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Cover photo: Capitol Christmas, Pierre, South Dakota, by Chad Coppess, South Dakota Department of Tourism
Should I Worry About Inflation?

BRAD REMPE, CFP®, AIF®, Lead Advisor

When the prices of goods and services increase over time, consumers can buy fewer of them with every dollar they have saved. This erosion of the real purchasing power of wealth is called inflation. Inflation is an important element of investing. In many cases, the reason for saving today is to support future spending. Therefore, keeping pace with inflation is a crucial goal for many investors.

To help understand inflation’s impact on purchasing power, consider the following illustration of the effects of inflation over time. In 1916, nine cents would buy a quart of milk. Fifty years later, nine cents would buy only a small glass of milk. And more than 100 years later, nine cents would buy only about seven tablespoons of milk. How can investors potentially prevent this loss of purchasing power from inflation over time?

INVESTING FOR THE LONG TERM AND OTHER “TIPS”

As the value of a dollar declines over time, investing can help grow wealth and preserve purchasing power. Investors should know that, over the long-haul, stocks historically have outpaced inflation, but there also have been stretches where this has not been the case. For example, during the 17-year period from 1966–1982, the return of the S&P 500 Index was 6.8% before inflation, but after adjusting for inflation, it was 0%. Additionally, if we look at the period from 2000–2009, the so-called “lost decade,” the return of the S&P 500 Index dropped from –0.9% before inflation to –3.4% after inflation.

Despite some periods where stocks have failed to outpace inflation, one dollar invested in the S&P 500 Index in 1926, after accounting for inflation, would have grown to more than $500 of purchasing power at the end of 2017, and would have significantly outpaced inflation over the long run. However, the story for US Treasury bills (T-bills), is quite different. In many periods, T-bills were unable to keep pace with inflation, and an investor would have experienced an erosion of purchasing power. After adjusting for inflation, one dollar invested in T-bills in 1926 would have grown only to $1.51 at the end of 2017.

While stocks are more volatile than T-bills, they also have been more likely to outpace inflation over long periods. The lesson here is that volatility is not the only type of risk that should concern investors. Ultimately, many investors may need to have some of their portfolio in growth investments that outpace inflation to maintain their standard of living and grow their wealth.

CONCLUSION

Inflation is an important consideration for many long-term investors. By combining the right mix of growth and risk management assets, investors may be able to blunt the effects of inflation and grow their wealth over time. Remember, however, that inflation is only one consideration among many that investors must contend with when building a portfolio for the future. The right mix of assets for any investor will depend upon that investor’s unique goals and needs. At Foster Group we help our clients weigh the impact of inflation and other important considerations when preparing and investing for their future.

Your success means everything to us.

And that’s worth celebrating.

At Foster Group, we treat clients like friends. We care about your success. And we take a fiduciary approach to helping you reach your goals. As an independent, fee-only firm with an integrated approach to financial planning and investment management, we love nothing more than giving you a reason to celebrate.
For many, the beginning of the new year brings with it a renewed sense of life and hope. This may be demonstrated through our commitment to goals for the new year. This sense of hope may also come through our final recognition of those we lost in the past year and our closure of the grieving process, as we look forward to more sun, warmer weather and perhaps a vacation with friends and family in the months to follow. Unfortunately for many, the new year brings with it continued feelings of desperation and hopelessness.

By now many of you have read the Argus Leader story, “Indian Health Service betrays patient trust and treaties,” published Dec. 5, 2018. If not, I encourage you to read it; however, I imagine many of you could write your own story based on patients you have seen and/or provided consultation for. Native American patients whose care was delayed due to lack of funding or disease has progressed beyond what it should have provided there was better access to care or care coordination.

While alcohol and drug addiction has long been a problem for the Native American community, over the last 15 years especially, Native American communities across the nation have been devastated by increasing prescription and illicit opioid abuse, addiction, and overdose. The reality of addiction and fallout is grave for our Native American communities. At a hearing of the Senate Committee on Indian Affairs, Dr. Michael Toedt, chief medical officer of the Indian Health Service (IHS) reported that, between 1999 and 2015, Native Americans experienced a fivefold increase in deaths by overdose. And CDC reports that one in 10 Native American children will use prescription opioids for nonmedical use – twice the rate of Caucasian children – and that pregnant Native Americans are eight times more likely to be diagnosed with opioid dependence than pregnant whites. In 2014, Native Americans ranked number one for death by opioid overdose.

The opioid crisis has a particular hold on communities in and around the Lakota homelands. While comprising just 9 percent of our state’s population, Native Americans make up almost 30 percent of the patients in South Dakota who are being treated for opioid use disorder. David Flute, Sisseton-Wahpeton Oyate Chairman, told the Bismarck Tribune earlier this year, “It’s growing to the point of being catastrophic. It’s causing more health conditions, causing social dysfunction, family separations. It’s negatively impacting our social way of life.”

As a part of Gov. Daugaard’s outgoing budget proposal last month, he indicated a surplus of approximately $6 million in Title XIX Medicaid FMAP expenses due lower utilization and increased federal reimbursement. While accurate, what was not noted is that a large percentage of that savings can be attributed to the efforts of the health care coalition who has worked tirelessly with the tribes to initiate care coordination agreements and to obtain 100 percent FMAP reimbursement for a percentage of services. Of note, a large percentage of the shared savings has benefited the Medicaid eligible community through some improvement in access to care. Expanded services includes coverage for substance abuse, the creation and incorporation of care coordinators for Native Americans, and an expansion in mental health care providers and services. The shared savings has also been utilized to fund a modest increase in reimbursement for community-based providers. However, the state nor DSS has expanded Medicaid eligibility – which was one of the initial selling points and reasons for the creation of the Coalition.

If the state were to expand Medicaid, 50,000 South Dakotans, including 15,000 American Indians, would have access to care. The SDSMA remains concerned about individuals who are below the federal poverty level but are not eligible for Medicaid coverage in South Dakota. Better health outcomes and management of costs begin with people having access to quality health care – to include addiction treatment and services.

While we can respect and appreciate the fact that Gov. Daugaard did not budget any of the anticipated $23 million from sales tax on e-commerce the state may receive as a result of the Wayfair decision, I do believe those funds hold the potential to do great things towards the improvement in access to health care for South Dakotans – to include members of our Native American community.

The SDSMA looks forward to working with Gov.-Elect Norm, her staff, policymakers, and the legislature, to address some of the problems that lie within our own backyard.
I had the most amazing dream last night! I just had to write it down. I dreamt that I was a kid again, a boy about age 13. Of course, I was starting to think about all sorts of adult things. Cars for sure, girls maybe, and I started thinking about smoking cigarettes. But I am not stupid! Everyone knows that cigarettes will kill you, so I am never doing that! However, a couple of my friends have shown me their electronic cigarette. They called it vaping. A really old guy, I think he was about 18, let me use his. There are over 100 different flavors of this juice you put in your e-cigarette. In my dream I tried every flavor there was. It was a hard choice but I finally decided that bubblegum flavor was my favorite, although watermelon and strawberry were really great. And what was so exciting was the beautiful short high I got after every puff. I inhaled it over and over and over again in my dream. I think adults called that “getting addicted.” I suddenly woke up, but wow did that dream seem real.

The above is reality for thousands of junior high and high school kids here in South Dakota, and the number is growing rapidly. This is becoming a parent’s worst nightmare. It is the perfect storm, a mixture of an incredibly addictive substance like nicotine with the candy flavorings like bubblegum.

When you inhale the nicotine laden vapor deep into your lungs you fill the thousands upon thousands of tiny alveoli. The nicotine rapidly crosses the cell barrier and enters the arterial blood stream. Within 4 to 5 heartbeats the nicotine saturated blood slams into the brain causing an intense nicotine high. The user is rewarded with a beautiful sensation which then rapidly dissipates. They are then encouraged to do this over and over again. This is the basis for nicotine addiction, and unlike the harsh and irritating smoke from cigarettes, vaping is the perfect soothing candy flavored way to rapid nicotine addiction.

The adolescent brain is rapidly developing. Young teens, by their nature are curious and are anxious to explore new behaviors. Young people as early as 12 years old are experimenting with vaping. There has been a rapid shift from cigarette smoking in teenagers to vaping. It is perceived by them to be of minimal or no harm compared to the well-known dangers of cigarettes. Most teens are well aware of the amazing list of carcinogens and other toxins in combustible cigarette smoke but assume, with the help of the advertising from E-cigarette companies, that vaping is harmless. But recent medical studies demonstrate that in youth that vape regularly, we can recover significant carcinogens from their blood. Also alarmingly a recent study showed that teens who vape regularly are more likely to become users of other tobacco products within the next year. (citations available upon request). Clearly vaping seems significantly less hazardous than smoking cigarettes, and could represent a desperately needed escape plan for adults who chronically smoke, but for teens however, it represents a straight and rapid road to nicotine addiction. This will lead to a lifetime of tobacco addiction and a life cut short by disease and death from tobacco use.

In this nightmare we seem incapable of doing anything meaningful to really impact the future for our children. But let us wake up, and decide that there is something we can do as parents and as voters to end this epidemic of tobacco addiction in our kids.

First become educated and sound the alarm! Vaping in our teens is creating a whole new generation of nicotine addicts and if left unabated, it represents the end of 40 years of successful tobacco control. Talk to your kids. Vaping is addicting and if you are using it you are a drug addict. And if you need any more information about vaping just ask any junior high school kid.

Next, as voters in South Dakota, we can significantly reduce the allure of this product to our young teens. We can pass legislation that eliminates all flavors for vaping products, except for the flavor of natural tobacco and possibly menthol, the only flavors allowed in combustible cigarettes. The federal government is moving slowly towards this end, but if we wait for the federal government to solve this problem, our children will be grandparents.
There will be those who say that we cannot be so bold, but courage is easy when we are talking about the health of our children.

Next, we need to raise the age of all tobacco products for purchase, possession and use to 21 years old. This has been amazingly successful for liquor products, saving thousands of lives. The major issue here is by increasing the tobacco age to 21, it effectively keeps tobacco out of our high schools. No more 18-year-old seniors selling tobacco to underclassmen. This law is rapidly sweeping our country, with over 300 communities and 5 states who have already passed this. The tipping point for tobacco age 21 is here and South Dakota needs to be out in front of this issue.

Lastly, we need to treat tobacco use in all its forms, as a much more serious addiction. There is significant medical evidence that in our kids, nicotine use is the entry-level drug to the use for almost all other drugs of addiction. There is medical evidence that almost no one uses meth, cocaine, heroin or other drugs of addiction without getting their first high on nicotine. We need to mature our thinking about the significance of using this universal entry level drug: nicotine. There is no need to further criminalize teenagers for using nicotine, but we do need to further criminalize those who sell and distribute nicotine to our kids.

Political reality dictates that this may not happen as rapidly as we wish but these are ideas whose time has come. Great ideas do not just rise to their moment; they have to be fought for! Ten years ago, we were on the verge of believing that we would eliminate tobacco use in our lifetime. We now stand on the edge, with the possibility of a new tidal wave of nicotine addiction in our kids. But there is clear action we can take to affect change. What is at stake is the future of an entire generation of our children.

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State of South Dakota’s Child: 2018

By Ann L. Wilson, PhD; Tyler A. Hemmingson, MPH; and Brad Randall, MD

Annual infant mortality rates are variable in South Dakota, partly because of the low number of annual births. Unfortunately, significant racial disparities continue to exist in this key indicator, making it clear that we have much work to do in our state. Data presented here remind us of the need for persistent efforts to improve the care for all parents and their infants. Public health and infant survival are deeply connected.

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Vice President for Health Affairs
University of South Dakota

Abstract
In 2017, similar to 2016, there was a decrease in total live resident births in South Dakota. Racial minorities comprised 25 percent of these newborns, demonstrating a similar pattern of diversity among births observed nationwide. Unlike 2016, when the state recorded its lowest ever rate of infant mortality (4.8 per 1,000 live births), in 2017 it spiked to 7.8. This increase was primarily observed in the neonatal deaths in both the white and minority population. An increase in births of very low birth weight newborns and deaths due to congenital anomalies partially contributed to this increase. Compared to the nation, a higher percent of the state’s infant deaths occur among those with birthweights above 2499 grams. A positive finding apparent in the 2017 mortality data was the decrease in the rate of sudden unexpected infant deaths from what has been observed in recent years. The small number of births in the state requires caution in interpreting findings that show year to year variability. Nonetheless, while the trend in infant mortality in the state is declining, it remains higher than the 2016 rate 5.9 for the nation.

