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Cover photo – Harvest Moon by Sherrie Bruhn
We have all likely been there before. Perhaps as a medical student struggling with the rigor of the basic sciences or trying to find our place in the clinical world. Perhaps as a resident, where more responsibility is placed on us, the hours are grueling, and we try to find that oh so precious work-life balance. Finally, we start practicing medicine with all the years of training behind us, thinking we have finally “made it.” However, along the way we encounter difficulties—such as patient complaints, poor interactions with nurses, administrators, or colleagues, or even a bad patient outcome. In the academic environment, we may feel “stuck” without defined opportunities for advancement. In each instance, I suspect there were one or more individuals that reached out to us—took us under their wing so to speak—to help us through the turbulent times. It may have been something as simple as listening, or as complex as helping us navigate the tortuous waters of a medical career. They were there for us, and we will be forever grateful. In essence, we were mentored, and as a result of these positive experiences, we may have an interest to mentor others.

The Webster dictionary defines mentor as “someone who teaches or gives advice to a less experienced person.” The word itself was inspired by the character Mentor in Homer’s Odyssey, who assumed the role of father to Odysseus’ son when the general was away at the Trojan War. Mentor was an exceptionally unselfish man, rich in patience, wisdom, and other virtues. The story makes clear that a great and sustained personal investment lies at the heart of mentoring.

The literature is replete with discussions on mentorship. One of its most significant benefits is felt to be the impact on affective reactions to the workplace and positive psychological feelings regarding one’s career. Clearly, if one is lucky enough to experience a solid mentor-mentee relationship, their feeling of self-fulfillment is high—and not just for the mentee, but for the mentor as well!

So why do I bring up this topic, given we have all likely heard the word repeatedly over the years? Statistics suggest that even though students, residents, and colleagues highly value mentorship, less than one-third of students report actually having a reliable mentor, and even less faculty members or colleagues report having had a quality mentor relationship. Whether we are involved with medical students, residents, or colleagues, we need to be more aware of the needs of the people who surround us, and perhaps reach out to those we perceive may need it.

A good mentor must be available, convey respect and confidence, track progress, give feedback, and sometimes just listen and be a good sounding board. They must avoid exclusive focus on their own professional needs, such as by promoting their own agenda or perhaps seeking to create a “clone” who mimics the mentor’s career path, philosophy, and opinions. A good mentee, on the other hand, will meet deadlines, follow through on commitments, and accept constructive criticism. They must also convey respect, show appreciation, and not overly rely on the mentor to make their decisions. Maintaining a relationship is a mutual responsibility, and both parties need to communicate directly and honestly. To be successful, the relationship should be a positive experience for both parties. I can honestly say that I not only benefited greatly from having good mentors, but perhaps felt even more satisfaction when mentoring others.

I would encourage you to look around, and be aware of a student, resident, or colleague who may be in need of a good mentor. For students, you can enhance knowledge about the “hidden curriculum” of professionalism, ethics, values, and the art of medicine not learned from texts. For all individuals at various career stages, mentors can provide career guidance, emotional support, and encouragement. The junior faculty member or individual who just joined your group may be the most in need. The mentor benefits as well, through career satisfaction, personal gratification, and perhaps a refreshing perspective on his or her own career. Mentorship is more than just a program offered by your institution or a buzzword that catches attention. In its highest form, it is a mutually beneficial support system for all involved. To quote Winston Churchill: “We make a living by what we get, but we make a life by what we give.”

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The death of a child is one of the deepest tragedies that can be experienced. The Regional Infant and Child Mortality Review Committee article in this issue is a thought-provoking report showing both how far we have come and how far we have to go in this critical area. The region has made progress in many areas, but significant areas of concern remain. Notably, progress has not been made in reducing deaths due to unsafe sleeping environments for infants.

What is our goal? Infant mortality rates in the region are lower than the national average (2010-2013). Is this our goal and have we then achieved it? Because we are talking about deaths in infants and children, it is unlikely that anyone would declare victory, but I would also argue against complacency. Medical experts have learned the hazards of using the national average as a target/goal. For example, in the past, hospitals simply tried to stay around the national average for the rate of infected central venous catheters. Then, a landmark study showed that it was possible to create a system that would result in substantial reductions in infection rates. Now, multiple health care organizations have consistently achieved infection rates of zero and in fact, zero is the new goal. Although a rate of zero is difficult to achieve and maintain, the goal itself has driven organizations to pour renewed efforts and resources into controlling healthcare-associated infections and rates have plummeted throughout the U.S.

Is it possible to set a goal of zero infant and childhood deaths? The Regional Infant and Child Mortality Review Committee report breaks down deaths into natural deaths, accidents, suicide, homicide and undetermined deaths. At first glance, one would think that natural deaths might not be preventable. Yet, natural deaths included neurodevelopmental disorders, malignancies and infections, each of which has pathways to prevention, treatment or research opportunities. Many natural deaths in infants were associated with unsafe sleeping conditions. Similarly, many deadly accidents involved unsafe driving through use of alcohol or non-use of appropriate restraint devices such as seat belts. Suicide underscores the needs for access to effective mental health services. Undetermined deaths are more problematic, but were associated with unsafe sleeping conditions or neurodevelopmental disorders in most of the cases presented by the authors. The article cogently describes many additional opportunities for improvement.

There are many barriers to achieving zero mortality in infants and children. Young people often consider themselves to be indestructible and embrace risk-taking as part of their perceived journey to adulthood. Those most in need of services may be the least able or willing to access care. Education on safe sleeping environments for infants is best directed at new mothers, yet the window of opportunity is shortened by the small amount of time spent in the health care setting just prior to or after delivery. Suicide prevention requires significant effort and coordination among experts in medicine, public health, health policy and social services. Substance abuse treatment requires a motivated participant and a responsive, effective health care system. Research and treatment cost money, in a time where expenditures are being curtailed. If one stacks up the barriers, they can seem insurmountable. But they are not. Success in each of these individual areas has been demonstrated in the scientific literature.

A goal is an aspiration, but it is also a statement of commitment. Like the goal of reducing healthcare-acquired infections to zero, reducing infant and childhood mortality to zero is difficult but possible.
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Case Report: Hormone Receptor Positive, HER2/neu Negative Inflammatory Breast Cancer in a Male Patient

By Anthony H. Loewen, MD; Spencer D. Schilling, MD; Mary Milroy, MD, FACS; and Mary Lee Villanueva, MD

Abstract
Inflammatory breast cancer is a rare and aggressive disease found almost exclusively in women. We present a case of a 51-year-old male with inflammatory breast carcinoma. The patient presented with a mass measuring roughly 7 cm with overlying erythema, peau d’orange appearance, and prominent nipple retraction. Core biopsy analysis demonstrated estrogen and progesterone receptor positive, HER2/neu receptor negative invasive ductal carcinoma. A PET scan revealed contralateral supraclavicular lymph node metastasis. The patient refused chemotherapy and radiation and was not a surgical candidate. Ultimately he opted for therapy with strictly an aromatase inhibitor. Most recent follow-up at 12 months demonstrated improvement of metastatic lesions on PET scan. Local progression of disease was noted on physical exam and the patient decided to add everolimus and radiation therapy while continuing an aromatase inhibitor. Retrospective studies have demonstrated increased survival of inflammatory breast cancer diagnosed in women with the utilization of neoadjuvant chemotherapy, surgical excision, and radiation therapy. Unfortunately, due to the rarity of the disease, no specific optimal treatment guidelines have been established for men diagnosed with this disease.

Introduction
Inflammatory breast cancer (IBC) is a distinct sub-classification of locally advanced breast cancer and historically has been associated with very high mortality rates and few five-year survivors. The disease is rare, comprising roughly 2.5 percent of newly diagnosed cancers of the breast.\footnote{1} Male breast cancer (MBC) in general is also relatively uncommon and comprises just less than 1 percent of all breast cancer diagnoses\footnote{2} and less than 1 percent of all new cancers in men.\footnote{3} We present a case of male inflammatory breast cancer (MIBC) as well as a literature review. According to our review of the English medical literature on MIBC, this represents the 12th described case of IBC in a male patient.

Case Description
A 51-year-old single Caucasian male presented to the emergency department by EMS after collapsing to the ground with shortness of breath, chest pain and vomiting. He reported that he had not seen a physician or sought medical attention in his entire adult life before this incident and thus had no past medical history to report. Furthermore, he denied a family history of breast or ovarian cancer and reported he did not take regular medications. The patient also denied a history of tobacco use and stated he only drank alcohol in moderation. He has never been married, has no children, and no biological sisters. His mother was a heavy smoker who passed away a number of years ago from lung cancer.

On physical examination, he was ill appearing with labored breathing and morbid obesity (BMI = 60) with bilateral gynecomastia. It was also noted that there was a large erythematous area greater than 20 cm x 20 cm over much of the surface of the right breast with a peau d’orange appearance and extensive nipple retraction (Figure 1A). With palpation, a firm, non-tender, mobile mass was detected in this area of erythema. Palpation for lymph nodes was positive in the right axillary, and bilateral cervical chains.

Ultrasound studies revealed an irregular, lobulated mass with some hypervascular flow measuring at least 7 cm with...
overlying skin thickening. This study also noted axillary adenopathy with at least a 1 cm thick lymph node cortex.

Computed tomography (CT) of the chest, abdomen and pelvis was limited due to body habitus but demonstrated significant soft tissue inflammation overlying a dense mass located in the right breast (Figure 2A). Also, significant right axillary lymphadenopathy was appreciated. PET scan was performed and demonstrated extensive right clavicular adenopathy with abnormal uptake in the anterior and posterior triangles, a large right breast mass with axillary adenopathy, and uptake in the left superior mediastinal nodes. A subsequent brain MRI ruled out metastatic lesions in the brain.

Core biopsy of the breast mass was sent to pathology for immunohistochemical staining and FISH analysis. Cytology smears revealed clusters of atypical cells consistent
with malignant ductal epithelium. Microscopic examination showed a pattern of invasive ductal carcinoma, grade 2 (Nottingham score 6) (Figure 3). Immunohistochemical staining determined the tumor cells to be both estrogen receptor (ER) and progesterone receptor (PR) positive. HER-2 by immunohistochemical staining was 2+ and HER-2 by FISH analysis was not amplified with a ratio of 1.1. The TNM staging was determined to be T4dN3M1 stage IV breast cancer.

Initiation of chemotherapy was delayed when the patient developed a pulmonary embolism a week after his diagnosis of IBC. His situation was further complicated by a lack of medical insurance, which resulted in apprehensions by the patient regarding treatment. Even after he attained alternate funding sources, the patient ultimately chose to forgo chemotherapy after an extensive discussion of his available options. He did, however, agree to start an aromatase inhibitor in an attempt to delay the progression of the ER positive cancer. A referral for genetic counseling was offered and declined by the patient.

At 12 months follow-up, he reported he stays active and denies medication intolerance and appreciable weight loss. His only medical complaint was local tenderness and irritation to the underside of the affected breast. Local erythema of the breast had improved (Figure 1B) but progression of local disease on the underside of the breast was observed. CT of the chest, abdomen and pelvis demonstrated a decrease in overlying skin thickness with the mass in the right breast remaining essentially unchanged (Figure 2B). PET scan showed a complete resolution of hypermetabolic activity in the lower cervical region bilaterally and a new hypermetabolic paratracheal lymph node on the right. A brain MRI demonstrated no appreciable metastatic disease. At this time, the patient has decided to continue an aromatase inhibitor (exemestane) and add everolimus and radiation therapy.

