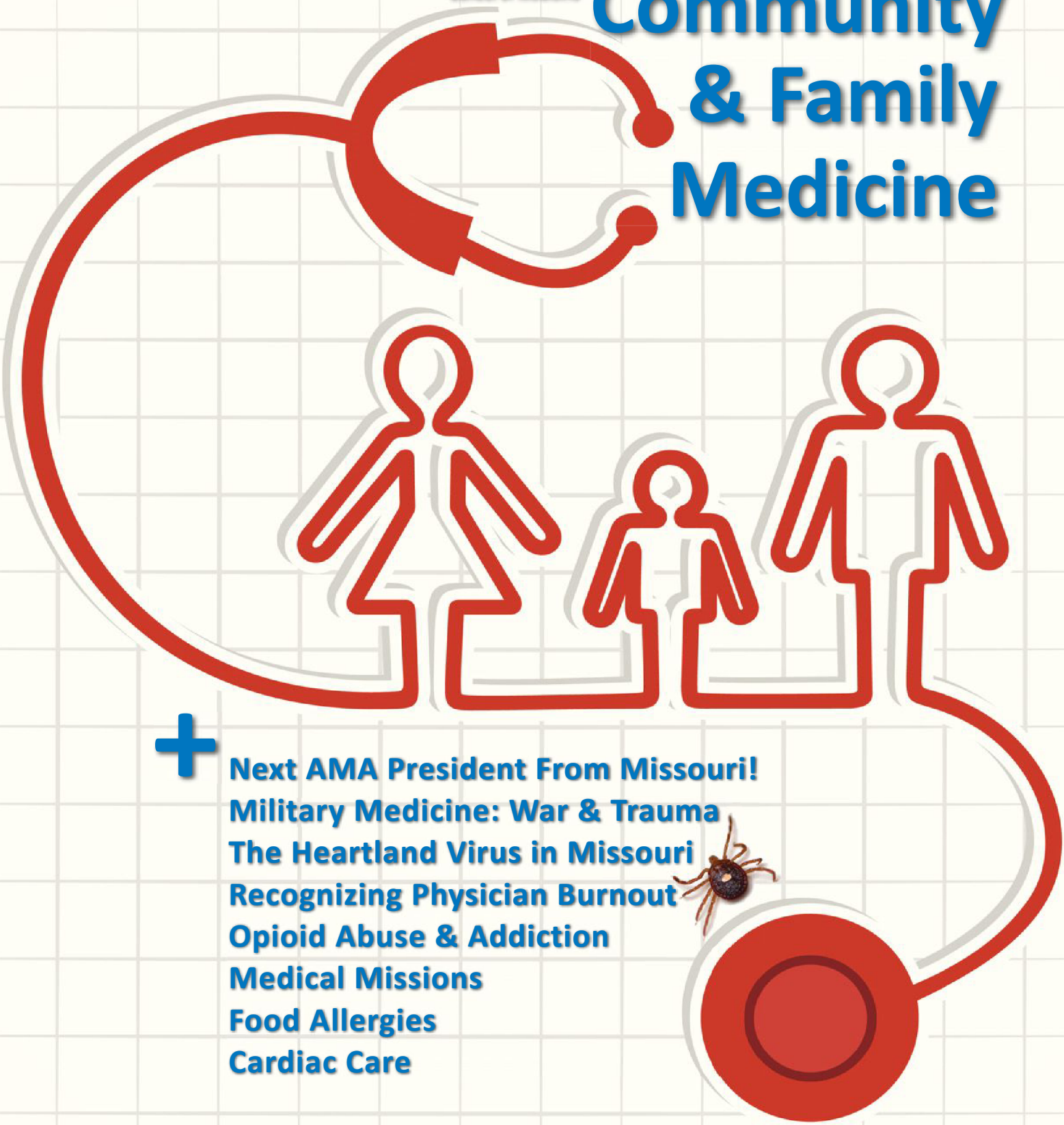
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The Journal of the Missouri State Medical Association www.msma.org/missouri-medicine July/August 2016

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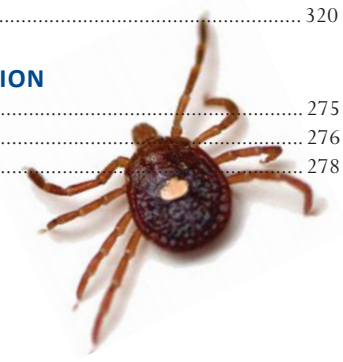
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MISSOURI MEDICINE EDITOR*

John C. Hagan, III, MD
9401 North Oak Trafficway, Ste. 200
Kansas City, MO 64155
Tel: 816-478-1230 / Fax: 816-454-8478
jhagan@bizkc.rr.com

MANAGING EDITOR

Lizabeth R. S. Fleenor
Missouri State Medical Association
113 Madison Street / P.O. Box 1028
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OPIOID ADDICTION

Drug Company Compensated Physicians Role in Causing America's Deadly Opioid Epidemic: When Will We Learn?

by Arthur H. Gale, MD

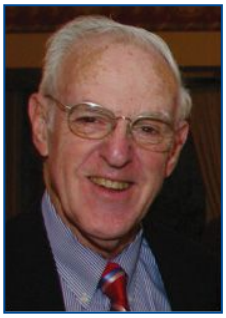
Follow the Money and the "Experts" It Buys

Because of the fear of addicting patients, physicians seldom prescribed opiates until the mid-1980s and early 1990s. At that time "medical experts" and "thought leaders" led by the neurologist and pain specialist Russell Portenoy, MD, proclaimed that the risks of addiction to opioids were minimal and that not treating pain was cruel and even amounted to medical negligence. Pain was to be considered the fifth vital sign.[1] To this day in most American hospitals nurses on their daily rounds ask patients to rate their pain on a scale of one to ten and then may administer a narcotic accordingly.

Portenoy once had an impeccable reputation. He wrote numerous articles and book chapters on pain and has won many accolades and awards. He was known as the "King of Pain." He was the Chairman of Pain Medicine and Palliative Care at Beth Israel Hospital in New York. Portenoy and other "thought leaders" had been so influential in promoting the safety of opioids that regulatory agencies such as the Joint Commission which accredits hospitals and the Federation of State Medical Boards wrote guidelines and rules for the treatment of pain. In many cases hospital lawyers warned physicians that their patients could sue them if they did not treat their pain adequately.[2]

Portnenoy and his acolytes wrote articles and gave lectures to physicians about the safety of narcotics they repeatedly cited a study by Porter and Jick in *The New England Journal of Medicine* that stated that only 1% of patients treated with narcotics became addicted. *Time* magazine described the Porter and Jick article a "landmark" study.[3] The problem was that Porter and Jick's so-called 'landmark study' was incredibly not a controlled study at all. It consisted of a short 101-word one paragraph letter to the editor. The lead author Hershel Jick, MD, has repeatedly stated that his letter to the editor has been misinterpreted. It was based solely on hospitalized patients and did not apply to patients after they left the hospital.[4]

Recently and belatedly, Portenoy has backtracked and admitted he was wrong about the addictive properties



Arthur H. Gale, MD, MSMA member since 1976, is a *Missouri Medicine* Contributing Editor. He practices Internal Medicine in St. Louis.
Contact: agalemd@yahoo.com

of opioids. He stated: "I gave innumerable lectures in the late 1980s and '90s about addiction that weren't true."[5] Incredibly the much discredited Portenoy remains the chairman of the pain clinic and palliative care clinic at Beth Israel Medical Center.

Based on false statements about the addicting properties of opioids and the assertions that leaving pain untreated might constitute malpractice the genie was out of the bottle. As of 2011, 75% of the world's opioid prescriptions were in the United States which comprises 5% of the world's population. Opioids are the most common cause of preventable death in America today - a horrifying and shameful statistic![6] It is estimated that 50% of opioid overdoses resulting in death are from physicians' prescriptions. From 1999 to 2014 opioid prescriptions quadrupled and there were more than 165,000 deaths related to opioid overdose.[7] (See Figure 1.)

But statistics on death do not tell the whole story. Thousands of lives have been destroyed by opioid addiction and a like number of families have been devastated and disrupted never to see their loved ones return to a normal productive life. In his book "Dreamland: The True Tale of America's Opiate Epidemic" investigative reporter Sam Quinones documents the prescription drug problem in America. He writes that drug addiction crosses all social strata affecting white middle class families from all walks of life including families of doctors, lawyers, judges, business people, politicians, and police.[8]

'Follow the Money'

In attempting to understand the role physicians and researchers with financial conflicts played in creating the drug problem it is essential to follow the money. Dr. Portenoy and his pain center have received millions of dollars of funding from many pharmaceutical companies including Purdue Pharma, the manufacturer of oxycontin, as well numerous other well known drug manufacturers such as Mallinckrodt, Wyeth, Baxter, and Pfizer. Portenoy has admitted to having financial relationships with more than a dozen companies most of which produce opioid pain killers. Portenoy defends himself with the statement: *"My viewpoint is that I can have these relationships [and] they would benefit my research mission and to some extent* ***they can benefit my own pocketbook,*** *without producing in me any tendency to engage in undue influence or misinformation."*[9] [Editor's note: emphasis added]

When drug companies fund research published in prestigious medical journals or give money to physician or PhD speakers at medical meetings or at upscale restaurants, practicing physicians should be very skeptical and hyper-critical of their findings and recommendations. The conflicts of interest are real and their conclusions are frequently suspect.

The American Medical Association has addressed this problem as have academic medical centers and scholarly medical journals. Their solution is currently that simply disclosing conflicts of interest is sufficient. It is left up to physicians and researchers to determine whether the research is valid. In the case of opioid prescribing this "buyer-beware" strategy has been a disaster. Busy doctors are in no position to evaluate shoddy research.

When the practice of Medicine loses its ethical foundation and operates by the rules of the market place rather than ethical standards, one can expect that disasters like the money-driven physician-caused opioid epidemic to occur again.

Purdue Pharma has paid over $600 million in fines for misrepresentation of the addictive properties of oxycontin and three of their chief executives were criminally charged.[10] But does that restore the lost or ruined lives of the tens of thousands of victims and their families? And what has happened to Portenoy and the other "experts" and "thought leaders" who falsely promoted the safety of opioids? What has happened to the Joint Commission and the Federation of State Medical Boards and hospital lawyers all of whom played 'follow the leader' and climbed on the opioid bandwagon and advised doctors they had better treat pain with opioids or possibly face sanctions or malpractice claims? The answer is a resounding nothing.

Physicians believed the false message of Portenoy and the other industry compensated "thought leaders" on the safety and the non-addictive properties of opioids. And now these physicians are being blamed for their role in causing the opioid epidemic-deservedly so in my opinion.

New studies show that opioids are not effective in most non-cancer chronic conditions causing pain. Such studies were available in the past but were ignored. The

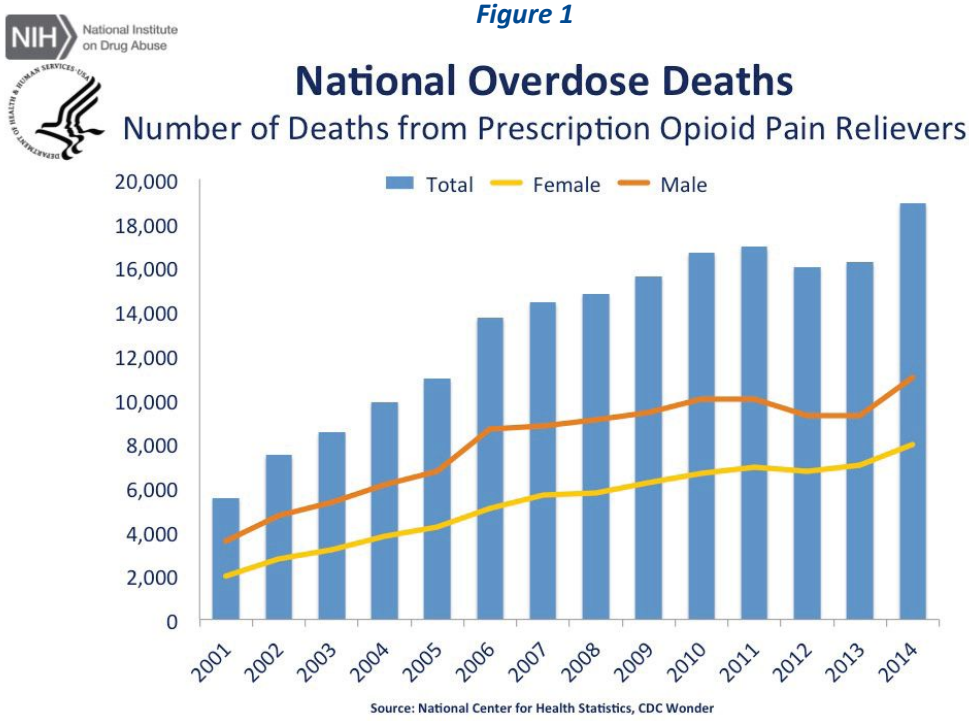
Centers for Disease Control and Prevention (CDC) has issued new guidelines against opioid prescriptions for chronic pain.[11] It is well recognized that patients receiving opioids long term can develop both tolerance and hyperalgesia or increased sensitivity to pain.[12]

The industry financed and physician led-physician driven opioid disaster proves, like no other example, that the policy of simple disclosure of conflicts of interest do not work. Probably nothing will be done about the problems of conflicts of interest. There is simply too much money at stake in our commercialized health care system for those who profit from these conflicts of interest: drug companies, academic medical centers, hospitals, researchers, medical education programs, and finally some physicians.

The commercialization of Medicine is the result of a little known 1972 unanimous Supreme Court decision known as Goldfarb. This decision ruled that Medicine (and Law) were no longer to be considered learned professions but were to be considered "ordinary purveyors of commerce."[13] Right after the Goldfarb decision the Federal Trade Commission sued the American Medical Association successfully and removed one of its most important Principles of Medical Ethics which was a restatement of the Hippocratic Oath.[14] Both of these Supreme Court decisions were intended to lower health care costs. Ironically they did not lower costs. Health care costs have increased dramatically since their enactment.[15]

When the practice of Medicine loses its ethical foundation and operates by the rules of the market place rather than ethical standards one can expect that disasters like the money driven-physician caused opioid epidemic to occur again. Physicians should be very skeptical and extremely careful in analyzing research by physicians and researchers compensated by pharmaceutical companies. They ought to avoid attending lectures given by physicians with blatant conflicts of interest. If these ethical bright lines had been honored with regard to opioid prescribing a great American tragedy might have been prevented.

Figure 1





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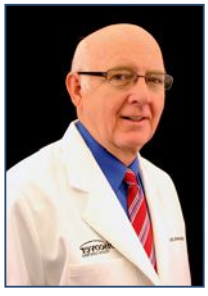
Kansas City Center for Practical Bioethics at Epicenter of Congressional Concerns about Conflicts of Interest with Pain Pill Industry

by John C. Hagan III, MD

The Center for Practical Bioethics (CPB) in Kansas City, Missouri, has on several occasions been investigated for its financial ties to the pain pill-opioid industry. In 2012 the United States Senate Finance Committee investigated CPB founder and former president Myra Christopher.[1] Christopher is a long-time acerbic critic of physicians for not recognizing and treating chronic pain. Christopher and CPB have longstanding financial ties to numerous drug companies. The CPB has received substantial financial support from a variety of pain medication companies including Purdue Pharma manufacturer of OxyContin. Christopher herself held a Chair funded with a $1.5 million dollar "gift" from Purdue Pharma.[1] Justifiable criticism of CPB continues; U.S. Senator Ron Wyden (D-Oregon) has questioned in 2016 whether members of the Interagency Pain Research Coordinating Committee (IPRCC) with financial ties to the pharmaceutical industry should be allowed to continue to serve.[2] Senator Wyden specifically singled out CPB for concern stating that Christopher and Richard Payne, MD, both employees of CPB, receive a disturbing variety of funding from drug manufactuers.[2]

Such conflicts of interest are not unusual and are frequently non-disclosed or incompletely or inadequately disclosed. The *Milwaukee Journal Sentinel* found that nine of 19 "pain experts" on a pain panel organized by the National Institute of Medicine organized in 2011 had connection to manufacturers of narcotic painkillers.[3] Myra Christopher was named by the investigative reporter for her conflicts. During the time period 2009-2011 drug companies were providing 14% of the Center for Practical Bioethics operating budget.[3]

In my opinion the Center for Practical Bioethics and its founder Myra Christopher have seriously undermined their credibility and objectivity by accepting so much financial support from the pain medicine industry whose opioid products they shill. CPB and other "pain management experts' receiving monies from the opioid industry must accept and admit some culpability for the current opioid overuse crisis.[4] As the above Gale editorial states Russell Portenoy, MD, the leading proponent of opioid use, has publicly admitted regret and culpability.[5] It's past time for other pain management experts and organizations, especially those receiving monies from the opioid industry, to do the same, eschew conflicting pain medicine industry income and direct more resources to the opioid abuse epidemic.



John C. Hagan, III, MD, FACS, is a Kansas City, Mo., ophthalmologist and *Missouri Medicine* Editor since 2000. He is a multi-year Super Diamond Contributor to MMPAC.
Contact: jhagan@bizkc.rr.com

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PRESCRIPTION OPIOID EPIDEMIC: KNOW THE FACTS



Recognize prescription opioid misuse, addiction, and overdose

FACTS ABOUT OPIOID ADDICTION IN THE UNITED STATES:

- As of 2016, the estimated death rate due to opioid overdose in the US was 40-52 people a day.
- Prescription pain medication misuse can affect all races, ages, economic levels, and genders.
- Studies estimate that between 3-19% of people who take prescription pain medications develop an addiction to the pills. Opioid addiction is often a biological response to misuse of properly prescribed medications.
- Risk factors for prescription pain medication addiction include previous substance abuse, mental illness, chronic pain, and genetic predisposition.
- Some people think that abusing prescription pain medication is safer than "street drugs" because it is a medicine, but that is not true.
- Some examples of opioids are: oxycodone, hydrocodone, and fentanyl.
- People who misuse opioids are 40% more likely to switch to heroin.

SIGNS OF ADDICTION:

- Losing motivation or productivity
- Decreased inhibitions— doing things that they typically would not do
- Appearing sedated or lethargic
- Changes in appetite and often sick with flu-like symptoms

SIGNS OF OVERDOSE:

- Overdose is a life threatening situation. People who take more opioids than are prescribed are at an increased risk for overdose and death.
- Signs of overdose include:

  Slowed or no breathing | Pinpoint pupils | Unconsciousness
  Seizures | Clammy skin | Fatigue | Confusion | Nervousness

AT SIGNS OF OVERDOSE, IMMEDIATELY CALL 911 and administer Naloxone (or Narcan) if available.

AVOIDING ADDICTION AND OVERDOSE:

- Ask your physician for pain medications that are not opioids to avoid bringing opioids into your home.
- Naloxone (or Narcan) is a medication that blocks the effects of prescription pain medications and has been effective in preventing death from overdose in those addicted, as does CPR breathing.

SAFE STORAGE AND DISPOSAL OF OPIOID MEDICINES:

- Keep medications hidden safely out of sight.
- Lock up prescription pain medications in the home. Keep a count of all pills to notice if any are missing.
- Dispose of all prescription pain medications when they are no longer needed:
  - Use safe local disposal sites and information found at: **www.deadiversion.usdoj.gov/drug_disposal/takeback**
  - OR crush medications, mix with coffee grounds and liquid soap or hand sanitizer and seal in a plastic bag to throw away.

If you think that you or a family member is misusing prescription opioids, contact your doctor about treatment for addiction or call the Substance Abuse and Mental Health Services Administrations national help line to find treatment options: 1-800-662-HELP (4357). Or visit www.samhsa.gov.

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Rising Mortality from Substance Abuse Among Middle-Aged White Americans

by James H. O'Keefe, MD

Something shocking is occurring among middle-aged white Americans. Death rates for United States (U.S.) whites between ages of 45 to 54 years are rising, not falling like they had been for the decades leading up to 2000. This is in stark contrast to other age cohorts, other ethnic and racial groups, and virtually all other wealthy nations, where mortality rates have continued to fall since 2000.[1]

Nobel Prize-winning economist Angus Deaton from Princeton coauthored this very disturbing recent study, which focused on problems with addiction and depression among middle-aged white Americans that began to worsen about the time the new millennium was ushered in. The increasing mortality rates among this group are being driven not by the usual non-communicable diseases such as heart disease and cancer, but instead by an epidemic of substance abuse and depression, with rising rates of alcoholic liver disease and suicides, and overdoses of ethanol, narcotics and benzodiazepines. The rising death rate was seen predominantly for people with a high school education or less—in this cohort mortality rates rose by 22%; in contrast death rates actually dropped for middle-aged whites with a college education. The essence of the article can be appreciated by studying the two figures below; an abrupt reversal in mortality rates occurred only among middle-aged American whites starting about 1999.

Dartmouth economists, Ellen Meara and Jonathan S. Skinner, in an accompanying editorial to the Deaton article in Proceedings of the National Academy of Sciences wrote, "It is difficult to find modern settings with survival losses of this magnitude. Clearly this is a unambiguous indication that something is awry in these American households."[2]

According to Dr. Deaton, "Only HIV/AIDS in contemporary times has done anything like this."[1] Death rates for middle-aged blacks and Hispanics continued to decline during the past 15 years, as did mortality rates for younger and older people of all races and ethnic groups.

It remains uncertain why only middle-aged whites experiences a rise in their mortality rates, but this cohort did have higher use of prescription narcotic drugs, and were also more pessimistic about their financial futures. Indeed, from 1999 to 2013 (the years of the study) the real (inflation-adjusted) income for U.S. households headed by a high school graduate fell by 19%, despite the fact that during this same time the real per capita gross domestic product in the U.S. increased by 16%.[2]

This study reminds me, as a physician, to continue to be extremely cautious about giving out prescriptions for benzodiazepines and/or opiates. As care providers we often hear complaints from our



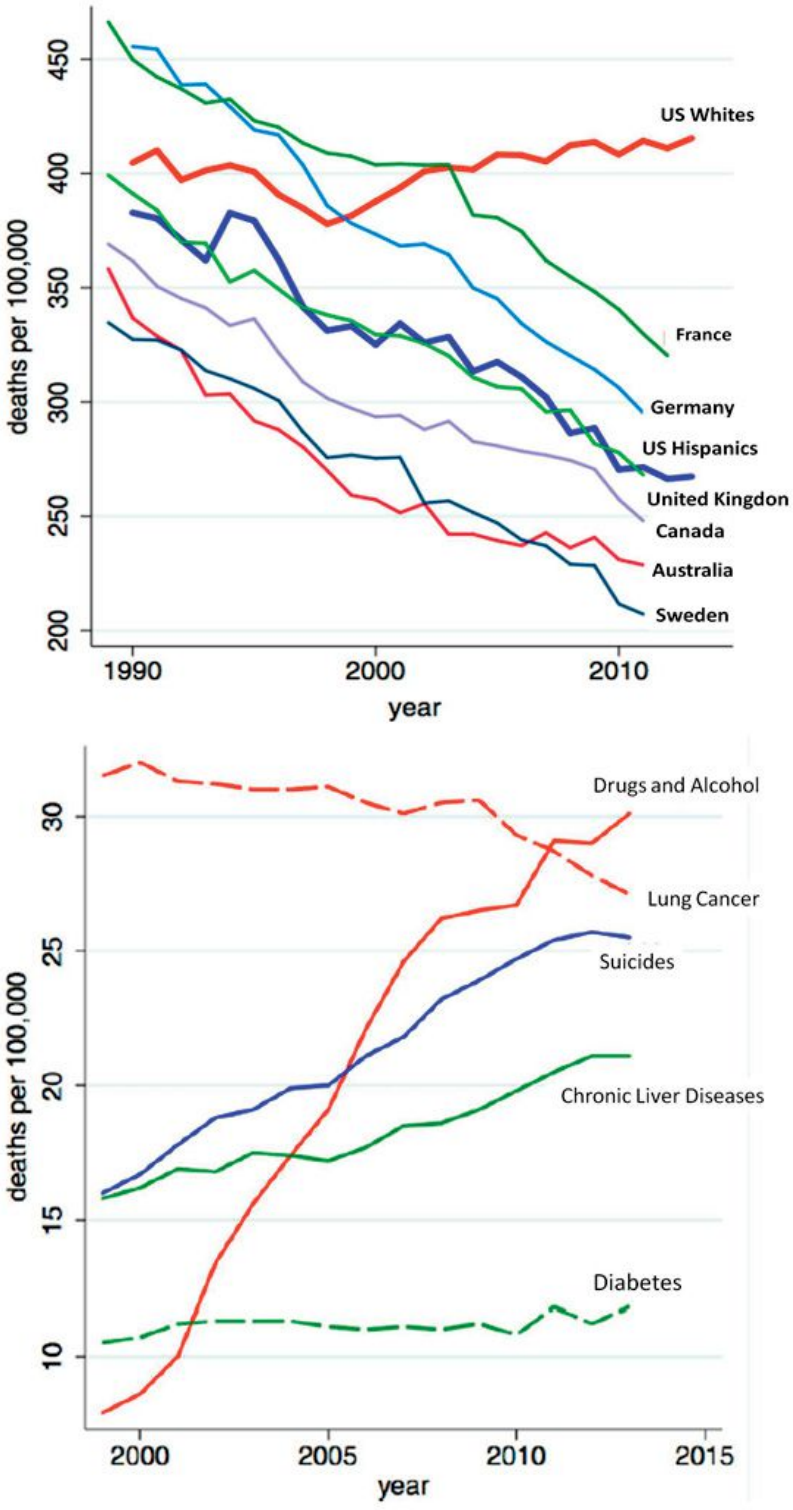
James H. O'Keefe, MD, MSMA member since 2003, is with the Saint Luke's Mid America Heart Institute, Kansas City, MO, and the *Missouri Medicine* Preventive Medicine Editorial Board Member.
Contact: jokeefe@saint-lukes.org

patients about pain and anxiety; but the shocking statistics show that the U.S. makes up only 4.6 percent of the world's population, but consumes 80 percent global opioid supply, and 99 percent of the world's hydrocodone.[3]

A recent large meta-analysis from Harvard researchers found that over-the-counter non-steroidal anti-inflammatory drugs (NSAIDS) such as ibuprofen and naproxen were as effective as prescription oral opioids for relieving pain.[4] For chronic pain and anxiety, better approaches than opioids and benzodiazepines are those emphasizing healthy copying skills, such as personal and community interpersonal connections, physical therapy, massage, exercise, weight loss, sleep, meditation, spirituality, prayer, etc. If and when patients need a medication to treat chronic pain, acetaminophen or an NSAID should be tried first. It appears that a multi-disciplinary approach for chronic pain and anxiety may be a safer and more effective strategy than ongoing prescription drug use.[4]

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Top, Figure 1: US whites aged 45 to 54 showed a reversal in the declining mortality rates noted among other rich nations and other ethnic groups.[1]
Bottom, Figure 2: Causes of death among US whites aged 45 to 54 years.[1]

Figures adapted from article:
Case A, Deaton A. Rising morbidity and mortality in midlife among white non-Hispanic Americans in the 21st century. Proc Natl Acad Sci U S A. 2015;112:15078-15083. PNAS Permissions Editor / 500 Fifth Street, NW / NAS 340 / Washington, DC 20001 USA / Anyone may, without requesting permission, use original figures or tables published in PNAS for noncommercial and educational use (i.e., in a review article, in a book that is not for sale) provided that the original source and the applicable copyright notice are cited.

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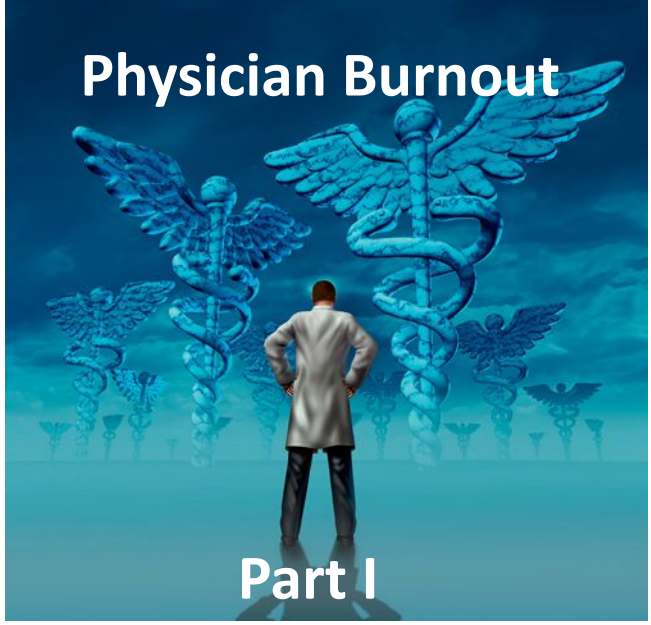
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by Dike Drummond, MD

Burnout Basics – Symptoms, Effects, Prevalence and the Five Main Causes

There is an epidemic of physician burnout in the USA. It has a pervasive negative effect on all aspects of medical care including your satisfaction with your career. In this three-part article series we will explore burnout's symptoms and causes (Part 1), proven methods to lower physician stress levels (Part 2) and proven methods to recharge and create more life balance (Part 3).

Before you can effectively fight an enemy, you must be able to recognize it. Physician burnout is both incredibly common and a taboo subject in the workplace. Stress management and burnout prevention are never covered in detail in medical school or residency training.

In this article we will fill this hole in your medical education by exploring burnout's prevalence, cardinal symptoms, effects, complications and five main causes. In future articles we will explore multiple field-tested burnout prevention tools to help you lower your stress levels and build more life balance and a more ideal practice.

The Prevalence of Physician Burnout

Burnout prevalence has been exhaustively studied in all major specialties and in most first world nations over the last three decades. Here is a telling quote from one of the key researchers:

"Numerous global studies involving nearly every medical and surgical specialty indicate that approximately one of every three physicians is experiencing burnout at any given time." - Tait Shanafelt, MD[1]

The 2015 Medscape Physician Lifestyle Survey[2] reported a burnout rate of 46%. This was up from 39.8% in the 2013 survey.

Why is Physician Burnout Important?

Burnout is directly linked to an impressive list of pervasively negative consequences.[3, 4, 5, 6, 7, 8]

- Lower patient satisfaction and care quality
- Higher medical error rates, malpractice risk
- Higher physician and staff turnover
- Physician alcohol and drug abuse and addiction, physician suicide

Burnout can be a fatal disorder. Suicide rates for both men and women are higher in physicians than the general population and widely underreported.

So, before we go on, let's agree that physician burnout is bad on multiple different levels. Bad for the doctor and their family. Bad for their staff, patients and organization. And burnout is everywhere, all the time.

The Origin of Physician Burnout

Burnout is a fundamental disorder of energy metabolism. This is not the Kreb's cycle. It is more like "the force" in Star Wars. Before we go any further, we must debunk a common metaphor for burnout: The battery. Physicians often discuss exhaustion and burnout as a state where, "my batteries are just run down." This battery metaphor is at odds with reality for the following reasons.

When a toy's battery runs out, what does the toy do? Yes, it stops working. When did you ever stop working - ever? If you had stopped working - at any time in your medical school, residency or practice - what effect would that have had on your career?

A much more accurate and useful metaphor is the energetic bank account. Like an account at the bank, it can have a negative balance. And just like a regular bank account, when you dip into a negative balance the account does not get closed. You keep working despite the fact that your energy account is in a negative balance. This is exactly what residency trains us to do. We learn to carry on despite complete exhaustion of our energy reserves.

Simply stated:

- We use energy from this account for the activities of our life and medical practice.
- We recharge the account during times of rest and rebalance.

Burnout is the constellation of symptoms that occur when your energy account is in a negative balance. You can continue to function in this depleted state, however, dozens of studies show you are a shadow of the doctor you are when your account is in a positive balance.

Burnout's Three Cardinal Symptoms

The accepted standard for burnout diagnosis is the Maslach Burnout Inventory, developed by Christina Maslach at the University of San Francisco in the 1970. Her team was the first to describe burnout and name the syndrome. Here are the three main symptoms.

1) Exhaustion

The physician's physical and emotional energy levels are extremely low and in a downward spiral over time. A common thought process at this point is, "I'm not sure how much longer I can keep going like this."

2) "Depersonalization"

This is signaled by cynicism, sarcasm and the need to vent about your patients or your job. This is also known as "compassion fatigue". At this stage you are not emotionally available for your patients, or anyone else for that matter. Your emotional energy is tapped dry.

3) "Lack of Efficacy"

You begin to doubt the meaning of your work. "What's the use, my work doesn't really serve a purpose anyway." Or you may worry that you will make a mistake if things don't get better soon.

