.53	0.47
Othera	75	21	1.00		
Any Clinical Symptoms/signs					
Yes	134	42	1.37	0.34-5.52	0.66
No[a]	7	3	1.00		
Fever					
Yes	46	14	1.05	0.50-2.18	0.90
Noa	88	28	1.00		
Headache					
Yes	44	10	1.56	0.71-3.47	0.27
No[a]	90	32	1.00		
Fatigue					
Yes	34	9	1.25	0.54-2.87	0.60
No[a]	100	33	1.00		
Myalgia					
Yes	31	10	0.96	0.43-2.18	0.93
No[a]	103	32	1.00		
Arthralgia/Arthritis					
Yes	69	29	0.48	0.23-0.99	0.48
No[a]	65	13	1.00		
Vomiting					
Yes	14	4	1.11	0.34-3.57	0.86
No[a]	120	38	1.00		
Treated					
Yes	0	30	NA	NA	NA
No[a]	0	15			
Male					
Yes	69	27	0.63	0.32-1.25	0.18
No[a]	73	18	1.00		
Age at 1st lab test			**1.03**	**0.96-1.11**	**0.42**
No. of subjects	**142**	**45**			
Mean	**10.5**	**9.8**			
Standard deviation	**4.7**	**4.7**			
Median	**9.6**	**9.1**			
Range	**2.4-19.0**	**2.1-18.3**			

Abbreviation = LDCT, Lyme disease confirmatory test.

[a]Referent group.

[b]*P*-value was derived from the unconditional logistic regression modeling.

We speculated that testing might also delay treatment; however, only 2 patients had antibiotics held while waiting for test results. Both were treated after the testing returned negative. It is therefore quite difficult to understand why providers obtain serology testing when the diagnosis and treatment are completely independent of the test results.

Based on our clinical experience, our hypothesis was that clinicians would fail to confirm LDST on a routine basis. We found that clinicians failed to order confirmatory testing for positive LDST for almost a quarter of patients. Moreover, two-thirds of the patients with unconfirmed LDST were treated. The laboratory reporting in our health system includes a narrative recommendation for confirmatory testing without which less confirmatory testing may have occurred (although clinicians do have to place the order after the positive result because there is no reflex confirmatory testing). There are a number of issues related to using the screening test as the final diagnostic confirmation of LD, but a primary concern is missing or delaying the diagnosis of other important illnesses. Overuse of antibiotics also may occur.

Our study is limited due to its retrospective design; the clinical documentation occasionally lacked the detail desired for research review. One difficulty could be that some cases were not identified due to a clinician coding an illness other than LD (ie, rash). Additionally, this study represents the practice of providers in 1 geographic region from a single health system and may not be generalizable to practices elsewhere. Because this health system has an intranet guideline site covering LD management that clinicians have been asked to review, it could be suspected that the practice of these clinicians might be more in line with recommendations than providers in other settings.

An additional criticism of our study could be that the guideline recommendations for LD management are not as standardized as we state. We recognize that most practice guidelines (including IDSA's guideline for LD) have a significant component of expert opinion relative to a basis on clinical trials. But both management concerns reviewed in this study would not be addressed easily in a clinical trial, and there is little controversy as to whether either recommendation represents best practice

(erythema migrans being a clinical diagnosis and screening LD test requiring confirmation). Moreover, related to erythema migrans management, we only reviewed cases that were given a clinical diagnosis or had a rash documented in the medical record that was consistent with erythema migrans. The management of atypical rashes that could not be considered consistent with LD, for which management is not standardized, were not included in this study.

The literature addressing the issue of improving clinician practice to more closely match practice recommendations supports the use of simple guidelines that are well-supported by evidence with access via information technology.[13] This health system's intranet guideline site for LD management is based on the IDSA guideline with a bullet point outline for ease of use. Portals to various resources are available to facilitate access to further background information as needed. It is updated yearly with input from providers. However, there is no process in place to determine the impact of the site on clinical practice, and as demonstrated from the findings of this study, there is a need for practice improvement.

CONCLUSIONS

In managing patients with erythema migrans, clinicians were found to often rely on serology testing even though there is no clinical utility in doing so. Moreover, clinicians were also found to fail to perform the 2-step screening-confirmation testing for patients with positive LDST.

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A Multidisciplinary Course on Injury Prevention and Control for Medical Students

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ABSTRACT

Purpose: Medical student education has begun to embrace integration across specialties in order to improve understanding of diseases. The Medical College of Wisconsin's Trauma and Injury Control course was developed to expose students to the science, principles, and practice of injury prevention and control, with emphasis on collaboration among disciplines. This paper describes the development, implementation, and evaluation of that course.

Methods: This retrospective study evaluated learner satisfaction and knowledge gained during a fourth-year selective from March 2007 to 2009. The educational experience provided unique activities developed through an interprofessional approach. Student assessment included oral presentations, small-group discussions, and participation in activities. Students evaluated the quality of the experience using written narrative evaluations. Two independent, blinded raters analyzed student narratives using the constant comparative method associated with grounded theory.

Results: Thirty-seven students completed the course and provided comments. Evaluations demonstrated high satisfaction. Five themes emerged as strengths and outcomes: (1) recognition of injury as preventable, (2) variety of interactive educational experiences, (3) understanding physician's role in injury policy, (4) opportunity to see the system of injury care, (5) recognition of injury as a disease. Criticisms of the course related to problems with coordination.

Conclusion: Horizontal integration of the teaching of injury is feasible and should be promoted as a valued instructional technique.

INTRODUCTION

Injuries have a far-reaching impact on individuals, families, the health care system, and society through premature death and disability, medical costs, and lost productivity. Injury is the leading cause of death for those between the ages of 1 and 44, and accounts for over 29 million yearly emergency department visits for nonfatal injuries.[1,2] Health care costs associated with injury account for approximately 12% of annual US medical costs.[3] Thus, preventing and controlling injuries has become a major health care challenge.

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Reducing the burden on injuries requires that physicians be trained in public health and prevention. However, in 2005, the Association of American Medical Colleges issued a report describing the current lack of training for medical students in injury prevention and treatment.[4] The report's Advisory Panel recommended an increase in training and development of clearly defined objectives so that upon graduation, all students have a basic understanding of injury prevention and control. The panel also suggested that educators use a variety of strategies, including didactic sessions and experiential learning exercises, to increase support, interest, and collaboration among health care providers.[4]

The Liaison Committee on Medical Education (LCME) Educational Directives mandate medical student participation in experiences that emphasize and demonstrate effective delivery of multidisciplinary care and services.[5] Students must be able to demonstrate an understanding of the larger context and system of health care and draw upon system resources to provide optimal patient care.[5]

The fourth-year selective allows students to tailor their educational experience to meet their needs prior to entering graduate training. During the fourth year, a student can begin to absorb the totality of information they have experienced during medical school. Cognitive theory suggests that integration of this information is critical to a functioning physician.[6-9] However, a common weakness among many graduating physicians is the ability to function in a collaborative manner with adequate communication across disciplines and professions.[10] According to the 2003 Institute of Medicine Summit on Medical Education Report: *Health Professions Education: A Bridge to Quality*, "All health professionals should be educated

to deliver patient-centered care as members of an interdisciplinary team emphasizing evidence-based practice, quality-improvement approaches and informatics."[11]

This paper describes the development, implementation, and evaluation of a course on injury prevention that emphasizes collaboration among disciplines.

METHODS

The Trauma and Injury Control selective is one of several fourth-year courses medical students may take to fulfill their fourth-year integrative course requirement at the Medical College of Wisconsin (the College). This 1-month course, which was first offered in 2007 in its current form, is held twice a year for up to 8 students per course. Using the expertise of faculty and other health care professionals affiliated with multiple disciplines and professions, the course introduces students to the field, science, principles, and practice of injury prevention and control.

A group of adult and pediatric trauma surgeons, emergency medicine physicians, physical medicine and rehabilitation (PM&R) physicians, and educational specialists developed the course and identified 4 core objectives (Table 1).

The course curriculum includes weekly discussion sessions; multidisciplinary, injury-related experiences; independent learning activities; and 20-minute student presentations for peers, course faculty, and administrators.

An administrative team typically meets 2 or 3 months prior to each course to plan and organize the necessary components. This team includes course co-directors (a physical medicine and rehabilitation physician and a trauma surgeon), the Division of Trauma Surgery's coordinator, the Rehabilitation section's administrator, and the Injury Research Center's coordinator. They are responsible for course preparation and evaluation, including organizing course materials, scheduling discussions and learning experiences, procuring supplies and equipment, and arranging classrooms.

Instructional Process

At the beginning of the course, a needs assessment is conducted using a pre-course quiz and small-group discussion for each student cohort. The quiz serves as a primer to increase learners' awareness of their current level of understanding regarding injury as a disease process; it is used again at the course's completion to illustrate knowledge growth. This format creates a learner-centered approach to the educational process.

The course co-directors build upon the initial needs assessments through a series of weekly small-group discussions with injury experts. Students participate in discussions about the unique characteristics of injury as well as the fundamental differences between the concepts of "injury" and "accident," which is facilitated through the presentation of an injury prevention and control model and discussion of Haddon's matrix.[12] The injury model and Haddon's matrix help students understand the essential elements of the scientific field of injury prevention and control, and provide a framework for analyzing the impact of injuries and phases of injury: prevention, acute care, and rehabilitation.

Table 1. Course Core Objectives

At the end of the 1-month course, each student will be able to:

- Describe injury as a disease process.
- Describe the principles of the scientific field of injury prevention and control.
- Demonstrate an enhanced awareness, appreciation, and knowledge of the consequences and impact of injuries.
- Describe how injury prevention and control will have an impact on their future health care careers.

