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What Kind of Bonds Should be in My Portfolio?

If your financial plan warrants the need to invest in bonds, what type should you invest in? At Foster Group we focus on two primary characteristics of fixed income investments to help us answer this question – maturity and credit quality.

Maturity

As a bond holder, essentially you are providing a loan to a corporation or government. The maturity is how long the loan lasts. If you purchase a corporate bond that matures in eight years, you will receive interest payments for eight years and then the return of your principal (the initial dollar amount invested) at the end of the eight years.

We focus on maturity for two primary reasons:

1. Longer maturity bonds have higher expected returns than bonds of similar credit quality but shorter maturities, to compensate investors for locking up their money for longer periods.
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Short-term (e.g., 1-2 years) cash needs are best met with short-term bonds, because of their lower volatility. Intermediate-term needs (three years and beyond) are best met with longer, intermediate-term bonds, because of their higher expected returns.

Credit Quality

The other primary characteristic we focus on is credit quality. Credit quality is related to a company’s financial condition.

Companies that aren’t doing well financially will have a lower credit rating because they have a higher chance of default. Alternatively, U.S. Government bonds are said to have no credit risk, because they are backed by the full faith and credit of the U.S. Government. Viewed by many financial advisors as a “safe haven,” intermediate to longer term U.S. Government bonds are one of the few asset classes that tend to increase in price when stock markets drop. That helps reduce portfolio volatility in times of stock market stress. Keep in mind that even U.S. Government bonds may be worth less if they need to be sold before their maturity date.

Credit quality is a primary focus for these two reasons:

1. Maintaining the stability of the bond portion of the portfolio for liquidity needs
2. Reducing overall portfolio volatility

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As we prepare for our SDSMA presidential district visits, several topics occupy our discussion and time. However, the only thing that’s certain during the legislative season is uncertainty. While the SDSMA has an experienced lobbyist, very significant and valuable advocacy takes place at a local level through our members. We cannot emphasize enough how important and valuable it is for physician members to establish and maintain relationships with their local elected officials.

Every year decisions are made in Pierre that impact your ability to practice medicine. As health care policy continues to take shape, physicians cannot sit back and let others, many of who have no background in health care, decide our future. If you are willing to visit with your local representatives but are unsure of what to say, contact the staff of the SDSMA for some materials and/or talking points to assist you with the discussion.

If you are unsure who your local representative are, visit www.sdsm.org or sdlegislature.gov.

This year, like every other, the SDSMA has been involved with a number of key issues. This includes the amazing work performed by our SDSMA staff, several committee and task force members, our Board of Directors, and our Policy Council members.

During the 2019 legislative session, the SDSMA will bring forward two bills on telemedicine. Rural health care and access to high quality care are essential to our state. Telemedicine services are being effectively used as an alternate to traditional in-person health care delivery. SDSMA will be working to advocate for the passage of legislation designed to help establish standards of care for the use of telemedicine technology and to ensure payment for services rendered.

Following the direction of our Policy Council (with a created position statement) this June, the SDSMA has joined the American Cancer Society, Cancer Action Network, and the American Heart Association in public support of IM 25. This is an initiated measure on the November ballot that will raise tobacco taxes by $1 per pack of cigarettes. The money raised will be used to reduce tuition at the state’s technical colleges. IM 25 is projected to raise $20 million annually for technical colleges while reducing the long-term health care costs from smoking. Tobacco use is a fiscal problem – even for people who don’t use tobacco. South Dakota pays more than $373 million annually in tobacco-related health care costs with an additional $282.5 million in lost productivity. It is estimated that each household pays $782 annually in taxes to cover these tobacco-related costs, whether they use the products or not.

The SDSMA has also been working to support the efforts of Life Circle South Dakota and Avera Health who are leading an initiative for the adoption of a statewide MOST (medical orders for scope of treatment) form. This document is incorporated into the medical record and provides direction regarding a patient’s goals and preferences for end of life care. We look forward to working with state legislators to support the adoption and use of MOST.

An Ad Hoc Committee on Prescription Drug Pricing, led by Dr. Victoria Walker, has been busy researching and drafting policy regarding prescription drug costs. While the initiated measure regarding prescription drug pricing will not be on the November ballot, the SDSMA Policy council will continue its discussions on this topic in November. We thank Dr. Walker and the committee in advance for their efforts. In addition, the SDSMA is currently working with members of the South Dakota American College of Physicians, the South Dakota Academy of Family Physicians and the Sanford School of Medicine to promote the importance of graduate medical education. The members of this group have visited with the staff of our congressional delegates, and will be having a sit down meeting with Sen. Mike Rounds soon.

Lastly, we would like to bring to your attention the Sports Medicine Licensure Clarity Act of 2017. As proposed, this bill extends the liability insurance coverage of a state-licensed medical professional to another state when the professional provides medical services to an athlete, athletic team, or team staff member pursuant to a written agreement. This is an issue that the SDSMA and South Dakota American College of Physicians have been working on together in hopes of achieving a federal solution since 2014. It appears as though those efforts have finally paid off as the Sports Medicine Licensure Clarity Act of 2017 has passed both the senate and the house and awaits our president’s signature for passage.

We are an association of engaged physicians, and I thank you for your involvement in advocating for our profession, patients, and health care in South Dakota.
Youth Suicide Rate Climbing

By Timothy J. Soundy, MD

There have been several recent reports in the medical literature and the lay press about the increase in suicide rates especially among youth. The “Regional Infant and Child Mortality Review Committee 2017 Final Report” authored by Ann L. Wilson, PhD, and Brad Randall, MD, in this issue attests to this very occurrence in South Dakota. In the 10 counties comprising southeastern South Dakota, there were five deaths attributed to suicide in 2017, yielding a rate for the region that is higher than that observed nationally. Some, but not all of these children had a history of receiving mental health services. According to the Centers for Disease Control and Prevention, in 2016 there were nearly 45,000 suicides in the U.S. among all age groups. It was the second leading cause of death among individuals between the age of 10 and 34. Rates are higher in males than females in all age groups. When race and ethnicity were taken into account, the American Indian/Alaska native group was the highest followed by the White/non-Hispanic group. The highest prevalence of suicidal thoughts and attempts in the U.S. adult population was in the 18 to 25 year old group. Even more alarming is that the teen suicide rate rose by more than 70 percent between 2006 and 2016 as quoted in a USA Today article based on the same CDC data.

In a Sept. 13, 2018 Medpage Today article on a workshop supported by the Substance Abuse Mental Health Services Administration (SAMHSA), panelists discussed the suicide epidemic in light of ever expanding pharmacological treatments and non-drug therapies such as dialectical behavioral therapy and cognitive behavioral therapy. It is estimated that 45 percent of people who died by suicide visited their primary care provider in the month prior to their death, according to Christine Moutier, MD, chief medical officer for the American Foundation for Suicide Prevention. Are opportunities to intervene being missed? Perhaps this is a partial explanation. As clinicians, we can all ask ourselves what more could be done in our practice to alert us to those who may be harboring suicidal thoughts and connect these individuals in need of urgent intervention with the help they need.

Before I sat down to write this editorial, I asked a group of counselors and social workers in the adolescent unit at the Humans Services Center in Yankton about their observations. These are dedicated state employees who work with our youth day after day, several of whom have decades of experience. Their responses included: break down of the family unit, addiction, and the glamorization of suicide in movies and online. However, the most frequent response was social media. The explanations for this response varied. “Bullying has always been around but not everyone could see it before now.” “Loss of true social connections, kids don’t know how to have a conversation.” “People constantly comparing themselves to others, as people filter and photoshop their pictures.” “People say things over social media they wouldn’t say to someone’s face.” One mother talking about her own daughter stated, “It is much easier to misinterpret a text than an actual phone call.” “We have adolescents admitted that have made suicide pacts with people online that they have never even met.”

As a practicing child and adolescent psychiatrist in South Dakota for the last 26 years, people sometimes ask what I think the reason is for this alarming trend. In my experience, the increasing role of social media in the life of youth has not been a net positive for many reasons. But as it can likely be implicated for the role it may play in making suicide seem an appealing option for our youth one could conclude social media use best be moderated.

About the Author:
Timothy J. Soundy, MD, Pediatric Psychiatry and Child & Adolescent Psychiatry, Avera Behavioral Health Center; Avera Medical Group University Psychiatry Associates, Sioux Falls, South Dakota.
Dear Editor,

I would like to applaud Dr. Wendell Hoffman’s series, “Here We Stand”, featured in the last three issues of *South Dakota Medicine*. For those who have not read it, these articles are not to be skimmed on your feet in a hall between seeing patients. Find a quiet room, close the door, and savor this thought-provoking series over a cup of your favorite coffee.

Many of us today are frustrated that the entire medical system has grown wildly out of physician control. The days in which the patient was the focus of medicine are a thing of the past. (If you say that out loud, it sounds absolutely absurd. Sadly, it’s true.) We grow weary of seeing patients who, with an ounce of preventative care, could have avoided that cancer diagnosis/massive surgery/overwhelming medical bills. We tire of the feeling that good medicine is for the wealthy or privileged, and that the purpose of the healthcare system is to line the pockets of insurers and pharmaceutical companies. We are exhausted of having to justify every medication or procedure to each individual insurance company, Medicaid, Medicare or IHS, or beg a charitable system to foot the bill for those who have nothing else, or worse yet, to watch our patients suffer with no hope of relief. As we are asked to cut costs, so are we continually compelled to practice defensive medicine. Instead of being treated as the medical experts we are, we often feel we have been reduced to a cog in an enormous and largely ineffective machine, and our patients reduced to political pawns.

But more than just bemoaning the red tape and politicization of our highly flawed medical system, Dr. Hoffman throws down the gauntlet, challenging us as physicians to use our education, our influence, and our compassion to enact real solutions, within our own clinics and hospitals, in our state, and in U.S. healthcare policy as a whole. More than that, he challenges us to own our authority and utilize it to bring medicine back to where it belongs: patient-centeredness.

Just reading this series gave me a much-needed breath of hope, and it is my fervent wish that this conversation continue. I would love to see Dr. Hoffman’s ideas carried from the philosophical abstract into concrete actions which South Dakota physicians can take to enact change that will move our healthcare system back to where its true focus belongs: the patient.
**Introduction**

Trauma patients are unique due to the variability of injuries sustained and organ groups affected thus increasing their severity of illness. These patients are at high risk for VTE, including DVT, and PE, with the incidence of DVT being as high as 58 percent. Venous thromboembolism is the leading cause of preventable death in hospitalized trauma patients. The prevention of VTE through pharmacologic VTE prophylaxis used in conjunction with mechanical prophylaxis is recommended by both the CHEST guidelines and EAST practice guidelines for the prevention of venous thromboembolism in trauma patients. The development of a pharmacologic VTE protocol for trauma patients was identified as an area of need as the EAST Trauma guidelines are outdated and differences in VTE prophylaxis recommendations exist. A review of trauma VTE protocols was completed and the Vanderbilt Practice Management Guidelines for venous thromboembolism prophylaxis was used to facilitate the development of trauma VTE protocol.