Gender Differences

Recent research shows that both men and women suffer from exhaustion and compassion fatigue equally. However, symptom three "Lack of Efficacy" is much less common in men. Male physicians are far less likely to doubt the quality of their work than women no matter how burned out they are.[9]

Fast and Slow and the Role of Trauma

Burnout can happen slowly over time in a chronic grinding fashion – the classic "death by 1,000 paper cuts." It can also crash down on you in a matter of minutes when it is triggered by a traumatic outcome, lawsuit, devastating medical error or equally tragic circumstance in your larger life. Trauma can drain your energy in mere moments, robbing you of the will to go on. The lifetime incidence of this level of trauma in practicing physicians is extremely high. In some specialties repeated practice trauma is a constant feature of the physician's professional life.

The Five Main Causes of Burnout

In over 1,500 hours of one-on-one coaching experience with burned out physicians, here are the five causes of burnout I see commonly:

1) The Practice of Clinical Medicine

Being a physician has been and always will be a stressful job. This is a fundamental feature of our profession for a simple reason. We are dealing with hurt, sick, scared, dying people and their families.

Our work takes energy even on the best of days. Our practice is the classic high-stress combination of great responsibility and little control. This stress is inescapable as long as you are seeing patients, no matter what your specialty. As you read on, note that this is the only one of the five causes of burnout we actually experience in our training.

2) Your Specific Job

On top of the generic stress of caring for patients above, your job has a very specific set of unique stresses. Everyone's matrix of job-specific stresses is unique. They include the hassles of your personal call rotation, your compensation formula, the local health care politics associated with the hospital(s) and provider group(s), the personality clashes in your department, your leadership and your personal work team and many, many more.

You could change jobs to escape your current stress matrix and your next position would have all the same stressors at different levels of intensity. It is also tempting to believe a different practice model would be less stressful. However, moving from an insurance-based practice model to concierge or direct pay simply switches one set of stressors for another.

3) Having a Life

In an ideal world, your larger life is the place where you recharge from the energy drain at work. Two major factors can prevent this vital recharging activity.

a) We are not taught life balance skills in our medical education. In fact, our residency training teaches us just the opposite. We learn and practice ignoring our physical, emotional and spiritual needs to unhealthy levels and then carry these negative habits out into our career. You work until you can't go any longer, then you keep going. To do otherwise could be seen as a sign of weakness. (See cause #4 below).

b) Multiple situations could arise at home that eliminate the opportunity to recharge your energy account. Your life outside your practice then switches from a place of recharge and recuperation to an additional source of stress.

The causes range widely from simple conflict with your spouse, through illness in a family member (child, spouse, parent), to financial pressures and many more.

This can lead to the common situation where you watch a colleague take on the downward spiral of burnout at work in the absence of any new work stress. If you reach out to a colleague who appears to be burnout out, you must ask, "how are things at home" to reveal this burnout cause.[10]

4) The Conditioning of Our Medical Education

As premeds several important character traits become essential to graduating from medical school and residency. Over the seven-plus years of our medical education they become hard wired into our day-to-day physician persona creating a double-edged sword. The same traits responsible for success as a physician simultaneously set us up for burnout down the road. Here are the top five that I see in my physician coaching practice.

- Workaholic
- Superhero
- Perfectionist
- Lone Ranger
- Emotion Free

In addition, we absorb two prime directives. One is conscious and quite visible.

"The patient comes first."

This is a natural, healthy and necessary truth when we are with patients. However, we are never shown the off switch. If you do not build the habit of putting yourself first when you are not with patients, burnout is inevitable.

The second prime directive is never stated, deeply unconscious and much more powerful. It goes like this:

"Never show weakness."

To show you this programming in stark relief, please try this thought experiment. Imagine you are back in your residency. A faculty member walks up to you and says, "You look really tired. Is everything OK?" How would you respond – and how quickly would that response come out of your mouth? That is the essence of this deeper prime directive. This kneejerk defense makes it very difficult to help physician colleagues even when their burnout is clear to everyone on the team.

Put the five personality traits together with the two prime directives and you have the complete conditioning of a well-trained physician. Combine this with a training process that is very much like a gladiator style survival contest, and doctors become hard wired for self-denial and burnout.

5) The Leadership Skills of Your Immediate Supervisors

Outside of health care there is a management saying, "People don't quit companies, they quit their boss." There is wide acceptance that your work satisfaction and stress levels are strongly powerfully effected by the leadership skills of your immediate supervisor.

Now we know this is true for physicians, too. A recent study shows a direct relationship between the quality of your boss and your burnout and job satisfaction levels.[11] In this era where physician groups are forming much more quickly than they can find trained doctors for their leadership positions, having either an unskilled, or worse, an absent boss to report to, is very common. This fifth cause of burnout has only recently joined the classic four above. It is a significant source of stress for many employed physicians.

The Pathophysiology of Burnout

How does burnout work in the body of its victims? Let's go back to two concepts discussed above – the energy account and the symptoms of the Maslach Burnout Inventory.

It is most useful to understand we each have more than one internal energy account. There are actually three energy accounts inside each of us. They correspond to the three symptoms of the MBI.

1) Exhaustion = your physical energy account

You make energy deposits here by taking care of your physical body with rest, exercise, nutrition – all the things we learned not to do in our training.

2) Compassion fatigue = your emotional energy account

You make energy deposits here by maintaining healthy relationships with the people you love – your friends and immediate family. Recharge here is essential if you are to have energy to be emotionally available for your patients and staff, family and friends.

3) "What's the use" = your spiritual bank account

You make deposits here via a regular connection with your personal sense of purpose. In your practice this

"(Burnout is) … an erosion of the soul caused by a deterioration of one's values, dignity, spirit and will."
- Christina Maslach

occurs when you have an ideal patient interaction. This is the visit where you say to yourself afterwards, "Oh yeah, that is why I became a doctor." You can connect with purpose outside of work as well. On example for me is when I coach my children's youth soccer teams. If you go long periods of time without connecting with purpose, this account is drained and you have a lot of trouble seeing a reason to carry on.

The Physician's Ethical Imperative

As physicians, we each have a moral imperative to keep our energy accounts in a positive balance. All good things flow from this positive energy state. Our leadership skills, quality patient care, empathy, our skills as a spouse and parent … all of these rely on a positive energy balance

And yet you can see we are not trained to notice, or care for, our energy levels and our job places us at very high risk for burnout.

How Can We Stop or Prevent Physician Burnout?

There are two fundamental mechanisms to drive a positive energy balance.

- Lower your stress levels and the drain they produce
- Improve your ability to recharge your energy accounts

Most physicians will use a combination of both methods to treat and prevent burnout. We will discuss multiple tools in both categories in future articles. One more thing ...

Beware of Einstein's insanity definition and the comprehension trap. Before we end this introductory article, let me show you an extremely common form of "mind trash" that stops many physicians from preventing burnout in the first place.

The comprehension trap, which is the tendency to study a concept until you understand it, then fail to put it into action.

Einstein's insanity definition: "The definition of insanity is doing the same things over and over and expecting a different result." [12]

Now that you have a better understanding of burnout, do not stop here. You must take different actions to get different results in your practice and your life. In order to prevent or recover from burnout you must rise above the habits you learned in training and take new actions to lower stress and create more balance.

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Dike Drummond, MD, is CEO of theHappyMD.com where he provides burnout prevention and leadership development coaching, training and consulting to individual physicians and health care organizations. He is the creator of the Burnout Prevention MATRIX Report with over 117 ways to prevent physician burnout.
Contact: dikedrummond@gmail.com

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Heartland Virus: A New Virus Discovered in Missouri

by Eden M. Esguerra, MD

In June 2009, two males ages 57 and 67 from Northwestern Missouri were hospitalized with symptoms consisting primarily of fever, fatigue, anorexia, and diarrhea. Prominent laboratory abnormalities included leucopenia with moderate neutropenia, thrombocytopenia, and elevated hepatic transaminase levels.[1]

They were both treated empirically with Doxycycline for suspected Ehrlichiosis, a common cause of febrile illness, leucopenia, thrombocytopenia and elevated hepatic transaminases in the warm weather months. Blood was drawn for PCR assay in both of them and sent to the CDC and was shown to be negative for *Ehrlichia chaffeensis*, *Ehrlichia ewingii* and rickettsiae of the spotted fever group and typhus.

Further work on the leukocytes of these two patients included inoculation into cultures of DH82 cells. These cultures showed cytopathic effects similar to those seen in *E. chaffeensis*, but there was no bacterial morulae. A virus was suspected as a possible etiologic organism and indeed electron microscopy findings revealed characteristics typical of a virus in the Bunyaviridae family. Additional genetic analysis proved that this virus is most similar to the phlebovirus in the Bunyaviridae family. Thus a newly discovered virus now named the Heartland virus is introduced.



Eden M. Esguerra, MD, MSMA member since 1995 and *Missouri Medicine* Infectious Disease Editorial Board Member, is with Mercy Hospital in Joplin, Mo.
Contact: Eden.Esguerra@Mercy.Net

In addition to the initial two index patients from Northwestern Missouri, six confirmed Heartland virus disease cases were identified in 2012-2013.[2] Five patients were Missouri residents and one was a Tennessee resident. They were all men (ages 50-80). Symptoms were from May to September. All of them had fever, thrombocytopenia and leucopenia when first evaluated. All of them reported fatigue and anorexia and most reported headache, nausea, myalgia and arthralgia. Four of the five were hospitalized. One patient with multiple comorbidities died. All reported spending time outdoors and most of them reported tick bites in the two weeks prior to the illness.

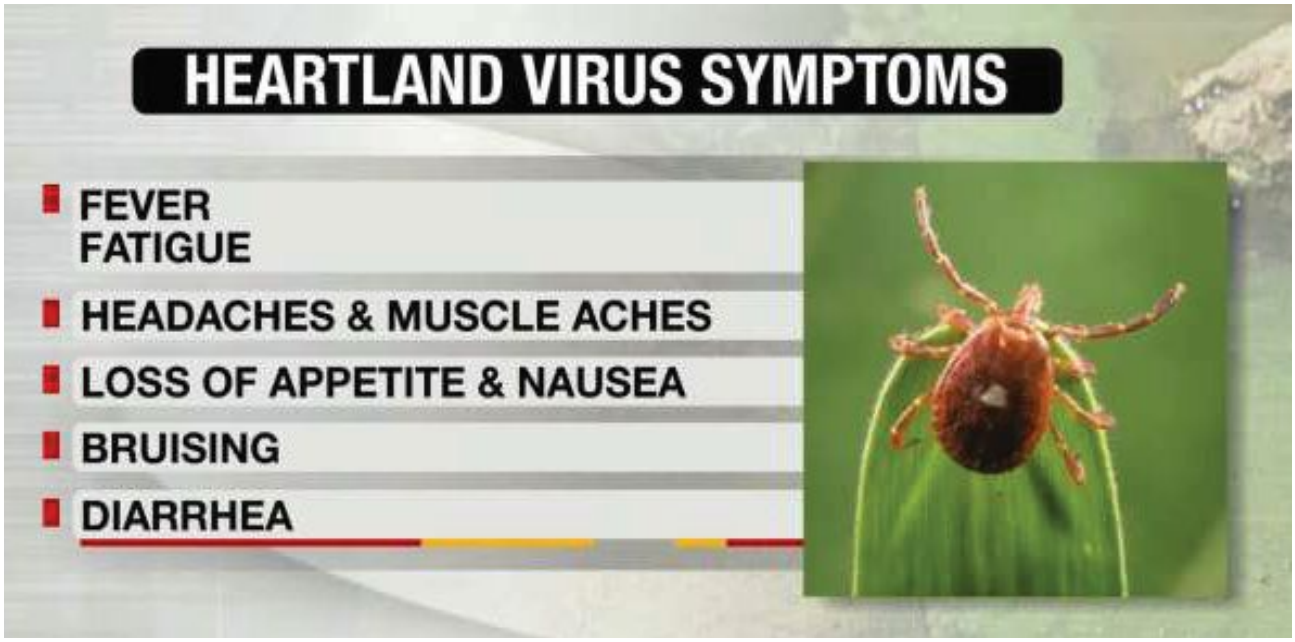
Currently, a confirmed case of Heartland virus disease is defined as a clinically compatible illness in a person with laboratory evidence of recent Heartland virus infection. A clinically compatible illness is defined as fever (≥ 100.4 degrees F), leucopenia (WBC < 4,500 cells mm^3) and thrombocytopenia (platelet count <150,000/mm^3) without a more likely clinical explanation. Evidence of recent Heartland virus infection included:

1) detection of viral RNA by Reverse Transcriptase PCR on blood or tissue or

2) a ≥ 4 fold rise in virus-specific plaque reduction neutralization antibody titers between acute and convalescent serum specimens.

In field studies that were conducted it was shown that the Heartland virus is found in the Lone Star tick, Amblyoma americanum. As of this writing, this tick is considered the most likely vector of the Heartland virus.[2]

The Centers for Disease Control has worked with state and local officials to learn more about the virus. The MO Department of Health and Senior Services have been collaborating with the CDC on an epidemiologic investigation for Heartland virus in Missouri to better understand the role of the Heartland virus as a human



Source: http://www.cdc.gov/ncezid/dvbd/heartland/

pathogen. The investigation began in 2012 and patient enrollment ended in December 2015. Data analysis process has begun and the results will be published once the analysis is complete. Therefore, this review article contains data prior to the upcoming comprehensive study to be published.[3]

In summary, the Heartland virus is a novel virus first reported in Missouri in 2009. This virus can cause symptoms, clinical laboratory results and the occurrence of tick bite are similar to those of ehrlichiosis infections. The Heartland virus should be considered as a possible etiologic agent in instances particularly when suspected ehrlichiosis does not improve within a few days of Doxycycline treatment.

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Successfully Incorporating Trainees in Medical Missions

by W. Abraham White, MD & William L. White, MD

The small plane circled over the dirt airstrip once to encourage the children playing soccer and livestock to move off of the unpaved runway. The turboprop touched down on the rough gravel and dirt moments later, taxiing next to the cinderblock terminal. After disembarking from the plane and retrieving our luggage, we carried our bags to the dump truck that would be our ride to the Haitian mission compound, located seven miles of winding roads almost an hour away. This was my introduction to medicine in the developing world in 2005 during my fifth year of medical school in the six-year program at the University of Missouri-Kansas City.



Northwest Haiti Christian Mission in St. Louis du Nord, Haiti. Patients queue up to see the team of physicians and other health care professionals from the USA.

There is growing interest in medical relief work among trainees at all levels within medicine, from medical students to residents and fellows. Since my initial trip, I have returned to Haiti four times to serve the eye care needs of the local population. Few experiences in my life have had a more enduring impact on my perspective than those trips. Expanding involvement to the youngest members of our profession in medical missions is not only possible, but desirable.

We're Not in Kansas Anymore

A number of benefits await students who venture into the developing world. Beyond exposure to a different social culture, experiencing a different medical culture and system of organization can be particularly eye opening and instructive. Indigenous physicians are frequently quite adept at dealing with scarcity; their resourcefulness contrasts starkly with the often inflexible demands of U.S. health practitioners. From re-purposing available instruments in the operating room to organizing staffing to provide more efficient care, there is much that can be gleaned from working alongside local providers. Native physicians will also have cultural insights that can be valuable to outside providers.

There are a number of crucial differences between practicing in the U.S. and practice in the developing world that must be considered. Medicine in the developing world is the ultimate test of clinical skills. Laboratory and imaging services are often limited or nonexistent, leaving the clinician with only their knowledge and experience to guide treatment decisions. This can be an anxiety-provoking experience, particularly for young physicians. Having advance knowledge of the resources available (if any) can be helpful in alleviating this concern for physicians in training. The flexibility needed to successfully provide medical care in the developing world is considerable, given the confluence of high demand, limited resources, and an unfamiliar environment and culture for providers.

It is also prudent to be aware of endemic conditions that are commonly seen in the developing world but are not often found in the U.S., such as malaria and trachoma. Gaining familiarity with the conditions that are likely to be seen in a given area can be a valuable preparatory exercise. While "tropical diseases" tend to get a lot of attention, in reality many of the conditions seen will tend to be the same diagnoses that are managed in the US presenting at a more advanced level of severity than is typical for the developed world.

Perhaps one of the most important (and often painful) lessons to be learned through medical missions is when not to intervene. On a recent trip, a young boy was brought to our clinic by his parents with an advanced retinoblastoma. Proptosis and obvious extraocular extension indicated near certainty that the child already had intracranial metastasis. The child was so dehydrated that even placing an IV was impossible at the time of his initial examination. While he was being



The author (WAW) performing vision screening as a UMKC medical student in Northern Haiti in 2005. Expanding involvement to the youngest members of our profession in medical missions is not only possible, but desirable.



Skills transfer can be a valuable component of any mission team, particularly for trainees. Often it is possible to use one operating room specifically for teaching, while the others are used by experienced surgeons. The author (WLW) teaching eyelid surgery in the operating room.

fluid resuscitated, the team discussed possible options for this difficult situation. One possible choice was surgery to debulk the tumor and decrease the child's discomfort, though his anesthesia risk was felt to be very high with essentially no chance of cure. It was also suggested that an attempt be made to send the child to the U.S. for chemotherapy or radiation. Ultimately this would require also sending a parent with the child, leaving the other parent to care for the family's other four children alone for an indeterminate period of time. In the end, the team and family decided to forgo surgery or care in the U.S., and we gave them pain medication to help keep the child comfortable for his few remaining weeks.

Some Basic Guidelines

Adherence to a few principles can save a considerable amount of time and trouble for trainees and instructors alike. The temptation to practice beyond your capability can be strong at times, but it is critical to remember the Hippocratic tenet to "first do no harm." Poor outcomes weaken the trust of the local population in the ability of the medical team and can ultimately undermine the long term objectives of any mission enterprise. If you wouldn't perform a particular procedure in the U.S., you probably shouldn't outside the U.S.

Trainees should be given responsibilities similar to their level of practice in the U.S. Medical students can be tasked with performing history and physical exams, assisting with procedures, and accomplishing administrative and liaison tasks. Residents may perform some procedures within their area of training skill level with supervision comparable to what they would receive in the U.S.

Adequate supervision should be ensured. Residents and fellows may be able to work more independently, but assistance should be readily available in the event that unanticipated issues are encountered. This is equally necessary in clinic, ward and operating room settings.

Skills transfer can be a valuable component of any mission team, particularly for trainees. Ideally, the instructors should be experienced teachers who are well versed in the tasks to be learned and able to anticipate complications. Provisions for education, such as optical teaching attachments for microscopes and monitors for endoscopes, should be available. Often it is possible to use one operating room specifically for teaching, while the others are used by experienced surgeons. This removes much of the time pressure from the trainee, allowing them to focus their efforts on learning a new technique rather than the volume of patients that remain to be cared for.

On one recent trip, Matthew Recko, MD, then the pediatric ophthalmology fellow at Children's Mercy Hospital in Kansas City, was a member of the team. One of our oculoplastics specialists taught Dr. Recko how to perform enucleation procedures using a dermis fat graft technique. This technique is quite useful both in the developed and developing world, as it obviates the need for an expensive orbital implant and achieves a cosmetically superior result in children with a comparable safety profile. He accomplished several of these procedures on the trip, and was able to perform the technique without assistance by the time we had returned home.

Closing Thoughts

Teaching medical students, residents and fellows is a challenge regardless of the setting, and the developing world presents additional obstacles. In spite of this, it can be an immensely rewarding experience for trainees and educators alike. Planning and preparation, combined with adequate supervision, can ensure a beneficial experience for patients and learners alike. The insights gathered during these experiences last for a lifetime, engendering both compassion and perspective. **MM**





W. Abraham White, MD, (left) practices comprehensive ophthalmology in Kansas City. William L. White, MD, (right), MSMA member since 1995, practices oculoplastic surgery in Kansas City.
Contact: docabe@gmail.com



War and Trauma: A History of Military Medicine

by Charles Van Way, III, MD

War is an actual, intentional, and widespread armed conflict between political communities.
- Stanford Encyclopedia of Philosophy

Care of the injured soldier is as old as war. And war is as old as history. Perhaps older. People were fighting and hurting one another back into the old stone age, long before organized societies and armies. And others were caring for the injured. So one can make the argument that military medicine should go back a very long way. Yet, what we now call military medicine is really a product of the 19th and 20th centuries. It was in fact during the Napoleonic wars at the beginning of the 19th century that the organized practice of military medicine began, and it didn't reach its modern form until the beginning of the 20th century.

What is this human activity that we call war? When did they invent it? How does it differ from simple fighting? As noted above, the definition of war includes nations, states, or their equivalent. In other words, civilization. No, not the computer game. The real thing. Primary civilizations appeared in four areas, widely separated in time and place. In chronologic order, from around 4000 BCE to around 1500 BCE, these were the Middle East, in Mesopotamia and Egypt; the Indus River valley, in present-day Pakistan and India; the Yangtze River valley in China; and the Americas, specifically meso-America and the Andes. All were agriculturally-based, and featured organized governments and armies supported by hereditary ruling and military castes. Without exception, all were warlike. Initially, it was thought that the meso-American civilization of the Maya were peaceful. The latest archeologic evidence is clear that they were not.

But when we say that armies of the ancient world were organized, that does not follow that they were organized as we would do so today. The treatment of casualties is very obviously an inherent part of military organization. But wound care and medicine itself varied widely from one culture to another. In ancient Egypt, for example, medicine was both sophisticated and highly specialized. The Smith Papyrus (1600 BCE) describes wound treatment, fracture splinting, and cauterization to control bleeding. Egyptian clinical practitioners were deployed to garrison posts. This can be seen as the beginning of a formal military medical service. Babylonian-Assyrian medicine (1000-600 BCE) had physician-priests for magic and ritual, but also had the "asu," pragmatic practitioners who became the first full-time military physicians. On the other hand, the Persians, whose empire stretched from the Middle East to India around 500 BCE, had no military medical service, and very rudimentary wound treatment.

In the ancient world, Roman military medicine most closely approached what we have today. The Greeks had a long tradition of practical medicine, although handicapped with the "humoral" theory of disease. The Romans were still more practical. The Roman army had organized field sanitation, well-designed camps, and separate companies of what we would now call field engineers. They had a much better grasp of sanitation and supply than anyone else before, or for a long while after. Their camps were laid



Charles W. Van Way, III, MD, MSMA member since 1989, and Missouri Medicine Editorial Board Member, is Colonel, US Army Reserve, Medical Corps, Retired; Emeritus Professor of Surgery at the University of Missouri - Kansas City School of Medicine; and Director of the UMKC Shock Trauma Research Center.
Contact: cvanway@kc.rr.com



out in a way as to protect their water supply and to locate latrines downstream. Their permanent camps included separate hospitals. They had medical corpsmen, whom they called "immunes." They practiced front-line treatment, beginning with soldiers treating one another, and they appeared to have a casualty collection system within each legion. They evacuated wounded legionnaires back down their well-organized support and logistics chains. They had more sophisticated wound treatment than anyone up to that time. Roman medicine reached a high point which was not to be equaled until the 18th Century.

It would be reasonable to argue that the Romans actually had something which we would call military medicine. Because of their improved sanitation, their armies suffered somewhat less from the epidemics which swept military camps, but only by comparison with their opponents. Two-thirds of their casualties were still due to disease. Their world-view included no such thing as bacteria or protozoa, and such things as immunizations were two millennia in their future. And, perhaps most important, their practices did not outlive their empire.

After the Romans came a period of regression, which has always been a bit difficult to characterize. It is probably best known for our purposes as the Early Middle Ages. The term "Dark Ages," implying a regression into barbarism, has become politically incorrect. Besides, it isn't really accurate. The people of the post-classical world often regarded themselves as quite civilized. In fact, they often regarded themselves to be Romans. The Eastern Roman Empire (Byzantine) so styled themselves until 1450, and the ruler of Russia was called "Caesar" (Czar) up into the 20th Century. But, I digress.

The early medieval armies were built around warlords and their bands of retainers. National armies, except for the Byzantine Empire, largely disappeared. Forces were made up from nobles and followers, tied to one another by a chain of reciprocal obligations and duties. We now call this the Feudal System. Whatever its name, it basically broke down armies into units the size of companies or smaller, with little central organization. All of the sophistication of the Romans regarding sanitation and camp organization was completely lost. Medical care was by whoever the lord happened to have in his retinue. The wounded were cared for by servants, camp followers, and other warriors. The lord might have a physician, but no more than one or two. In short, if a soldier was wounded, he was pretty much on his own. Most battles were between small armies, because anything over a few thousand men, could not be supplied, so the numbers of wounded were relatively small.

By the Late Middle Ages, organization had improved markedly. Armies of 10,000 to 15,000 men were routinely fielded. At the famous battle of Crécy, 1346, about 10,000 English beat 20,000 French, using the longbow, a weapon which dominated battle for the next 200 years. Over those years, gunpowder weapons evolved, and armies began once again to specialize. Cavalry and infantry were always present, but there began to be, besides archers, pikemen, engineers, artillerists, and finally musketeers. Medical organization did not advance at the same pace. Bandsmen, who typically weren't much good at fighting, were designated to evacuate the injured. And again, camp followers, personal servants, and other members of the lord's retinue were pressed into service. Local doctors and surgeons were conscripted into caring for the wounded. Indeed, this last persisted for a surprisingly long time, and was seen in our Civil War, as well as most other 19th Century wars.

The Early Modern Period was from about 1450 to 1700. ("Renaissance" has fallen into disuse, something like "Dark Ages." Feel free to substitute if you wish.) This era



Roman soldiers wounded in battle or afflicted by illness or disease would find themselves in the hands of the medical corps. In battle wounded soldiers may have been treated by field medics, *milites medici* or *capsarii* so-called after the capsa or box for bandages that they commonly carried. Right, Capsarii treating the wounded as depicted on Trajan's Column, Rome, Italy.
Source: http://romanmedicine.co.uk/romanmilitary

was marked by the widespread use of gunpowder weapons and the rise of national armies. Paid soldiers, often with standardized weapons and uniforms, replaced the old feudal levy. The thing about the new weapons was, they used things up, like powder and shot. Someone had to make replacements, and then those had to be transported forward to the fighting line. Cannon and even early personal firearms had to be made in a rear area and then transported forward to make good losses and damage. Armies became too big to live off the land. Horses required fodder. So a system of what we now call logistics began to emerge. Of course, this would have been no mystery to the Romans. But around 1500, it was a major innovation. But for a number of reasons, a system of medical support failed to evolve in the armies of the day.

To be sure, medicine wasn't very effective. And it was during this time that medicine re-discovered Greco-Roman medicine. Unfortunately, they latched on to the humoral theory of disease, and began to combine that with astrology. To compound a medicine, one needed to diagnose which humors were involved, then determine the house of the zodiac under which the patient was born, and then prepare the appropriate medication. If this seems odd, reflect that we have faithfully collected our patients' date of birth down to the present day. At least today, we use it for identification purposes, so the effort isn't entirely wasted.



Figure 1
Dominique Jean Larrey, surgeon-in-chief of Napoleon's armies.

The problem with all of this theory was that it wasn't much use in treating a wound, or for that matter lancing a boil or removing a tumor. So these sorts of things fell to the less educated but more practical barber surgeons. These men (mostly) were the ones to accompany armies, and they were the ones who actually carried out wound treatment and care. The most famous barber-surgeon of this period was Ambrose Paré (1510-1590). From a family of barber-surgeons, he started as a battlefield surgeon, and eventually was in the royal service of five successive kings of France. He re-discovered the old Roman remedy of treating wounds with a compound which included turpentine, a harsh but effective wound antiseptic. He re-discovered (from Galen) the use of ligatures to tie off bleeding vessels, rather than using hot iron cautery or boiling oil, two of the "remedies" of the day. He even invented an early hemostat. He published, in 1545, The Method of Curing Wounds Caused by Arquebus and Firearms, a book cited by others for centuries.

But eventually, medical science moved beyond the limits of the old theories. Great advances were made during the 18th century. Jean Louis Petit introduced the tourniquet, in 1718. Forceps were used to remove bullets. Pierre-Joseph Desault described the debridement of wounds. There were three textbooks of military medicine, John Pringle (1752), Richard Brockelsby (1756), and John Hunter (1794). Hunter's views on the treatment of wounds dominated the next century, and many of his principles survive today. Perhaps most significantly, John Pringle, about 1740, described and identified the epidemic disease of typhus, one of the scourges of the battlefield.

Much of this came together in the epic wars which began the 19th Century, the Napoleonic Wars. Armies of 100,000 or more ranged throughout Europe, almost forcing the recognition of a need to care for the wounded, and to provide some organization to the medical system. This was done best in the French army. Dominique Jean Larrey, surgeon-in-chief of French armies from 1797 to 1815, contributed in many ways to modern military medicine. (See Figure 1.) He established the criteria for "triage," in case you were wondering why we use a French term for that. He invented the "ambulance volante," or flying ambulance, which imitated Napoleon's "flying artillery." These were horse-drawn carriages, which could move quickly around the battlefield to provide evacuation. (See Figure 2.) He staffed ambulance units with corpsmen and litter-bearers, used initial care just behind the battle, and formalized the use of field hospitals a few miles back from the battle. He is considered the first modern battlefield surgeon.

In 1812, the French Emperor decided to invade Russia. Leaving Berlin with 600,000 men, he returned with 50,000. Of 800 physicians with the army, 300 made it back. Minard's famous graphic is a milestone in its own way, shows the grim reality of the failed campaign. (See Figure 3.) What happened? Starvation, cold, exposure, typhus, diarrhea, and pneumonia. Poor logistics, corruption in the Army administration, poor attention to medical issues, and the Russian weather all contributed. Larrey ended the



Figure 2
The "ambulance volante," or flying ambulance.

campaign as a hero for his efforts on behalf of the wounded and ill. But even he was unable to prevent the disaster. He could control the treatment of the wounded, and he did so. But he had no say in how the army was organized, nor how sanitation was carried out, nor over anything we would now term public health.

Napoleon's invasion of Russia was perhaps the best documented military misadventure up to the 20th Century. Despite that Hitler's Germany made the same series of mistakes in 1941 and thereafter. And as someone put it after that war, "At least Napoleon took Moscow. Hitler did not."

By the beginning of the 19th century, then, Western European military medicine had equaled, and maybe surpassed in some ways, the military medicine of the Romans of the 3rd and 4th centuries. There was still a long distance to go. The place of physicians within the society of the day, and especially within the military caste, was relatively low. In an aristocracy, as most European countries were, physicians rank somewhere down in the social scale between merchants and shopkeepers. Barber-surgeons were still lower, and were regarded as skilled craftsmen. Put plainly, no military leader was going to listen to a physician tell him how to run a military camp, or take care of his troops. Indeed, Larrey became a French folk hero, in large part because he was willing to fight the higher command of the French army to see that soldiers under his care were well-treated. His efforts to care for the sick and wounded during the retreat from Moscow were things of legend.

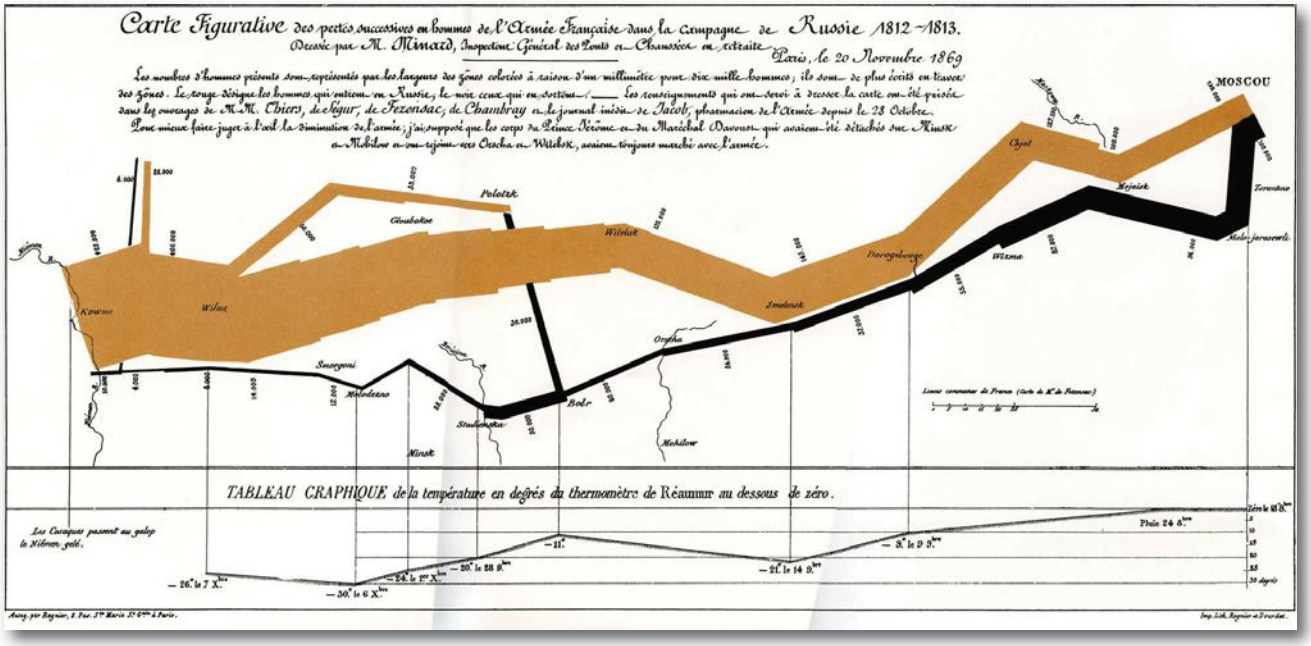
In the last part of this series, we will move to the New World. American military medicine was no better, and perhaps a bit worse, than that of Europe. We had far greater distances, fewer doctors, and fewer resources. As the 19th century passed, we learned bitter lessons in the Civil War, and the Spanish-American War, and we made great progress in the early 20th century. Stay tuned.