Each subsequent small-group session consists of 2 to 3 faculty presentations, journal article reviews, and interactive discussions. Medical and surgical subspecialists involved in injury-related clinical care and research serve as presenters and facilitators.

The course employs experiential learning activities in a variety of nontraditional locations and incorporates interprofessional exposure to highlight the broad impact of injury across specialties and professions (Table 2).

Experiential Learning Activities

The students' first learning activity exposes them to the trauma system and the multidisciplinary team of professionals who work together. During this 3-hour experience, students follow the path of the injured patient through the health care trauma system. They witness the amount of resources and systems coordination required to care for patients, and they meet with emergency medical system and triage personnel, emergency physicians, trauma surgeons, nurses, radiologists, intensivists and hospitalists, physiatrists, therapists, social workers, and discharge planners to learn about their training, roles, and responsibilities.

Given that a substantial number of injuries are fatal and never "enter" the system of care, another primary learning activity is a weekly visit to the Milwaukee County Morgue. Students observe injury-related autopsies performed by the medical examiner, then discuss the risk factors and causes, biomechanics/forces, and consequences of various fatal injuries.

The students also spend time in the emergency department and intensive care unit. They attend inpatient rounds, which provide exposure to information about the causes, consequences, and early hospital management of injured patients. Students focus on initial utilization of resources, the importance of a multidisciplinary team, and the need for effective communication and timely delivery of effectual care and services.

Table 2. Experiential Learning Activities

Activity	Description
Trauma System Experience	3-hour walking tour of hospital trauma system
	Case-based exploration of path of injured patient from ambulance or helicopter transport to rehab unit
	Health care providers within each area provide insight and description of their role in care of injured patients and the trauma system
Medical Examiner	Weekly immersion at Milwaukee County Morgue
	Observe injury-related autopsies
	Discussion of causes and biomechanical consequences of ultimately fatal injuries
Emergency Department/	Rotations in emergency department and trauma intensive care units
Intensive Care Unit	Focus on early hospital management
	Discuss resource utilization
	Demonstrate necessity for teamwork and timely communication
Wheelchair Day	One day spent using a wheelchair for transport
	Assigned to visit various locations around medical campus to demonstrate challenges to mobility
	Identify and discuss environmental modifications necessary after significant injury
Patient Interview	Personal interview with injured and permanently disabled patient
	Focus on cause, consequences, and challenges to long-term recovery
Vehicle Crash Laboratory	Witness simulated crash at Milwaukee Veterans Affairs Vehicle Crash Laboratory
	Observe the biomechanics and science related to vehicle safety and design
Independent Study	Perform selected chart reviews to identify challenges to the trauma system associated with communication, consults, and documentation
	Carry trauma pagers for entire month and track volume and type of trauma activations to increase awareness of resource consumption and burden
Personal Journal	Keep daily journal documenting feelings and thoughts about the experience
	Encourage self-awareness and reflection to generate discussion during month
Student Presentation	Each student prepares and gives a 20-minute presentation on an injury-related topic of his or her choice
	Discussion and feedback provided by course faculty

Students also learn, first-hand, the challenges of using a wheelchair as the primary means of mobility. Each student receives a wheelchair to use for an entire day as they visit various locations around the medical campus. Following the experience, students reflect on their personal discoveries, including physical barriers they experienced as well as interactions with strangers and acquaintances. They discuss modifying the environment for people with impairments and disabilities.

Students meet and interview an individual who has been injured permanently and is now living with life-long impairments and disabilities. They hear how the injury has affected the individual as well as the lives of his or her family and significant others. The individual's ability to gain employment, pursue a career, and be productive professionally is discussed.

Students visit the Milwaukee Veterans Affairs Vehicle Crash Laboratory, a federally funded research facility, to witness a simulated crash. This enables them to observe the science of biomechanics of motor vehicle crashes and to witness the effect of physical forces on the vehicle and crash test dummies. The Vehicle Crash Laboratory experience relates to discussions about the history and development of vehicular safety, including the strategies and techniques used today to prevent serious motor vehicle injuries.

Individual Independent Study and Written Assignments

In addition to the experiential learning activities described above, students carry trauma pagers; record the pages; and research, document, and discuss select cases with faculty. They conduct selected chart reviews and discuss the clinical course of injured patients focusing on resource consumption and system of care with faculty.

Throughout the course, each student keeps a daily journal to document his or her personal feelings, thoughts, and ideas. This is intended to encourage them to reflect on their experiences, identify what they have learned, and recognize their changed perspectives.

At the end of the course, each student prepares and delivers a 20-minute oral presentation on a topic of his or her choice in the area of injury prevention and control. Students apply the principles of Haddon's matrix and incorporate into their presentations the issues and principles discussed throughout the course.

Assessment Methods

Course faculty use predetermined criteria, tools, and rating forms to evaluate students based on participation and completion of the required assignments. Students are assessed through a variety of methods including pre- and post-tests, participation in group discussions, attendance and participation in the

active-learning experiences, completion of the daily journal, chart audits of selected trauma patients, and final oral presentations.

Students evaluate each learning activity at the end of the course by responding to the following 4 questions:

- What are the highlights of the course?
- What could be improved?
- Would you recommend this course to others?
- How did this course change your perspective of trauma and injury control?

Faculty analyze the evaluations and use them to revise and modify the course and its components.

For this paper, the authors analyzed all written comments and identified themes and subthemes by using the constant comparative method associated with grounded theory.[14,15] Two independent raters (TW, LH) then coded each theme, and after all comments were analyzed, the raters compared themes. They achieved consensus iteratively through reanalysis of all comments and coding, then tabulated comments within each theme according to the number of times each theme was indicated by the students. As this study was solely a review of the course itself, the authors did not seek Institutional Review Board (IRB) approval, consistent with our institution's human research protection guidelines.

RESULTS

Researchers analyzed the comments from all 37 students, which demonstrated high satisfaction with the course. Thirty-two students provided positive comments and there were no negative responses to the question "Would you recommend this course to others?" Seventeen comments identified communication and coordination as an area needing improvement. Five themes emerged as the greatest strengths and outcomes of the selective: (1) recognition of injury as preventable, (2) variety of interactive educational experiences, (3) understanding physician's role in injury policy, (4) understanding the system of care, (5) recognition of injury as a disease (Table 3).

Table 3. Themes Identified (N = 37)

Themes	Number of related comments
Recognition of injury as preventable	20
Variety of interactive educational experiences	13
Understanding physician's role in injury policy	15
Understanding the system of care	11
Recognition of injury as a disease	6

Recognition of Injury as Preventable. Students highlighted a new understanding and awareness that trauma and injury is preventable. They found the focus for prevention differed from their typical focus on acute care treatment. Comments included, "I now have a better understanding of the preventable nature of many injuries," and "I see now that everything could be prevented."

Variety of Interactive Educational Experiences. One of the course's greatest strengths appears to be the variety of unique, innovative, educational experiences provided during the month-long course. Student comments consistently identified the following as specific course highlights: the "wheelchair experience," which elicited 17 comments, "medical examiner" (13 comments), "system of care" (12 comments), and the "crash lab" (10 comments).

Understanding Physician's Role in Injury Policy. Students established a new understanding of the physician's role in societal and community injury policy. They developed an appreciation for their future roles in shaping policy and laws regarding injury prevention. Several comments described being proactive in policy decisions as future goals. One student said, "The biggest impact this course has had is to further my interest in policy." Another wrote the course "helped me realize that an individual can make a difference."

Understanding the System of Care. Students better appreciated the team approach to trauma care and injury prevention. They also recognized the broad array of professionals needed to care for patients from the time of injury to the rehabilitation stages of recovery. Students frequently described "a greater appreciation for how the trauma system works and how injury cases are handled."

Recognition of Injury as a Disease. Students noted that the course provided them with new insight into injury as a disease process. One student wrote, "I now view injury as a disease that is preventable rather than just treatable."

Room for Improvement: Communication and Coordination. One common theme arose from the question "What could be improved?" Seventeen comments highlighted the difficulty in coordinating the integrated experience across specialties and locations. Comments pointed out instances where expectations were not clear, and communication breakdowns had occurred in planning immersive experiences. Comments included: "I felt that in a few of the sessions people were not expecting me," and "When I showed up … they didn't know exactly what to do with me."

Pre- and post-test results demonstrated a modest knowledge increase. Both tests were identical, 44-question multiple-choice examinations. The average pretest score over the 2-year study period was 71% (range 61% - 83%) vs 77% (range 57% - 87%)

on the post-test. Using student's t-test to assess for significant improvement in knowledge gained, this overall 6% cumulative average increase did not reach statistical significance ($P = 0.06$).

DISCUSSION

The Trauma and Injury Control Selective is an innovative 1-month course for fourth-year medical students at the Medical College of Wisconsin that focuses on the injury prevention and control field and the delivery of effective multidisciplinary care and services. Based on principles of active learning and learner engagement, the highly sucessful course employs simulation and experiential education as fundamental teaching methods.[13]

Much of the course's success is attributable to the innovative integration of the educational experience across disciplines and professions. Many medical schools currently are considering vertical and horizontal integration of educational experiences in their curricula,[9] but much of the emphasis has been in areas such as cancer, genetics, and cardiovascular. Trauma and injury control has been ignored largely in student training.

Injury is a disease process well-suited for integration of interprofessional management concepts and systems-based practice principles. As demonstrated by our evaluation data, when students receive exposure to the longitudinal patient experience through the course of an injury, they develop an appreciation for the concept of injury as a disease with a specific etiology, pathophysiology, and outcome.