Discussion
To our knowledge, the current case is the 12th reported case of MIBC described in the English medical literature. Previous cases have been summarized and compared by Hyakudomi et al. recently with one additional case. Of note, the current case represents the third youngest male (51 years) to be diagnosed with MIBC in the literature (the average of the previous 11 cases is 65.5, ranging from 43 to 85). Furthermore, our case is the first to demonstrate hormone receptor positive MIBC. Although seven of the 11 prior cases reported did not specify hormone receptor status, it should be noted that over half of those cases were published either before the development of the assay or during its development and refinement. The correlation between hormone receptor positive status and earlier age at diagnosis is consistent with data recorded in females with IBC in The University of Texas M.D. Anderson Cancer Center Registry.

Genetic, endocrine, and several uncategorized risk factors have been identified for the development of MBC. It can be assumed with some degree of certainty that these risk factors can also be attributed to the development of MIBC. Well-established genetic risk factors for the development of MBC have been published with an estimated minimum of 10 percent of all new diagnoses having an identifiable genetic predisposition. One study showed Klinefelter syndrome had a 7.5 percent prevalence among a subset of 93 males diagnosed with breast cancer.
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Similarly, a number of reports have shown the relationship of BRCA mutations and MBC. In summation, population-based studies have demonstrated between 5-15 percent prevalence of BRCA2 mutations and a less convincing 0-4 percent prevalence of BRCA1 in MBC patients.\(^7\)

BRCA mutation testing is recommended in all cases of MBC by the American Cancer Society and the U.S. Preventative Services Task Force (USPSTF) if the subsequent results will be used to further assess family members’ risk of developing breast cancer. While other breast cancer genetic markers are under investigation, the USPSTF does not recommend for or against testing patients for these markers at this time.\(^6\) All family members of patients with positive BRCA mutation testing should be informed they carry a 50 percent risk of also carrying the mutation and may wish to pursue genetic counseling and testing. Female family members who test positive for a BRCA mutation should be counselled about risk reducing strategies. Surgically, this could include a bilateral prophylactic mastectomy and/or oophorectomy.\(^9\) Therapy with tamoxifen or raloxifene could also be used in addition to surgery or as a noninvasive option.\(^10\)

Women who are BRCA mutation positive or who have not been tested but have a first-degree family member who is positive should follow a high-risk screening schedule as recommended by the USPSTF. This includes regular breast exams every six to 12 months and a yearly breast MRI starting at age 25 with the addition of yearly mammography starting at age 30.\(^11\) Males who are BRCA mutation positive or those with positive first-degree family members should be aware of their increased risk of developing MBC. They should also be informed that even if they do not develop MBC, they will always carry a 50 percent risk of passing the mutation on to their children.

In the current case, if the patient had a daughter and he still chose to refuse genetic testing we would recommend genetic counseling and likely testing for the daughter at or after age 25. If she was BRCA mutation positive, we would recommend counseling for risk reduction strategies and implementing the high-risk screening schedule recommended by the USPSTF as listed above. If she was BRCA mutation negative, we would recommend high-risk screening starting at 40 years of age or 10 years prior to her family member’s breast cancer diagnosis.

Endocrine risk factors for MBC have been observed primarily in cases of long-term unopposed estrogen. Increased risk of MBC has been demonstrated in men with liver disease, a prolactinoma, low plasma testosterone, and obesity.\(^12\) Correlations with exogenous estrogens have also been reported in a male being treated for prostate cancer\(^12\) and in cross-sex hormone use in transsexual.\(^1,3\) Gynecomastia has been proposed as a risk factor; however, it has been postulated that risk factors for male breast cancer are the same as those for gynecomastia thus bringing into question this association.\(^3\)

Other identified risk factors include increased age, African American race, and radiation exposure. At all ages, black men have an increased risk of developing breast cancer over white men. In contrast, this relationship is generally reversed in women. In women older than 40, the population with the highest incidence of breast cancer, the incidence of breast cancer is higher in white women as opposed to black women.\(^3\) High levels of radiation exposure have been demonstrated to increase the incidence of MBC over baseline as demonstrated in a cohort of atomic bomb survivors.\(^14\)

Due to the rarity of MBC, recommendations regarding treatment are extrapolated from therapeutic responses seen in women diagnosed with the disease.

Before the advent of novel chemotherapeutic agents, surgery and therapeutic radiation were the only treatments available for IBC. Furthermore, several historic studies demonstrated little, if any, survival benefit of these treatments used individually or in combination when five years survival was used as the endpoint.\(^2\) More recently, the implementation of chemotherapeutic agents into a multimodal treatment scheme with surgery and radiation has increased both local control of disease and long term survival.\(^1,2,15\)

Many chemotherapeutic regimens have been used as initial therapy in IBC. Unfortunately, most published data comes from retrospective analysis containing only a few participants undergoing one particular treatment regimen. Of note, the efficacy of anthracycline-based chemotherapy followed by radiation, with and without mastectomy has been demonstrated in a 20-year review of data from the University of Texas M.D. Anderson Cancer Center Registry. Survival rates were 40, 33, and 28 percent at 5, 10, and 15 years respectively.\(^16\) Similarly, randomized trials in patients with IBC have shown regimens of CAF (cyclophosphamide, doxorubicin and 5-fluorouracil) and CEF (cyclophosphamide, epirubicin, and 5-fluororacil) followed by surgery, adjuvant therapy, and radiation to produce survival rates of 44 percent and 32 percent at 5
and 10 years, respectively. An extensive review of the medical literature regarding chemotherapeutic treatments in IBC has been performed by Dawood, Ueno, and M. Cristofanilli.

Tamoxifen or aromatase inhibitors in hormone receptor positive cancers and trastuzumab in HER2-positive IBC have similarly been thought to be of significant benefit following chemotherapy. However, one study of 65 participants with metastatic IBC has suggested no benefit of tamoxifen therapy. The rarity of hormone receptor positive IBC has significantly contributed to the limitations of available research in this area.

Historically, mastectomy alone has offered no survival benefit in IBC. However, it appears that in patients that have had a complete or partial response to chemotherapy, mastectomy with axillary lymph node dissection has demonstrated improved local control and survival duration.

Recently studied surgical approaches to the treatment of most breast cancers, including MBC, have enabled the surgeon to limit the extent of the resection without decreasing the efficacy of the intervention. These include sentinel lymph node biopsy (SLNB), breast conservation therapy and skin-sparing mastectomy with the option of immediate reconstruction. These approaches have not been extended to the treatment and management of IBC primarily due to the extensive lymphatic involvement by the tumor. In SLNB, an intact lymphatic pathway is necessary to identify the sentinel node for biopsy and thus evaluate the extent of disease. Similarly, extensive carcinoma infiltration of the dermal lymphatics seen in IBC makes a skin-sparing mastectomy impossible. Furthermore, with the need for postmastectomy radiation therapy in IBC, immediate reconstruction is not recommended.

Most patients with IBC receive radiation therapy. Radiation therapy is targeted at the chest wall and axillary, infraclavicular, supraclavicular and internal mammary lymph nodes with the goal of obliterating any residual tumor emboli within the lymphatic system. It follows that the level of success of radiation therapy in these patients can be influenced by the extent of the resection, achieving negative margins, and surgical expertise in dissection and retrieval of the locoregional lymph nodes.

While no randomized trials are available exploring the treatment of IBC in women and so few cases even reported in men, it goes without saying that more research is merited on the topic. With the advent of chemotherapeutics, the diagnosis of IBC has transformed from one of despair with almost no five-year survivors to one of hope with a significant, yet minor percent achieving long-term survival. Optimal implementation of chemotherapeutics, surgical intervention and radiation therapy are essential to decreasing mortality while maintaining and improving the quality of life for these patients. This can only come about with additional investigation efforts into this rare and devastating disease.

### REFERENCES


Please note: Due to limited space, we are unable to list all references. You may contact South Dakota Medicine at 605.336.1965 for a complete listing.

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Regional Infant and Child Mortality Review Committee 2014 Final Report

By Ann L. Wilson, PhD; and Jim Sideras, MSN

Abstract

The Regional Infant and Child Mortality Review Committee serves 10 counties in southeastern South Dakota with the aim of using its reviews to prevent future loss of life during childhood. In 2014, the committee reviewed 25 deaths. Consistent with observations made in previous years, in 2014 all infants who died during sleep did so with risks present in the sleep environment. Concern persists about progress in decreasing these infant deaths during sleep in the region. The two teen suicides in 2014 marked a decrease in the number observed in 2013, but represent an ongoing concern. Four deaths involved auto crashes with three of these involving a teen driver. A child homicide did not occur in the region in 2014. The report provides the committee’s recommendations for community action that could prevent future deaths of infants and children.

The Regional Infant and Child Mortality Review Committee (RICMRC) was established in 1997 with the aim of examining deaths of infants and children to identify preventive strategies that may decrease the risk of loss of young life in Minnehaha County. The committee’s mission is “to review infant and child deaths so that information can be transformed into action to protect young life.” The committee now serves Minnehaha, Lincoln, Turner, McCook, Lake, Moody, Union, Hanson, Miner and Brookings counties.

The committee is chaired by the Sioux Falls Fire Department chief and is composed of professionals representing expertise in pediatrics, medico-legal death investigations, nursing, law enforcement, child protective services, emergency medical services and mental health. Sherriff and police departments from the participating counties are invited to be present for the reviews of deaths of children occurring in their counties. To operationalize its goal of prevention, the following criteria are used for reviewing deaths of infants and children (under the age of 18):

• Residents of the RICMRC region whose deaths occurred subsequent to hospital discharge following delivery (or did not occur in a hospital) from causes sustained in the region.

• Non-residents of RICMRC region whose deaths occurred in the region from causes sustained in the region.

Seventy-two deaths occurred in the 10-county review area in 2014 (63 in Minnehaha, four in Moody, two each in Lincoln, and Brookings and one in McCook). For illustrative purposes, the age distribution of all childhood deaths of Minnehaha County residents (who represent 61 percent of the total resident deaths in the 10-county RICMRC review area in 2014) is presented in Table 1. Important to recognize in these 2014 data is that 44 percent of the Minnehaha County resident deaths of children under the age of 18 occurred in the first 28 days of life (neonatal) and some of these occurred within hours of birth. Noted in Table 1 is how the population of Minnehaha County has grown by almost 32 percent between 1990 and 2014. Apparent over this span of time is year-to-year variation in the number of infant and child deaths in the county. However, a comparison of the mean number of deaths for the intervals of 1991 to 2002 and 2003 to 2014 shows a slight decrease. The mean number of annual deaths was 26.6 for the first 12 years of this time interval and 25.3 for the more recent 12 years. In light of the growth of the county’s population, this is an encouraging finding. Though caution must be exercised when calculating rates with the small population base of the RICMRC area, the
2010 to 2013 regional rate of death for infants (birth to age 1) of approximately 4.7 per 1,000 live births is lower than the 2013 national rate of 6.1-2 Alternately, for children (ages 1 to 17), the approximate regional rate of death (25 per 100,000 population) is higher than the 2013 national rate of 20.1-2

In 2014, 25 deaths met the committee’s criteria and all were reviewed (compared to 32 cases in 2013). Of the 25 reviewed cases, 16 were residents of Minnehaha County, four were from Moody County, two each were from Lincoln and Brookings counties, and one was from McCook County.

The reviewed deaths listed below are separated by their manner (natural, accidental, suicide, homicide and undetermined). The number of deaths for 2014 in each manner category is indicated in bold adjacent to its heading. Numbers listed in parentheses represent the comparable number of deaths from 1997 through 2013. Care must be taken in comparing yearly data due to the addition of Lincoln County (1998), Turner County (1999), McCook County (2000), Lake and Moody counties (2001), Union County (2002), Hanson and Miner counties (2003), and Brookings County (2004) in years subsequent to the establishment of the review committee’s work in Minnehaha County in 1997. However, as approximately two-thirds of the reviewed cases since 2005 have been residents of Minnehaha County, some meaningful comparison of data between years is justified.