Natality
In 2017, South Dakota greeted 12,128 live newborns as residents to the state. As noted in Figure 1, this number is 1.3 percent less than the previous three year mean number of live resident births in the state. This emerging decrease in live newborns may reflect the apparent lower number of births that occurred to state residents two decades ago. Forty-five percent of the 2017 newborns became residents of the state’s two largest counties, Minnehaha and Pennington, and their neighboring Lincoln and Lawrence counties.

Figure 2 presents data revealing the increasing heterogeneity of South Dakota’s annual cohort of births. In the past 15 years, South Dakota’s percent of racial minority
Births has increased and is now resembling national trends. In 2017, South Dakota matched the nation with a quarter of its births representing racial minorities. In 2017, South Dakota matched the nation with a quarter of its births representing racial minorities. Figure 3 compares the distributions of racial groups for the state with those of the U.S. Three-quarters of all births for both the state and nation are white (which includes Hispanics). Alternately, 16 percent of the total births in the state are American Indian, whereas they only contribute to 1 percent of all national births. While Blacks comprise 14 percent of all U.S. births, this population makes up only 3 percent of all South Dakota births. The emerging racial diversity of newborns and their parents in South Dakota may increasingly contribute to the cultural multiplicity of the communities where they live, go to school, and work.

Birth weight is a marker of perinatal health. Data presented in Figure 4 show that 2017 saw an increase in South Dakota’s resident births of very low birth weight (VLBW = less than 1500 grams) newborns. Though the state’s percent of newborns in this 2017 cohort showed an increase to 1.23 percent from a previous five year mean of 1.05 percent, this remained slightly below the 2016 national 1.4 percent of newborns in this weight category. See below for South Dakota’s definition of live birth.

Utilization of prenatal care is a marker used in assessing achievement of the Centers for Disease Control goals for Healthy People 2020. Specifically, it has as a target that 77.9 percent of all pregnant women begin prenatal care in the first trimester. In 2016, 77.1 percent of all pregnant women in the U.S. have met this goal. In South Dakota,

Note: South Dakota’s definition of “Live birth:” the complete expulsion or extraction from its mother of a product of human conception, irrespective of the duration of pregnancy, which, after such expulsion or extraction, breathes or shows any other evidence of life such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached. https://sdlegislature.gov/Statutes/Codified_Laws/DisplayStatute.aspx?XType=Statute&Statute=34-25-1.1
Figure 6 demonstrates that this goal already is observed for white women. Yet, this is currently true for only 49 percent of the state’s American Indian pregnant women. Data on utilization of prenatal care come from birth certificates, and may be subject to response bias.

The relationship between prenatal care and survival during infancy is clearly depicted in data presented in Figure 7. These South Dakota data from 2012-16 contrast rates of death by when prenatal care began.\(^4\) Infants whose mothers received no prenatal care had a rate of death 8 times higher (40 versus 5 per 1000 live births) than it was for infants whose mothers received care in the first trimester. Data on the number of prenatal care visits would contribute to a fuller understanding of the dynamics associated with these findings. What is available are data from a survey conducted with a stratified random sample of women who gave birth to a live born infant in South Dakota in 2016.\(^6\) These data show that not receiving prenatal care as early as the mother wanted was associated with the intendedness of pregnancy. Specifically, a higher percent of women who had an unintended pregnancy did not receive prenatal care as early as they wanted (22.2 percent) compared to women who had an intended pregnancy (5.6 percent). Further, data from this survey show the main reason given by mothers not receiving care as early as they wanted, was their lack of awareness that they were pregnant. These observations reveal how the educational and social complexities during pregnancy are associated with its outcome.

Figure 7. Infant Mortality Rates by Prenatal Care, South Dakota, 2012-2016

Infant Mortality

The infant mortality rates (deaths during first year of life per 1,000 live births) over time in South Dakota show significant variability as shifts in the number of deaths impact rates based on the small population of resident births in the state. This is apparent in Figure 8. In 2016, the state experienced its lowest ever recorded infant mortality rate (IMR) of 4.8 which contrasts with its most current 2017 rate of 7.8,\(^1,4\) which is higher than the previous five year (2012-16) mean of 6.6. Figure 8, however, shows the overall downward trend in the state’s mortality rate for infants and denotes the progress made in survival during the first year of life.

An analysis of factors that account for the annual shifts in South Dakota’s rates of infant mortality is instructive. Central to this analysis is an examination of racial differences in rates of infant death, at what age during the first year of life the deaths occur, birth weight specific mortality, and causes of infant death.

Figure 8. Infant Mortality, South Dakota and United States, 1964-2017

Figure 9 compares white versus minority infant mortality rates. Data in this figure show that in 2017, the IMR of 7.0 for the white population was its highest rate since 1999.\(^1\) The 2017 minority rate of 10.4, though higher than the previous year for this population in the state, is lower than its previous five year mean of 11.6.\(^1\)

Figure 10 presents the ratio of minority to white infant mortality rates over the past five decades. Associated with the spike in the white IMR, the 2017 data show a drop in this ratio. Nonetheless, the trend line shows that the ratio of minority to white rates of infant death has slightly increased over time reflecting the overall trend of higher minority than white IMR.

Figure 9. Infant Mortality: White and Minority, South Dakota, 1965-2017
To better understand the infant mortality rate, it is helpful to identify when deaths occur in the first year of life. Neonatal mortality rate (NMR) refers to death that takes place before the 28th day of life and post neonatal mortality rate (PNMR) refers to death occurring between the 28th and 365th day of life. Both rates are expressed per 1,000 live births. Figure 11 presents these neonatal and post neonatal mortality rates. In 2017, the South Dakota NMR was 5.5 (compared to 3.9 for the U.S. in 2016). The state’s PNMR was 2.2 in 2017 (compared to 2.0 for the U.S. in 2016). Noticeable in this figure is the state’s 2017 spike in the NMR and continued downward trend in the state’s PNMR.

Figures 12 and 13 break down the data presented in Figure 11 by racial groups to better understand the dynamics associated with the 2017 spike in the IMR. Apparent in these data are the differences in the 2017 data for neonatal and post neonatal mortality. During the first 28 days of life, there was an increase in the rate of death for both the white and minority newborns. The 2017 NMR for whites is 5.3 compared to its previous five year (2012-16) mean of 3.6. This depicts its highest rate since 1986. The 2017 NMR for minorities was 6.4 compared to its previous five year mean of 5.7. In 2017, the white PNMR (1.67) is only slightly higher than its previous five year mean of 1.6. For minorities, the PNMR was 4.0, lower than its previous five year mean of 5.9.

Figure 14 presents data that compare the percentage of infant deaths by birthweight for South Dakota and the U.S. These data show that a significantly higher percent (p<0.05) of infant deaths in the U.S. (2016) than in South Dakota (mean 2013-17) are VLBW (52 percent vs. 42 percent) and alternately a significantly higher percent (p<0.05) of infant deaths in South Dakota than the U.S. weigh more than 2499 grams. Noted below these pie charts are data on birth weight specific mortality. The mortality rate for VLBW infants is higher (p<0.05) in South Dakota than it is for the U.S. This is also true for MLBW infants and those with birth weights of greater than 2499 grams, but these differences are not statistically significant. Among the subgroups of infants in the VLBW
cohort, the only statistically significant difference between the state and the U.S. is for infants with birth weights of 1000 to 1499 grams (p<0.05).

Figure 15 provides data that explain causes of infant death. Part of the spike noted in 2017 perinatal causes of infant death reflects the increase in less than 500 gram newborns. In 2017, there was also noted an increase in congenital anomalies. In 2017, had the births and deaths of less than 500 gram newborns and deaths due to congenital anomalies been equal to the previous five year mean, the state’s IMR for 2017 would have been only slightly higher (6.8) than its previous five year mean of 6.6. A positive finding in these 2017 cause of death data was the dip noted in sudden unexpected infant deaths.

The jagged annual changes in causes of infant death plotted in Figure 15 can be more meaningfully understood by comparing five year mean rates rather than annual rates. Table 1 presents South Dakota mean rates of infant death for the 2013-17 white and minority populations. During these years, infant deaths due to perinatal causes, sudden unexpected infant death, and accidents and homicides are significantly higher (p <0.001) for minorities than for white infants in the state. Further, the total IMR is significantly (p<0.001) higher for minority than white infants. Comparisons of South Dakota’s mean rates of infant death for 2013-17 by cause with those of the U.S. are also presented in Table 1. The state saw a spike in perinatal deaths in 2017; however, its five year mean rate is not significantly different than that observed nationally. Alternately, South Dakota’s mean rates of congenital anomalies, SUID and accidents/homicide are significantly higher than those noted nationally. Despite these significant differences with the nation, the state’s total IMR for 2013-17 is not statistically significantly higher than that of the nation in 2015.

Discussion

The death of an infant violates our modern sense that new life is protected and safe. In reality, the likelihood of death does not again reach that of the first year of life until the fifth decade. Life during its earliest days is fragile and this fragility is explored with data on the first year of life in South Dakota.

Similar to the nation, now approximately a quarter of all South Dakota newborns are racial minorities. In South Dakota, there is a growing percent of infants born to American Indian and other minority groups. As the diversity of the state increases, it is important for medical education to expand awareness of diseases and conditions that are seen in minority groups that previously have been rarely observed locally. Alternately, awareness must persist regarding the ongoing challenges known to accompany reservation life. Indeed, data show that 17 percent of American Indian women receive no or only last trimester prenatal care. Lack of prenatal care in the state is associated with much higher rates of mortality during the first year of life. One can speculate on reasons for this association. Is it lack of awareness of the need for health care, inaccessible services, substance abuse, or barriers created by lack of income, transportation or child care? For many American Indians, reservation life is known to

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*All South Dakota data are from South Dakota Department of Health NS=non significant
include instability in relationships, housing, and income needed for basic necessities of life. All of this becomes manifest in stress that impacts wellbeing. The disparity in survival for the white and minority infants reflects these realities and the ratio of white to minority deaths does not appear to be improving in the state. The IMR for minorities in South Dakota is significantly (p<0.001) higher than it is for whites. Social complexities create difficult challenges and demand that health care maintains a broad public health perspective to address the environmental and psychosocial variables that affect the outcome of pregnancy and the safety of an infant during the precarious first year of life.

While acknowledging the above realities, analyses of the spike observed in the 2017 infant mortality occurred among the state’s white and minority newborns less than 28 days of age. The increase in perinatal causes of death includes the spike in births of the less than 500 gram newborns. Some of these very tiny infants were outcomes of pregnancies with multiple gestations. Other factors contributing to their premature births are beyond the scope of this paper.

What can be recognized in the birth and mortality data is a pattern that differentiates the state from what is noted nationally. South Dakota typically has a lower percent of low birth weight infants than noted in the country as a whole but a higher infant mortality rate. In addition, in the last five years, the state’s birth weight specific mortality for its VLBW infants is higher than that observed nationally (p<0.05). Further, in recent years, the state has a higher percent of its infant deaths occurring among non-low birth weight infants that is likely related to its rates of PNM, especially for minorities, that are higher than those observed nationally. These dynamics become expressed in the mortality data observed.

The state’s significantly higher than national rates of SUID and accidents/homicide also reveal the complex social factors reflected in infant mortality rates. Though the state’s 2017 rate of SUID showed a decrease from previous years, its mean rate for 2013-17 (1.3) is significantly higher (p<0.01) than what is reported nationally for 2015 (0.93) and is three times higher for its minority than its white population (p<0.001). Data from the Regional Infant and Child Mortality Committee show that in reviews of these SUID deaths in its 10 county south eastern region of the state, nearly all occur with unsafe sleep that presented risks for the infants’ death. While education on safe sleep for families, care givers, and health care providers must persist, it is also important to examine why guidance offered is not heeded by those who care for babies. Is it harried lives combined with sleep deprivation, inability to afford/provide safe sleep places for babies, cultural beliefs about infant care, substance use that impairs judgment, the purchase and use of unsafe bedding, or other factors that become manifest in practices that unfortunately are identified when an otherwise healthy baby is found dead during sleep? Similar questions can be asked regarding the presence of hazards in an infant’s environment that can be associated with deaths due to accidents or homicide.