This fourth-year selective has proven itself an effective method for introducing injury control principles to students; however, it is reaching a small percentage of the medical school population. Further development and implementation of similar teaching strategies and programs should be considered. Vertical integration of instructional methods and material is one of the goals for the College's curriculum.

The Trauma and Injury Control Selective is a very complex course that requires coordination of extensive resources, multiple components, multidisciplinary faculty, and detailed individual and group schedules. It requires significant planning and committed administrative support. The administrative group typically meets 2 or 3 months prior to each course to plan and organize the necessary components. The course continues to evolve primarily in the advanced preparation and recognition of potential scheduling pitfalls. Suggested new experiences are vetted among the course directors and staff with an eye on continued innovation and improvement.

Of course, there are limitations to wide dissemination of this type of learning experience. Much of the program's success can be attributed to the unique active-learning experiences. However, limitations such as space, equipment, time, faculty, and financial resources present challenges when trying to accommodate all students. Because a variety of spaces, resources, and faculty are needed, scheduling and coordinating the course requires significant administrative support.

There also are limitations to this report. The small cohort of students who have enrolled and evaluated the course to date limits the ability to generalize our results. Most of the learners had some interest in injury; therefore, their evaluations may have been biased by preconceived ideas and opinions. To date, 30% of the students who completed the course matched into surgery or one of the surgical subspecialties. Another 24% matched into emergency medicine programs. No data is available currently to provide long-term impact information regarding pursuit of injury prevention and control as a career or scholarly focus. Additionally, the pre- and post-test results show only a modest increase in knowledge gained; however, the results of the qualitative analysis support attainment of the course objectives. Revision of the test may be necessary to better assess the real knowledge gained during the course.

Despite these limitations, we feel the Trauma and Injury Control Selective can serve as a model for utilizing an interprofessional approach to teach medical students about injury as a disease and integrating the principles of injury prevention and control into the medical school curriculum.

We hope that by increasing opportunities in other medical schools, we can improve physician knowledge about their important role in preventing and treating injuries, which will lead to better treatment and prevention of fatal and nonfatal injuries.

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Bronchopulmonary Sequestration Presenting as Recurrent Pneumonia

Govinda Aryal, MD; Vikas Pathak, MD

ABSTRACT

Bronchopulmonary sequestration is a rare congenital malformation of the lower respiratory tract. Its presentation is varied, and it rarely presents in adulthood. We report the case of a 31-year-old woman who was admitted with recurrent pneumonia. She had been treated for pneumonia multiple times within the last 3 years. On subsequent workup, she was found to have intra-lobar bronchopulmonary sequestration in the left lower lobe of the lung, which was diagnosed on computerized tomography (CT) of the chest. The chest CT revealed an anomalous blood vessel from the abdominal aorta ascending to the left lower lobe of the lung and supplying an abnormal part of the left lung, which was the key to the diagnosis. Bronchopulmonary sequestration was found to be the cause of her recurrent pneumonia. She subsequently underwent resection of the left, lower lobe of the lung. We recommend that bronchopulmonary sequestration be included in the differential diagnosis of recurrent pneumonia in relatively healthy patients.

INTRODUCTION

Bronchopulmonary sequestration (BPS) is an extremely rare congenital malformation of the lower respiratory tract that usually manifests in infants and adolescents.[1] It is rare to see it in adults, and its presentation is varied. We report a young adult female who presented with recurrent pneumonia and was eventually diagnosed with BPS.

CASE REPORT

A 31-year-old relatively healthy Asian American woman presented with complaints of purulent productive cough, hemoptysis, and subjective fever for 2 weeks. She denied any chest pain, shortness of breath, weight loss, night sweats, or loss of appetite. She also denied exposure to any illness, contact with animals, or any recent travel outside the United States. Her past medical history was significant for 2 episodes of pneumonia in the past 3 years and a chronic cough with unknown etiology for the same duration. She had been admitted twice to a different medical institution for pneumonia, where she had been treated with antibiotics and had responded well. She brought her old records with her, which included a chest radiograph that showed left lower lobe lung infiltrate. All of her other tests, including blood cultures, had been negative. A computed tomography (CT) of the chest had not been performed, because her illness was thought to have been a simple case of community-acquired pneumonia. She worked as a waitress at a local bar and had a history of 15-pack years of cigarette smoking. On physical examination she appeared anxious, but her vital signs were within normal limits. Chest examination revealed crackles in the left lower lobe of the lung. Examination of other systems (including oral cavity, cardiovascular, abdominal, and neurological) all were unremarkable.

Laboratory investigation revealed leucocytosis, with a white blood cell count of 14.0 x 10*3/uL and a neutrophil count of 92%. Her purified protein derivative (PPD) test and human immunodeficiency virus (HIV) test were negative. Chest radiograph showed left lower lobe consolidation. Sputum examination showed growth of normal flora, and sputum for acid-fast bacilli was negative. An echocardiogram was negative without any associated abnormality. Because this was her third episode of pneumonia, a CT scan of the chest was ordered, which showed dense consolidation in left lower lobe with areas of cavity, cysts, and air fluid level. The CT scan also revealed an anomalous blood vessel from the abdominal aorta ascending to the left lower lobe of the lung and supplying an abnormal part of the left lung (Figures 1–5). The patient's presentation, based on history, physical findings, and chest radiography, was consistent with bronchopulmonary sequestration. She eventually was referred to cardiothoracic surgery and underwent a left lower lobe lung resection.

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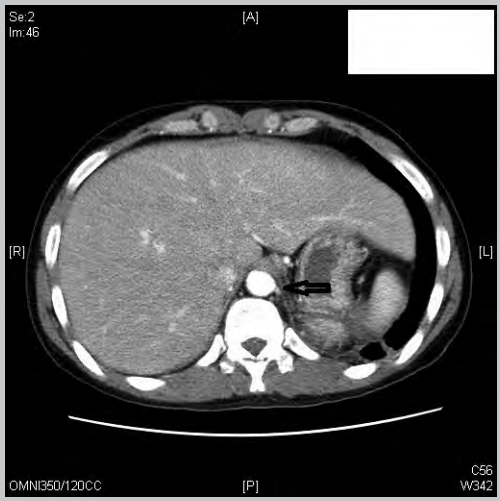
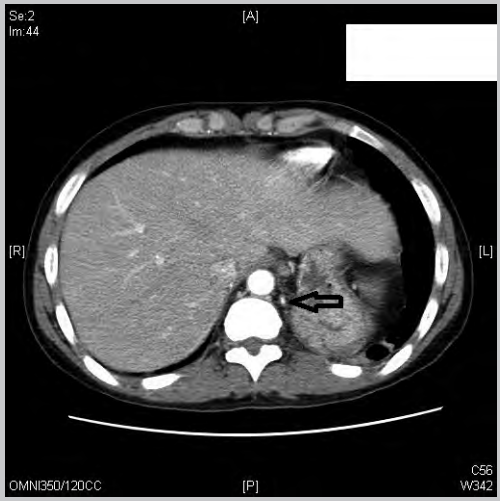


Figure 1. Computed tomography scan of chest and abdomen showing a small artery arising from abdominal aorta.



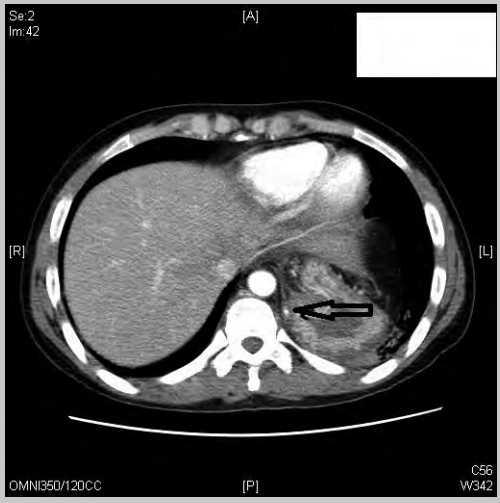


Figure 2A (top) and B. Computed tomography scans of chest and abdomen showing the artery travelling upward toward the thorax.

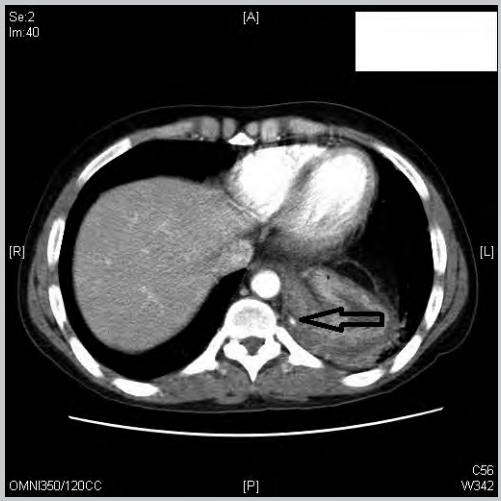


Figure 3. Computed tomography scan of chest and abdomen showing that the artery now can be traced into the thorax.

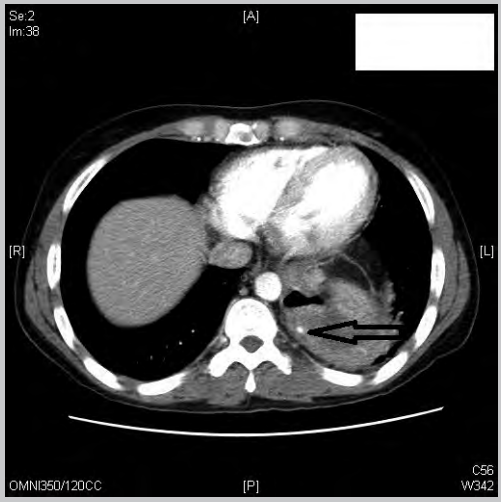


Figure 4. Computed tomography scan of chest and abdomen showing the artery now in the lung parenchyma.