**General Trauma Patient Pharmacologic VTE Recommendations**

The CHEST guidelines published in 2012 recommends low dose unfractionated heparin (LDUH), low molecular weight heparin (LMWH) or mechanical prophylaxis over no prophylaxis for major trauma patients. The EAST trauma guidelines for VTE prevention recommend LMWH (enoxaparin 30 mg SUBQ every 12 hours) over LDUH (5000 units SUBQ two or three times daily) for VTE prophylaxis in moderate to high risk trauma patients when bleeding risk is acceptable. LDUH for VTE prophylaxis in trauma patients has been shown to be ineffective and equivalent to no prophylaxis in high risk trauma patients. Thus LDUH is not recommended for use unless LMWH is contraindicated. The use of enoxaparin 30 mg SUBQ every 12 hours has shown a 58 percent risk reduction in preventing proximal DVT in trauma patients compared to LDUH. Currently, enoxaparin is the LMWH drug of choice for pharmacologic VTE prophylaxis for all trauma patients but dalteparin could be considered for use. Dalteparin is a LMWH that is not currently recommend for pharmacologic VTE prophylaxis in trauma patients but was shown to be noninferior in orthopedic and acute spinal cord injury patients compared to enoxaparin. Dalteparin use is not currently recommended for pharmacologic VTE.
prophylaxis in trauma patients due to limited available literature to guide therapy, and due to the level 1 evidence supporting the routine use of enoxaparin in trauma patients.\textsuperscript{1,12} The current standard of care for pharmacologic VTE prophylaxis is enoxaparin 30 mg SUBQ every 12 hours started within 24 hours of injury when no contraindications exist due to the amount of available evidence and guideline recommendations.\textsuperscript{3,4}

**VTE Risk Factors in Trauma Patients**

The VTE risk factors for trauma patients have been evaluated in numerous studies including the EAST Trauma VTE prevention in trauma patient guidelines.\textsuperscript{3} (Table 1) The EAST Trauma guidelines state spinal cord injury and spinal fractures place trauma patients at high risk for VTE.\textsuperscript{4} Other traditional risk factors include long bone fractures, pelvic fracture, and head injury.\textsuperscript{4} A more recent study by Knudson et al. found that 90 percent of trauma patients that develop clinically significant VTE also had the risk factors of age 40 years and older, lower extremity fracture, venous injury, shock on admission (BP less than 90 mmHg), major surgical procedures, head injury abbreviated injury scale (AIS) 3 and greater, lower extremity fracture AIS 3 and greater, and ventilator days greater than 3. Other more traditional risk factors for VTE include malignancy, prior VTE, obesity, major surgical procedures and immobility.\textsuperscript{4} Iatrogenic factors also associated with VTE in trauma patients included central femoral line greater than 24 hours and blood transfusion of greater than 4 units in a 24 hour period.\textsuperscript{9,10} The risk factors for VTE in major trauma patients are numerous and the risk for development of symptomatic VTE is estimated to be at minimum of 3-5 percent and patients with traumatic spinal cord injury or traumatic brain injury is an estimated 8-10 percent\textsuperscript{11} (Table 1).

**Table 1. Risk factors for Venous Thromboembolism in Trauma Patients ≥ 18 Years of Age**

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Associated (\geq) %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spinal cord injury with paraplegia or quadriplegia</td>
<td>Obesity</td>
</tr>
<tr>
<td>Head injury (AIS ≥ 2)</td>
<td>Malignancy</td>
</tr>
<tr>
<td>Age ≥ 40</td>
<td>Prolonged Immobility</td>
</tr>
<tr>
<td>ISS ≥ 9</td>
<td>Femoral venous line</td>
</tr>
<tr>
<td>Blood transfusion &gt; 4 units</td>
<td>Ventilator days &gt; 3</td>
</tr>
<tr>
<td>Lower extremity fracture (AIS ≥ 3)</td>
<td>Major surgical procedure</td>
</tr>
<tr>
<td>Shock (SBP &lt; 90 mm Hg)</td>
<td>Pelvic fracture</td>
</tr>
<tr>
<td>PMH of venous thromboembolism</td>
<td></td>
</tr>
<tr>
<td>Venous injury</td>
<td></td>
</tr>
</tbody>
</table>

**Use of Pharmacologic VTE Prophylaxis in Critically Ill Patients with Traumatic Brain Injury with Intracranial Hemorrhage or Spine Injury**

The use of pharmacologic VTE prophylaxis in trauma patients with traumatic brain injury (TBI) resulting with intracranial hemorrhage (ICH) is an area of hot debate. Traumatic brain injury patients are at high risk of developing VTE due to the induced hypercoagulability with the release of tissue factors as the result of trauma.\textsuperscript{12} The standard of care has not been established for the initiation of pharmacologic VTE prophylaxis with UFH or LMWH in critically ill patients with TBI.\textsuperscript{13} The most recent Brain Trauma Foundation Guidelines for the Management of Severe Traumatic Brain Injury 2016 give a level III recommendation for the use of LMWH or LDUH in combination with mechanical prophylaxis.\textsuperscript{14} These guidelines give no specific dosing recommendations for LMWH or LDUH, and no timeline for starting pharmacologic VTE prophylaxis.\textsuperscript{14} The Neurocritical Care Society VTE prophylaxis guidelines give a weak recommendation of starting LMWH or UFH within 24-48 hours after presentation of injury in patients with ICH and TBI, or 24 hours after craniotomy.\textsuperscript{15} These guidelines give no dosing recommendations for LMWH or UFH.\textsuperscript{15} Overall guideline recommendations for starting VTE prophylaxis in patients with TBI and ICH are weak and give no dosing recommendations for LMWH or UFH.

Currently enoxaparin 30 mg SUBQ twice daily is the preferred pharmacologic VTE prophylaxis agent for trauma patients with TBI and ICH; however heparin 5000 units SUBQ twice daily or three times daily may be used as an alternative in patients with TBI, TBI that require intracranial pressure monitoring or drains.\textsuperscript{16,23} A recent study evaluating the use of prophylactic dose LMWH or UFH in patients with TBI and an invasive monitoring device showed no new hemorrhages or expansion of hemorrhages.\textsuperscript{15} The use of LMWH or UFH initiated 72 hours after injury has been shown to decrease rates of VTE and no significant increase in hemorrhage progression in patients with stable CT scan.\textsuperscript{16,23} Pharmacologic VTE prophylaxis should begin within 72 hours of initial injury or craniotomy with stable repeat CT scans. Pharmacologic VTE prophylaxis may start 24 hours after injury in patients with stable repeat CT scans meeting low risk TBI criteria including: subdural or epidural hematoma less than 8 mm, glasgow coma score (GCS) of 15 within 30 minutes of injury, and contusion or intraventricular hemorrhage.
less than 2 cm (single lobe). These criteria are used to help guide the initiation of pharmacologic VTE prophylaxis as guidelines give no specific criteria for initiation of pharmacologic VTE prophylaxis. It is recommended that neurosurgery and trauma services discuss the decision to use pharmacologic VTE prophylaxis in trauma patients with TBI and weigh the risk of hemorrhage against the benefit of VTE prevention.

Trauma patients who sustain spinal cord injury have a higher incidence of developing VTE leading to increased morbidity and mortality. Recommendations for pharmacologic VTE prophylaxis are similar to that of patients with TBI and ICH in LMWHs or dose adjusted UFH (5000 units twice daily) are treatment options. The 2016 Neurocritical Care VTE prophylaxis in neurocritical care patient guidelines give no specific recommendations for use of LMWH or adjusted dose UFH.

Enoxaparin 30 mg SUBQ twice daily is recommended for pharmacologic VTE prophylaxis in trauma patients with spinal cord injury. The 2016 Consortium for Spinal Cord Medicine clinical practice guidelines for spinal cord injury recommends LMWH for pharmacologic VTE prophylaxis following spinal cord injury and recommends not using low-dose or adjusted dose UFH. A meta-analysis by Paciaroni compared low-dose UFH vs LMWH in spinal cord injury patients. The results showed neither low-dose UFH or LMWH reduced the number of DVTs however a significant reduction in rate of pulmonary embolism and significant reduction in major bleeding was found with the use of LMWH. A meta-analysis evaluating the use of UFH 5000 units two or three times daily for pharmacologic VTE prophylaxis in spinal cord injury was not more effective than no prophylaxis or placebo. Dahl et al. recommends not using low-dose UFH alone for pharmacologic VTE prophylaxis and states better alternatives such as enoxaparin or adjusted dose UFH should be used. Enoxaparin 30 mg SUBQ twice daily is preferred for pharmacologic VTE prophylaxis in patients with spinal cord injury.

The ideal time to start pharmacologic VTE prophylaxis in patients with spinal cord injury is within 72 hours of injury and once bleeding is controlled as supported by a systematic review by Christie et al. and recommended by the Neurocritical Care Society. Other considerations for patients with spinal cord injury is when to hold and restart pharmacologic VTE prophylaxis. Patients undergoing surgery should have pharmacologic VTE prophylaxis held off the morning of surgery and restarted within 24 hours after surgery.

Pharmacologic VTE Prophylaxis Management with Epidural Catheter Placement

Trauma patients may have epidural catheters placed to optimize pain control. The use of enoxaparin 30 mg SUBQ twice daily is recommended for pharmacologic VTE prophylaxis in trauma patients but is contraindicated after an epidural catheter has been placed. UFH 5000 units SUBQ twice daily must be used while epidural catheter is in place to avoid development of a spinal epidural hematoma. UFH 5000 units SUBQ twice daily is preferred as this dose will not cause prolongation of the aPTT above 1.5 times the normal level. Enoxaparin should be held 24 hours prior to epidural placement, while the catheter is in place and may be restarted 4 hours after epidural is removed. Epidural catheter use in trauma patients is not a contraindication to VTE prophylaxis, but care must be taken to use the appropriate VTE prophylaxis.

Renal Impairment and Pharmacologic VTE Prophylaxis

The development of renal impairment in trauma patients adds to the complexity of treatment as considerations for renal dose adjustment of medications must be considered.

The use of UFH, enoxaparin and dalteparin are options for pharmacologic VTE prophylaxis in medical patients and the differences in pharmacokinetics along with literature guide the choice of pharmacologic VTE prophylaxis in trauma patients with renal dysfunction. The clearance of UFH occurs through two separate mechanisms and is dependent on the size of the molecule and dose. UFH has a mean molecular weight of 15,000 daltons (3,000-30,000 daltons) and renal clearance of UFH goes through a slower, nonsaturable process that occurs at higher therapeutic intravenous doses. Enoxaparin and dalteparin renal clearance is affected by molecular weight of the molecule. Dalteparin has a large molecular weight of 6,000 daltons and has greater non-renal clearance compared to enoxaparin which has a molecular weight of 4,500 daltons. Accumulation of enoxaparin is expected to be greater than dalteparin due to smaller molecular weight as in inverse relationship exists between renal clearance and increasing molecular weight.

Renal impairment requires adjustment in pharmacologic VTE prophylaxis as LMWHs are cleared by the kidneys and may accumulate with continued use. Enoxaparin has significantly more data supporting use for pharmacologic
Safe sleep practices can save lives.

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1. Talk to parents of newborns about the American Academy of Pediatrics’ “Recommendations for a Safe Infant Sleeping Environment” before discharging them from the hospital. ForBabySakeSD.com/training/healthcare-provider-training

2. Every infant should have a safe place to sleep. If a family is unable to afford an approved crib, contact the South Dakota Department of Health at 1-800-305-3064.

3. To reduce the risk of suffocation and SIDS, infants should be placed on a firm sleep surface (e.g., mattress in a safety-approved crib) with a fitted sheet and no other bedding, bumper pads, or soft objects.

4. Soft objects and loose bedding should be kept away from infants’ sleep area to reduce risk of SIDS, suffocation, entrapment, and strangulation.

5. Infants should sleep in parents’ room, close to the parents’ bed, but on a separate safe surface, ideally for the first year, but at least for the first six months of life.
VTE prophylaxis in trauma patients but some may consider use of dalteparin for pharmacologic VTE prophylaxis in critically ill patients with renal dysfunction. A study by Douketis et al. evaluated the use of dalteparin 5000 units SUBQ once daily in 136 critically ill patients with a creatinine clearance of less than 30 ml/min. No patient had any accumulation of dalteparin as defined by trough anti-Xa levels of greater than 0.4 IU/ml; however, seven patients developed major bleeding that was not associated with detectable trough anti-Xa levels in the previous three days (HR 0.76; 95 percent CI, 0.15-3.81). 18 Enoxaparin is known to accumulate in patients with a creatinine clearance 30 or greater ml/min can lead to an increased risk of major bleeding. 17 Also the use of prophylactic dosing of enoxaparin may lead to accumulation with use greater than 10 days in patients with creatinine clearance of 30-50 ml/min. 17 The recommended dose of enoxaparin for pharmacologic VTE prophylaxis in patients with creatinine clearance less than or equal to 30 ml/min is 30 mg SUBQ daily. 17

Current treatment options for pharmacologic VTE prophylaxis in trauma patients with renal dysfunction include enoxaparin, dalteparin and UFH. Dalteparin has limited evidence supporting use in critically ill patients with severe renal dysfunction and in trauma patients in general. Enoxaparin 30 mg SUBQ daily or UFH 5000 units SUBQ three times daily is favored for pharmacologic VTE prophylaxis due to the amount of literature supporting enoxaparin in trauma patients and the ability to use UFH without any restrictions in patients with renal dysfunction. Enoxaparin 30 mg SUBQ daily or UFH 5000 units SUBQ three times daily is recommend for pharmacologic VTE prophylaxis in trauma patients with creatinine clearance less than 30 ml/min or an acute increase in serum creatinine of 50 percent or greater. Resumption of enoxaparin 30 mg SUBQ every 12 hours may be restated once the patient’s renal function has returned to baseline or creatinine clearance has improved to greater than 30 ml/min.