### Natural Deaths

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<th>15-17 years</th>
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<th>Population</th>
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In total, 11 children died in 2014 from natural causes. Seven of these children died of neuro-developmental conditions that they experienced from birth or early childhood. Three children died of malignancies and one from a rapidly progressing infection.

In 2014, similar to the three previous years, there were no deaths attributable to sudden infant death syndrome (SIDS). There were five deaths of infants, which occurred during sleep, whose manner were coded as “accidental” or “undetermined.”

### Accidental Death

<table>
<thead>
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<th>Year</th>
<th>Infant</th>
<th>1-14 years</th>
<th>15-17 years</th>
<th>Total</th>
<th>Population</th>
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The number of childhood deaths (n=8) caused by accidents in 2014 is comparable to the mean for this manner of death observed in previous years. Four children died in motor vehicle related events. After several years of no accidental deaths involving teen drivers, this trend was broken with three such events. Among these three deaths was one involving alcohol impairment of a teen driver. In all cases involving a crash with a child in a moving vehicle, seat belts were either not used or improperly worn by the deceased.

There was one drowning in 2014 that again occurred in a river in the region. This death highlights the attraction of
local rivers for recreation, but also their dangers, especially when play is unsupervised.

Figure 1 shows the manner of the five deaths of infants that occurred during sleep. Three of these deaths were certified as accidental and two as undetermined. In each of these five cases, the infants were found dead in an unsafe sleep position or environment, and four of these five deaths occurred on a sofa or adult bed. In one case, the infant died in a child care setting that violated legal requirements. For the previous five years (2009-2013), the mean number of infant deaths during sleep has been 3.4, and the five unexpected deaths during sleep in 2014 exceed this mean.

As noted in previous reports, in recent years there has been increasing awareness of the importance of death scene investigation of sudden infant deaths. When hazards are identified in the environments where these deaths occur, their cause is now increasingly identified as accidental, undetermined, or as natural with the cause listed as sudden unexpected infant death (SUID). SUID is a term that began to be used on a Center for Disease Control and Prevention (CDC) investigation form issued in 1996. For SIDS to be identified as a cause of death, it must remain unexplained after a thorough investigation is conducted that includes a complete autopsy, examination of the death scene, and review of the clinical history.

The most recent national data available show that in 2013 the rate of SIDS was 0.397 per 1,000 live births that equates to approximately two deaths per year in the RICMRC 10-county area. As noted in Figure 1, since 2000, only in 2008 has that number of deaths due to SIDS occurred. Nonetheless, the recent annual number of infant deaths during sleep has been fairly consistent and has not been decreasing. This observation demands community attention to the need for public education and action to prevent environmental hazards for safe infant sleep.


Data from 2013 revealed a spike in the number of teen suicides. In 2014 this number decreased to two self-inflicted deaths from the five such deaths observed in the previous year. While this recent number contributes to an affirmation that the 2013 observation did indeed represent a spike, data continue to inform us that if the 2013 national youth suicide rate (1.9 per 100,000 population) is reflected in our region, there would be approximately one suicide per year of a child between the ages of 1 and 17 years. Twice this number was observed in 2014. One of these youth was known to the mental health community and the other event was precipitous.


In 2014, the committee is pleased to report that there were no homicidal deaths in the region. In the past 18 years, this has been only previously observed in 2011. Nonetheless, ongoing vigilance in assessing and responding to familial situations that reveal maltreatment or its risk is critically important for our community.


As described above and presented in Figure 1, there were two deaths of infants that occurred during sleep whose cause was certified as undetermined. In each of these cases, the infant was found dead in an unsafe non-crib sleep environment that may have contributed to the death. In addition, two toddlers died in sleep from un-known causes. One of these toddlers had a neurodevel-opmental condition.

Advocacy Issues

Data from the reviews of the 2014 deaths highlight these actions that health care professionals, community leaders, and citizens may take to prevent future loss of life of infants and children. Issues that are listed with an asterisk...
note those that have been discussed in previous reports and require ongoing attention.

1.* Unexpected infant deaths during sleep occur in unsafe sleep environments. Repeatedly, in its reviews of infant deaths, the committee recognizes that those that are unexpected during sleep are accompanied by hazards in the sleep environment or with the improper placement of the baby when put to sleep. In 2014, similar to 2013, risks to safe sleep were present with each of the five deaths reviewed. The challenge to preventing this loss of life is finding ways of assuring safe sleep environments for infants. This requires both education and the possession and use of a safe crib for every infant.

The committee continues to applaud the televised public service announcements of First Lady Linda Daugaard that demonstrate how babies should be safely placed to sleep. Ongoing education of parents regarding safe sleep at the time of hospital discharge with their newborn must continue. Ease of parental access to these cribs is vital. Assurance of their use requires parental responsibility.

The “Safe to Sleep” campaign initiated by the National Institute of Child Health and Human Development in collaboration with other organizations strives to focus public attention on how a safe sleep environment includes a flat surface free of soft bedding, bumper pads, toys, quilts or other materials. A scan of advertisements in the local newspaper reveals some images of cribs without these hazards. These businesses receive commendation from the committee for their efforts to promote safe sleep for babies. The risk of bed sharing is another issue demanding ongoing public attention. When infants sleep with adults, especially when the adult is impaired by alcohol or other substances, their safety is jeopardized. This message is vital to the safe care and survival of babies.

2.* Proper seatbelt use is vital to survival. Finding ways to assure seat belt use that effectively counters adolescent mentality and risk taking is challenging but critically important. Reminding drivers to take the time to assure that child passengers are not only belted, but properly belted, in a vehicle prior to commencing travel is an important message for public dissemination.

3.* Rivers create safety hazards for the region. Similar to 2013, a 2014 drowning occurred in a river that creates beauty and risks for our region. While education on water safety is of ongoing importance, the challenge is recognizing how these messages compete with the belief of youth in their invulnerability. Community efforts and the watchful eyes and actions of adults near the river offer a potential shield of protection that can be marshaled to provide informal barriers to the hazards posed by area rivers.

4.* Adolescence is a time of vulnerability to social pressures and emotional volatility. The tragedy of suicide presents the need for vigilance in supporting youth with known mental health concerns and assuring that homes do not include access to the means of fatal self-harm. Fire arm safety is needed in all homes. Further, the committee is applauding the statewide efforts in suicide prevention that are funded by the federal Substance Abuse and Mental Health Services Administration. Locally, the Help Line Center is involved in this important effort.

5.* The sleeping environments for all children and adults should be protected by working smoke detectors. Since 2008, eight children’s lives may have been saved by a functioning smoke detector. The committee supports and encourages the ongoing efforts of local fire departments in educating the public about the need for families to install and service smoke detectors to assure their ability to provide life-saving warnings of home fires.

6.* Maternal tobacco and alcohol use are known risk factors for SIDS/SUID. Maternal smoking, both during and after pregnancy, also represents a risk factor for SIDS/SUID. Secondhand smoke is an additional SUID risk factor. Parents should make every effort to restrict the use of alcohol, tobacco, and illicit drugs for the well-being of their infants, both before and after the baby’s birth. We encourage the creation of programs that assist parents in abstaining from tobacco and alcohol use. After adherence to the safe sleep programs for infants, cessation of maternal smoking during and after pregnancy is the next best way to prevent sudden infant deaths.

7.* Care must be taken to assure that all infants and children have periodic physical examinations to detect potentially preventable and treatable illness and immunizations. Vigilance in assuring that infants and children are up to date on immunizations may prevent loss of life from an infectious illness. Encounters with health care providers also provide opportunities for guidance on identifying the signs of illness in infants and young children.
8. * Follow-up activities from the 2011 State Task Force on Infant Mortality convened by South Dakota’s First Lady, Linda Dugaard, include coordination between the state Department of Health, RICMRC and the similar committee that reviews infant deaths in the Rapid City area. These two committees have begun to review infant deaths occurring in counties outside of their regions. The data base established by the National Center for Child Death Review is now being used by the state for recording and analyzing data collected regarding infant deaths. A statewide committee will begin to analyze these reviews of all infant deaths conducted by the state’s committees. Thoughtful review of data enables the development of strategies that are responsive to local causes of death. The state’s ongoing initiation of this effort is encouraged.

9. Implementation of the recommendations of the South Dakota’s Teen Driving Taskforce is encouraged. This taskforce was established during the 2011 legislative session and completed its work in 2013. Its findings on teen driving include recommendations on the age of final licensing, limits on non-relatives in a car with a teen driver, and education for young drivers. The committee applauds this effort to strengthen the preparedness of young drivers.

A final note: Young life is fragile – communities can rally to protect infants and children.

As the committee finishes its 18th year of reviewing childhood deaths, we recognize that the infants born in the year of its inception have now reached the age of majority. Sadly, not all infants born in 1997 have survived and we are reminded of this reality as we examine data on mortality. The stories that are revealed in the numbers representing death often present unfortunate, and at times, preventable circumstances that have ended the lives of our youngest citizens. While parents are children’s most significant protectors, they may be a source of harm or may lack the capacity to assure their children’s survival. Further, there are times when capricious events lead to tragedy. A compelling message from these reviews is the role that communities of caring citizens may play in stepping forward to take protective actions when infants and children are in peril. Further, active citizenship can do much to create expectations of safe environments that may involve public policy initiatives that protect the lives of infants and children.
Thank You!

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Paul Amundson, MD  Chief Medical Officer
Mike Pekas, MD  Associate Medical Director
James Engelbrecht, MD  Associate Medical Director

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MARKETPLACE
Smartphones Enable Teledermatology in South Dakota: An Overview and Primer for Primary Care Providers

By Emily E. Gaster, MS IV; Indy Chabra, MD, PhD; Gene F. Burrish, MD

Abstract
Timely access to specialty care by dermatologists is a significant problem in South Dakota. This is especially germane to patients in rural areas, the elderly, and those with socioeconomic barriers. Implementation of a modality utilizing smartphone technology called mobile teledermatology (MTD) should improve access to dermatologic care. MTD provides location- and time-independent dermatologic care and is currently being used successfully across the U.S. MTD has the potential to benefit both patients and providers in South Dakota; however, barriers to its implementation currently exist. Expanding insurance coverage and reimbursement for teledermatology, facilitating multi-state telemedicine licensure, and educating primary care providers and patients about teledermatology would facilitate widespread utilization of teledermatology in South Dakota. Current legislation addressing licensure may soon come to fruition, making it easier for dermatologists to practice teledermatology across state lines. In addition to pay-for-service, Medicaid is currently the only insurer in South Dakota that reimburses for store-and-forward teledermatology. We propose MTD as an apt solution for enabling prompt access to dermatologic care in South Dakota and emphasize the need for greater insurance coverage, improved licensure policy, and user education to fully realize the benefits of this technology for our patients.

Introduction
Telemedicine is growing as a cost-effective way to provide specialty care in rural South Dakota. A natural extension of telemedicine is to the field of dermatology. Specifically, a subtype of telemedicine called store-and-forward (S&F) teledermatology is an advantageous model since it allows for the delivery of care independent of time or location, and accommodates digital visual images often essential in dermatology. S&F teledermatology allows a primary care provider (PCP) to perform a patient history and physical, capture high-resolution images of a patient’s dermatologic condition at initial presentation, and send this data electronically to a dermatologist for evaluation. The consulting dermatologist can then provide the PCP with management recommendations including the diagnosis, treatment and follow-up plan. This increases the probability of correctly diagnosing a condition at the time of presentation, initiating the most appropriate therapy, and achieving faster resolution while decreasing unnecessary testing and treatments, travel time and expense, waiting time, and patient inconvenience. S&F teledermatology also facilitates appropriate initial triaging of patients and in-person dermatology visits if necessary. Further, S&F teledermatology provides continuity with the patient’s own provider as well as much-needed support for rural PCPs. From the dermatologist’s standpoint, S&F teledermatology has the advantage that patient consultations can be completed at the dermatologist’s schedule without dedicated appointment slots. Finally, S&F teledermatology does not require setting up expensive telemedicine equipment at either the PCP’s or dermatologist’s sites. It can be readily implemented with available mobile technology (smartphones), which should ease clinical application while maintaining adequate patient care. S&F teledermatology utilizing smartphones, or mobile teledermatology (MTD), has the capacity to increase access to dermatologic care in South Dakota by addressing the current geographic, temporal, and socioeconomic barriers between patients and providers. This article will
introduce MTD and discuss its applications in South Dakota. It will also serve as a user's guide for PCPs interested in implementing this technology into their practice by examining the operational needs of MTD and the best methods for obtaining a teleconsultation. Special considerations unique to MTD including licensure, reimbursement, liability, privacy and HIPAA will be discussed.