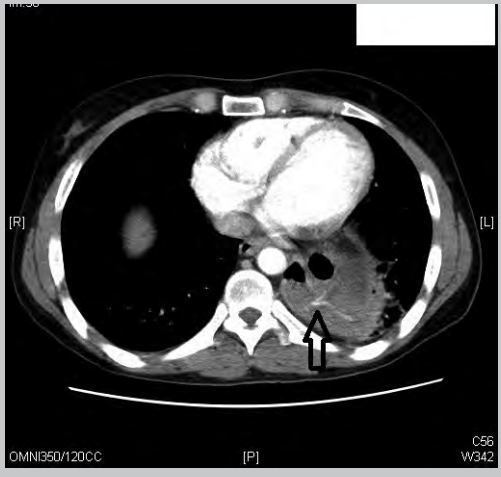


Figure 5. Computed tomography scan of chest and abdomen showing that the artery bifurcates within the bronchopulmonary sequestration.

Histopathological examination of the tissue from the lung resection included gross and microscopic examination. Gross examination revealed "left lower lobe sequestration" consisting of a hemorrhagic and fibrinous left lower lobe (315 g; 15.0 x 10.9 x 4.5 cm). The inferior portion of the specimen (7.0 x 4.5 x 2.3 cm) was an area of previous disruption with a silk-sutured vessel at the edge (0.8 cm x 0.6 cm). The hilar area had several stapled resection margins, including a bronchial resection margin (0.8 cm in length x 3.1 cm in greatest diameter), a curved lung resection margin (4.2 cm in greatest dimension), and 4 vessel branches ranging from 0.3 cm to 1.2 cm in length and from 1.6 cm to 2.1 cm in greatest dimension. The pleural surface was fibrinous and hemorrhagic, and the serial section of the lobe from the superior to inferior surface revealed an ill-defined tan-firm hemorrhagic cystic lesion with cavity formation of the bronchus that was partially filled with a brown mucus plug. The rest of the lung was spongy maroon-red with tan speculations. Microscopic examination showed acute and chronic inflammation with cystic dilatation consistent with intralobar sequestration. No fungi or acid-fast bacilli were identified (confirmed by special Gomori methenamine silver and acid fast bacilli stains).

DISCUSSION

Bronchopulmonary sequestration was first described by Pryce in 1946 in a report of 7 cases.[2] BPS is defined as a nonfunctioning mass of lung tissue that lacks normal communication with the tracheobronchial tree and receives its arterial blood supply from the systemic circulation.[3] It is an extremely rare disorder: BPS accounts for only 0.16% to 6.4% of all pulmonary congenital malformation.[1] The differential diagnosis may include bronchial atresia, cystic adenomatoid malformation, intrapulmonary bronchogenic cyst, and arteriovenous fistula.[4] These conditions are differentiated through the finding of an anomalous systemic arterial supply in bronchopulmonary sequestration.

Depending on its location, BPS is subdivided into intralobar and extralobar sequestration.[5] Extralobar sequestration is located outside the normal lung and has its own visceral pleura, whereas intralobar sequestration is located within the normal lung parenchyma and shares the viscera pleura of the parent lobe of the lung. Intralobar sequestration has normal pulmonary venous return, while extralobar sequestration is associated with aberrant pulmonary venous drainage. Intralobar sequestration is more common than extralobar sequestration, and the majority of intralobar sequestrations are likely acquired lesions.[6-8] Approximately 75% of bronchopulmonary sequestrations are intralobar.[5-8] Extralobar sequestration may be an incidental finding on prenatal ultrasound done during the second to third trimesters. It usually presents in infancy as respiratory distress syndrome or, less commonly, as pneumonia.[9] Intralobar sequestration usually presents in early childhood and adolescence with recurrent respiratory infections. The blood usually is supplied by an aberrant artery arising from the descending thoracic aorta (70%) or abdominal aorta (20%).[5] The defense mechanism is impaired in the abnormal lung tissue, making it prone to recurrent infection, chronic inflammation, cystic changes, and fibrosis. The standard treatment is resection of the segment or lobe that contains the sequestered tissue; the prognosis is favorable.[7,8] Our patient had intralobar sequestration and subsequently underwent a left lower lobe lung resection.

CONCLUSION

In the adult population, BPS can present as recurrent pneumonia and should be included in the differential diagnosis of recurrent pneumonia in relatively healthy patients.[10] Physicians should be aware of this rare congenital condition that can present in adults with symptoms of common diseases.

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Low-Vision Education for the Health Care Workforce: A Strategy to Create a Vision-friendly Hospital

Ariba Khan, MBBS, MPH; Susan Simon, APNP

ABSTRACT:

Background: Aging of the baby boomers presents a unique set of challenges for health care workers. Low vision among patients may be a barrier to providing appropriate patient care, may impede communication, and may decrease patients' satisfaction with health care. It is important to train the medical workforce to understand the unique challenges of the aging population.

Objective: To test an interactive educational learning model targeting health care workers to improve knowledge and awareness of low vision.

Methods: Participants completed a survey prior to and after an educational intervention that consisted of 4 components: (1) normal aging, (2) eye-disease of the elderly, (3) experiential learning, and (4) written material with references and further resources.

Results: Three hundred eight-six members of the hospital workforce completed the training. There was statistically significant improvement in 7 of the 8 test questions. One question demonstrated a positive trend but was not statistically significant.

Conclusion: An interactive educational model on low vision can improve the knowledge of the health care team. This may lead to improvement in patients' satisfaction and quality of care and help create a vision-friendly hospital.

BACKGROUND

In the year 2030, the last of the baby boomers will celebrate their 65th birthday, and nearly 1 in 5 US residents will be 65 years or older. The elderly population is projected to increase to 88.5 million in 2050, more than double the number in 2008 (38.7 million).[1] Although they comprise only 12% of the population, they're responsible for 35% of hospital stays.[2] The Institute of Medicine (IOM) reports a shortage of a competent workforce to care for the older population.[3] The IOM further notes that there is a paucity of required geriatrics exposure during training for nurses, pharmacists, social workers, and medical students.

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Providing medical care to the elderly in hospital settings is a challenge due to multiple medical problems and the prevalence of geriatrics syndromes. It is important for the hospital workforce to be equipped with training in issues specific to the elderly population. In addition, there is a need for ongoing education of the hospital care workforce to ensure they are in touch with the latest in geriatrics care.

Low vision is a common problem in the hospitalized elderly, affecting almost half of the patients.[4] Low vision is associated with memory loss,[5] falls,[6] impaired quality of life,[7] driving difficulties,[8] longer length of stay,[9] and higher mortality.[10] Screening and bedside evaluation as part of a multi-component intervention in hospitalized elderly has shown to reduce delirium.[11]

Interdisciplinary education about low vision is important in creating a health care workforce sensitive to the needs of the elderly.[12] It may empower health care professionals to take simple steps to ensure a comfortable hospital experience[13] and create a "vision-friendly hospital." A "vision-friendly hospital" is sensitive to the needs of seniors with low vision. This includes screening for low visual function and providing interventions to improve the experience of these people during their hospital stay. This is a quality improvement project to test an interactive educational model for health care workers whose purpose is to improve knowledge and awareness of low vision among the elderly.

METHOD

This intervention took place in a community teaching hospital in Milwaukee, Wisconsin, that has a geriatrics consultation service, geriatrics fellows, and an "acute care for elders" unit.