VTE Prophylaxis in Morbidly Obese (BMI of 40 kg/m² or greater) Trauma Patients

The current recommendations for pharmacologic VTE prophylaxis in trauma patients make no specific recommendations for pharmacologic agent, dose, or BMI. The use of prophylactic dose enoxaparin or dalteparin in obese trauma patients is limited to data extrapolated from a variety of patient populations. There is a larger amount of data evaluating enoxaparin prophylactic VTE dosing in obese patients compared to dalteparin. The effect of prophylactic dalteparin 7500 units SUBQ daily on anti-factor Xa levels in 135 morbidly obese patients after bariatric surgery was retrospectively evaluated. This study found an inverse relationship between anti-factor Xa levels and patient weight which was supported by data indicating only 60 percent of patients attained target anti-factor Xa levels of 0.2-0.5 IU/ml. 19 The effect showing an inverse relationship between patient weight and anti-factor Xa levels has previously been seen with fixed dose enoxaparin. 19

The efficacy of enoxaparin dosing in obese patients and the optimal dose for pharmacologic VTE prophylaxis is currently unknown. 17 There is no high quality evidence evaluating enoxaparin dosing in obese trauma patients. The current recommendations from the EAST Trauma guidelines recommend enoxaparin 30 mg SUBQ twice daily with no specific recommendations based on weight or BMI. 1 Literature evaluating the use of enoxaparin in obese medical/surgical ICU, and bariatric surgery patients has evaluated other enoxaparin dosing strategies such as dose adjustment based on BMI, or dose adjustments based on anti-Xa level monitoring. The results of these studies do not directly correlate to obese trauma patients, but do provide evidence for enoxaparin dose adjustment based on weight and anti-Xa level monitoring.

The use of enoxaparin for VTE prophylaxis in bariatric surgery patients has shown a lower incidence of VTE with no increased risk of hemorrhage with the use of enoxaparin 40 mg SUBQ twice daily vs enoxaparin 30 mg SUBQ twice daily. 40 Other research has evaluated weight based dosing of enoxaparin 0.5 mg/kg SUBQ twice daily in 23 morbidly obese (BMI 35 kg/m² or greater, or weight 150 kg or greater) surgical ICU patients. Initial mean enoxaparin doses of 60 mg SUBQ twice daily (range 50-120 mg) reached therapeutic peak anti-Xa levels in 91 percent of patients with only one patient having minor bleeding and one patient having a VTE. 41 The evidence for increasing prophylactic VTE enoxaparin dosing to a minimum of 40 mg SUBQ twice daily in obese trauma patients is supported by limited evidence but must be considered as these patients remain at increased risk for development of VTE. Enoxaparin 40 mg SUBQ twice daily is recommended for pharmacologic VTE prophylaxis in obese trauma patients with BMI 40 kg/m² or greater with normal renal function at this time as there is more evidence evaluating the use of enoxaparin in obese patients compared to dalteparin.
**LMWH Anti-Xa Level Monitoring**

The use of peak LMWH anti-Xa level monitoring is currently recommended for treatment with enoxaparin in patients at extremes of weight, pregnancy or renal dysfunction. The EAST Trauma guidelines give no recommendations for LMWH anti-Xa level monitor for pharmacologic VTE prophylaxis. However trauma literature evaluating prophylactic enoxaparin dosing and checking LMWH anti-Xa levels has been done in a limited number of patients. Trauma literature evaluating goal trough anti-Xa levels of less than or equal to 0.1 IU/ml and peak levels of 0.2-0.4 IU/ml has been done. Peak anti-Xa levels of 0.2-0.5 IU/ml have been researched in obese medically ill patients and are considered the goal for this patient population.

Research currently suggests standard prophylactic enoxaparin 30 mg SUBQ twice daily may be inadequate in critically ill surgery trauma patients and dose adjustments based on LMWH anti-Xa level should be considered. A study evaluating the use of enoxaparin 30 mg SUBQ twice daily in critically ill trauma surgery patients showed 50 percent of patients with trough anti-Xa levels 0.1 IU/ml or fewer had significantly more DVTs than patients with trough anti-Xa levels 0.1 IU/mL and greater (37 percent vs. 11 percent, P = 0.026). Further evidence suggesting monitoring enoxaparin dosing by anti-Xa levels in trauma patients is supported by Ko et al. This study evaluated enoxaparin dose adjustment by trough anti-Xa levels and showed 83.9 percent of trauma patients receiving enoxaparin 30 mg SUBQ twice daily had subtherapeutic anti-Xa levels (0.1 IU/ml or fewer) and the majority of patients required a dose increase to 40 mg SUBQ twice daily. The dose adjustment group had significantly less overall VTEs compared to the control group enoxaparin 30 mg SUBQ twice daily. The literature correlating the development of VTE and goal anti-Xa level is not incredibly robust in trauma patients but does have some evidence for use.

Other trauma literature has evaluated LMWH anti-Xa levels in correlation to enoxaparin dosing with VTE outcomes data. A dose adjustment study of 61 trauma patients by Constantini et al of enoxaparin 30 mg SUBQ twice daily adjusted by increasing enoxaparin doses by 10 mg increments according to peak anti-Xa levels showed 43 patients (70.5 percent) had sub-therapeutic peak anti-Xa levels on enoxaparin 30 mg SUBQ twice daily. Adjustment of enoxaparin occurred in 27 patients (44.3 percent) as 16 patients (26.2 percent) were discharged prior to enoxaparin dose adjustment. No correlation with the development of VTE was done as the study was not powered to detect this difference. A recent study by Chapman et al evaluated the use of a VTE protocol using the standard VTE prophylactic enoxaparin 30 mg SUBQ twice daily in 51 trauma patients. Enoxaparin dose was increased or decreased by 10 mg according to peak anti-Xa levels (0.2-0.4 IU/mL). Results of the study show 72.5 percent of patients had initial peak anti-Xa levels less than 0.2 IU/mL while 27.5 percent of patients had therapeutic peak anti-Xa level 0.2 IU/mL or greater. Overall this study shows standard enoxaparin 30 mg SUBQ twice daily does not consistently achieve therapeutic prophylactic peak anti-Xa levels and dose adjustments are needed to reach goal peak anti-Xa levels. The use of peak or trough LMWH anti-Xa level monitoring has shown trauma patients need an increase in enoxaparin dose to 40 mg SUBQ twice daily in many patients but there is limited literature to correlate subtherapeutic anti-Xa levels to the development of VTE in trauma patients.

Overall, these studies show trauma patients receiving enoxaparin 30 mg SUBQ twice daily do not consistently achieve trough or peak anti-Xa levels and are at risk of development of a VTE due to under dosing of enoxaparin with standard enoxaparin dosing of 30 mg SUBQ twice daily according to the 2002 EAST Trauma guidelines and 2012 CHEST guidelines. The decision to use standard dose enoxaparin versus dose adjustments based on anti-Xa levels must take into consideration the patient’s weight and other risk factors for the development of VTE or bleeding. A reasonable approach to using LMWH anti-Xa levels is to consider using in obese patients with weight greater than 150 kg or trauma patients with multiple risk factors for VTE at the trauma physician and pharmacist discretion. Peak LMWH anti-Xa levels may be monitored with a goal of 0.2-0.4 IU/mL around the third or fourth dose with a dose adjustment of enoxaparin by 10 mg every 12 hours if the LMWH anti-Xa level is not within goal range.

The goal anti-Xa range for prophylactic enoxaparin has not been well described in the literature however studies evaluating enoxaparin 30 mg SUB twice daily in trauma patients commonly uses a range of 0.2-0.4 IU/mL. The goal peak anti-Xa level is specific to enoxaparin and must not be used with dalteparin. The optimal time to check the first peak anti-Xa level is one hour after the third or fourth dose to allow for enoxaparin to reach steady state.
concentrations. Dose adjustments for enoxaparin should take place after evaluation of the enoxaparin anti-Xa level and the adjustments should be done by increasing or decreasing each dose by 10 mg. Repeat anti-Xa level monitoring may take place after the third or fourth dose of new prophylactic enoxaparin dosing regimen.

Conclusion
Trauma patients are a challenging patient population with multiple risk factors for the development of VTE. The hyperdynamic nature of the trauma patient and variety of injuries requires careful consideration of starting and continuing VTE prophylaxis. The current recommended dose of enoxaparin for VTE prophylaxis in trauma patients is 30 mg SUBQ twice daily which is supported by high level evidence. This dose may be used in most patients without requiring dose adjustments but considerations must be taken for increasing the dose to 40 mg SUBQ twice daily in the obese patient (BMI 40 kg/m or greater). Trauma patients with solid organ injury, stable ICH and TBI may be safely initiated on VTE prophylaxis.

REFERENCES


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Introduction
Peer victimization (PV), or the negative behaviors intended to inflict injury or pain on the victim, is a subject of national unease evident in the nearly daily accounts scrutinized in media outlets and forums. While nearly one in every four children nationally reports experiencing victimization, recent studies suggest between 40-75 percent of rural youth encounter some form of PV during the school year. Given that victimized youth often report higher psychosocial and academic adjustment problems with potential longitudinal impacts including depression and suicidal ideation, there is an important need to study and address the impacts of peer victimization specific to rural youth. The lack of mental health resources and a culture of reluctance to engage in help-seeking behaviors often seen within rural communities can further exacerbate the potential immediate and longitudinal impact of victimization on mental health outcomes. Among rural adolescents experiencing victimization, research suggest distinct disparities, including heightened rates of depression and anxiety in comparison to their non-victim counterparts. In particular, results indicate 30 percent of rural children who report being bullied have had a suicide ideation in comparison to nearly half (13.8 percent) among their non-bullied classmates. Given the already alarming disparity in mental health outcomes and rates of suicide among rural youth, research efforts that focus on identifying and addressing the impacts of PV specific to rural youth are needed.

Developmental Trajectories and Peer Victimization Types
Early adolescence, in particular, is often marked with significant transitions both physically in relation to puberty and environmentally in relation to classroom and school structures. Youth are tasked with restructuring peer groups during this period, a process wherein some children exert social dominance over others as they cope with increasingly complex peer contexts. Subsequently, PV often increases during this developmental period and tends to escalate during elementary years, peaking in middle school. Together, the heightened prevalence of peer victimization, coupled with intensified stressors during this developmental period lays the foundation for potential psychosocial and mental health difficulties for many youth.

Peer victimization occurs through various forms that can differ in prevalence and impact. In-person victimization, including direct (i.e., hitting, kicking, pushing) and relational forms (i.e., social exclusion and rumor spreading) are often the most pervasive for elementary age students. Current government estimates suggest one in four children in the U.S. have been bullied on school property during the year, with 6 percent experiencing direct victimization and 13 percent relational. The 2016 Indicators of School Crime and Safety report indicates 42.6 percent of rural 3rd graders experienced PV, 15.1 percent noted direct victimization, 16.7 percent were teased, made fun
of, or called names, 24.7 percent were subject to lies or untrue rumors, and 18.4 percent were excluded from play on purpose. All victimization categories were higher for rural students when compared to city, suburban, and town locales with the exception of verbal victimization, with city students reporting 16.9 percent. Even higher rates were reported in a study with rural 3rd-8th graders where 82 percent affirmed being bullied in the past three months. Interestingly, the literature has produced no clear explanations for the disparity of heightened in-person PV for rural children.

Another type of PV, cyberbullying or “willful and repeated harm inflicted through computers, cell phones, and other electronic devices,” is becoming increasingly prevalent in early adolescence. With 56 percent of children aged 8-12 using a cellphone, it is clear youth have access to a variety of social media platforms and texting. Electronic victimization does have unique differences from traditional bullying with its potential for unlimited audience and no barriers in time and physical location. Much of the cyberbullying research focuses on children 12 years and up, leaving a significant gap in the literature for younger adolescents. Hinduja and Patchin, who have completed over a decade of research, suggest 27.9 percent of U.S. students have experienced cyberbullying in their lifetime. A study focused on 3rd-5th graders observed 17.7 percent of students reported cyberbullying, while another survey noted more than a fourth of rural students in the 5th and 6th grade experienced electronic victimization. Understanding the differential nuances and similarities of in-person versus electronic victimization within a rural context is key to future research prevention and intervention efforts.