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Figure 3. The graphic of Napoleon's Russian campaign, as constructed by M. Minard.



Secure Disposal of Medical Practice Records

by Peter Sloan, JD & Deborah H. Juhnke, JD

Missouri medical offices have a wide variety of protected data in electronic and paper formats, such as patient medical records, patient payment account information, and employee personnel data. In today's dangerous world of information "insecurity,", this data must be safeguarded throughout its lifecycle, from creation or receipt through ultimate disposition.

Perhaps surprisingly, one of the most crucial data security controls for any organization is a properly implemented records retention schedule. The retention schedule helps ensure that the organization keeps its records as long as required for legal compliance and business needs. But a well-implemented retention schedule is equally valuable in making sure that the organization is reliably disposing of information that is no longer valuable or legally required. Compromised computer systems frequently contain information for twice or more times the number of individuals than was necessary for any business or legal recordkeeping need. The employee or patient information simply accumulates over time in the breached system, well past any prudent retention periods. The results of this unfortunate practice are expensive, with more individuals affected by the breach, higher response costs, and elevated exposures for the organization. With a well-implemented retention schedule, beyond other benefits, an organization improves its data security profile. It is not possible to have a security breach for information that no longer exists, after being compliantly disposed of under the organization's retention schedule.

An organization's retention schedule and information management policy will establish when records are to be disposed of in the ordinary course of business. But if such electronic or paper information are pertinent to pending or impending litigation or governmental proceedings, they must nevertheless be preserved under a legal hold until the matter concludes. Litigation counsel can assist in determining when and how that should be done.

When medical offices timely dispose of information under a retention schedule and after any applicable legal holds are released, the actual disposal must be done in a compliant, secure manner. Here is guidance on the What, How, and Who of secure disposal.

What Records Must Be Securely Disposed?

Various legal requirements mandate secure destruction of different types of information common to Missouri medical offices. Three of the most pertinent are the following:

- **HIPAA Security & Privacy Standards:** The HIPAA Security Standards apply to electronic Protected Health Information ("ePHI") of HIPAA covered entities and business associates. Under the Security Standards, covered entities and their business associates must "implement policies and procedures to address the final disposition of electronic protected health information, and/or the hardware or electronic media on which it is stored." [1] And PHI in paper records must also be disposed of securely to ensure compliance with the HIPAA Privacy Standards. For example, in April 2015 the Department of Health & Human Services settled a HIPAA investigation of a small compounding pharmacy, with a $125,000 payment and resolution agreement.[2] The investigation





This article was written by Peter Sloan, JD, a partner in the Kansas City office of Husch Blackwell, LLP, and Deborah H. Juhnke, JD, Director of Information Governance Consulting for Husch Blackwell. Husch Blackwell is the Association's outside general counsel. The information contained in this article should not be construed as legal advice or a legal opinion on any specific facts or circumstances. The contents are intended for general information purposes only, and readers are urged to consult their own attorney concerning their own situation and any specific legal questions.
Contact: psloan@infogovgroup.com

was triggered by reports from a local Denver, Colorado news outlet that unshredded documents containing the PHI of 1,610 patients were found in an unlocked, open disposal container on the pharmacy's premises.

- **Section 5 of the FTC Act:** The federal FTC Act prohibits unfair and deceptive trade practices generally, and for over a decade the FTC has pursued companies across a wide range of industries for allegedly deceptive or unfair data security practices. On at least two occasions the FTC has brought enforcement actions against health care entities, primarily commercial pharmacies, for disposing of unshredded paper documents containing customers' health information and employee information in dumpsters accessible to the public.[3]

- **State Breach Notification Statutes**: Under statutes in most states, including Missouri, organizations that suffer a breach of electronic Protected Information of state residents must make required notifications to the affected individuals and, depending on the state's thresholds, to responsible government agencies. Protected Information is defined differently in the various states' laws, but it generally includes the individual's name combined with another identifier useful for identity theft, such as the individual's Social Security number, driver's license or other governmental identification number, or financial account number with access information – in other words, the type of information commonly kept regarding employees. Missouri's statute adds as additional combination elements such individual's medical information or health insurance information.[4]

How Are Records Securely Disposed?

Neither HIPAA nor the Missouri breach notification statute contains explicit requirements on particular means for securely disposing of paper or electronic records containing protected information, such as patient and employee records. Guidance can be found in the Guidelines for Media Sanitization of the National Institute of Standards and Technology (NIST),[5] which addresses secure means of disposal for hardcopy documents (paper and microfilm) and also for electronic data and storage devices (such as hard drives, disks, flash media, mobile computing devices, networking devices, and office equipment):

Hard copy paper and microfilm: Destroy paper using cross cut shredders which produce particles that are 1 mm x 5 mm (0.04 in. x 0.2 in.) in size (or smaller), or pulverize/ disintegrate paper materials using disintegrator devices equipped with a 3/32 in. (2.4 mm) security screen. Destroy microforms (microfilm, microfiche, or other reduced image photo negatives) by burning.

Mobile devices generally: Manually delete all information, and then perform a full manufacturer's reset to reset the mobile device to factory state. Alternatively, shred, disintegrate, pulverize, or incinerate by burning the device in a licensed incinerator. For guidance regarding specific devices, see NIST SP 800-88, Appendix A.

Hard disk drives: Overwrite media by using organizationally approved and validated overwriting technologies/methods/tools. At least a single write pass should be used with a fixed data value, such as all zeros. Multiple write passes or more complex values may optionally be used. Alternatively, shred, disintegrate, pulverize, or incinerate by burning the device in a licensed incinerator. For guidance regarding specific devices, see NIST SP 800-88, Appendix A.

CDs, DVDs: Destroy in order of recommendations:

1) Removing the information-bearing layers of CD media using a commercial optical disk grinding device—note that this applies only to CD and not to DVD or BD media,

2) incinerate optical disk media (reduce to ash) using a licensed facility,

3) use optical disk media shredders or disintegrator devices to reduce to particles that have a nominal edge dimensions of 0.5 mm and surface area of 0.25 mm2 or smaller.

Regardless of the specifics of the media and the method of destruction, careful attention should be paid to the overall process of disposal, and also to properly documenting the disposal. Security safeguards should remain in place for records prior to their actual disposal, and documentation of the actual disposal should be made and kept, including the date and method of destruction, a description (and if pertinent, date range) of the disposed-



of records, a statement or certification that the records were destroyed in the normal course of business, and the signature of the persons supervising or witnessing the destruction.

Who Handles Secure Disposal?

Though HIPAA and other information security laws generally do not mandate use of a disposal provider, many organizations opt to contract with a disposal vendor to handle the secure destruction of records in paper and electronic media. HIPAA treats such disposal service providers as business associates, and so the medical office must have a business associate agreement in place with the disposal vendor.

It is also prudent to do appropriate due diligence in selecting a disposal vendor, including such steps as obtaining information about the vendor from several references or other reliable sources, reviewing an independent audit of the vendor's operations and security practices, confirming that the vendor has been certified by a recognized association or similar third party, or other appropriate measures to determine the integrity and competency of the disposal vendor.

The selected disposal vendor should confirm the methods that will be used for secure destruction of the various media, and should also provide certifications of destruction. All such matters should be addressed in the medical office's contract with the disposal vendor. And if bargaining power permits, the medical office is well served by a contract that includes terms addressing the specific responsibilities of the disposal vendor in case of a security breach, and also whether the vendor will have cyber or errors and omissions insurance coverage that provides effective coverage in the event of a security breach, with the medical office as an additional insured under the vendor's policies.

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3. See, e.g., https://www.ftc.gov/news-events/press-releases/2009/02/cvs-caremark-settles-ftc-chargesfailed-protect-medical-financial; https://www.ftc.gov/news-events/press-releases/2010/07/rite-aid-settles-ftc-charges-it-failed-protect-medical-financial
4. Mo. Rev. Stat. § 407.1500.1(9).
5. NIST Special Publication 800-88 Revision 1, Guidelines for Media Sanitization (December 2014)

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AMA Chooses Missouri Physician as its Next President Elect!

by the Missouri Delegation to the AMA; summarized by Charles W. Van Way, III, MD

Physicians elected Missouri doctor David O. Barbe, MD, as its next President elect during the AMA's Annual Meeting in Chicago. Dr. Barbe is the fifth Missouri President to hold this honor.



The biggest news for Missouri physicians this year: during the American Medical Association Annual Meeting, June 10-15, physicians from around the nation elected Missouri doctor David O. Barbe, MD, Mountain Grove, as its next President elect.

Dr. Barbe has served on the AMA Board of Trustees, and is its past Chair, and also on the Council on Medical Service. He will serve as AMA President in 2017-18. He will represent us, and all physicians, very well indeed. If you are reading this and are not an AMA member, join now. Missouri's influence will never be greater than over the next two years. And we owe a big thanks to Liz Fleenor, Managing Editor of *Missouri Medicine*, who very capably ran the election campaign.

The AMA has, after an eight-year revision, approved a comprehensive update of the Code of Medical Ethics. It will shortly be available to all on the AMA web site. This has been a major and somewhat contentious effort, but appears to have been resolved to the approval of all. In a related issue, telemedicine received guidelines which will hopefully ensure that quality care is provided through these electronic interactions. Telemedicine is growing rapidly. Who knows, your next doctor's appointment may be over your iPad or at a kiosk at the mall!

Our Heart of America Caucus, which includes Missouri, Kansas, Oklahoma, and Arkansas, was torn this year, as both Oklahoma and



Charles W. Van Way, III, MD, MSMA member since 1989, is a Missouri Alternate Delegate to the American Medical Association, Emeritus Professor of Surgery at the University of Missouri - Kansas City School of Medicine, and Director of the UMKC Shock Trauma Research Center.
Contact: cvanway@kc.rr.com

Missouri fielded candidates for President elect. Like most other states, we join forces with other state delegations in our region to ensure that our voice is heard in all of the reference committees and deliberations. Leaders of all four state delegations handled the potentially-disruptive conflicts of interest in a thoroughly professional manner, preserving our alliance. Congratulations for his part in this effort to Edmond Cabbabe, MD, of St. Louis, Chair of the Missouri Delegation.



Your Missouri Delegation to the AMA: from left, standing, Ravi Johar, James Conant, Charles Van Way, Edmond Cabbabe, David Barbe; seated, Nathaniel Murdock, Warren Lovinger, Rebecca Hierholzer, and Bill Huffaker.

Last year, Congress finally repealed the Sustainable Growth Rate formula. Its substitute was called the Medicare Access and CHIP Reauthorization Act of 2015 – i.e., MACRA. There will be much more on this subject in *Missouri Medicine* in the future. At this AMA meeting, the acting administrator for CMS, Andy Slavitt, spoke extensively. He told delegates that physicians will have significant input to the new regulations and to how they will be implemented. To get involved, go to https://breaktheredtape.org, and sign up. The AMA has a great deal of information on its website at http://www.ama-assn.org/ama/pub/advocacy/topics/medicare-physician-payment-reform.page.

The opioid epidemic continues to kill. In 2014, there were 47,000 deaths from drug overdose, and the number continues to increase. More of these deaths were from misused prescription drugs than from street drugs. Drug overdoses now kill more people than motor vehicle crashes or gun violence, both of which continue to decline. There was a great deal of concern about this, and a number of resolutions. The AMA strongly supports the increased availability of naloxone. A resolution calls for an end to the notion of "pain as the fifth vital sign." Another condemned the use of patient satisfaction surveys which reward physicians and hospitals for overprescribing opioids. The AMA continues to strongly supported prescription drug registries, an issue of particular relevance in Missouri. We retain the distinction of being the only state without such a registry, a distinction we would be very happy to lose. The AMA supports new guidelines on opioid use from the CDC. These advocate the usefulness of non-opioid drugs for pain relief. Visit http://www.cdc.gov/drugoverdose/prescribing/guideline.html to review the guidelines.

Dysfunctional electronic health record systems were a significant focus. We know that poorly performing EHRs are a major source of physician stress and dissatisfaction. James Madera, MD, AMA Executive Vice-President, spoke of the "digital dystopia." The AMA works strongly for better transparency, interoperability, better functionality, and improved ease of use. The AMA is working along several lines to improve the present system.

The AMA has long been concerned about gun violence. Partly in response to the outrage in Orlando, the HOD passed resolutions calling for universal background checks for all firearms, and to Congress to authorize federally-supported research on gun violence.

A number of issues around testing and certification were discussed. A resolution passed to do away with the United States Medical Licensing Examination (USMLE) Step 2 Clinical Skills (CS), and its osteopathic equivalent, the Comprehensive Osteopathic Licensing Examination (COMLEX) Level 2-Performance Examination (PE). Medical students and residents have long held these examinations to be expensive, burdensome, and of little value.

Maintenance of Certification (MOC) continues to be a major issue for physicians. Several resolutions dealing with the modification or even elimination of MOC passed the HOD. Perhaps the most important was a resolution opposing examination-based MOC and Maintenance of Licensure (MOL). This would completely change current practices, and marks another step in the ongoing AMA effort to reform MOC and MOL.

There is continuing concern about the mismatch between MD and DO graduates and residency places. A resolution called on Congress to fund more residency positions, and to investigate alternative ways of funding graduate medical education. As I noted last year in a similar report, "This year, as many as 1,500 MD and DO graduates

from U.S. schools, plus about 3,000 American graduates of international schools, were unable to find residency positions after graduation. There simply aren't enough jobs to go around." Unfortunately, the statement is as true this year as it was last year.

Related to this was concern over the cost of medical education. The AMA Foundation continues to fund medical student scholarships, but the need is far greater than a single foundation can meet. The AMA urged the AAMC to conduct a study of student indebtedness, which will be useful, but will probably just re-state the problem.

As always, the HOD passed many resolutions about small, yet important, issues. Of particular interest was a Missouri resolution supporting inclusion of direct primary care as a qualified medical expense by the IRS. Among other things, this would allow funds in medical savings accounts to fund direct primary care.

Several other resolutions were:

- banning powdered alcohol
- advocating disposal programs for unused medications
- testing rental properties for radon
- addressing sexual assault on college campuses
- preventing violence to health care workers, and delaying school start times for teenagers
- researching violence (verbal, physical) between law enforcement and citizens
- increased funding for the CDC
- advocating control by the FDA over nicotine delivery systems (this latter may have been overtaken by the FDA itself).

Several resolutions dealt with water supply, focusing on eliminating lead in pipes, shortening the "grace period" for municipalities to correct lead levels in water, and making the water supply safer for the public.

Such resolutions are routine at the AMA meeting. But they are important. Improving personal and public health in many small ways is something we should all support. The AMA is constantly working towards improvement of our health system. Do you see something that needs to be recognized, or improved? We'll be looking for new resolutions for the Interim Meeting in November, and the Annual Meeting next June. Speak up!

There is a new president of the AMA. Andrew W. Gurman, MD, an orthopedic hand surgeon from Altoona, Pennsylvania, has been in the AMA leadership for eight years, as Speaker of the House of Delegates, and as a member of the Board of Trustees. His inaugural address was a call to get involved. We are in the midst of accelerating change, and we must advocate on our own behalf, and in the interests of our patients. Because if we do not, who will? **MM**

AMA Presidents from Missouri

1854-55	Charles A. Pope, St. Louis
1881-82	John T. Hodgen, Richmond
1887-88	E. H. Gregory, St. Louis
1927-28	Jabez N. Jackson, Kansas City
2017-18	David O. Barbe, Mountain Grove



Missouri representatives, from left: Ravi Johar, MSMA President; J. Regan Thomas, former *Missouri Medicine* Editor and plastic surgery delegate; and Jerry Kennett, AMA Council on Legislation.



Missouri Delegation, from left: Barbara Hover, Alex Hover, MD, Rebecca Hierholzer, MD, Charles Van Way, MD, Debbie Barbe, David Barbe, MD, Marsha Conant, James Conant, MD, Rima Cabbabe, Edmond Cabbabe, MD, Kay Johar, Ravi Johar, MD, Sandra Murdock, and Nathaniel Murdock, MD.





Problems with the 2015 Dietary Guidelines for Americans:

A Rebuttal

by John S. Daniels, MD

The article by DiNicolantonio, Harcombe & O'Keefe in the March/April 2016 *Missouri Medicine* makes four recommendations that conflict with the United States Department of Agriculture's eighth edition of Dietary Guidelines For Americans 2015-2020.

The first recommendation regards consumption of grains, citing evidence that grain consumption increases small dense LDL particles and decreases HDL particles. The authors recommend that grains should be avoided and that "instead more natural, nutrient dense foods, such as meat, fish, eggs, vegetables, fruits, nuts and seeds" be consumed. The author's second recommendation is to increase the amount of saturated fat intake found in meats, fish, eggs, dairy and other products, citing several populations that consume relatively high percentages of saturated fats and yet have a very low prevalence of cardiovascular disease. The third recommendation is not really a recommendation, but rather a refutation of the Dietary Guidelines to restrict salt intake to 2,300 mg daily; the authors cite evidence that reducing salt intake may increase risk of cardiovascular mortality secondary to stimulation of the renin-angiotensin pathway, and although the authors do not give specific alternative recommendations regarding salt intake, the implication is that salt intake should not be restricted. The fourth recommendation regards intake of unsaturated versus saturated fats, citing studies that indicate a Mediterranean diet is superior to a low-fat American Heart Association diet in terms of cardiovascular outcome and that replacing saturated fats with unsaturated fats increases the risk of cardiovascular death, insulin resistance, diabetes, obesity, and cancer. The authors thus recommend eating the saturated fats found in meats, fish, eggs and dairy products.

The Dietary Guidelines For Americans 2015-2020 is a 215-page document that is based upon the recommendations of a fifteen member Advisory Committee made up of distinguished scientists with expertise in nutrition. The recommendations are the result of original systematic reviews of the scientific literature by members of the Committee, a review of existing systematic reviews, meta-analyses, and reports by federal agencies or scientific organizations. The Committee cited evidence for their recommendations and classified the evidence as strong, moderate, or limited.[1]

The purpose of this Point/Counterpoint is to emphasize the reservations I have regarding the authors' recommendations. My intent is not to give a systematic review of the literature. I would refer the reader to a number of websites with extensive lists of references, including the National Institutes of Health, the Centers for Disease Control, the American Heart Association, and the American Diabetes Association.

1. Grains

The authors argue that grains are a relatively recent addition to the human diet (10,000 years ago) and that "common sense would advise caution being applied to recommendations to consume more of relatively recent adaptations to the food chain." The authors also argue that grains are "nutritionally poor." It should be noted that the life expectancy of homo sapiens 10,000 years ago was less than twenty years.

More importantly the authors ignore the primary recommendation of the Committee regarding grains. Most grain consumption in the United States is refined, and the primary thrust of the Committee is to substantially increase whole grain consumption to 50% of total grain consumption.[1]

There is a huge body of evidence that demonstrates a decrease in cardiovascular disease, obesity, insulin resistance, Type 2 diabetes mellitus, hypertension, and a variety of cancers including colorectal cancer and pancreatic cancer associated with a relatively high consumption of whole grains. Diets high in whole grains result in decrease in total and LDL cholesterol, an increase in HDL cholesterol, and decreases in various markers for cardiovascular risk including C-reactive protein and homocysteine.[2,3,4,5]

The author's recommendation to avoid grains is not, in my opinion, thoughtful. The Committee's recommendation to increase whole grain consumption is strongly supported by the evidence.

2. Saturated Fats

There are indeed studies, cited by the authors, that demonstrate no difference in cardiovascular risk in individuals who consume primarily saturated fats versus individuals who consume polyunsaturated fats. However, there are a plethora of studies that do demonstrate an increase in LDL cholesterol and cardiovascular mortality in individuals who consume diets high in saturated fats. The evidence is controversial. Most authoritative bodies, including the American Heart Association, the National Institutes of Health, the World Health Organization, the British Heart Foundation, and the American Dietetic Association, as well as many others, have position statements which cite an increase in cardiovascular mortality as a result of increased saturated dietary fat. The authors' recommendation to in effect increase dietary saturated fat is, in my opinion, ill advised.[6,7,8]

3. Salt

The authors cite a few studies, epidemiologic and meta-analyses, which indicate that salt restriction does not decrease cardiovascular mortality and might, in fact, increase cardiovascular mortality. There are many studies in the medical literature, prospective controlled studies, which show that salt reduction does indeed decrease cardiovascular mortality. High salt intake has clearly been shown to increase blood pressure, and increased blood pressure has been clearly shown to increase cardiovascular mortality. The authors imply that sodium restriction is unwarranted and may be harmful. I believe that implication is ill advised and at the least, caution for salt intake should be given to those individuals with hypertension or prehypertension and to individuals with known cardiovascular disease or who are at high risk for cardiovascular disease. [9,10,11,12]

4. Polyunsaturated Fats

There is a plethora of evidence that polyunsaturated fats decrease LDL cholesterol and decrease cardiovascular mortality compared to individuals who eat diets high in saturated fats. The authors cite a study comparing a Mediterranean diet supplemented with olive oil compared to a low fat diet, which shows that the Mediterranean diet decreases risk of cardiovascular outcomes. Olive oil is a monounsaturated oil which has been shown to decrease LDL cholesterol and cardiovascular risk, just as other polyunsaturated fats have been shown to decrease LDL cholesterol and cardiovascular risk. The authors summarize by stating that the Committee's recommendation to consume polyunsaturated fats should be replaced with a recommendation to increase consumption of olive oil. This summary is followed by their official recommendation to increase "natural saturated and unsaturated fats found in meat, fish, eggs and dairy products." Olive oil is not found in the meat, fish, eggs and dairy products that the authors recommend, and therefore the authors' "alternative recommendation" does not seem to comport with their summary. The overwhelming evidence supports the idea that polyunsaturated and monounsaturated oils are healthier than saturated fats.[8,13, 14,15]

Summary

In summary, the authors discuss the Dietary Guidelines' recommendations for grains, salt, saturated fats, and unsaturated fats. The "alternative recommendation" at the end of each of these discussions is the same: eat meat, fish, eggs, dairy products and various seeds. I believe that Missouri physicians should be very cautious about accepting these recommendations. I would encourage each physician to read the Dietary Guidelines for Americans, eighth edition, and make his or her own determination regarding dietary recommendations, which may vary depending upon an individual's underlying health problems and genetic predispositions.

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Problems with the 2015 Dietary Guidelines for Americans:

A Response to a Rebuttal

by James J. DiNicolantonio, PharmD, Zoe Harcombe, PhD & James H. O'Keefe, MD

We appreciate the rebuttal to our brief review article in the March/April 2016 issue of *Missouri Medicine* by Dr. Daniels who points out some of his reservations regarding four of our alternative recommendations to the 2015 Dietary Guidelines for Americans. We respectfully counter his rebuttal with the following:

1. Grains

Dr. Daniels argues that the life expectancy of Homo sapiens 10,000 years ago was fewer than twenty years and that this may have something to do with the lack of grains in the diet. It is common knowledge that life expectancy, even as recently as the early 1900s was short due to infections and early-life (childhood) mortality and undoubtedly had nothing to do with a lack of grains in the diet. More revealing is when one has a closer look at numerous hunter-gatherer societies (who do not ingest grains in any significant amount). The age where most of the deaths are occurring in such hunter-gatherer societies is not very different than that of the United States. Indeed, despite a lack of modern medical treatments, most deaths are occurring in many hunter gatherer societies at a comparable age to that of the United States (85 y.o.), such as the Tsimane (78 y.o.), Hadza (76 y.o.), the Yanomamo (75 y.o.), and Aborigines (74 y.o.).[1] Importantly, these hunter-gatherer societies (again who lack any significant intake of grains if any at all) have a much lower rate of "diseases of westernization" including diabetes, hypertension, heart disease, dementia, and cancer.[1] Specifically regarding the last hunter-gatherer society, (Aborigines), O'Dea famously took urbanized diabetic Aborigines and placed them back on their traditional hunter-gatherer diet (lacking grains), which resulted in improvements in glucose tolerance as well as a fall in plasma triglycerides.[2]

Regarding the "huge body of evidence" suggesting that whole grains are metabolically healthy; of the four references provided by Dr. Daniels, only one includes randomized controlled trials. Regarding this line of evidence, it specifically found that compared to non-whole grain control diets, whole-grain diets lowered LDL-cholesterol and total cholesterol but had no effect on HDL or triglycerides. Our argument is not whether whole grains are healthier than refined grains (as suggested by Dr. Daniels) but rather if consumption of grains should be encouraged at all (whole or refined), as grains are a relatively new dietary insertion associated with a Western dietary pattern a pattern which associates with worse health outcomes. Thus, the evidence provided by Dr. Daniels does not counter our overall suggestion for replacing grains (refined or not) with whole (largely unprocessed) foods as are found in nature, such as leafy greens and other vegetables, fruits, nuts and seeds, fish, meat, and eggs.

2. Saturated Fat

Regarding the "evidence" cited by Dr. Daniels including health authorities such as the British Heart Foundation, World Health Organization, American Heart Association, etc. This would certainly not be considered grade A (level 1) evidence as compared to a meta-analysis of randomized studies. Moreover, Dr. Daniels seems to have taken our recommendation (i.e., increasing the intake of whole foods) and inappropriately extrapolated this "to in effect increase dietary saturated fat." However, we are not promoting the increased intake of saturated fat, rather we are encouraging people to eat healthy whole foods, which may contain all three broad groups of fats (saturated, monounsaturated, and polyunsaturated). For example, beef contains nearly as much monounsaturated fat (oleic acid) as it does saturated fat and more unsaturated than saturated fat overall. Additionally, to support a reduction in the intake of saturated fat, based on a surrogate marker (LDL) is ironic, as this ignores the fact that the particular saturated fats that raise LDL also raise HDL[3, 4] How is one to interpret an increase in the so-called "harmful" cholesterol level (LDL) when there is a concomitant increase in the "healthy" cholesterol (HDL) level? Additionally, when saturated fat replaces refined carbohydrates there appears to be a reduction in triglyceride levels and improvements in blood glucose. Thus, when one considers the overall lipid/metabolic profile it appears that increasing saturated fat may actually improve health outcomes depending on what dietary substance is replaced.[5, 6]

3. Salt

In regards to the author's statement that, "There are many studies in the medical literature, prospective controlled studies, which show that salt reduction does indeed decrease cardiovascular mortality." Ironically, the very meta-analysis of prospective studies cited by Dr. Daniels actually supports the notion that lowering sodium intake, as compared to normal sodium intake, increases all-cause mortality and cardiovascular disease events.[7] The argument that, "High salt intake has clearly been shown to increase blood pressure, and increased blood pressure has been clearly shown to increase cardiovascular mortality," ignores the fact that a higher salt intake also lowers heart rate, and that the product of the two (heart rate plus blood pressure) is generally improved with a higher salt intake compared to salt restriction.[8] Since the overall damage to the heart (and the arterial tree) is a result of both blood pressure and heart rate, this does not seem to support salt restriction. Additionally, when one considers the fact that salt restriction increases triglycerides, LDL cholesterol, total cholesterol, aldosterone, renin, noradrenaline, and insulin levels, the small (and likely inconsequential) reduction in blood pressure is far outweighed by the harm.[9-11] Importantly, the "reduction in blood pressure" with salt restriction may actually reflect hypovolemia (a decrease in plasma/blood volume) and may in fact be a harmful effect in many.[12] Lastly, to generalize the effects of salt restriction as having an overall reduction in blood pressure ignores the fact that a similar percentage of people who get a reduction in blood pressure may actually have an increase in blood pressure of a similar magnitude with salt restriction.[13] As with almost everything regarding health, moderation is the safest course. Excessive sodium restriction causes profound counter-regulatory hormonal disturbances such as activation of the sympathetic and renin angiotensin aldosterone systems. In summary, restricting the intake of sodium to less than 1,500 mg daily, and probably even less than 2,500 mg daily, will likely lead to worse health outcomes rather than improved ones compared to a moderate sodium diet of around 2,500 mg to 5,000 mg daily.

4. Polyunsaturated Fats

In regards to Dr. Daniels statement, "There is a plethora of evidence that polyunsaturated fats decrease LDL cholesterol and decrease cardiovascular mortality compared to individuals who eat diets high in saturated fats." It is rather bewildering that if this is indeed the case why Dr. Daniels does not cite a single reference supporting this statement. In fact, two meta-analyses of randomized controlled trials have found that when omega-6 PUFA replaces saturated fat plus trans-fat there is an increase in mortality and cardiovascular mortality (despite a reduction in cholesterol levels).[14, 15] In regards to Dr. Daniels assertion that "olive oil is not found in meat," in fact, oleic acid makes up a similar percentage of fatty acids as does saturated fat in meat, which again supports our overall message, that people eat foods not saturated fat.

Summary

In summary, the overall evidence in the literature does not support the following four recommendations supported by the 2015 Dietary Guidelines, including 1.) The consumption of grains, 2.) Restriction of saturated fat, 3.) Restriction of salt intake, and 4.) An increase in the intake of omega-6 PUFA (mainly via vegetable oils).

Our alternative recommendations to increase the intake of whole, largely unprocessed foods - such as vegetables, fruits, nuts and seeds, fish, meat, and eggs - as the most natural food available is in our opinion a much better overall recommendation for improving health and indeed is a much simpler message than the above four recommendations.

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MM

Medical Errors, Hysteria, and Death

by Gerald Gianoli, MD

So how can medical errors have become the "third leading cause of death"—as trumpeted in a recent editorial in the *BMJ*. Where are those hundreds of thousands of casualties every year? The actual number of patient deaths analyzed, over a period of 10 years was 35.

Medical errors are taken very seriously by the medical profession. It starts early in training at M&M (Morbidity & Mortality) Conference. During M&M, each complication and death is presented before the entire department of students, physicians in training, and professors. The cases are scrutinized and criticized to see what could have been done better. No one likes to see complications or deaths—especially not physicians. So how can medical errors have become the "third leading cause of death"—as trumpeted in a recent editorial in the *BMJ* (formerly known as the *British Medical Journal*)?[1] Where are those hundreds of thousands of casualties every year? The actual number of patient deaths analyzed, over a period of 10 years was 35.

Shame on the *BMJ* for allowing this inflammatory, sensationalist article to be published and reported in the general news media without noting to the public that this was NOT a scientific study at all, but only an opinion piece. It presented no new research, and it was not peer-reviewed. The paper simply states the average of three previously published studies and one paper that was never vetted through the peer review process – all published more than eight years ago. All four of these papers include a combined analysis of a grand total of only 35 actual patients, from which the authors extrapolate to 251,454 deaths due to medical errors in the U.S. every year. This is a highly dubious estimate.

In research, much depends on definitions. Consider the case of someone falling from a tree. In running to catch him, you trip over a stone. The person hits the ground and dies. Did your tripping over the stone cause that person's death, or was it the fall? According to the reasoning behind the *BMJ* article, the death was your fault. When a patient was sent home from an emergency room in Dallas with Ebola last year, this was an error probably caused by electronic medical record-related disruption. The patient later returned, and died. But he probably would have died even if this "systems" error had not occurred.

The one case presented in the *BMJ* article concerns a patient who died of complications from pericardiocentesis--inserting a needle into the sac around the heart. This procedure is risky. This was not a medical error, but a known complication that can occur even when everything is done perfectly by the most competent of physicians. While proposing that iatrogenic deaths are underestimated, the authors never admit that death would be inevitable in many/most of these cases without medical intervention, and the margin of error in critically ill patients is often razor thin.

This article may turn out to be the "silicone breast implant hysteria" of our generation. In the 1980s and 1990s, there was much hype about silicone breast implants causing an epidemic of medical ills. The hysteria surrounding this was fueled by the FDA, the media, and plaintiff's attorneys. As a result, many implants were removed without medical justification, undeserved money went into the hands of plaintiff's attorneys, and a formerly successful major corporation (Dow Corning) was bankrupted. A moratorium was placed on the use of silicone, keeping it from patients who desperately needed it for breast cancer reconstruction. Finally, after a few decades, medical research has established beyond a reasonable doubt that the whole debacle was nonsense. Silicone is safe and is finally being used again.