All members of the hospital health care team were invited to

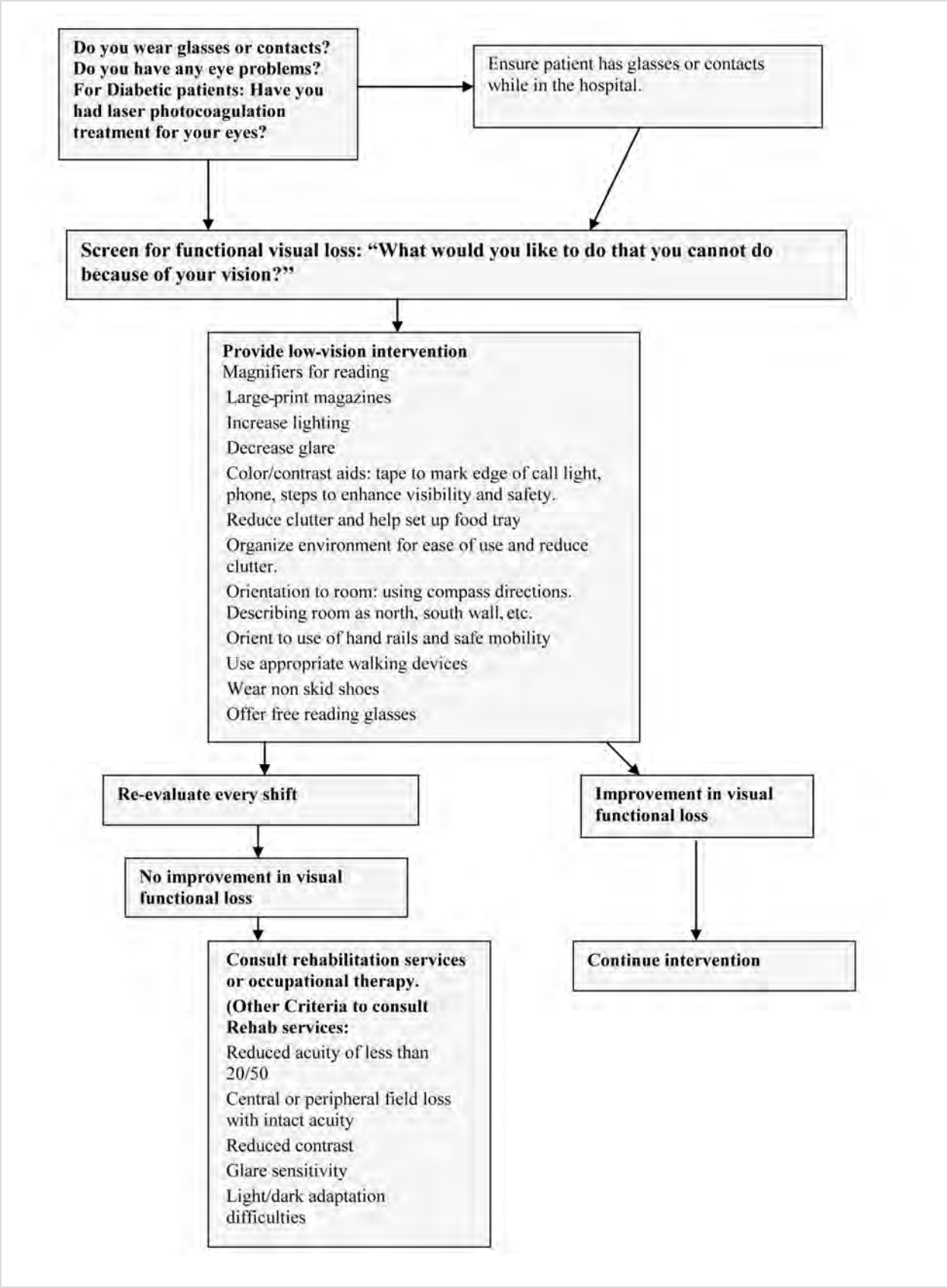

Figure 1: Example of the educational intervention

participate, and the module was approved as "diversity training"—a mandatory training every year. The intervention was carried out in the hospital cafeteria. The study was approved by the Institutional Review Board (IRB) as an exempt study.

The Educational Intervention

A "hands-on" interactive model was developed with the goal of imparting knowledge and changing attitude by allowing experiential learning. Learners are able to "walk in the shoes" of a senior and experience the affect of aging and disease on the eye. The intervention had the following components:

1. Normal aging model: A model of the eye demonstrating the anatomy and effects of normal aging.
2. Diseases affecting the eye: Pathological changes that commonly occur in the eye demonstrated by the anatomical site: cataract, macular degeneration, diabetic retinopathy, and glaucoma.
3. Experiential learning: The learners were able to experience the effect of diseases affecting the eye. Pairs of glasses simulating macular degeneration, glaucoma, and diabetic retinopathy were available. The learners were able to use the simulations to experience the world of our patients. Effect of cataracts on the eyes was demonstrated by Claude Monet's serial paintings of "Bridge at Giverny."[14] His cataracts, developed over the years, were evident in the paintings as the bridge became less clear.[15,16] Learners were provided with visual-aid devices they could try.
4. Written material (Figure 1): The learners were able to take written material that noted normal aging, diseases affecting the eye, further references, and resources.

We measured outcomes using a pre- and post-test questionnaire (Figure 2). The Chi-square test was performed to test the proportional difference. All statistical analyses were performed using SAS 9.2.

Low-vision knowledge survey **Survey ID:**

For each question, please select one answer only.

1. Low vision is an important issue in the hospital because people with low vision may have:
a. Longer length of stay
b. Higher mortality
c. Poor patient satisfaction
d. All of the above

2. Which of the following may co-exist in people with low vision?
a. Geriatric syndromes (like depression, falls, hearing loss)
b. Inappropriate behavior
c. Heart diseases
d. No other disease is associated

3. The most common cause of poor vision is?
a. Refractive errors (far or near sighted)
b. Cataracts
c. Glaucoma
d. Diabetic retinopathy

4. Which vision problem is a result of normal aging?
a. Double vision
b. Pain in or around eye
c. Reduced near vision (Presbyopia)-Difficulty Reading
d. Seeing flashes of light

5. I feel sympathy for people who have trouble seeing.
a. Strongly Agree
b. Agree
c. Disagree
d. Strongly Disagree

6. I can name some ways to improve quality of life for seniors with low vision.
a. Strongly Agree
b. Agree
c. Disagree
d. Strongly Disagree

7. An appropriate approach to evaluate "functional visual loss" in older patients is?
a. Snellen's test
b. FACT test
c. Jaeger test
d. Ask patient "what would you like to do that you cannot do because of your low vision?"

8. By age 80, a person needs how many times more light to see than a younger person.
a. 2 times
b. 3 times
c. 4 times
d. 5 times

I am:
1. RN
2. CNA
3. PT
4. OT
5. ST
6. MD
7. PA
8. NP
9. IS
10. Dietary
11. Env Services
12. Maintenance
13. Transporter
14. Chaplains
15. Admin.
16. Other

My Age:
1. <30
2. 30-45
3. 46-60
4. 61-70
5. >70

Gender:
1. M
2. F

Figure 2: Low-vision knowledge questionnaire

RESULTS

Three hundred eighty-six members of the hospital workforce completed the training; 19% were nurses, 32% ancillary services, 3% physicians, 13% environmental services, 5% maintenance, 8% dietary, and 2% transportation department, and 18% other. A large proportion of the participants were 46-60 years (45%) and female (78%).

Six questions measured medical knowledge, all of which showed statistically significant improvement. Question 5 measured the attitude toward people with low vision. There was improvement, but it was not statistically significant. Question 6 measured the learners' self-confidence; there was statistically significant improvement (Table 1).

DISCUSSION

Lessons Learned

Education in the form of lectures has a modest effect in changing clinician behavior.[17] Passive education—including distribution of guidelines, written material, and continuing medical education—are not very effective in changing clinician behavior, whereas interactive sessions that allow par-

Table 1. Survey Questions - Pre- and Post-test Results

Survey		Pre-Test No	Pre-Test %	Post-Test No	Post-Test %	*P*-value *
Question 1	Wrong	50	13.0	12	3.1	<0.001
	Correct	336	87.1	374	96.9	
Question 2	Wrong	78	20.2	25	6.5	<0.001
	Correct	308	79.8	361	93.5	
Question 3	Wrong	163	42.2	64	16.6	<0.001
	Correct	223	57.8	322	83.4	
Question 4	Wrong	52	13.5	34	8.8	0.039
	Correct	334	86.5	352	91.2	
Question 5	Strongly Agree	238	61.7	260	67.4	0.323
	Agree	129	33.4	114	29.5	
	Disagree	11	2.9	7	1.8	
	Strongly disagree	8	2.1	5	1.3	
Question 6	Strongly Agree	119	30.9	221	57.3	<0.001
	Agree	232	60.3	150	38.9	
	Disagree	27	7.0	13	3.4	
	Strongly disagree	7	1.8	2	0.5	
Question 7	Wrong	202	52.3	126	32.6	<0.001
	Correct	184	47.7	260	67.4	
Question 8	Wrong	177	45.9	22	5.7	<0.001
	Correct	209	54.2	364	94.3	

ticipation are more effective.[18] We developed an interactive model that allowed experiential learning.

Some of the limitations of the model are an inability to demonstrate completion of the module. During the day, there was a research intern available to encourage participation. We are not able to measure the effect of her presence; however, her participation did not include imparting education and was only for facilitation of the process. We were not able to measure the effect of the intervention on patient outcomes. Unfortunately, we do not have a control group because it is difficult to randomize the workforce in a midsize hospital. The educational intervention was able to accommodate multiple learners at different levels of knowledge. It was available for 7 days and 24 hours per day in the cafeteria.

Implication

It is known that interdisciplinary teams are able to change the culture in the hospital.[19,20] By increasing the medical knowledge, we believe they are more likely to be sensitive to the needs of patients with low vision. This intervention can be replicated easily in other hospitals. In the past, we had low participation in online and face-to-face geriatrics lectures. To improve participation, this training was approved as one of the "diversity training" modules for the employees, a yearly requirement by the institution. One-third of the hospital employees participated. We believe this critical mass will be the "change agent" required for organizational change.[21] The increase in workforce knowledge along with changes in the hospital environment may be critical in creating a senior-friendly hospital and may improve quality of care and patient satisfaction.

CONCLUSION

An interactive model to educate clinicians on visual loss and function can improve patients' satisfaction, clinicians' knowledge, and visual function during the hospital stay.

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To receive CME credit, complete this quiz and return it to the address listed below. See CME-designated article on pages 228-233.

Quiz: Lyme Disease Testing in Children in an Endemic Area

EDUCATIONAL OBJECTIVES

1. To understand the appropriate role of the Lyme disease serologic tests and the Western Blot Lyme disease confirmatory test in the management of patients suspected of having Lyme disease.
2. To understand when treatment of Lyme disease should be based on clinical signs alone.