**Risk and Resilience Factors**

To date, the majority of research focused on PV has examined associated risk factors or behaviors that predict future maladjustment. This trend is similar among studies of rural youth where risk factors such as isolation, socioeconomic stress, and barriers to treatment are unique to rural communities. However, studying associated protective factors or indicators that reduce or prevent victimization, such as social support, instead may provide a unique opportunity to intervene and/or prevent PV for these youth. For example, while bully-victims typically report low social acceptance from peers and adults, those experiencing social support have been shown to encounter less negative outcomes associated with PV such as aggression, anxiety, and depression. For rural communities, in particular, an individual’s feeling of community connectedness, or ability to count on their community for support or assistance, has been linked to reduced risk for suicide, decreased school delinquency in boys, and an increased feeling of protection. Minimal research has explored how this can serve as a source of resiliency for children affected by PV, even though the Centers for Disease Control and Prevention notes connectedness as a positive intervention tool to increase protective factors for youth. Similarly, students who experience high levels of parent support have been found to have less emotional and behavioral problems. High parental support is further linked to a decrease in bullying and victimization, depression, non-suicidal self-injury and aggression.

Studying the relationships of risk and resiliency within rural communities has, to date, been limited. Many of the federal level PV surveys are completed by urban students aged 12 and up (moving out of middle school and into high school), leaving a research gap for rural youth transitioning into middle school, a transition that has been well established in the literature as a peak for PV rates. While nearly 12 million children attend the approximately 27,000 rural public schools in the U.S., we continue to understand very little about the unique risks rural youth face in peer relationships and the roles community and family connectedness may play in their overall well-being and mental health outcomes.

**Local Impact**

For South Dakota, 109 of the state’s 151 school districts have fewer than 600 students, with 41.4 percent considered rural (population densities less than 500 people per square mile and places with fewer than 2,500 people) and 75.5 percent of those districts classified as rural remote (rural territory that is more than 25 miles from an urbanized area and is also more than 10 miles from an urban cluster). The South Dakota legislature requires a bullying policy for school districts; however, currently, the South Dakota Department of Education does not formally track bullying prevalence. Federal level high school results are the only data source available for South Dakota through the biannual Youth Behavior Surveillance System (YRBSS). South Dakota students have reported higher rates of risk-taking behavior and victimization with 21.6 percent of 9-12th-grade students reporting bullying on school grounds and 18.4 percent experiencing electronic
victimization (see Figure 1) over the past 12 months. These heightened rates coupled with South Dakota’s distinction as the third highest in youth suicides (5-14 years) nationally suggests the important need to understand the climate surrounding these peer relations and their impact on mental health outcomes for our youth.

**Figure 1. 2015 Youth Behavior Surveillance System Bullying Rates**

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**Conclusion**

Peer victimization is a complex social problem to which our rural communities and youth are not immune. Given the prior research suggesting the disparate rates and associated maladjustment evident among rural youth experiencing PV, South Dakota health care providers, educators, and researchers face a unique responsibility to better understand and address these disparities. Further, in better understanding the unique protective factors present in our rural communities, we have an opportunity to cultivate school and community environments to help our youth thrive.

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**REFERENCES**


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Examining Prevalence and Impact of Peer Victimization and Social Support for Rural Youth

By Jaymi N. Russo, MEd; Emily R. Griese, PhD; and Valerie J. Bares, PhD

Abstract

Introduction: Peer victimization is a common experience in early adolescence often associated with psychosocial issues, following some youth into adulthood. Preliminary findings from a longitudinal study on peer victimization and protective factors were measured in rural elementary youth. Bullying is often seen as a school-only issue but research findings suggest the importance of systems outside the school setting as important protective factors for intervention.

Methods: Preliminary data were collected through online questionnaires focused on direct, relational, and electronic victimization. Protective factors, including parent and community support, were also measured. Participants include 307 children (52.8 percent female; 80.4 percent White; mean age = 10) attending the fourth and fifth grade at four rural, South Dakota public school districts.

Results: Overall, 91.2 percent of the sample reported at least one peer victimization experience during the first wave of data collection. Traditional victimization results include 57.7 percent citing direct and 89.5 percent relational. Electronic victimization was 25.3 percent. Participants reported high levels of community (94.8 percent) and parent (68.3 percent) support. Community support was significantly, negatively correlated with all types of victimization but parent support was only significant in relation to direct victimization.

Conclusions: Findings provide an important baseline of the prevalence of direct, relational, and electronic victimization among rural young adolescents and the importance of community and parent support. Results demonstrate the need for a community wide approach including, health care providers, to take an active role to prevent and assist affected youth.

Introduction

Peer victimization (PV) is a common experience with often lasting consequences (see “Peer Victimization in Rural Youth and Why It Matters” in this issue of South Dakota Medicine). One in four students in the U.S. reports being bullied1 but limited research has been conducted around PV and social support in the context of rural communities, particularly in the early adolescent period. Previous studies indicate PV tends to increase across mid to late grade school (i.e., grades 3-6), peaking in middle school.2-3 Given the detrimental immediate and potential longitudinal effects, decreasing and ultimately preventing peer victimization in community and healthcare settings is critical for positive outcomes during adolescence and later into adulthood.

Present Study

The present study is part of a broader longitudinal investigation aimed at identifying distinct trajectories of PV, relevant protective factors present for rural youth, and the impact these early trajectories have on mental health outcomes over time. While data collection is longitudinal, the current findings reported here provides a preliminary look at rates and relationships within these data. Ultimately, this project is working to inform community-specific efforts in the development of more effective interventions by identifying the important heterogeneity,
including potentially at-risk (high victimization, low protective) and/or resilient (decreasing victimization, high protective) trajectories present among rural youth.

**Methods**

**Participants and Procedures**

Data for this initial wave were collected from children enrolled in 4th and 5th grade at one rural, distant (census-defined rural territory that is more than miles but less than or equal to 25 miles from an urbanized area) and three rural, remote (rural territory that is more than 25 miles from an urbanized area and is also more than 10 miles from an urban cluster) public school districts in South Dakota during the fall of 2017. IRB approval and school district consent was obtained prior to recruitment. All children in 4th and 5th grade were invited to participate through a consent form sent home via student backpacks. Across all schools, parent consent was 74 percent. After obtaining electronic assent, study data were collected and managed using REDCap electronic data capture tools. Each participant received a $5 gift card for his or her time and involvement. The classroom incentive, if 80 percent of parental consent forms were returned stating a yes or no for participation, was a field trip to the Sanford Research PROMISE Lab.

The sample includes 307 students (52.8 percent female) who range from age of 9 to 12 years. 81.4 percent of children are White, 13.4 percent American Indian, 2.6 percent Hispanic, 0.7 percent African American and 2 percent biracial.

**Measures – Peer Victimization**

To determine overall, direct, and relational PV prevalence participants completed the Multidimensional Peer Victimization Scale assessing physical victimization (e.g. “punched me”), verbal victimization (e.g. “called me names”), and social manipulation (e.g. “made other people not talk to me”). Response choices were “not at all (0)”, “once (1)”, and “more than once (2)”. Internal reliability for the adapted scale was good ($\alpha = 0.86$). Overall and subscale scores were calculated by determining any negative peer behavior (“once” or “sometimes”).

Electronic victimization measured participant’s experience with various forms of online aggression using the Cyberbullying Victimization Scale. Cyberbullying was defined for students and six questions were asked (e.g. someone spread rumors about me online). Those who had no experience were coded as zero, with the remainder on a scale of one (sometimes) to three (always). Good internal reliability was found for the adapted scale ($\alpha = 0.83$).

**Measures – Social Support**

Participant’s perception of help from parents/caregivers was measured using the Child and Adolescent Social Support Scale (CASSS). The parent subscale (e.g. “My parents or caregivers help me make good decisions”) contains six items recorded on a 4-point Likert scale from 0 (Never) to 3 (Always). Averaging the six items, high support was indicated by a score greater than two (“often” and “always”). The scale had good reliability ($\alpha = 0.91$).

Community connectedness was measured using seven items from adapted scales. Students were asked to “agree” or “disagree” to community support perceptions (e.g. “I feel I am an important part of my neighborhood”). High community connectedness was reported if at least four of the seven items contained a positive response. Internal reliability was $\alpha = 0.58$.

**Correlations**

Pearson’s Correlation Coefficient was used to analyze the association between victimization and community and parent support.

**Results**

The primary goal during this initial data collection wave was to determine the prevalence of direct, relational, and electronic PV in rural South Dakota schools and to establish preliminary protective factor correlations. The majority of students (91.2 percent) (See Figure 1) reported at least one negative instance of PV from the beginning of the school year to the time of the survey (approximately 3 months). Overall victimization was notably higher when
compared to the 2015 Youth Risk Behavior Surveillance Survey where 20.2 percent of U.S. students and 21.6 percent of South Dakota students were bullied on school property in the past year. Of the 307 participants, 57.7 percent reported at least one occurrence of direct victimization and 89.5 percent relational, both higher than national results. Electronic victimization was also higher than government reported national (15.5 percent) and state findings (18.4 percent), as 25.3 percent of rural study participants acknowledged being a victim of cyberbullying. Participants also described high community connectedness at 94.8 percent and 68.3 percent noted high parent support. Direct \( r = -0.13 \), relational \( r = -0.14 \) and electronic \( r = -0.25 \) victimization were negatively correlated with community support (See Figure 2). Parent support revealed a significant, negative correlation to direct PV \( r = -0.18 \). No significant differences were found between schools concerning victimization type or social support.

### Discussion

Rates within this study suggest youth in these rural South Dakota communities experience PV rates higher than other rural and national figures. Discrepancies in rates could be attributed to variations in PV definitions, measures, and age of participants. In either case, this is an evident disparity, one that is crucial for community advocates in our rural communities to identify the most effective intervention and prevention work to assist these affected youth. One promising strategy is to incorporate more social support constructs into an intervention that best meets the needs of rural youth. Results from the initial data collection revealed high social support in connection to parents and community. While there has been limited research on the importance of social support and PV interventions, rural communities may benefit from promoting parent and community connectedness and employing interventions that contain these protective factors.

### Future Directions

Where does this leave healthcare providers in supporting peer victimized youth? The American Academy of Pediatrics suggests having initial discussions about bullying with parents at the six-year old well-child examination. In 2018, The American Academy of Family Physicians published guidance that states family physicians have a clear role by focusing on prevention, screening early for bullying, recognizing signs, and providing support to patients and families, including referrals for those experiencing significant mental health issues. In addition, being aware of protective factors, such as family, peer, school and community support can be used for interventions against PV. Currently, there are no evidence-based screening tools for bullying, but medical providers may consider using timesaving electronic psychosocial assessment tools such as myAssessment or the Rapid Assessment for Adolescent Preventative Services. Simple conversation using indirect, open-ended questions related to bullying (i.e. “Do you feel safe at school”) or more direct questions asking if they have ever experienced bullying at school or through social media can be implemented. Emergency department (ED) providers also have opportunity to identify, treat and refer children who may present with injuries, psychiatric conditions, such as depression or suicide, or other somatic complaints. Many of the children who present at the ED may not have a primary care provider and/or experience high risk factors such as special health needs, sexual orientation or low social support, allowing opportunity to screen and refer as necessary. In general, every health care provider can implement simple, time-effective practices that address PV and the risks associated with it, leading to better mental and physical health outcomes for young rural patients.

### Limitations

Limitations do exist in the present study. The results only provide limited generalizability to other school systems due to the small sample of schools located in a specific region. In addition, there was relative homogeneity in terms of race of the participants and SES was not collected. Students self-reported their victimization and while youth
are considered reliable reporters, some participants may have under or over represented their experiences.

Conclusions
This study assessed correlates of PV and protective factors in a sample of rural youth. In general, the majority of these rural youth experienced peer victimization at rates higher than many previous findings and national rates. Community support was found to be significantly, negatively correlated with all forms of PV and has had limited research in the PV field. Given these findings, along with those related to mental health outcomes, the importance of recognizing the potential negative effects of bullying should be prioritized in young children’s health care.

Acknowledgement – This project is supported by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number 5P20GM121341. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

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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.” Over time, it expanded its service area to include Lincoln, Turner, McCook, Lake, Moody, Union, Hanson, Miner and Brookings Counties.