What will be the result of this article? It will help sell more books for the authors and possibly help them get more grant funding, but I doubt it will result in fewer medical errors. In fact, it will likely serve only to increase already nightmarish bureaucratic burdens on medical professionals. The next time you see the doctor looking at the computer terminal instead of you, blame inflammatory opinion pieces like this one. Since system errors are the most common medical errors, there will almost certainly be more cases like the Dallas Ebola case.

Doctors and nurses are dedicated to improving outcomes from medical interventions and do not shy away from self-criticism. Self-serving, irresponsible sensationalism by armchair quarterbacks will only make the professionals' job more difficult.

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Gerard Gianoli, MD. FACS, specializes in Neuro-otology and Skull Base Surgery. He is in private practice and a Clinical Associate Professor in the Departments of Otolaryngology and Pediatrics at Tulane University School of Medicine.
Contact: ggianoli@gmail.com
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[Editor's Note: Criticism of the *BMJ* article is extensive and in my opinion well founded. This is a link to efforts to have the article retracted: http://www.medscape.com/viewarticle/866063?nlid=108268_3922&src=WNL_mdplsnews_160715_mscpedit_card&uac=77990SX&spon=2&impID=1156625&faf=1#vp_2]

Dietary Guidelines Head North

Minnesota Medical Association is covering issues related to food and nutrition in the September/October issue of *Minnesota Medicine*. We noticed the article in your March/April issue by James J. DiNicolantonio, Zoe Harcombe and James O'Keefe, "Problems with the 2015 Dietary Guidelines for Americans: An Alternative."

We thought it was very well done and offered very useful information. We would like to reprint it for our Minnesota readers. Thank you.

Kim Kiser
Editor, Minnesota Medicine
Minnesota Medical Association

Over-Prescribed Medications/ Under-Appreciated Risks

I read with interest the review article from *Missouri Medicine* (May/June 2016), entitled "Over-Prescribed Medications, Under-Appreciated Risks: A Review of the Cognitive Effects of Anticholinergic Medications in Older Adults" by Daniel M. I. Britt and Dr. Gregory Day from Washington University in St. Louis.

This article discusses an important topic, the cognitive effects of anticholinergic medications in older adults. The authors point to a number of previous studies showing an association between cognitive impairment and use of anticholinergic medications and summarize with the consensus finding that older adults taking anticholinergic medications are at higher risk for cognitive impairment and dementia.

Our recent report in the *Journal of the American Medical Association - Neurology* entitled "Association between Anticholinergic Medication Use and Cognition, Brain Metabolism, and Brain Atrophy in Cognitively Normal Older Adults" supports Mr. Britt and Dr. Day's conclusion of an association of anticholinergic medication use in older adults with both decreased cognition and increased risk for dementia in older adults.

Further, our study was the first to provide *in vivo* measures of structural and functional brain changes in that may underlie the observed association. Our study examined older adults (mean age = 73.3 years) who were cognitively normal at the time of baseline exam from a consortium study on neuroimaging measures in Alzheimer's disease (AD) called the Alzheimer's Disease Neuroimaging Initiative (ADNI), as well as a secondary cohort of cognitively normal older adults from the Indiana Memory and Aging Study (IMAS; mean age = 70.3 years). Both cohorts underwent cognitive testing of memory and executive function and structural magnetic resonance imaging (MRI) to measures brain volume. The ADNI participants also underwent baseline functional neuroimaging with positron emission tomography (PET) using [18F]FDG to examine brain glucose metabolism and longitudinal clinical follow-up (mean follow-up period = 32.1 months). We then compared cognition, brain glucose metabolism and volume, and risk of conversion to a diagnosis of mild cognitive impairment (MCI) or AD over the follow-up period between older adults taking one or more anticholinergic medications (AC+) to those not taking anticholinergic medications (AC-). Similar to previous reports, we found significantly lower memory and executive function in AC+ older adults relative to AC- older adults, as well as a 2.5x increased risk of conversion to MCI and/or AD (which increases to a more than 7x increased risk in those that are also amyloid positive) in AC+ older adults relative to AC- older adults.

Further, we found reduced brain glucose metabolism and greater atrophy across the whole brain, as well as more specifically in the temporal lobe, a region important for memory and other types of cognition. Overall, we concluded that use of anticholinergic medications should be discouraged in older adults if alternatives are available, although additional longitudinal prospective studies are needed to fully understand the role of anticholinergic medications on cognitive impairment and associated brain pathology.

The article published by Mr. Britt and Dr. Day raises important and timely issues about the use of anticholinergic medications in older populations, and I feel is an excellent resource for researchers and clinicians who are concerned about or interested in the use of anticholinergic medications in these populations.

Shannon L. Risacher, PhD
Assistant Professor of Radiology and Imaging Sciences
Center for Neuroimaging, Department of Radiology and Imaging Sciences
Indiana Alzheimer Disease Center
Indiana University School of Medicine

Member-Driven Goals Shape Cape Girardeau County Area Medical Society

History

On January 23, 1905, the Cape Girardeau County Medical Society was granted its charter by the Missouri State Medical Association. In 1977 the Cape Girardeau County Medical Society changed its name to the Cape Girardeau County Area Medical Society (CGCAMS). For the past 111 years, CGCAMS has served not only the local medical community, but the Cape Girardeau community as well.

Cape Girardeau has long been considered a medical hub in Southeast Missouri. Located between St. Louis and Memphis, Cape Girardeau physicians see patients throughout Southeast Missouri, Southern Illinois, and Northeast Arkansas. With two hospitals in Cape Girardeau, there is constant innovation, benefiting everyone in the Cape Girardeau community.

Over the last 111 years many things have changed within CGCAMS, however the mission of the society has not. CGCAMS still aims to serve the people of the Cape Girardeau County community in matters of medical care, prevention and in the efforts of improving public health.

CGCAMS Membership

Being a member of CGCAMS has many benefits for local physicians. CGCAMS offers free bi-monthly membership meetings which includes a dinner, computerized CME tracking for all CGCAMS events, complimentary quarterly journal, patient dispute mediation, referrals, and networking, in addition to social opportunities for members and their families.

The main service of CGCAMS is providing members and guests access to continuing medical education. Each year CGCAMS hosts four symposiums and six membership meetings, from each of which CME credits are awarded.

Each year CGCAMS kicks off its CME season with the Infectious Disease Symposium. CGCAMS then offers a variety of topics of interest to area physicians. Past popular topics have included Skin Cancer, Back Pain, Diabetes & Endocrinology, Colon Cancer, Breast Cancer and Pediatrics. By providing a wide range of topics, CGCAMS is able to support a wide range of specialties. This fall CGCAMS will host a Dermatology Symposium on September 17, followed by a Diabetes & Endocrinology Symposium on October 1.

Each membership meeting features a CGCAMS member or guest speaker, allowing attendees to learn what their peers are doing in their field. These presentations lead to great discussions among the membership. One very well attended membership meeting featured a guest speaker from the St. Louis anti-human trafficking office. Unbeknownst to many Americans, and by extension physicians is; human trafficking is not just limited to 'foreigners.' There are young American children who are corralled into human trafficking, often by not so well meaning parents and relatives. The meetings are free for members; spouses are invited for 'date night' and the setting provides an invaluable networking opportunity.

Another service CGCAMS is proud to provide to its members is the *Cape Medical Journal*. Initially published in 1954, after a long absence the journal made its return in July of 2013. Published quarterly, the journal features articles by CGCAMS members and tackles important issues facing the Cape Girardeau community.



CGCAMS President
Andrew Moore, MD



CGCAMS Vice President
Darren Allcock, DO

Social and Networking

In January, CGCAMS hosted its annual holiday party. Members celebrate the past year, induct new officers and recognize two members with the CGCAMS Blue and Yellow Awards. The recipient of the Blue Award is known as a physician of distinction in the local community. The recipient of the Yellow Award is a physician who is a leader in their field and encourages constant learning and professional growth.

The holiday party is not the only social opportunity for members. In June CGCAMS hosted a Summer Social at a local winery. This social also featured a karaoke competition where attendees were treated to the very best karaoke in town. Songs included, Adele's "Someone Like You" to "Jackson" the duet by Johnny Cash and June Carter Cash. Other favorites of the night included "Yellow Submarine" by the Beatles and "Bohemian Rhapsody" by Queen.

In August CGCAMS will host the Back to School Bowling Bash. CGCAMS members work long and hard, and it is through these social events that CGCAMS hopes to encourage long lasting friendships among its members.

5 Goals of CGCAMS

1. To enhance the reputation of CGCAMS and its members through professional and personal development with CME programs for physicians and staff.
2. To promote interdisciplinary harmony among our members and maintain a member-driven approach based on effective communication.
3. To vigorously maintain the highest ethical standards.
4. To represent physicians' interests when interacting with managed care organizations, third-party payors, legislative groups, and regulatory agencies.
5. To be an effective advocate for our members and strive to maintain the highest quality of care for patients.

Moving Forward

The last couple of years have seen great change within CGCAMS. The Society has become more active within the Cape Girardeau community and the Missouri State Medical Association.

The desire to be a force of good in the community has led to the society becoming involved with Hope House and the Safe House for Women.

The Hope House is a non-profit children's home, which provides emergency shelter for foster children in the Cape Girardeau area. While the Hope House works alongside the State of Missouri Children's Division, the Hope House does operate independently of the State of Missouri Children's Division. The society contributes annually to the First 48 fund, which covers emergency medical services when children are brought to the Hope House.

CGCAMS work with the Safe House has included presentations to increase awareness of domestic violence as well as resources for physicians who see victims of domestic violence and human trafficking. Additionally CGCAMS has worked with the Safe House to find a safe method to convey contact information for the local shelter, for victims of domestic violence.





Top; CGCAMS Summer Social
Bottom: Annual Back to School Bowling Bash

Increased participation by CGCAMS in the Missouri State Medical Association, is essential; as MSMA is the voice of Missouri physicians. With everything that is happening in health care, it is important to work together. With this in mind, CGCAMS put forth two resolutions at the 2016 Annual Convention, which affect the CGCAMS membership.

In the last year, CGCAMS created the Past Presidents Advisory Board. This board is made up of past presidents of CGCAMS and meets before each membership meeting. The past presidents shaped the society, and by forming this board, CGCAMS hopes to combine aspects of the past to create a greater future for CGCAMS.

In regard to the future, CGCAMS took a big step in relocating its office effective August 2016. The new office provides a more functional updated space that reflects the forward momentum and growth of CGCAMS. The last few years have seen new life breathed into CGCAMS and with this there is no stopping us. **MM**

MSMA Members in the News

Read more about what our members are doing at www.facebook.com/momedical



An MSMA member since 2008, Samuel Brewster, MD, has been honored with the Physician of Excellence Award by Cass Regional Medical Center.



Thomas Hopkins, MD, MSMA member since 1995, co-authored "The Princes of Albion, Book One of The Long-Aimed Blow," and was recognized at the 10th Annual National Indie Excellence Awards in the category of Religion-Fiction as a finalist in this year's competition.



An MSMA member since 2002, Scott Kujath, MD, of Kansas City, has been named the 2016 INMED International Medicine Award Recipient.



Amy Lockhert, MD, an MSMA member since 2006, is now seeing patients at Kennett Clinic and Campbell Medical Clinic.



Fassil Mesfin, MD, is a newer member of MSMA, now practicing in both Columbia and Osage Beach.





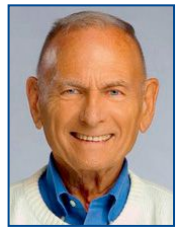
Congratulations to Drs. Joel Ray and David Yingling, who have joined Saint Francis Medical Partners in Cape Girardeau. Both have been loyal MSMA members since 1998.



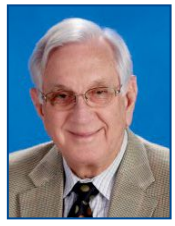
Lisa Roark, MD, of Cassville, has been an MSMA member since 2010, and helps her community by educating students about how the body works.



A valued member since 2003, Martin Rudloff, MD, volunteers his time, reading to children at Washington Middle School's Family Reading Night. (Photo courtesy of Washington Missourian)



Norman Shealy, MD, PhD, DSc, of Fair Grove, has been recognized as a Professional of the Year for 2016 by Strathmore's Who's Who Worldwide Edition for his achievements in the field of holistic health care. He's been an MSMA member for 35 years.



Kirby Turner, MD, has been honored by the Caledonia/Valley R-6 High School Alumni Association as a 2016 Inaugural Spotlight Alumni Recipient. He's been an MSMA member since 1977.



One of MSMA's newest members, Andrew Valleroy, MD, of Washington, recently joined Mercy Clinic Family Medicine.



Laura Voss, DO, is a new member of MSMA and an outstanding physician in Lee's Summit. She spent a week in Jordan on a Medical Mission helping refugees of the Syrian Civil War. (Story courtesy of Betty Beason and Pleasant Hill Times)



MSMA is happy to have Sara Wood, MD, as a new member, chosen by the *St. Louis Business Journal* as a Class of 40 Under 40 honoree.

Did you make the news? Submit your success story and photo to hwansing@msma.org.

UMKC Community and Family Medicine: A Heritage of Service Since 1851

by Michael O'Dell, MD

We are extremely grateful to the number of volunteer community physicians that assist us in training students during student rotations.

The Department of Community and Family Medicine is housed at Truman Medical Center - Lakewood (TMC-LW) and is part of the University of Missouri - Kansas City School of Medicine (UMKC-SOM). The Lakewood location lends history the program, having been a facility serving the indigent since 1851, first as the Jackson County Poor Farm and, through the decades, changing into a modern medical care facility. The current campus boasts inpatient and outpatient programs, as well as an 188-bed long-term care facility. TMC-LW is an active component of the UMKC SOM teaching program, training medical students residents, and fellows at the site.

Medical resident teaching at TMC-LW was initiated by Jack Stelmach, MD, in 1975, primarily residents on rotation from the Goppert and Menorah hospital programs. In 1979, Thomas Nicholas, MD, was hired to establish a Family Medicine residency program and later became the first Chairman of the Department. The Department established its residency program in 1980, beginning with training six residents that year. The Department has grown over the years and four persons have served successively as Department Chair: Dr. Nicholas (1979-1989); Paul A. Williams, MD, (1989- 2001); R. Stephen Griffith, MD, (2001 - 2010); Michael L. O'Dell, MD, (2010-present).



Michael L. O'Dell, MD, MSHA, FAAFP, MSMA member since 2010, is Associate Chief Medical Officer at Truman Medical Center and Professor and Chair of the Department of Community and Family Medicine at the University of Missouri - Kansas City.
Contact: odellm@umkc.edu

The Department trains UMKC medical students during their six-year combined BA/MD program. Faculty from the Department serve: as docents during years one and two; clinical faculty for a fourth-year and fifth-year rotation; faculty for various elective rotations and other teaching opportunities. We are extremely grateful to the number of volunteer community physicians that assist us in training students during student rotations. The Department trains 12 residents in family medicine each year. We offer fellowships that provide a certificate of added qualifications to two fellows each in both Sports Medicine and Geriatrics annually. We also provide a year-long fellowship in maternity care, where two fellows learn caesarean section skills and other advanced training in obstetrics.

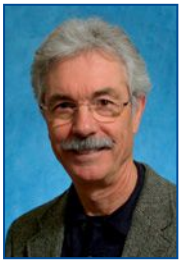
The articles written by faculty in this issue of the Journal reflect some of the breadth of activity within the Department. Dr. Voran et al. write about work of engaging patients and physicians in using computers as tools during medical care and how to teach appropriate use to resident physicians. Dr. Hempstead et al. provide a summary of the detailed and extraordinary work of evaluation now being accomplished in training young physicians during their path to independent practice following residency. This should be of particular interest to those looking to add new associates. Dr. Griffith provides a clinically focused piece on common skin disease, an area of particular expertise for several of our physicians as dermatology consultation is hard to obtain for the population we serve. Dr. Shaffer has written a timely piece on our regions physician supply. I have added an article on Patient-Centered Medical Homes. Lastly, Dr. Gibson et al. provide knowledge to the readers of common sports supplements, their benefits, and misuses.

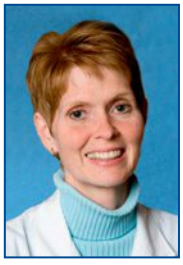
As a Department, we are grateful to *Missouri Medicine* for providing this opportunity to highlight some of our work and activities. **MM**

The "Magic Triangle" Foundation to Effective Use of Information Technology in the Exam Room

by David A. Voran, MD, Beth Rosemergey, DO & Teri Scott, DNP

We are confirming that simply directing the patient's attention to the screen and inviting them to participate in the documentation is consistent with the essence of patient-centered care that is so fundamental to Family Medicine.





David A. Voran, MD, (left), MSMA member since 2010, Beth Rosemergey, DO, (right), MSMA member since 2015, are both Assistant Professors at the Community and Family Medicine Department, University of Missouri - Kansas City and Truman Medical Center-Lakewood. Teri Scott, DNP, APRN, FNP-BC, is at Truman Medical Center, Kansas City.
Contact: vorand@umkc.edu

Abstract

The computer has become an integral part of the exam room and plays an important role in provider-patient interaction. The special arrangement of the provider-patient and computer as well as the provider's computer skills and hardware knowledge play a pivotal role in patient satisfaction, engagement and productivity. Patient satisfaction and engagement play an ever increasing role as medicine migrates to value-based reimbursement. How a physician uses the computer and interacts with patients in the exam room can encourage or discourage participation. Many physicians practice in rooms ill designed for optimal computer use. Learning how to adapt and incorporate the computer is a key patient interaction skill required of all clinicians. This paper discusses the research supporting this activity and describes how we are attempting to teach this to resident physicians in our practice.

Background

Electronic medical records (EMRs) are a fundamental requirement for medicine today and will continue to play increasingly important functions in our move towards value-based reimbursement. Effective patient-clinician communication is the foundation of patient engagement necessary to deliver patient-centered care. Many clinicians have expressed concerns that technology is interfering with this communication. A comprehensive review of the published material studying the effect of computers in the exam room was completed by Noah Cramption, Shmuel Reis, and Aviv Shachak.[1] Their review demonstrated that computers affect the patient encounter both positively and negatively and suggests application of best practices to reduce the negative impact. Other studies have corroborated most physicians are not only accepting and reliant on EMRs but generally satisfied with many of the features.[2] Patients certainly do not indicate a sense of loss of rapport with their physicians after introduction of an EMR in outpatient settings.[3, 4]

As suggested by Crampton, et al., effective use of computers in the outpatient exam room depends heavily on a physician's computer and communication skills that includes both verbal and nonverbal behavior. Relatively simple modifications of how physicians position themselves in the exam rooms or how exam rooms are configured can facilitate or interfere with effective communication.[5]

The American Academy of Family Practice recognized the potential for computers to enhance the visit experience in a 2006 Family Practice Management journal offering, "10 Tips on how to effectively use computers in the exam room."[6] The ten tips were:

- Use mobile computer monitors
- Learn to type
- Integrate typing around your patients' needs
- Reserve templates for documentation
- Separate some routine data entry and health-care maintenance issues from your patient encounters
- Start with your patients' concerns
- Tell your patients what you are doing – as you are doing it
- Point to the screen
- Encourage patients' participation in building their charts
- Look at your patients

A common theme in these tips is for physicians to integrate the exam room computer into the clinic workflow. Doing so reduces redundant work and encourages the patient to participate in the process. This involves training and practice for most physicians.

Some schools like the University of North Carolina – Chapel Hills have created a Clinical Skills Center with 16 exam rooms to teach students how to interact with patients in a controlled setting.[7] The Society of Teachers of Family Medicine Conference on Practice Improvement (December 2015, Dallas, Tx.), provided tours of the Primary Care Office of the Future. These model rooms were originally developed by the Connecticut Institute for Primary Care Innovation and that, among other innovations emphasized the importance of sharing information with patients during the visit using large flat-panel screens. Use of these innovations foster productive inter-professional teamwork around a patient or population.[8]

Discussion

The patient's chart is a critically important tool in patient care. This is as true in the digital world today as it was in the paper world of yesteryear. Practice to practice variability in paper chart organization and use was nearly as great as practice to practice variability in EMR implementations, even of the same vendor, due to local customization.

These skills and familiarity with localization is as important for physicians today as skill with any other medical procedure or instrumentation. Physicians who are skilled at navigating and locating patient's information are more productive than those who have difficulty locating that information.[9] On the other hand, when the physician's computer skills are less than adequate, demanding heavy use of the computer by the physician is viewed negatively by the patients.[10] McGrath, et al. emphasized the importance of physician training noting that those who are skilled at using the equipment AND have the ability to use that equipment in the context of a patient visit are more productive than those who have difficulties with these skills. This competency can have a positive effect on patient health.

Enhanced patient engagement is important for disease management and optimized physician-patient communication is key in this process.[11] The physician's skill and understanding of these tools is the primary influencer, both positively and negatively, in the nonverbal communication between the physician and the patient. Understanding of the hardware features and functions and being able to adapt to new technologies is as important for the office physician as skill and dexterity with surgical instruments is to the surgeon. Being able to incorporate multiple screens, manage multimedia, incorporate mobile and patient generated data, and how to extract and share information with the patient without disrupting the visit requires not only knowledge but practice.

The nonverbal framework for the interview is often dictated by the spatial arrangement of the patient, computer and physician. This framework can dictate a closed, blocked or open nonverbal communication. McGrath postulated the ideal arrangement was where the computer and patient are both positioned in a 45-degree angle toward the physician.[12]

Most family medicine residency programs are ill equipped to provide effective training in how to function in rooms much more optimized from a technology perspective. This is particularly true of our program, Community and Family Medicine at Truman Medical Center – Lakewood. Our residents practice in rooms that are ill designed for computers. The placement of computers often present barriers residents and faculty need to overcome in order to be able to effectively use them during the patient encounter. Some rooms have the computers built into the wall where it is impossible to use them without turning one's back to the patient and make it difficult

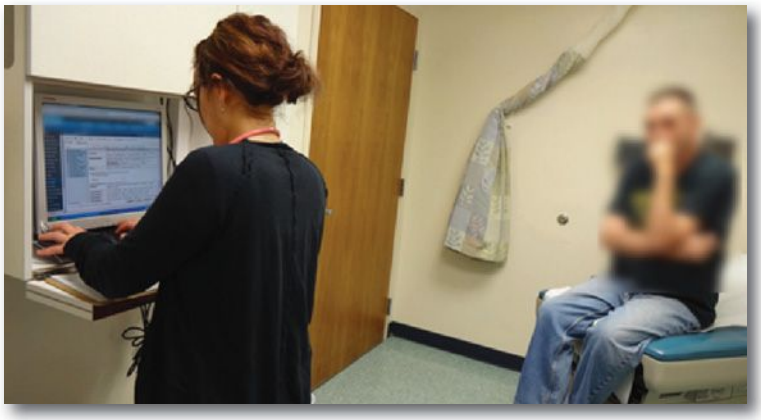


Figure 1. Traditional clinic room ill designed for computers.

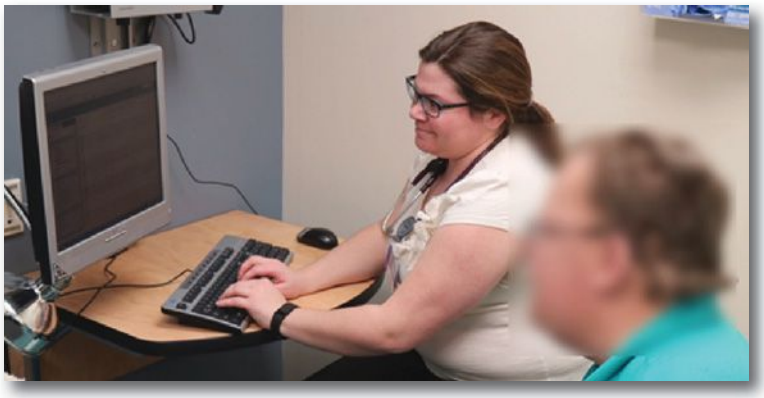


Figure 2. Exam room with consultation table.

to share what's on the screen with the patients (See Figure 1).

Other rooms are better suited and allow the physician and patient to sit where both can easily visualize the screen as well as interact together comfortably in a triangular where the patient, physician and computer are points in an equilateral triangle (See Figure 2).

The rooms were designed long before computers became an integral part of the visit work flow. Modern exam rooms, such as those designed by MidMark Solutions,[13] (See Figure 3), are configured to facilitate both a consultation area facilitating this triangle.

An extreme form of this design is being used in large company on-site clinics, such as Cerner's Healthe Clinic on its World Headquarters campus in North Kansas City. These exam room suites were designed by employees planning to be patients at this clinic (Figure 4) and in these the exam area was separated from the consultation area to facilitate parents bringing their children in as a family unit for their visits.

Our residency programs facility, like many primary care offices, cannot retrofit all of our exam rooms with adequate devices to enhance the exam room experience. To ameliorate this deficiency and provide better tools for our residents, we have opted to arm our residents with state-of-the art mobile devices that help overcome some of the existing barriers.[14] This allows us to expand our education to include patient-physician-computer interactions that are necessary to practice medicine. In this way we are training our residents to be able to adapt to virtually any environment in which they find themselves as well as encouraging them utilize best practices with regard to using the computer in the exam room to improve the patient experience and engender patient engagement in their health.[15]

We are also undertaking a year-long process improvement project lead by Dr. Beth Rosemergy, Medical Director of the resident run Family Medicine Clinic. In this project all first-year residents are asked to change their normal interactions with patients and incorporate the computer as the third entity in the room. Where possible faculty teach our residents how to interact with the patients using the computer as a critical visit tool in the exam room.

Teaching our residents to recognize the spatial arrangement (proxemics) of the room; helping them learn to adapt by repositioning themselves and the patient so both the can easily share (participate and interact with) what is on the computer screen better prepares them for their future careers. The residents can use their own devices or the computer in the room to actively draw the patient's attention to the monitor throughout the interview and visit and, to complete most of their documentation in the exam room. The patient is being asked to validate the information already in the chart as well as what is being added to the chart for accuracy. After the visit a questionnaire is given to the patient asking them for their opinion and effect of this behavior.

Early results (unpublished) are very encouraging (See Figure 5). Patients are reporting that they do not object to this behavior, perceive this computer use positively and that it does not detract from the physician-patient communication. The residents also report learning to do this helps them with accurate documentation, has uncovered many inconsistencies in the chart and does not



Figure 3. Examples of exam rooms designed with computer in mind
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slow or obstruct the normal visit experience.

By incorporating and helping residents learn to actively use their computers with their patients we are improving their ability to increase the accuracy and completeness of the chart while increasing patient engagement. Both of these are critical physician skills as we move from a volume to value based reimbursement system where so much depends on quality measures, patient engagement, satisfaction and active participation in their health. We are confirming that simply directing the patient's attention to the screen and inviting them to participate in the documentation is consistent with the essence of patient centered care that is so fundamental to Family Medicine.

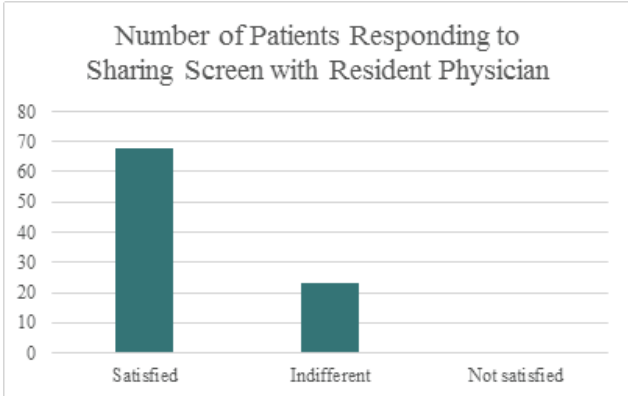


Figure 5. Patient satisfaction with residents inviting patients to share screen for problem review and medication reconciliation.

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Disclosure

None reported.

MM

Clinical Competency Committee: Tools for Developing Tomorrow's Physician Leaders

by Laura Hempstead, DO, Margaret Gibson, MD, Todd Shaffer, MD & Jennifer Groner, DO

Each medical specialty has individual milestones to evaluate residents and fellows.



Laura Hempstead, DO, (top left), Program Director, AOA Internship and Associate Professor; Margaret E. Gibson, MD, (top right), MSMA member since 2010, Associate Professor; Todd Shaffer, MD, (bottom left), Professor and Program Director Family Medicine Residency; and Jennifer Groner, DO, (bottom right), Assistant Professor, are all at the University of Missouri - Kansas City, Department of Community and Family Medicine and Truman Medical Center-Lakewood.
Contact: hempsteadl@umkc.edu

Introduction

Many practicing physicians participated in residency training in the Twentieth Century and remember the era of "see one, do one, teach one." Residents seldom interacted with the program director and graduate medical education staff (many institutions did not even have designated staff for the purpose of graduate medical education). A chord of fear shot through the residents' hearts in response to the thought of bothering an attending physician after hours. Interns sought guidance from upper-level residents, who sometimes waited until patients were in dire straits before approaching their attending physicians with panicked requests for assistance.

The primary training tool for the resident was the autonomous management of patient care. Exposure to a wide variety and number of patients was assumed to be adequate to produce competent physicians.[1] A written examination to determine core medical knowledge was the primary method of assessing graduate readiness. This education system assumed that a sense of duty to patients and core medical knowledge would produce good patient outcomes and effective physicians.[1]

Patient Safety Concern

As patients acquired better access to medical information, they began to demand more of their physicians. Concern for the safety of patients under the care of residents in a hospital setting came to the forefront. On November 29, 1999, the Institute of Medicine (IOM) released a report called *To Err is Human: Building a Safer Health System*[2] recommending improved safety and oversight within a hospital system. In response to these concerns, it became necessary to evaluate residents on their ability to work effectively and safely within a health care system.

At the same time, burgeoning technological advances and employer sponsored health insurance transformed the practice of medicine from a solo endeavor into a complex multifactorial business. The solo physician became a relic of the past, most physicians becoming salaried physicians within a larger group connected with multiple resources. Payment reforms shifted the focus away from acute care fee-for-service payment systems to capitated payments requiring accountability towards providing care for populations

of patients with chronic health conditions.[3] These changes required resident physicians to learn to work as effective team members, exhibit exceptional communication skills and to demonstrate the highest levels of professionalism. Novel methods of evaluation had to be developed to assess new skills.

As scientific advances continued to accelerate, the need for cost containment and equity in health care delivery became evident. The Affordable Care Act stressed the need for improved access to care, and focused the public eye on health care. The public demanded increasing transparency and accountability in health care[4] and the government started critically examining the funding of residency training.[4] Requirement for continuous practice improvement became another area in which residents needed to be assessed.



Many practicing physicians participated in residency training in the Twentieth Century and remember the era of "see one, do one, teach one."