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EXPIRATION DATE: October 17, 2012

QUESTIONS

1. 4 cm or greater pink or red skin lesion that has expanded over time in a Lyme disease endemic area is presumed to be erythema migrans, the skin lesion typical for Lyme disease.
   - ❑ True
   - ❑ False

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

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

2. When the clinical diagnosis of erythema migrans is made in a patient, the clinician should confirm the diagnosis of Lyme disease by obtaining a Western Blot Lyme disease confirmatory test prior to treatment.
   - ❑ True
   - ❑ False

3. In a patient with erythema migrans, seroconversion to give a positive Lyme disease serologic test is often delayed.
   - ❑ True
   - ❑ False

4. In a patient suspected of having disseminated Lyme disease, a positive Lyme disease enzyme immunoassay (EIA) should be confirmed by a more specific Western Blot confirmatory test.
   - ❑ True
   - ❑ False

5. A Lyme disease Western Blot test should be obtained only if the Lyme disease screening serologic test is negative.
   - ❑ True
   - ❑ False

6. Patients living in an endemic area who have a history of a tick bite, systemic symptoms, and a rash suggestive of erythema migrans have a likelihood of Lyme disease that is clearly sufficient to justify treatment.
   - ❑ True
   - ❑ False

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WMJ

Call for Papers Special Issue

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

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

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

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

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

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

Visit www.wmjonline.org to learn more.

Anatomy of a Malpractice Claim: What Every Health Care Professional Needs to Know

Guy DuBeau, JD

A recent *New England Journal of Medicine* article estimated that, by retirement age, 75% of physicians in low-risk specialties and 99% of physicians in high-risk specialties will face a malpractice claim.[1] No physician relishes finding themselves a target of a legal claim any more than a patient relishes hearing a challenging diagnosis. In many respects, the experiences are similar. It is unnerving. One is thrust into a world where people speak in new and strange terms. The procedures to which one is subjected are invasive. It is a world where no one gives any guarantees. No amount of confidence that it will turn out fine can fully relieve the attendant anxiety.

While those of us who work with health care professionals cannot stop all claims from happening, we can help our clients understand the process. We find that with even rudimentary knowledge of the process, the physician becomes more a part of the legal team and better results ensue. What follows is a basic primer designed to help health care professionals understand what is involved in a medical malpractice claim.

There are two basic types of medical malpractice claims that account for the overwhelming majority of the actions filed. The first are claims asserting a violation of the standard of care. The second type of claim asserts that a provider failed to obtain informed consent. These are not mutually exclusive and can be (and frequently are) alleged in the same action.

While definitions of "standard of care" vary slightly, these are claims asserting that the provider failed to use the same care, skill, and judgment a similarly situated provider would have done when faced with the same patient situation. The concept takes into account the provider's area of specialty and the state of medical knowledge at the time the service was rendered. These claims apply to all health care professionals.

Informed-consent claims, in most jurisdictions, apply only to physicians. They are generally codified by statute, where the duties and exceptions are defined. They focus on what information must be shared with patients so that the patients can make informed choices regarding their medical care.

All claims arise out of patient dissatisfaction, whether justified or not. When a claim arises, several people become involved on the health care professional's behalf. Usually, the first person a professional deals with is the risk manager for the institution where the professional works. One of the risk manager's first tasks is to tender the claim to the professional insurance company, where the matter will be assigned to a claims handler. The claims handler's job is to oversee the claim from the insurer's perspective. One of the claim handler's tasks is to assign the matter to legal counsel who will be the provider's attorney. These three individuals comprise the professional's legal team.

While lawsuits proper do not begin until a plaintiff files a "Summons and Complaint" in court, the process usually starts well before then. Some jurisdictions, such as Wisconsin, even have mandatory diversion processes that are prerequisite to prosecution of a medical malpractice action. Generally, a patient contemplating a claim will have raised concerns previously to someone regarding the care. As soon as any concern is raised, the risk manager should become involved. He or she will investigate and invoke possible interventions, such as arranging for medical directors to contact the patient, referring to the insurer, or setting up an independent review, which may include patient input. All of this can occur well before any lawsuit is filed, and with proper intervention some suits are avoided altogether.

A Complaint, which is the formal document filed with the court to commence a lawsuit, must be served on the person being sued. This is a critical event because there is a set amount of time in which it must be answered; failure to do so can result in the suit being lost on procedural grounds before any defense is mounted. A Complaint is a set of numbered paragraphs containing the plaintiff's allegations and the Answer admits or denies each of these allegations. The allegations denied define the scope of the controversy. Lawsuits then move into their next phase, discovery.

Discovery is a broad term, premised on the notion that during this phase of a pro-

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ceeding, each side gets an opportunity to discover what the other knows or believes. It is during this phase that written questions and answers are exchanged, documents are collected and depositions are taken. Each side will retain experts to stake out the contours of their positions. When the parties reach the point where they fully know both their case and the opponent's, decisions are made whether to settle or try a claim.

Trials are involved events, and to do them justice in summary form would require an article longer than this space allows. While trials can be heard by a judge sitting alone, medical malpractice cases usually are presented to a jury. They are rarely less than 3 days long and can stretch into weeks. It is, unfortunately, necessary for the provider to be present during the entirety of a trial, even when doing so causes a serious disruption to his or her practice.

There are many ways health care professionals can assist in their defense. The points we repeatedly stress with our clients are:

- Notify your risk manager at the first sign of patient dissatisfaction.
- Never become defensive or angry with a patient—refer them to the systems in place to address their concerns.
- Never alter medical records—if a correction to the record needs to be made, follow approved protocols for doing so.
- If you are served with a Summons and Complaint, contact your risk manager or assigned attorney immediately.
- Do not discuss the claim with colleagues or others outside your legal team—you may inadvertently bring them into the matter.
- Do not conduct independent research on the care being questioned.
- Be prepared to educate your counsel on your medical decision-making process and the medical concepts involved, but recognize you do not have to, nor should you, assume responsibility for building your case.
- Understand the nature of the claim asserted and give thought to how your conduct is justified in that context.
- Be prepared for a slow process—legal matters may take more than a year to bring to conclusion.
- Resist the temptation to "overcorrect" your practices simply because one of them has been called into question.
- Remember that you are not alone, recognize that it is a stressful process, and address that stress in a healthy manner.

In the end, physicians and other health care professionals survive lawsuits because there is a refined system in place to shepherd them through the process. While it is not always possible to prevail on every matter, those providers who understand the basics of the process, and their role in it, will maximize their chances for a successful outcome.

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Outcomes Research Brings Best Practices to Blood and Marrow Transplantation

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

For many patients facing certain cancers and autoimmune diseases, transplantation of blood stem cells from bone marrow, peripheral blood, and/or cord blood represents the best hope for survival. Make no mistake; this is a complex process entailing complete eradication and replacement of the patient's immune system.

With such high stakes, it is critical for physicians to know whether the potential reward outweighs the risks of this treatment and to determine which approach is most effective for each specific disease. Developing high-quality, evidence-based protocols requires high-quality outcomes data. One clinical center could never perform enough transplants to generate the information needed for meaningful outcomes research; however, by collecting results from transplant centers across the world, researchers can accumulate a large enough sample size to inform future treatment decisions.

That was the vision when a Medical College of Wisconsin professor, the late Mortimer Bortin, MD, and his colleagues founded the International Bone Marrow Transplant Registry (IBMTR) in 1972, just 4 years after the first successful hematopoietic cell transplantation. At the time, there were only about 12 transplant centers and fewer than 50 patients a year receiving transplants worldwide.

The scope of this effort today is striking by comparison. First came the addition of the Autologous Blood and Marrow Transplant Registry in 1990. Then in 2004, the Medical College registries combined with the National Marrow Donor Program's outcome research program to synergize the work of these complementary organizations.

This union created the Center for International Blood and Marrow Transplant Research (CIBMTR), which collaborates with the global scientific community to advance hematopoietic cell transplantation and cellular therapy research worldwide. Housed at the Medical College of Wisconsin, where Chief Scientific Director Mary M. Horowitz, MD, the Robert A. Uihlein Professor in Hematologic Research, provides leadership, the CIBMTR collects outcomes data on every allogeneic blood and marrow transplant as well as many autologous transplants performed in the United States.

Currently, the CIBMTR's clinical database contains information on almost 400,000 autologous, related, and unrelated donor transplant recipients. Supplying this data is our network of 450 transplant centers in almost 50 countries. The Center's prospective and observational research has resulted in more than 500 publications and includes more than 250 active studies.

The CIBMTR is a truly unique resource that, although based in Wisconsin at the Medical College, has the ability to benefit patients everywhere. Among its extensive contributions, CIBMTR research has identified factors affecting outcomes, such as age, stage of disease, and conditioning regimens; determined efficacy of various donor types and graft sources; and assessed long-term quality of life and late complications after transplantation.

The Center's past is remarkable, but the most significant discoveries may be yet to come. In August, the National Heart, Lung and Blood Institute and the National Cancer Institute awarded the Medical College of Wisconsin a 6-year, $45 million grant to support the CIBMTR's leadership role in facilitating large prospective clinical trials through the US Blood and Marrow Transplant Clinical Trials Network. It is the largest grant in Medical College of Wisconsin history.

Results of blood and marrow transplantation have improved dramatically since the 1970s, when only about 15% of patients survived. Still, only about half of patients who need a transplant receive one, only half of those who receive a transplant become long-term survivors, and about half of long-term survivors have ongoing medical problems that affect their daily life. We hope this remarkable investment in clinical research will lead to significant strides in donor matching, survival rates, and quality of life.

The overall goal of the grant is to complete high-quality clinical trials that focus on the most important barriers to transplant success. It specifically is funding the Data and Coordinating Center Consortium, which sup-

ports the Clinical Trials Network by managing the efficient development, implementation, and completion of phase I-III clinical trials, including database management, storage of biologic specimens, regulatory compliance, and numerous other oversight responsibilities. The Medical College is the lead institution for the Data and Coordinating Center.