The Committee for the year 2017 was chaired by the Minnehaha County coroner and is composed of professionals representing expertise in pediatrics, medicolegal death investigations, nursing, law enforcement, child protective services, emergency medical services, and mental health. Sheriff and police departments from the participating counties are invited to be present for the reviews of deaths of children occurring in their counties. Representatives of the South Dakota Department of Health also attend the meetings to help coordinate infant death investigation throughout the state. To operationalize its goal of prevention, these 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

Fifty-one percent of the total resident deaths in the 10 county RICMRC review area in 2017 were from Minnehaha County. For illustrative purposes, the age distribution of these deaths is presented in Table 1. Important to recognize in these 2017 data is that 53 percent of the Minnehaha County resident deaths of those 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 52 percent between 1990 and 2017. Apparent over this span of time, is year...
Table 1. Minnehaha County Resident Deaths and Population

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Mortality data for 1997-2017 from the Regional Infant and Child Mortality Review Committee
Mortality data for the 1991-1996 from the SD Department of Health
Population data from US Census Bureau

Yearly variation in the number of infant and child deaths in the county. However, a comparison of the mean numbers of infant and child deaths for the intervals of 1991 to 2003 (mean = 26.2) and 2004 to 2017 (mean = 25.8) shows a similar number, in spite of the growth of the county’s population.

Great caution must be exercised when examining rates calculated with the small population base of the RICMRC area data. Nonetheless, for children (ages 1 to 17), the approximate 2012-2016 10 county regional rate of death (25 per 100,000 population) is lower than the state rate of 32, but higher than the national rate of 19.8 for 2012-2016. Further, the 2012-2016 rate of infant death (birth to age 1) in the RICMRC counties of southeastern South Dakota is approximately 5.7 per 1,000 live births and is lower than the state rate of 6.6 during the same period. The national rate of infant mortality for the years 2012-2016 was 5.9.

In 2017, 29 deaths met the Committee’s criteria and all were reviewed (compared to 32 cases in 2013, 25 in 2014, and 24 in 2015, 25 in 2016). Of the 29 reviewed cases, 15 were residents of Minnehaha County, and 14 were from Brookings, Lincoln, Turner, or Union Counties.

The reviewed deaths listed below are separated by their manner (natural, accidental, suicide, homicide and undetermined) with an additional section that addresses those attributed to sudden unexpected infant deaths (SUID). The number of deaths for 2017 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 2016. 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 59 percent of the reviewed cases since 2005 have been residents of Minnehaha County, some meaningful comparison of data between years is justified.


There were 12 deaths in 2017 due to natural causes. Among these, four were associated with neurological conditions. Three were associated with genetic conditions or congenital malformations. Cancer caused one death, and infections caused three. One death was related to a chronic medical condition.
The number of childhood deaths (n=5) caused by accidents in 2017 is lower than the mean of 7.7 for the previous ten years. These 2017 deaths involved a child choking on a foreign object, an unbelted teenager and a child playing near machinery. The other two deaths certified as accidental involved infants who were sleeping in unsafe environments and will be further described below in the SUID section of this report.


There were five deaths attributed to suicide in 2017. Several of these deaths occurred among children having a history of receiving mental health services and medication to treat depression. Caution must be exercised when interpreting data from one year for one cause of death among a small population, such as the 10 county area covered by the RICMRC. Nonetheless, the five suicide deaths observed in 2017 reveal a spike similar to what was observed in the region in 2013. Typically, there are one to two such deaths a year in the 10 county region yielding a rate that is consistent with the national mean 2012-16 suicide rate (1.9 per 100,000) for the population of 1 to 17 year olds. 1 The mean rate of suicide for the previous five years (2012-2017) for the RICMRC area is twice this rate (4.0) but less than the state rate of 5.2 for 2012-2016. 1


In 2017, four homicidal deaths occurred in the region, representing the highest annual number of deaths due to this cause in the past 21 years. Typically, there is one such death per year due to fatal maltreatment of infants or children. Unique to 2017, was the first time that RICMRC reviewed two homicidal deaths involving adolescents. Drug transactions among peers were involved in each of these deaths. The third case was a murder-suicide involving a distressed parent. The fourth case revealed maltreatment of an infant.


The manner of two of the three deaths with causes identified as undetermined involved sleeping infants and will be discussed in the below section on SUID. The other was a sudden unexpected death of a child for which a cause could not be determined.

Sudden Unexpected Infant Deaths 4 (5-2016, 7-2015, 5-2014, 5-2013, 4-2012, 2-2011, 3-2010, 3-2009, 8-2008, 4-2007, 5-2006, 4-2005, 0-2004, 3-2003, 4-2002, 4-2001, 4-2000, 7-1999, 6-1998, 1-1997) (Note: these deaths are included by their manner in the above sections of this report)

The above sections of this report and Figure 1 note in 2017 there were four deaths attributed to SUID in the RICMRC area. These included two coded as accidents and two as undetermined. The term SUID began to be used on a Center for Disease Control and Prevention.
(CDC) investigation form issued in 1996,4 and describes deaths attributed to three different coded causes classified as also having three different “manners.” These are: sudden infant death syndrome (SIDS) (a “natural” manner), strangulation and suffocation – to include overlaying – in bed (usually an “accidental” manner), and other unknown causes (an “undetermined” manner).5 It is quite likely that in previous RICMRC annual reports, the deaths listed in this 2017 report as SUID would have been listed as SIDS. Figure 1 shows that in the RICMRC region, between 2010 and 2017, there has only been one death coded as SIDS, while there have been between two and seven SUID deaths per year.

Figure 2 shows that the four SUID deaths in the RICMRC yielded a rate of approximately 0.84 and represents a decrease from previous years. This 2017 rate is less than that (0.91 per 1,000 live births) most recently reported in 2016 for the nation and for the state (1.4).2-3 Similar to observations made in previous years, each of the four 2017 RICMRC SUID deaths occurred in unsafe sleep environments that included adult beds or unsafe infant sleeping places. Bed sharing with a sibling or adult was also observed among these cases. With increasing use of complete death scene investigations, hazards in the sleep environment can be assessed and often are found to exist.6-7 Though a definitive causal link between these hazards and the death of an infant cannot be made, these tragic deaths do emphasize the importance of parental, caregiver and community education on safety of sleep environments for infants.

Advocacy Issues

Data from the reviews of the 2017 deaths highlight 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.* Adolescence is a time of vulnerability to social pressures and emotional volatility.

The five deaths observed in 2017 attributed to suicide reflect a very sad loss of life. A similar spike in suicides was observed in 2013. There are year to year fluctuations in all causes of deaths that reflect shifts in rates that are especially apparent in small populations. Nonetheless, if current national rates prevailed in the RICMRC area, between one and two suicides would occur per year in this 10 country region. Between 2013 and 2015, the region has seen an average of three such deaths. Reasons for this local higher suicide rate are unclear but its reality behooves attention to signs of distress among youth and their families.

Adolescence is a time of emotional volatility. While access to mental health services is essential for troubled youth, even with this care, life can be lost. Vigilance in recommending that fire arms or other dangerous materials be removed from homes of children experiencing distress is a preventive strategy that may impede an impulsive young person’s ability to end his or her life. Reviewing with families of youth how homes can be made safer must
accompany encounters with health professionals who treat troubled youth. The Committee applauds the work of the local Help Line Center that offers direct care to at-risk teens and to those who have survived personal loss caused by suicide.

The spike observed in youth suicide deaths also beckons attention to community issues that may be contributing to impulsive dangerous reactions to stressful events in the lives of youth and their families. Are new strategies needed to help youth cope with loss, disappointment, and stress? Have life experiences become more severe or are families less able to buffer the responses experienced by youth as they develop greater capacity for coping with emotions? Perhaps both are emerging realities. Consideration of these variables with attention to the ecology of adolescence may be useful in identifying strategies that could prevent this troubling cause of death. Further, there must be recognition for how the data reported here do not include attempted suicides, some of which lead to life-long disabilities.

2. Child maltreatment and homicide are realities that demand vigilance.

In 2016, a spike in homicidal deaths was observed when three young children died from inflicted trauma. In 2017 this previous spike was again observed with four homicide deaths in the region. A new finding among these deaths was the occurrence of two deaths of teenagers. This is the first time that we have seen youth homicide deaths in the RICMRCArea. Further, each of these deaths was the outcome of peer-related violence involving a drug transaction. Law enforcement professionals suggest this may be the beginning of a new trend warranting attention to a downward progression in age of those involved with use and sale of illegal substances.

The other two deaths reveal dynamics previously seen with infants and children of distressed parents. How greater sensitivity to the dynamics leading to these deaths can be developed and how supports may have been provided to de-escalate the tensions that led to their tragic consequences are issues that typically arise when children die in the hands of those responsible for their care and protection. What becomes apparent when the circumstances of such loss of life are examined is the need for community responses that involve coordinated efforts to protect children.

The Committee again applauds the state’s creation of a new Center for the Prevention of Child Maltreatment. This Center will provide focused attention on strategies, programs and policies that promote protective practices for the care of children.

3. *Unexpected infant deaths during sleep occur in unsafe sleep environments.*

Similar to previous years, each of the four SUID cases in 2017 involved hazards in the sleep environment where the infant died. In addition, three deaths involved bed-sharing. In recent years, when thorough death scene investigations have taken place, rarely has a sudden unexpected death of an infant occurred in a setting considered to be safe. Current recommendations for infant sleep from the American Academy of Pediatrics include the following:

- Place a baby on his or her back on a firm sleep surface with a tight fitting sheet
- Avoid use of soft bedding (bumper pads, blankets, pillows or soft toys) – a crib should be bare
- Have the baby share a bedroom with parents, but not the same sleeping surface, preferably until the baby turns 1 but at least for the first six months
- Avoid the baby’s exposure to smoke, alcohol or illicit drugs

The challenge for all who interact with new parents is to assure that these recommendations are communicated in a manner that fosters parental compliance with them. Bed sharing has been observed in a number of the cases reviewed. Not uncommonly parents in these circumstances are compromised by exhaustion, alcohol or other illicit substances, or medication. Direct communication regarding the dangers of this practice is a preventive strategy that must also accompany resources to provide safe sleep.

To be emphasized is the need for education on safe sleep to reach beyond the population of new parents. While extended families with new babies must receive this information, so must entire communities so that expectations for safe sleep for infants become a norm. The Committee repeats its call for public awareness of how all citizens can play a vital role in promoting safe sleep for babies. We describe, again, how narratives surrounding the events that have occurred just prior to a SUID death often include a rushed decision to do what is easiest at a stressed moment. Exhausted parents or harried child care providers, even those who usually place infants in safe
sleeping environments, are prone to justifying placing a baby in an unsafe position “just this one time” and the “one time” can become fatal. Further, babies are known to die as house guests where proper places for them to sleep fail to be used in an unfamiliar setting. Care in using a horizontal flat firm protected surface for the baby’s sleep is needed in such situations. Bed sharing or sleep in infant carrier devices pose hazards for sleeping infants. Further, advocacy efforts need to reach out to those who market and sell equipment for infant sleep to assure their safety.

4.* Proper seatbelt use is vital to survival.
The 2017 death of a teenager in the region may have been prevented had a seat belt been used. While teens hold a robust belief in their immortality, the habit of seatbelt use may be developed during early childhood when adults routinely “buckle up” and assure that all passengers are belted before a car begins to move. Messages about the life saving benefits of seat belts must focus on entire communities to promote the expectation that belting before driving is essential to prevent injury or death.

5.* Parents with limited intellectual capacity require intensive surveillance.

6.* Infants and young children place objects in their mouths upon which they may choke.

7.* The Big Sioux River creates safety hazards for the region.

8.* The sleeping environments for all children and adults should be protected by working smoke detectors.

9.* Maternal use of tobacco, alcohol and illicit drugs is a known risk factor for SUID.

10.* Care must be taken to assure that all infants and children have periodic physical examinations to detect potentially preventable and treatable illness and immunizations.

11.* Follow up activities from the 2011 State Task Force on Infant Mortality convened by First Lady Linda Daugaard, include coordination between the South Dakota State Department of Health, RICMRC and the similar committee that reviews infant deaths in the Rapid City area. State support enables these committees’ reviews of an expanded cohort of infant deaths and analyses of the data generated from these reviews may enable the targeting of prevention efforts.

Report submitted by the 2017 Regional Infant and Child Mortality Review Committee:
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Ann Wilson PhD, Vice Chair, University of South Dakota
Jerry Blake, MD, Retired Developmental and Behavioral Pediatrician
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Background
Percutaneous coronary intervention (PCI) in patients with large caliber coronary arteries (5 mm and greater) can be challenging. There are currently no solid recommendations available to help operators treat these vessels with PCI. The deployment of undersized coronary stents in such patients carries with it risks of architectural distortion and future stent thrombosis/stenosis.