Background
The main form of telemedicine currently utilized in South Dakota is called live interactive (LI) telemedicine. LI telemedicine uses video-conferencing technology to allow real-time interactions between patients and providers separated across distances. LI telemedicine allows a specialist to take a live, interactive history from either the patient or referring provider and offer immediate treatment recommendations. LI telemedicine is a necessary approach in emergency medicine and critical care where there is an urgent need for rapid feedback. LI telemedicine is also necessary in psychiatry, where the patient interview is invaluable for an appropriate assessment. In contrast, S&F telemedicine, which uses electronic correspondence for transmission of medical information and images, may be better suited for dermatology in the non-emergent setting. S&F telemedicine allows for the transmission of high-resolution digital images often essential for dermatologic evaluation. For this reason, as well as cost, accessibility, and time-based advantages over LI telemedicine, S&F telemedicine is the most frequently practiced form of teledermatology. S&F teledermatology can either take the form of tele-triage, tele-consultation or direct-to-patient telemedicine. S&F tele-triage and tele-consultation involve a PCP collecting medical information and images of a patient's difficult-to-diagnose or challenging-to-treat dermatologic condition and sending this information electronically to a dermatologist at a distant location. After evaluation of the medical information and images, the consulting dermatologist provides management recommendations to the PCP, who in turn communicates these recommendations to the patient and implements the treatment plan. Figure 1 demonstrates the work flow of a typical S&F dermatology tele-consultation (Figure 1). For S&F tele-triage, the consulting dermatologist can determine if the patient needs an in-person dermatology visit and how urgently the patient requires referral (Table 1). An alternative form of S&F teledermatology is direct-to-patient, wherein care is provided directly to the patient. In direct-to-patient S&F teledermatology, a patient creates his or her own consultation by electronically submitting

![Figure 1. Work flow diagram of a typical teledermatology teleconsultation utilizing mobile devices (smartphones). Diagram adapted from Caroline Nelson found on AAD Teledermatology Resources Webpage.](image-url)
Table 1. Live Interactive (LI) vs. Store-and-Forward (S&F) Teledermatology

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<td>Stored electronic correspondence</td>
<td>Triage, consults, follow-up</td>
<td>PCP</td>
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Table 2. Types of Store-and-Forward (S&F) Teledermatology

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<thead>
<tr>
<th>Type of S&amp;F Teledermatology</th>
<th>Type of Care</th>
<th>Who Creates Consultation?</th>
<th>Who Provides Care?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triage/Consultation</td>
<td>Triage, outpatient and hospital consults, follow-up</td>
<td>PCP</td>
<td>PCP</td>
</tr>
<tr>
<td>Direct-to-patient</td>
<td>Triage, outpatient consults, follow-up</td>
<td>Patient</td>
<td>Dermatologist</td>
</tr>
</tbody>
</table>

Table 3. Pros and Cons of Live Interactive (LI) and Store-and-Forward (S&F) Teledermatology

<table>
<thead>
<tr>
<th></th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live Interactive (LI) Teledermatology</td>
<td>Instant feedback</td>
<td>Requires specialized equipment, maintenance, and training (higher cost infrastructure)</td>
</tr>
<tr>
<td></td>
<td>Direct interaction with dermatologist</td>
<td>Requires scheduled appointment</td>
</tr>
<tr>
<td></td>
<td>Better coverage/reimbursement options</td>
<td>Requires dermatologist to be immediately available</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Longer patient encounter</td>
</tr>
<tr>
<td>Store-and-Forward (S&amp;F) Teledermatology</td>
<td>Low cost infrastructure</td>
<td>Delayed feedback</td>
</tr>
<tr>
<td></td>
<td>Does not require specialized equipment or intensive training</td>
<td>No direct interaction</td>
</tr>
<tr>
<td></td>
<td>No appointment necessary</td>
<td>Coverage/reimbursement issues</td>
</tr>
<tr>
<td></td>
<td>Dermatologist does not have to be immediately available</td>
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<tr>
<td></td>
<td>Reduced time investment</td>
<td></td>
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<tr>
<td></td>
<td>Allows follow-up with patient’s PCP</td>
<td></td>
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<tr>
<td></td>
<td>Education for PCPs</td>
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</tr>
</tbody>
</table>

self-acquired images and medical information to a dermatologist. The dermatologist then provides treatment recommendations directly to the patient through electronic correspondence (Table 2).

Compared to LI telemedicine, S&F technology utilizes readily available, less expensive, user-friendly equipment such as mobile phones, digital cameras, and computers. No appointment is required, since the consultation is submitted at the convenience of the provider or the patient and the response time can be same day or next day. S&F teledermatology can be used for triage, diagnosis, development of a treatment plan and providing follow-up care or monitoring (Table 3).

Smartphone-driven teledermatology, or mobile teledermatology (MTD), has the convenience of portability, requires no additional downloading of images onto a computer, and many health care professionals and patients are already familiar with the use of smartphones. Furthermore, the creation of smartphones with high-resolution digital cameras offers improved image quality suitable for clinical applications. MTD utilizing smartphones has been found to have good diagnostic accuracy and management concordance compared with face-to-face consults across all diagnostic categories, including skin cancer screening. Preliminary studies have also demonstrated MTD as a practical and efficacious method.
for follow-up of high-need acne treatment and management of psoriasis. MTD may also have the potential for improved primary diagnosis of rashes that wax and wane or evolve from initial presentation.

Significance for Patients and Providers in South Dakota
Implementation of MTD would increase access to care for South Dakota residents by addressing current geographic, time-based, and socioeconomic barriers. Dermatologists are in demand in South Dakota with a total of 34 practitioners providing for a population exceeding 840,000. Dermatologists are also distributed unevenly across the state and concentrated in higher-density areas including Sioux Falls and Rapid City. Patients in rural or remote areas may at times drive several hundred miles to see a dermatologist. This can become especially problematic when patients require frequent monitoring or prompt evaluation. Furthermore, elderly patients often require a family member to drive them to an appointment, while patients in rural nursing facilities and hospitals are likely foregoing expert dermatologic care. In addition to geographical isolation, protracted wait times can hinder access to dermatologic care at time of need. The average wait time, determined via telephone survey, for establishing care with a dermatologist in South Dakota is 5.5 weeks. This is concerning as timely intervention is important for accurate diagnosis and appropriate treatment of many dermatologic conditions. Socioeconomic factors may also preclude access to care for some patients. MTD can reduce travel expenditure for patients that reside in rural areas and allow them to receive care from their local PCP’s office or from home. Because no appointments are necessary for MTD and response time can be same day or next day, MTD has the capacity to decrease wait times and thereby shorten time to intervention for patients. South Dakota Medicaid beneficiaries and patients without medical insurance seen at community clinics may be a special population that could benefit from MTD technology. Currently, South Dakota is one of only seven states that reimburses providers at both ends of S&F technology for Medicaid beneficiaries. Under served patients in South Dakota may also benefit from implementation of a free MTD consultative service called AccessDerm that is available for PCPs and their patients in eligible community clinics. AccessDerm is an American Academy of Dermatology-sponsored MTD program where dermatologists provide free recommendations to PCPs caring for underserved populations in their own state. AccessDerm is currently being used successfully in 16 states, but has not been implemented yet in South Dakota.

For PCPs, utilizing MTD is accessible and time-efficient, as many PCPs already own smartphones and creation of a consultation on average only adds four minutes to a typical office visit. Further, MTD can accelerate feedback from the consulting dermatologist and allow the PCP to better meet the needs of his or her patients. There is limited exposure to dermatology in medical school and even less exposure in mid-level practitioner (PA, NP) education. MTD could serve as an educational tool for PCPs and mid-level practitioners interested in gaining further knowledge in diagnosis and management of dermatologic conditions. In time, MTD consultations may allow PCPs to become comfortable and proficient managing various skin conditions independently. In a recent study, all PCPs who tried teledermatology reported an interest in reusing the technology.

For dermatologists, MTD allows for the delivery of care independent of time or location. MTD also has low cost infrastructure and offers the potential to better match the needs of their referral area. The convenience of MTD makes it possible for dermatologists to participate in outreach services needed in rural or underserved medical communities currently lacking access to specialty care.

Significance for Employers
In addition to offering potential benefits for patients and providers in South Dakota, implementation of MTD and other mobile telemedicine services may have a broader impact on businesses and insurers in the state. Employer and insurance expansion of health care coverage for teledermatology would realize cost savings by reducing time away from work for traditional appointments. Several national businesses report substantial savings after increasing coverage of mobile telemedicine services for employees. After allowing their employees to seek care via telemedicine, companies such as Rent-A-Center and Penske Truck Leasing report a $1.3 million savings over a two-year period and a $300,000 savings over a one-year period, respectively. According to a recent survey, shifts in health care coverage of telemedicine services could potentially save U.S. companies $6 billion annually.

Operational Needs and Imaging Methods
The only required equipment for MTD includes a smartphone with a high-resolution camera and a secure, HIPAA-compliant method for transmission of medical information and clinical images. The American Telemedicine Association (ATA) recommends a digital
camera with a minimal resolution of 800 x 600 pixels, although resolutions of 1024 x 768 pixels (or 0.8 megapixels) or greater are favored and may help improve diagnostic accuracy. Most available smartphones have built-in cameras that exceed these specifications. Transmission of patient data, including images, patient history, and physical exam information, can be sent securely via encrypted email, multimedia messaging service (MMS), or via downloadable applications (apps) for smartphones. Current data suggests that secure transmission of patient information sent by smartphones may be an issue when physicians are not using specialized apps designed for this purpose. Therefore, use of available MTD apps for smartphones that allow the HIPAA-compliant transmission of information and coordination with the consulting dermatologist may be a convenient, straightforward solution to this issue. Although not required, a ruler, image stabilizer, and a pocket dermatoscope can be used by the examining PCP. A dermatoscope can be applied to the camera lens on the smartphone to obtain teledermoscopy images that may improve evaluation of certain malignant skin lesions.

The referring provider needs minimal training in order to capture adequate clinical images. However, care should be taken when obtaining photographs as poor image quality could compromise the ability of the teledermatologist to make a clinical decision and increase the likelihood for a referral. The ATA and American Academy of Dermatology (AAD) offer information on the best methods to photograph skin lesions including instructions for obtaining additional images depending on what areas of the body are involved. The following imaging instructions were obtained from the AAD Teledermatology Resources webpage and the ATA Quick Guides for Store-and-Forward Teledermatology:

1. First, the imager should find an area with diffuse, indirect lighting and a solid neutral color for the background.

2. Next, the involved area on the patient should be exposed and any distracting clothing or jewelry removed. For hair-bearing areas, tape can be used to separate hair and to better reveal the underlying skin condition.

3. Ideally, the imager should obtain several photographs of the involved areas including a far away view, a medium view, and a close-up view. The far away view should contain the entire body with the obvious skin lesion pictured. Next, the medium view should contain the involved lesion area while also including an anatomical landmark for a reference point such as the hand or navel. Finally, a close-up view should contain only the lesion and be captured using the “macro” (flower image) setting or optimal zoom.