The Clinical Trials Network, established in 2001, has launched more than 25 multicenter trials involving nearly 4000 patients in the United States. Those trials have resulted in 15 published papers with another five in pre-publication. Their findings have had important implications for blood and marrow transplantation practice. For example, one Network trial identified the potential benefit of removing T-cells, which cause graft-vs-host disease, from grafts before transplantation in acute myelogenous leukemia. Another trial – the largest study of transplantation for multiple myeloma ever conducted – determined that 2 sequential autologous transplants gave results similar to an autologous followed by an allogeneic transplant, in contrast to results from previous small-scale studies.

These are significant findings, yet they are the tip of the iceberg. The CIBMTR's unique, collaborative efforts will grow our knowledge base while measuring the success of current treatments and evaluating new therapies for blood and marrow transplantation. Safety, efficacy, best practices, and the best patient outcomes will be the hallmarks of our work.

WMJ

Let us hear from you

If an article strikes a chord or you have something on your mind related to medicine, we want to hear from you. Submit your letter via e-mail to wmj@wismed.org or send it to *WMJ* Letters, 330 E Lakeside St, Madison, WI 53715.

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MetaStar Begins Work on New Quality Improvement Organization Priorities Focused on System-wide Change

Jay A. Gold, MD, JD, MPH

In August 2011, MetaStar began working on the new Centers for Medicare & Medicaid Services (CMS) Quality Improvement Organization (QIO) Program priorities with a focus on 3 aims: better patient care, better population health, and lower health care costs. The QIO Program is the largest federal program dedicated to improving health quality at the community level, and it has QIOs in every state and territory responding to local needs.

The new program priorities differ from those in the past in that they focus on effecting system-wide change by removing organizational, cultural, and geographic boundaries and by including health care professionals at all levels of clinical performance who make a commitment to improvement. MetaStar will convene large-scale learning and action networks throughout Wisconsin to accelerate the pace of change and to spread best practices rapidly. The improvement initiatives also will include collaborative projects, online interaction, and peer-to-peer education.

Improvement Aims

From August 2011 through July 2014, physicians, their health care professionals and quality stakeholders in Wisconsin can join MetaStar for the following.

To Improve Individual Patient Care—Patient safety initiatives in hospitals will reduce catheter-associated urinary tract infections (CAUTIs), Clostridium difficile infections, and surgical site infections by implementing a program called the Comprehensive Unit-Based Safety Program (CUSP). All Medicare-participating hospitals will receive technical assistance for reporting inpatient and outpatient quality data to CMS.

In nursing homes, work initially targets pressure ulcers and physical restraints. It then will evolve to address other health care-acquired conditions, such as falls and CAUTIs.

To decrease adverse drug events, MetaStar is bringing together teams of community pharmacists, physicians, facilities, administrators, and patients into the federal Health Resources and Services Administration's Patient Safety and Clinical Pharmacy Services Collaborative (PSPC).

To Improve Health for Populations and Communities—MetaStar will be assisting physician practices that want to use their electronic health record (EHR) system to coordinate and increase preventive services such as flu and pneumococcal immunizations and colorectal and breast cancer screenings. We also will assist practices with reporting Physician Quality Reporting System (PQRS) measures to CMS via their EHR. Additionally, practices will be able to participate in a learning network focused on reducing patient risk factors for cardiac disease. MetaStar will partner with the Wisconsin Health Information Technology Extension Center (WHITEC) to promote health IT integration into clinical practice.

To Integrate Care for Populations and Communities—MetaStar is bringing together hospitals, nursing homes, patient advocacy organizations and other stakeholders in a community coalition. Our goal is to reduce hospital readmissions by improving transitions of care and to support the coalition's success in obtaining grant funding through Section 3026 of the Affordable Care Act.

To Deliver Beneficiary- and Family-Centered Care—MetaStar also will continue to fulfill CMS's obligation to protect the rights of Medicare beneficiaries by reviewing complaints about quality and appeals about the denial or discontinuation of health care services. In addition to reviewing complaints and appeals, MetaStar will invite Medicare beneficiaries and their families to become involved in meaningful ways in the improvement and prevention activities taking place in their communities.

As Wisconsin's QIO, MetaStar welcomes participation by all who want to contribute to better care, better health, and lower costs through improvement. For more information, visit www.metastar.com or contact Jay A. Gold, MD, JD, MPH, at 608.274.1940.

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This material was prepared by MetaStar, the Medicare Quality Improvement Organization for Wisconsin, under contract with the Centers for Medicare & Medicaid Services (CMS), an agency of the U.S. Department of Health and Human Services. The contents presented do not necessarily reflect CMS policy. 10SOW-WI-CRSP-11-02.

Providing Resources and Support for Physicians

W. Stancil Starnes, CEO, ProAssurance Corporation

Editor's Note: The Wisconsin Medical Society helped form PIC WISCONSIN in 1986 to ensure the availability of medical professional liability insurance for Wisconsin physicians. Today, the Society continues to endorse ProAssurance Wisconsin Insurance Company (formerly PIC WISCONSIN) to provide professional liability insurance coverage with unmatched success in claims defense.

Q: Will you describe ProAssurance's history in Wisconsin and discuss your commitment to your physician insureds?

A: I think it's imperative to understand the formation of ProAssurance and our predecessor companies. At a time when there were no available options for physicians to obtain medical professional liability (MPL) insurance in the commercial market, physician-founded companies such as ProAssurance were formed to provide a sound, long-term alternative. The fact that ProAssurance was formed by physicians for physicians, and continues to enjoy strong physician leadership helps ensure that we never lose sight of our mission—providing solid, secure MPL insurance at the lowest realistic price and ensuring that our insureds receive the finest possible defense in the event of a claim.

That same commitment was at the core of Physicians Insurance Company of Wisconsin (PIC Wisconsin), when the Wisconsin Medical Society helped found the company to improve access to affordable, effective medical professional liability coverage for Wisconsin physicians. That shared sense of commitment to our customers was one of the main reasons PIC Wisconsin and ProAssurance agreed to come together in 2006. That commitment has only deepened as we've expanded the coverages available to our insureds, built additional financial strength to back our policies, and provided additional risk management options to help our insureds enhance the care they provide.

Q: The Society recently won a case before the Wisconsin Supreme Court resulting in the return of $200 million, plus interest, to the Injured Patients and Families Compensation Fund (IPFCF). ProAssurance was the only MPL insurer that contributed to the Society's litigation fund in support of the Society's case. Why is a sound IPFCF important to Wisconsin physicians and ProAssurance?

A: ProAssurance believes anything that benefits not only its insureds—but all physicians—is important, so it was only natural to support the Society's efforts. Having a strong, stable IPFCF in place provides Wisconsin physicians with rate stability and certainty that physicians in many other states do not enjoy. The existence of the fund is also a benefit to patients who receive a judgment above $1 million; having a fiscally-sound IPFCF eliminates uncertainty over receiving their ultimate judgment. Without the Society's high-profile advocacy, the IPFCF would have faced an uncertain financial future—at best.

Q: You mentioned risk management resources as an important part of ProAssurance's value proposition for its insureds. What risk management resources and loss prevention programs does ProAssurance offer?

A: Our risk management focus is squarely on providing our insureds with timely, useful information. We're committed to providing information in ways that best fit each insured's needs—be it online or in person. Private seminars are available for large physician groups and insured facilities on a wide range of topics tailored to address the risks encountered in specific practice environments. We are so thoroughly dedicated to excellence in this area that we have gone through the rigorous process to become an accredited provider of CME by the ACCME, an accreditation we achieved with commendation. We are also able to award CEU for nurses.

An equally important aspect of our loss prevention efforts are the risk management surveys of physician practices. These are usually performed onsite; however, phone surveys and online self-assessments are also available. In all of these efforts, our goal is to help our insureds find ways to improve the care they offer patients—thus reducing the potential for

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Stan Starnes is the CEO of ProAssurance, the parent company of ProAssurance Wisconsin Insurance Company (formerly PIC WISCONSIN). ProAssurance Corporation is the nation's 5th largest writer of medical professional liability insurance through principal subsidiaries ProAssurance Indemnity Company, Inc., ProAssurance Casualty Company, ProAssurance National Capital Insurance Company, ProAssurance Wisconsin, and ProAssurance Specialty Insurance Company, Inc.

medical incidents that can lead to litigation.

We encourage physicians who are insured by ProAssurance through the Society's Insurance and Financial Services Group to earn up to 2.5% premium credit by taking advantage of our online loss prevention seminar program. Because we believe so strongly in the Society's efforts, these physicians also may earn the 2.5% premium credit by completing approved sessions of its Transformational Leadership series, offered as part of the Society's Member Benefit Program.

While in-person and online risk management efforts are vitally important, we also seek to keep our insureds updated on the latest trends in the developing medical/legal environment through timely print communications. We provide these risk management newsletters throughout the year for insured physicians' benefit: the *Medical Risk Management Advisor* (for physicians' practices), *Vital Signs* (providing specialty-specific case studies), *Key Considerations* (for facilities), and a Wisconsin-specific publication, *Comment,* which is designed to convey news of more immediate interest.

Insureds also can access online risk management resources within a secure area of our website: ProAssurance.com. Resources may be downloaded and personalized to meet an insureds' specific need for sample forms, policies and procedures, podcasts, etc.

Finally, because we know there are situations when only a personal consultation can provide the specific, immediate help an insured might need, we maintain a risk management help line for answers and solutions to challenging risk management questions. Insureds may access our highly trained risk management consultants by phone or e-mail (at 800.292.1036 or rmquestions@proassurance.com).