In 1910, Sir Arthur Newsholme, an historic leader in the field of public health, noted that “Infant mortality is the most sensitive index we possess of social welfare.” This statement behooves all whose lives touch those of babies and their care givers to recognize their role in contributing to the welfare of their community. Infant survival is absolutely dependent on the professional expertise of medical care providers and the health care systems in which they serve their patients. Yet, it is communities and the relationships among those who care for infants and those who care for caregivers that foster the support critical for nurturing the wellbeing of fragile new life.

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Statins are a group of essential medications used in ischemic heart disease, stroke, and peripheral vascular disease. In patients with these medical conditions, they have been proven to decrease mortality and morbidity. However, statins can cause transient elevation of liver enzymes in some patients, which has led to the unnecessary cessation of these agents prematurely.

Physicians also face a dilemma when determining if they should utilize statins in patients whose liver enzymes are elevated at baseline. This dilemma may prevent physicians from prescribing statins when clinically indicated, and safe.

The purpose of this article is to review existing literature that provides guidance on the utilization of statins in clinical scenarios where liver enzymes are elevated at baseline or when liver enzymes increase after the initiation of statin-based therapy.

Introduction

Statins are a 3-hydroxy-3-methylglutaryl coenzyme A reductase inhibitor, which decreases the LDL cholesterol in the blood. They act on the enzyme that converts HMG-CoA to mevalonic acid (a cholesterol precursor). Statins have been proven to improve outcomes in coronary artery disease, ischemic stroke, and peripheral vascular disease. The role of statins was highlighted in the cholesterol management guidelines published by ACC/AHA. Many diabetics above 40 years of age now qualify for statins of either moderate or higher intensity.

Even with the publication of these guidelines, providers still experience concern about potential side effects when prescribing statins to patients at risk for vascular disease. This is in part due to the fact that statins have been linked to the development of myositis, rhabdomyolysis, new onset diabetes, and elevated liver enzymes. In one study, only 44 percent of NAFLD patients with an indication for statin treatment were actually on therapy. The FDA has listed various side effects of statin therapy in its website www.fda.gov/drugs/drugsafety/ucm293101.htm. FDA has done several post marketing reviews of statins and hepatotoxicity between years 2000-2009. It has noted that the frequency of statin associated serious liver injury in the Adverse Events Reporting System (AERS) database is extremely low (reporting rate of two or fewer per 1 million patient-years). Statins were also found to have reversible cognitive side effects as memory loss as an uncommon adverse effect per the statement. Conversely, it has listed increased blood sugar and glycosylated hemoglobin (HbA1c) levels as a more common adverse effect with statin use.

Because there is confusion about the relationship between statins and liver enzymes, we discuss the risks and benefits of statin therapies in patients with existing liver enzyme abnormalities from various medical condition, as well as recommendations for monitoring statin prescribing associated with elevation in liver enzymes after the initiation of the therapy.

Abnormal Liver Enzymes After Initiation of Statins

Asymptomatic, transient elevations of serum aminotransferase levels may occur in the first 12 weeks of therapy. It is believed to occur due to the initiation of statins leading to a more permeable hepatocyte membrane. These side effects of statins are known to cause “transamnitis.” It is important to distinguish this from hepatitis, as transamnitis refers to leakage of liver enzymes rather than actual
inflammation of the liver.\textsuperscript{13,17} Physicians are hesitant to start patients with liver enzyme elevations on statins, which may lead to patients not receiving potential cardiovascular benefit from these drugs\textsuperscript{13,19}. There is a tendency of physicians to discourage the use of statins in patients with baseline elevation of liver enzymes and to discontinue medications when minor enzyme elevations occur\textsuperscript{7}. Statin-related acute liver failures are extremely rare; reports of statin-induced acute liver failure are similar to reports of idiopathic acute liver failure in the general population.\textsuperscript{6,10}

There is ambiguity in the diagnostic criteria for defining statin-induced liver injury. The presence of ALT more than two to three times the upper limit of normal or a conjugated bilirubin level of more than two times the upper limit of normal are often used to define drug-induced hepatotoxicity. However, it has also been proposed that an ALT level of more than 10 times the upper limit of normal is needed to differentiate from true hepatotoxicity from transaminitis.\textsuperscript{11}

In the PPP (Prospective Pravastatin Pooling project), the percentage of either mild to moderate (greater than three but less than five times the upper limit of normal) or severe (greater than 10 times the upper limit of normal) elevation in aminotransferase levels were not significantly different between the statin-treated and the placebo groups.\textsuperscript{12} It was also noted that most cases of transaminitis resolved spontaneously without the need for discontinuation of statins. Seventy percent of the cases with an increased AST level resolved spontaneously.\textsuperscript{13,14} This has led many clinicians to consider re-initiation of the same statin vs a different statin once the abnormal aminotransferase levels have normalized.\textsuperscript{15}

**Statins in Patients with NAFLD and NASH**

The Third National Health and Nutrition Examination Survey (1988-1994), showed that 7.9 percent of the U.S. population had asymptomatic evaluations of serum aminotransferase levels, which could be from chronic liver disease.\textsuperscript{16} The most common causes were NAFLD and hepatitis C, followed by alcoholic liver disease, hepatitis B, and hemochromatosis. NAFLD is independently associated with an increased risk of cardiovascular disease.\textsuperscript{17-19}

Based on a systemic review by Esfami et al., it seemed possible that statins might improve ultrasound findings and liver enzymes in patients with NAFLD or NASH, although but more studies are recommended.\textsuperscript{20} After analyzing statin users and their matched controls, the major finding of this study was that statin use was not associated with a greater prevalence of hepatic steatosis or elevated serum ALT values. Statin use was also not associated with a greater prevalence of elevated serum ALT among subjects with hepatic steatosis. Strikingly, patients with mixed hyperlipidemia and elevated ALT were found to have a higher incidence of hepatic steatosis if they were not using statins. In conclusion, statin use was not associated with a higher frequency of hepatic steatosis or serum ALT abnormalities, even among those with hepatic steatosis. This is useful information, as individuals meeting criteria for statin therapy are likely to have coexistent hepatic steatosis.\textsuperscript{11} These findings were confirmed by the Dallas Heart Study,\textsuperscript{21} which revealed a lack of correlation with statin use and severe worsening of hepatic steatosis or elevated ALT values (13 vs. 15 percent).

**In patients with Hepatitis C and Hepatitis B**

The prevalence of hepatitis C in the U.S. is at 1.6 percent.\textsuperscript{22} There is some concern about statins’ safety in HCV. Given statins up-regulate LDL receptors, which are thought to allow entry of HCV to the hepatocytes, there was concern statin use would cause increase infection with the virus. However, in a few studies this has not been proven to be the case. Statins were not only found to be safe but beneficial in these group of patients.\textsuperscript{23,24} Based on the study conducted at the Stanford Veterans Administration Hospital, there was no significant difference in the incidence of mild-moderate or severe increases in liver enzyme levels between statin-treated groups with or without HCV infection. Also, severe increases in liver enzymes were seen in the HCV infected patients who were not on statins. Statin therapy was associated with a decrease in AST and ALT levels in a retrospective cohort study in 20 biopsy proven hepatitis C virus-infected veterans matched to patient’s not using statins during a period of one year follow up.\textsuperscript{25} The HALT-C trial cohort consisted of 543 chronic HCV patients who were followed for 42 months; statin use in this population actually revealed a reduced risk of hepatic fibrosis.\textsuperscript{26}

Statin use was seen to have effect on lower development of cirrhosis and less decompensation episodes in hepatitis B Virus (HBV) Taiwanese patients. Although fibrates were associated with lower risk of cirrhosis, they were not associated with decreased risk of cirrhosis decompensation.\textsuperscript{9}

**In Patients With Alcohol Use**

The Heart Protection Study demonstrated that patients
with an alcohol intake of less than 21 units a week, demonstrated no significant risk of statin related myopathy or elevation in liver enzyme levels.\textsuperscript{7,8} In a retrospective case-cohort study with Bang et al., of the 24,748 patients with alcoholic cirrhosis, only 15 percent of the patients were using statins. The study found that statins were associated with reduced risk of decompensation and death in patients with alcoholic cirrhosis. The association between use of statins and death was more pronounced in patients with cirrhosis compared with noncirrhotic controls. This study also demonstrated that the use of statins in patients with alcoholic cirrhosis reduced mortality; the hazard ratio was 0.57. While the dose of statins and mortality couldn’t be clearly shown, stable statin dosing lowered mortality when compared to patients whose statin doses changed.\textsuperscript{9}

In Patient With Diagnosis of Hepatocellular Carcinoma

The use of statins demonstrated an inverse association with the incidence of hepatocellular carcinoma in a retrospective study comparing statin users to matched controls in the U.S.\textsuperscript{10}

In Patients With Primary Biliary Cirrhosis (Pbc)

Patients with primary biliary cirrhosis were found to have hyperlipidemia, even though it was not associated with atherosclerosis and increased cardiovascular risk. Prospective studies of statins and PBC have shown improved liver profiles and vascular function without deterioration of liver function tests or cholestasis.\textsuperscript{11}

In patients with compensated cirrhosis

A retrospective study evaluated 81 cirrhotic patients who were matched 1:2 to look for increased complication with the use of statins over a period of 36 months, including patients at an early stage of cirrhosis (Child-Pugh A). This study revealed statins lowered mortality and episodes of decompensation.\textsuperscript{12}

Drug-Drug Interaction:

In transplant liver patients, the immunosuppressive medications tacrolimus and cyclosporine are metabolized via cytochrome P450 system, which increases the risk of adverse reaction for statins that undergo phase I oxidation in the liver (fluvastatin, lovastatin, simvastatin and atorvastatin).\textsuperscript{33} Cyclosporine also competes with statins for hepatic uptake at the level of an organic anion transporter encoded by the SLC01B1 gene.\textsuperscript{34} Some immunosuppressants can therefore increase the risk of statin-side effects. However, in a study done by Zachoval et al.,\textsuperscript{35} six weeks of treatment with pravastatin was well tolerated in post liver transplant patients in terms of liver functions and immunosuppression. Drug interaction must also be considered in patients with HCV and HBV who are on antiviral treatment.\textsuperscript{13} U.S. FDA has issued an updated recommendation concerning drug-drug interaction between drugs for human immunodeficiency virus (HIV) or hepatitis C virus (HCV) known as protease inhibitors and statins. Protease inhibitors and statins taken together may raise the blood levels of statins and increase the risk for muscle injury (myopathy). The most serious form of myopathy, called rhabdomyolysis, can damage the kidneys and lead to kidney failure, which can be fatal. In a special point, FDA mentions that HIV and HCV protease inhibitors should never be taken (are contraindicated) with lovastatin (Mevacor) and simvastatin (Zocor) (www.fda.gov/Drugs/DrugSafety/ucm293877.htm).

Lastly, as with any drug, the metabolism of statins may also be impaired in patients with decompensated liver disease. The steady state and peak serum concentration of pravastatin was found to be increased in Child-Pugh Class B patients when compared to patients with normal liver function or Child-Pugh Class A patients.\textsuperscript{36–38}

Conclusions

In general statins are very safe. The National Lipid Association Statin Liver Safety Task Force takes the position that follow up liver enzyme testing is not uniformly required after statin initiation in chronic liver disease patients, unless indicated for other clinical reasons.\textsuperscript{15} If the increment of liver enzymes is below the threshold three times of the upper limit of the normal, statin treatment can often be continued with the monitoring of liver biochemistries.\textsuperscript{19} If the increment is above three times the upper limit of normal, statins should be stopped, and liver enzymes be monitored. Statins should not be used in patients with acutely decompensated liver function (fulminant hepatic necrosis).

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Post-Complex Myocardial Infarct Pseudoaneurysm Rupture and Subsequent Complications

By Filip Oleszak, MS IV; Chirag K. Desai, MD; Shahjahan Khan, MD; Maryam Sheikh, MD; Tomasz Styś, MD; and Adam Styś, MD

Abstract

Ventricular pseudoaneurysm is an uncommonly encountered complication of myocardial infarction (MI) in the era of percutaneous coronary intervention. Its presentation can be very non-specific, and diagnosis requires a high index of suspicion. Urgent surgical repair is generally warranted to prevent potentially catastrophic complications. We present a case of patient who presented several days after his index MI. He was ultimately diagnosed with a ruptured pseudoaneurysm, and despite best efforts had a complicated hospital course.