4. Flash can be used in certain circumstances to eliminate shadows, but should not be too close to cause “white-out” of the image.

5. Complimentary views may be helpful to accentuate differences in lesional versus uninvolved skin, asymmetry or scope of involvement.

Interested PCPs can access the AAD Teledermatology Resources webpage and ATA Quick Guides for Store-and-Forward Teledermatology online for further information on complementary views and imaging recommendations.

**Special Considerations**

The unique infrastructure of MTD requires consideration of provider licensure, liability coverage, reimbursement and patient confidentiality. As telemedicine gains ground in South Dakota and the U.S., these aspects may be changing as legislation changes.

**Licensure:** Dermatologists should consider credentialing when his or her service area crosses state lines. Specialists who utilize S&F technology are considered consultants by The Joint Commission and therefore may be able to provide care to patients in states where they are not licensed. However, most states require the specialist to be licensed in the same state where the patient is seen by the PCP, even when the specialist acts as a consultant. New legislation created by the Federation of State Medical Boards called the Interstate Medical Licensure Compact could soon simplify and accelerate licensing for physicians seeking to practice telemedicine in multiple states. The Interstate Medical Licensure Compact could enable the practice of telemedicine across state lines by qualified physicians and allow greater access to care for underserved populations in participating states.

**Liability:** Establishing a physician-patient relationship in a telemedicine encounter creates liability similar to that of an in-office encounter. In tele-triage and tele-consultation forms of MTD, since a treatment plan is recommended by a consulting teledermatologist and implemented by a PCP, both providers would be liable. By contrast, in direct-to-patient teledermatology, the teledermatologist is primarily liable. Further, teledermatologists participating in direct-
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<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Topic</th>
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<tbody>
<tr>
<td>September 8, 2015</td>
<td>7 p.m. CT</td>
<td>Tips, Tricks and Steps to Take to Avoid a Malpractice Lawsuit</td>
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<tr>
<td>December 8, 2015</td>
<td>7 p.m. CT</td>
<td>Underwriting Considerations in Medical Malpractice Insurance</td>
</tr>
<tr>
<td>March 8, 2016</td>
<td>7 p.m. CT</td>
<td>Apology and Communication in Medicine</td>
</tr>
<tr>
<td>June 14, 2016</td>
<td>7 p.m. CT</td>
<td>Anatomy of a Medical Malpractice Lawsuit</td>
</tr>
<tr>
<td>September 13, 2016</td>
<td>7 p.m. CT</td>
<td>Physician Resiliency – Healing the Healer</td>
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The USDSSOM designates this live activity for a maximum of 1 AMA PRA Category I Credit(s). Physicians should claim only the credit commensurate with the extent of their participation in the activity.

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to-patient teledermatology are responsible for recommending appropriate patient follow-up similar to in-office encounters. Dermatologists can verify with their medical liability insurance carrier if their policy covers teledermatology services.

Coverage/reimbursement: Coverage and reimbursement policies affect patients, the teledermatologist, and the PCP. We investigated coverage and reimbursement information for S&F telemedicine by the main insurers in South Dakota including Avera Health, Dakotacare, Sanford Health, Wellmark, and Medicaid/Medicare. Among these providers, only Medicaid provides coverage and reimbursement for S&F teledermatology. Currently, South Dakota is only one of seven states that reimburses providers at both ends of S&F technology for Medicaid beneficiaries. Coverage of telemedicine consultations is treated like any other consultation service, however, the GT modifier is needed for S&F reimbursement. SD Medicaid only covers consultative teledermatology, while patients can self-pay for direct-to-patient teledermatology.

Privacy/confidentiality: HIPAA compliance is critical for the entire teledermatology encounter. The referring provider must obtain informed consent from the patient, acknowledging their information will be sent electronically to a dermatologist for consultation, and make available the HIPAA notice of privacy practices. Patient images and information should also be encrypted, whether sent via MMS, email, or via downloadable apps for smartphones. Protection of patient privacy may be more easily achieved when clinical images and medical history are sent using special MTD apps created for smartphones. Smartphones and computers should also contain password-guarded entry into patient information.

Conclusions
Great progress has been made since 1973 when engineer Jack Nilles originated the idea of “telecommute” or “telework” to describe using technology to work remotely. Today, advances in technology like smartphone-driven teledermatology (MTD) enable access to prompt, expert, and cost-effective dermatologic care without delay or travel. With successful service models employed worldwide, MTD implementation in South Dakota is a promising approach to address our state’s need for dermatologic care. Expanding insurance coverage for store-and-forward teledermatology, increasing patient and provider awareness, and allowing for telemedicine licensure across state lines would greatly foster MTD utilization in South Dakota.
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Pediatric Traumatic Brain Injury

By Alexandra L. Schaller, DO; Saquib A. Lakhani, MD, FAAP; and Benson S. Hsu, MD, MBA, FAAP

Abstract
The purpose of this article is to provide a better understanding of pediatric traumatic brain injury and its management. Within the pediatric age group, ages 1 to 19, injuries are the number one cause of death with traumatic brain injury being involved in almost 50 percent of these cases. This, along with the fact that the medical system spends over $1 billion annually on pediatric traumatic brain injury, makes this issue both timely and relevant to health care providers. Over the course of this article the epidemiology, physiology, pathophysiology, and treatment of pediatric traumatic brain injury will be explored. Emphasis will be placed on the role of the early responder and the immediate interventions that should be considered and/or performed. The management discussed in this article follows the most recent recommendations from the 2012 edition of the Guidelines for the Acute Medical Management of Severe Traumatic Brain Injury in Infants, Children, and Adolescents. Despite the focus of this article, it is important not to lose sight of the fact that an ounce of prevention is worth a pound – or, to be more precise and use the average human’s brain measurements, just above three pounds – of cure.

Introduction
Primary care providers dedicate a substantial amount of time giving anticipatory guidance to prevent pediatric head injuries. Despite these efforts, approximately 60,000 pediatric patients are hospitalized every year due to traumatic brain injury (TBI). The sequelae of pediatric TBI are extremely variable, ranging from short-term neurologic deficits to death. Time is of the essence when it comes to limiting the medical and socioeconomic impact of these potentially devastating injuries, and across South Dakota’s vast rural landscape, it is often local medical providers who find themselves initiating the crucial first steps.

Improvement in outcomes is possible through rapid and accurate initial assessments, proper triaging of patients, early risk stratification, and appropriate treatment. This review article will explore the epidemiology, physiology, pathophysiology and management of pediatric traumatic brain injury, with a focus on early provider response.

Epidemiology
Over 1.4 million Americans are diagnosed with head trauma each year, leading to 235,000 hospitalizations and 50,000 deaths. Emergency departments see over 600,000 visits associated with pediatric head trauma annually, resulting in 60,000 hospitalizations and 7,000 deaths. The annual incidence for pediatric TBI hospitalizations is 70 per 100,000, with males (65.3 percent) and adolescents age 15 to 17 (30.1 percent) predominating (Table 1). Falls are the primary cause of TBI in the pediatric population; however, as the age of the patient increases, the mechanisms of injury diversifies. 72.8 percent of TBIs in the age group 0 to 4 occur due to falls, whereas 35.1 percent in the 5 to 14 age range occur due to falls and 34.9 percent occur due to being struck by or against an object. Despite these staggering numbers, there has been a downward trend in TBI-related hospitalizations. In the 0 to 4 age range, TBI-related hospitalizations have decreased from 70.3 per 100,000 in 2001 to 57.7 per 100,000 by 2010. The 5 to 14 age group has seen the largest decline in hospitalizations from 54.5 per 100,000 in 2001 to 23.1 per 100,000 in 2010. This trend persists through adolescents decreasing...

<table>
<thead>
<tr>
<th>Table 1. Common Causes of Pediatric TBI</th>
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<tbody>
<tr>
<td>Motor vehicle accident</td>
</tr>
<tr>
<td>Non-accidental trauma</td>
</tr>
<tr>
<td>Falls</td>
</tr>
<tr>
<td>Assault/violence</td>
</tr>
<tr>
<td>Sports injury</td>
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<td>Unknown</td>
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form 104.1 per 100,000 in 2001 to 81.2 per 100,000 in 2010.4

Trauma is the primary cause of deaths from ages 1 to 19, with half of those accidents involving traumatic brain injury.1 Of those who suffer moderate to severe traumatic brain injury 50.6 have unfavorable six-month outcomes and an estimated 20 percent mortality rate.5 The primary cause of TBI deaths is different between age groups. In ages 0 to 4, assaults are the cause of 42.9 percent of deaths followed by motor vehicle accidents at 29.2 percent.4 The mechanism of injury leading to death changes between ages 5 and 14 with motor vehicle accidents related to 55.8 percent.4 Moderate to severe traumatic brain injury has a 20 percent mortality rate.

Health care costs for pediatric TBI exceed $1 billion annually, making it the fifth most expensive pediatric diagnosis.3,4 An average hospitalization lasts 4.5 days and results in over $20,000 in charges, with the longest length of stay and highest charges incurred by patients 15 to 17 years of age.3 Those that die have both the shortest length of stay and the highest total cost of hospitalization.3

Pathophysiology

Nerve cell injury is ultimately what is to blame for the evolving sequelae that result from TBI. The role of a neuron is to send information through electrical signals to the rest of the body.6 When these cells are damaged the body loses its ability to coordinate and transmit the appropriate signals in the nervous system. Injury to these cells occurs in two stages. The primary stage is irreversible, stemming from the force of the initial impact. The secondary stage, however, is influenced by management, as it depends on the progression of neuronal injury. If interventions are not employed, cell death will occur through two mechanisms: necrosis or apoptosis.6

Primary Injury

Primary injury from the initial impact results in immediate neuronal death, known as necrosis, through the sudden and unexpected rupture of the nerve cell. The intracellular contents flood out into the extracellular space and often lead to local inflammation due to the potent nature of the substances within the cell.6 The physical impact itself can create fractures and bleeds at various levels. In addition to injury caused by the impact of brain tissue against the cranial vault, there may be the traumatic introduction of objects, bullets or skull fragments.

Skull fractures from impact can be very serious. Particularly concerning injuries that may require immediate intervention include basilar and depressed/displaced fractures. Battle’s sign (bruising around the mastoid process) and/or raccoon eyes (periorbital ecchymosis) are characteristic of basilar skull fractures.1 Due to the risk of cerebrospinal
fluid leak, meningitis occurs in 2 to 9 percent of these fracture cases.7

Direct impact also leads to bleeds within and around the brain; these include epidural and subdural hematomas as well as subarachnoid bleeding. Epidural hematomas occur from the tearing of meningeal arteries located directly beneath the bones and are commonly associated with blunt trauma.7 Subdural hematomas result from the tearing of the bridging veins, directly below the meningeal layer and are typically found with acceleration/deceleration injuries.7 Subarachnoid bleeds, usually from a direct blow to the head, occur from damage to the small vessels in the space between the arachnoid membrane and the pia mater that covers the brain7 (Figure 1A and 1B, Figure 2, Figure 3A and 3B).

Secondary Injury
As time elapses, damage within the brain progresses and primary injury advances to secondary injury. Due to derangements in normal brain physiology autoregulation fails and the usual compensatory mechanisms cease to react due to changes in the cellular environment. These injuries continue to progress if interventions are not taken. An appreciation of normal brain physiology is therefore crucial to understanding how secondary injury transpires and where interventions can be taken to stop progression.
Cerebral blood flow (CBF), like systemic flow, is affected by changes in vascular resistance and blood viscosity. Cerebral blood flow also changes based on the metabolic needs of the local tissue bed. Poiseuille’s Law describes the relationship between blood flow and resistance, using three changing variables: vessel diameter, vessel length, and blood viscosity. Higher resistance, and therefore reduced flow, occurs with small vessel diameter, longer lengths, and higher viscosity. Vascular diameter can be altered locally by autoregulation mechanisms reacting to changes in pH, hypoxia, and various signaling molecules. For instance, acidosis within cerebral vascular beds leads to localized vasodilatation whereas alkalosis leads to vasoconstriction.