Case Details
We report a case of an 88-year-old gentleman who was hospitalized to treat community acquired pneumonia. During hospitalization, the patient complained of anginal chest pain at rest. Cardiopulmonary exam was unremarkable. EKG showed new ST elevation in leads II, III, and aVF. Troponin levels were also elevated. The patient was emergently transferred to the catheterization laboratory and coronary angiography via right trans-radial approach showed subtotal thrombotic occlusion of the proximal right coronary artery (RCA, Figure 1). A 6 Fr Amplatz Left 1 guide catheter was used to engage RCA. A BMW guidewire crossed the proximal RCA lesion. A 2.5 x 12 mm balloon was inflated at 14 atm for seven seconds for predilation (Figures 2 and 3). A 6 x 24 mm Cordis Peripheral Palmaz Blue biliary stent was selected for PCI. The BMW wire did not provide enough support to advance the large stent across the lesion so we switched to a Cordis Peripheral SV-5 (Figure 4) 0.018” guidewire. Then the stent was advanced successfully and deployed at 15 atm. The result of PCI was good, including TIMI 3 flow (Figure 6). The patient improved clinically and was discharged to subacute rehabilitation in stable condition three days later.

Discussion
The deployment of biliary bare metal stents in coronary arteries to treat ST elevation myocardial infarction (STEMI) is uncommon. At present, there are no coronary artery stents available which can be used in large vessels with diameters greater than approximately 5 mm. This case highlights a clinical scenario in which a stent...
normally used in biliary interventions can be used in percutaneous coronary intervention in order to avoid risks associated with deployment of undersized coronary stents. Furthermore, a larger, peripheral guidewire was needed in this case for successful revascularization. We used this equipment “off label” as there is no Food and Drug Administration approved coronary equipment that would be successful in this case. In the future, development of larger coronary artery stents and other devices may improve patient outcomes in similar scenarios.

Conclusion

There is paucity of data regarding efficacy of peripheral stent in large coronary arteries in patients presenting with acute coronary syndromes. At times, implantation of non-coronary stents into coronary arteries is the only option available. This case demonstrates the need to collect data on how frequently culprit lesions are located in large coronary arteries, the way such diseased vessels are managed, and their short-and long-term outcomes.

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By telling your patients about the All Women Count! Program, more women are here today, and will be long into the future.

I wanted to personally thank you for your help with the All women Count! Program. My mother lost her battle with breast cancer in 1985, so I am very diligent about getting annual screenings.

Last year I lost my full-time job. When it came time for this year’s appointment, I felt the additional stress of having a huge medical bill and the chance of a cancer diagnosis.

It was your program that helped me worry less and get the care I needed.

Please tell everyone involved with AWC that their efforts are very much appreciated.

Vicki
AWC Participant

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Delayed Anaphylaxis to Mammalian Meat: A Fascinating Disease and Captivating Story

By Mohamed A. Abdallah, MBBS; and Eric A. Larson, MD, FACP

Abstract

Delayed anaphylaxis to mammalian meat is a newly recognized IgE-mediated syndrome associated with Lone Star tick bites. IgE-mediated anaphylaxis classically occurs within one hour of exposure to the allergen, which is typically a protein epitope. However, in this disease, circulating antibodies to a carbohydrate, alpha-gal (galactose-alpha-1,3-galactose), stimulate the anaphylactic cascade with hives, diarrhea, abdominal cramps, respiratory distress and anaphylactic shock developing after ingestion of beef, pork or lamb meat. The delayed onset of symptoms three to six hours after ingestion of meat is unique. Recognition and understanding of this disease is important for treating and educating patients with suggestive symptoms. Avoidance of red meat is the recommended therapy.

What Is It?

Delayed anaphylaxis to mammalian meat caused by tick bites is a newly recognized syndrome with a unique pathophysiology and clinical presentation. It was initially reported in the Southeastern U.S. (Tennessee, North Carolina, Arkansas, Missouri and Virginia). Subsequent cases were more widespread and included cases in Texas, Georgia, South Carolina, Mississippi, Kentucky, Oklahoma, and West Virginia. Outside of the U.S., there have been cases reported in Australia, France, Germany, Sweden, Spain, Italy, Japan and Korea.

Anaphylaxis to mammalian meat is triggered by circulating IgE antibodies to the carbohydrate galactose-alpha-1,3-galactose (alpha-gal). These IgE antibodies in the U.S. are caused by bites of larval or adult Lone Star ticks (Amblyomma americanum) predominantly, if not exclusively. The IgE response with resultant histamine release is implicated in pathogenesis of the reaction.

Patients with IgE alpha-gal antibodies develop hives, shortness of breath, angioedema, congestion and wheezing. Patients might report diarrhea and abdominal cramps, and could become hemodynamically unstable and develop anaphylactic shock three to six hours after ingestion of mammalian meat. Patients commonly present after waking in the middle of the night with hives and anaphylaxis after ingesting red meat for dinner. Patients might report a history of exposure to tick bites with symptoms occurring after eating red meat, but not fish or poultry. A high suspicion and understanding of the epidemiology of the disease is imperative for diagnosis. The diagnosis is confirmed using IgE immunoassays to galactose-alpha-1,3-galactose (alpha-gal), which are commercially available.

Alpha-gal is a carbohydrate found on non-primate mammal and tick glycoproteins. Humans and higher primates cannot produce alpha-gal, which makes it possible to stimulate production of IgG antibodies to this oligosaccharide. Alpha-gal is a major transplantation barrier between primates and other mammals.

Figure 1. The structure of alpha gal compared to blood group A and B

Blood group A antigen Blood group B antigen Alpha-gal

α1,2 α1,3 α1,4

R

α1,3 α1,4

α1,2 R

α1,3 α1,4

α1,2
The identification of delayed anaphylaxis to red meat, it had not been known to cause IgE-mediated anaphylaxis.\(^1\)

Avoidance of all mammalian meat (including beef, pork and lamb) is the current recommendation for alpha-gal sensitized patients. As anaphylaxis is potentially fatal; counseling and education about avoidance of tick exposure, in addition to equipping patients with an epinephrine auto injectors, is vital in management.\(^2\)

**Why is it Unique?**

There are numerous unique and unusual aspects in the pathogenesis and clinical presentation of this syndrome. Adult-onset food allergy is rare, and patients with this disease report a history of ingestion of red meat for many years with no symptoms. In contrast to typical IgE-mediated anaphylaxis which occurs within one hour of allergen exposure, the anaphylaxis in this syndrome is delayed, with the IgE-mediated response to antibody alpha-gal occurs on average 3-6 hours after ingestion of alpha-gal containing meat. Interestingly, commercially available skin prick tests for mammalian meat are most often negative.\(^4\) Moreover, in classical food allergies (milk, egg, wheat, soy, peanut, tree nut, fish and shellfish), the major epitopes are known to be proteins. However, alpha-gal is unique, as it is a carbohydrate recognized by IgE antibodies.\(^2\)

**Discovery, Why is it Important to Report Cases and to Link Clues, Document Observations and Utilize Epidemiology?**

The identification of the relationship between tick bites and meat allergy is as interesting and unique as is the disease itself. It is a story in which close observation, case reporting, the use of epidemiology and insightful analysis was essential in elucidating the disease process.

The story began in 2005, with an increased incidence of anaphylaxis in patients receiving cetuximab (a monoclonal antibody against epidermal growth factor receptor used for treating colorectal and head and neck cancers) was observed.\(^1\) Patients who developed anaphylaxis did so within minutes of receiving their first intravenous infusion of cetuximab. Interestingly, evidence of IgE antibodies against cetuximab was present before the first exposure to the medication.\(^1\) This IgE was specific for alpha-gal that was present on the Fab portion of the cetuximab heavy chain.\(^1\) Complicating this observation was the fact that alpha-gal is a carbohydrate found on non-primate mammal and tick glycoproteins, but is not made by humans.\(^1\) This carbohydrate had not been known to cause IgE-mediated anaphylaxis.\(^2\) During monoclonal antibody production using animal cell lines, oligosaccharides made by the animal cell attach to the antibody.\(^1\) In theory, foreign oligosaccharides such as alpha-gal can cause an allergic reaction. However, such reactions were thought to be uncommon because humans typically make IgE antibodies against protein, not carbohydrate determinants.\(^1\)

Cases of cetuximab-associated anaphylaxis have been shown to have a geographic predominance in the southeastern U.S. (sensitization was as high as 20 percent in some states).\(^1\) Researchers have postulated that sensitization to alpha-gal in the Southeastern states has an association with tick bites since development of IgE alpha-gal seemed to follow tick bites in certain individuals.\(^2\) In fact, the geographic distribution of the cetuximab-induced anaphylaxis and reported delayed reactions to red meat correlate with the distribution of the Lone Star tick, (Amblyomma americanum), and match the maximum incidence of Rocky Mountain Spotted Fever which is transmitted by the same tick (Figure 2).\(^4\) In other countries, other tick species, such as *Ixodes ricinus* in Europe, and *Ixodes holocyclus* in Australia, have been implicated in the pathogenesis of meat allergy.\(^1\) However, *Ixodes scapularis*, the main vector of Lyme in the U.S., does not induce IgE to alpha-gal and is less likely to cause itching compared to the Lone Star tick.\(^4\) The Lone Star tick is much more aggressive in both adult and larvae forms than *Ixodes scapularis*.\(^1\) The larvae tick (also called seed tick) bites are often confused with chiggers (larval form of the Trombiculid mite).\(^4,13,14\) Long attachment, repeated attachments, and large numbers of larvae bites are all contributing risk factors to development of anaphylaxis.\(^13\) The presence of alpha-gal has been found in the gastrointestinal tract of ticks, matching the staining pattern in sera of patients with IgE positive to alpha-gal.\(^19\)

The question of why this anaphylaxis emerged dramatically over the last few years remains unanswered. Although the exact mechanism is unknown, the epidemiological evidence in the U.S. would suggest that the rise in the deer population has played an important role.\(^14\) The exponential increase in lone star tick population parallels the increase in the deer population (a major carrier of these ticks in the U.S.) in the past 30 years.\(^10,11\) It was linked to the enactment of leash laws for dogs, a decrease in the number of hunters, and movement of the deer into suburban areas, which provide a means for the ticks to be transported over large geographic areas quickly.\(^4\)
Desensitization therapy for alpha-gal sensitive patients has been successful in the case of cancer patients requiring treatment with cetuximab, but to date, has not been accomplished in the case of meat-allergic patients. Patients with this syndrome remain symptom free with avoidance of red meat, and report no symptoms with ingestion of non-mammalian meat such as turkey, fish or chicken. The long-term prognosis of this condition is not well described. However, it is thought that if a strict diet is followed, and tick re-exposure is avoided, reactions may lessen over time.1,2,3

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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Coronary Artery Perforation Spilling into Right Ventricle: A Rare Complication of Percutaneous Coronary Intervention

By Aiham H. Jbeli, MD; Prince Sethi, MD; Shawn Kelly, MD; Amol Raizada, MD; Tomasz Stys, MD; and Adam Stys, MD

Abstract
Injury to the coronary circulation during percutaneous interventions is an existent risk. One of these is coronary artery perforation that can have grave consequences. Fortunately, this is rare and overall there is a declining incidence of complications due to technological advances and extensive experience over time. Predictors of coronary artery perforation include the administration of glycoprotein IIb/IIIa inhibitors, the use of hydrophilic guide wires, and the use of noncompliant high-pressure intracoronary balloons. Complex coronary lesions and the presence of total chronic occlusion are additional risk factors. In this paper, we present a rare class III coronary artery perforation with spilling into the right ventricle. Our case exemplifies all the aforementioned risk factors for perforation. The perforation was successfully sealed with a polytetrafluoroethylene covered stent and the patient remained hemodynamically stable.