Core Compentencies

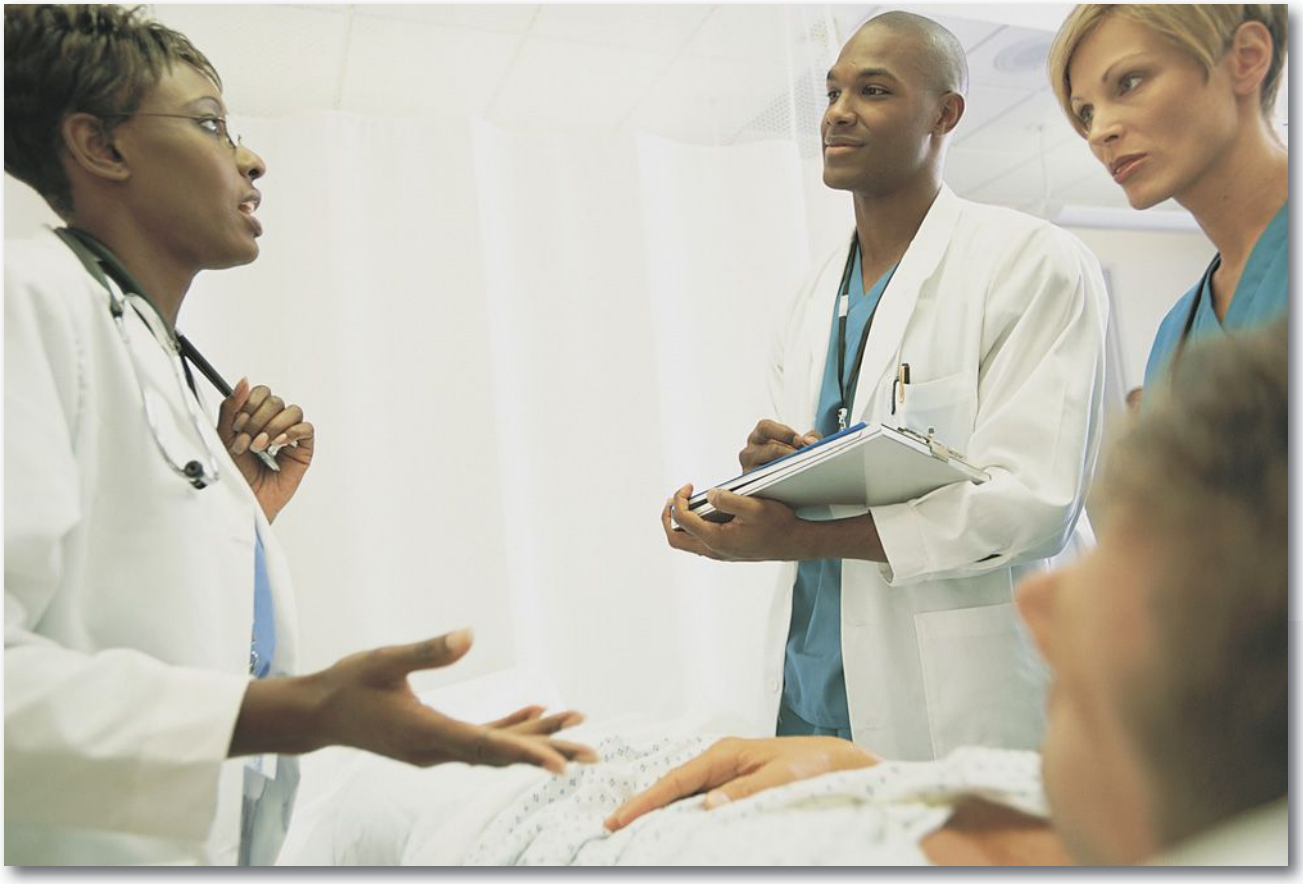
The Accreditation Council for Graduate Medical Education (ACGME) began to respond to changes in the medical practice climate early on. In 1999, the ACGME introduced its Outcome Project which defined medical competency as a core group of six competencies.[5] These core competencies formed the new basis for residency curricula and evaluation of resident graduation readiness. Outcome project core competencies included the traditional areas of evaluation, patient care and medical knowledge, and added requirements to achieve competence in systems-based practice, interpersonal and communication skills, professionalism, and practice-based learning and improvement. Much latitude was given to individual programs to define the criteria for competency in each of the core areas.[5]

In 2007, after nearly a decade of experience with the six core competencies, the ACGME Outcomes Project required delineation of specific anchor points or milestones to mark development of knowledge, skills and attitudes expected of a resident during training.[1] Each of these milestones was developed to anchor a subcategory within one of the six core competencies. Milestones were designed with the hope of measuring growth, stagnation or deterioration of resident performance.[6] These milestones provided program directors and evaluators with observable goals and behaviors designed to assess a learner's progression towards competency.[6] These assessment milestones known as Next Accreditation System (NAS) Reporting Milestones were initiated in 2012 for pilot specialties and were enacted for all residency program specialties in 2014.[7]

The milestones were developed along a continuum of education which includes behaviors expected at the level of a novice advancing up to aspirational goals that practicing physicians may not meet.[8] Level 1 milestones measure the knowledge, skills and attitudes expected of a recent medical school graduate upon entry into a residency program. Level 2 milestones reflect ongoing progress expected in the first and second years of residency. Level 3 milestones reflect basic competence and the ability to practice independently, although oversight may be required. Level 4 is the graduation target and represents behavioral anchors expected of a competent physician ready to enter independent practice. Level 5 is an aspirational level for residents attained by professional leaders and mentors within the specialty.[9]

The Current State of Evaluation for Family Medicine Residents

Each specialty has individual milestones to evaluate residents and fellows. The ACGME Family Medicine milestones contain between two and five subcategories for each of the six core competencies. Within each of these subcategories, there are the five levels of milestones. For family medicine residents, there are 22 subcategories with a total of 225 milestones to evaluate.[10] Family medicine milestones reflect that during residency a developing physician moves from a dependent learner to an independent practitioner. Recurring themes within the milestones reflected that resident physicians are expected to develop an appreciation of the need for teamwork and



To assess achievement in areas such as this, our residency program coordinator and a member of hospital administration who runs compliance reports are important members of our committee.

incorporation of resources outside of self. The learner is also required to develop self-awareness, seek feedback, understand his or her limitations and know when to ask for help. Also, the learner must develop strategies to manage ambiguity.[1]

As the number of requirements for observing resident performance expanded, the ACGME perceived the need for a more formal system of resident evaluation. As part of NAS, they required the formation of a clinical competency committee (CCC) to meet regularly and assess resident performance.[7]

Individual milestones capture observable behaviors for a specified time and context. The CCC does not just check off individual milestones, rather the committee reviews repeated behaviors over time and in different clinical settings to determine if a resident is developing a habit of consistent performance within the competency domain.[8] The CCC is expected to synthesize information from multiple sources such as rotation evaluations, 360 degree evaluations completed by hospital and clinical staff, patient surveys, in-training examination scores, objectives structured clinical examinations (OSCEs) using standardized and simulated patients, direct observation of residents and others.[9]

Every resident is evaluated twice a year on the 225 milestones. Therefore, lack of achievement or growth in a specific milestone can be identified by the CCC. The committee recommends interventions that assist residents in their growth towards graduation and independent practice. One of the primary goals of the CCC is to identify struggling learners and provide support early to insure proper progress towards the ultimate goal of independent practice which signifies graduation readiness. In this way, the process of assessing graduation readiness begins on the first day of orientation as a new family medicine resident.

A major task undertaken by the CCC in evaluating each resident is taking information from across a variety of settings and deconstructing this information into behaviors applicable to graduation milestones.[6] The committee uses written and verbal evaluations from multiple sources to confirm that the learner possesses

the knowledge, skills and attitudes needed for the safe, effective and compassionate practice of medicine within their specialty.[11]

One barrier to evaluating residents was the fact that each evaluator brought their standards and criteria to a general milestone such as "effectively delivers bad news to patients."[11] The initial task of our CCC was to look at each milestone and more clearly define how that milestone was going to be evaluated in the context of our family medicine residency program. The committee also had to look at the opportunities available in our program to decide what level of milestone was attainable. The next step was to rewrite our global rotation evaluations to correlate with the milestones. Several milestones cannot be evaluated in the context of a global rotation evaluation, for example "uses systematic improvement method (e.g. PDSA cycle) to address an identified area of improvement."[10]

To assess achievement in areas such as this, our residency program coordinator and a member of hospital administration who runs compliance reports are important members of our committee. They provide essential information regarding resident participation in hospital safety and quality initiatives and progress toward meeting academic requirements. Resident self-evaluation is also vital to the process. The subcategory "Maintains emotional, physical and mental health; and pursues continual personal and professional growth"[10] is measured by completion of a resident self-evaluation form, and by input from our behaviorist. The psychologist is a vital part of the CCC and provides valuable insight into resident behavior and progress toward independent practice.

To meet the momentous requirement of evaluating 14 residents on 225 milestones every six months, we have developed a system that we repeat every four weeks. Our family medicine residents enjoy the most autonomy on inpatient obstetrical and inpatient medicine services. Each of these services has a third year resident acting in a leadership role as the resident in charge (RIC). This resident supervises a team of first and second year residents. Two weeks into the rotation, each RIC provides a verbal report to the CCC regarding their assessment of the strengths and potential areas for improvement of each of their team members. The RIC is evaluated by faculty members supervising the service. The milestones are incorporated into our electronic rotation evaluations and the software then generates a numerical level from 1-5. Using this number as a guide, the CCC takes into account the information gathered from all other sources as previously mentioned and then assigns a numerical value to each milestone. A remediation strategy is recommended if the resident fails to progress at the level expected for their point in training.

During the final month of the residency program, all the information gleaned from the multiple sources outlined above is compiled for each of the graduating residents. The members of the CCC meet and review the information. Each resident has been discussed regularly throughout his or her residency program and interventions were introduced when needed to insure success. Criteria for successful graduation include achievement of a minimum of level 3 on all milestones, and achievement of level 4 on the majority of milestones. The resident meeting these criteria can then be recommended as a candidate for successful completion of our residency program. The program director then provides the American Board of Family Medicine with a completion letter attesting that "Dr X has demonstrated sufficient competence to enter practice without direct supervision and is qualified to practice medicine competently and independently as a family physician."

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Disclosure

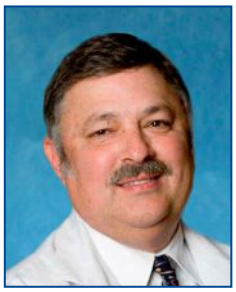
None reported.

MM

A Triad of Dermatologic Dilemmas

by R. Stephen Griffith, MD

Primary care physicians must be prepared to assess patients' with conditions benign or malignant, cosmetic or grave, irritants or harbingers of systemic illness, pathological or normal variant.



R. Stephen Griffith, MD, MSMA member since 2011, is Associate Professor, University of Missouri - Kansas City, Department of Community and Family Medicine and Truman Medical Center-Lakewood.
Contact: Steve.Griffith@tmcmed.org

Abstract

The U.S. health care system relies on primary care physicians to provide the majority of the dermatologic care—dermatologists see an estimated 30-40% of patients with dermatologic issues.[1] Issues related to skin and mucous membrane conditions account for an estimated 8% of all visits to Family Physicians.[2] Thus the primary care physician must be prepared to assess patients' with conditions benign or malignant, cosmetic or grave, irritants or harbingers of systemic illness, pathological or normal variant. In this article, three commonly seen and difficult to treat conditions will be reviewed.

Angular Chelitis

Also called angular chelosis, commissural chelitis, angular stomatitis or perleche, Angular Chelitis (AC) is an inflammation of the vermilion commissures and adjacent mucous membranes which can rapidly escalate to erythema, moist maceration, ulceration and crusting at the corners of the mouth (See Figure 1). With long-term inflammation, granulation tissue may develop, evolving into diffuse chelitis involving the entire upper and lower lips. Symptoms are soreness, pain, burning, and itching, exacerbated by opening the mouth, and can be unilateral or bilateral. It is most common in adults in the third and sixth decades of life.[3]

AC is associated with a variety of local and systemic factors, alone or in combination, but most common are local factors: irritant, allergic, or infectious. Treatment must neutralize the impact of specific local factors on the barrier function.

The most common cause is irritant chelitis due to persistent contact with saliva with maceration and resulting inflammation. Factors leading to this are conditions which lead to deeper than usual fold of skin at the corner of the mouth, such as in edentulous patients or those with damage to elastic tissue due to extensive UV light skin damage or smoking. Other causes include habitual drooling (e.g. post CVA) or chemical irritants from denture cleaning products.[3] It is more common in people with underlying eczema with reactive skin.

Allergic AC is less common but should be considered if no irritant cause is found. Nickel-based metals in braces or other oral appliances may be a cause of AC, even in the absence of mucositis. Anything that can cause generalized chelitis (lipstick, toothpaste, sunscreens, and medications such as neomycin) can also cause localized AC.

Whether AC is in part due to infectious causes or if the

microorganisms found are just colonizing the inflamed tissue is controversial. Some believe infection to be the most common cause of AC.[4] Staphylococcal species, *Streptococcal* species, *Candida albicans*, and *Herpes simplex* are the common organisms found.

Less common causes of AC are nutritional deficiencies (iron, B vitamins, Zinc), side effects of pharmaceuticals (isotretinoin and other systemic retinoids, Indinavir, drugs that interfere with B-6 synthesis such as INH), drugs of abuse (cocaine due to compulsive lip smacking, heroin and methamphetamines due to neurotic excoriation), and systemic diseases (Down's syndrome, xerostomia (from many causes), anorexia, systemic lupus erythematosus, inflammatory bowel disease, uremia, and HIV).[5]

The diagnostic approach to a patient presenting with AC begins with a history of timing, duration, recurrence, exposures, medication use, dental issues, tobacco use, solar damage due to prolonged UV light exposure, and symptoms of systemic illness that may predispose to AC. Examination should include evaluating the extent of the chelitis and associated dental hygiene, signs of pooling of saliva, and any sign of nutritional deficiencies. In select patients, cultures can be considered as well as further laboratory testing for systemic illness or nutritional deficiencies.[5]



Figure 1. Angular Chelitis



Figure 2. Aphthous Stomatitis

Treatment is often not needed and AC resolves on its own.[5] For persistent symptoms, barrier creams or emollients applied frequently will resolve the condition (e.g., zinc oxide). Addition of a low-potency steroid may help reduce inflammation.[5] If there is evidence of an infectious agent, topical treatment with antifungals or antibiotics will suffice without systemic treatment. Replacement of ill-fitting dentures or oral appliances may be needed. Addressing nutritional deficiencies will be needed in those unusual cases. If deep folds at the corner of the mouth cause recurrent symptoms, tissue fillers such as collagen or autologous fat may be considered.[5]

Recurrent Aphthous Stomatitis

Aphthae, also called canker sores, have plagued mankind throughout recorded history, first described by Hippocrates (460-370 BCE).7 Recurrent Aphthous Stomatitis (RAS) results in recurrent small round or ovoid symmetric mucosal ulcers with circumscribed margins, erythematous halos and yellow or gray bases (See Figure 2). RAS is the most common inflammatory ulcerative condition of the oral cavity. The point prevalence is 1.23% and the lifetime prevalence is 36.5% based on the National Survey of Oral Health in the USA (1986-1987).[7] The incidence is higher in children, and if both parents have a history of RAS, 90% of their children will experience it, whereas only 20% of children will have it if neither parent has it. RAS is five times more common in children of high socioeconomic status.[8] The peak age is 10-19 and de creases over the decades, but can affect people of any age. The etiology is unknown, but several local, systemic, immunologic, genetic, allergic, nutritional, and microbiological factors have been proposed.[7]

RAS is more common with trauma—denture wearers have triple the incidence of non-denture wearers. Smokers have lower incidence than non-smokers for

uncertain reasons. Change in saliva composition has been suggested as a cause of RAS, such as stress-induced increase in salivary cortisol. Graduates students have been noted to have a higher incidence of RAS, presumably due to the stress of exams, dissertation, etc. However, those same students later become professionals with no higher incidence of RAS than non-professionals, so it may be more age related than stress related.[7] Evidence for microbial causes have been unconvincing, with EB virus, Herpes virus, and *H. pylori* all effectively ruled out. However, a T-cell mediated immune response to *Streptococcus sanguis* 2A may be involved.[7]

A number of systemic conditions may have an RAS-like presentation. Behcet's disease is a systemic vasculitis multi-organ process with RAS-like ulceration, but also has genital, cutaneous, and ocular symptoms along with renal, neurological, GI, hematological, and joint abnormalities. Other systemic conditions to consider are: mouth and genital ulcers with inflamed cartilage (MAGIC) syndrome; periodic fever, aphthosis, pharyngitis, and adenitis syndrome (PFAPA); Crohn's disease; ulcerative colitis; celiac disease; HIV infection, and cyclic neutropenia.[7]

Increased stress has been associated with exacerbations of RAS, and some women experience RAS associated with menses.[7] Genetic predisposition exists as evidenced by the parent-child associations mentioned.

A small subset of patients with RAS may have nutritional deficiencies. The most common deficiencies reported include iron, folate, zinc, and vitamins B-1, B-2, B-6, and B-12.

Drug induced RAS has been reported with NSAIDs and beta-blockers.

Many patients associate certain foods with outbreaks. Some of the more commonly reported foods associated with exacerbations of RAS include: strawberries, chocolate, coffee, peanuts, cheese, tomatoes, citrus fruits, cereals, and almonds. Sodium lauryl sulfate in toothpaste has also been reported as a cause.[7]

Symptoms of RAS begin with a prodromal burning 2-48 hours prior to the redness and white papule which quickly ulcerates and enlarges over the next two days. The ulcerations cause pain with eating, swallowing and speaking. There are three presentations of RAS:

- Minor RAS. This is the most common presentation, representing >85% of cases.[8] Typically there are 1-5 ulcers < 5mm on the labial or buccal mucosa or floor of mouth, lasting 10-14 days, healing with no scars.
- Major RAS. Uncommon, severe form, also called periadenitis mucosa necrotica recurrens. Oval, >1cm ulcers on lips or soft palate. The ulcers may last six weeks and leave scars. This is a chronic condition with recurrences over 20 years or more.
- Herpetiform RAS. Least common, presenting as multiple recurrent crops of widespread small painful ulcers on the tip of the tongue and the floor and anterior portions of mouth. Usually <2mm in size, but there may be dozens and some may fuse to appear to be larger ulcers. Most common in females and with later onset than the other types.

The diagnosis is usually evident on history and physical examination. No additional testing is indicated in most cases, however, if an adult presents with new onset RAS, consider screening labs (CBC, iron, B-12 and folate levels). If the history or examination suggests a systemic condition, further testing is indicated.

Treatment is aimed at pain relief and healing as well as attempts to decrease recurrence, although few agents have demonstrated efficacy.[9] A search for triggers is indicated, looking for associated foods, medications, trauma (too firm toothbrush or ill-fitting dentures), or stress. Any nutritional deficiencies suspected should be addressed—it has been suggested that up to 20% of patients have iron deficiency.[10]

Puri, Gill, et al. have suggested a therapeutic ladder from topical to systemic.[11] Topical agents are used first. Local anesthetics/analgesics are used for pain relief, including lidocaine preparations, benzocaine, tannic acid, and camphor/phenol. If those products are inadequate, topical steroids can be tried, such as triamcinolone 0.1% in adhesive paste, high potency steroids including clobetasol solution 0.05% or fluocinonide solution 0.05% applied directly to the ulcer or mixed with Orobase, or betamethasone rinses. Tapuni, et al., demonstrated a significant decrease in the Ulcer Severity Score with oral rinses using 500 microgram betamethasone tablet dissolved in 10 mL of water four times a day for treatment and twice a day to prevent recurrence.[12] Topical antimicrobials are the next step on the ladder. Tetracycline, 250 mg dissolved in 10 mL of water and used as a rinse three times a day decreased pain significantly. Chlorhexidine rinses 0.12% also has demonstrated efficacy. Topical anti-inflammatories, such as diclofenac have been used, as has topical sulcrafate. Topical immunomodulatory agents have

been used in recalcitrant cases, such as azelastine and cyclosporine.

If topical treatments are unsuccessful, physical therapies have been used: surgical removal or debridement, laser ablation, low dense ultrasound, chemical cautery (with agents such as silver nitrate), and barriers like cyanoacrylate adhesives.

For severe cases not responding to topical treatments, systemic treatments have been tried, although none are FDA approved. Immune enhancement agents, such as levamisole have been tried. Systemic steroids at doses of 1 mg/kg daily for one to two weeks have been used for severe exacerbations. Systemic cyclosporine and chlorambucil have shown some efficacy.

Agents used for prevention include dapsone, colchicine, pentoxifylline, methotrexate, and thalidomide. Biologic agents such as infliximab or entarecept have also been used.

Table 1. Causes of Pruritis Ani

Dermatologic Conditions	Fecal Soilage	Systemic Disease
Atopic dermatitis	Anal Fissure	Aplastic anemia
Contact dermatitis	Chronic constipation	Diabetes mellitus
Hidradenitis suppurativa	Chronic diarrhea	Inflammatory bowel disease
Lichen planus	Fistula	Jaundice
Lichen sclerosis	Incontinence	Leukemia
Psoriasis	Prolapsed hemorrhoids	Lymphoma
Seborrheic dermatitis	Rectal prolapse	Thyroid Disease
	Skin tags	
Infections		**Medications**
Abscess	**Dietary irritants**	Chemotherapy
Candida (intertrigo)	Beer	Colchicine
Erythrasma	Coffee	Neomycin
Molluscum contagiosum	Chili peppers	Quinidine
Parasites (pinworms, scabies)	Citrus, tomatoes	
Sexually transmitted (e.g., herpes simplex, syphilis, HPV)	Milk	**Topical irritants**
		Deodorants
Malignancy	**Miscellaneous**	Detergents/fabric softeners
Bowen disease	Idiopathic	Soaps
Extra-mammary Paget's	Lumbosacral radiculopathy	Suppositories
Squamous Cell Carcinoma	Psychological disorders	Talcum powder
		Tight clothing
		Toilet paper dyes and perfume
		Hemorrhoidal remedies

Adapted from Fargo, et al. [14]

Table 2. ITCH acronym for initial evaluation of causes of pruritis ani

Acronym	Examples
I-infection	*Candida albicans*, herpes, Condyloma accuminata, HIV, syphilis, gonorrhea, pinworm, other bacteria (erythrasma caused by *Corynebacterium minutissimum*)
T-topical irritants	Detergents, tight occlusive clothing, nylon undergarments, dyes and scents in toilet tissue
C-cutaneous	Lichen planus, psoriasis, contact dermatitis, seborrhea, lichen sclerosis, lichen simplex chronicus
C-cancer	Paget's, skin cancers, Mycosis fungoides
H-hypersensitivity	Foods ("C's"-coffee, cola, citrus, chocolate, and calcium), medications (colchicine, quinidine, chemotherapy)

Pruritis Ani

At the other end of the alimentary canal is a less common but just as vexing issue. Pruritis ani (PA) is an intense, irresistible, chronic itching of the perianal region. PA was first mentioned in an ancient Egyptian papyrus in which 10 of the 41 remedies listed were to manage anal itching. It is estimated to affect 1-5% of the population, is four times more common in men, and presents most commonly in the fourth to sixth decade of life.[13] Most cases have associated pathology, but up to 25% can be idiopathic. Over 100 causes have been reported, and can be dermatologic, hygienic, infectious (including sexually transmitted infections), due to topical or dietary irritants, due to systemic disease including malignancies, or psychological[13,14] (See Table 2). It is beyond the scope of this paper to discuss all causes—instead this paper will focus on the cases often felt to be idiopathic.

Two of the most common causes of PA are related to hygiene—too little or too much. Fecal soiling, whether overt or occult, can lead to local irritation and maceration with resultant itching. Local conditions, such as anal fistulae or hemorrhoids can result in fecal leakage and skin irritation. This is usually detectable on examination and appropriate treatment instituted—resolution of conditions leading to the incontinence if possible, and barrier creams to protect the skin.[13]

Conversely, excessive hygiene can lead to PA. Often this begins with a sign or symptom such as minor itching or stained undergarments the patient relates to inadequate cleansing after bowel movements. As a result, vigorous hygiene with soap is often used to resolve the condition, but the over-zealous hygiene removes the protective mucous layer around the anus. As a result the itching intensifies and more cleansing is used in attempts to resolve it. If the history obtained is suggestive of over-zealous hygiene, resolution of the symptoms usually is rapid with advice to discontinue the cleansing practices—particularly the use of soaps—and application of petrolatum for a few days to allow the condition to resolve.[14]

If there is no explanation for the itching with the above conditions, then further history and examination

must be done. Henderson, et al. suggest helpful mnemonics: the "Cs" and ITCH. [15]

Food intolerances can cause PA. The most common foods reported are the "Cs": cola, coffee, chocolate, citrus, and calcium (dairy products). There may be a direct correlation to the symptoms and amount of coffee consumed in sensitive individuals.[16] Elimination diets are effective in these patients, with recurrent symptoms on re-challenge.

The ITCH acronym suggests looking for infections, topical irritants, cutaneous conditions/cancer, and hypersensitivity (See Table 1).

A number of systemic diseases have been linked to PA, including diabetes mellitus, uremia, thyroid disease, inflammatory bowel disease, jaundice, leukemia, and lymphoma.[14]

Evaluation of a patient with symptoms of PA should include a history to discover potential reversible secondary causes, symptoms of systemic illness, or exposure to irritants, food exposures, or exposures to infections. Examination should include inspection of the perianal region looking for local factors (e.g., hemorrhoids, fistulae, papilloma, condyloma, signs of infection), the presence of lichenification, implying chronicity, and skin changes suggesting an underlying dermatological or pre-malignant condition. A rectal examination is indicated for detection of internal hemorrhoids or masses. An anoscopy should be done if the diagnosis is not apparent from the external examination.[15]

Treatment is aimed at elimination of irritants and scratching. Adequate hygiene is imperative, however patients should be admonished to avoid aggressive perianal cleansing that can aggravate the condition and to avoid medicated or scented wipes or soaps after defecation. Instead they should use plain tissue or wipes to cleanse the perianal region. It should be emphasized that keeping the perianal region dry is important. Patient education regarding "pat" drying the perianal region or using a blow dryer on the cool setting may be beneficial.[15]

Addressing reversible causes such as hemorrhoids or fistulae or treating infectious causes is necessary, as is elimination of irritants and foods which may be causing the issue. In addition to patient education and treatment of secondary causes, medication may be needed. The itching of PA can be profound, and antihistamines may be helpful in diminishing the pruritis, particularly when used at night. Tricyclic antidepressants such as doxepin can also be helpful for night time itching. Witch hazel has been used as a topical anti-pruritic. Barrier creams can be helpful, such as zinc oxide or petrolatum. Low potency topical steroids, such as hydrocortisone 2.5% can be used for short periods to help with inflammation and itching, but must be used with caution due to the risk of epidermal thinning.[15]

Though somewhat counterintuitive, capsaicin cream 0.006% can be effective. The short intense burning produces an inhibitory feedback.[13] In one randomized study, both 1% hydrocortisone and capsaicin 0.006% worked better than placebo.[17]

For the intractable cases, anal tattooing with methylene blue has been used.

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Disclosure

None reported. **MM**

Primary Care Physician Supply for Missouri

by Todd Shaffer, MD

We must have community support for the recruitment and retention of primary care doctors. Creating opportunities where primary care doctors excel in settings like patient-centered medical homes with teams of providers ready for the needs of society.



Todd Shaffer, MD, MBA, FAAFP, Professor and Program Director Family Medicine Residency, University of Missouri - Kansas City, Department of Community and Family Medicine and Truman Medical Center-Lakewood.
Contact: shaffert@umkc.edu

Abstract

Primary Care Supply is not at a level to support needs for the U.S. public now or in the future. Missouri is deteriorating to an extreme shortage of primary care clinicians. With a present supply that is stagnant and not meeting patient needs, new opportunities to select and educate the next generation of physicians will be necessary to meet the predicted health care needs for our citizens. Examining the pipeline, process of medical education, practice transformation, and payment reform are important for the future.[1] We should encourage our training institutions to provide resources for increasing the types of physicians we need for the next generation. Local and national leadership will need to heed the advice of forecasts and provide new methods and solutions for the needs of society. Academic institutions should be held to achieving a true output of physicians for the needs of society.

Knowns and Importance: Primary Care Physician Supply

Missouri physician workforce is now lacking adequate primary care physicians and is declining toward a larger shortage for the next 20 years.[2] By 2035, the United States is going to need an additional 44,000 primary care physicians. Missouri will need an additional 687 primary care physicians (18% increase of current workforce) by 2030 to maintain the status quo. The status quo is that Missouri is presently 363 primary care physicians short of overcoming the current Health Professional Shortage Areas.[3] By the year 2035, the current supply of our training programs, we will be short by 33,000 primary care physicians and would require an additional 1,700 primary care slots per year to meet this need.[4]

Definition of Primary Care

First Contact, Continuous, Comprehensive and Coordinated to populations undifferentiated by sex, disease or organ systems.[5] Health care systems that have more primary care, have better quality, better population health, greater health equity at lower costs.[6]

Family Medicine best meets the definition of primary care. The recently approved Entrustable Professional Activities (EPAs) for Family Medicine by the eight family medicine national organizations include the diversity of care across the spectrum for FM. These EPAs clearly defined the broad spectrum skills of first contact medical care that graduates of family medicine programs achieve.[7] (See Figure 1.)

Family physicians are in virtually every type of community, whether that is rural, urban, suburban, or underserved.

Figure 1

EPAs for Family Medicine End of Residency Training

Entrustable Professional Activities

1. Provide a usual source of comprehensive, longitudinal medical care for people of all ages.
2. Care for patients and families in multiple settings.
3. Provide first-contact access to care for health issues and medical problems.
4. Provide preventive care that improves wellness, modifies risk factors for illness and injury, and detects illness in early, treatable stages.
5. Provide care that speeds recovery from illness and improves function.
6. Evaluate and manage undifferentiated symptoms and complex conditions.
7. Diagnose and manage chronic medical conditions and multiple co-morbidities.
8. Diagnose and manage mental health conditions.
9. Diagnose and manage acute illness and injury.
10. Perform common procedures in the outpatient or inpatient setting.
11. Manage prenatal, labor, delivery and post-partum care.
12. Manage end-of-life and palliative care.
13. Manage inpatient care, discharge planning, transitions of care.
14. Manage care for patients with medical emergencies.
15. Develop trusting relationships and sustained partnerships with patients, families and communities.
16. Use data to optimize the care of individuals, families and populations.
17. In the context of culture and health beliefs of patients and families, use the best science to set mutual health goals and provide services most likely to benefit health.
18. Advocate for patients, families and communities to optimize health care equity and minimize health outcome disparities.
19. Provide leadership within interprofessional health care teams.
20. Coordinate care and evaluate specialty consultation as the condition of the patient requires.

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4. The clinical epidemiology definition of the three levels of prevention
5. The role definition of the family physician FFM 2.0

How Did We Get Here?

Currently practicing primary care physicians make up only a quarter of the physicians in the U.S. and this number has been on a decline for the past 30 years.[8]

Why Has This Happened?

Like so many complex systems, we have arrived at where we are because of market forces that are shaping physician output. From the 1990s, DRGs were introduced that decreased value of the outpatient visits and led to favoring procedural billing codes. The RUC (Relative Value Scale Update Committee) was introduced to pay physicians on RVUs and as the RUC was dominated by specialist physicians, procedures continued to be higher valued over outpatient and cognitive care visits as new procedures continued to take value from outpatient billing codes.[9]

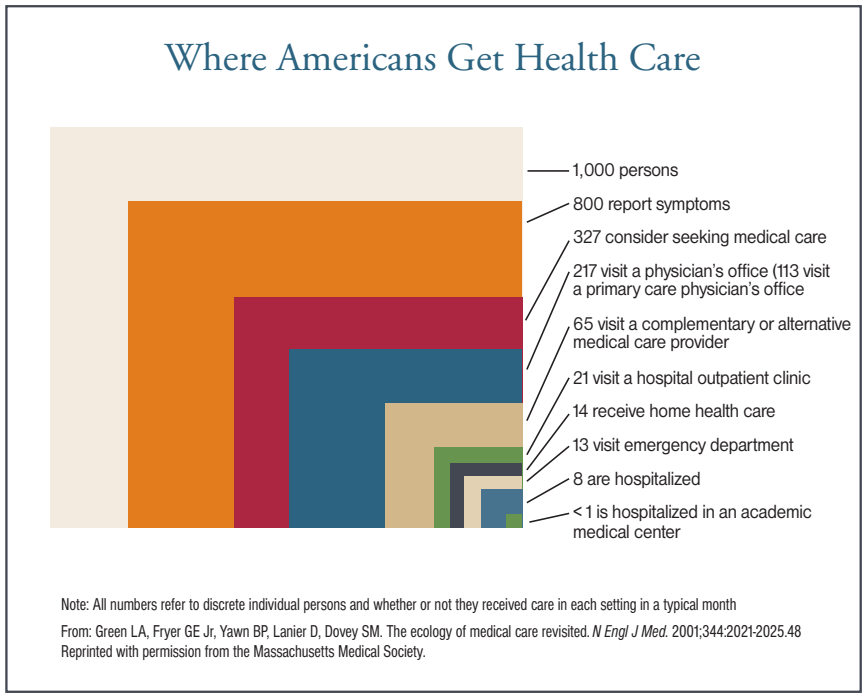
Over time, primary care salaries have declined with inflation and specialty salaries have significantly outpaced inflation, and over time the spread of these salaries among physicians. Primary care as an option for many medical students is seen as a less than viable option for their impending medical school debt.[10] Although the majority of patient visits are in outpatient clinics, the majority of medical education is in large academic tertiary care centers where only 1/1,000 people per population visit in a year versus 113/1,000 visit a primary care clinician.[11] Medical reports have concluded we should work toward a balanced workforce of near 50% primary care in the U.S. The more recent COGME (Council on Graduate Medical Education report to HRSA in 2013 recommended GME slots be adjusted to meet the workforce of more than 40% primary care.[12] (See Figure 2.)

The U.S. population has been growing, and our population has an impending large group of baby boomers in the retirement age that are increasing their needs for primary care medicine access. The number of PCP supply has not kept up and has actually fallen behind. Family Medicine supply has been stagnant; general internal medicine supply, general pediatric supply and general surgery have also continued to decrease during this time period. During this time, the number of general internal medicine graduates entering primary care has declined to 10%, only half of pediatricians enter primary care pediatrics on graduation from residency, and only about 10% of surgery residents enter general surgery upon graduation.[13] Only Family Medicine has continued to have almost all of their graduates providing primary care.