Nitric oxide, cyclic guanosine monophosphate, and cyclic adenosine monophosphate exist as potent vasodilators that work with endothelin-1, a potent vasoconstrictor, to regulate cerebral blood flow. Evolving traumatic brain injury disrupts these vasodilatory and vasoconstrictive signaling pathways. When molecules fail to produce the appropriate vascular response, the consequence is injured and edematous areas that do not receive increased blood flow and thus become ischemic.

Cerebral perfusion pressure (CPP) is the mean arterial pressure (MAP) minus intracranial pressure (ICP). It is used as an indirect measurement of cerebral blood flow and oxygenation. An increase in ICP will lead to a concurrent decrease in CPP when MAP remains unchanged. When cerebral perfusion pressure becomes too low, cerebral blood flow will become static and anoxic injury will occur. While data attempting to uncover an optimum CPP in TBI has been inconclusive to date, mortality has been shown to dramatically increase when CPP is below 40 mm Hg. Current pediatric guidelines recommend maintaining CPP between 40 and 60 mm Hg.

The impact of the loss of cerebral blood flow is multifactorial. The dynamic relationship between MAP and ICP necessary to maintain appropriate CPP cannot be preserved when there is a loss of cerebral blood flow, creating more localized ischemia. As the injured brain becomes ischemic it is forced to rely heavily on inefficient anaerobic glycolysis to produce adenosine triphosphate (ATP). Unfortunately, anaerobic metabolism also creates lactic acid. The change in pH and lack of sufficient ATP disrupt proper enzymatic folding and function. The ATP deficient state leads to failure of ATP-dependent pumps and, ultimately, to apoptosis or programmed cell death. Thus, treatment is aimed at maintaining CPP, minimizing continued ischemia, and maximizing survival of neuronal cells.

Cerebral edema is the result of three different mechanisms seen as secondary injury evolves. First, edema can develop because of hypoperfusion, ischemia, and apoptosis. Additionally, if the brain is unable to maintain a cohesive blood brain barrier due to the initial trauma, vasogenic edema results secondary to vascular leak from capillaries. Finally, swelling can evolve from the release of glutamate that occurs with disruption of astrocytes known as cytogenic edema. Neurons swell because glutamate alters the distribution of sodium. All these mechanisms of brain edema, compounded by autoregulatory failure, lead to increasing intracranial pressure. Not only can this decrease CPP, it can also cause downward displacement of the brain parenchyma and herniation.

The Monro-Kellie doctrine describes the brain as a closed space, with a fixed combined volume consisting of brain matter, cerebrospinal fluid, and blood. If one of these three components increases, the other two are forced to compensate by decreasing. Small changes are well tolerated under normal physiological conditions secondary to compensatory mechanisms. Once intracranial pressure exceeds around 20 mm Hg, these innate mechanisms begin to fail, and any further increase in overall volume within fixed intracranial space may lead to herniation.

Herniation is the process by which the components of the brain are displaced across suture lines as a result of intracranial pressure exceeding the limit allowed by the closed compartment of the brain. This occurs at four anatomical locations: the supratentorium, tentorium cerebelli, falx cerebrum, and foramen magnum. Herniation at these locations can have different consequences ranging from cranial nerve compression to severe cardiovascular and respiratory decompensation.

Management
Evidence-based guidelines exist for the treatment of TBI in the pediatric population. The most recent recommendations are from the 2012 edition of the Guidelines for the Acute Medical Management of Severe Traumatic Brain Injury in Infants, Children, and Adolescents. This section will explore these recommendations, with emphasis on the role of front line providers in management. (Table 2-3)

Imaging
The 2012 recommendations recognize the need for acute
computed tomography (CT) imaging in the presence of mental status change or concern for increasing ICP. CT can help visualize the areas where blood has accumulated, identify the severity of edema, and show ischemic changes. While initial CT scan can be useful, the guidelines recommend avoiding routine scans in the absence of clinical indicators such as altered mental status or visible signs of head injury.⁰¹

**Treatment**

Evaluation to determine the need for endotracheal intubation is multifactorial and can include the use of the Glasgow Coma Scale (GCS). A GCS less than 8 is an absolute indication for immediate intubation.⁰¹ This score indicates that the patient has impaired consciousness and a high likelihood of being unable to protect their airway. Intubation should be performed following rapid-sequence induction as this ensures quick and sufficient control of an airway that is compromised.⁰¹ Intubation provides several benefits in addition to the crucial task of protecting the airway. For one, sedation can decrease the metabolic demands of the brain. Secondly, if herniation is imminent, hyperventilation can more easily be performed (see below).⁰¹

Deciding on a sedative is based on clinical discretion, but the guidelines warn in particular against the use of etomidate due to adrenal suppression and propofol due to the impact on systemic blood pressure and thereby cerebral perfusion pressure. If the patient is hemodynamically unstable, fentanyl, lidocaine, and rocuronium are useful. In the case of a hemodynamically stable patient, fentanyl, lidocaine, midazolam, and rocuronium can be used, as can the combination of thiopental, lidocaine, and rocuronium. Thiopental is a useful alternative as it can help to decrease the metabolic demands of the brain.⁰¹

Initial treatment should focus on interventions that can prevent a rise in ICP and ultimately minimize further ischemia. Performing a clinical evaluation to identify mental status or pupillary changes can determine if urgent interventions are needed. Fixed, dilated, and poorly reactive pupils are obvious signs of herniation. In some cases, hyperventilation in unresponsive or intubated patients can be an important rapid intervention. Hyperventilation lowers the serum carbon dioxide, causing vasoconstriction of the cerebral vasculature through alkalosis, reducing CBF, and decreasing ICP.⁰¹ Although the guidelines recommend against the use of prophylactic hyperventilation since it reduces CBF and may lead to further ischemia, this therapy can be useful as a temporizing measure in the presence of impending herniation.⁰¹

Overall treatment of elevated ICP revolves around the use of hyperosmolar therapy. Based on the 2012 guidelines, 3 percent hypertonic saline is recommended in the dose range of 6.5 to 10 ml/kg for hyperosmolar therapy.⁰¹ This works, under normal brain physiology, by driving up plasma osmolarity and creating an osmolar gradient to decrease fluid in the cranial space. Additionally, a continuous infusion of 3 percent hypertonic saline may also be useful at rates titrated between 0.1 to 1 ml/kg/hr to maintain ICP less than 20 mm Hg. The guidelines recommend monitoring of therapy to maintain serum osmolarity below 360 mOsm/L. Mannitol is commonly used in the resuscitation of TBI patients as it leads to osmotic diuresis from the brain, but no studies have been done to evaluate this strategy in the pediatric population. Of note, during volume resuscitation, a foley catheter should be placed to avoid the risk of bladder rupture.⁰¹

The use of temperature regulation has been hotly debated in recent years. The official 2012 guidelines do recommend introduction of hypothermia within eight hours of injury to 32 to 33 degrees Celsius for greater than 24 hours. Rewarming should occur no faster than 0.5 C / hour.⁰¹ Hypothermia decreases the metabolic demands of the brain, and may reduce inflammation, cell death and acute seizures. However, it is important to note that existing literature on the topic is inconclusive, particularly in the pediatric literature. A key, universally accepted goal, however, is the absolute avoidance of fever in traumatic brain injury.⁰¹
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The USERISON designates this live activity for a maximum of 1 AMA PRA Category 1 Credit(s). Physicians should claim only the credit commensurate with the extent of their participation in the activity.

This educational series will help physicians and their respective advisors identify and address the unique challenges employment can present to professionalism and the practice of medicine, providing guidance on how to negotiate with potential employers and to develop an optimum employment agreement.

Register at [www.sdsma.org](http://www.sdsma.org) or 605.336.1965

Brought to you in partnership with the American Medical Association
The use of anti-seizure prophylaxis is not officially recommended in the 2012 guidelines. However, due to the lower seizure thresholds within the pediatric population, the use of anti-seizure prophylaxis should be considered in cases of depressed skull fracture, GCS less than 10, subdural/epidural, cerebral contusion, retained bone or debris, penetrating trauma or focal deficits.11

Finally, steroid therapy and nutritional support, previously considered viable, are no longer encouraged. Steroids work to improve vascular permeability, stimulate angiogenesis, and decrease swelling/edema; however studies have not shown improvement in outcomes with the use of steroids and steroids have been found to be associated with infectious complications.10 Aggressive nutritional support may be necessary to meet metabolic demand and help in recovery. Studies have shown that glycemic control has been associated with positive outcomes. However, there is insufficient data within the TBI population to support this. Thus, the 2012 guidelines recommend against the use of either steroids or specific nutritional support.11

Monitoring
These following recommendations have limited utility for the immediate responder due to the need for invasive monitoring placement. However, a basic understanding of the thresholds for interventions may be helpful in further management. The guidelines recommend treatment to decrease ICP when it is persistently greater than 20 mm Hg.11 Prior studies show 100 percent mortality across all ages when ICP is greater than 40 mm Hg, though it does allow for brief periods above this threshold.11 Hemodynamic monitoring using an arterial catheter is also recommended, allowing for calculations of CPP (MAP-ICP), with the goal of maintaining it at least above 40 mm Hg.11 It is vital to keep in mind that there is more flexibility with CPP than with ICP and that ideal values may be age related. Finally, advanced monitoring systems that provide direct brain tissue oxygenation markers may be useful. If these devices are present, the recommended goal is to keep partial pressure of brain tissue oxygen (PbtO2) greater than 10 mm Hg.11

Advanced Therapies
Should patients be refractory to above interventions, advanced therapies within the pediatric intensive care setting can be expanded to include barbiturates, decompressive craniectomy, and cerebrospinal fluid drainage.11 Barbiturates work to decrease ICP, decreasing metabolic demand and causing vasoconstriction leading to lower CBF and decreased ICP. Decompressive craniectomy can be useful when medical therapy has failed. This surgery subverts Monro-Kellie by opening up the closed space around the brain. This is recommended in the presence of early signs of deterioration, herniation, or intractable intracranial hypertension. Cerebrospinal fluid drainage is another mechanism of decreasing ICP by decreasing volume in the cranial space and can be considered when managing severe TBI.11

Conclusion
Over the last 20 years, thanks to the advances in knowledge and treatment described above, fatalities associated with moderate to severe traumatic brain injury have decreased dramatically.1 Appropriate evaluation and treatment should be based on an understanding of the physiology, the pathophysiology, and on current guidelines. Primary care providers can feel empowered to know that rapid interventions can have a significant positive impact on clinical outcome. All providers, however, must keep in mind that the ultimate goal in the pediatric population should always be prevention of injury, and feel a renewed drive to continue their daily work of encouraging the use of helmets, seat belts and other preventative equipment. When it comes to traumatic brain injury, an ounce of prevention is worth a pound – or, to be more precise and use the average human’s brain measurements, just above three pounds – of cure.
The use of antipsychotic agents in nursing homes has been scrutinized since the 1987 Nursing Home Reform Act. Over this timeframe a variety of approaches were implemented to reduce antipsychotic use, and rates have fluctuated greatly. Recently, concern regarding antipsychotic use has increased due to high levels of antipsychotic prescribing in nursing homes; data showing increased morbidity and mortality with antipsychotic medication use in the elderly dementia population; frequent use of these agents outside of the Centers for Medicare and Medicaid Services (CMS) standards; prescription use for non-FDA labeled indications; and the high cost of these agents.