Introduction

Mechanical complications of ST elevation myocardial infarction (STEMI) are relatively uncommon in the era of early percutaneous intervention and rapid revascularization. They are now most commonly observed in cases of delayed or incomplete revascularization. We present a case of a post-STEMI pseudoaneurysm that developed in spite of revascularization, was surgically repaired, and was complicated by stroke.

Case Presentation

A 64 year-old male patient presented with worsening atypical, pleuritic and positional chest pain, shortness of breath, and three days of fevers with cough. His past medical history included hypertension, diabetes mellitus type 2, hyperlipidemia, chronic pancreatitis and tobacco dependence. A few days before presentation he had been started on an antibiotic for bronchitis. His physical exam was notable for fever, bilateral diffuse rhonchi, and a pericardial friction rub. The white blood cell count was elevated with a left shift. A chest X-ray showed only hyperaeration. An electrocardiogram (EKG) showed nondiagnostic ST elevations inferiorly with diffuse ST depressions, and a transthoracic echocardiogram (TTE) showed dyskinesia of the basal portion of the inferior wall, a left ventricular ejection fraction (EF) of 55-60%, and a trace pericardial effusion.

Due to worsening chest pain and an elevated initial troponin level of 9.78 ng/mL (normal < 0.04 ng/mL), the patient was taken for urgent left heart catheterization. An angiographically acute appearing 100 percent thrombotic occlusion of the mid-right coronary artery (RCA) and angiographically chronic appearing 80 percent mid-left anterior descending artery (LAD) stenosis were found. The patient underwent successful PCI of the RCA followed by a staged percutaneous coronary intervention (PCI) of his LAD with good results. The peak troponin level was 24.24 ng/ml. His immediate post-PCI hospital course was uneventful, and he was discharged home in stable condition on aspirin, ticagrelor, metoprolol, and atorvastatin.

The patient presented to the hospital one month after discharge with severe right shoulder pain radiating to the head and neck and associated pleuritic chest pain. An EKG revealed atrial fibrillation with a rapid ventricular rate, and a TTE revealed an ejection fraction of 45-50 percent, a large postero-basal left ventricular pseudoaneurysm, and a large pericardial effusion without tamponade physiology (Figure 1). A cardiac computed tomography scan (CTA) further delineated the extent of the pseudoaneurysm (Figure 2). The patient was taken urgently for surgical repair and was found to have a large 2 x 6 cm endocardial defect extending from the level of mid-papillary muscles to the mitral apparatus. The defect
communicated with 6 x 10 cm aneurysm-like sac with a very friable wall and associated pericardial adhesions, which was consistent with a large pseudoaneurysm. The endocardial defect was repaired with a Dacron patch and the pseudoaneurysmal outpouching was plicated and over-sewn. The patient recovered well postoperatively and was discharged home on dual antiplatelet therapy. Although the patient had a CHA2DS2-VASc score of 2, he was not started on anticoagulation due to his ruptured pseudoaneurysm and increased risk of bleeding complications with triple therapy. He was furthermore in sinus rhythm after his initial paroxysm of atrial fibrillation. He was therefore discharged with plans to follow up in clinic and re-evaluate his candidacy for anticoagulation.

The patient presented a third time three weeks after this discharge with a right sided hemiparesis, dysarthria, dysphagia, expressive aphasia, and confusion. An EKG showed normal sinus rhythm. An MRI of the brain demonstrated multiple ischemic infarcts consistent with an embolic etiology. A CTA revealed a persisting inferobasal left ventricular aneurysm with thrombus and a narrow neck. This finding was also seen on transesophageal echocardiogram (Figure 3). The patient was started on warfarin. In consultation with the cardiothoracic surgery team, no further intervention was warranted for the residual defect, and the patient was discharged to inpatient rehabilitation with plans for close follow up.
Discussion

Epidemiology

Left ventricular pseudoaneurysm (LVPA) can occur following a transmural myocardial infarction (MI) that is complicated by free wall rupture but contained by the pericardium. Both free wall rupture and pseudoaneurysm are exceedingly rare in the era of percutaneous coronary intervention, occurring in as few as 0.7% and 0.002% of post-MI patients, respectively. Advanced age, female gender, and low body mass index have been associated with post-infarction myocardial rupture. Of note, patients presenting with free wall rupture are less likely to have had a prior MI, whereas patients presenting with a post-infarction pseudoaneurysm may more commonly have a history of antecedent MI.

Clinical Presentation and Diagnosis

Older series have reported a time period of anywhere from 3 to 80 days from time of infarction to diagnosis of LVPA. Patients most commonly have sustained inferior myocardial infarction and present with a posterior LVPA. Presenting complaints are generally non-specific, as in our case, though patients can also be asymptomatic. Echocardiography, computed tomography, magnetic resonance imaging, and left ventriculography have all proven suitable for diagnosis.

Management and Post-Surgical Outcomes

Given the high mortality associated with myocardial rupture in general, in the absence of prohibitive risk, ventricular pseudoaneurysm is treated by way of surgical repair. Regardless of approach, surgical repair generally leads to good outcomes except in cases of concomitant ischemic cardiomypathy, which is associated with increased mortality.

The repair of the ventricular defect causing pseudoaneurysm should in theory reduce the risk of stroke. Unrepaired pseudoaneurysms have been associated with a high risk for future ischemic stroke. Atrial fibrillation is also a known independent risk factor for stroke. The CHA2DS2-VASc score may more precisely estimate stroke risk in paroxysmal atrial fibrillation, and in the absence of significant bleeding risk, a score of 2 or higher would have been an indication for anticoagulation in our patient. However, the occurrence of stroke post-repair and a finding of organized thrombus at the repair site in our patient suggests that a stroke was caused by this local problem, rather than by paroxysmal atrial fibrillation. A strategy of non-operative management of pseudoaneurysms has been previously described and could in theory be applied to our patient with a small residual defect and high re-operative risk.

Conclusion

The present case demonstrates that although post-infarct pseudoaneurysm and rupture are rare, they can have potentially disastrous complications. While our patient survived infarction, rupture, and cardiac repair, he nevertheless suffered an embolic stroke, illustrating this condition’s often complicated course despite timely intervention.

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Primers in Medicine

A Brief Review of Left Ventricular Assist Devices and Their Management

By Maheedhar Gedela, MD; Ahmed Gohar, MD; and Orvar Jonsson, MD

Abstract
The number of people older than 65 will double by 2060, and with it, the number of people suffering from heart failure will also surge. In the United States, it is estimated that there are close to 250,000-500,000 end-stage/advanced heart failure cases. Mechanical circulatory support (MCS) is an evolving advanced therapy for end-stage heart failure. MCS can be an interim measure along with acute mechanical circulatory support measures including but not limited to the intra-aortic balloon pump, extracorporeal membrane oxygenation, or temporary ventricular assist devices such as Impella, or MCS can be a more prolonged and ambulatory measure in conjunction with an implantable, durable left ventricular assist device (LVAD). As the technology of LVADs advances, the complication rate is decreasing, and the living LVAD patient population is expanding. This indicates that the probability of a non-heart failure specialist encountering these patients is also on the rise. In this article, we aim to expand the familiarity and basic knowledge of non-heart failure specialists by detailing the concepts and complications of LVADs, enabling them to more comfortably manage these patients.

Introduction
Left ventricular assist devices (LVADs), one of the most common mechanical circulatory support (MCS) therapies, aspire to off-load the left ventricle (LV) and assume the role of providing blood flow to vital organs in patients with advanced heart failure (HF). LVADs are now used in the context of bridge to transplant (BTT), bridge to recovery, or even destination therapy (DT). DT is intended as a permanent therapy for patients who are ineligible for heart transplantation. An earlier study showed that the survival rate at one year was 52 percent in the LVAD cohort compared to 25 percent in the optimal medical therapy group. In addition, quality of life was significantly better in the device group. In the contemporary era, more than 95 percent of MCS implants are continuous flow-LVADs (CF-LVADs), and longevity rates at one year are >80 percent and two years >70 percent. In this review, we describe the indications for LVAD implantation, LVAD equipment and basic functioning, and the fundamental management of common and serious complications after device placement.

When to Refer for LVAD Implantation
Prompt recognition of patients with stage D HF (refractory HF requiring specialized interventions) essential due to the progressive nature of the disease, high mortality, and limited number of management strategies available. A heart failure patient exhibiting one or more of the following features needs to be referred to an HF specialist to evaluate the options for LVAD placement: NYHA classes IIIb-IV symptoms despite optimal medical therapy, frequent hospital admissions due to the heart failure (three or greater hospital admissions within the previous 12 months), inability to tolerate neurohormonal antagonist agents, increased need for diuretics, dependence on inotropes, symptoms despite cardiac resynchronization therapy, and/or progressive end-organ dysfunction due to hypoperfusion from the low cardiac output.

Development of LVADs
Pioneer LVADs like the HeartMate I utilized pulsatile flow. In the current era, the vast majority of implants utilize continuous flow. Contemporary devices have the advantage of being less bulky and can therefore be implanted in the thoracic cavity, in direct opposition to the heart. These devices also have a lower risk of mechanical failure. Due to the continuous flow, patients with such devices can be pulseless upon examination,
depending on the force of contractility of the native heart. There are two main modes of continuous flow pumps: axial pumps and centrifugal pumps. The following are the currently FDA-approved CF-LVADs:

• HeartMate II (Abbott, Saint Paul, Minnesota) (Figure A).
• HeartWare Ventricular Assist Device (HVAD; HeartWare, Framingham, Massachusetts) (Figure B).
• HeartMate 3 (Abbott, Saint Paul, Minnesota) (Figure C). This device was recently approved, in August of 2017.

**Concept and Main Parts of an LVAD System**

Primarily, LVADs circulate blood from the left ventricular apex to the systemic vasculature in a continuous/nonpulsatile way. Although devices differ from each other from a technical construction perspective, the components of LVADs are similar. The main components of the system include (Figures A-C):

A surgically implanted inflow cannula into the left ventricular apex that delivers the blood from the LV to a pump.

The pump containing the rotor/impeller, which distributes the blood through the outflow graft to the ascending aorta and then into systemic circulation.
A percutaneous driveline connecting the pump to the external controller. This is surgically tunneled to connect to the pump and traverses the skin to connect to the controller.

A controller that is usually worn on a belt outside the body. It operates and monitors the pump's functioning. There is also a screen that can display operational parameters and error messages (Figures D and E).

The wearable and rechargeable batteries provide power for the system and are connected to the controller through two power cables.

Other components include AC and DC adapters and an external monitor where the pump parameters can be reviewed and adjusted. Patients are also provided with backup batteries, chargers, and a backup controller as safety measures.

Key Operational Parameters of LVADs

(a) Pump Speed
The pump speed, measured in revolutions per minute (RPM), is how fast the rotor/impeller spins, and it is set by the HF specialist. This is an absolute fixed speed in the case of the HeartMate II, while the HVAD and HeartMate 3 have a feature that aims at creating a pulsatile aspect to the continuous flow. This intrinsic, artificial pulse feature of the newly magnetic, levitated, centrifugal, continuous flow HeartMate 3 pump showed no pump thrombosis and improved clinical outcomes in a recent trial.5

If the speed is inappropriately slow, the pump can fail to generate enough pressure to maintain forward flow, and retrograde flow may occur, creating a shunt from the aorta to the LV, mimicking aortic insufficiency. On the other hand, if the speed is inappropriately high, exceeding the capacity of the right heart side to provide preload/blood, an excessive negative pressure could be created in the LV, leading to ventricle suction events due to the inadequate blood volume entering into the pump.

(b) Power
The system controller directly measures power consumption, which is influenced by multiple factors including the pump speed, preload, afterload, and flow. Thrombus ingestion into the pump or thrombus formation on the rotor/impeller will result in an increase in power consumption and a concomitant decrease in flow.6

(c) Flow
Flow is an estimated value; hence, an important clinical note is that it does not always reflect the actual cardiac output. It is estimated by the controller based on algorithms, taking into consideration the set speed and the measured power consumption in the case of the HeartMate II and the pump speed and the patient's hematocrit as a surrogate for blood viscosity in the cases of the HeartMate 3 and the HVAD.