Many medical schools declare that their graduating classes have nearly half of their graduates that are going to be primary care doctors. This is sometimes referred to as the "Deans Lie." What really is demonstrated is many of those graduates in internal medicine and pediatrics proceed into subspecialties after their primary certification residency. These doctors are not going to be providing primary care. It has been proposed that the true measure of primary care output of a medical school, should be measured five years out from medical school graduation to count those actually doing primary care and this would give a more accurate presentation at what percentage are actually providing primary care for

Figure 2

AMERICAN ACADEMY OF FAMILY PHYSICIANS
STRONG MEDICINE FOR AMERICA



their career.[14] It may very well be that family medicine is the true indicator on how well a medical school does in preparing doctors for the future needs of the country and meeting the needs for a diverse population and decreasing health disparities.

Of all types of physicians and advanced practitioners, only Family Medicine tends to locate where the population is. They tend to locate in rural areas per capita more than any other type of medical providers (physicians, nurse practitioners, or physician assistants).[15]

Why Is This Important?

High performing health care systems in the world have one commonality. These countries have a rather larger proportion of primary care physicians compared to specialty care. Almost all of these high performing health systems have a proportion of 50% or greater of the physicians in primary care.[16] From that data, an increase in the PCP supply for society meets the Triple AIM of lower costs, better quality, and better outcomes.[17]

There are also Economics: for every one family physician entering a community, there is 1.4 million dollars added to the annual local economy.[18] There continues to be a shortage of primary care physicians in rural areas. Family Medicine is the second largest specialty and family doctors have been the number one recruited specialty nationally for nine years running and the number of available positions is almost double that of the next most recruited specialty, general internal medicine.[19]

Where is Missouri?

Missouri is one state that has a sizable rural population and struggles to maintain an adequate supply of medical providers. Pending demographic shifts also increase the concern for further shortages. Health care in Missouri plays a significant role in the economy. Nearly 10% of Missouri's workforce is employed in the health care sector. Missouri ranks eleventh in the nation (8.7%) for number employed in health care. Missouri is a national leader in medical school graduates (twelfth with 517 annual allopathic graduates and 330 osteopathic graduates.)[20] With 2.7% of the medical school graduates in the U.S. yet only 1.9% of the population. There are six medical schools in the state supplying these graduates. Missouri has the third highest per capita medical student graduates, yet the eighth lowest for all types of residency slots.[2] Recent data has ranked Missouri near the bottom four states in the country for the past decade in retaining graduates entering family medicine. Missouri is the number two state for exporters of medical graduates. Missouri has fewer physicians (all specialties and primary care physicians) per 100,000 population than the U.S. as a whole. The state also has less physician assistants and dentists.[2] Missouri will need an additional 1,000 primary care physicians by 2025. That would be an additional 100 graduates every year from our programs all staying in Missouri. Currently Missouri is only producing 75 per year in our Family Medicine programs and with the pediatricians and general internists practicing primary care, that number

is estimated at 150 graduates actually initially providing primary care, assuming they all stay in Missouri to practice. Missouri would have to double the output to meet this need in the next few years and every year through 2025. There are no known current plans to significantly increase the primary supply at any of the teaching centers in the state.

Missouri also has significant Health Professional Shortage Areas (HPSAs) which may be urban or rural. HPSAs are defined as having fewer than 3,500:1 population to practitioner. Almost 19% of Missourians live in a primary care HPSA compared to 12% nationally. Missouri has 200 primary care HPSAs (sixth most in U.S.) and is now short 363 primary care physicians (seventh most need in the U.S.) and is meeting only 39% of its need ranking it fifty-first in the U.S. for meeting its primary care needs. The types of physicians needed in rural Missouri the most are: primary care doctors, general surgeons, and psychiatrists.[2]

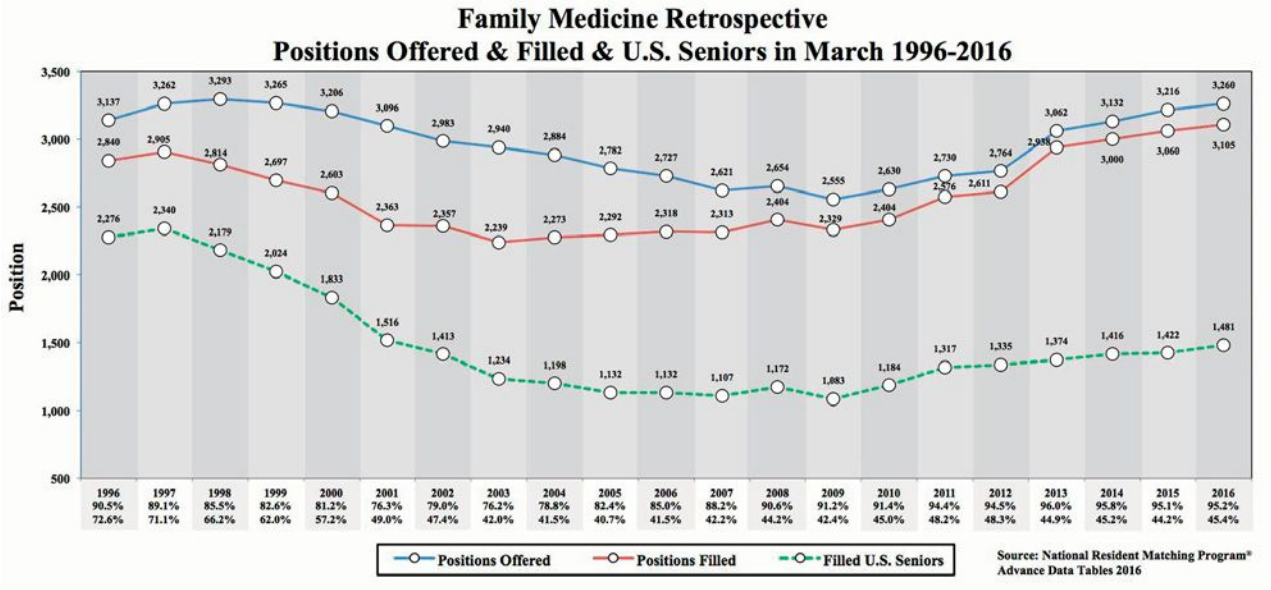
Over 60% of Family Medicine residency graduates stay within 100 miles of where they are trained.[21] However, Missouri is the number two exporter of medical school graduates in the country. Missouri has one of the lowest retention of our medical school graduates remaining in the state to complete their training in Family Medicine according to the AAFP. There are limited primary care residency training slots to increase this number for the state's needs. There has been no increase in the training funding from Medicare since 1997 in the form of Medicare training slots. As medical student graduates leave to complete their training in other states, they most likely will not be coming back to Missouri to practice medicine.

What Needs to Happen?

There has been a 10% increase of U.S. medical student graduates over the past 10 years. However, the PCP supply has stayed stable and the number of U.S. graduates entering primary care as a percentage has actually fallen compared to other specialties and is now around 8% of allopathic graduates.[22] There is not a need for increased medical students, or schools, in Missouri as shown in the data above-there needs to be an increase in the number entering primary care and staying in Missouri upon graduation. Medical schools and training programs should be held accountable for their graduates entering practice for the needs of society. (See Figure 3[23].)

There is really not a need for an increased number of Medicare cap slots-we need a redistribution of the slots to a primary focus. Despite incorrect assumptions about the match and number of Medicare cap slots in the U.S. being stable since 1997, there are over 6,000 foreign medical graduates entering our training programs every year.[22] Most specialties have seen an increase in numbers of residents being trained despite no increase in the cap. Academic centers have continued to grow despite no increase in cap, and most large academic centers are double and triple digits of the number of residents over the Medicare cap. Many

Figure 3



institutions increase specialty slots based on the needs of the hospital, not on the needs of the surrounding community or the country as a whole. In reality, there is an adequate supply of residency slots for graduates of U.S. allopathic and osteopathic schools, just not the right mix of what those slots are for the current or future needs of the population.

"Emphasis on coordinated and ongoing care leads to better health outcomes, and saving money. Cost savings is not the only benefit. Having a regular access to a particular physician is associated with earlier and more accurate access, fewer ER visits, fewer hospitalizations, lower costs, and better care," said Dick Durbin, Senator Illinois. Dis-coordinated care leads to the opposite of what Senator Durbin stated.[16] Having an ongoing relationship with a regular family physician is associated with lower costs, fewer hospitalizations, better outcomes and better patient satisfaction.[24]

"Expert Research has found nations where the primary care physician supply is 50% or greater than of physician workforce, there are better outcomes and lower costs," attributed to Jeff Harris, MD, ACP President.[25]

Our Current Physician Supply

The state of Kansas will be used as a comparison. Kansas has one medical school with three campuses. Kansas graduates about 170 medical students per year and there are four Family Medicine residency programs in Kansas with approximately 42 graduates per year. At 19%, Kansas University ranks as the second highest allopathic medical school in the country for percentage of graduates entering family medicine (32 entered family medicine in 2015).[26]

Missouri has six medical schools. In 2015, 850 medical students graduated. Only 103 (12%) entered Family Medicine. Forty-five of those 103 were from one of the six medical schools, Kansas City University (osteopathic school). Only 34 of those graduates of the 103 total entered Family Medicine training programs in the state. There are six allopathic and three osteopathic family medicine training programs in the state. The allopathic have the most consistent amount of graduates producing about 61 graduates per year and the osteopathic programs graduate about 14 per year total. There has been the closure of three family medicine training programs in the last 15 years in Missouri and the opening of a new one in 2012 with a net loss of 10 graduates per year in those past 15 years. With a population more than double that of Kansas (2.9 million), Missouri (six million residents) is only producing 75 graduates per year versus Kansas at 42. Missouri produces 1/80,000 residents-per year and Kansas produces 1/69,000 residents per year. At that rate Missouri will be looking at more of a gap in primary care physicians in the future. Although there is no statewide data source on an exact clear picture of the primary care workforce, the University of Missouri, and more recently the State of Missouri, is progressing toward state workforce numbers to show this need. Present data is derived from the Graham center and population based statistics for the federal registries.[27]

Only 12% of Missouri medical school graduates entered Family Medicine and only 4% of the total graduates stayed in Missouri to complete their training in Missouri Family Medicine programs. Missouri has been in the bottom five states in the country for retaining primary care graduates from its medical schools for the past decade. It is an established fact that the majority of residency graduates stay within a 100-mile radius of where they did their training.[21] Therefore, it is very important to look at increasing the number of primary care training slots in Missouri to allow graduates to complete their training and progress into practice within our state borders.

Options for Solutions

New incentives and policies for distributing primary care physicians to areas of greatest need, as well as a larger absolute number of primary care physicians that will be needed. Since many medical students graduate with an average education debt of $250,000, students often make their specialty choice on financial reasons and paying back these loans is one of those acute financial factors. One effective way to encourage students to enter primary care is to have loan repayment programs for primary care physicians with payback being time practicing in those states underserved areas. Both Missouri and Kansas have such plans.

Kansas loan repayment programs actually outnumber those available in Missouri quite significantly. As many as 20 graduating residents per year enter practice in underserved areas of Kansas with loan repayment programs provided through various state agencies. There are many opportunities to receive this funding through the Kansas Medical Student Loan (KMSL) and

Kansas State plans, and they continue to be funded at this time. The Kansas Department of Rural Health Education also administers the Kansas Bridging Plan. Since its inception, the program has had 313 physician participants and 84% are currently practicing in Kansas.

Keeping Talent in Missouri

On the other hand, the Missouri loan repayment programs is not as abundant as the Kansas Program. PRIMO (Primary Care Resource Initiative for Missouri) is the only statewide program that pays back student loans for service to Missouri needed populations. The Missouri governor has removed most of its funding every year since 2010. It has only been able to support 1-2 primary care residents per year since 2010. The PRIMO program began in 1995 and has numerous success stories of primary care physicians remaining in Missouri after loan payback. The author of this article is one such recipient's of the PRIMO program and continues to practice and train primary care physicians for Missouri.

National Solutions

There is a consideration to rebalance the GME dollars to influence the country's population needs for medical physicians. More dollars directed at primary care will lead to desired increase, improving outcomes, improving student interest in primary care and balancing the widening pay gap between PCPs and specialties. A recent study in Academic Medicine drew a sharp conclusion of the lack of accountability among publicly funded graduate medical education (GME) institutions. GME institutions receive about $13 billion in public funds annually through Medicare and Medicaid yet they produce PCPs at an abysmal rate. Currently, there is no accountability for GME-funded academic institutions to produce the type of doctors needed for efficient, high quality health care delivery for society needs. Institutions should be held accountable for the public dollars that are entrusted to them to meet needs of society.

There is a consideration for GME reform where the system for payment of education for resident physicians that will allow dollars go to initial certification residencies only, and not to secondary certificate programs (fellowships). With the saved money, there could be an increase in the number of physicians that are training in primary certificate training programs. Many of the secondary certificates are finding alternative payment models currently, as mentioned above, and are increasing the number of specialty trained residents above the 1997 cap. We should also look beyond the historic training sites in large urban centers and train more residents in the community where most patient visits and practices are located.

Improving the Image of Primary Care as a Career Path

This summer the "Health is Primary" national marketing campaign to Kansas City. This is a five-year, $20-million-dollar campaign funded by the national organizations of family medicine. The five-year campaign began in 2015 and is doing "City Tours" across the U.S. Kansas and Missouri will be featured with the Kansas City tour during July and August of 2016 in conjunction with the annual National Conference of Family Medicine Resident and Student Conference at Bartle Hall in Kansas City, Mo. The conference, held July 28-30, 2016, in Kansas City, had record-breaking attendance with almost 4,500 students, residents, and educators at the meeting, which is reported as the largest national gathering of residents and students in the country. Family Medicine already has a great image when asking patients, health care agencies and employers and this message is being marketed to increase the perceived nature of Family Medicine across the country.[28]

Patient-Centered Medical Homes and Team-Based Care

Patient-Center Medical Homes (PCMH) with physician leaders have been affiliated with meeting the Triple AIM. Physicians leading teams of other providers leads to timely care and better outcomes. Although some might believe that advanced NPs and PAs can provide primary care unsupervised, this is not how they are trained. Family Medicine physicians receive over 22,000 hours of supervised training before they enter practice while APRNs receive about 4,000-6,000 hours and PAs even less.[29] Advanced providers are trained to augment physicians and delivery of care but not to lead the care independently. Only physicians, at the completion of residency training, receive written approval to practice independently per their final program letter as required by the ACGME. APRNs and PAs receive no such declaration at graduation. APRNs and PAs are vital team members in PCMHs as they provide for more care providers in the team based system.

The UMKC Family Medicine residency program has done several things to help improve the short supply. First of all, it is currently the fourth largest Family Medicine program in the country. Doximity ranked the UMKC Family Medicine program as one of the top in the Midwest. As of 2016, it has graduated 375 Family Medicine graduates with another 93 graduates in the primary care fellowships of sports medicine, geriatrics, and surgical obstetrics. The UMKC program has taken great pride in training full spectrum family physicians with concentration in geriatrics and advanced training in maternity care for the needs of our communities. With these 468 UMKC graduates, 48% of them serve in rural America. One hundred and seventy-eight residency graduates practice across Missouri and 69 practice in Kansas. There are 160 practicing in the Kansas City Metropolitan area. UMKC was awarded a 3.8 million dollar grant from HRSA in 2011 (1.9 Million each in Family Medicine and general internal medicine) through the federal health care law that increased the size of the UMKC general internal medicine and Family Medicine programs each by two per year. The UMKC Family Medicine program was a rural designated program with three quality indicators to gauge its success. HRSA required that all the positions were in primary care and that the graduates would go into primary care. The local indicators of success were that the residents graduating would do rural Family Medicine and a third level was that they practice in Missouri. Of the six graduates from the UMKC Family Medicine rural program, all of them are practicing rural medicine and five out of six are practicing in rural Missouri. Of the last four residents yet to graduate, they all have intentions of practicing in Missouri and believe they are committing to rural practice. This is great success to a program costing $1.9 million federal dollars supporting 10 graduates of which all are doing rural medicine and nine out of ten remaining in Missouri. Economic outcomes would tell us Family Medicine doctors in rural communities stimulate about $1.4 million to their local economies per year.[18] This will be $13 million to the Missouri state economy per year and additions to local rural communities. Over a typical 37-year career, that is $481 million added to the rural economy of Missouri. This shows a great return on investment for years to come. Unfortunately, this federal grant is expiring and Truman Medical Centers is unable to support the continuation of these spots secondary to financial reasons since the core institution is well over the Medicare cap. Therefore, UMKC and Missouri will have a net of decreasing primary care output by four PCPs per year in 2018. This is not the direction our state needs to be going.

The UMKC Family Medicine program continues to matriculate many Kansas students that have Kansas Medical Student Loan (KMSL) and Kansas Bridging Plan (KBL) scholarships. UMKC FMRP has consistently one to two in every residency class that will return to practice in Kansas rural communities and will be leaving to fulfill their obligations to Kansas further widening the gap of primary care physician output between Kansas and Missouri.

Conclusions and Relevance

There needs to be some action on several levels. First, there must be more support for matriculating students in our medical schools that have a high predilection to go into primary care. Diversity, rural background, and women are all known factors in the success of this.[26] We must have community support for the recruitment and retention of primary care doctors. Creating clinics and opportunities where primary care doctors excel in settings like patient centered medical homes with teams of providers ready for the needs of society. Residency programs and hospitals must expand to meet the need of the primary physician supply beyond the large academic centers needs, whether that is locally or garnering state and national support to expand these training programs like the PRIMO and HRSA grants have. There must be support at each state level to support loan repayment and opportunities to match primary care students and residents to locations where they are needed. There must be a coordinated effort to improve the viability of primary care practice and payment reform to balance the widening gap of primary care/specialty pay. There also needs to be national level GME reform to pay for what our country and society needs, not the needs of the established medical urban teaching centers and to create accountability for the types of physicians they graduate. Real payment reform could be initiated to influence the changes we need in the future for our physician supply.

Author's Note

Locally, people know I wear a button on my white coat that reads, Who's your doctor?" Many primary care physicians are not accepting new patients now because of being over paneled. There are a few out there, but as you

see from the article there is an even shorter supply in the near future. So, I would ask you as the reader, "Who's your doctor?" You better get one, as there aren't many left. If you want coordinated and affordable care that will provide you with a longer and productive life, then you better get a family physician before they all have closed panels.

I once had a student on an interview for our residency program and he was asked by our hospital COO why he wanted to go into Family Medicine and he said: "When you ask a patient who their doctor is, they don't tell you their cardiologist, or surgeon or dermatologist, they say my doctor is my Family Physician," and that student wanted to be that person. I want to be that person, too. We just need more of us.

Acknowledgments

The data derived for the primary care training programs was manually researched with calls to residency programs and web sites with publicly available information and has been accumulated by the author over the years of educating primary care clinicians for our state. Also, special thanks to the Missouri Academy of Family Physicians for advocacy efforts and data acquisition to further the primary care health needs of the state of Missouri.

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Disclsoure

None reported.

MM

What is a Patient-Centered Medical Home?

by Michael L. O'Dell, MD

A well-managed and supported patient centered medical home can improve quality of care, lower costs of care, and provide primary care physicians with joy in their practices.



Michael L. O'Dell, MD, MSHA, MD, FAAFP, MSMA member since 2010, is Associate Chief Medical Officer at Truman Medical Center and Professor and Chair of the Department of Community and Family Medicine at the University of Missouri - Kansas City.
Contact: odellm@umkc.edu

Abstract

The concept of Patient-Centered Medical Home (PCMH) originated with the specialty of pediatrics to provide care to children with complex illness. Similar concepts were uncovered when researchers looked at high quality yet low cost health systems. PCMH concepts have been adopted by primary care professional organizations and are being supported by multiple other organizations. The implementation of PCMH practices by individual physician groups is accelerating with new payment models and other key drivers.

What is a Patient-Centered Medical Home?

Patient-Centered Medical Home (PCMH) is an oft-mentioned but poorly understood as a concept.[1] The concept also has some aliases; the Affordable Care Act mentions Medical Homes numerous times; others refer to Advanced Primary Care Practices. While definitions may vary, the past two decades have brought much interest in PCMH concepts. As evidence of this interest, using PubMed elicited 17,430 articles on Patient-Centered Medical Home, most published since 1994.[2] Three days later, the same search elicited an additional 31 new articles. In this paper, we will discuss the origins of and driving forces behind the PCMH concept, what practices look like in a PCMH model, and what physicians engaged in PCMH work can expect.

Origins of the PCMH Concept

PCMH roots are traced Medical Home for children with special health care needs (CSHCN). As initially envisioned, the Pediatric Medical Home would be the source of patient information for CSHCN, representing an early attempt at coordinating care for these children who often saw multiple and disconnected physicians and providers.[3,4] The American Academy of Pediatrics (AAP) may have been the first to use the term Medical Home when it published its 1967 version of the Standards of Child Health Care. The AAP soon recognized that fragmented care was a problem affecting not just the CSHCN, but nearly all children. In 1977, the AAP began advocating that Medical Home implementation could benefit all children. Although there were earlier attempts, notably in North Carolina, the first state-wide child health plan recognition occurred in Hawaii, under the leadership of Calvin Sia, MD. Dr. Sia's ongoing championing of the medical home concept has led many to view him as the father of the medical home. These early efforts with pediatric medical homes demonstrated the medical home feasibility and benefits of coordinated care.

Early Research Supporting Primary Care PCMH

Researchers studying health outcomes note that, for populations in highly-developed countries, more generalist physicians means lower cost and better outcomes for the population. The World Health Organization definition of primary care, based on the 1978 Declaration at Alma-Ata, has been used to define primary care.[5] That definition is the provision of: first-contact access for each new need; long-term person- focused care (not disease focused); comprehensive care for most health needs; and coordination of care when care must be sought elsewhere. Barbara Starfield's work, in particular, revealed that where there is a higher supply of primary care physicians, there is an association with lower costs, more equity in care, and higher quality of care.[6, 7]

The mere presence of more primary care physicians does not explain the improved outcomes associated with more primary care physicians. Some systems with substantial numbers of primary care physicians achieve better results than others. Research work began to explore what processes underlie these higher performing systems. Using the findings of Starfield and others, health care policy organizations, notably the Robert Wood Johnson Foundation and the Commonwealth Fund, commissioned studies that have further explored the value of primary care in providing high-quality, low-cost health-care. Not surprisingly, systematic delivery of primary care is associated with improved health outcomes, reduced costs and improved quality of health care. The desired outcomes occur when primary care physicians are working in systems that support first-contact care, long-term personal continuity of care, and coordinated care in a comprehensive manner. Such systems have collectively come to be associated with PCMH practices.

What Defines A PCMH?

The American College of Physicians, American Academy of Family Physicians, American Osteopathic Association, and the American Academy of Pediatrics adopted Joint Principles of the Patient-Centered Medical Home in 2007. In their statement, these organizations held that a recognized PCMH should demonstrate processes and outcome performance in the following general areas as quoted in the following:

1. Personal physician-each patient has an ongoing relationship with a personal physician trained to provide first contact, continuous and comprehensive care.
2. Physician directed medical practice – the personal physician leads a team of individuals at the practice level who collectively take responsibility for the ongoing care of patients.
3. Whole person orientation – the personal physician is responsible for providing for all the patient's health care needs or taking responsibility for appropriately arranging care with other qualified professionals.
4. Care is coordinated and/or integrated across all elements of the complex health care system (e.g., subspecialty care, hospitals, home health agencies, nursing homes) and the patient's community (e.g., family, public and private community-based services).
5. Quality and safety are hallmarks of the medical home.
6. Enhanced access to care is available through systems such as open scheduling, expanded hours and new options for communication between patients, their personal physician, and practice staff.
7. Payment appropriately recognizes the added value provided to patients who have a patient-centered medical home.

The Agency for Healthcare Quality and Research (AHRQ), which often functions as a testing arm of Centers for Medicare and Medicaid Services (CMS) has adopted a slightly different definition, one which is more amenable to non-physician practitioners. In the AHRQ definition, the requirement for a personal physician and the practice to be physician directed are missing. Also absent in the AHRQ statement is any explicit commitment to payment reform. Nonetheless, the CMS movement to value-based purchasing relies on many of the processes found in the PCMH. Of note is that Health and Human Services has found that the use of Advanced Primary Care Practices seems to be a more palatable and understandable term than medical home. The stated reason is that many patients associated medical home with facilities, such as a nursing home. One has to suspect that non-physician providers found dropping the term medical desirable. There is little available evidence that a system of care led by non-physician providers will perform at comparable levels with prior studies of physician-led PCMHs. The Agency appears to be bowing to political pressure in dropping physician leadership as a qualifying standard. The National Committee for Quality Assurance (NCQA) has adopted a set of standards for practices leading to recognition as a PCMH. The NCQA recognition is arguably the most widely accepted evidence of performance as a medical home. Joint Commission and other accrediting agencies offer standards programs to recognize PCMH practices as well.

Who Benefits From A PCMH?

For payers and patients, the PCMH offers improved value through lower cost and higher quality of care. Health systems that rely on inpatient beds being filled for revenue have difficulty adapting to PCMH, which lowers such costs. For patients, the PCMH provides lower cost, higher quality of care, improved access, and coordination of care. But what about physicians?

Physician Benefits in a PCMH

A startling number of physicians, but in particular family medicine and general internal medicine physicians, report significant distress, dissatisfaction with work-life balance, and burn-out, much higher than what is present the general population.[8, 9] This level of distress urgently calls for system change and restoration of health to our physician workforce. Figure 1 is a typical day drawn from the authors' experience of PCMH versus usual practice. It is little wonder that the typical fee-for-service practice can lead to burnout! The system changes associated with full implementation of PCMH concepts do much to restore and rejuvenate physicians and staff.[10, 11] In a study of 23 high performing practices, Sinsky describes this as joy in practice.[12] Changes in practice processes associated led these 23 practices to have physicians who reported not only satisfaction, but actual joy in practice. Physicians that intended to leave were retained, and physician satisfaction in practice has markedly improved.

A primary care physician leading a PCMH accepts not only the care of the patient seen in the office, but also reaches out to her community of patients or patient panel. This process of empanelment is an important building block in attaining continuity and providing PCMH services. The number of patients in a physician's panel varies according to factors such as age, presence of chronic illnesses, and other acuity factors. Unfortunately, there is not a widely accepted or tested means of risk adjustment for outpatient acuity, thus determining appropriate panel sizes for physicians remains more art than science. Many electronic medical records (EMR) remain frustratingly unsophisticated in providing registries of patients that would benefit from enhanced chronic care and preventive measures. Many practices establish care – manager positions to contact patients regarding needed preventive services and follow-up care for chronic illness. Population management is generally a new skill to be acquired by physicians. Residency programs are increasingly training that provides skill in population management.

A hallmark of successful PCMH practice is team-based care. Each member of the practice strives to work at the top of their license a way of saying that tasks should be performed by those whose skill and regulations permit. Thus, the physicians time should be generally spent on diagnosis and prescription of treatment. Tasks, such as initial history taking, that do not require physician level of training and licensure are completed by others. Where possible protocols that enable others to act are developed. For instance, under a physician-directed protocol, and LPN or MA can initiate immunizations, ordering of labs, etc. Effective delegation and standardized protocols allow physicians to engage in tasks only the physician can perform and provides new time to engage in effective patient care and related activities. Surprisingly, delegation to skilled non-physicians is often resisted by physicians. This lack of skill in delegation may be due to misunderstanding the skill of others on the team and training that emphasizes individual skill and accountability rather than teamwork. Medical school and residency programs are addressing leadership and delegation skills through enhancing interdisciplinary training and, in primary care programs, explicitly training residents in skills necessary for effective PCMH practice.

Figure 1
Comparison of Physician Activities in Usual Practice vs. PCMH

	Usual Practice	PCMH Practice
7:00 am	Review tests and returned consults, Instructions to nurse regarding yesterday's phone calls, fill out and sign forms, answer e-mails. Send prescription refills requested.	Huddle with team: review registry/charts for patients to be seen, order chronic care and preventive care needs, discuss which phone and portal messages staff needs assistance with. Deal with the few overnight refill requests outside of those nurse can handle through protocols.
8:00 am -12:00 pm	See patients (generally every 15-20 minutes). 3-5 minutes actually spent with each average patient, rest of time looking up results, adding orders, placing consults, etc. *(Patient satisfaction scores reflect lack of time spent with patient and unanswered, unaddressed patient issues. Quality scores poor due to unaddressed chronic care and preventive care.)*	See patients (generally every 15-30 minutes). Point of care tests done by staff prior to entering room, Initial history performed and in record, Preventive care orders ready or completed prior to entering room. 5+ minutes spent with patient. *(Higher patient satisfaction scores, improved quality performance on chronic care and preventive care.)*
12:00 - 1:00 pm	Usually still seeing patients due to unanticipated patient needs and point-of-care testing ordered after seeing patient. Missed lunch. Clinic manager wants to meet about patients grievances about not having refills approved yet.	Generally finished with patients, some charting and portal messages/e-mails to finish. Review new labs not previously seen Deal with refills outside of nursing protocol. Have lunch
1:00 - 5:00 pm	(See 8:00 – 12:00 above) You are wishing you had eaten lunch)	(See 8:00 – 12:00 above)
5:00 - 6:00 pm	Still finishing patients until 6:00. Fending off Office manager fussing about staff overtime, and telling you yet another staff member has left for a similar position but at a less chaotic (PCMH) practice. Still have day's phone calls and e-mails to answer. Charting not finished	Generally finished with patients, some charting and portal messages/e-mails to finish. Review new labs not previously seen. Deal with refills outside of nursing protocol. Leave for home
6:00 - 7:00 pm	Leave notes for nurse to call back patients. Try to finish charting.	Enjoy Home activities
7:00 - 8:00 pm	Arrive late for dinner, charts not done	Enjoy Home activities
8:00 - 10:00 pm	Finish charting, test review, billing documents, e-mails, etc.	Enjoy Home activities

Specialty physicians interacting with a primary care PCMH should expect and support the PCMH requiring timely responses to consult requests and reports, including if the patient did not keep a scheduled appointment. The PCMH physician will expect dialogue about further testing and treatment plans. Most follow-up will be conducted by the PCMH and return visits to the consultant should be only for those matters which cannot be accomplished at the PCMH. Information about the patient should be relayed in a manner that is easily incorporated into the EMR.

Finance and PCMH

The financial benefits associated with providing a PCMH concerns practicing physicians. Because of differing definitions, differing implementation, and other factors, there are few reliable studies about practice costs. To date, physician requests for return on investment numbers have been met with the response, if you have seen one PCMH you have seen one. Nevertheless, it seems clear that PCMH practices will fare well under the recently passed Medicare Reform Law and CHIP Reauthorization Act of 2015 (MACRA). Advanced payment models (APM) promulgated by MACRA provide substantial payment advantages to PCMH qualified practices, including potentially lower costs the due to waiver of Merit- based Incentive Payment Plan (MIPS) compliance and associated costs. Larger physician-led organizations participating in risk-sharing models have seen substantial revenue, such as Group Health in Washington have seen shared savings of $10.30/month/patient.[13] Current MGMA statistics indicate a decrease in staff associated with PCMH models, a surprising statistic that bears further evaluation and time. (Personal access via http://data.mgma.com/DataDive/) It may well be that costs lower over time dues to a lessened reliance on face-face care (reduced need for staff) and on improved quality of care (reduced burden of uncontrolled illness) as has been demonstrated in international models.

To support widespread adoption of the PCMH model, most policy writers advocate for continuation of some face-to-face visit based fees, per-member-per-month payment for empaneled patients, payment for meeting quality measures, and periodic, at least annual, shared savings distributed to the PCMH practices. Many insurers are offering incentives for physicians to engage in PCMH implementation. For examples, in Kansas City, Blue Cross and Blue Shield offers enhanced payments to practices recognized as a PCMH using the criteria of NCQA. For practices involved in Accountable Care Organizations, the ability to provide value and reduced cost it critical to the success for the ACO and generally translates into additional revenue to the physicians in the PCMH practice.

Regulations continue to be written for Medicare APM, but PCMH practices will be favorably treated under the law. Other APM models outside of the PCMH have less certainty about their impact.

Summary

The PCMH model offers value to patients and payers and satisfying practice to physicians. Developing a PCMH practice requires physicians to exercise delegation and leadership skills, work in a team-based environment, and support population management beyond patients being seen at the practice facility. A well managed and supported PCMH can improve quality of care, lower costs of care, and provide primary care physicians with joy in their practices. While payment models are under development, well-managed PCMH practices will be in a better financial position than most other practices.