National Efforts to Reduce Use

In May 2012, a partnership including federal and state agencies, providers and stakeholders was formed with the goal of reducing antipsychotic medications by 15 percent by the end of the year. Since the partnership formed, a number of national initiatives have been implemented. In July 2012, antipsychotic quality measures were added to the Nursing Home Compare website to provide public reporting of antipsychotic use data. Specifically two measures were added (short stay and long stay residents who received an antipsychotic medication) to 16 existing measures. Another major effort involved the distribution of the Hand-in-Hand Training Series Toolkit to all nursing homes in the U.S. in the fall of 2012. The materials focused on direct care providers and included six one-hour videos covering aspects such as consistent assignment and team involvement. The CMS State Operations Manual (SOM) appendix P was revised in May of 2013 and resulted in a narrowing of behavioral criteria justifying antipsychotic medication use. In September 2014 the partnership established a new goal to reduce use by 25 percent at the end of 2015 and 30 percent by the end of 2016 (baseline level – fourth quarter 2011). Most recently in February 2015, the calculation of the Overall Nursing Home Star Rating (composite score) on the Nursing Home Compare website was revised to include the two antipsychotic measures. Specifically, 11 quality measures are used to create the quality measure (QM) star rating and extremes in the QM rating (1-star or 5-star) raise or lower the overall nursing home star rating by one star.

Trends in Antipsychotic Agent Use

As shown in Figure 1, the percentage of residents in nursing homes prescribed antipsychotic medications has continued to decline since May 2012 when the partnership was formed. The figure also contains the timeline of select interventions involving survey processes, public reporting of data, and staff training. While attribution cannot be determined, the distribution of interventions and data trends offer an interesting perspective on events.

Impact of Efforts to Reduce Antipsychotic Agent Use

A recent study examined changes in nursing home practices based on the perceptions of 320 state nursing home surveyors in the spring of 2013 following announcement of the partnership to reduce antipsychotic medication use. The study found that while over 60 percent of surveyors reported improvements in care, more than 30 percent had not observed improvement in the areas of care planning, participation of resident/family in antipsychotic use decisions, and assessment of residents. While multiple variables may have influenced surveyors’ perspective (e.g., agency culture, surveying methodology), these results highlight perceived positive effects but emphasize the concern that remains regarding care practices.

Limited scientific evidence exists on successful practices in nursing homes to reduce antipsychotic use. Recently a systematic review examined 22 studies involving 19,300 residents. These studies were published over a 28-year period, demonstrating the scarcity of quality information. Approaches were categorized as educational programs (11 studies), in-reach programs characterized as multidisciplinary teams working with the staff (two), medication review (four), and combination modalities (five). The largest change compared to control was found in a study examining medication reviews by pharmacists with specific training (i.e., 20 percent use rate in the intervention group versus 50 percent in the control group). Overall, 17 of 22 studies reported positive results.

Behaviors or psychological symptoms of dementia (BPSD) are often reasons given for the use of antipsychotic agents. In order to adequately manage these behaviors, health care providers must carefully address underlying causes because research suggests these behaviors are manifesta-
tions of an unmet need due to the resident’s inability to convey an issue or concern. An excellent review of 33 randomized, controlled design studies of interventions to reduce agitation identified effective approaches including resident centered care and staff training on communication with residents having dementia. Conversely, light therapy and aromatherapy were not shown to be effective in reducing behaviors. Assessment of behavioral causes, implementation of interventions, and evaluation of subsequent success are critical steps in managing behaviors associated with dementia.

Resources to Guide Practice

While high-quality research focused on documenting the impact of effective approaches to reduce antipsychotic medication use is limited, multiple resources are available to help caregivers gain ideas for improvement. For example, the Advancing Excellence in America’s Nursing Home website www.nhqualitycampaign.org/dementiaCare.aspx contains a wide range of high quality resources from those specifically focused on physicians’ needs to training materials for staff. Similarly, the Iowa Geriatric Education Center has a compilation of useful materials. In addition, best practice reports can also be used to spur innovation. Description of successful practices have been published and presented via webinars available at www.cms.gov/Oppi/Outreach-and-Education/Outreach/NPC/National-Provider-Call-and-Events/2015-06-16-Dementia.html?DLPage=2&DLEntries=10&DLSort=0&DLSortDir=descending.

Summary

Consensus exists regarding the need to reduce antipsychotic medication use in nursing homes, multiple initiatives have been implemented with the intent to achieve this goal, and progress is being made. While limited high quality research is available documenting the impact of various approaches, resource tool kits and best practice descriptions can help guide efforts.

REFERENCES


About the Author:
Jane R. Mort, PharmD, Associate Dean for Academic Programs; Professor of Pharmacy Practice, College of Pharmacy, South Dakota State University.
Phantoms and ghosts are apparitions of spirits not real, and yet there is scientific support for such haunting and mysterious visions.

Start with the human brain, the control center, receiving signals from five senses, and re-directing them through memory circuits, weighing and processing thoughts, and then creating new out-going signals for muscle contraction to send a basketball arching through air to swoosh through net; to force air through vocal cords to make musical notes of perfect harmony; or even to push a button switching channels to watch a TV show.

But if that is not interesting enough – when sensory input is lost for the blind, the deaf, the amputee... we have learned that the brain fills in with phantom images, sounds and even body parts.

Take for example phantom visions of the blind called Charles Bonnet syndrome. First described in 1769, Swiss naturalist Charles Bonnet noted the hallucinations of his 89-year-old grandfather, who saw smaller than normal faces, birds, trees, and patterns like tapestry all from his failing eyes. Oliver Sacks, a famous neurologist and writer, tells us that you don't have to have failing vision, and that most of us have hallucinations normally as we first close our eyes to go to sleep often with swirling patterns. The take-home message from Bonnet and Sacks is to reassure us that visual hallucinations can be very normal, simply reflecting the brain filling in when vision is diminished.

Also, there are phantom sounds of the hearing-deprived called tinnitus, and rarely musical ear syndrome. The first is a simple bother to ignore, and the second a complex form of auditory hallucinations to admire. Apparently great composers Robert Schumann and Dmitri Schostakovich both described hearing phantom symphonies in their heads from which they drew inspiration for composing music we still hear today.

Similarly, people who have lost a limb sometimes sense that the limb is still there, and this is called phantom limb syndrome. Unfortunately, these hallucinatory limbs can become painful, and too often are unresponsive to standard pain medications and treatment. Recent promising research, however, is bringing relief for some suffering with phantom limb pain by using mirrors reflecting the real limb in order to teach the amputee to unclench or relax the phantom limb.

Imagine that! When there is loss, the human brain fills in with phantom images, sounds, and limbs. And even though they are not part of the real world, they are real to our minds and we need to deal with them.
Both prediabetes and diabetes meet established criteria for those conditions in which early detection is timely and appropriate. Both of these diseases are common and appear to be increasing in prevalence, therefore imposing a fairly significant burden on future public health. Often, the phase prior to the diagnosis of type 2 diabetes may last a lengthy period without symptoms.

There is a suggestion that patients with impaired glucose tolerance, an abnormal fasting glucose or an A1C in the range of 5.7 to 6.4 percent, should receive consideration for referral to a weight loss program. A targeted weight loss of around 7 percent of body weight, as well as increased physical activity and lifestyle changes, should be encouraged.

The Diabetes Prevention Program (DPP) was a major multicenter clinical research project. Those participants who lost a modest amount of weight through dietary changes and increased physical activity sharply reduced their chances of developing diabetes. Besides these intensive lifestyle modifications, there have been a number of pharmaceutical agents, such as metformin, that have been shown to help delay or prevent the subsequent development of diabetes.

A study recently published in JAMA suggested that the total number of adults in the U.S. that have either outright diabetes or pre-diabetes may approach 50 percent. This represents a potentially staggering utilization of health care resources and lost productivity. According to the authors, “diabetes prevalence significantly increased over time in every age group, in both sexes, in every racial and ethnic group, by all education levels, and in all poverty income groups.”

Obesity, along with lack of exercise, would appear to be a major risk factor in this population. The U.S. surgeon general and the Institute of Medicine have recommended the implementation of food, nutrition, agricultural, and physical activity policies and regulations by federal, state and local governments to help control the increase in obesity and its subsequent effect on the development of diabetes. Providing assistance for intensive behavioral therapies in order to obtain weight loss, as well as using behavioral economic approaches to encourage patient engagement, may help to slow the increase in obesity and the development of prediabetes.

One of the overall goals for the Great Plains Quality Innovation Network is to increase the number of certified diabetes centers, certified diabetic educators, and community health workers, along with facilitating the development of diabetes self-management programs. Efforts will need to be continued, increased and sustained in order to control this expanding challenge.

REFERENCES

1. ADA Standards of Medical Care in Diabetes - American Diabetic Association 2014
2. JAMA 2015;314:1021-1029
Help Shape the Future of Medicine in South Dakota

The South Dakota State Medical Association Foundation, the philanthropic arm of the South Dakota State Medical Association, is a tax-exempt 501 (C)(3) non-profit corporation, was established to assist and support medical research, medical teaching and medical education at the Sanford School of Medicine.

On average, medical students graduate with $130,000 in debt. Contributions to the South Dakota State Medical Association Foundation provide financial assistance to students at the Sanford School of Medicine and are all designated for scholarships, grants and low-interest loans for students.

Any amount can be donated at any time throughout the year. If you have questions or want more information, please call Laura Olson at 605.336.1905.

Send Your Contributions Today To:
South Dakota State Medical Association Foundation
PO Box 7406, Sioux Falls, SD 57117-7406
www.sdsma.org
Preparing our industry via six priorities: 1) Making care ultimate goal being to reduce costs, irrespective of any going forward approximately 25 years, provider quality As some of you may recall, beginning in the 1980s and 35 years and contain outdated, obsolete terms. This expansion can provide detail which will affect quality measurement, largely in the area of greater specificity. This expansion can provide detail that wasn’t present before, meaning improved data for assessing patient severity, the quality of care received, and patient outcomes. The medical codes America uses for diagnosis and billing have not been updated in more than 35 years and contain outdated, obsolete terms.

As some of you may recall, beginning in the 1980s and going forward approximately 25 years, provider quality activities were mostly composed only of a “standard screwdriver to tweak the valve” of a project/program with the ultimate goal being to reduce costs, irrespective of any other outcomes. Today we have a cadre of tools to choose from (some of which we have described in earlier articles this year), which not only tweak but also can build, streamline, and improve...focusing finally on clinical outcomes which are positively influencing care to patients. Like it or not, ICD-10 data will enable payers to have enhanced data to monitor clinical outcomes, a necessary component to the new payment models being implemented nationwide and coming soon to an area near you.

Possibly unbeknownst to you because of the other multiple life/work responsibilities you have, back in November 2013, the Centers for Medicare and Medicaid Services issued a “quality strategy” with a laudable goal to optimize health outcomes by leading clinical quality improvement and health system transformation.1 This vision is (slowly) transforming our industry via six priorities: 1) Making care safer by reducing harm caused in the delivery of care; 2) Ensuring that each person and family is engaged as partners in their care; 3) Promoting effective communication and coordination of care; 4) Promoting the most effective prevention and treatment practices for the leading causes of mortality, starting with cardiovascular disease; 5) Working with communities to promote wide use of best practices to enable healthy living; and 6) Making quality care more affordable for individuals, families, employers, and governments by developing and spreading new healthcare delivery models.

In addition, back in January 2015, U.S. Health and Human Services (HHS) Secretary Sylvia Burwell announced goals for Medicare provider payment and delivery system reform. In establishing its goals, HHS identifies the following payment categories: Category 1: fee-for-service with no link of payment to quality; Category 2: fee-for-service with a link of payment to quality; Category 3: alternative payment models built on fee-for-service architecture; and Category 4: population-based payment.