Q: ProAssurance has been a vital supporter in the Society's establishment of the Center for Medical Practice Research and Education. What role do you think the Center's work will play in enhancing patient care and reducing the number of medical liability lawsuits?

A: ProAssurance is excited to be part of such a progressive project. The Center will provide a real-world vehicle to connect data on resource utilization and quality indicators to specific actions undertaken by physicians to reduce variation and improve outcomes. Conscientiously applying quality-enhancement techniques after analyzing the data will undoubtedly enhance treatment outcomes and foster stronger physician-patient relationships. Each of those outcomes is consistent with risk management and loss prevention efforts that ultimately reduce lawsuits by helping to reduce adverse outcomes, to say nothing of the potential reduction in the cost of overall medical treatment. Of course nothing can entirely eliminate unexpected outcomes, but we can—and should—have enhanced patient safety and a corresponding reduction in lawsuits as our goal.

Society's Center for Medical Practice Research and Education using data to drive change

Tim Bartholow, MD, Wisconsin Medical Society Chief Medical Officer

The Wisconsin Medical Society launched its Center for Medical Practice Research and Education in 2010 with financial support from ProAssurance and a grant from The Physicians Foundation following a successful pilot project that partnered practicing physicians with business leaders who purchase health care benefits for employees. The goal of this unprecedented effort was to find ways to reduce health care costs without compromising quality.

Our workgroups studied claims data* for 1.6 million Wisconsin residents across 4 key areas: orthopedics, cardiology, gastroenterology and behavioral health (psychiatry and addiction medicine). Preliminary findings showed variation in the way physicians diagnose and treat some health conditions—and that variation is sometimes significant. This helped focus attention on expensive areas where physicians are using different amounts of resources to treat patients with similar diagnoses, which allowed us to then explore why that variation exists, if the additional costs are necessary, and if not, how that disparity can be reduced.

During the past year, the Center has delved further into the data and developed analytical tools and resources to assist physicians and groups as they strive to improve quality of patient care, increase efficiencies and to manage risk. Today, we are committed to

- Bending the health care cost curve.
- Evaluating quality care from an efficiency perspective, harmonizing practice guidelines, assuring appropriateness of care and decreasing variation and improving patient safety.
- Delivering continuous improvement initiatives to support efficiency gains.
- Developing accountability models that support accessible, coordinated patient-centered care.

We are extremely excited about this work, because we are confident it will lead to positive changes in key areas of health care delivery, and we are very grateful to ProAssurance for supporting this work.

**Source of data: Wisconsin Health Information Organization Data Mart Version 2*

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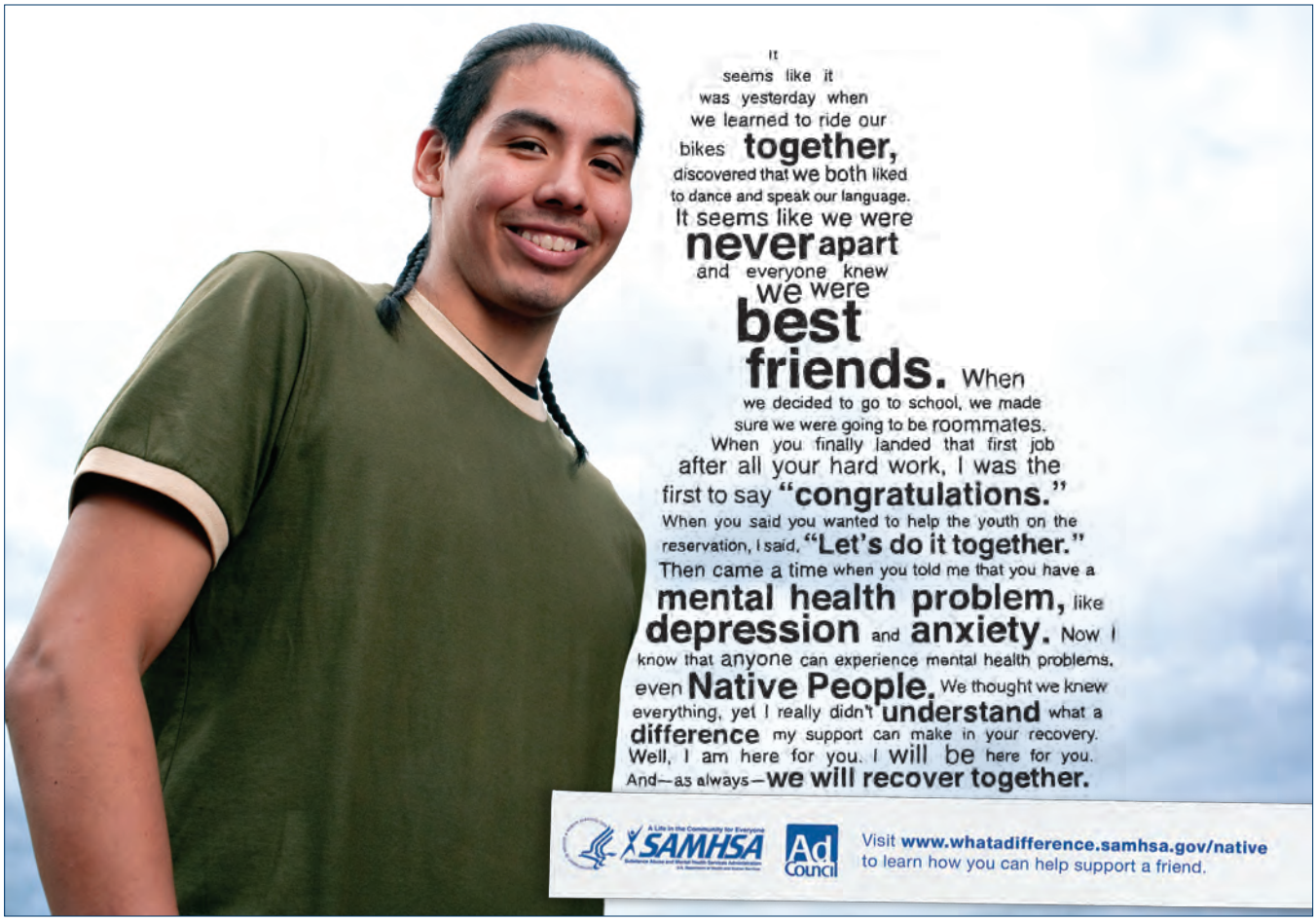

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WMJ is a peer-reviewed, indexed scientific journal published six times a year by the Wisconsin Medical Society (Society). *WMJ's* mission is to provide a forum for professional communication and continuing education for its readers—thousands of practicing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

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

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

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GEARING UP FOR

ICD-10

OCTOBER 1, 2013: WILL YOU BE READY?

ICD-10 is much, much more than a new code set—it's an opportunity to provide better care through better documentation. And while implementation won't be easy, the Society has the resources you need to make the transition to ICD-10 successfully—starting today.

ICD-10 compliance is two years away, but there's a lot to learn before the October 1, 2013 deadline. Get started now with Anatomy and Pathophysiology self-study curriculum, available through the Wisconsin Medical Society.

The benefits of the ICD-10 code set lie in the greater specificity physicians can provide in patients' records. This detailed documentation, however, requires a strong understanding of anatomy and pathophysiology by coding and billing specialists, clinical staff members and other members of the health care team. Because of this critical aspect of ICD-10, the Wisconsin Medical Society has partnered with the American Academy of Professional Coders (AAPC) to offer ICD-10-CM Anatomy and Pathophysiology (A&P) self-study training.

This Internet-based learning opportunity covers all body systems in 14 modules. The curriculum—which includes online multimedia presentations with downloadable manuals and evaluations for each module to ensure material comprehension—is available as individual modules or as a package. Materials may be accessed at any time from any computer with Internet access.

Cost

Save more than 60 percent when you purchase the 13 modules as a complete package, which includes a congenital malformations module:

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- Nervous
- Pregnancy
- Complete Package
- Congential Malformations *(included when you order the complete package.Not available for individual purchase.)*

Please visit our website www.wisconsinmedicalsociety.org/icd-10 for more information.

Additional ICD-10 education opportunities from the Wisconsin Medical Society

ICD-10: Getting Started—A Webinar Series

These webinars may be purchased as individual sessions for $119 each or as a package for $299. Webinar topics and dates:

- Steps for Successful Migration—*October 12*
- Performing an Impact Analysis—*November 8*
- What You Need to Know About the Code Set NOW!—*December 14*

Custom learning opportunities can be designed to fit your specific needs. Options include, but are not limited to:

- The Essentials of ICD-10 Implementation
- Documentation Assessments
- ICD-10 On-site Implementation Training
- ICD-10-CM and ICD-10-PCS Code Set Training
- Train the Trainer ICD-10-CM and ICD-10-PCS

Additional webinars include:

- Medical Terminology: Building the Foundation for ICD-10—*November 10*
- ICD-10 Transition: Focus on Diabetes—*December 15*

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- *US News and World Report* recognized seven UW Health specialties (Cancer, Ear Nose and Throat, Gastroenterology, Geriatrics, Nephrology, Pulmonology and Urology) in its 2011 "America's Best Hospitals" guide. This is the 18th year our physicians and care teams have been recognized.
- *US News and World Report* has designated the American Family Children's Hospital as a Top 50 Children's Hospital for 2011-2012.
- *Hospitals & Health Networks* magazine named UW Hospital to its list of the "Most Wired" hospitals and health systems in the nation.
- Our Emergency Department has been selected as one of only 20 EDs to receive the Emergency Nurses Association (ENA) Lantern Award for leadership, evidence-based practice, education, advocacy and research.

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