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Disclosure

None reported. **MM**

To Supplement or Not

by Margaret E. Gibson, MD, Jon Schultz, MD & Drew Glover, MD

Sports supplements should be used to augment not replace any food in the diet. Just because something is "natural" does not mean it is safe. Supplements often lack purity. What you see on the label is not always what you get in the bottle.





Margaret E Gibson, MD, CAQSM, (left), MSMA member since 2010, Jon Schultz, MD, CAQSM, (right), MSMA member since 2014, and Drew Glover, MD, CAQSM, are all Assistant Professors at University of Missouri - Kansas City, Department of Community and Family Medicine and Truman Medical Center-Lakewood.
Contact: Margaret.Gibson@tmcmed.org

Introduction

Patients often come to the physician's office seeking advice about whether or not to use supplements to augment athletic performance. Certain ergogenic aids such as anabolic steroids and human growth hormone have been shown to improve athletic performance but have significant associated morbidity and possible mortality.[1] These substance are illegal to use for performance enhancement and therefore it is easy to recommend against usage. However, there remains a large amount of controversy and confusion about the use of other easily available, legal dietary supplements.

Supplementation

Sports supplementation is any dietary manipulation in an attempt to enhance athletic performance. The use of dietary manipulation dates back to Greek Olympians who ate large amounts of meat, dried figs, mushrooms, and strychnine to try to improve performance.[2] Starting in the 1900s dietary manipulation and sports supplementation grew. Today sports supplementation is big business. In 2013, the global sports nutrition market was worth almost 22 million dollars and the general supplement market reached into the billions.[3]

Elite athletes are not the only ones using supplements to edge out the competition. Students in high school and even younger are looking to supplements to gain any possible advantage. In 2012, a study of 2800 students, average age of 14 years, revealed that 35% had used a supplement.[4] Nationally, that equates to over 9 million adolescents. Statistics for college athletes using supplements is even higher. A 2004 study of Division I athletes showed 37% used creatine, 61% used calorie replacements and 73% consumed energy drinks.[5] Supplement use continues and may even increase as the population ages. A survey of masters athletes revealed 60% used nutritional supplementation at the World Masters Athletics Indoor Championships in 2004.[6] Education for the medical provider regarding supplements is critical. It is not always clear which sports supplements may help augment athletic performance and what side effects need to be monitored.

A 16-year-old high school soccer player comes into the office with his mom and she is concerned about her child's diet. She states, "My child doesn't eat well. Will taking a dietary supplement help his performance?"

Everyone needs a balanced diet and this is even more important for athletes. No supplement will correct for a poor diet. Supplements are meant to provide nutrients they are not complete food sources. Athletes with poor nutritional habits will not reach full potential. Adequate nutrients are important for tissue

growth and repair which is required for athletes to have full recovery between practices and competitions.[7] Athletic activity requires high metabolic rates for extended periods of time and adequate nutrients are required to keep athletes performing at the highest level. It is also important to remember that dietary habits are learned at a young age and carried into adulthood. Talking to young patients about diet and especially focusing on how poor nutrition will negatively affect athletic performance can be a powerful motivator for young athletes.



Logos to look for on products having undergone additional testing include United States Pharmacopeia (USP), National Sanitation Foundation (NSF International), and Natural Products Association (NPA).

Everyone would like to find a magic pill that would improve athletic performance with no side effects or unfair advantages, but there is no known food or supplement will allow an average athlete to become an elite athlete. If certain elements are missing from the diet. A multi-vitamin may be recommended, however vitamins in a product should not exceed 500% of the Daily Value (DV) and minerals should not exceed 100% of the DV.[8]

A 25-year-old body builder who competes in local and statewide competitions comes in with a bottle he picked up at the local drug store. He tells you, "I got this supplement at the store and it lists the ingredients, so I know exactly what I am taking."

The regulation of nutritional supplements in the United States changed in 1994 when Congress passed the Dietary Supplement Health and Education Act (DSHEA).[9] It defined dietary supplements as food and not drugs, therefore the Food and Drug Administration does not need to approve any product before it is produced or sold. Manufacturers are required to analyze the identity, purity, and strength of the supplement, but they are not required to demonstrate safety or efficacy. Common impurities found in supplements include pharmaceuticals, heavy metals, microbiological contamination and pesticides. Contamination with banned substances can also occur. The International Olympic Committee (IOC) Medical Commission analyzed 634 nutritional supplements from 215 suppliers and 18.8% of the supplements purchased in the United States contained non-labeled prohormone substances (precursors to anabolic steroids) at varying levels that could lead to a positive drug test.[10]

In an attempted to improve quality in 2007, the FDA passed a rule on Good Manufacturing Practices for dietary supplements.[11] The goal was to ensure that products were made in a consistent, quality manner and were accurately labeled and free from impurities. However, the rule is hard to enforce and impurities are still found. Some manufacturers use third-party inspection to show they have passed independent quality testing. Logos to look for on products having undergone additional testing include United States Pharmacopeia (USP), National Sanitation Foundation (NSF International), and Natural Products Association (NPA).

A 32-year-old business professional who is an avid cyclist is seeing you for his annual physical. Overall he feels that he is pretty healthy. He wants to raise his cycling to the next level and wants to know in addition to training what could help improve his times.

It is important to be able to talk to patients about supplements that have known ergogenic or performance enhancing effects. Some of the most commonly used legal supplements that performed as claimed are creatine, caffeine, sports drinks, gels, bars, and protein supplements.[12]

Creatine is likely the most widely use ergogenic aid to build muscle and enhance recovery. Oral

creatine supplementation works by increasing the available phosphocreatine body stores and causing muscle cell hypertrophy.[13] Supplementation is more effective for high intensity sports with repeated short bursts of activity, such as sprinting and weight-lifting.[14] Benefit has not been shown in longer duration activity such as running and swimming. Commonly used doses include loading with 5 grams four times per day then taking 2 grams daily for three months.[15] Drinking enough water, 6-8 glasses per day, is extremely important when taking additional creatine.



Sports drinks, gels, and bars are frequently used during athletic endeavors to help enhance performance.

Creatine supplementation is generally considered safe in healthy adults. Thirty percent of people who take creatine will not respond at all with the supplement due to already maximized phosphocreatine stores.[16] Contamination of the product with other supplements is frequently seen. The most common adverse effects are weight gain, gastrointestinal discomfort, and muscle cramps.[17] There have been case reports of renal function compromise and permanent kidney damage.[18] The daily requirement of creatine is 2 grams. A good way for individuals to maximize the benefits of creatine is to get higher dosages in real foods, rather than supplements. For example, creatine content in is 1.1 grams in 8 ounces of pork, 1 gram in 8 ounces of salmon or beef, and 0.7 grams in 8 ounces of cod.[8]

Caffeine is the most widely used stimulant in the world. Caffeine is quickly absorbed and peak levels are reached 1-2 hours after consumption. Caffeine has been shown to increase aerobic endurance and possible increase strength, improve reaction time, and delay fatigue.[19] It works as a central nervous system stimulant and leads to decreased perception of effort. In the laboratory setting in high level adult athletes who took 3-9 mg/kg of caffeine prior to exercise increased performance during prolonged endurance exercise and short-term intense exercise lasting five minutes.[20]

Caffeine is a legal supplement, but the NCAA and IOC prohibit urinary concentrations above 15ug/mL and 12ug/mL, respectively. When used in moderation adverse effects are low, but include anxiety, feeling jittery, increased hear rate, gastrointestinal distress, and insomnia.[19] It is not recommended to use caffeine in combination with other stimulants. Caffeine is commonly used by young athletes as a way to help athletic performance and is often thought to be a possible gateway ergogenic supplement.

Sports drinks, gels, and bars are frequently used during athletic endeavors to help enhance performance. They tend to be easier to transport and digest than other food options. Sports drinks should contain carbohydrates and glucose. The glucose can help to stimulate sodium and water absorption in the intestines. Usage is recommended in activities lasting greater than one hour. They can help to replace electrolytes and nutrients lost through sweating. Sports bars often are high in carbohydrates and contain less protein. Sports gels, chews, and beans frequently include carbohydrates, glucose, and possibly caffeine.

These supplements are not meant to be meal replacements and sports drinks should not be consumed in place of water or milk at meals. Obesity is a growing problem especially among young children and these drinks can be a source of unnecessary calories. Unless performing high level sports for prolonged periods of time, sports drinks are not required for fluid replacement, because water is sufficient. In addition, studies have shown increases in dental erosion in adolescents consuming these drinks.[21]

Energy drinks may be easily confused with sports drinks. Energy drinks contain extremely high levels of caffeine and other stimulants and consumption can lead to dependence and addiction. In addition, energy drinks may or may not have the required amount of carbohydrates recommended for athletes. The American Academy of Pediatrics does not recommend use in anyone less than 18-years-old.[22]

Protein supplements and amino acid supplements may help athletes gain lean body mass. However, they are no more or less effective than food when energy intake is sufficient.[12] Strength and endurance athletes need 1.2-1.7 grams of protein per kilogram of body weight or 0.5-0.8 grams per pound of body weight.[23] Pre-exercise protein intake can increase the resting energy expenditure

for 48 hours after the activity, increase lean muscle mass, and reduce fat mass. Post-exercise protein and carbohydrate intake within one hour of activity does lead to skeletal muscle hypertrophy. Low fat milk is a good recovery drink for athletes. Whey protein is frequently used due to rapid absorption and high concentration of amino acids. Any athlete using protein powders or amino acid supplements needs to be aware of the risk of unlisted ingredients and contamination.



Studies have shown that creatine supplementation can help increase strength gains during the first six months of training in older individuals.

A 19-year-old female comes in complaining of fatigue. She runs for stress relief and likes to compete in local races. She runs 5-6 miles most days of the week, does strength training and practices yoga regularly. She doesn't complain of any pain. She reports eating a well-balanced diet, and is at a healthy, stable weight. Her menses are regular every 30 days and not particularly heavy. She tells you that her running magazine states iron and ferritin levels can be important for runners. She wants to know if she should be taking an iron supplement.

In addition to checking a CBC, TSH, and BMP, there may be benefit to checking a ferritin level. Anemia and iron deficiency without anemia are common in endurance athletes. Ferritin is the main storage form of iron. Some studies have shown that treating low ferritin levels can help performance in athletes with deficiency.[24] There is no evidence supporting iron supplementation in athletes with normal iron and ferritin levels. Iron overload is also a possible complication if an athlete over supplements and therefore before starting iron labs should be checked. Low ferritin levels can be adequately supplemented with ferrous sulfate or ferrous gluconate. This is an area that would benefit from further research.

You are asked to speak to student athletes at the local high school about sport supplement use. You are not sure that it is worth your time. High school athletes probably do not use supplements: they won't remember anything you tell them, and it will not change their minds if they plan to use a supplement.

Although supplements have been used for years to improve performance there has been increasing pressure on young athletes to perform at high levels, causing some athletes to look for possible advantages through supplements. In a study of 1,103 athletes 10 to 18 years old, 5.6% admitted to taking creatine and 44% of the twelfth grade athletes reported use.[25] Increasing costs of a college education push athletes to work for harder for scholarships and young athletes are modeling themselves on the behaviors of professional athletes who are advertising and endorsing growing numbers of supplements.

Speaking to groups of students athletes may not seem a like a good way to change behavior, but there have been some good studies showing benefits. A growing number of adolescents play sports. For the twenty-fifth year in a row, the number of high school students participating in sports grew with 7.8 million high school students participating in organized school sports in the 2013-2014 academic year.[26] When looking at drug use by athletes two categories have changed behavior rules changes, including drug tests and education. Drug tests are now mandated by some school districts in anyone participating in extra-curricular activities, sports, and band.[27] Education also makes a difference. A study of 3,000 high school football players examined different education formats.[28] The experimental group had interactive classroom sessions and exercise training sessions, while the control group was given a brochure. The experimental group was more knowledgeable about steroid and drug effects, less likely

to believe supplement ads, more able to reject drugs from peers, and at the end of season and on year later lower steroid and supplement use.

A patient, who is a retired lawyer, sees you heading into the gym. He just finished his swimming workout and wants to know your thoughts about taking a supplement to help increase his muscle mass in addition to weight training.

It is important to stress the need for adequate food intake, even with older patients. The American College of Sports Medicine guidelines for pre-and post-activity fluid and carbohydrate replacement should be followed by all active individuals.[12] Additionally, studies have shown that creatine supplementation can help increase strength gains during the first six months of training in older individuals.[23]

Conclusion

Sports supplements should be used to augment not replace any food in the diet. Just because something is "natural" does not mean it is safe. Supplements often lack purity. What you see on the label is not always what you get in the bottle. It is important to remember that sports supplements are big business for many corporations and can cost the consumer a lot of money with little benefit; however, there are some supplements that may be beneficial for your active patients.

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Disclosure

None reported.

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Emergency Medicine Interest Group Procedural Simulation Conference: An Experience for Multiple Learner Levels

by Megan Litzau, MD, Emily Hillman, MD, Stefanie Ellison, MD & Angellar Manguvo, PhD

With the demands of performing procedures with accuracy under challenging conditions, it is important to hone skills and practice them on a regular basis.



Megan Litzau, MD, (above) University of Missouri- Kansas City School of Medicine Class of 2015, now a Resident at Indiana University Department of Emergency Medicine. Emily Hillman, MD, MSMA member since 2014, Assistant Professor Emergency Medicine, Assistant Program Director & Clerkship Director Emergency Medicine, Medical Director Clinical Training Facility, University of Missouri-Kansas City School of Medicine. Stefanie Ellison, MD, Associate Professor Emergency Medicine, and Associate Dean of Curriculum, University of Missouri-Kansas City School of Medicine. Angellar Manguvo, PhD, Instructional Design Specialist & Assistant Professor, Department of Medical Education Support Services, University of Missouri-Kansas City School of Medicine.
Contact: MLL7c9@mail.umkc.edu

Abstract

Prior research has identified knowledge gaps between the verbalization of procedures and performance in simulations. Against this background, we designed a procedural simulation conference to enhance our students' procedural skills development using instruction and deliberate practice. The conference had six procedure stations, each focusing on specific learning objectives. Sixty medical students and 20 instructors from University of Missouri-Kansas City's Emergency Medicine Interest Group participated. A majority rated the conference as helpful in enhancing students' procedural skills.

Background and Purpose

Emergency Medicine (EM) requires the ability to perform a range of procedures in a stressful environment.[1] With the demands of performing procedures with accuracy under challenging conditions, it is important to hone skills and practice them on a regular basis.[2] Additionally, public demand for improved patient safety means that providers must be competent in procedures prior to performing them on actual patients.[3] The use of simulation in the training of medical students, EM residents, and faculty has shown to be a useful educational tool. Prior research has, however, identified a knowledge gap between the ability to verbalize steps in procedures and actual performance in simulations.[4] As other researchers have previously attested, interactive simulation workshops alone or with other interventions are likely to improve performance on procedures as compared to didactic lectures alone.[5] It is against this background that we designed a one-day procedural simulation conference to enhance our medical students' procedural skills using simulation-based, deliberate hands-on practice, and structured feedback. The ultimate goal was to provide a model on which students could develop real-life skills before entering residency.

The procedural simulation conference was hosted at the University of Missouri-Kansas City (UMKC) medical school's simulation center. UMKC is one of the few medical schools in the United States that offers a six-year combined baccalaureate/medical degree (BA/MD) program. Sixty medical students from our Emergency Medicine Interest Group (EMIG) participated in the conference. The students were divided into six groups based on their curriculum year, ranging from first-year

students who were still taking undergraduate coursework to fifth-year students who were in the process of completing their core clinical medical rotations.

Curricular Design

The conference had six procedure stations: Airway Management, Lumbar Puncture, Ultrasound, Emergency Medical Services (EMS), Suturing/Peripheral Access, and Trauma Surveys. The stations were selected to be representative of the range of common procedural skills utilized in EM. Each of the six stations had specific learning objectives tailored to the level of the learners. Students were provided with binders with station reference information and areas for note-taking. Each station had three instructors with varying levels of training; an EM faculty member, EM resident, as well as a senior year 6 medical student entering into EM residency. In addition, an advanced practice nurse (NP) and paramedics served as instructors for the Suturing/Peripheral Access and EMS stations respectively; this provided students the opportunity to experience an interprofessional team-based approach mirroring care provided in the emergency department.

All instructors were provided with skills binders at their stations with specific learning objectives and checklists specific to each group of students. Given that students of the same education level were grouped together, the binders assisted faculty in curtailing their instruction to the level of the learners. Additional tasks for the instructors included introducing students to the interprofessional approach of EM care and providing an opportunity for medical students to explore EM as a possible career choice. Students spent 60 minutes at each station and, overall, the conference was seven hours long. Given that this was our first procedural conference, we found it crucial to solicit participants' perceptions of the effectiveness of the conference particularly on enhancing the procedural skills development in order to improve our future implementation processes.

At the conclusion of the conference and following approval by the UMKC Institutional Review Board, we surveyed both student and instructor participants on their conference experiences. Using a five point Likert-scaled response format (Strongly Disagree to Strongly Agree), the student survey solicited their ratings of the extent to which each of the six stations had equipped them with the necessary procedural skills appropriate to their level of medical education. Other items in the survey asked students' overall feelings about the helpfulness of the conference in relation to other competencies, for example, interprofessional participation. The instructors' survey



Dr. Ellison instructing the lumbar puncture station.
Photo credit, Bob Steckmest, UMKC School of Medicine Photographer

asked the extent to which they felt they had provided sufficient group and individual feedback to students at their respective stations as well as their overall feeling about the effectiveness of the conference as a whole. We also collected qualitative data through open-ended items where participants were asked in the survey to share experiences about and perceptions of the conference. A paper version of the survey was distributed at the conclusion of the conference and participation in the survey was voluntary for both students and instructors. Fifty-two students out of 60 completed the survey for a response rate of 87%. The distribution of the students was as follows: Year 1=13; Year 2=11; Year 3=13; Year 4=8; and Year 5=7. Fifteen out of 20 instructors (1 paramedic, 1 NP, 3 attending, 6 resident, 3 senior students) completed the survey for a response rate of 75%. The two faculty and the student responsible for developing the curriculum and assessments did not complete the survey to avoid bias. Data were analyzed using Statistical Package for Social Scientists (SPSS) version 22. We first calculated frequency distributions and obtained

Table 1. Students Ratings of the Stations and Other Experiences about the Conference (N=52)

	Strongly Disagree (%)	*Disagree (%)*	*Neutral (%)*	*Agree (%)*	*Strongly Agree (%)*
Station equipped me with procedural skills appropriate for my level of medical education					
Ultrasound	0	0	0	27	73
Trauma Survey	0	0	2	13	85
IV/IO/Suturing	0	0	2	17	81
Lumbar Puncture	0	0	0	8	92
Airway Management	0	0	0	19	81
EMS Station	0	0	0	25	75
Other Experiences about the Conference					
Group sizes were appropriate	0	0	0	17	83
Conference fostered interprofessionalism	0	0	0	15	85
Conference fostered EMS collaboration	0	0	2	23	75
Conference fostered advisor opportunity	0	0	0	21	79
Conference was a good experience	0	0	0	12	88
Conference should be repeated	0	0	0	10	90

Notes: IV/IO/Suturing=Suturing/Peripheral Access; EMS =Emergency Medical Services

Table 2. Faculty Ratings of their Experience about the Conference

	Strongly Disagree (%)	*Disagree (%)*	*Neutral (%)*	*Agree (%)*	*Strongly Agree (%)*
Appropriateness of group sizes	0	0	7	33	60
Provided sufficient and indi. feedback	0	0	0	40	60
Adjusted material to learner's level	0	0	0	20	80
Conference reinforce own skills	0	0	0	20	80
Recognition of mentoring role	0	0	0	7	93
Conference was a good experience	0	0	0	0	100
Conference should be repeated	0	0	0	0	100

data are presented as means and percentages. We then used Analyses of Variance (ANOVA) to determine if students' ratings of the various aspects of the conference would differ as a function of year of study as well as if instructor's responses would differ as a function of type of instructor.

Effectiveness of Conference

The main goal of our survey was to solicit students' evaluations of the usefulness of the conference on enhancing their procedural skills development for their level of medical education. To that effect, a majority of students strongly agreed that all the five stations had equipped them with the necessary procedural skills appropriate for their level of medical education. Specifically, 73% and 75% of the student participants strongly agreed that the Ultrasound and the Emergency Medical Services stations effectively equipped them with the necessary procedural skills for their level of medical education. On that same note, 81% of the student participants strongly agreed that both the Airway and the Suturing/Peripheral Access stations effectively equipped them with the necessary procedural skills. The Trauma Survey and Lumbar Puncture were most positively rated with 85% and 92% of the student participants respectively strongly agreeing that the stations effectively equipped them with the necessary procedural skills for their level of medical education (See Table 1). Students' positive ratings of the effectiveness of the stations in equipping them with the necessary procedural skills was not surprising given that all the instructor participants either agreed or strongly agreed that they were able to follow the set learning objectives and adjust the material to the educational level of the learners. Additionally, 93% of the instructors either agreed or strongly agreed that they were able to provide sufficient individualized or group feedback to the students (See Table 2). Both student and instructors' responses, therefore, confirm the intended benefits of the procedural conference in relation to enhancing students' procedural skills development.

Student and instructors' responses also confirmed other intended additional benefits of the conference. For example, 85% of the student participants strongly agreed that the procedural conference reinforced the interprofessional and team-based approach to EM. Additionally, 80% of instructors strongly agreed that, by serving as an instructor, the procedural conference had reinforced their own procedural skills. Given the positive ratings of various sub-components of the conference, it was not surprising that, 85% of students and 93% of the instructors strongly agreed the conference was a good experience whereas almost all participants were of the view that the conference should be repeated. On a different note, 79% of the student participants strongly agreed that the conference was a platform to get connected with potential advisors. In concurrence with student views, 80% of instructors also strongly recognized their role as potential advisors and role models to medical students interested in EM as a career choice (See Tables 1 and 2).

The general positive ratings of the overall effectiveness of the procedural conference were well corroborated by open-ended qualitative responses. For example, one student participant remarked that the conference "covered material that was not covered elsewhere in the curriculum."

Both student and instructor participants, through open-ended qualitative responses, also provided valuable information on aspects that they perceived as having worked very well at the stations. For example, one participant noted that the use of the GlideScope allowed instructors to demonstrate airway views and techniques to the large group of students prior to having the students attempt airway management on their own. At the same time, participants also provided valuable suggestions that may help improve our next implementation of a conference of this nature. For example, both students and instructors noted that the Suturing/Peripheral Access station needed more time to complete the planned learning objectives as compared to other stations. While a majority of students (83%) strongly agreed that the conference configurations were appropriate (i.e. group size and arrangement, station organization, and timing), only 67% percent of instructors shared the same view. Through open-ended responses, some instructors provided valuable qualitative feedback especially pertaining to group sizes, which is quite helpful in guiding our implementation of our next procedural conference.

Although our sample sizes for both student and instructor participants were small for any meaningful inferential statistics, we wanted to determine if students' ratings of each station would be significantly different as a function of their year of study. Results showed that Year 4s ($\bar{X}=4.38$) rated Suturing/Peripheral Access significantly lower ($p<0.05$) as compared to other groups of student participants ($\bar{X}$ ranging from 4.73-5.00). We could not propose a plausible explanation to account for this difference in ratings of this station. No further significant differences were noted on other various aspects of the survey items. We also wanted to determine if faculty ratings/evaluations of the various aspects of the conference would be significantly different as a function of the position of the instructor (EM faculty, EM resident, EMS instructor, NP, and senior medical student) and our results did not show any significant differences ($p>0.05$).

Conclusions

Procedural competence is necessary to ensure safe patient care. This is especially important for emergency department and critical care procedures, which are frequently performed under challenging conditions. This procedural conference provided students an opportunity to practice skills in a safe environment that promoted learner-specific objectives, active learning and constructive feedback. Instructors reinforced their own skills through teaching and also recognized their roles as potential mentors. Such a conference can be replicated in other medical schools as a way to advance the procedural skills of students, expose students to the interprofessional nature of EM, and facilitate EM faculty and resident involvement in the medical school. As a result of the success of this conference and the constructive feedback we have received, our institution is planning to continue this experience for students. Considerations for future conferences will include expansion of the interprofessional component, learning objective refinement, and revisions of station configuration to ensure adequate time to complete the learning objectives.

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Disclosure

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Children's Mercy HOSPITALS & CLINICS
www.childrensmercy.org

Food Allergy Care: "It Takes a Team"

by Chitra Dinakar, MD & Barbara Warady, RD

Primary care providers are the first-line resource for individuals with food allergic disorders.

Abstract

In 2011, the Division of Allergy/Immunology at Children's Mercy published a themed mini-series[1] including an article on food allergies that recommended allergen avoidance and prevention/ treatment of anaphylaxis as the key pillars of management.[2] Since then, the escalating food allergy "epidemic" has stimulated diagnostic and therapeutic advances, as well as coordinated multidisciplinary approaches to treat nutritional imbalances and psychosocial issues. We aim to highlight the team approach to food allergy care in this article.

Introduction

Food allergies have dramatically increased in prevalence, with some hailing it "the new epidemic." Recent studies suggest a near 50% increase in the prevalence since 2007.[3] It is estimated that about 15 million individuals in the U.S., including ethnic populations[4], have food allergies. Review of patient encounter data at Children's Mercy Allergy/ Immunology (A/I) clinics over the past five years mirror the upward trend with one in six patients presenting for evaluation of food allergies. While speculations abound regarding the reasons for this spike, the "hygiene hypothesis" is currently the most favored explanation. Muted exposure to microorganisms in an environment that emphasizes germ-free cleanliness prompts the cytokine milieu to tilt towards a predominantly allergic phenotype. This concept can be encapsulated as "The 5 Ds": dry skin, diet, dogs, dribble (shared microbial exposure), and vitamin D.[5]

Diagnosis of Food Allergies

The top eight allergens that trigger 90% of food allergic reactions are milk, egg, soy, wheat, fish, shellfish, peanut and tree nuts.[6] With the enhancement of the repertoire of the western diet, a wide variety of food allergens ranging from fresh fruits and vegetables causing mild oropharyngeal symptoms (i.e., Oral Allergy Syndrome), to seeds such as sesame causing severe allergic reactions, are increasingly implicated. Oral Allergy Syndrome, also known as Pollen-Food Syndrome, is caused by cross-reacting allergens found in both pollen and foods such as raw fruits, vegetables, and some tree nuts. The immune system recognizes the cross-reacting epitopes in the pollen/food and directs an allergic response to it. Interestingly, the same fruits or vegetables can be ingested in cooked form because the heat-labile proteins get distorted during the heating process, rendering them unrecognizable by the immune system. The typical cross-reacting pollens are birch, ragweed, or grass allergens.

The diagnosis of food allergies pivots around a meticulous medical history looking for the presence of immediate onset of consistent




Chitra Dinakar, MD, (left), MSMA member since 2002, and Missouri Medicine Editorial Board Member, is Professor of Pediatrics, University of Missouri-Kansas City and Director, FARE Center of Excellence at Children's Mercy, Division of Allergy/Immunology, Children's Mercy Kansas City. Barbara Warady, MS, RD, LD, (right), is Senior Clinical Nutrition Specialist in Nutrition Services, Children's Mercy Kansas City.
Contact: cdinakar@cmh.edu

Table 1
Values that may help in Diagnosis of Food Allergy[7]

Age Group	Food	Specific IgE Levels Associated with 95% Risk of Reaction Serum IgE (kU/L)	Component Testing
Child	Egg	≥ 7	
<2 years	Egg	≥ 2	Absent or trace Ovomucoid Can tolerate baked egg
Child	Cow Milk	≥ 15	
<2 years	Cow Milk	≥ 5	Absent or trace Casein Can tolerate baked milk
Child	Peanut	≥ 14	Ara h2 >2 Predictive of systemic reactions
Child	Fish	≥ 20	Elevated Ara h8 and ara h9 (predictive of cross-reactive minor symptoms)

and reproducible symptoms with ingestion of trace-small amounts of a particular food.[6] Improvement of the symptoms with elimination of the food, and recurrence with reintroduction are also helpful historical features. If the history is suspicious of an IgE mediated reaction, percutaneous (prick) skin testing or blood testing for specific IgE (ImmunoCAP) to the food allergen, may be considered as the next step in the diagnostic evaluation. In particular, the tests are near-confirmatory when negative since they have a 95% negative predictive value.[7] In other words, if the history is unclear or not suggestive of an allergic reaction (e.g., gassiness/fussiness on drinking milk-based formula) and the skin/blood test to milk is negative, IgE mediated allergy to milk can be ruled out with a 95% certainty. Unfortunately, the high false positive rate of 50% causes a large number of individuals to be incorrectly labeled as having food allergies.[8] Use of 95% positive predictive cut off values may help differentiate sensitization (presence of positive IgE alone) from true food allergy (associated clinical symptoms).

Fortunately, recent advances in testing methods, such as the emergence of Component Testing, are enabling delineation of cross-reactivity to shared proteins (such as described in the Oral Allergy Syndrome), from allergic sensitization to the anaphylactic components, though this is still a work in progress. For instance, component testing to peanut enables identification of individuals who may have a severe reaction to peanut ingestion (those with elevated ara h2 greater than 2 kUA/L), versus those who may have mild oropharyngeal symptoms secondary to cross-reactivity with plant proteins/pollens (elevated ara h8 or ara h9).[9] Similarly, the absence or low level of specific IgE to ovomucoid, helps predict the likelihood of an individual with egg allergy tolerating baked egg products.[10] With the same rationale, the absence or low levels of specific IgE to casein helps delineate patients who may tolerate baked milk products.[10] (See Table 1). This knowledge not only facilitates safe introduction of baked egg and baked milk products into the child's diet, but also has prognostic value in delineating sub-groups of patients who may outgrow these allergies. Research into component analysis for soy, wheat, and other food allergens is ongoing, and promises to open up clinical management options for individuals with these allergies in the future.

Oral Food Challenges

Since a combination of history, blood/skin test, elimination/reintroduction of the food is only able to correctly confirm or rule out the presence of food allergies in up to 50-60% of patients, the Oral Food Challenge (OFC) remains the gold standard for confirming a food allergy.[6] This is a process where the suspected food is ingested by the patient using a graded protocol, while being closely monitored by a trained specialist in a setting appropriately equipped to handle anaphylaxis. This can be performed in a double-blind placebo controlled manner) or, more commonly, as an "open challenge" where the suspected food is introduced in a preparation that is normally consumed (e.g., peanut butter, scrambled eggs).[11] At Children's Mercy, we prefer the latter approach since the family will then be comfortable using the same preparation/recipe at home. If there are issues with texture or special needs (e.g. G tube feeds) or the family needs help, then our on-site Chef helps to create a customized recipe/dish. We have been performing OFCs at our Food Allergy Center for over 19 years and have not had any significant adverse safety outcomes to date.

Proximity Food Challenges

Food allergies cause significant impairment in the quality of life for affected individuals and their families, with many of them worried about accidental contact with the trigger allergen. Published literature is conflicting,

with some earlier reports suggesting a heightened risk of reaction on contact or inhalation of food allergens (e.g., peanuts) in public places such as airplanes and baseball games.[12] Contrary to those reports, some recent studies[13,14] including those from our center[15,16] suggest that the risk of a severe reaction is largely related to ingestion or contact of the allergen with mucus membranes, and not with casual contact on intact skin. Therefore, in order to address the concerns regarding the possibility of airborne and contact food sensitivity in individual patients, we developed the Proximity Food Challenge test at our center. This test helps them understand what to expect with similar exposure in a real world environment in the future.

The Proximity Food Challenge procedure is conducted in an office setting equipped to handle anaphylaxis. After obtaining verbal consent, the provider opens a jar containing the suspect allergen, often peanut (since it is the most feared) in the room. While conversing, the peanut butter jar is then brought increasingly closer to the child. If there is no reaction, a dab is applied on the patient's arm, and the patient monitored. Five minutes later, the food allergen is washed off with soap and water. After an initial period of anxiety, we typically notice visible calming and relief. In situations where there is heightened anxiety secondary to the perception of occurrence of a previous reaction, an attempt to mimic the scenario may be undertaken in a double-blind, placebo controlled fashion. In our experience, the Proximity Food Challenge has helped alleviate fears of the families and enabled the child to integrate in the social network at school and in the community.

Treatment of Food Allergies

The staple treatment of food allergies over the past decade has been strict avoidance of the triggering allergen.[6] Patients and families are educated on how to read labels and are provided written food/anaphylaxis plans and epinephrine autoinjector delivery device demonstration using the "teach-back method." Since some food allergies are outgrown (e.g., milk, egg, soy, wheat), periodic evaluation of the serum IgE to check for decline suggestive of onset of tolerance, followed by diagnostic oral food challenges when levels fall to predictive cut-off values, is standard of care. In instances where the food allergy is thought to be life-long (e.g., peanut, fish), the patients are advised to continue to avoid the food as the only recourse available to them. To assist with the challenges of keeping up with the ever-changing dietary products available in the market, patients and families are referred to resources such as "Food Allergy Education and Research" (FARE) for credible and updated information (www.foodallergy.org).