HHS goals call for Categories 3 and 4 (combined) to account for 30 percent of Medicare fee-for-service payments by the end of 2016 and 50 percent by the end of 2018. In addition, HHS goals also call for Categories 2, 3 and 4 (combined) to account for 85 percent of Medicare fee-for-service payments by 2016 and 90 percent by 2018.

Dakotacare intends to mirror these payment transformation targets and is a participating stakeholder of the Health Care Payment Learning and Action Network, a collaborative effort between HHS and private payers, employers, providers, states and others around the U.S. with the intent to expand alternative payment models into their programs. This means we have been asked to not only support the national alternative payment model goals listed above (e.g., 30 percent alternative payment model penetration by 2016 and 50 percent by 2018), but also agree that progress toward national goals should be measured and work with our network partners (YOU) to establish standard definitions for alternative payment models. We will be busy this coming year. We will need your help.

I leave you with this quote to ponder as you learn to adapt to these (and other) changes: “Progress is impossible without change, and those who cannot change their minds cannot change anything.” – George Bernard Shaw

References
Board News

By Margaret B. Hansen, PA-C, MPAS, Executive Director

Each month the South Dakota Board of Medical and Osteopathic Examiners (Board) submits a column to South Dakota Medicine to inform physicians and other licensees about various topics of interest that come to the Board. Recently the Board received questions regarding the role and responsibilities of medical directors, and the statutes and administrative rules relating to ethical standards for physicians.

South Dakota Law

The state constitution, statutes and administrative rules collectively are referred to as South Dakota law. South Dakota administrative rules help to define the statutes known as South Dakota Codified Law (SDCL). Administrative rules and statutes have the same force and effect of law. Each state has its own set of administrative rules which are approved by the state legislature. South Dakota follows the Administrative Procedures Act described in SDCL 1-26. The Board holds public hearings and then submits proposed rules to an Interim Rules Committee whose members are state legislators. The Interim Rules Committee returns recommendations to the Board which then adopts the rules which become law.

South Dakota Law Regarding Ethics for Physicians

Administrative rules for physician licensure, inspections, fees, and ethics can be found in Article 20:47. A South Dakota licensed physician shall comply with ethical standards and conduct set forth in the 2012-2013 edition of the Code of Medical Ethics of the American Medical Association (AMA). A violation of any of the ethical standards and conduct are considered unprofessional conduct.

The Board may utilize the annotations and opinions included in the AMA Code of Medical Ethics as guidance in determining whether a physician has violated professional ethical standards and conduct. The AMA Code of Medical Ethics in its entirety may be found on the AMA’s website at www.ama-assn.org.

South Dakota Law Regarding Ethics for Medical Directors

Medical directors and the entities using medical directors frequently query the Board staff about medical director responsibilities. A medical director for a lab, clinic, organization, or office who is a “qualified medical director” is defined in South Dakota law and required to be a South Dakota licensed physician. The South Dakota legal standard for medical director ethics is set forth in AMA Opinion 8.021 which was adopted by the AMA in 1999 and contained within the AMA Code of Medical Ethics.

The following opinion is provided in its entirety to assist South Dakota medical directors and the entities using medical directors:

Opinion 8.021 - Ethical Obligations of Medical Directors

Assuming a title or position that removes the physician from direct patient-physician relationships does not override professional ethical obligations. The term “medical directors,” as used here, refers to physicians who are employed by third party payers in the health care delivery system (i.e., insurance companies, managed care organizations, self-insured employers) or by entities that perform medical appropriateness determinations on behalf of payers. These types of medical directors have specific functions, such as making coverage determinations, which go beyond mere administrative responsibility. The following stem from this understanding. Whenever physicians employ professional knowledge and values gained through medical training and practice, and in so doing affect individual or group patient care, they are functioning within the professional sphere of physicians and must uphold ethical obligations, including those articulated by the AMA’s Code of Medical Ethics. Medical directors acting within the professional sphere, such as when making decisions regarding medical appropriateness, have an overriding ethical obligation to promote professional standards.

Adherence to professional medical standards includes:

1. Placing the interests of patients above other considerations, such as personal interests (e.g., financial incentives) or employer business interests (e.g., profit). This entails applying the plan parameters to each patient equally and engaging in neither discrimination nor favoritism.

2. Using fair and just criteria when making care-related determinations. This entails contributing professional expertise to help craft plan guidelines that ensure fair and equal consideration of all plan enrollees. In addition, medical directors should review plan policies and guidelines to ensure that decision-making mechanisms are objective, flexible, and consistent, and apply only ethically appropriate criteria, such as those identified by the Council in Opinion 2.03, “Allocation of Limited Medical Resources.”

3. Working towards achieving access to adequate medical services. This entails encouraging employers to provide services that would be considered part of an adequate level of health care, as articulated in Opinion 2.095, “The Provision of Adequate Health Care.” (I, III, VII)

REFERENCES

3. Code of Medical Ethics of the American Medical Association 2012-2013 edition, annotations prepared by the southern Illinois University School of Medicine. Copies may be viewed at the Board’s office or obtained from the American Medical Association by calling 800.621.8335 or visiting www.amabookstore.org.
AMA Urges HHS to Pause Meaningful Use Stage 3 Rules

The American Medical Association (AMA) is circulating a sign-on letter asking the U.S. Department of Health and Human Services to pause finalizing meaningful use (MU) Stage 3 rules while the government reevaluates the EHR incentive program.

The letter states that “moving forward with MU Stage 3 at this time will severely undermine the ability of the health system to support the implementation” of this spring’s SGR-repeal legislation. Additionally, the AMA said that if the Stage 3 rules are finalized now, “vendors will create software that will lock-in problematic technology, which physicians and patients will be living with for years to come.”

Source: Politico and AMA

“The Issue Is” is the SDSMA’s monthly update on key policy issues of importance to physicians.

SDSMA President Visits Medical Districts

SDSMA President Dr. Tim Ridgway’s Presidential District Visits are underway. Dr. Ridgway and physicians attending have discussed issues facing physician practices, the challenges faced in health care in South Dakota and nationwide, and the ways physicians can work together toward common goals.

So far, Dr. Ridgway has been hosted by Aberdeen, Black Hills, Mitchell and Yankton district medical societies.

Please consider attending your district’s meeting. Dr. Ridgway wants to hear your concerns about challenges that affect care for South Dakotans and to gather ideas on how to work together to represent physicians both at the state and federal levels.

The remaining Presidential District Visit schedule is as follows:
- Oct. 6 – Watertown/Wheatstone Valley districts, 6 p.m., 2nd Street Station, Watertown
- Oct. 12 – Madison/ Brookings District, 6 p.m., Craft Fusion Italian Restaurant, Brookings
- Oct. 20 – Huron District, Location TBD
- Jan. 12 – Rosebud District, 6 p.m., Frank Day’s Bar & Grill, Dallas
- Jan. 13 – Northwest District, 11:30 a.m., Mobridge Community Hospital Conference Room
- Jan. 13 – Pierre District, 6 p.m. Redrossa, ClubHouse Suites, Pierre
- Jan. 25 – Seventh District, 6 p.m., CJ Callaway’s, Sioux Falls

Source: SDSMA staff

Sign up to be Doctor of the Day!

The SDSMA’s Doctor of the Day program is a huge success every legislative session. During session, the SDSMA commits to providing a physician member to serve as Doctor of the Day for the State Legislature in Pierre. This volunteer commitment involves one day of service at the State Capitol by providing basic medical assistance to legislators and staff as needed.

As Doctor of the Day, you’ll have the unique opportunity to interact with legislators on the House and Senate floors and get a first-hand look at the legislative process and how it affects the practice of medicine. Your presence at the Capitol shows legislators not only your expertise but also your concern for the health of South Dakotans.

The SDSMA is in need of volunteers willing to spend a day to serve as Doctor of the Day. It is critical that volunteer physicians are serving each day of session as each year we receive requests from physician assistants and advanced nurse practitioners who wish to participate in our program.

South Dakota’s 2016 Legislative Session opens on Jan. 12. To see a listing of available dates, visit www.sdsm.org. If you are interested in volunteering, please contact Mark East at 605.336.1965 or meast@sdsm.org.

Source: SDSMA staff
For Your Benefit:

Your Communications Link

Information is essential to your continuing success and viability. You can stay up-to-date with key issues and events by logging on to www.sdsm.org. As a member you also receive the South Dakota Medicine every month and have online access to full issues. We also produce the bi-monthly E-News, weekly InSession during the state legislative session, and public awareness campaigns to communicate health issues of importance to the media and the public.

If you’d like more information about our communications programs give us a call at 605.336.1965, visit www.sdsm.org, or email Elizabeth Reiss at ereiss@sdsm.org. As always, thank you for your membership in SDSMA.

“For Your Benefit” is the SDSMA’s monthly update on programs and services available to physicians through their affiliation with the SDSMA.

Legal Brief Highlight: Brand and Generic Prescriptions

A pharmacist, under certain circumstances, may substitute a generic equivalent of a drug prescribed by its brand name. The pharmacist must notify the person receiving the drug of the substitution, and must also notify them of their right to refuse the selected drug.

The physician may prohibit the substitution of a generic equivalent by including on the prescription order the words “brand necessary” or words of similar meaning. If the prescription order is oral, the physician or authorized agent must specifically instruct the pharmacist that substitution is prohibited. The selection of an equivalent drug product does not give rise to a cause of action against the practitioner.

For more information, download the SDSMA legal brief Brand and Generic Prescriptions at www.sdsm.org. Through the SDSMA Center for Physician Resources, the SDSMA has developed more than 40 legal briefs that are available to members. In addition, the Center develops and delivers and programs for members in the area of practice management, leadership and health and wellness.

SDSMA Center for Physician Resources Webinar:
“Pre-Employment Considerations”
- 7 pm Tuesday, October 6

The SDSMA Center for Physician Resources brings you its Practice Education Series on physician employment beginning at 7 p.m. CT Tuesday, Oct. 6 with the webinar “Pre-Employment Considerations,” the first of five webinars in the series. To register for the webinar, find a link on the homepage calendar at www.sdsm.org. Additional programs in this series include the following:

- 7 p.m. CT Jan. 5, 2016 - Understanding an Employment Contract - Overview
- 7 p.m. CT April 5, 2016 - Understanding an Employment Contract - Quality of Life Issues
- 7 p.m. CT July 12, 2016 - Understanding an Employment Contract - Compensation & Benefits
- 7 p.m. CT Oct. 4, 2016 - Termination of an Employment Contract

This educational series will help physicians and their respective advisors identify and address the unique challenges employment can present to professionalism and the practice of medicine, providing guidance on how to negotiate with potential employers and to develop an optimum employment agreement.

The USDSSOM designates this activity for a maximum of 1 AMA PRA Category 1 Credit(s). Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Source: SDSMA staff
A Medicare program meant to reduce hospital readmissions may be penalizing hospitals "to a large extent based on the patients they serve," according to a study published in *JAMA Internal Medicine*.

Researchers at Harvard Medical School found that nearly two dozen variables, such as patients’ education, income and ability to bathe, dress and feed themselves, explain nearly half of the difference in readmission rates between the best- and worst-performing hospitals.

The study suggests the Hospital Readmissions Reduction Program could set off a "vicious cycle - hospitals that see sick patients end up with higher penalties, lose money, and end up with less money to manage their already complex patients."

Modern Healthcare reported that in March, Sen. Joe Manchin (R-WV) re-introduced legislation that would reform the calculation of the readmissions penalty to factor in socio-economic characteristics of patients.

Additionally, the National Quality Forum is working with Medicare officials to develop a two-year trial with measures that are risk-adjusted for factors such as socio-economic and demographic characteristics.

Source: AMA, *JAMA Internal Medicine*, and Modern Healthcare
### CME Events

Continuing Medical Education events which are being held throughout the United States (Category 1 CME credit available as listed)

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