Care should be taken when interpreting the reported flow value, as thrombus formation on the rotor can result in increased power consumption. In such an instance, the estimated/calculated flow value reported by the controller would be high while the actual flow would be the same or even decreased.7

(d) Flow Pulsatility
As the LVAD systems work in parallel with the native heart, contractions by the native diseased heart can still result in an increase in the flow. This can be estimated by measuring temporal power fluctuations. Flow pulsatility is represented by a pulsatility index (PI) value by the HeartMate devices and graphically as a pump flow...
waveform by the HVAD. PI is inversely proportionate to the support provided by the LVAD. Therefore, an increase in the pump speed would increase the support provided by the LVAD and would drive the PI down.

Clinical Evaluation of an LVAD Patient
A clinical assessment of a patient with an LVAD follows the routine of history-gathering and a physical examination assessing for adequate pump function. It is fundamental to keep in mind that LVAD implantation is a part of HF therapy and not a cure; thus, patients may still experience HF symptoms and exacerbation episodes. As such, history-gathering should include an inquiry about heart failure symptoms, as well as the frequency and type of LVAD alarms; any changes in the pump parameters; symptoms suggestive of infection, especially related to the driveline; compliance with medications including anticoagulation treatments; and any past occurrence of bleeding events, with special attention paid to gastrointestinal bleeding, given its high prevalence in this patient population.

Most of these patients exhibit an absent pulse upon examination due to the continuous flow feature. A fraction of CF-LVAD patients may retain a pulse if the native heart is still able to contribute to the cardiac output and mount enough pressure to eject blood through the aortic valve. It is also important to remember that newer CF-LVADs like the HeartMate 3 can provide an artificial pulse, usually at a rate of 30 beats per minute, and this does not correlate with the native heart rate (HR). Accordingly, telemetry or electrocardiography (ECG) is usually required for a reliable assessment of HR.

Another clinical challenge is obtaining noninvasive blood pressure (BP) measurements given the absence of typical pulsatile flow, which leads to the absence of Korotkoff sounds upon auscultation of arterial flow. Automated, noninvasive BP cuffs were found to have a 52.9 percent success rate in obtaining a BP reading. A Doppler ultrasound (US) is recommended to assess BP in LVAD patients, and the obtained pressure should be used as a surrogate for the mean arterial pressure (MAP). The rest of the physical exam should include auscultation of the pump hum, tracking the patient's weight, assessing volume status, and examining for signs of percutaneous driveline infection if there is a suggestive history.

Hypertension
CF-LVADs are afterload-sensitive, which means BP can significantly affect flow through the pump. Hypertension (HTN) can lead to slower flow and theoretically a higher risk of pump thrombosis and greater incidence of neurological events. It is recommended to maintain a MAP of 80mmHg or fewer to prevent these issues. When choosing an antihypertensive agent, guideline-directed medical therapy for HF should be taken into consideration, given the overlap possibilities of antihypertensive agents, patient comorbidities, and tolerability to different agents.

Anticoagulation
Anticoagulation is recommended for all patients with CF-LVADs to prevent pump thrombosis and ischemic stroke. Although the international normalized ratio (INR) varies based on the treating center and the type of device, the suggested target INR from the International Society for Heart & Lung Transplantation (ISHLT) was 2.0-3.0 for the HeartMate II and centrifugal flow LVAD.

Laboratory Evaluation and Imaging Studies
Routine blood work (including measuring creatinine and blood urea nitrogen to monitor kidney function as well as liver enzymes to determine liver function) should be performed as part of an end-organ functioning evaluation. Patients on warfarin should undergo regular INR monitoring to gauge the appropriate level based on the manufacturer’s specifications for the device and the patient’s profile. Platelet efficacy could be evaluated with the help of platelet aggregation or thromboelastographic studies. Complete blood count (CBC), lactate dehydrogenase (LDH) and plasma-free hemoglobin are needed to assess for hemolysis and for the suspicion of pump thrombosis.

Transthoracic echocardiography (TTE) is recommended on a regular basis postoperatively to evaluate the myocardial recovery and optimal functioning of the LVAD. TTE is also helpful in diagnosing LVAD dysfunction and for setting the optimal pump parameters in that setting. Contrast ECG-gated multidetector cardiac computed tomography may be used to identify inflow cannula and outflow graft complications, as well as thromboses of the pump and aortic root.

Evaluation and Management of LVAD Complications
In this section, we outline the most common and deleterious complications encountered post-implant.
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(1) Cerebrovascular Accidents
Stroke remains one of the most serious adverse events post-LVAD implantation, with an incidence rate of 11 percent in the first year.\(^1\) It is one of the main causes of death in the first three months post-implantation and is the leading cause of death between six months and four years post-implantation.\(^2\) Therefore, meticulous management of HTN is important. The acute management of a stroke here is similar to that of a non-LVAD patient including promptly identifying the stroke, obtaining appropriate cerebral imaging to assess whether it is an ischemic or hemorrhagic stroke, and also holding anticoagulation and antiplatelet agents until excluding hemorrhagic stroke. TTE and/or a contrast-enhanced computed tomography scan can be utilized to assess the pump or outflow graft as a possible source of an embolic stroke.\(^4\)

(2) Bleeding Events
Epistaxis and gastrointestinal (GI) bleeds are the most commonly encountered nonsurgical bleeding complications post-LVAD implantation.\(^1\) In addition to receiving chronic oral anticoagulation treatment, these patients are at a high risk for acquiring von Willebrand disease, platelet dysfunction, and arteriovenous malformation of the GI tract, and these factors contribute to the bleeding events.\(^14,15\) Management is mainly centered around determining the cause of the bleeding and assessing the transfusion need, in addition to anticoagulation management or even reversal in life-threatening bleeding situations and direct control of the source of the bleeding, if applicable.

(3) Infections in the LVAD Patient Population
Infection is a prevailing cause of morbidity and mortality post-LVAD implantation.\(^2,11\) The infections can be classified as VAD-specific infections (pump and/or cannula infections, pocket infections, percutaneous driveline infections), VAD-related infections (infective endocarditis, bloodstream infections, and VAD-related mediastinitis), and non-VAD-related infections.\(^11\) Percutaneous driveline infections are the most common LVAD infections. Immobilization of the driveline and optimum care of the exit site are crucial to preventing these infections, as trauma to the exit site impairs the proper healing of the wound and creates a portal of access for pathogens.

An evaluation of a suspected infection in an LVAD patient should include the following:\(^11\)
- CBC
- Chest radiography
- Blood cultures (at least three sets of blood cultures over 24 hours should be drawn, with at least one from any indwelling central venous catheter).
- For those with a suspected cannula or driveline infection, obtain a sample for a Gram stain, potassium hydroxide smear, and routine bacterial and fungal cultures.
- When clinically indicated, aspirate from other potential sources as dictated by the presenting symptoms and examination.
- Directed radiographic studies based on the presenting symptoms and exam findings

Management includes antimicrobial therapy, incision and drainage (I&D) of the driveline exit site, I&D of the pump pocket in the case of pump pocket infection with axial flow pumps, driveline revision, and device exchange or explant with urgent transplantation versus prolonged antimicrobial therapy. The extent of the infection, the indication of the LVAD (whether BTT or DT), and the goals of care determine how aggressive the management should be, as well as the need for surgical intervention.

(4) Hemolysis
Hemolysis is a well-established complication with MCS, and possible causes in the context of LVADs include shear stress, kinking or thrombosis of the outflow graft, malposition, or obstruction of the inflow cannula. Although baseline hemolysis could occur in these patients, a plasma-free hemoglobin level more than 40mg/dl or an LDH value that is 2.5 times the upper limit of normal, greater than 600 IU, or significantly exceeding the baseline should prompt an evaluation.\(^16\) Periodic evaluation for the presence and degree of hemolysis with LDH and plasma-free hemoglobin can be beneficial. Evaluation for hemolysis is also indicated when there is an unexpected drop in hemoglobin or the hematocrit level or in the presence of clinical evidence of hemolysis, such as hemoglobinuria.\(^11\)

(5) Pump Thrombosis
Pump thrombosis is a dreaded complication post-LVAD implantation, with an estimated incidence rate of 12.2 percent.\(^17\) Multiple factors may contribute to pump thrombosis including (a) suboptimal anticoagulation; (b) low doses or poor adherence to antiplatelet therapy;
(c) low flow through the pump, which could be the result of HTN, low pump speed, and/or malposition of the inflow cannula. Evidence of hemolysis, such as elevated LDH, can be an early clue to ongoing thrombosis and should prompt further evaluation. Management of pump thrombosis should always be undertaken in coordination with the MCS center.

(6) Right Ventricular Failure
Right ventricular (RV) failure post-LVAD implantation is associated with negative outcomes including increased mortality, frequent readmissions, reduced functional capacity, and poor quality of life. RV failure can develop due to an increase in preload from hypervolemia or excessive forward flow from the LVAD due to inappropriately high pump speed. Other causes include excessive unloading of the LV, causing leftward shift of the interventricular septum, and pulmonary HTN. Whenever RV failure is suspected, TTE and right heart catheterization are indicated for further evaluation. Management includes the use of inotropes and the optimization of volume status, as well as managing pulmonary HTN if present.

(7) Arrhythmias
The incidence of atrial and ventricular arrhythmias is high in patients post-LVAD implantation based on several studies. A patient with atrial fibrillation (AF) causing a rapid ventricular response that affects the device’s performance should undergo cardioversion. If the AF doesn’t interfere with the device’s functioning, the LVAD patient should be treated similarly to a non-LVAD patient. Sustained ventricular tachycardia (VT) or ventricular fibrillation (VF) is infrequent after one-month post-implant. Evaluation of reversible causes such as electrolyte imbalances and ischemia may be considered. The other possible mechanisms include apposition of the inflow cannula to the LV due to volume depletion or the very high speed of the rotor and scarring from the myocardial fibrosis. Even though a patient can maintain relative hemodynamic stability in VT or VF, if an arrhythmia is prolonged it may cause low flow across the pump with poor end-organ perfusion, resulting in death. Therefore, cardioversion should not be delayed if the VT/VF results in poor device flow and/or hemodynamic compromise.

(8) Aortic Insufficiency
Aortic insufficiency (AI) is a common complication in the era of CF-LVAD devices. The absence of pulsatile flow and continuous closure of the valve that can result from a severely impaired native LV function or an inappropriately high pump speed are thought to play major parts in the pathogenesis. The 2013 ISHLT MCS guidelines recommend that the pump RPM be set at a speed that allows intermittent aortic valve opening. Other important factors to consider are adequate control of HTN to decrease afterload and to optimize volume status. Newer CF-LVAD devices like the HeartMate 3 generate an artificial pulse by alternating the pump speed, and the effect of this artificially generated pulsatility of flow might reduce the incidence of AI in CF-LVAD patients and the results are underway.

(9) Pump Failure/Stoppage
Pump stoppage is a very serious situation that can lead to significant hemodynamic instability or even death. Pump failure can be suspected when hazard alarms indicate pump stoppage with the absence of pump hum upon auscultation. The most common cause of pump stoppage is power failure. If the batteries run out of power and the power module is not connected to the AC/DC current, this leads to power failure and results in pump stoppage and hazard alarms. It is important to quickly ensure that all the connections are secured and to contact the MCS center immediately. An important fact to consider is that prolonged pump stoppage can lead to stagnant blood flow and thrombosis; hence, restarting an LVAD pump after prolonged stoppage carries a high risk of thromboembolic sequelae.

(10) Alarms
The causes of LVAD alarms are divided into advisory and critical alarms. Advisory alarms occur as sporadic audible alarms and appear on the monitor as yellow warning lights. These are usually due to either a power source disconnection or low battery power and can be managed on a non-emergent basis within 24 hours. However, critical alarms are continuous audible sounds with red warning lights and require immediate attention due to the imminent hemodynamic compromise. It is necessary to check the power cable connections immediately and notify the primary LVAD team as soon as possible.

Advanced Cardiac Life Support (ACLS)
The assessment and resuscitation of an unresponsive LVAD patient are unique in multiple aspects. First, it is imperative to recognize whether the pump is running or not and to assess for adequate circulation. This can be
done by auscultation for a mechanical hum over the pump and assessing the patient’s MAP with a Doppler US. A patient with adequate pump function could have adequate perfusion despite the presence of a nonperfusing rhythm like ventricular fibrillation. Performing chest compressions on these patients carries the risk of cardiac injury or pump dislodgement; therefore, this should only be performed in the absence of adequate pump flow leading to poor perfusion. Defibrillation, pacing, fluid resuscitation, and pharmacological agents should be utilized as would otherwise be indicated per ACLS guidelines. The LVAD should not be disconnected from the power source to perform defibrillation, and the defibrillation pads should not be positioned directly over the LVAD pump in order to avoid malfunctioning of the pump.14

**Goals of Care**

A discussion of the goals of care and arranging advance directives is necessary before implantation. This discussion should include potential serious complications, how to proceed in case they occur, and issues pertinent to the end of life.14 Having well-trained personnel in an end-of-life situation can make the process less anxiety-provoking by helping to terminate the LVAD function without provoking frequent device alarms.