Newer Options for Treatment of Food Allergies

Recent emergence of promising options to patients with unremitting food allergies are generating excitement and hope. Research using techniques geared towards inducing tolerance such as oral immunotherapy, sublingual immunotherapy and epicutaneous immunotherapy (e.g. topical peanut patch application) have shown promise[17] and may be commercially available to patients and families with food allergic disorders in the future.

Food Allergy Center of Excellence/ Clinical Trial Network Member

The Children's Mercy Food Allergy Center was recently recognized as a Food Allergy Center of Excellence and a member of the Food Allergy Clinical Network by FARE.[18] The Clinical Network will strive to accelerate the development of new therapeutics and best practices for patients with food allergies.

The Children's Mercy Food Allergy Center of Excellence (CM_FACE) offers comprehensive clinical care and cutting edge opportunities to participate in clinical and translational research for individuals with food allergic disorders. The four key pillars and the additional unique strengths of CM_FACE are depicted in Figure 1.

1. Multi-Disciplinary Clinical Care: A one-stop shop care for patients with complex food allergic disorders focused on providing outcomes-based quality care. Currently, the Comprehensive Food Allergy and Nutrition Clinic and the Eosinophilic Esophagitis Clinics include providers from the specialties of Allergy/Immunology, Nutrition and Gastroenterology.
2. Research: Therapy-oriented, outcomes-based clinical research with participation in local, national and international multi-centered clinical trials and establishment of a registry and bio-repository bank (including genetic material).
3. Education: Education of patients and families, providers, and the community on avoidance of food allergic triggers and selection of appropriate foods resulting in a well-balanced and nutritious diet.
4. Advocacy/Service: Active support of community initiatives (such as FARE, Allergy and Asthma Network, etc.) that champion the needs of patients and families with food allergic disorders.

Figure 1



Nutritional Imbalance and Multidisciplinary Team Approach

Children with multiple food allergies have been reported to have significantly decreased nutritional intake and growth and elevated systemic and gut inflammatory biomarkers, compared to children without food allergy.[19, 20] It is therefore imperative to recognize these issues upfront and to provide resources for education, counseling and intervention. CM_FACE offers multi-disciplinary "Comprehensive Food Allergy and Nutrition Clinics" held both at the Missouri and Kansas locations. Each clinic is typically staffed by a board certified allergist, an advanced nurse practitioner trained in food allergy, and a registered dietitian. The role of the dietitian is to provide nutrition assessment, intervention, education, and follow-up services. The nutrition assessment includes anthropometric, biochemical, clinical and dietary analysis. Anthropometric measurements to monitor growth and development, and laboratory data pertinent to the assessment of nutritional status, such as Vitamin D insufficiency and anemia, are obtained. Clinical evaluation includes obtaining details of the food allergy, food related behavioral issues, and medication history along with the use of vitmans/minerals and nutrient/ alternative supplements. Dietary assessment includes obtaining either a 24-hour or a three-day dietary record, as applicable. The feeding environment, cultural and ethnic practices that may impact dietary intake, feeding times, and food availability are assessed. Comprehensive nutrition education is provided including presentation of the CM_FACE food allergy folder containing age appropriate nutrition information, instructions on reading food labels, methods to avoid cross contamination, food safety, working with schools, and alternative food choices to prevent nutrient deficiencies that may occur secondary to food-restrictive diets (See Table 2). Innovations include collaboration with the Children's Mercy Chef to create recipes for oral food challenges as well as assisting families with allergen-free home cooking.

Timing of Introduction of High-Risk Allergenic Foods into the Infant Diet

With the increasing awareness of food allergies, providers are faced with questions from anxious families regarding the optimal timing of introduction of high-risk allergenic foods and its impact on the possible prevention of food allergies. In 2000, the American Academy of Pediatrics (AAP) made the recommendation to strictly avoid introduction of high risk foods such as peanuts until the age of two to three years. In 2008, the AAP rescinded the recommendations based on evidence based review of studies that failed to demonstrate that delayed introduction of highly allergenic foods prevented the onset of food allergies. In 2015, based on the findings of the Learning Early about Peanut Allergy (LEAP study), the AAP went one step further and recommended introduction of these foods between 4-11 months of age.[21] In 2016, the National Institute of Inflammatory and Allergic Diseases (NIAID) proposed addenda to the 2010 NIAID Food Allergy Guidelines that are currently under public review, and are elaborated on below.[22]

The LEAP study enrolled 640 "high risk" U.K. infants at high risk for peanut allergy, a priori defined as those who had egg allergy, severe eczema, or both.[23] The children, ranging from 4 to 11 months old, were split into two groups: a "consumption group" that was regularly fed peanut, and an "avoidance group" that ate no peanut protein. At age 5, the children were subjected to an Oral Food Challenge to peanut protein to determine their allergy status. Overall, feeding peanut to high-risk infants

Table 2

Local and National Food Allergy Resources

www.childrensmercy.org/Allergy
-> Clinical Services -> Evaluation of food allergies
Children's Mercy Allergy is an academic group of physicians and nurse practitioners who are dedicated to clinically caring for children with food allergies and advancing research in the field of food allergy. We are a FARE Center of Excellence/Clinical Trial Network member. We have dedicated Food Allergy and Nutrition Clinics at Children's Mercy Broadway Clinics and at Children's Mercy Kansas that occur monthly with a registered dietician. We also conduct research studies in food allergies. Contact studynurseallergy@cmh.edu or call 816-960-8904.

Food Allergy Research & Education
www.foodallergy.org
Food Allergy Research & Education (FARE) is a 501(c)(3) nonprofit organization and the leading national organization working on behalf of the 15 million Americans with food allergies.

Centerview Food Allergy
www.centerviewfoodallergymanagement.com
Centerview is a local non-profit in Kansas City that works to educate the community about food allergies. Centerview has 5 local support groups located throughout Kansas City to provide education and support to families dealing with food allergies. The web-site has handy links to local resources.

Food Allergy Equality Initiative
www.foodequalityinitiative.org
Food Equality Initiative, Inc. (FEI) is a recognized non-profit, public benefit corporation established in 2014 by Emily Brown and Amy Goode, two food allergy moms, to support the low-income food allergy and Celiac communities by providing safe, healthy gluten free and allergy friendly food, nutrition education and advocacy.

reduced the likelihood of developing peanut allergy in both groups of these infants by 70-80 percent.

The follow-up LEAP-ON study evaluated 550 of the original LEAP study participants to determine whether regular ongoing consumption of the peanut protein was essential to maintain the state of tolerance.[24] The subjects in both groups were told to actively avoid peanut protein for 12 months. At the end of the year, they underwent an oral food challenge to peanut. The rate of peanut allergy was still significantly higher in the "avoidance" group (18.6 percent) compared to the "consumption" group (4.8 percent), providing reassurance that despite the lack of peanut protein in their diet, the rate of peanut allergy remained 74 percent lower in the consumption group than the avoidance group.

Based on data in the above studies, the NIAD is proposing the following recommendations that are currently under public review.[22]

NIAID Addendum Guideline 1-3 Recommendations

The NIAID Expert Panel (EP) recommends that infants with severe eczema and/or egg allergy be introduced to age-appropriate peanut-containing food as early as four to six months to reduce the risk of peanut allergy, following successful introduction of other solid food that demonstrates developmental readiness. They recommend that evaluation with peanut-specific IgE or skin prick testing be strongly considered before introduction of peanut in these high-risk infants, in order to determine whether peanut should be introduced, and if so, the preferred method of introduction. The document outlines an algorithmic management approach to facilitate the decision making process.

For infants with mild-moderate eczema, egg allergy or both, the EP recommends that dietary peanut be introduced at home without an in-office evaluation. If an in-office evaluation is desired, the decision points discussed above should apply. For infants without eczema or any food allergy, the EP recommends that age-appropriate peanut-containing foods be freely introduced in the diet, along with other solid foods, and in accordance with family preferences and cultural practices.

Introduction of Other High Risk Allergenic Solid Foods

Does introducing other allergenic foods, specifically cooked egg, cow's milk, sesame, whitefish, or wheat, also protect against the development of allergy? In the Enquiring about Tolerance (EAT) study, 1,303 exclusively breastfed infants were randomized them into two groups.[25] The "Standard introduction" group was exclusively breastfed until age six months, and then allowed to consume allergenic foods according to the parents' discretion. The "Early-introduction" group was fed 2 grams of allergen protein twice weekly from three months of age. The prevalence of food allergy in the participants was assessed at one and three years of age. Overall, the trial did not demonstrate efficacy of early introduction of multiple allergenic foods.

Conclusion

The prevalence and impact of food allergies is considerable. Primary care providers are the first-line resource for individuals with food allergic disorders. Ongoing collaboration between primary care providers and A/I specialists is essential to ensure affected individuals lead productive and healthy lives.

Take-Home Messages

- Food Allergies continue to increase in the U.S.
- The clinical history is key to making an accurate food allergy diagnosis.
- Oral food challenges are the gold standard to help confirm or rule out the presence of IgE mediated allergies.

- Food diary, elimination/re-introduction of suspected foods, and evaluation via percutaneous skin/mmunoCap testing for evidence of significant IgE mediated sensitization have supplementary roles in diagnosis.
- The "pitfalls" of food allergy diagnosis are an over-reliance on easily obtainable blood test panels, and under-reliance on corroboration with history and food challenges, that result in incorrect labels creating anxious "food allergic" families.
- Avoidance, education, and preparation for emergencies continue as the pillars of current management.
- Coordinated and collaborative co-management with allergists and trained dietitians is key to ensuring optimal nutritional intake and growth of children.
- Some individuals with milk and egg allergies can consume them in baked form; these individuals are more likely to outgrow those allergies.
- Component testing can help identify those individuals who tolerate baked milk/egg products, as well as facilitate determination of those who may have the more severe forms of peanut allergy.
- Periodic re-challenges to monitor tolerance as indicated by history, food allergen, and serum IgE is a part of ongoing follow-up.
- Delaying introduction of highly allergenic solid foods in infants is not supported by recent evidence.
- There is increasing evidence that even infants at moderately higher risk of developing food allergies may be able to gain tolerance by consuming peanut products between four to eleven months of age.
- Emerging therapeutic research options that may help individuals attain tolerance to some allergenic foods (such as peanut, milk and egg), may be commercially available in the near future.
- The Food Allergy and Research Education (FARE) designated Children's Mercy Food Allergy Center of Excellence offers state-of-the art food allergy care, including comprehensive, personalized food allergy and nutrition clinics, and opportunities to participate in potentially ground-breaking food allergy studies.

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Perioperative Evaluation and Optimization of Patients at Risk of Cardiac Complications for Non-Cardiac Surgery

by BobbieJean Sweitzer, MD

Anesthesiologists need to be aware of cardiac conditions that predispose patients to perioperative risk, and interventions to lower that risk.



BobbieJean Sweitzer, MD, FACP, is Professor of Anesthesiology, Director Preoperative Medicine at Northwestern University in Chicago. This paper is based on a presentation from the 2015 MSMA Annual Convention.
Contact: bobbie.sweitzer@nm.org

Abstract

Major adverse cardiac events (MACE) are some of the most common complications occurring in the perioperative period. Even though traditionally more focus has been on the patient with ischemic disease other cardiac conditions pose a greater risk. The risk is related to both patient-specific and surgical factors. Patients with significant cardiac disease undergoing vascular or major surgery may have up to a 10% risk of major morbidity and mortality. Identifying modifiable risks and intervening pre-, intra- and postoperatively can improve outcomes.

Heart Failure

Heart failure (HF) increases perioperative mortality three- to fivefold and is associated with a substantially higher risk than coronary artery disease (CAD) with a 30-day mortality rate 9.3% versus 2.9% risk with ischemic disease.[2] HF may be present in up to 20% of elderly surgical patients. HF is also an independent predictor for ischemic heart disease and perioperative myocardial infarction risk.[2] Patients with HF are twofold more likely to require readmission compared to those with CAD. HF is a strong predictor of pulmonary complications, and at least as important as a diagnosis of chronic obstructive pulmonary disease (COPD) in predicting perioperative respiratory adverse events.[3] Many studies have shown that HF is among the most significant risk factors for perioperative complications. Patients with compensated HF have a 5 to 7% risk of cardiac complications; those with decompensated HF have a 20 to 30% incidence. Patients with active HF symptoms such as orthopnea, paroxysmal nocturnal dyspnea, or findings on examination such as rales, jugular venous distention, peripheral edema, or pulmonary edema on chest radiography have a very high risk of perioperative complications. Optimization of HF is important before proceeding with elective procedures. Waiting until B-type natriuretic peptide (BNP) levels have returned to baseline may assist with timing of procedures after a HF exacerbation.

Determination of ejection fraction (EF) with echocardiography can assist with intra- and postoperative care. Systolic HF with EF less than 30% is predictive of the highest risk followed by systolic HF with EF greater than 30%, then patients with diastolic HF who are higher risk than patients with normal EF. Elevated preoperative levels of C-reactive protein (CRP) and BNP are independent and strong predictors of serious postoperative cardiovascular events in patients having non-cardiac surgery.[4] A normal BNP predicts a low risk of perioperative MACE. Ischemic disease is the most common cause of systolic HF, and hypertension is the most common cause of diastolic dysfunction. Much less information is known about the

perioperative consequences of diastolic dysfunction compared to systolic dysfunction.

Valvular Disease

Aortic stenosis (AS) is the most common valvular lesion in the U.S. (2%-4% of adults older than 65 years); severe AS is associated with a high risk for perioperative complications. Aortic sclerosis, present in 25% of people 65-74 years old and 50% of those older than 84 years, causes a systolic ejection murmur similar to that of AS, but does not compromise hemodynamics. Aortic sclerosis can progress to stenosis, especially with aging or unmodified risk factors. The same risk factors that predispose to CAD are associated with development of AS. Any patient with AS should be considered at risk of ischemia due to a high likelihood of concomitant CAD, and even in the absence of CAD due to left ventricular hypertrophy secondary to the increased resistance from a stenotic valve.

Echocardiography is beneficial, especially if more than sedation is planned for a procedure. Patients with mild AS need echocardiography every three to five years; those with moderate stenosis benefit from evaluation every two to three years; and severe AS should be evaluated yearly with echocardiography. Patients with severe AS or mitral stenosis should not have anesthesia (unless emergency and life-saving) without a cardiology evaluation. It is reasonable to proceed with elective procedures in patients with severe AS if they are asymptomatic, and appropriate resources are available intra- and postoperatively. Additional hemodynamic monitoring may be necessary to avoid hypotension and tachycardia which can decrease coronary perfusion and cardiac output with untoward development of arrhythmias, ischemia, HF, or death. If patients meet independent criteria for valve replacement but are considered too high risk consideration should be given to balloon valvuloplasty, or transcatheter aortic valve replacement (TAVR).

Severe mitral stenosis poses significant risk. Patients with symptoms such as syncope, dyspnea, or HF associated with mitral stenosis should not undergo elective procedures. Patients with regurgitant lesions tolerate anesthesia and surgery if volume status is managed appropriately.

Infective endocarditis prophylaxis

Antibiotic prophylaxis to prevent endocarditis has never been evaluated with a randomized controlled trial. Over the last several decades the recommendations by the American College of Cardiology/American Heart Association (ACC/AHA) have drastically reduced the numbers of patients for whom prophylaxis is recommended. Adverse effects from antibiotics exceed the benefit from prophylactic therapy for most patients for whom past recommendations applied. It is felt that only an extremely small number of endocarditis resulting from bacteria can be prevented by taking antibiotics. Infective endocarditis is more likely to result from daily activities than from bacteremia caused by dental procedures, or those involving the gastrointestinal (GI) or genitourinary (GU) tracts. It is likely that educating patients to maintain optimal oral hygiene is most important.

Antibiotic prophylaxis to prevent infective endocarditis (IE) is only recommended for patients having dental procedures with manipulation of gingival tissue or the periapical region of teeth, or perforation of the oral mucosa. Prophylaxis is no longer indicated for procedures that involve the respiratory tract unless the procedure involves incision of the mucosa, such as tonsillectomy or adenoidectomy. Prophylaxis is no longer recommended for patients undergoing GI or GU procedures. Patients with enterococci should receive antibiotics to eradicate the bacteria from the urine before elective cystoscopy or other urinary tract manipulation if the presence of cardiac disease warrants prophylaxis. Only patients with the following cardiac conditions need IE prophylaxis: prosthetic valves, previous endocarditis, unrepaired cyanotic congenital heart disease (CHD), for 6 months after repair of CHD with prosthetic material or device, repaired CHD with residual defects at the site of prosthetic material, or transplanted hearts with valvular regurgitation.[5]

Ischemic Disease

Patients with risk factors for CAD experience cardiovascular (CV) complications after non-cardiac surgery. CAD varies from mild, stable disease with little impact on perioperative outcome to severe disease accounting for serious complications during anesthesia. The basis of cardiac assessment is the history and the physical examination. Review of records and previous studies, especially stress tests and catheterization results, is necessary. Although commonly ordered, routine preoperative electrocardiograms (ECG) rarely add value to the care of surgical patients, particularly if ordered for advanced age.[2] Recommendations for age-based testing were derived from the frequent incidence of abnormalities found on ECGs of elderly patients. Several studies have shown that clinical risk factors predict perioperative MACE better than ECG abnormalities. The ACC/AHA guidelines do not include ECG findings in the algorithm for evaluation of ischemic risk. A preoperative ECG should be ordered only to evaluate for rhythm disturbances or an acute coronary event. It is equally misguided to order a preoperative ECG to establish a baseline for comparison to postoperative ECG for the detection of ischemia or myocardial infarction (MI). Troponins levels detect far more events (40%) than ECG (6%) postoperatively.[2] Troponin elevation predicted death at 1 year, but ECG changes

Figure 1

Evaluation of Patients at Risk for Ischemic Complications for Noncardiac Surgery

**RCRI = Revised Cardiac Risk Index (see Table 1) or use risk calculator available at: surgicalriskcalculator.com/miorcardiacarrest.com*

***MET= metabolic equivalents. 4 METs is the ability to walk 2-4 blocks or climb 1-2 flights of stairs.*

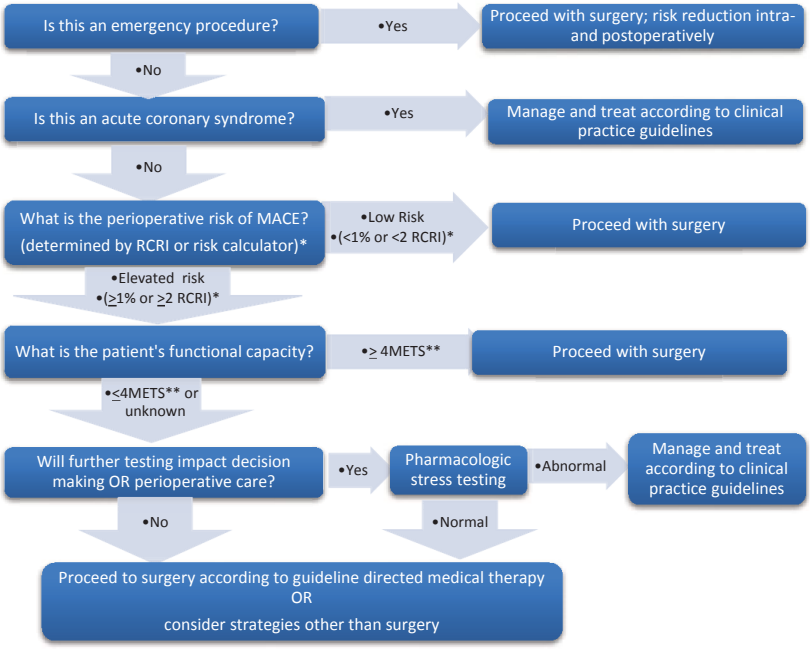


Table 1

Revised Cardiac Risk Index (RCRI)

- Ischemic heart disease
- Heart failure
- Cerebrovascular disease
- Diabetes mellitus, requiring insulin
- Creatinine > 2.0 mg/dL
- High risk surgery (e.g., intraabdominal, intrathoracic, major vascular, or procedures associated with significant blood loss or fluid shifts)

did not. The ACC/AHA guidelines state "The current use of ECGs may have developed as a method to screen for MI when little else was routinely available."

The ACC/AHA guidelines for CV evaluation for non-cardiac surgery have decreased recommendations for testing or revascularization.[2] The guidelines have an algorithm to be followed in stepwise fashion, stopping at the first point that applies to the patient (See Figure 1). For emergency surgery, the focus is perioperative surveillance (e.g., troponins, hemodynamic monitoring) and risk reduction (e.g., beta blockers, statins, aggressive pain management). Active cardiac conditions (acute MI, unstable or severe angina, decompensated HF, severe valvular disease, or significant arrhythmias) warrant postponement for all except life-saving emergency procedures. Step 3, is the most complicated and requires calculation of the risk of a MACE. Using either a risk calculator (http://www.riskcalculator.facs.org or surgicalriskcalculator.com/miorcardiacarrest.com) or the Revised Cardiac Risk Index (RCRI) to define MACE rates determines the next steps. (See Table 1.) If the calculated MACE rate is 1% or less no further cardiac testing is recommended. The two risk calculators provide this number or if using the RCRI a patient with 0-1 RCRI predictors. The RCRI is calculated by assigning one point each for each of the following: a history of CAD, compensated HF, cerebrovascular disease, diabetes requiring insulin, a creatinine level $\geq$2 mg/dL, type of surgery (intrathoracic, intra-abdominal, or suprainguinal vascular surgery). For calculated risk greater than 1% or more than 2 RCRI predictors, Step 4 assesses functional capacity, defined by metabolic equivalents. Asymptomatic patients with average functional capacity (able to climb 2 flights of stairs without symptoms) can proceed to surgery. Step 5 considers patients with poor or indeterminate functional capacity, and a calculated risk of greater than 1%, or 2 or more RCRI predictors. However, additional testing is considered only if results will alter management.[2, 6] The most benefit is derived from optimal medical interventions which can be instituted based on calculated risk usually without stress testing. The only utility of stress testing is determining patients with severe CAD with a large amount of myocardium at risk. These patients are typically those with 3 or more RCRI predictors who are symptomatic with exertion. Large areas of wall motion abnormalities on dobutamine stress echocardiography and poor exercise capacity on cardiopulmonary exercise testing (CPET) predict elevated risk.[1, 6] Excess testing is associated with harm, especially for asymptomatic patients with no RCRI predictors.[2,6]

Traditional risk factors for CAD such as smoking, hypertension (HTN), age, male gender, hypercholesterolemia, and family history do not predict perioperative risk. Surgical risk is no longer considered separately with the exception of the guidelines noting that cataract and plastic surgery are very low risk, and one can assume that patients having these procedures need no further testing. Therefore, the algorithm does not apply.[2] The risk of a postoperative MI is increased if

surgery is performed soon after an acute MI. The ACC/AHA guidelines recommend delaying surgery for at least 60 days post-infarction. Additionally, an MI within 6 months of surgery increases the risk of a perioperative stroke with an 8-fold increase in mortality.[2]

The benefits and risks of coronary revascularization before non-cardiac surgery are controversial. The only randomized prospective study of preoperative revascularization vs. medical management failed to show an outcome difference. Revascularization is not recommended simply to lower the risk of surgery. There should be long term benefits of revascularization independent of the planned noncardiac procedure. Percutaneous coronary intervention (PCI) before noncardiac surgery is indicated only for acute coronary syndromes, or for left main (LM) disease in patients who are too high risk for coronary artery bypass grafting. PCI has not been shown to lower the perioperative risk in patients with stable CAD (other than LM disease in non-operative patients).

For patients who have non-cardiac surgery soon after revascularization, rates of morbidity and mortality are high. Patients who have had a PCI, especially with a drug-eluting stent (DES) require months, if not a lifetime of anti-platelets to prevent restenosis or thrombosis. The type of stent, DES or bare metal (BMS), must be identified. A scientific advisory offers recommendations for managing patients with coronary stents.[2] Elective procedures that require stopping dual antiplatelet therapy are delayed during the high-risk period (12 months for DES; 4-6 weeks for BMS; 2 weeks after angioplasty without stenting). Invasive procedures increase the risk of stent thrombosis with mortality rates more than 45%. Stent thrombosis is best treated with PCI, which can be safely performed postoperatively. High-risk patients should only have procedures in facilities with immediate access to interventional cardiology.[2] Premature discontinuation of dual antiplatelet therapy can cause catastrophic stent thrombosis, MI, or death.

If aspirin is continued, there is a low risk of bleeding complications during most procedures.[7] A meta-analysis involving almost 50,000 patients undergoing a variety of noncardiac surgeries (30% taking aspirin perioperatively) found that aspirin increased bleeding complications by a factor of 1.5, but not the severity of complications, except in patients undergoing intracranial surgery and possibly transurethral resection of the prostate.[7] When surgeons were blinded to aspirin administration they could not identify patients taking or not taking aspirin based on bleeding. There is an increased risk of vascular events when aspirin is stopped in patients who take it regularly. A rebound hypercoagulable state may result. Acute coronary syndromes occur 8.5 ± 3.6 days and acute cerebral events 14.3 ± 11.3 days after aspirin cessation, the typical duration of cessation before surgery. Events are twice as common in patients who discontinued aspirin in the previous 3 weeks compared to those who have not. Discontinuing aspirin for 3-4 days should be sufficient, if aspirin is stopped at all. Dosing is resumed as soon as possible. New platelets, formed after aspirin is discontinued, will not be affected. Normally functioning platelets of at least 50,000/mm^3 are adequate to control surgical bleeding. It is recommended to discontinue aspirin only if taken for primary prevention (no history of stents, strokes, MI, vascular disease) except for neurosurgical procedures. If taken for secondary prevention (history of vascular disease), continuing aspirin is recommended except for procedures with a risk of bleeding in closed spaces (e.g., intracranial or intraspinal procedures).

Non-aspirin nonsteroidal anti-inflammatory drugs (NSAIDs) are associated with increased vascular events. Recently the Federal Drug Agency (FDA) placed a warning on over-the-counter NSAIDs highlighting this risk. NSAIDS can block the therapeutic antiplatelet effects of aspirin if ingested before aspirin. Caution is warranted in using NSAIDs in the perioperative period in patients at risk of ischemia, especially if aspirin is discontinued.

Statins and beta-blockers started ahead of the day of surgery lower risk.[2,8] Beta-blockers should not be started the day of surgery merely to lower the risk of ischemic events. Titration of beta-blockers is necessary to avoid hypotension. Hypotension and anemia in conjunction with beta-blockers increase the risk of strokes and death. However, careful and appropriate use of beta-blockers in patients at risk of perioperative ischemia prevents MACE.[8] Bisoprolol may be preferred over other beta-blockers.[9] Statins have anti-inflammatory and plaque-stabilizing properties. All patients with atherosclerosis benefit from statins, regardless of cholesterol levels. Continuing statins perioperatively reduces risk, and withdrawal can result in more adverse events. Statins should be started before high risk procedures in patients with elevated risk of MACE. Angiotension receptor blockers (ARB) and angiotension converting enzyme inhibitors (ACEI) are commonly used to treat HF and hypertension. Continuation of these drugs is associated with hypotension during anesthesia. This has led many to advocate holding these medications before surgery. However, there is reasonable evidence from nonsurgical settings that discontinuing ACE inhibitors is associated with worse outcomes.

The ACC/AHA guidelines give a class IIa recommendation to continuing these drugs in the perioperative period. Failure to resume ACEI and ARBs within 48 hours of procedures is associated with a 50% increase in mortality.[10]

Elevated troponin levels in the first 3 days after surgery are associated with 30-day mortality.[11] There is evidence that patients who have silent ischemia postoperatively have higher mortality rates than those with overt myocardial infarction. Perhaps this result can be attributed to interventions such

as aggressive medial management to reduce complications, which suggests that there may be opportunities to impact outcome. European guidelines recommend troponin screening postoperatively in higher risk patients (i.e., those with 1 or more RCRI predictors having intermediate-low risk surgeries).[12]

Cardiac Implantable Electronic Devices (CIEDs)

Pacemakers and implantable cardioverter-defibrillators (ICDs) can be affected by electromagnetic interference.[13] Consultation with the manufacturer or cardiologist may be needed. Patients usually have a card with important designations and phone numbers. Patients with ICDs invariably have HF, ischemic or valvular disease, cardiomyopathies, or potentially lethal arrhythmias. Special features such as rate adaptive mechanisms in some pacemakers need to be disabled, or the device reprogrammed to asynchronous pacing to prevent interference. Some monitors, ventilators, vibrations, or chest prepping fool the sensors into increasing pacing, leading to ischemia or inappropriate treatment.

Shock functions are disabled before procedures if interference or unexpected movement is undesirable. During intracranial, spinal, or ocular procedures, an unexpected discharge with movement can be catastrophic. Central line placement can trigger cardioversion. ICDs are deactivated only after a patient's arrival to a facility that has monitoring and external defibrillation devices. Many devices are complex and reliance on a magnet to disable them, except in emergencies, is not recommended. Some devices ignore magnet placement. A magnet typically suspends anti-shock therapies in ICDs only while it is in place. Magnets do not affect the pacing function of an ICD. If a patient is pacemaker-dependent with a combination ICD the pacemaker must be reprogrammed if interference is anticipated. Magnets put pacemakers in a fixed rate mode to prevent interference. Some manufacturers' magnet rates may be too fast for many patients during surgery, and consideration should be to have pacemakers reprogrammed to an appropriate rate. For procedures below the umbilicus interference is very unlikely. If a pacemaker or ICD is reprogrammed the device must be re-interrogated and re-enabled before the patient leaves a monitored setting.[13]

Atrial Fibrillation

Patients with atrial fibrillation (AF) are twice as likely to die within 30 days of surgery as patients with CAD.[2] AF is associated with age, hyperthyroidism and valvular disease. Patients with rapid ventricular rates require rate control before elective surgery. Patients with new onset AF should have echocardiography and thyroid function testing.

Summary

Cardiac disease is common in the surgical population. A large population of patients is at risk of MACE. The history and physical examination provide valuable information. Using risk predictors can identify patients who will benefit from optimization primarily with medical management preoperatively. High risk patients need specialized care intra- and postoperatively. Patients with heart failure, arrhythmias and valvular disease are at far greater risk than those with CAD. Anesthesiologists need to be aware of cardiac conditions that predispose patients to perioperative risk, and interventions to lower that risk.

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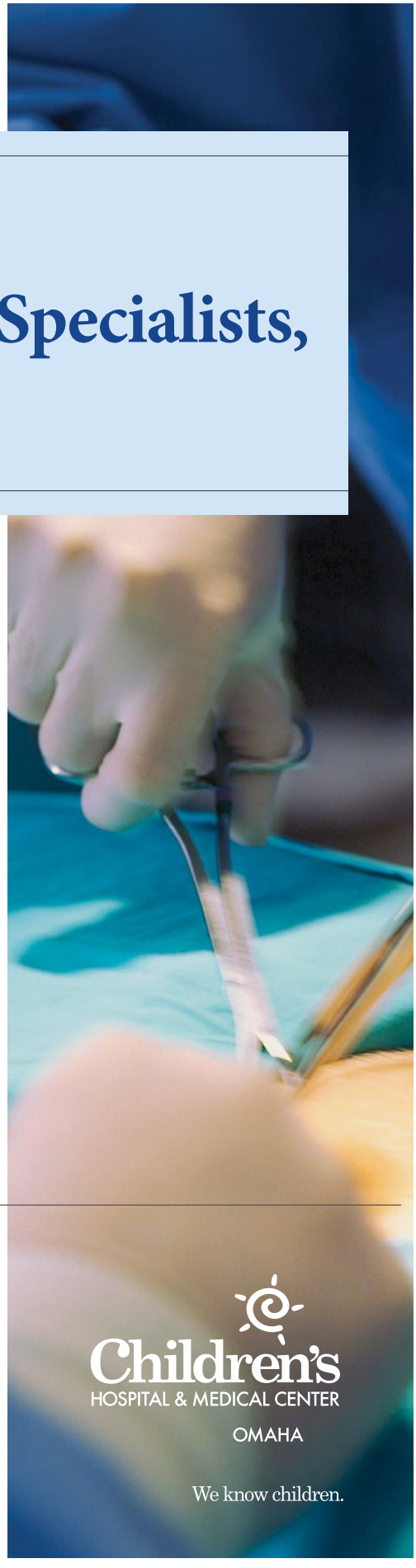
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Disclosure

None reported.

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