Introduction
Percutaneous coronary intervention (PCI) is the principle method for managing significant symptomatic coronary stenosis that is deemed non-surgical. Iatrogenic vascular complications attributed to PCI have been reported since its introduction and continue to be described. In 1998, Ellis et al. performed the first landmark study that bestowed the Ellis classification of coronary artery perforation, describing class I as an extra-luminal crater without extravasation of contrast; class II as a pericardial or myocardial contrast blush; class III as an extravasation through a definite perforation (1 mm or greater) or spillage of contrast into an adjacent cavity.¹

Case Report
A 65-year-old male presented to our facility with progressive angina pectoris and dyspnea on exertion for three months. New T-wave inversions in the anterior leads were noted on electrocardiography, and the troponin I level was elevated at 0.06 ng/mL (ref. range is 0.00-0.03 ng/mL). Medical management was initiated with intravenous nitroglycerin, tirofiban, and unfractionated heparin. The patient underwent coronary angiography, which revealed chronic total occlusion (CTO) within the stent of the proximal to mid-left anterior descending artery (LAD) (Figure 1). A decision was made to re-canalize the vessel, and PCI of LAD CTO was performed. A hydrophilic intracoronary wire was advanced across the CTO segment. Balloon angioplasty was performed with a 2 x 20 mm compliant balloon; Thrombolysis in Myocardial

Figure 1. Coronary angiogram showed in-stent restenosis with chronic total occlusion of the mid left anterior descending artery
Infarction (TIMI) grade 2 flow was achieved without suggestion of vascular compromise (Figure 2). A 2.25 x 32 mm drug-eluted stent was successfully deployed in the LAD, but post-deployment angiography revealed a class III coronary perforation of the distal LAD (Figure 3). There was a brisk flow of contrast with spillage into the right ventricle. The patient remained hemodynamically stable and an emergent transthoracic echocardiography did not reveal any pericardial fluid collection. An intracoronary balloon was inflated across the stent edge to tamponade the perforation. Repeat angiography revealed the persistence of the fistula without distal vessel thrombosis; therefore, a polytetrafluoroethylene (PTFE) covered stent was inserted at the perforation site (2.8 x16 mm).
Discussion

Coronary perforation is a relatively rare complication of PCI; Fukutom i et al. described coronary artery perforation in 0.93 percent of 7,443 PCI cases. Class I and class II injuries accounted for the majority of identified perforations. An alternate classification score was suggested by Kini et al.; however, the Ellis classification remains the preferred classification for prognostic and risk stratification. Despite the initially reported incidence of 0.1-3 percent, a noticeable decline has occurred which is likely attributed to technological advances and the accumulation of experience. Recently, in a pooled analysis of 16 studies, the cumulative incidence of perforation was 0.43 percent of 197,061 performed PCI cases.

Class III perforations were associated with the highest mortality and likelihood of developing cardiac tamponade. In a retrospective analysis of 24,465 PCI cases, class III perforations occurred in only 56 patients (0.23 percent). The features associated with an increased risk of high-grade coronary artery perforation have been stratified by the patient, lesion, and procedural characteristics. Patients with coronary artery perforations had an increased prevalence of hypertension (82 percent), were older, and presented with an acute coronary syndrome (81 percent). Interestingly, fewer patients presented with ST-elevation myocardial infarction (7 percent). High-grade complex lesions have increased risk of perforation. Class C and chronic total occlusions account for 51.8 percent and 28.6 percent of perforations respectively. Additional angiographic characteristics that are associated with an increased risk of perforation include a small vessel caliber, increased tortuosity or angulation, and prominent lesion calcification. They tend to occur more frequently in right and circumflex arteries. Chronic total occlusion was a particularly pertinent risk factor for our case. The highest incidence of perforations (13.6 percent) has been described in the Japanese registry of CTO PCI.

Some reported modifiable risk factors include use of glycoprotein IIb/IIIa inhibitors, high pressure and noncompliant intracoronary balloons, and hydrophilic guidewires. Intravascular ultrasound and athero-ablative procedures are most highly correlated with perforation with odds ratios of (1.59, 95 percent CI 1.03 to 2.44) and (3.71, 95 percent CI 2.33 to 5.91) respectively.

Management of coronary perforations includes balloon tamponade, embolization or covered stent implantation. Cavity spilling perforations are rare and have only been described in a small number case reports. Treatment is generally less aggressive, presumptively because the fistula is unlikely to cause pericardial tamponade and the fact that shunting is minor. Our patient had a class III perforation with cavity spillage into the right ventricle that did not cause hemodynamic compromise. This afforded time so that a balloon mediated tamponade strategy could be followed by placement of a polytetrafluoroethylene (PTFE) stent – thereby preserving vessel integrity.

Acknowledgements: The authors acknowledge the contribution of Dennis C. Stevens, MD for his technical assistance with the preparation of this manuscript.

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.
Fact:

- A single JUUL pod contains as much nicotine as a pack of 20 regular cigarettes.
- Nicotine can harm a growing brain – it is known to damage brain circuits that control attention, learning, and susceptibility to addiction.
- Young people who use e-cigarettes may be more likely to go on to use regular cigarettes.

JUULing is dangerous.

The newest e-cigarettes are shaped like flash drives and are being used at alarming rates by teens. They are very discrete and come in an array of tasty flavors. Remind young patients and parents that tobacco use in ALL forms comes with serious health risks and encourage them to talk about JUULing.

Mom, everybody is JUULing. It's no big deal... way safer than smoking, and it's fun.

Well... some people use vape short term to help them quit smoking, but the truth is, vape is full of cancer causing chemicals, heavy metals, tin, lead, and high levels of nicotine. Not only is nicotine very addictive, but it can stunt your brain growth.

A few maybe. But most kids want the nicotine buzz and all JUUL pods contain lots of nicotine. And it's not fully regulated yet, so you may not know what you're getting. If you keep using it, it will damage your brain permanently. You'll never know how smart been.

Some don't contain nicotine. It's just harmless flavor and water vapor...

Whoa – I didn’t know that. I think I might stay away from that stuff. So not worth it.

WARNING: E-cigarette use among young people has risen significantly over the last 5 years. Use among middle and high school students has now surpassed use of regular cigarettes.
A long-awaited update to the Clostridium difficile infection (CDI) guidelines was published within this past year by the Infectious Diseases Society of America (IDSA) and Society for Healthcare Epidemiology of America (SHEA). This update provides valuable guidance for the management of this serious complication of antimicrobial use. Recommendations for the treatment of children with CDI, a population not specifically addressed in the 2010 guidelines, are a key addition. The use of probiotics is addressed, but recommendations are similar to the 2010 guidelines, again citing insufficient evidence for use in primary prevention. Importantly, guideline writers attempted to make stronger recommendations toward diagnostic testing and antimicrobial treatment of CDI. Testing and antimicrobial treatment recommendations (particularly for non-severe CDI) have created some controversy and these two areas will be the focus of this discussion.

**Diagnostic Testing Recommendations**

Guideline writers addressed several diagnostic testing methods in the 2010 guidelines. This included discussion related to the strengths and limitations of stool culture, enzyme immunoassay (EIA), and polymerase chain reaction (PCR). Each of these tests was noted to be plagued by impracticality (stool culture), low sensitivity (EIA), or inadequate data (PCR). Given these limitations, no preference for any one testing strategy was recommended at the time. The 2017 guidelines are written with more specific guidance, endorsing several testing strategies to choose from depending on the presence of pre-agreed institutional criteria for stool specimen submission.

Quality of stool specimen has been recognized as an important factor in interpreting the results of diagnostic testing for CDI. IDSA/SHEA emphasizes testing should be optimally performed on specimens obtained from patients with three or more unformed stools in 24 hours. These unformed stools should be new onset and not explained by other factors such as laxatives. If strong institutional policies are in place to ensure appropriate specimen submission and testing, IDSA/SHEA suggests nucleic acid amplification test (NAAT; formerly termed PCR) may be used alone, a recommendation they grade as a weak based on low quality evidence. Because NAAT cannot differentiate colonization from infection, it is important to reserve NAAT-only testing for patients with appropriate stool specimens (meeting predefined criteria), recent antibiotic use and symptoms consistent with CDI. Given the limitations of NAAT-only data, guideline writers also give the option for a multi-step approach even in situations where stool specimens are well controlled, adding a toxin EIA in a multi-step approach (i.e., NAAT plus toxin EIA). This is also noted to be a weak recommendation based on low quality evidence. Finally, for institutions where stool specimens are not well regulated (accept all stool samples for testing), NAAT-only testing is not recommended due to the previously mentioned difficulties differentiating colonization from infection and the potential for over-diagnosis and unnecessary treatment.

A multi-step approach such as NAAT plus toxin EIA is again suggested in this scenario, as multi-step algorithms that include toxin testing may be more specific for CDI when all stool samples are accepted (weak recommendation, low quality of evidence).

Questions remain as to what value toxin EIA will actually provide in addition to NAAT, particularly for institutions that have established effective policies controlling stool specimen submission. For example, what action should be taken with a patient with symptoms consistent with CDI, a positive NAAT and a negative toxin EIA? Treat despite negative toxin test due to symptoms? Don’t treat due to the negative toxin EIA test despite symptoms? It can be confusing for a provider. Ultimately each facility must make their own decision on optimal testing and providers will have to make patient-specific decisions on how to interpret results.
Oral metronidazole no longer recommended first-line for initial episodes of non-severe CDI

While 2010 guidelines recommended oral metronidazole for initial episodes of mild-moderate CDI and oral vancomycin for severe CDI, the 2017 guidelines have removed oral metronidazole as a preferred agent for any level of severity. Oral vancomycin or fidaxomicin is now recommended over metronidazole for initial episodes of either non-severe or severe CDI (strong recommendation, high quality evidence). While intravenous metronidazole remains as a recommended option in combination with oral vancomycin for the treatment of fulminant CDI (defined as hypotension or shock, ileus, or megacolon), oral metronidazole is only recommended for non-severe initial episodes if the preferred agents are unavailable (weak recommendation, high quality evidence).

Some have advocated for retaining oral metronidazole as an option for the treatment of initial episodes of mild CDI, citing data with comparable results between oral metronidazole and vancomycin in mild disease. These authors also suggested comparison studies of oral vancomycin and oral metronidazole may be significantly influenced by patients with severe disease. Guideline writers argue oral vancomycin has consistently outperformed oral metronidazole in numerous studies that include patients with CDI at all ranges of disease severity. They also suggest given the increasing availability of relatively inexpensive dosage forms of vancomycin, such as commercially available oral solution and generic capsules, there is no compelling reason to suggest oral metronidazole as a preferred agent, even for non-severe disease. Given the ongoing controversy surrounding this issue, it is expected providers will continue to make patient-specific decisions on CDI treatment for non-severe disease, particularly if drug availability and cost issues are in play.

In conclusion, the IDSA/SHEA guidelines are a welcome update for the diagnosis and treatment of CDI. Given the limitations of current evidence, questions regarding the best diagnostic testing strategy and treatment approach remain, particularly for non-severe disease.

REFERENCES

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Hardly any clinical problem demands more from a patient and a physician than diabetes. The condition demands a special diet, significant exercise, lots of monitoring, expensive oral and injectable medicine, and a rescue plan when things get out of control.

Regarding the need for a special diet, there are different ideas about what is the correct for a diabetic to eat. There are low carbohydrate plans, low fat plans, low meat plans, high fiber plans, and the list goes on. Whatever the plan may be, the biggest challenge, and probably the most important one, is to eat less and to do that forever. However, asking someone to always eat less seems almost too much to expect.

Regarding the need for a special exercise plan, there are different ideas about what is the correct way to exercise and often the capacity of the individual to exercise is limited. Whatever that plan may be, the biggest challenge is in the doing. People with (and without) diabetes need to get enough exercise and to do it regularly (daily), but that also seems almost too much to expect.

When exercise and a special diet are not enough, various diabetic medicines or non-insulin injections can be prescribed. When these fail, various types of insulin are added. Some are long-acting, and some are short-acting. Another challenge to this condition is that medicinal treatment options seem more expensive over time, not less, even though the patent for these pills should have run out.

Regarding the need for monitoring, people with diabetes and their doctors are asked to keep track, not only of blood sugars, but also of cholesterol, blood pressure and the condition of their feet, eyes, and kidneys. Physicians and other care providers are under the gun by insurance companies and the government to meticulously monitor diabetics and are even being graded on how well they do this monitoring. Therefore, care providers are bugging the person with diabetes to carefully monitor themselves too. It almost seems too much to expect.

People with diabetes sometimes have out-of-control blood sugars despite doing everything right. It’s been my experience, especially when insulin is being used, that sometimes there is no rhyme or reason for a person’s blood sugar to be too high or too low, but it still happens. Rescue plans must be made and practiced.

Hardly any clinical problem demands more out of a patient and a doctor than diabetes.
South Dakota Board of Medical and Osteopathic Examiners
2018 Legislation Update

The South Dakota Board of Medical and Osteopathic Examiners (SDBMOE) submits a column to South Dakota Medicine to inform physicians and other licensees about various topics of interest that come to the Board. Here is an update of the new 2018 laws that are of interest or directly affect SDBMOE licensees.

Senate Bill 71 (SB 71) was sponsored by the South Dakota Medical Association and is effective on July 1, 2018. This new law makes two changes to the South Dakota Medical Practice Act:

1. Requires physicians to notify the Board, within 30 days, of any acts, including but not limited to:
   a. Any changes in contact information, unprofessional conduct, malpractice or privilege to practice issues, hospital disciplinary actions, alcohol or substance abuse issues, and law enforcement issues.