**Summary**

The longevity and quality of life of LVAD patients continue to get better with advancements in the technological aspects and safety profile of these devices. LVAD patients usually seek medical attention for non-LVAD-related issues, and therefore, it is of paramount importance to notice complications and provide basic management for this unique patient population.

**Disclosures** — Dr. Orvar Jonsson has a consulting agreement with Abbott.
Physicians on the U.S. Army health care team support our Soldiers and their families. They take pride in the fact that their skills and experience will continue to grow, along with their nation’s gratitude.

To learn more about the U.S. Army and Army Reserve health care team, visit healthcare.goarmy.com/lq77
As medicine continues to advance, more and more patients are surviving critical illnesses that would have been deadly in the past. Longer term observations in these patients has led to the recognition of a sequelae of symptoms being termed post-intensive care syndrome (PICS). It has been estimated that approximately one-half or more of patients discharged from the intensive care unit (ICU) will suffer from PICS.¹

No official definition has been established for PICS but most often it is recognized as new dysfunction or worsening function in one or more areas of cognitive, psychiatric, and/or physical function following a critical illness.² PICS is under-recognized and although it is most commonly seen immediately following the illness, no defined time-line exists. One large study found that three months post critical illness, 40 percent of patients had the cognitive impairment of someone with a moderate traumatic brain injury and 26 percent had impairment of someone with mild dementia.³

PICS often presents with a number of signs or symptoms in the areas of cognitive, psychiatric, and/or physical impairment. It is important to keep in mind that these signs or symptoms are new or worsened following a critical illness. An inter-relationship exists between the three areas of impairment. For example, patients with cognitive impairment often have psychiatric and/or physical impairment as well. On the contrary, improvement in one area often leads to improvement in the others.⁴ Table 1 below highlights the three main areas of impairment,

<table>
<thead>
<tr>
<th>Impairment</th>
<th>Presentation</th>
<th>Major Risk Factors</th>
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<tbody>
<tr>
<td><strong>Cognitive</strong></td>
<td>Mild (difficulty with complex tasks) to Severe (inability to preform activities of daily living)</td>
<td>ICU Delirium</td>
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<td></td>
<td>Memory loss</td>
<td>Prior cognitive deficits</td>
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<td></td>
<td>Inattention/decreased concentration</td>
<td>Severe Sepsis</td>
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<td>Decreased speed of mental processing</td>
<td>Hypoxia</td>
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<td>Decreased executive function</td>
<td>Hypotension</td>
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<td></td>
<td>Glucose dysregulation</td>
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<td></td>
<td>Acute respiratory distress syndrome (ARDS)</td>
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<tr>
<td><strong>Psychiatric</strong></td>
<td>Decreased quality of life for patient and families</td>
<td>Severe sepsis</td>
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<tr>
<td></td>
<td>Anxiety</td>
<td>ARDS</td>
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<td></td>
<td>Depression</td>
<td>Respiratory failure</td>
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<td></td>
<td>Posttraumatic stress disorder (PTSD)</td>
<td>Trauma</td>
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<td>Hypoglycemia</td>
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<td></td>
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<td>Hypoxemia</td>
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<tr>
<td><strong>Physical</strong></td>
<td>Range from general poor mobility to parasis</td>
<td>Mechanical ventilation &gt; 7 days</td>
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<td></td>
<td>Other common post-ICU comorbidities that can contribute</td>
<td>Sepsis</td>
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<td></td>
<td>• Poor lung function</td>
<td>Multi-organ failure</td>
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<td></td>
<td>• Malnutrition</td>
<td>Prolonged bed rest</td>
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<td>Deep Sedation</td>
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some of the common signs and symptoms present, and the major ICU risk factors that have been associated.

A high suspicion for PICS should exist for all patients discharged from the ICU and evaluation should be considered in everyone. Post-discharge evaluation of these patients should include a history and physical examination; as well as confirmatory testing with validated screening tools and consultation referrals as necessary. Potential referrals include specialties such as occupational and physical therapy, as well as neuropsychologists and psychiatrists.

Prevention is key in the management of PICS. A multi-disciplinary approach to managing the care of these patients while they are in the ICU has proven most effective. This multi-disciplinary team would ideally include a physician, nurse, respiratory therapist, pharmacist, physical and occupational therapists, dietician, case managers, social worker, and chaplain; with each member playing a very important role.

One approach to the prevention of PICS in critically ill patients, especially patients requiring mechanical ventilation, is the ABCDEF bundle. This bundle in combination with the Pain, Agitation, Delirium, Immobility, and Sleep Disturbance (PADIS) guidelines can provide specific recommendations to aid in prevention. Outlined below are the key components to the ABCDEF bundle and Table 2 highlights the tools available to aid in achieving the component, as well as the key team members that should be included.

Assess, prevent, and manage pain. It is imperative to recognize that most critically ill patients will experience pain while in the ICU. This pain can be due to either their present illness or injury, or be due to the procedures, as well as confirmatory testing with validated screening tools and consultation referrals as necessary. Potential referrals include specialties such as occupational and physical therapy, as well as neuropsychologists and psychiatrists.

It is also important to incorporate pain prevention strategies such as frequent repositioning, removal of unnecessary lines and tubes, and pre-medicating prior to any potentially painful procedure.

Both spontaneous awakening trial (SAT) and spontaneous breathing trials (SBT). Each day SAT and SBT safety screens should be performed, if the patient does not have any exclusion criteria, the patient should be given a “sedation vacation” as well as a breathing trial. Should the patient exhibit signs of intolerance, such as extreme agitation, apnea, or tachypnea, they will be placed back on a full ventilator support mode and sedation will be re-initiated at half of the previous rate. If the patient tolerates the “sedation vacation” and breathing trial, they will be further evaluated by the physician and considered for extubation.

Choice of analgesia and sedation. Pain and discomfort should be treated prior to initiation of additional sedative therapy. This approach is termed analgo-sedation and is often accomplished with the use of an opioid analgesic.

Delirium monitoring and management. Validated delirium assessment tools must be in place to detect hyper- and hypoactive delirium. One such tool often utilized is the Confusion Assessment Method in the Intensive Care Unit (CAM-ICU). Education to staff regarding the types of delirium is also important. Hyperactive delirium (combative, agitated, or restless features) accounts for only about 1 percent of delirium; while hypoactive delirium (lethargy, sedation, stupor) is present in approximately 35 percent of patients with delirium. Another 64 percent of patients will have mixed hyper- and hypoactive delirium. The long term negative effects of delirium include increased mortality and long term cognitive impairment. Much like for PICS, the management of delirium lies in prevention. The interventions associated with reduction of delirium are mostly non-pharmacologic interventions. These interventions include early mobility, promotion of day and night
Pharmacology Focus

Table 2. ABCDEF Bundle.7,8

<table>
<thead>
<tr>
<th>Tools</th>
<th>Key Team Members</th>
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<tr>
<td><strong>Assess, prevent, and manage pain</strong></td>
<td>Behavioral Pain Scale (BPS)</td>
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<td>Numerical Rating Scale (NRS)</td>
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<td>Critical-Care Pain Observation Tool (CPOT)</td>
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<td><strong>Both spontaneous awakening trial (SAT) and spontaneous breathing trials (SBT)</strong></td>
<td>SAT safety screen</td>
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<td>SBT safety screen</td>
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<td><strong>Choice of analgesia and sedation</strong></td>
<td>Richmond Agitation-Sedation Scale (RASS)</td>
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<td>Riker Sedation-Agitation Scale (SAS)</td>
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<tr>
<td><strong>Delirium monitoring and management</strong></td>
<td>Confusion Assessment Method in the Intensive Care Unit (CAM-ICU)</td>
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<td><strong>Early mobility and exercise</strong></td>
<td>Daily mobility goal</td>
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<td>Optimization of nutrition</td>
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<tr>
<td><strong>Family engagement and empowerment</strong></td>
<td>Routine inclusion of patient and family in care plan</td>
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<td>ICU diary</td>
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distinction, frequent structured reorientation, use of sensory assistive devices such as hearing aids and glasses, and cognitive stimulation. Pharmacologic agents, such as atypical antipsychotics, dexmedetomidine, and melatonin, for the prevention and treatment of delirium continue to be studied. At this time no strong evidence exists to routinely recommend any of these agents.7,8

Early mobility and exercise. Studies have concluded that early mobility of ICU patients resulted in reduced levels of sedation, less mechanical ventilator days, decreased ICU length of stay, reduction in hospital length of stay, as well as decreased levels of delirium. A daily mobility goal should be defined and the team work together to meet that goal.7,8

Family engagement and empowerment. Patients and their families should be invited to have a direct role in the care of the patient. Suggestions include inviting them to join rounds, provide them an opportunity to ask questions and clarify information, and specifically ask if they have any concerns. Patient and family involvement fosters bi-
directional communication and allows for shared decision-making in the care plan. Another potential resource to be utilized are ICU diaries. It has been found that ICU diaries may decrease the incidence of PTSD following an ICU stay. These diaries include things such as a calendar of events and/or milestones, photographs (both of the patient and the ICU), and entries from both staff and the family members.\(^7,^8\)

In conclusion, PICS can negatively impact a patient’s quality of life long after they survive a critical illness and are discharged from the ICU. The key to the management of PICS lies in prevention. The ABCDEF bundle provides many tools and recommendations to help all members of the multi-disciplinary team be more engaged and effective in this potential life altering prevention.

**REFERENCES**


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Patient Education:
The Trap of Poverty

By Richard P. Holm, MD

The U.S. is rated as the tenth wealthiest country in the world. The financial website 24/7 Wall St. clarifies that there are two reasons we are not considered wealthier:
1. We have the world’s largest gap between the rich and the poor, which continues to grow
2. We are the only developed nation in the world without universally available health care.
The second issue of health care goes hand in hand with poverty. Poverty, not ethnicity, is strongly associated with mental health problems, crime, overcrowding, malnutrition and illness. Poverty also affects children more than others.

All of us would be better off if poverty was reduced.

The U.S. Census defines poverty depending on the number in the family. For a single person, poverty means a yearly income below about $12,500 and, for a family of four, that number is about $24,000. In 2016, the U.S. Census found about 13 percent of our general population is in poverty. When we break that down by ethnicity, 28 percent of Native Americans, 27 percent of single parent families, 26 percent of African Americans, 23 percent of Hispanics, and 21 percent of disabled people live below the poverty line. Again, experts clarify that some of the most major problems in our country are associated with poverty, not ethnicity.

Contrast this with the growing billionaire class. A Forbes Magazine study stated that the rich are getting richer in a way not witnessed since the first gilded age a century ago. Josh Hoxie, co-author of the Forbes report, said “So much money concentrating in so few hands, while so many people struggle, is not just bad economics, it’s a moral crisis.” For example, the wealthiest 400 people in the U.S. now have more money than the total of the lowest 64 percent of the U.S. population.

Poverty is a U.S. humanitarian shortcoming within our own borders which, I personally believe, is the core issue about which our political leaders should give their greatest attention. I don’t claim to have the answers to poverty, but our country could do better in making available to all: affordable health care, satisfying jobs with living wages, and quality and affordable pre-school and higher-education.
I believe political leaders should be intensely studying the issue of poverty and how to support people in need while encouraging opportunities for rewarding work. All of us, rich and poor alike, could personally try to attack this problem, especially locally.

Addressing poverty will also address mental health problems, crime, overcrowding, malnutrition and illness; especially the way these issues so severely affect children. Helping all people caught in the trap of poverty will immeasurably raise all boats and make everyone in our society safer and happier.
STRESS AND STRESS RELIEF...

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Ask your patients who use tobacco or vape why they do it and chances are they’ll tell you that it helps them cope with their stress.

Our recent SD QuitLine Outcome Report shows that stress is one of the main reasons tobacco users relapse.

Problem is, stress is part of life, so a big key to being healthy is finding less harmful ways to handle it.

When you help them do that, you’re treating the person AND the patient.

Visit SDQuitLine.com/providers/referral-options for more on how to refer patients to the South Dakota QuitLine and connect them with a Quit Coach.

Remember...
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Board News is a monthly feature sponsored by the South Dakota Board of Medical and Osteopathic Examiners. For more information, contact the Board at SDBMOE@state.sd.us or write to SDBMOE, 101 N. Main Avenue, Suite 301, Sioux Falls, SD 57104.
Quality Focus:
Making Long-Term Care a Home

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

Our monthly articles often dwell on quality improvement areas and encourage providers to consider changes and focus on upcoming challenges. This month we decided to highlight achievements and notable programs in the area of long-term care. Endless regulatory and reimbursement changes can leave caregivers and facilities under constant economic and social pressure. They are expected to maintain mandatory reportable metrics to stay licensed and competitive. This data is made available to the public through tools such as Nursing Home Compare.

While quality improvement and reporting metrics are demanding and important issues, there are also efforts undertaken to improve lifestyle and personal care. They are aimed at making patients and families recognize they are in a patient-centered facility and truly at “home.” Example areas of engagement may include games, puzzles, art therapy, support groups and pets (real or toy). Visits from youth and community groups can be frequent and helpful. Residents may receive benefit and feel useful when assisting staff in maintaining the facility environment.

One such program that has recently been expanded to South Dakota facilities is Music and Memory. Established under a grant from the Centers for Medicare & Medicaid Services (CMS), it involves the use of personalized music playlists on iPod or mp3 devices in an attempt to help residents with cognitive and physical challenges. Great Plains Quality Innovation Network, in conjunction with the South Dakota Association of Healthcare Organizations, the South Dakota Health Care Association, the South Dakota Department of Health and Office of Licensure and Certification, offers support for these services in participating facilities. Hopefully, this program can improve well-being and reduce adverse behavior with the need for medication. Music can help patients recall precious memories and assist adjustment to long-term care facility lifestyle.

Another area that GPQIN staff assisted was organizing a training series for long-term care facility staff to learn about caring for dementia patients. It consisted of presentations in three communities across the state designed to educate and involve all levels of employed facility staff. It offered a basis for understanding and dealing with dementia patients. As an example, the facility in Highmore sent a very large percentage of their total staff to learn how to assist in caring for these demanding residents. There are countless similar efforts in long-term care facilities across our state involving various sized communities and remote locations. Providers caring for adults, regardless of their specialty, need to be aware of the social environment of their nursing home resident patients. In the demanding world of long-term care, there are many projects undertaken to make those facilities as much like a true “home” as possible.

More information can be found on the Great Plains QIN website (https://greatplainsqin.org/initiatives/hac-nhl/) or by contacting Stephan Schroeder, MD, CMD, CMQ (Stephan.Schroeder@area-a.hcqis.org) or Lori Hintz, RN (Lori.Hintz@area-a.hcqis.org).

“Quality Focus” is a monthly feature sponsored by The South Dakota Foundation for Medical Care (SDFMPC), 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. HHOW-GPQIN-SD-C2-3520119
Richard C. “Dick” Erickson, SDSMA CEO from 1964-1972

Dick Erickson, 85, passed away Nov. 30. Dick began working for the SDSMA in 1958. In 1964, he began serving as SDMSA Executive Secretary and President of South Dakota Blue Shield. He then assumed full-time duties as President and CEO of Blue Shield until 1982. In January 1972, before the start of the 47th Session of the South Dakota Legislature, then-SDSMA president Dr. G. Robert Bartron wrote that under the leadership of Erickson, the SDSMA was “most competently represented [in] Pierre.” Dr. Bartron wrote that along with Bob Johnson, Erickson and Johnson “know their way around the legislative halls, are intimately familiar with the backstage ins-and-outs of legislating, and have the broad acquaintance and many contacts effective lobbying demands. Dick has been instrumental session after session in promoting legislation beneficial to our profession and in sidetracking proposals which were not in our best interests. Our association owes him an enthusiastic debt of thanks.”

Paul Jensen, SDSMA CEO from 1999-2006

Paul Jensen, 70, passed away Dec. 5. Paul began working for the SDSMA in 1972. In acknowledgement of his retirement from the SDSMA in 2006 after 36 years, then-SDSMA president Dr. P. Kenneth Aspaas, Jr., wrote of Jensen: “I know he considers the past 36 years working for the physicians of South Dakota a true labor of love.” Dr. Aspaas continued, “Paul led the organization through challenging times to become a distinct organization representing the professional interests of physicians and their patients. He successfully increased value to physician members through improved communications and strong advocacy efforts…a champion for adequate funding for medical education and publicly-sponsored health programs…”and he “played a significant role in shaping many of the favorable aspects of the medical practice climate which South Dakota physicians enjoy today….the family of medicine has been well-blessed by Paul’s dedication long-time history, and leadership.” Paul also served as the Executive Secretary of the South Dakota State Board of Medical and Osteopathic Examiners from 1999-2005.

**MEMORIAL SCHOLARSHIP**

A memorial scholarship has been started for former SDSMA CEOs who have passed away. Contributions will be used for medical school scholarships. Please mail contributions to SDSMA Foundation, 2600 W 49th St Ste 200, Sioux Falls, SD 57105 with CEO Memorial Scholarship in the memo line. Donors who wish to contribute in honor of a specific former CEO – Dick Erickson, Paul Jensen, or Bob Johnson (who passed away in 2017), please include the name in the memo line.
In Memoriam 2018

Honoring physician members of the SDSMA who passed away in 2018

Loren H. Amundson, MD
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Edward G. Huppler, MD
Buron O. Lindbloom, DO
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David L. T. Oey, MD
Edward A. Pasek, MD
Guy E. Tarn, MD
(passed away in 2017)
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### SDSMA District Legislative Districts

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### Special Features

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Welcome to the SDSMA!
NEW MEMBERS WHO JOINED IN 2018

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<td>Shahid Nafees Ahmad, MD</td>
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This list includes new members from October 2017 through November 2018.
Welcome to the SDSMA!  
NEW MEMBERS WHO JOINED IN 2018

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This list includes new members from October 2017 through November 2018
SUBSCRIPTION ORDER FORM – 2019

Date: ________________________________

Name: ____________________________________________

Company: __________________________________________

Address: __________________________________________

City, State, Zip: _____________________________________

Phone: __________________________ Fax: __________________________

E-mail: ____________________________________________

Mailing Address For Publication (if different from above):

Name: ____________________________________________

Company: __________________________________________

Address: __________________________________________

City, State, Zip: _____________________________________

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Prices: 
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$65.00 (Foreign)

Subscription Agency Fee: $40.00 (U.S.)
$50.00 (Foreign)

Please return order form and payment to: South Dakota Medicine
2600 W. 49th Street, Suite 200
Sioux Falls, SD 57105
Fax: 605.274.3274  Email: ereiss@sdsm.org

Please direct any questions to: Elizabeth Reiss
Staff Editor, South Dakota Medicine
Phone: 605.336.1965  Fax: 605.274.3274
Email: ereiss@sdsm.org

FOR OFFICE USE ONLY

Received By: __________________________ Date: __________________________

Amount Paid: __________________________ Date Paid: __________________________
Don't Let Your Member Benefits Expire - Please Renew Your Membership for 2019

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!

Doctor of the Day Informational Call – Join Us!

Do you have an interest in serving as the South Dakota State Medical Association Doctor of the Day for one day at the State Capitol during the legislative session? Are you interested in learning more about this volunteer opportunity?

An informational conference call will be held at 5:30 p.m. CT/4:30 p.m. MT on Jan. 2 to discuss Doctor of the Day guidelines with an opportunity to learn about the program and ask questions.

If you would like to participate, please register by emailing Mark East at meast@sdsm.org or reply to this email.

To join the call, please follow these call-in instructions at 5:30 p.m. CT/4:30 p.m. MT on January 2:

Dial: 1-888-285-0307
Access code: 6693984#
Daugaard Announces Budget Proposal

Gov. Daugaard announced his proposed budget and gave his farewell address on Dec. 4. In total, the governor proposed a nearly $1.7 billion general fund budget for the 2020 budget year which starts on July 1.

His proposal includes a 2.3 percent inflationary increase in Medicaid provider reimbursement rates. The SDSMA appreciated the proposed increase and the governor’s ongoing efforts to ensure Medicaid reimbursement rates are within 90 percent of Medicare. However, low reimbursement rates continue to be a concern for us as many of our small, rural providers lack the private pay base to help offset the lower reimbursement rates of entitlement programs.

As a part of the governor’s outgoing budget proposal, he indicated a surplus of approximately $6 million in Title XIX Medicaid FMAP expenses due lower utilization and increased federal reimbursement. While accurate, what was not noted is that a large percentage of that savings can be attributed to the efforts of the aGovernor’s Health Care Coalition who has worked tirelessly with the tribes in initiate care coordination agreements and to ensure 100 percent FMAP reimbursement. Of note, a large percentage of the shared savings has benefited the Medicaid eligible community through some improvement in access to care. Expanded services include coverage for substance abuse, the creation and incorporation of care coordinators for Native Americans, and an expansion in mental health care providers and services. The shared savings has also been utilized for fund a modest increase in reimbursement for community-based providers. However, the state nor DSS has expanded Medicaid eligibility – which was one of the initial selling points and reasons for the creation of the Coalition.

If the state were to expand Medicaid, 50,000 South Dakotans, including 15,000 American Indians, would have access to care. The SDSMA remains concerned about individuals who are below the federal poverty level but are not eligible for Medicaid coverage in South Dakota. Better health outcomes and management of costs begin with people having access to quality health care.

While we can respect and appreciate the fact that Gov. Daugaard did not budget any of the anticipated $23 million from sales tax on e-commerce the state may receive as a result of the Wayfair decision, we do believe those funds hold the potential to do great things towards the improvement in access to health care for South Dakotans.

The SDSMA looks forward to working with Gov.-Elect Noem, her staff, policymakers, and the legislature, to address the needs of all South Dakota patients.

Legal Brief Highlight: The Use of Electronic and Social Media

The Internet has created the ability for physicians and medical students to communicate and share information quickly and to reach millions of people easily. Participating in social networking and other similar internet opportunities can support physicians’ personal expression, enable individual physicians to have a professional presence online, foster collegiality and camaraderie within the profession, provide opportunity to widely disseminate public health message and other health communication. Social networks, blogs and other forms of communication online also create new challenges to the patient-physician relationship. Physicians should weight a number of considerations when maintaining a presence online.

The same confidentiality rules apply to patient communications and information facilitated or posted online as in any other setting. Social media sites open to the public should never be used to communicate with a patient or to post information concerning patients. Once a post is made online, the posting physician loses control of the post. A physician should use separate social media sites for his or her practice and his or her personal life.

Just as in the hospital or ambulatory setting, patient privacy and confidentiality must be protected on social media and social networking websites. These sites have the potential to be viewed by many people and any breaches in confidentiality could be harmful to the patient and in violation of federal privacy laws, such as HIPAA. Physicians should not discuss their professional experiences on social media available to the general public, and should never in any setting, especially social media, provide any information that could be used to identify patients.

Social networking websites may be useful places for physicians to gather and share their experiences, as well as to discuss areas of medicine and particular treatments. These types of professional interactions with other physicians represent an ancillary and convenient means for peer-to-peer education and dialogue. While such networks may be useful, it is the responsibility of the physician to ensure, to the best of his or her ability, that professional networks for physicians are secure and that only verified and registered users have access to the information.

A social media-use policy for employees is important to protect a
physician’s practice and reputation and to give employees fair notice of what is and is not permissible. If the physician maintains a website in connection with the physician’s practice, the physician should set limits on the persons who may post on that website.

For more, download the SDSMA legal brief Electronic and Social Media at sdsma.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.

AMA Delegate Report

Members of the South Dakota State Medical Association (SDSMA) and the SDSMA Medical Student Section attended the American Medical Association (AMA) Interim Meeting in National Harbor, Maryland, in November. The gathering was filled with activities and policy debate that will help shape the future of health care in the nation. Some policies adopted by the AMA House of Delegates (HOD) include the following:

The future of medicine. Tensions surrounding health care today are evident to patients and physicians. When it comes to alleviating those tensions and shaping practical changes to improve care, the onus is on physicians to lead the way, AMA CEO James Madara, MD, told delegates. “New solutions must facilitate, not complicate medical practice,” Dr. Madara said. “These solutions must save time, not take time.” Dr. Madara highlighted the AMA’s role in programs to prevent diabetes, as well as the AMA’s efforts to help physicians accelerate digital health implementation in practice.