2. Medical licenses change from an annual renewal to a two (2) year renewal in the odd numbered years. This law will be in effect after July 1, 2018. The initial, reinstatement, and biennial renewal license fees for physicians were all increased to $400.00 as required.

House Bill 1019 (HB 1019) revised provisions regarding background checks for physicians and was passed by the South Dakota Legislature with an emergency provision, and was made effective upon Governor Dugaard’s February 5, 2018 signature. The bill requires an applicant for expedited licensure (through the Interstate Medical License Compact) to submit to a criminal background investigation.

House Bill 1020 (HB 1020) revised provisions and regulations regarding medical assistants after 2017 legislation ended the joint regulation of the Board of Medical and Osteopathic Examiners and the Board of Nursing. This legislation removed references to the Board of Nursing and any mention of joint regulation in the medical assistant practice act, and is effective after July 1, 2018.

House Bill 1079 (HB 1079) was sponsored by the South Dakota Physical Therapy Association to allow physical therapists with advanced training to perform dry needling. Physical therapist assistants are not included in this law and are not permitted to perform dry needling. The bill will go into effect after July 1, 2018; however, dry needling cannot take place until rules regarding dry needling have been established and passed by the SDBMOE. Every effort is being made to have the rules in place by July 1, and the SDBMOE will be informing all physical therapists of the process before the performance of dry needling can begin.
Reducing the Dementia Burden through Appropriate Diagnosis and Treatment Methods

By Stephan Schroeder, MD, CMD, CMQ
Medical Director, South Dakota Foundation for Medical Care

The decline in cognitive function characterized as dementia places an emotional and financial burden on family members, caregivers, residential facilities and society as a whole. This disorder represents a decreased ability to function in one or more cognitive domains. Those deficits often progress to interfere with daily living and independence. The criteria for dementia impairment involve one or more of the areas of learning, memory, language, social cognition, attention and function.

There are multiple conditions that present with dementia ranging from Alzheimer’s disease to vascular and metabolic syndromes. The diagnosis of dementia needs to be distinguished from delirium and severe depression. Mild cognitive impairment may present with memory loss but preserved ability to function. Once the diagnosis has been established and potentially reversible factors eliminated, healthcare professionals face the challenge of addressing the ability for self-care.

Pharmacologic agents exist for treatment and benefits are usually obtained when used during early stages of the disorder. Family and caregivers need an objective assessment and frank discussion about the patient’s ability to care for themselves. The timing of the diagnosis and the ability for self-care literally vary for every patient. Providers can help develop action plans through frequent communication and can assist in determining the appropriate level of care. Services and available resources for functional impairment also vary by community and location. Providers in all settings and specialties need to be aware of any cognitive decline in their patients.

Hospitalization is a frequent gateway to assisted living and long-term care (LTC). That transition depends on the transfer of timely and updated data on medication and functional ability. When behavior reaches the level of neuropsychiatric symptoms of agitation, aggression, delusion, hallucination, wandering, apathy or sleep disturbance, the need for expanded treatment arises. A search for underlying causes is important at the first appearance or increase of symptoms. Factors such as infection, medication toxicity, pain, confusion and poor sleep are examples of conditions that need to be evaluated.

When behavior and agitation pose a safety threat to the patient or those around them, rapidly administering appropriate therapy is vital. Nonpharmacologic means such as changes in bathing, feeding or sleep interventions may provoke less disruptive behavior. Music therapy is being instituted in a number of LTC facilities in our state and may offer some assistance in dealing with these issues. Ultimately, when nonpharmacologic therapies, pain control, anti-depressants and multiple other medication regimens fail to control behavior, the use of antipsychotic drugs (AD) becomes a choice. Despite lacking FDA approval for use in dementia, the benefits may outweigh the risks in patients with severe symptoms.

The use of these agents in LTC facilities is publicly reported and the Centers for Medicare & Medicaid Services (CMS) have put forth a strong effort to reduce the use of AD unless absolutely necessary. Documenting use of these agents along with efforts to reduce the dose or discontinue the medication are important elements of the medical record. Pharmacist consultation is a great resource in these situations.

Dementia patients can cause dilemma and distress to all those involved in caring for them and living with them. Delivering the care in a safe and patient-centered environment is a challenge needing frequent reevaluation and adaption. The Great Plains Quality Innovation Network recently provided dementia care training to over 270 long-term care staff across the state. The curriculum used was added to the CMS National Partnership for Dementia Care Training Crosswalk Document (https://www.nhqualitycampaign.org/files/Dementia_Care_Training_Crosswalk.pdf), which provides a list of recommended national training resources.

Please contact Stephan Schroeder, MD, CMD, CMQ, at Stephan.Schroeder@area-a.hcqis.org for more information.

"Quality Focus " is a monthly feature sponsored by The South Dakota Foundation for Medical Care (SDFMC), a partner in the Great Plains Quality Innovation Network. Learn more at www.greatplainsqin.org.

This material was prepared by the Great Plains Quality Innovation Network, the Medicare Quality Improvement Organization for Kansas, Nebraska, North Dakota and South Dakota, under contract with the Centers for Medicare & Medicaid Services (CMS), an agency of the U.S. Department of Health and Human Services. The contents presented do not necessarily reflect CMS policy. HFOW-GfqQn-SD-C2-33S1O18
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Give us a call at 605.336.1965 or visit www.sdsm.org. And, as always, thank you for your membership in SDSMA.

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**Sign Up to be Doctor of the Day at the State Capitol!**

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 firsthand 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. Each year we receive requests from physician assistants and advanced practice nurse practitioners who wish to participate in the program; it is critical that volunteer physicians are serving each day of session.

For more information and to see a listing of available dates, visit www.sdsm.org. Please contact Mark East at 605.336.1965 or meast@sdsm.org to sign up.

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**SDSMA President Visits Medical Districts**

SDSMA President Dr. Christopher T. Dietrich will visit Medical Districts beginning this month. Dr. Dietrich and physicians attending these meetings will discuss 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. Dr. Dietrich will also give an update on the SDSMA’s plans for the 2019 state legislative session and how physicians can get involved.

**Upcoming Meetings**

- Oct. 16 – District 2 Visit: 6 p.m., Second Street Station, 15 2nd St. SW, Watertown
- Oct. 17 – District 1 Visit: 6 p.m., Minerva’s, Best Western Ramkota Hotel, 1400 8th Ave NW, Aberdeen

Please consider attending your district’s meeting. Dr. Dietrich and SDSMA staff want to hear your concerns about challenges that affect care for patients and gather ideas on how to work together to represent physicians both at the state and federal levels.
Medical Record Privacy – Patient Right of Access

A patient has a right of access to his or her medical records, subject to limited exceptions. Practitioners may withhold records under certain circumstances, including when the practitioner believes the release of records could harm the patient or others.

Both state law and the HIPAA mandated privacy rules provide that a patient has a right to access his or her medical records as long as they are maintained by the provider. The exceptions to this general rule include psychotherapy notes, information compiled in anticipation of litigation, and information exempted from access under the Clinical Laboratory Improvements Amendments of 1988. Before granting access, the provider may require the patient to make a written request, and if the requested information is maintained and accessible on site, the request must be acted upon within 30 days.

A provider may refuse to provide the patient access to records, and the patient has no right to seek a review of that denial if:

The records are excluded as described above;
- The records relate to an inmate in a correctional institution and obtaining such records would jeopardize the health, safety, security, custody, or rehabilitation of the individual or any other at the institution;
- The records relate to research and the patient agreed to suspension of access rights prior to participation in the research; or
- The records were received by the practitioner from a third party under a confidentiality agreement.

Under some circumstances, a provider may refuse to provide the patient access to records, but the patient has a right for the denial to be reviewed in the following situations:
- When the practitioner believes that access would be likely to endanger the life or physical safety of the patient or some other person;
- If the record makes reference to another person other than a health care provider and the practitioner believes that such access is likely to cause substantial harm to the other person; or
- If the request is made by a patient’s personal representative and the practitioner believes that such access is likely to result in substantial harm to the patient or another person.

For more about medical records privacy, download the SDSMA legal brief Medical Record Privacy – Patient Right of Access at www.sdsm.org. Through the SDSMA Center for Physician Resources, the SDSMA has developed more than 50 legal briefs that are available to members. In addition, the Center develops and delivers programs for members in the areas of practice management, leadership and health and wellness.

2019 SDSMA Membership Dues Renewal Now Available

Annually, SDSMA members must renew their membership to continue receiving membership benefits. Membership renewal are done on the SDSMA website at www.sdsm.org.

To ensure a smooth renewal process for 2019, please complete the following:

1. Log into your member profile at sdsm.org. If assistance is needed, contact the SDSMA office at 605.336.1965 or membership@sdsm.org.
   a. Do not create a new account. All members have an existing sdsm.org account.

2. It is recommended that you contact your office administrator to determine if you or your organization will be paying the dues, and who will be completing this online process.

3. Once you have logged into your account, proceed to the “Pay My Dues” link at the top of the page. Payment by electronic check and credit card are both accepted. A receipt will be emailed to you upon completion of the payment.

Those with questions may email membership@sdsm.org. Thank you for your membership in the SDSMA!
In order for the SDSMA office to provide members with timely information, it is important that members regularly review their contact information on file with the SDSMA. Have you changed practice locations? Is your email correct? Is your mail going to the right place?

All SDSMA members have an existing online profile. Visit www.sdsm.org and log into your secure online account. Next, access your profile by clicking the “Update my Profile” link at the top of the page.

Please take a few minutes to review your profile and make any necessary updates. Updating your secure account keeps your information up to date and notifies the SDSMA of any changes so you are accurately listed in the member directory and ensures that your membership materials, emails and renewal notices are sent to the appropriate mailing and email addresses.

Do you have a new photo? Updated photos can be uploaded to your user account or emailed to membership@sdsm.org.

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CMS Re-Calculates 2017 MIPS Final Scores and Extends Targeted Review Deadline Until Oct. 15

CMS has released physician’s 2017 Merit-based Incentive Payment System (MIPS) performance feedback and upon release opened the targeted review process. Based on the American Medical Association (AMA) flagging calculation error concerns and the initial targeted review requests the Centers for Medicare & Medicaid Services (CMS) received, CMS has revised the scoring logic and re-issued the 2017 MIPS final scores for the physicians who were impacted by the following identified issues:

- Application of the 2017 Advancing Care Information (ACI) and Extreme and Uncontrollable Circumstances hardship exceptions.
- The awarding of Improvement Activity credit for successful participation in the Improvement Activities (IA) Burden Reduction Study.
- Incorrect attribution of the All-Cause Readmission (ACR) measure to certain physicians and group practices MIPS final score.
- Additionally, to ensure CMS maintains the budget neutrality that is required by law under the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA), some physicians will see slight changes in their payment adjustment because of the reapplication of budget neutrality.

The revisions have been made to the performance feedback on the Quality Payment Program website at qpp.cms.gov. The AMA encourages physicians and groups to review their performance feedback.

To offer additional time for physicians, groups, and APM entities and their participants to access and review their performance feedback, CMS is extending the targeted review deadline to Oct. 15, 2018 at 7 p.m. CT. CMS also has several resources available on the Quality Payment Program Resource Library to help physicians and practices understand their performance feedback and the targeted review process. If you need additional assistance, please reach out to the Quality Payment Program Service Center at 866.288.8292 or 877.715.6222 or by email at QPP@cms.hhs.gov.

Source: AMA and CMS

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With the rising cost of education, the need continues.

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Log in through your SDSMA account at www.sdsm.org to donate to the SDSMA Foundation, or send your contribution to SDSMA Foundation, 2600 W. 49th St, Ste 200, Sioux Falls, SD 57105.

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What's stronger than cancer? Our clinical trials.

**Clinical Trials at Sanford Health**

Carefully conducted research studies are the fastest and safest way to find new treatments and improve the health of all patients. Sanford Health provides the most advanced care and treatment that today's medical research offers and has over 290 open cancer clinical trials and over 400 open clinical trials (all disease types). Participating in a clinical trial may provide you with access to innovative treatments, while helping to improve care and find cures for future generations.

The types of studies conducted at Sanford Health include:

- **Treatment studies** to improve the standard of care.
- **Prevention studies** to look for better ways to prevent disease.
- **Diagnostic and screening studies** designed to find better ways to detect diseases.
- **Quality of life studies**, which explore ways to improve comfort and quality of life for patients.

Sanford Cancer Center

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