Creating — and sustaining — patient-centered medical homes requires support from payers. Primary care and the patient-centered medical home (PCMH) are “bedrocks of high-quality patient-centered care,” says an AMA Council on Medical Service report whose recommendations were adopted. But practices of all sizes and settings need support to overcome cultural and financial obstacles to adopting the PCMH model, it notes. The costs of PCMH implementation and maintenance are significant, as are integrating innovations such as telemedicine to increase access. Efforts to improve care quality also may be expensive, the council report says. To this end, delegates adopted policy to: (1) Urge the Centers for Medicare & Medicaid Services to assist physician practices seeking to qualify for and sustain medical home status with financial and other resources; (2) Advocate that all payers support and assist PCMH transformation and maintenance efforts recognizing that payer support is crucial to the long-term sustainability of delivery reform; and (3) Encourage health agencies, health systems, and other stakeholders to support and assist patient-centered medical home transformation and maintenance efforts.

Seamless interface between EHRs, pharmacies, and PDMP programs. Delegates voted to advocate for a federal study to evaluate the use of PDMPs to improve pain care as well as treatment for substance use disorders. This would include identifying whether PDMPs can distinguish team-based care from uncoordinated care, misuse, or “doctor shopping,” as well as help coordinate care for a patient with a substance use disorder or other condition requiring specialty care. In addition, the AMA will urge EHR vendors to increase transparency of custom connections and costs for physicians to integrate their products in their practice. Delegates also voted to support state-based pilot studies of best practices to integrate EHRs, EPCCs and PDMPs as well as efforts to identify burdensome state and federal regulations that prevent such integration from occurring.

Physician-assisted suicide vs. aid-in-dying: study end-of-life options, and the need to distinguish “physician assisted suicide” and “aid in dying” A report from the Council on Ethical and Judicial Affairs (CEJA) was referred back to CEJA for a second time this year. The CEJA report describes a multiple range of views on physician-assisted suicide. The report aims to add clarity to the issue and emphasizes that physicians from all perspectives share a common commitment to the core values of care, compassion, respect, and dignity for their patients, but draw different moral conclusions from these shared commitments. Over the last two-and-a-half-years, CEJA solicited input and consulted with stakeholders representing a range of views on physician-assisted suicide. The report states that the AMA’s Code of Medical Ethics, in its current form, offers guidance to support physicians and the patients they serve in making well-considered, mutually respectful decisions about legally available options for care at the end of life in the intimacy of the patient-physician relationship and in keeping with their deeply held personal beliefs. “We believe that the code as it exists is excellent moral guidance to our profession,” said CEJA Chair Jim Sabin, MD.

CEJA’s report had been revised following comments to the committee at the June 2018 AMA meeting. CEJA maintained its recommendation that the AMA leave its code intact. The code, as it exists, states the AMA’s opposition to physician-assisted suicide, and a second code, the “Physician’s Exercise of Conscience,” addresses concerns raised at the last meeting about the need to improve safeguards in states where physician-assisted
suicide is legal, in order to mitigate risk of those practicing in those states. In addition, CEJA acknowledged that the terms “physician-assisted suicide” and “aid-in-dying” reflect different ethical perspectives. CEJA maintained its finding that the term “physician-assisted suicide” is the most precise language and urges that it be used by the AMA in all policy and position statements. The House of Delegates did not endorse CEJA’s report and it was referred back to CEJA. The existing AMA code can be found at the following link: https://www.ama-assn.org/delivering-care/ethics/physician-assisted-suicide. Physicians are encouraged to read the full CEJA report which can be accessed here: https://www.ama-assn.org/system/files/2018-11/refcomm-conby.pdf.

AEDs can save lives, but are underused. More than 40,000 people suffer a sudden cardiac arrest in a public place each year in the U.S. and automatic external defibrillators (AEDs) can be a key to their survival, yet AEDs are used in only 5 percent of these events. Poor public awareness of AEDs and other factors have contributed to the poor take-up of these lifesaving tools, says a resolution presented by several heart-care medical specialty societies. To promote wider use of AEDs, the delegates adopted new policy to “endorse efforts to promote the importance of AED use and public awareness of AED locations, by using solutions such as integrating AED sites into widely accessible mobile maps and applications.”

Boost internet access to cut rural health disparities. A lack of broadband internet access is a social determinant of health that limits access to health care resources, government services, economic growth, job opportunities and educational programs, says a resolution presented by delegations from 10 states. More than 20 million Americans live in areas without broadband internet access, which is needed to provide telemedicine to underserved rural areas. To address the issue, delegates adopted new policy to “advocate for the expansion of broadband and wireless connectivity to all rural and underserved areas of the U.S. while at all times taking care to protect existing federally licensed radio services from harmful interference that can be caused by broadband and wireless services.”

Increasing rural rotations for residents during training. Delegates agreed to work with interested stakeholders to identify strategies to increase residency training opportunities in rural areas, with a report back to the House of Delegates, and that the AMA work to formulate an actionable plan of advocacy with the goal of increasing residency training in rural areas.

“Site of Service” differential payment by Medicare. The AMA has long supported and advocated for fair, equitable and adequate Medicare payments across outpatient sites of service, as well as payment policies that support value-based care and encourage use of the most cost-effective care setting. The policy priority in addressing the site-of-service differential has been to ensure patient access to services in the most clinically appropriate setting, depending on their needs and the severity of their conditions. While an hospital outpatient departments may be the appropriate setting for certain medically complex patients, the migration of many services from physician offices to hospital-owned facilities is of significant concern not only because of increased costs to the Medicare program, but also because it has become increasingly difficult for practices in certain specialties to remain competitive or even sustain operations because of declining payment rates and the increased costs to practices of dealing with regulatory and administrative burdens. The AMA continues to be concerned about independent physician practices, and for Medicare patients who incur higher cost-sharing expenses for outpatient services provided in hospital facilities whose care could have been safely provided in lower-cost settings. Policy proposals addressing the site-of-service differential must be patient-centric and ensure adequate payment that supports the costs of providing high-quality, high-value physician services. Representatives on the AMA’s Council on Medical Services asked the AMA to encourage CMS to both: a) base disproportionate share hospitals and uncompensated care payments to hospitals on actual uncompensated care data; and b) study the costs to independent physician practices of providing uncompensated care. Delegates recognized the need to address broader physician payment issues and that achieving site-neutral payments for outpatient procedures will require increases in Medicare payment for physician services so that physician practices can be sustained, and patient choice of care setting is safeguarded. To help build the case for future Medicare payment reforms, the AMA was asked to collect data and conduct research both: a) to document the role that physicians have played in reducing Medicare spending; and b) to facilitate adjustments to the portion of the Medicare budget allocated to physician services that more accurately reflects practice costs and changes in health care delivery.

Criteria for the Director of the Indian Health Services. In consideration of the unique demands for the Indian Health Service (IHS) director, AMA delegates adopted a resolution, “Desired Qualifications for Indian Health Service Director,” which was brought forward by the Association of American Indian Physicians. The resolution lists desired qualifications, including having lived on tribal lands or interacted closely with a American Indian or Alaska Native community, experience with the IHS or extensive work with tribal or urban Indian health programs, a leadership position in American Indian/Alaska Native health care, and an understanding of social and cultural issues affecting the health of American Indian and Alaska Native people.

Continued support for federal vaccination funding. Delegates voted to update AMA policy regarding support for federal funding of vaccine programs. In the updated policy, delegates directed the AMA to release a public statement and actively advocate for increased federal funding for vaccines. The policy includes funding for publication education about the importance of immunization.
Physicians spoke out on gun-violence policy. AMA delegates adopted policy calling for a better background check system for firearms purchases, a ban on 3D-printed firearms, and “gun violence restraining orders” for people arrested or convicted of domestic violence or stalking. The AMA’s actions stem from comprehensive policy adopted in previous House of Delegates meetings.

Better data needed to guide suicide prevention efforts among physicians and medical students. Citing the high rate of suicide among medical professionals, delegates want a better understanding of patterns linked to physician and medical student suicide. Long work hours are commonly cited as a reason for the prevalence of mental illness and burnout among physicians and medical students, but additional institutional factors can contribute to suicide.

AMA seeks better patient access to medical forensic examinations after sexual assault. Hospital emergency departments serve as the primary point of care for survivors of sexual assault by conducting a medical forensic examination (MFE), which takes an average of two hours to perform and must be completed within 72 hours of the assault. Because emergency physicians in many areas typically see almost three patients per hour, it is difficult to effectively complete the MFE and maintain chain-of-custody of the evidence alongside their clinical responsibilities. Involvement of sexual assault nurse examiners — RNs who have completed specialized education and clinical preparation to perform MFES — and other trained and qualified clinicians, is associated with higher rates of psychological recovery for survivors and offender prosecution due to better collection of forensic evidence. Although several programs for access to a medical forensic examination exist around the country, many communities, especially rural locations, may not have access to these services. To improve access for patients, delegates adopted new policy to “advocate for increased post-pubertal patient access to sexual assault nurse examiners, and other trained and qualified clinicians, in the emergency department for medical forensic examinations.” There was a great deal of discussion at the North Central Medical Conference, which met in conjunction with the AMA Interim Meeting, regarding the feasibility in rural areas and small hospitals. NCMMC representatives agreed with the sentiment, and they discussed the need for additional thought must be given around how to accomplish this.

Help homeless people get the government ID cards often needed to access medical care. More than 3.5 million Americans will experience homelessness at some point in a given year — and nearly 80,000 are chronically homeless, according to data cited in a resolution presented by the AMA Medical Student Section. For these people, lack of government-issued identification remains a major barrier to seeking medical care. With more than 36 percent of the U.S. homeless population suffering from severe mental illness or chronic substance abuse, a lack of ID prevents them from accessing drug treatment and rehabilitation programs, says the resolution whose recommendations were adopted by the AMA House of Delegates. This can also prevent access to benefits from the Supplemental Nutrition Assistance Program and delayed care due to lack of insurance. Delegates adopted new policy to support legislative and policy changes that streamline, simplify and reduce or eliminate the cost of obtaining identification cards for the homeless population.

Fix hospital eligibility criteria for drug-discount program. The 340B program requires drugmakers to sell outpatient prescription medications at a discount to “covered entities” that include disproportionate-share hospitals, children’s hospitals, certain cancer hospitals, critical access hospitals and other safety-net or remote institutions. The number of these entities quadrupled in six years, according to research cited in an AMA Board of Trustees report. Delegates adopted policy to “support a revised 340B drug-discount program covered-entity eligibility formula, which appropriately captures the level of outpatient charity care provided by hospitals, as well as stand-alone community practices.”

Vaping is an epidemic and the FDA must act. The nation’s physicians sent a strong message on “the urgent public health epidemic” of the skyrocketing use of e-cigarettes and called on the FDA to take action to address it. Research has shown that the use of e-cigarettes and vaping products is unsafe and can cause addiction, according to data cited in a resolution presented by the AMA Organized Medical Staff Section. The AMA will work with the FDA to counteract the marketing and use of e-cigarettes, “including but not limited to bans and strict restrictions on marketing to minors under the age of 21.”

Definition of gender. The AMA will work to inform officials about the medical spectrum of gender identity. About 1 million adults are transgender, according to data cited in a resolution presented at the Interim Meeting. The resolution also notes that “sex and gender are complex and fluid parts of individuals’ identities that may not align with the sex assigned to them at birth.” The AMA has been working to educate the medical community and the public about gender identity. To further those efforts, delegates adopted policy so that the AMA will: (1) Educate state and federal policymakers and legislators on and advocate policies addressing the medical spectrum of gender identity to ensure access to quality health care; (2) Oppose any efforts to deny an individual’s right to determine their stated sex marker or gender identity; and (3) Affirm that an individual’s genotypic sex, phenotypic sex, sexual orientation, gender and gender identity are not always aligned or indicative of the other, and that gender for many individuals may differ from the sex assigned at birth.

Respectfully Submitted,
Mary S. Carpenter, MD, SDSMA Delegate to the AMA
Robert L. Allison, MD, SDSMA Alternate Delegate to the AMA
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